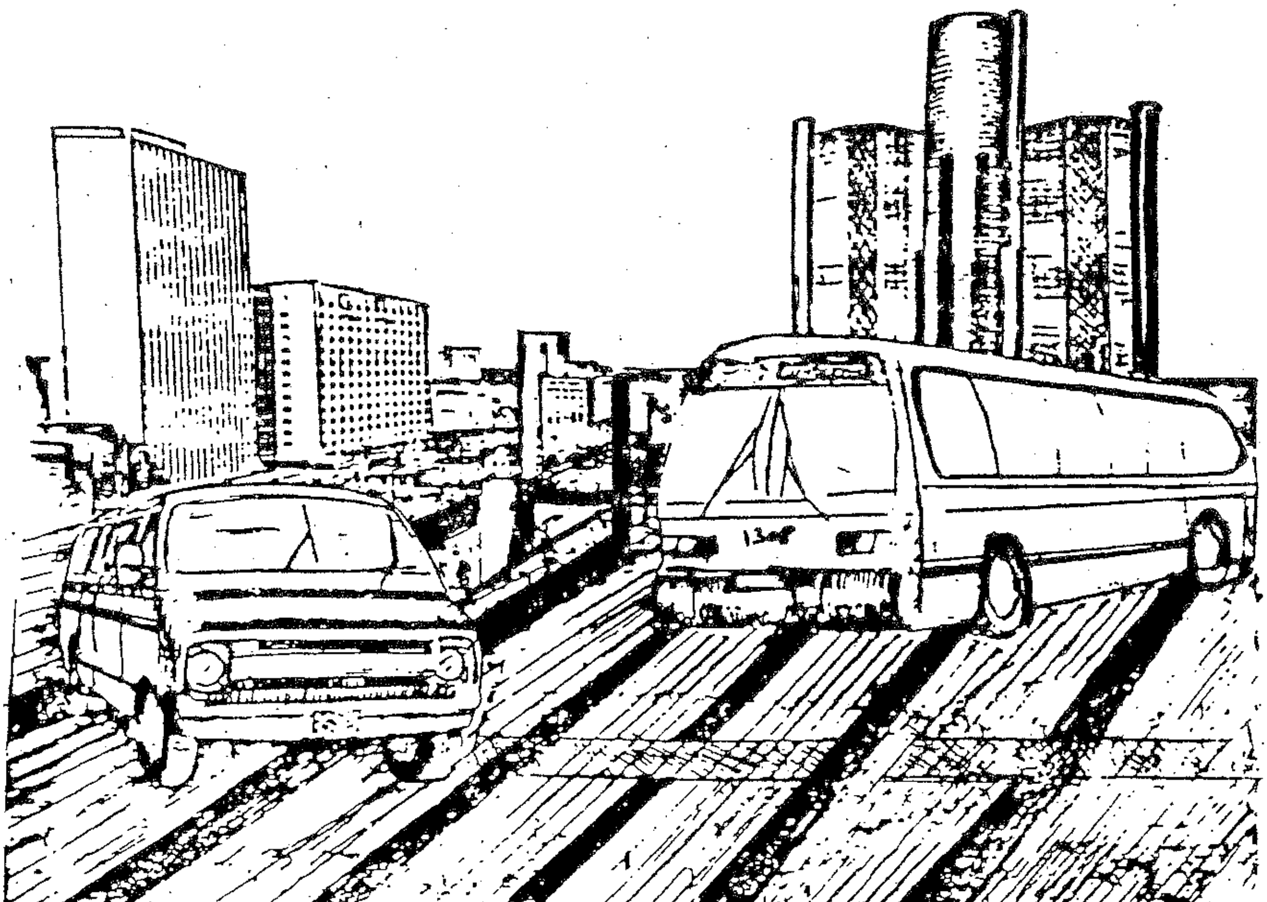
U.S. Department
of Transportation

Urban Mass
Transportation
Administration

FULLY ALLOCATED COST ANALYSIS

GUIDELINES FOR PUBLIC TRANSIT PROVIDERS



FULLY ALLOCATED COST ANALYSIS
GUIDELINES FOR PUBLIC TRANSIT PROVIDERS

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PREPARED BY

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SECOND EDITION

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I. INTRODUCTION

UMTA guidance for implementation of the Private Enterprise Policy (Federal Register, Volume 49, No. 205) stipulates that:

> "When comparing the service proposals made by public and private entities all the fully allocated costs of public and non-profit agencies should be counted."

The use of fully allocated costs to compare the service proposals made by public and private entities in accordance with this policy treats public and non-profit agencies as if they were required to recover their cost of production, like a private firm, in a competitive environment.

The purpose of this report is to describe generally accepted approaches to fully allocated costing analysis which are consistent with this policy guidance.

A. Fully Allocated Cost Analysis - A Definition

The principle underlying fully allocated costing analysis is that the total cost incurred in producing a specific product or in delivering a specific service should be attributed to that product or to that service. The fully allocated cost of a specific product or service includes both:

- The direct costs of the labor, capital and material resources used exclusively in the production of the product or the delivery of the service; and

- A portion of the shared costs of the labor, capital and material resources used in the production of the range of products or in the delivery of the range of services "produced" by an organization. The cost of any specific product or service, for example, would include a portion of the fixed facility costs and a portion of the administrative costs associated with the management of the organization.

The principles of fully allocated costing analysis are often used by public agencies to determine the appropriate sharing of fiscal responsibility for deficits. A common example is a regional transit authority which receives local subsidies from a central city and several suburban jurisdictions. The "fiscal responsibility" of each jurisdiction is often determined on the basis of the fully allocated cost of the service received by each jurisdiction including (1) the direct cost of service received by the jurisdiction and (2) a portion of the shared costs of the management, administration and underlying infrastructure supporting the service received by the jurisdiction. This approach is intended to ensure full and equitable sharing of the cost of the service delivered to each jurisdiction.

This report builds upon these principles and describes generally accepted approaches to fully allocated costing analysis. It should be noted, however, that fully allocated costing analysis requires analytical judgment and skill because there are several acceptable techniques which can be used to prepare a fully allocated cost estimate. This report, therefore, is descriptive and not prescriptive. It describes generally accepted methods and techniques that are consistent with the principles of fully allocated costing analysis. It does not, however, prescribe a specific fully allocated costing model.

B. Organization of the Report

This report is organized to serve as a reference guide for practitioners. The remainder of the report is presented in four sections:

II. Fully Allocated Cost Analysis - What to Include This section describes the types of costs that should be included in a fully allocated cost estimate.

III. Development and Application of a Fully Allocated Costing Model - The Basics This section describes the step-by-step process for developing and using a fully allocated costing model. This process is described using an example for a single mode, single facility transit system. The section also describes generally accepted methods for estimating specific items of transit cost--including methods for treating capital costs in a fully allocated costing analysis.

IV. Development and Application of a Fully Allocated Costing Model - Added Complexities This section describes how the principles outlined in Section III should be modified and adapted for more complex operating environments and more involved service proposals.

V. Principles for the Treatment of Costs that are Unique to Public and Private Sector Transit Providers. This section describes principles for comparing public and private sector transit costs taking into account the inherent differences of public and private sector transit service providers. These principles are based upon the consensus building efforts of the Competitive Services Board established by the Urban Mass Transportation Administration in cooperation with the American Public Transit Association.

The report also contains six appendices. The first appendix describes selected references bearing on fully allocated costing analysis and on generally accepted techniques for cost analysis in the transit industry. The second appendix presents a glossary of terms used in cost analysis. The third appendix describes generally accepted approaches to cost estimation for each of the principal cost elements of transit operation. The fourth appendix presents generally accepted approaches for estimating the depreciation expense associated with capital assets used in the delivery of transit service. The fifth appendix presents generally accepted approaches to treating the cost of leased capital assets in a fully allocated costing analysis. The sixth Appendix presents the complete text of the Competitive Services Board's Principles on Cost Comparison in Competitive Bidding.

II. FULLY ALLOCATED COSTS - WHAT TO INCLUDE

The purpose of this section of the report is to describe the types of costs that should be included in a fully allocated cost estimate for service proposals by public and non-profit agencies. The section first defines fully allocated cost in terms of the cost components of transit service. The section then indicates how to determine which costs should be included in a fully allocated cost estimate for a specific segment of transit service.

A. Components of a Fully Allocated Cost Estimate

The costs associated with the delivery of transit service include:

- Fixed Costs, which are constant over very large increments of service and therefore do not vary with small changes in the level of transit service. Examples of fixed costs include most administrative labor costs, facility related capital costs, and materials and supplies costs other than those costs incurred directly to support revenue service.
- Variable Costs, which normally vary with the level of transit service provided. Variable costs include driver wages and vehicle fuel costs which vary directly with the level of service.

A fully allocated costing analysis recognizes that both fixed and variable resources contribute to the delivery of any specific segment of transit service. A fully allocated cost estimate, therefore, represents a complete accounting of all the labor, capital and material resources used in the delivery of a segment of transit service.

By contrast, a marginal cost analysis recognizes only the variable costs of any specific segment of service. Marginal cost analysis understates the cost of service provision because it does not account for the fixed costs incurred by the transit operator

The fully allocated cost for a segment of transit service includes the portion of total transit system costs which are attributable to the specific segment of service. Some costs can be directly attributed to the specific segment of transit service. These costs are the variable costs of that segment of service. Other costs however, cannot be directly and exclusively attributed to the specific segment of service but instead are costs which support and are shared by the range of services provided by the transit operator. These costs are normally the fixed costs of the overall transit system. A fully allocated costing analysis takes both of these types of costs into account

A fully allocated costing analysis, therefore, requires the identification and estimation of the:

> Direct Costs of a segment of transit service - These are the costs which can be associated on a one-to-one basis with a segment of transit services. At the route or vehicle level, for example, direct costs generally consist of operator, mechanic and servicer wages, associated fringe benefits, fuel and lubricants, tires and tubes, and the depreciation costs associated with the vehicles used to operate that service, including spare vehicles.
>
> Shared Costs of a segment of transit service - These are costs which cannot be associated on a one-to-one basis with a specific segment of transit service. The shared costs relevant to a single bus route or vehicle, for example. consist at a minimum of the costs to operate the facility from which the route or vehicle is designated. Shared costs must be allocated to a specific segment of transit service in a logical manner which reflects the rate at which the cost is incurred to support the specific segment of service.

B. [illegible] [illegible] Transit Service

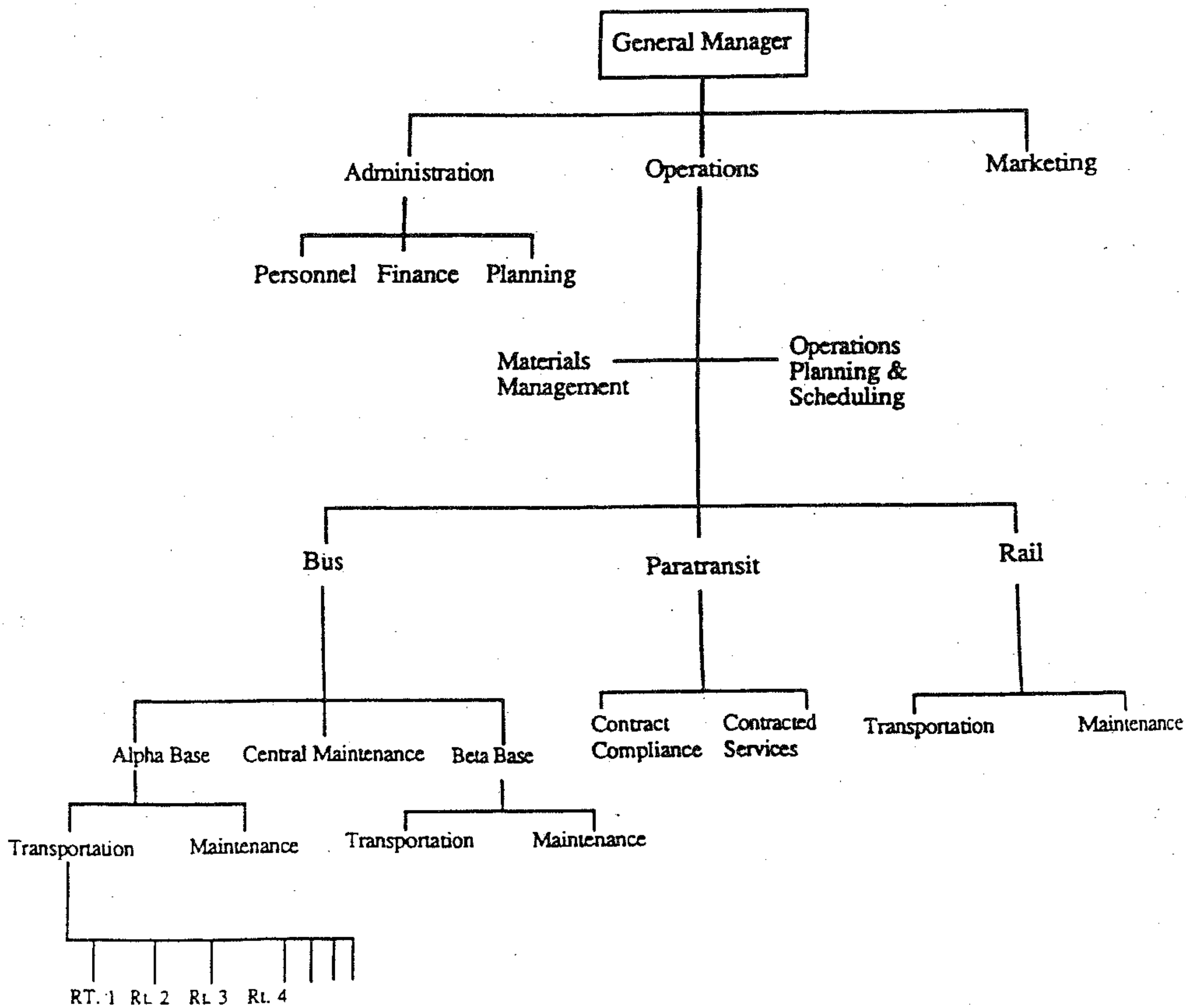
To determine the fully allocated cost of a specific segment of transit service, it is helpful to consider how that segment of service relates to the overall structure of the transit system. To illustrate this concept, Exhibit II-1 shows an organization structure for a hypothetical public transit system.

If the segment of services being considered consists of all routes operating from a specific facility (say the Alpha Base in Exhibit II-1) the fully allocated cost includes the direct costs of the facility and a portion of the shared administrative and operations costs which support all of the facilities operated by the public operator. At the operating facility level, direct costs would consist of the direct costs of all routes or vehicles operated from that facility plus the direct costs associated with the facility itself, including all supervisory and administrative labor, their fringe benefits, and related capital and material costs. Shared costs include an allocated portion of all of the functions which support the operation of that facility

As a general rule, the fully allocated cost of specific segments of service can be related to this concept of an organizational hierarchy The fully allocated cost of the service produced at any level in the organization consists of all costs at and below that level (i.e., the direct costs) plus some portion of all costs above that level (i.e., the shared costs)

There may be [illegible] the organization however, which [illegible] support the segment of [illegible] with these

HYPOTHETICAL TRANSIT ORGANIZATION STRUCTURE



unrelated functions should be excluded from the fully allocated cost analysis of the specific segment of service being considered. For example, in developing a fully allocated cost estimate for regular bus services, costs associated exclusively with the provision of paratransit service (e.g., the depreciation of paratransit vehicles) would be excluded from the fully allocated cost analysis.

In summary, a fully allocated cost analysis counts total labor, capital and materials costs, less excluded costs. The fully allocated cost of any segment of transit service consists of its direct cost plus its portion of shared costs.

III. DEVELOPMENT AND APPLICATION OF A FULLY ALLOCATED COSTING MODEL - THE BASICS

Because it is widely used, comprehensive in its accounting of both direct and shared costs, and generally applicable to most public transit systems, the three-variable unit cost model is used in this section to illustrate the development of fully allocated cost estimates. The three variable unit cost model is, however, just one of many acceptable approaches to developing a fully allocated cost estimate for a segment of service.

The development of a fully allocated cost estimate requires a complete accounting of the direct and shared costs associated with the service proposals of public and non-profit agencies. The important consideration in preparing a fully allocated cost estimate therefore is not the precise form of the estimating method but rather the logic and rationale for the method, and the completeness of the method in recognizing the total costs (both direct and shared) associated with the transit services being considered.

In this context, the first part of this section provides an example of the development of a simple three-variable fully allocated cost model for a medium-size transit operator. The remainder of the section discusses modifications to this method; these modifications are intended to provide for more accurate measurement of specific cost elements (e.g., operator labor).

A. Allocating Costs With a Three-Variable Unit Cost Model - An Example

The three-variable unit cost model is widely used within the transit industry to estimate the fully allocated cost of operating individual routes or vehicles. Some common applications of the model include performance monitoring and allocation of operating deficits among jurisdictions supporting a regional transit system. The three-variable unit cost model is also one of several appropriate methods for developing fully allocated cost estimates for the service proposals of public and non-profit agencies.

Exhibit 2 provides a step-by-step summary of the cost allocation process using a three-variable, fully allocated, unit cost model. The following example illustrates the process shown in this exhibit for a hypothetical transit system operating regular bus service from a single facility. This hypothetical system is considering contracting out ten routes comprising approximately fifty percent of its service for one year.

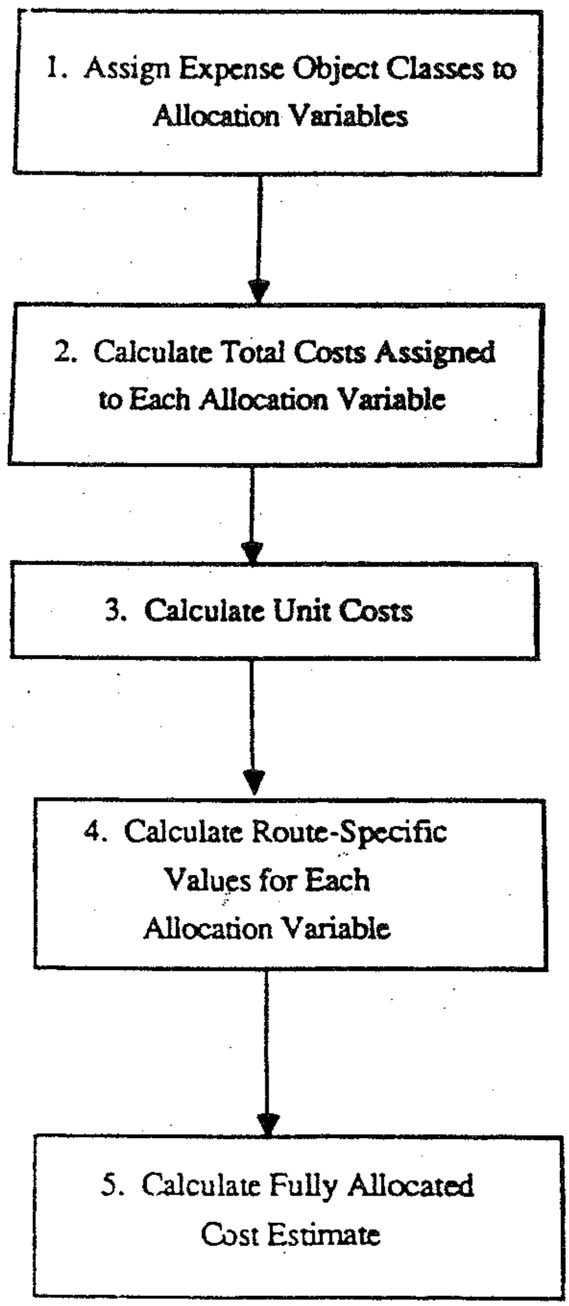
Step 1--Assign Expense Object Classes to Allocation Variables

This first step requires a logical allocation of each expense class to one or more allocation variables which are used to develop unit costs. In this example three variables are used for allocation: vehicle hours, vehicle miles, and peak vehicles. The use of alternative and additional allocation variables is discussed later in this section.

As shown in Exhibit 3, each expense class is assigned to the allocation variable with which it is most closely associated. Generally transportation-related costs (e.g., operator wages) are allocated to vehicle hours since these costs are a function of the number of vehicle hours operated. Vehicle maintenance and fuel costs are allocated to vehicle miles, since the number of miles operated reflects the exposure of vehicles to wear and the rate of fuel consumption. Administrative and capital costs

EXHIBIT 2

SUMMARY OF THE COST ALLOCATION PROCESS USING A UNIT COST MODEL



ASSIGNMENT OF EXPENSE OBJECT CLASSES TO ALLOCATION VARIABLES

EXPENSE OBJECT CLASS	VEHICLE HOURS	VEHICLE MILES	PEAK VEHICLES
LABOR			
Operator Salaries	X		
Maint Salaries		X	
Other Salaries			X
FRINGE BENEFITS			
Operator	X		
Maintenance		X	
Other			X
SERVICES			
Professional & Tech			X
Contract Maintenance		X	
Security Services			X
Other Services			X
MATERIALS & SUPPLIES			
Fuel & Lubricants		X	
Tires & Tubes		X	
Other Materials			X
UTILITIES			
Utilities			X
CASUALTY & LIABILITY			
Premiums for Damage		X	
Recoveries of Losses			X
Payouts for Uninsured			X
TAXES			
Vehicle Registration			X
Fuel & Lubricant		X	
Other Taxes			X
MISCELLANEOUS EXPENSES			
Dues & Subscriptions			X
Travel & Meetings			X
Bridges, Tunnel Tolls		X	
Advertising Media			X
Other Misc Expense			X
RECONCILING ITEMS			
Interest Expense			X
Leases & Rentals		X	
DEPRECIATION			
Vehicles			X
Other			X

are allocated to peak vehicles because they are largely a function of the size of the transit system. Any sound rationale in addition to those noted above may be applied in assigning expenses to allocation variables.

Step 2--Calculate Total Costs Assigned to Each Allocation Variable

Once expense classes are assigned to allocation variables, the costs in each expense class are summed by allocation variable. This step is illustrated in Exhibit 4. The costs used in this example are simply the costs incurred, by expense class, for the previous fiscal year. The sum of the costs allocated to each variable must equal the total costs for the system.

Included in the expense items is the depreciation cost of capital assets. In computing the depreciation cost of the direct and shared capital assets used in the delivery of transit service (e.g., fixed facilities), the following general principles apply:

(1) The total cost of an asset, regardless of the source of financial support, should be used in the cost calculation. For example, if vehicles are purchased with 75 percent federal funds and 25 percent non-federal funds, the full 100 percent cost should be used in the cost comparison.

(2) All assets used in the delivery of the service, regardless of ownership, should be included in the cost calculation. For example, if a public operator uses, without charge, the facilities of a separate government agency (e.g., a parking lot for vehicle storage) the cost of these facilities should be included in the cost calculation.

(3) The cost of capital assets should be calculated based on generally accepted accounting principles for computing the depreciation expense of direct and shared capital assets. Appendix D provides a description of

EXHIBIT 4

CALCULATION OF TOTAL COSTS ASSIGNED TO EACH ALLOCATION VARIABLE

EXPENSE OBJECT CLASS	VEHICLE HOURS	VEHICLE MILES	PEAK VEHICLES	ANNUAL TOTAL COST
LABOR				
Operator Salaries	$3,535,172			$3,535,172
Maint Salaries		$726,175		726,175
Other Salaries			$1,100,603	1,100,603
FRINGE BENEFITS				
Operator	1,526,282			1,526,282
Maintenance		352,526		352,526
Other			492,260	492,260
SERVICES				
Professional & Tech			214,002	214,002
Contract Maintenance		68,906		68,906
Security Services			39,664	39,664
Other Services			2,004	2,004
MATERIALS & SUPPLIES				
Fuel & Lubricants		1,654,021		1,654,021
Tires & Tubes		161,990		161,990
Other Materials			1,021,801	1,021,801
UTILITIES				
Utilities			114,827	114,827
CASUALTY & LIABILITY				
Premiums for Damage		293,891		293,891
Recovers of Losses			72,887	72,887
Payouts for Uninsured			1,039	1,039
TAXES				
Vehicle Registration			670	670
Fuel & Lubricant		83,700		83,700
Other Taxes			708	708
MISCELLANEOUS EXPENSES				
Dues & Subscriptions			16,024	16,024
Travel & Meetings			6,516	6,516
Bridges, Tunnel Tolls		8,292		8,292
Advertising Media			107,092	107,092
Other Misc Expense			188,337	188,337
RECONCILING ITEMS				
Interest Expense			24,492	24,492
Leases & Rentals		9,824		9,824
DEPRECIATION				
Vehicles			544,885	544,885
Other			64,396	64,396
TOTAL COSTS	$5,061,454	$3,359,325	$4,012,207	$12,432,986

generally accepted accounting methods for computing depreciation expense and includes a listing of generally accepted useful lives and salvage values for specific capital assets.

(4) If the public operator provides the capital assets (such as vehicles or facilities) for all competitors for a service contract those capital assets should not be included in the cost calculation for the public operator's service proposal.

(5) If the public operator leases capital assets, the lease cost should be treated in the cost calculation using generally accepted accounting principles consistent with the treatment of operating and capital leases in the public operator's accounting statement. Appendix E provides a description of generally accepted accounting methods for treating the lease cost of capital assets.

(6) If the public operator uses assets that have exceeded their useful lives, there is no depreciation expense included in the cost calculation for these assets. It should be noted, however, that a management decision to employ assets beyond their expected useful life is likely to have an impact on maintenance costs. This impact should to the extent practical be reflected in the maintenance expense estimates.

In this cost assignment step, it is also important to confirm that all costs supporting the delivery of the service under consideration are recognized, including costs incurred by other organizational units supporting the transit operator. For example, a local transit system functioning as a division of the local government must include in its cost assignments any resources provided to it by other units of local government, such as legal services or personnel administration.

Step 3--Calculate Unit Costs

In this step, shown in Exhibit 5, unit costs are calculated for each allocation variable. This consists of dividing the costs allocated to each allocation variable by the value of the

EXHIBIT 5

CALCULATION OF UNIT COSTS

Allocation Variable	Allocated Costs	Value of Allocation Variable	Unit Cost
Vehicle Hours (VH)	$5,061,454	421,953	$12.00
Vehicle Miles (VM)	$3,359,325	5,927,648	$0.57
Peak Vehicles (PV)	$4,012,207	125	$32,097.66

Total Cost = ($12.00 * VH) + ($0.57 * VM) + ($32,097.66 * PV) allocation variable. For example, the unit cost for vehicle hours is $5,061,454 divided by 421,953 hours, or $12.00 per vehicle hour. It is essential to the validity of the results that the value of the allocation variables is measured for the same period as the costs. For this example, the total costs are expressed on a fiscal year basis and the values of the allocation variables shown in Exhibit 5 reflect operating statistics from that same fiscal year.

Step 4--Calculate Route-Specific Values for Each Allocation Variable

In order to estimate the fully allocated costs of the service under consideration using the calculated unit costs, values for the allocation variables for that segment of service must be known or estimated. Exhibit 6 provides route-specific values for each allocation variable and the total value of each variable for the service under consideration (i.e., the sum of the values for the ten routes). These values represent service over the one year period for which the cost comparison will be made.

Step 5--Calculate Fully Allocated Costs

The fully allocated cost of the service described in Exhibit 6 can now be estimated by multiplying the value of the allocation variables for that service by the unit cost developed for each variable. As shown in Exhibit 7, the fully allocated cost of the ten routes for the period under consideration is $6,169,976.

EXHIBIT 6

CALCULATION OF ROUTE-SPECIFIC VALUES FOR EACH ALLOCATION VARIABLE

	Allocation Variables		
Route	Vehicle Hours	Vehicle Miles	Peak Vehicles
Route A	23,638	330,295	7
Route B	28,366	396,353	8
Route C	17,560	245,362	5
Route D	27,015	377,480	8
Route E	18,911	264,236	6
Route F	25,664	358,606	8
Route G	21,612	301,984	6
Route H	12,157	169,866	4
Route I	16,884	235,925	5
Route J	17,560	245,362	5
Total--All Routes	209,367	2,925,469	62

CALCULATION OF FULLY ALLOCATED COSTS

Allocation Variable	Total Value for Routes	X	Unit Cost	=	Total Costs
Vehicle Hours	209,367		$12.00		$2,512,404
Vehicle Miles	2,925,469		$0.57		$1,667,517
Peak Vehicles	62		$32,097.66		$1,990,055
			Total Costs		$6,169,976

B. Additional and Alternative Allocation Variables for Developing Unit Costs

While the three-variable unit cost model described above is commonly used, it is important to note that variables other than vehicle hours, vehicle miles and peak vehicles may also be used as bases for allocating costs. The most important concept to bear in mind in developing a fully allocated cost estimate is that the bases used for allocating costs are logical, and that the cost allocation process is complete in its consideration of all the costs supporting the transit system.

A number of generally accepted cost allocation variables are summarized in Exhibit 8. The potential rationale for using these alternative allocation variables in specific cost allocation analyses is explained below:

- Vehicle hours -- These hours measure the amount of time that a vehicle is in operation. Since this represents the minimum amount of time that bus (or rail) operators are to be paid, it is an appropriate basis for allocating operator wage and benefits cost. It is also often used to allocate supervisory and administrative labor costs attributed to the vehicle operations (or transportation) function.

- Revenue hours -- These hours are a subset of vehicle hours, and measure the amount of time that vehicles are available to board or discharge passengers (known as revenue service). Revenue hours are often substituted for vehicle hours in cost allocation. This measure is particularly useful to capture the cost of service as delivered on the street, because it excludes deadhead (i.e., non-revenue vehicle travel) and layover time.

- Vehicle miles -- These miles measure the distance travelled by revenue vehicles during and in addition to revenue service. Vehicle maintenance, fuel consumption, and use of tires and tubes correlates closely with vehicle miles, and accordingly vehicle miles is commonly used as a basis of allocation for vehicle maintenance and materials [illegible]

EXHIBIT 8

SUMMARY OF COST ALLOCATION VARIABLE OPTIONS BY OBJECT CLASS

EXPENSE OBJECT CLASSES	VEHICLE HOURS	REVENUE HOURS	VEHICLE MILES	REVENUE MILES	PEAK VEHICLES	TOTAL VEHICLES	NUMBER OF EMPLOYEES	RIDERSHIP	PERCENT OF DIRECT EXPENSES
LABOR									
Operator Salaries	X	X							
Maintenance Salaries			X	X	X				
Other Salaries					X		X	X	X
FRINGE BENEFITS									
Operators	X	X							X(a)
Maintenance			X	X					X(a)
Other					X	X	X	X	X
SERVICES					X	X			
MATERIALS & SUPPLIES									
Fuel and Lubricants			X	X					
Tires and Tubes			X	X					
Other Materials & Supplies			X	X	X	X	X	X	X
UTILITIES					X	X			X
CASUALTY AND LIABILITY					X	X	X	X	X
TAXES					X	X			X
MISCELLANEOUS EXPENSES					X	X	X	X	
RECONCILING ITEMS									
Interest Expense					X			X	X
Leases and Rentals					X	X			
DEPRECIATION									
Vehicles					X	X			
Other					X	X			

(a) percent of direct <u>wage</u> cost

- Revenue miles -- These miles measure the distance travelled by revenue vehicles while in revenue service, and thus is a subset of vehicle miles. It can be used in lieu of vehicle miles to measure the cost of service as delivered on the street, because it excludes all non-revenue mileage.

- Peak vehicles -- These are the maximum number of vehicles in service during the day. This measure is typically used as a basis for allocating shared costs, because peak vehicles can be used as a proxy for the size and complexity of a transit operator's overhead structure. Peak vehicles are also used in a more direct sense for the allocation of vehicle servicing costs (i.e., daily fueling and washing) and for the allocation of capital costs for vehicles and facilities.

- Total vehicles -- These are the total number of revenue vehicles, including spare and idle vehicles. Total vehicles can be used as a substitute for peak vehicles, and may provide a particularly appropriate substitution in cases where the spares ratio is materially and defensibly different among operating facilities or among modes.

- Number of employees -- This measure can be used as a basis for allocating expenses shared among modes, since it is measured in a uniform manner for different types of services and is also a proxy for the relative size and complexity of the overhead structure of various modes or services. It is also a useful measure for allocating particular types of costs which are closely related to the number of employees (such as payroll processing costs).

- Ridership -- This measure can be used as a basis for allocating expenses shared among modes, for the same reasons as cited above for the use of employees as a basis for allocation. It is also a meaningful measure for allocating costs which are ridership-dependent, such as pass or ticket sales and distribution.

- Percent of Direct Expenses -- This measure can be applied as a "multiplier" to direct expenses, and is a logical choice for allocating those types of expenses which are not closely related to service levels.

These options for allocating costs are found commonly within the U.S. transit industry. They are not, however, intended to represent an exhaustive list. Other variables may be more appropriate for certain circumstances. For example, route miles can be used as a basis for allocating bus stop maintenance expense. The number of park-and-ride lots is likewise a logical choice for allocating park-and-ride lot maintenance cost. Similarly, track miles and passenger stations may be appropriate bases for allocating certain types of rail system costs. In fact, any variable or measure which can be related to the services provided by a transit system, and is logically related to the rate of consumption of an expense element, is an acceptable basis for allocation of that expense to some segment of transit service.

C. Optional Methods for the Development of Fully Allocated Cost Estimates

In the cost allocation example presented above, the fully allocated costs of the service under consideration were estimated based on a three-variable unit cost model developed from historical cost data. It consists of average unit costs which are calculated based on the number of vehicle hours, vehicle miles and peak vehicles operated, with expenses allocated to each of these variables.

The model developed in the previous example does not differentiate between the direct costs and the shared costs of the service being considered. Thus, the unit costs calculated are average costs, applicable to any segment of service. To estimate a more precise cost for a specific segment of service, the identifiable direct cost can be estimated separately from the shared costs.

In particular, extensive research and development has been conducted to establish accurate techniques for estimating operator labor costs in transit. It is often especially appropriate to consider using one of these direct estimation techniques for calculating the operating labor cost of a service proposal because the direct cost of operations labor is uniquely related to the nature and extent of the services considered.

The process of developing a fully allocated cost estimate with direct costs estimated separately is shown in Exhibit 9. The steps for this process are explained below:

- Identify Direct and Shared Costs by Expense Object Class--Expense classes which represent direct cost (e.g., operator labor) are identified and separated from other costs in this step.

- Develop Unit Costs for Shared Expenses--For the remaining expenses, unit costs are developed in the same manner as for the example of a fully allocated cost model shown above.

- Estimate Total Shared Costs--Total shared costs are estimated by multiplying the unit costs by appropriate values for each allocation variable reflecting the service proposed. This step is also identical to the calculation made for the fully allocated cost model.

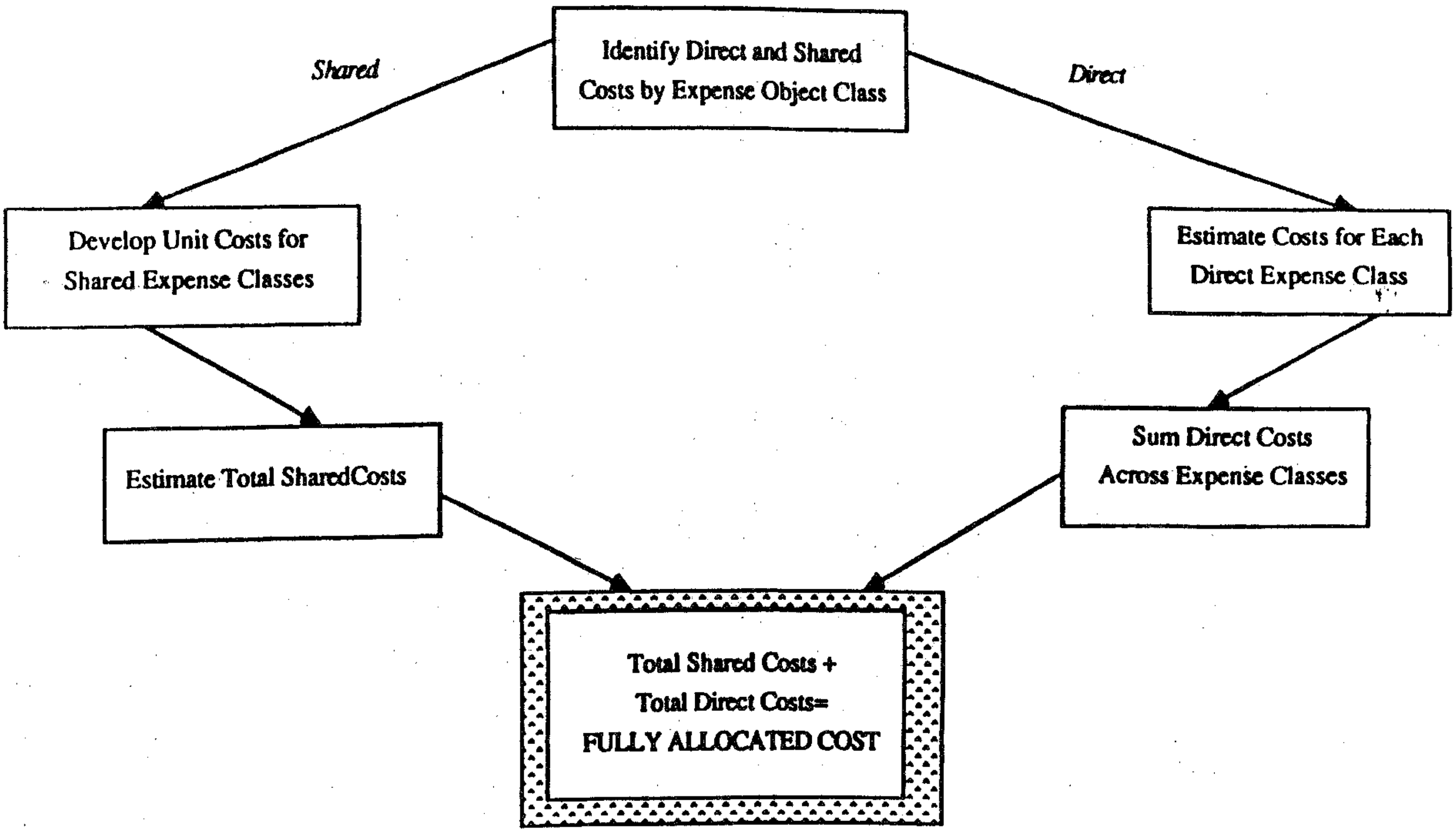
- Estimate Cost for Each Direct Expense Class--For each expense class identified as a direct cost, an estimate of the cost of that expense class specifically for the segment of service being considered must be developed. Generally accepted estimation methods for use in this step are described in Appendix C.

- Sum Direct Costs Across Expenses Classes--This step sums all of the directly estimated costs for the specific service being considered.

- Sum Total Shared Costs and Total Direct Costs--This calculation results in the fully allocated cost estimate for the specific service for which the direct costs were estimated.

EXHIBIT 9

DEVELOPMENT OF A FULLY ALLOCATED COST ESTIMATE USING COST BUILD-UP AND UNIT COST METHODS



The separate treatment of direct costs, as described in this process, can substantially improve the accuracy of the fully allocated cost estimate for specific service proposals.

For example, estimates of operator wage costs for specific service proposals can often be substantially improved with the application of direct cost estimation methods. An example of one possible direct estimation approach for computing the operator labor costs of a service proposal is presented in Exhibit 10. In this example, an estimate of operator wage cost is developed using a cost build-up method based on scheduled pay hours data. This data is commonly available because it is a primary input to the payroll calculation. Using this method, the estimation process consists of the following five steps:

- Obtain daily scheduled pay hours for selected routes -- These pay hours include driving and non-driving pay hours that can be directly associated with the routes being analyzed.

- Compute annual scheduled pay hours for selected routes -- This step "expands" the daily data based on the number of days that each type of schedule is operated. In this example, a weekday schedule would be operated 254 days annually, adjusting for the common practice of operating reduced service (such as Sunday service) on weekdays which are also observed as holidays.

- Compute the ratio of total pay hours to scheduled pay hours for the entire system -- This step is analogous to the calculation of unit cost factors, in that it develops a basis for allocating "shared" operator wage cost to the routes being analyzed. Non-scheduled operator pay, such as unscheduled overtime paid to extraboard operators, often cannot be associated on a one-to-one basis with a specific route. Its impact on cost, however, can be accounted for by measuring the extent to which scheduled pay hours need to be "expanded" to approximate total pay hours.

- Compute average hourly wage rate -- Operators are usually paid on a pay scale which reflects their seniority Also, certain types of pay may be paid at

USE OF COST BUILD-UP AND UNIT COST METHODS TO ESTIMATE ROUTE-SPECIFIC OPERATOR WAGE COST--EXAMPLE CALCULATIONS

1. Obtain Daily Scheduled Pay Hours for Selected Routes

Route	Scheduled Pay Hours: Weekday	Saturday	Sunday or Holiday
A	91	46	27
B	104	52	31
C	65	33	20
D	104	52	31
E	92	-	-
F	122	-	-
G	78	39	23
H	61	-	-
I	65	33	20
J	65	33	20
Total	847	288	172

2. Compute Annual Scheduled Pay Hours for Selected Routes

a. Assume that each type of schedule is operated the following number of days on an annual basis:

o Weekday Schedule --	254	days	(260 days, less 6 holidays when a Sunday schedule is operated)
o Saturday Schedule --	52	days	
o Sunday Schedule --	59	days	(53 days plus 6 holidays)
	365		

USE OF COST BUILD-UP AND UNIT COST METHODS TO ESTIMATE ROUTE-SPECIFIC OPERATOR WAGE COST--EXAMPLE CALCULATIONS

b. Then calculate annual pay hours based on daily pay hours (from Step 1) and number of days operated per schedule (Step 2(a)):

Annual scheduled pay hours =(254 * 847) + (52 * 288) + (59 * 172)
=240,262

3. Compute Ratio of Total Pay Hours to Scheduled Pay Hours for the Entire System

Compute this ratio for at least a six-month period to filter-out short-term variations in certain types of pay (e.g., holiday premiums):

	Total Pay Hours		Scheduled Pay Hours	=	Ratio
January	51,615	divided by	41,292		1.25
February	45,072		37,560		1.20
March	48,611		40,174		1.21
April	50,366		40,948		1.23
May	50,218		40,174		1.25
June	48,310		39,598		1.22
Total	294,192		239,746		1.23

4. Compute Average Hourly Wage Rate

Use the most recent period in which no changes in systemwide pay rates have occurred (in this example, April through June):

	Total Driver Wages Paid	Total Pay Hours	=	Average Hourly Wage Rate
April	$415,520	50,366		$8.25
May	406,766	50,218		8.10
June	396,142	48,310		8.20
Total	$1,218,428	148,894		$8.18

USE OF COST BUILD-UP AND UNIT COST METHODS TO ESTIMATE ROUTE-SPECIFIC OPERATOR WAGE COST--EXAMPLE CALCULATIONS

5. Compute Current Annual Operator Wage Cost for Selected Routes

Annual Wage Cost = Annual Scheduled Pay Hours * Ratio of Total Pay Hours to Scheduled Pay Hours * Average Hourly Wage Rate

= 240,262 * 1.23 * 8.18

= $2,417,372

more or less than the standard hourly rate. Accordingly, the use of an average hourly pay rate, which is developed over a number of pay periods in order to measure all these efforts, can serve as a reasonable basis for converting pay hours to estimates of wage cost.

- Compute current annual operator wage cost -- Once the annual scheduled pay hours, the ratio of total to scheduled pay hours, and the average hourly pay rate are known, then the current annual operator wage cost for the selected routes can be readily computed by combining these factors.

This example has illustrated the use of one possible direct estimation method which incorporates features of the unit cost approach. In general, direct estimation methods need to be supplemented, as was done in this example, with some type of expansion factor to ensure that all costs are taken into account. In the example above, scheduled pay hours were "expanded" to approximate total pay hours, thus accounting for the pay hours of those operators who serve as a "shared" resource for all routes.

A summary of the options for directly estimating costs for each expense object class is presented in Exhibit 11. This exhibit also indicates whether an object class typically represents either a direct or shared cost. Generally, direct costs are estimated by either a unit cost method or a cost build-up method. Shared costs are generally estimated by either a unit cost or a ratios method (i.e., one type of cost, such as administrative labor, is expressed as a percentage or ratio with respect to direct cost). A more complete description of the cost estimation options for each object class is presented in Appendix C. References for work published on this subject are included in Appendix A.

SUMMARY OF COST ESTIMATION OPTIONS BY EXPENSE OBJECT CLASS

EXPENSE OBJECT CLASSES	TYPICAL COST BASIS		TYPICALLY APPLIED COST ESTIMATION METHODS		
	DIRECT	SHARED	UNIT COST	COST BUILD-UP	RATIOS
LABOR					
Operators Salaries	X		X	X	
Maintenance Salaries	X		X	X	
Other Salaries		X	X		X
FRINGE BENEFITS					
Operators	X		X	X	X
Maintenance	X		X	X	X
Other		X	X		X
SERVICES		X	X		X
MATERIALS & SUPPLIES					
Fuel and Lubricants	X		X	X	
Tires and Tubes	X		X	X	
Other Materials and Supplies	X(a)	X	X		X
UTILITIES		X	X		X
CASUALTY AND LIABILITY		X	X		X
TAXES	X(b)	X(b)			
MISCELLANEOUS EXPENSES		X	X		X
RECONCILING ITEMS					
Interest Expense		X	X		X
Leases and Rentals	X	X(c)	X	X	
DEPRECIATION					
Vehicles	X	X(c)	X	X	
Other		X	X		X

(a) Vehicle repair-related materials and supplies are typically considered to be a direct cost.

(b) Taxes may be either a direct cost (such as fuel tax) or a shared cost (such as property tax) depending on types of taxes paid by a transit system, if any.

(c) Lease, rental and depreciation expenses for non-revenue vehicles would normally be considered a shared expense.

IV. DEVELOPMENT AND APPLICATION OF A FULLY ALLOCATED COSTING MODEL - ADDED COMPLEXITIES

The description of a fully allocated costing model as presented in Section III used a single mode, single facility transit operator as an illustration. It also considered the case where the service proposal was for a single year only. Multiyear service proposals or more complicated operating environments introduce added complexity to the development and application of a fully allocated costing model. The purpose of this section of the report is to highlight the considerations which are required in addressing these added complexities.

A. Multiyear Service Proposals

Service proposals which encompass more than a single year may require special consideration in conducting a fully allocated costing analysis to account for anticipated:

- Escalation of administrative, operating and maintenance costs
- Changes in administrative, operating or maintenance cost structures
- Replacement of capital assets attributed to the segment of service being considered

Each of these considerations are expanded upon in the remainder of this subsection.

1. Escalation of Administrative, Operating and Maintenance Costs

The simplest method for projecting administrative, operating and maintenance costs for a multiyear contract period is to apply cost escalation factors to current costs. This approach would be appropriate when the transit system has not committed to structural changes (such as the opening of a new operating facility) which would affect the shared costs included in a fully allocated cost estimate (e.g., the cost of supervisory and administrative labor associated with a new facility).

An example of the steps required to estimate future-year operating costs by applying cost escalation factors is shown in Exhibit 12. In this example, three expense object classes (operator labor, fuel, and utilities) are estimated for a five-year period. For each of these expense object classes, the following steps are performed in this example:

- Identify systemwide, current year costs -- This will be used as the base for the estimation of future-year costs. In the exhibit, systemwide operator labor cost for the current year is $3,250,422.

- Identify cost escalation factors for each year of the service proposal -- The cost escalation factor for each year represents the impact of inflation or known price changes relative to the prior year's cost. In the example, operator labor cost is expected to increase at two percent annually for the first two years of the contract period, reflecting increases in the hourly wage rate that have already been incorporated into the labor agreement. In the remaining years, management has assumed that labor costs would increase at four percent annually. Similarly, fuel costs (in this example) are known to increase at two percent annually for the first two years, reflecting the terms of a purchase agreement with a local vendor.

- Calculate estimated annual costs -- The cost estimate for each expense object class in each year is based on the cost escalation factor for that year and the prior year's cost estimate. For the first year of the contract period, the "prior year" is the current year cost. Operator labor, for example, is estimated to be $3,315,430 in year 1 of the contract period, based on the current year cost ($3,250,422) and a 1.02 cost

EXHIBIT 12

PROJECTION OF SELECTED OPERATING COSTS

EXPENSE OBJECT CLASS	CURRENT YEAR COST	X	YEAR 1 ESCALATION FACTOR	=	YEAR 1 COST	X	YEAR 2 ESCAL FACTOR	=	YEAR 2 COST	X	YEAR 3 ESCAL FACTOR	=	YEAR 3 COST	X	YEAR 4 ESCAL FACTOR	=	YEAR 4 COST	X	YEAR 5 ESCAL FACTOR	=	YEAR 5 COST
OPERATOR LABOR	$3,250,422		1.02		3,315,430		1.02		3,381,739		1.04		3,517,009		1.04		3,657,689		1.04		3,803,997
FUEL	$1,520,793		1.02		1,551,209		1.02		1,582,233		1.04		1,645,522		1.04		1,711,343		1.04		1,779,797
UTILITIES	$104,991		1.03		108,141		1.03		111,385		1.03		114,727		1.03		118,168		1.03		121,713

escalation factor. In year 2, operator labor cost is estimated to be $3,381,739, based on the cost estimate for year 1 and a cost escalation factor of 1.02.

These steps would be repeated for all other operating expense object classes to obtain an annual systemwide estimate of operating costs. These annual systemwide estimates would then be used, following the step-by-step process outlined in Section III to develop and apply a fully allocated cost model for each year of the service proposal.

2. <u>Adjustments Due to Changes in Administrative, Operating or Maintenance Cost Structures</u>

In the event that the transit system has committed to or plans structural changes in its service or organization that would be implemented during the period covered by the service proposal, the costs of these changes would need to be considered in projecting fully allocated costs. Examples of structural changes include the addition or removal of staff and facilities. These actions may be occasioned by service expansion or contraction, or may be taken in recognition of the need for additional or fewer support activities (such as training). Typically, the most appropriate method for making necessary adjustments in these cases would involve the use of a direct cost estimation approach, taking into account the specific characteristics of the planned structural changes.

3. <u>Adjustment for Replacement of Capital Assets During the Period Covered by the Service Proposal</u>

Generally, the estimation of capital costs rests on determining the annual depreciation cost of the current capital inventory. When service contracts are to be extended over a period of several years, however, the fully allocated cost of capital should include current depreciation costs, plus the depreciation cost associated with the anticipated replacement of current assets.

Consider, for example, a transit operator that is analyzing the five-year costs of a portion of its service in preparation for a service proposal. On average, approximately 40 percent of the revenue vehicle fleet would require replacement within this period (i.e., five-twelfths of the fleet). These new vehicles would have a higher annual depreciation cost than the vehicles they replace, assuming that they have a higher purchase price. Since this phenomenon is applicable to all capital assets replaced during the period, the current annual depreciation cost should not be used in determining the fully allocated cost for the full term of the service proposal. Instead, depreciation costs should be projected for the duration of the service proposal based on anticipated capital replacement actions. The depreciation cost of replacement assets acquired during that period should then be included in the fully allocated cost estimate.

In summary, the estimation of capital cost involves carrying forward through the contract period the depreciation cost of existing assets, and the estimation of the depreciation cost of any new assets expected to be acquired during the contract period. Generally, the process for estimating capital costs consists of the following steps:

- Calculate annual depreciation cost for all capital assets -- The annual depreciation cost should be calculated using the generally accepted accounting methods described in Appendix D. These costs are usually constant for the entire depreciation period (e.g., a bus which costs $144,000 and depreciated over 12 years would have an annual depreciation cost of

$12,000 if a straight-line depreciation method were used).

- Carry forward the annual depreciation cost for existing assets through the contract period or through the assets' depreciation period -- The annual depreciation cost should be carried forward through each year of the contract period, unless an asset is fully depreciated either prior to or during the contract period. For example, the depreciation cost for a bus that is 10 years old would be carried through the first two years of a contract period. A bus that is 12 years old would be fully depreciated in the current year, and thus its annual depreciation cost would not be carried forward into the contract period.

- Calculate and carry forward depreciation costs for any replacements of existing capital assets -- The transit system may or may not choose to replace fully depreciated assets during the contract period. This represents an explicit trade-off, however, with increased maintenance costs. The depreciation costs of replacement assets should be calculated and carried forward in the same manner as identified above for existing capital assets.

- Calculate total capital costs -- The total capital costs for the contract period is the sum of the depreciation costs for existing assets and for replacement assets.

A simple example of estimating the capital costs associated with revenue vehicles is presented in Exhibit 13. In this example, the existing revenue vehicle fleet consists of five buses (labeled Vehl through Veh5). An annual depreciation cost is calculated for each based on their respective purchase price, using a straight-line depreciation method and assuming a 12-year depreciation period. In this example, each vehicle would be retired (and a replacement vehicle purchased) at the end of its depreciation period (labeled "retirement year"). The annual depreciation cost for each vehicle is carried forward for each year of the five-year contract period (i.e., 1988 through 1992), or through the end of each vehicle's depreciation period (or retirement year). The vehicles labeled Veh4 and Veh5, which

EXHIBIT 13

PROJECTION OF REVENUE VEHICLE COSTS

AN EXAMPLE

EXISTING VEHICLES	Purchase Price	Annual Depreciation	Retirement Year	1988	1989	1990	1991	1992	Total
Veh_1	$110,000	$ 9,167	1992	$ 9,167	$ 9,167	$ 9,167	$ 9,167	$ 9,167	$ 45,835
Veh_2	110,000	9,167	1992	9,167	9,167	9,167	9,167	9,167	45,835
Veh_3	110,000	9,167	1992	9,167	9,167	9,167	9,167	9,167	45,835
Veh_4	75,000	6,250	1989	6,250	6,250	—	—	—	12,500
Veh_5	75,000	6,250	1989	6,250	6,250	—	—	—	12,500
Annual Depreciation Cost--Existing Vehicles				$40,001	$40,001	$27,501	$27,501	$27,501	$162,505
REPLACEMENT VEHICLES									
Veh_6	150,000	12,500	2001	—	—	12,500	12,500	12,500	37,500
Veh_7	150,000	12,500	2001	—	—	12,500	12,500	12,500	37,500
Annual Depreciation Cost--Replacement Vehicles				$ 0	$ 0	$25,000	$25,000	$25,000	$ 75,000
TOTAL DEPRECIATION COST				$40,001	$40,001	$52,501	$52,501	$52,501	$237,505

were purchased in the same year (1977), will be retired in 1989. Accordingly, no depreciation cost is carried forward for these vehicles beyond 1989. Two replacement vehicles (labeled Veh6 and Veh7) are purchased in 1990, and their depreciation costs are carried forward through the end of the contract period. The total annual depreciation cost for all vehicles is the sum of the depreciation cost for existing vehicles and for replacement vehicles.

B. Complex Operating Environments

As noted earlier, the fully allocated cost of any segment of transit service should reflect the direct cost of that service as well as the relevant costs shared by that service with other services operated by the transit system. Cost allocation within a multi-modal or multi-facility operating environment requires particularly careful identification and treatment of shared costs. In a multi-modal or multi-facility environment, these shared costs could include 1) the shared costs specific to the facility from which the service is operated; 2) the shared costs within the mode or program to which the service of interest belongs; 3) other systemwide costs which are shared by all service programs or modes, including the cost of services provided by other units of local or state government, where relevant.

This section describes the additional steps required to develop a fully allocated cost model for a multiple-mode and/or multiple-facility operating environment. The primary emphasis in this section is on the allocation of shared costs. Again, a three-variable cost allocation model is used to illustrate the approach for allocating these shared costs. Other cost allocation methods may be preferable depending on the circumstances of the cost comparison to be performed.

Within this context, cost allocation considerations for the following cases are discussed:

- Multiple modes operating from a single facility
- One mode operating from multiple facilities
- Multiple modes operating from multiple facilities

Each of these cases are presented in order, below. These three types of operating environments, along with the single mode, single facility case presented earlier, illustrate a wide range of cost allocation situations likely to be relevant to U.S. transit systems.

1. Multiple Modes Operating from a Single Facility

The characteristic of this operating environment that distinguishes it from the single-mode, single-facility case is the proper allocation of costs shared among the modes. In this case, the term mode is used to denote different service delivery options, such as fixed-route transit and paratransit, which are distinct primarily in regard to their operating characteristics.

The development of a fully allocated cost model for this case must carefully consider the relationship of costs to the types of services being provided (modes). The process for developing a fully allocated cost model should include the following steps:

- Identify the costs to be excluded from the public-private cost comparison -- Generally, any cost devoted exclusively to supporting both publicly and privately operated services can be excluded from the development of the unit costs described below. In the case where a portion of an activity is attributable to the support of both public and private services, costs can be excluded on a pro-rata basis.

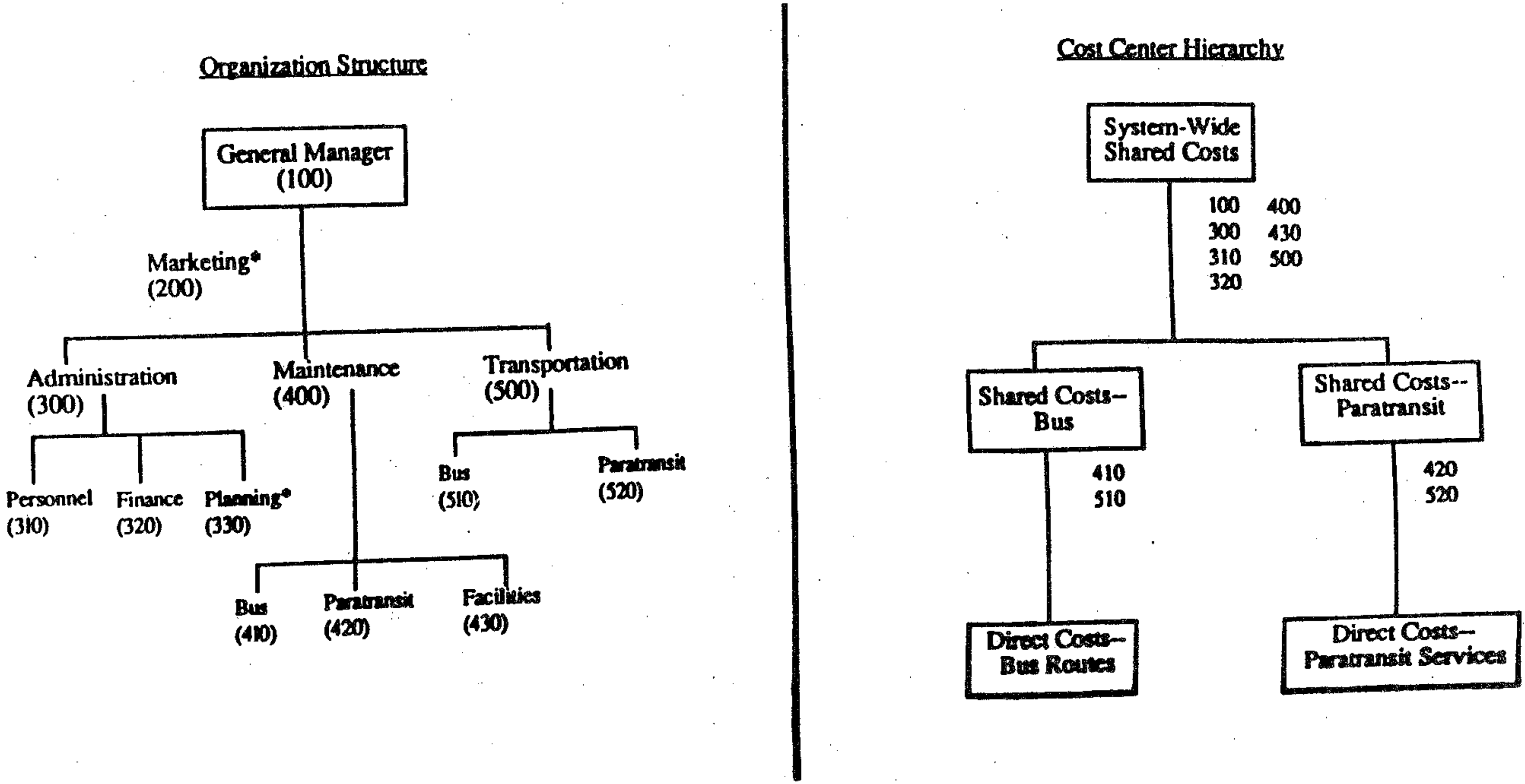
- Identify direct and shared costs -- This step identifies those costs which are associated exclusively with a particular mode, or support all modes. An example of this step is presented in Exhibit 14 for a relatively simple operation providing bus and paratransit services.

- Allocate expense object classes to the physical and operating resources (i.e., allocation variables) of the services -- This step is slightly different than the single mode, single facility case because the typical bases for cost allocation (i.e., vehicle hours, vehicle miles and peak vehicles) may not be uniform across all modes. In the case of paratransit, for example, it is arguable whether a paratransit van is comparable to a full-sized bus when considering the allocation of systemwide costs using a unit cost per peak vehicle. Accordingly, the allocation of systemwide costs shared among modes should be performed using a consistent system of measurement, such as pro-rata costs, employees or ridership. These costs can be interpreted as an additional expense object class at the modal level, and then allocated using a common allocation variable (such as peak vehicles) within a mode. The process of allocating expense object classes to variables within each mode should proceed in the same manner as described in the single mode, single facility case, with the exception that different variables can be used as a basis of allocation within each mode.

- Allocate systemwide shared costs to individual modes -- This step consists of three tasks: 1) sum expenses allocated to each variable (e.g., employees) across all costs which are shared among all modes; 2) calculate unit costs by dividing the summed expenses by the relevant value of that variable, systemwide; 3) calculate the costs to be allocated to each mode based on each mode's respective value of the allocation variable. In the example shown in Exhibit 15, a systemwide unit cost of $4,000 per employee was calculated. This resulted in costs of $800,000 and $400,000 being allocated to bus and paratransit services respectively based on the number of employees in each of these modes.

- Calculate unit costs for services operated within each mode -- This final step in developing a fully allocated cost model consists of two tasks: 1) for each allocation variable within each mode, sum the costs across the relevant expense object classes including

SAMPLE RELATIONSHIP OF ORGANIZATION STRUCTURE TO COST CENTER HIERARCHY FOR A MULTIPLE-MODE, SINGLE-FACILITY TRANSIT SYSTEM



* Omitted from cost comparison

Note: numbers in ... eses are cost center identifiers; cost centers do not necessarily represent an ... ting system accumulation of costs

SAMPLE CALCULATION OF UNIT COSTS FOR A MULTI-MODAL, SINGLE-FACILITY TRANSIT SYSTEM

System-Wide Shared Costs
$1,200,000

300 employees = $4,000 per employee

Bus Costs
200 employees

System-wide shared costs=
$4,000 * 200 employees=
$800,000

	Bus Costs	+	Shared Costs	=	Total Costs	÷	Service Units	=	Bus Unit Costs
Vehicle Hours	$1,400,000				$1,400,000		200,000		$ 7.00
Vehicle Miles	$2,750,000				$2,750,000		4,000,000		$ 0.69
Peak Vehicles	820,000		800,000		$1,620,000		150		$10,800

Paratransit Costs
100 employees

System-wide shared costs=
$4,000 * 100 employees=
$400,000

	Para-Transit Costs	+	Shared Costs	=	Total Costs	÷	Service Units	=	Para-Transit Unit Costs
Vehicle Hours	$ 900,000				$ 900,000		85,000		$ 10.59
Vehicle Miles	$1,300,000				*1,300,000		1,700,000		$ 0.76
Peak Vehicles	410,000		$400,000		$ 810,000		50		$16,200

system wide shared costs allocated in the previous step ; and 2) divide the summed costs by the appropriate value of the allocation variable specific to each mode. A sample calculation of these unit costs is also presented in Exhibit 15.

In summary, the cost allocation process for a multi-modal, single facility operation should explicitly account for: 1) systemwide costs which are shared among the modes of service provided; and 2) the shared and direct costs specific to each mode.

2. <u>One Mode Operating from Multiple Facilities</u>

The characteristic of this operating environment which distinguishes it from the single mode, single facility case is the consideration of facility-specific shared and direct costs. Generally, operating facilities have different cost characteristics which should be reflected in the cost estimates for services operated from a specific facility. For example, workers compensation costs can vary dramatically on a facility-by-facility basis, as can overall labor productivity. Shared costs which can vary on a facility-by-facility basis include supervisory staffing, utilities, leases, rentals, and depreciation. It is important that these cost differences are reflected in the cost allocation scheme, rather than being masked by a general, system wide allocation of these costs.

The process for developing a fully allocated cost model in this context differs slightly from the cases presented earlier. Generally, the following steps should be employed:

- <u>Identify costs to be excluded from the public-private cost comparison</u> -- Generally, any costs that are devoted exclusively to supporting both publicly and privately operated services can be excluded from the costs to be allocated to the services of interest. In cases where a portion of an activity falls into this category, the excluded costs could be prorated.

- Identify direct and shared costs -- This step identifies which costs are shared among all operating facilities and which costs are specific to individual facilities. Exhibit 16 illustrates these two types of costs in the context of a two-facility transit system.

- Allocate expense object classes to allocation variables -- This step is identical to that described for the single mode, single facility case. Each expense object class should be assigned to one or more of the variables (e.g., vehicle hours) being used as a basis for allocation of expenses. This allocation scheme should be consistent across all operating facilities.

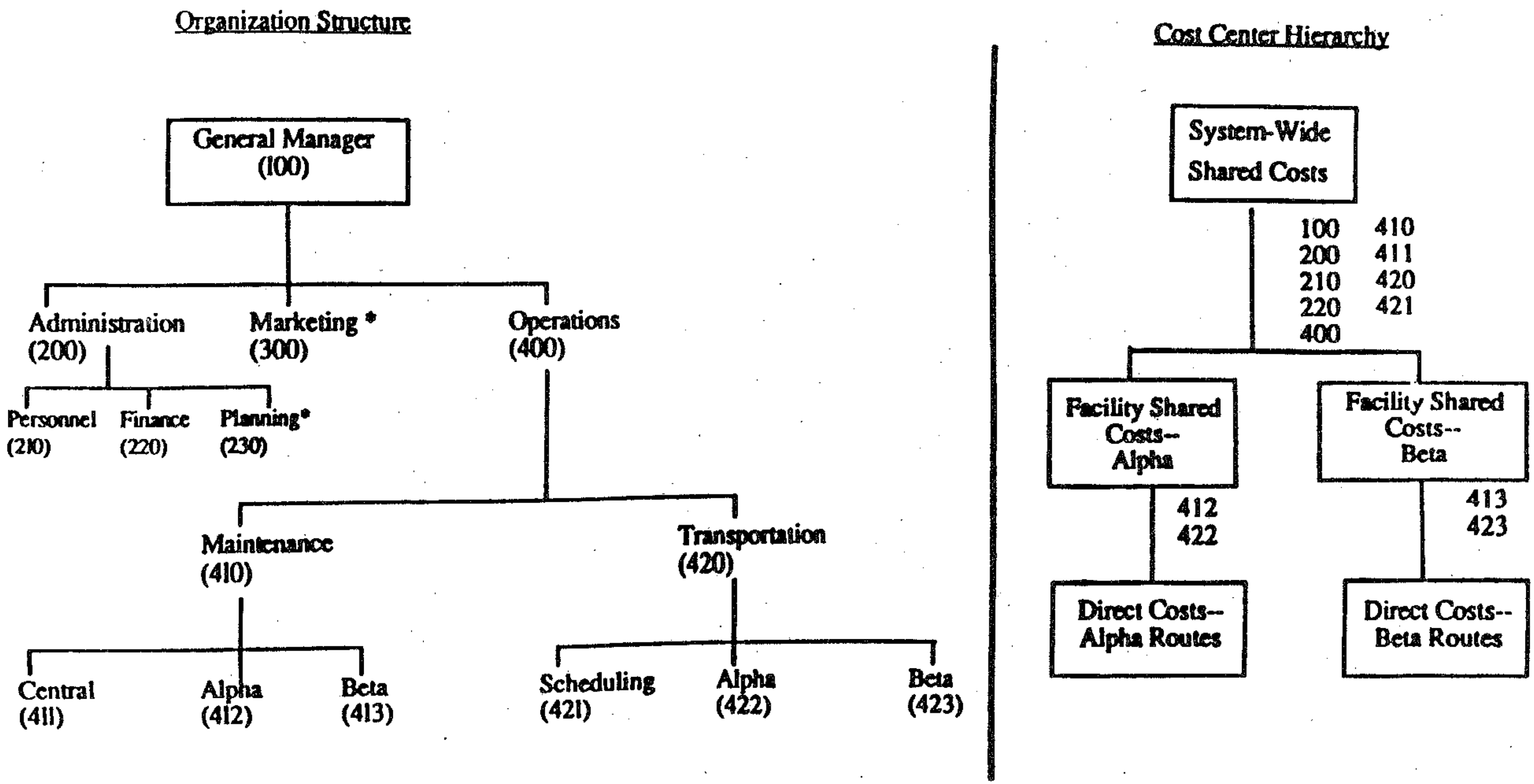
- Calculate unit costs for costs shared among all operating facilities -- This step consists of two tasks. First, expenses are summed for each variable across all expense object classes. Second, unit costs are calculated by dividing the costs allocated to each variable by a systemwide value of the relevant variable. A sample calculation of these systemwide shared unit costs is illustrated in Exhibit 17.

- Calculate unit costs for costs within each operating facility -- These unit costs are found by summing the expenses for each variable across all expense object classes within each operating facility, then dividing these expenses by a facility-specific value of each variable. A sample calculation of these unit costs is presented in the lower portion of Exhibit 17 for a two-facility operation.

- Calculate unit costs to be applied to all services operated from each operating facility -- The fully allocated unit cost for the services operated from a given facility is the sum of the above two sets of unit costs: systemwide shared unit costs, and facility-specific shared and direct unit costs. A sample calculation of these unit costs is presented in the lower portion of Exhibit 17 and is labeled "total unit cost".

In summary, the cost allocation process for a single mode, multiple facility operation should explicitly account for:

SAMPLE RELATIONSHIP BETWEEN ORGANIZATION STRUCTURE AND COST CENTERS FOR A SINGLE-MODE, MULTI-FACILITY TRANSIT SYSTEM



*Planning and Marketing are excluded costs for this comparison.

Note: numbers in parentheses are cost center identifiers; cost centers do not necessarily represent an accounting system accumulation of costs

EXHIBIT 17

CALCULATION OF UNIT COSTS FOR A SINGLE-MODE, MULTI-FACILITY TRANSIT SYSTEM

SYSTEM-WIDE SHARED COSTS

	Sum of Expenses	÷	Service Units	=	Unit Cost
Vehicle Hours	$ 620,000		300,000		$ 2.07
Vehicle Miles	$ 840,000		4,500,000		$ 0.19
Peak Vehicles	$1,300,000		140		$9,286

ALPHA FACILITY

	ALPHA FACILITY Sum of Expenses	÷	Service Units	=	Unit Cost	+	System-Wide Shared Unit Cost	=	Total Unit Cost
Vehicle Hours	$2,300,000		200,000		$11.50		$ 2.07		$ 13.57
Vehicle Miles	$1,250,000		3,400,000		$ 0.37		$ 0.19		$ 0.56
Peak Vehicles	$ 680,000		100		$6,800		$9,286		$16,086

BETA FACILITY

	BETA FACILITY Sum of Expenses	÷	Service Units	=	Unit Cost	+	System-Wide Shared Unit Cost	=	Total Unit Cost
Vehicle Hours	$1,800,000		100,000		$ 18.00		$ 2.07		$ 20.07
Vehicle Miles	$ 730,000		1,100,000		$ 0.66		$ 0.19		$ 0.85
Peak Vehicles	$ 440,000		40		$11,000		$9,286		$20,286

1) system wide costs which are shared among services operated from all operating facilities; and 2) the shared and direct costs specific to each operating facility.

3. Multiple Modes Operating from Multiple Facilities

The process for developing a fully allocated cost model for a multi-modal, multi-facility transit system is similar to that described in the immediately preceding section. It differs primarily in that it must explicitly incorporate systemwide costs shared among modes, as well as modal-specific costs shared among operating facilities within a mode and facility-specific direct and shared costs.

In this context, the process for developing a fully allocated cost model consists of the following steps:

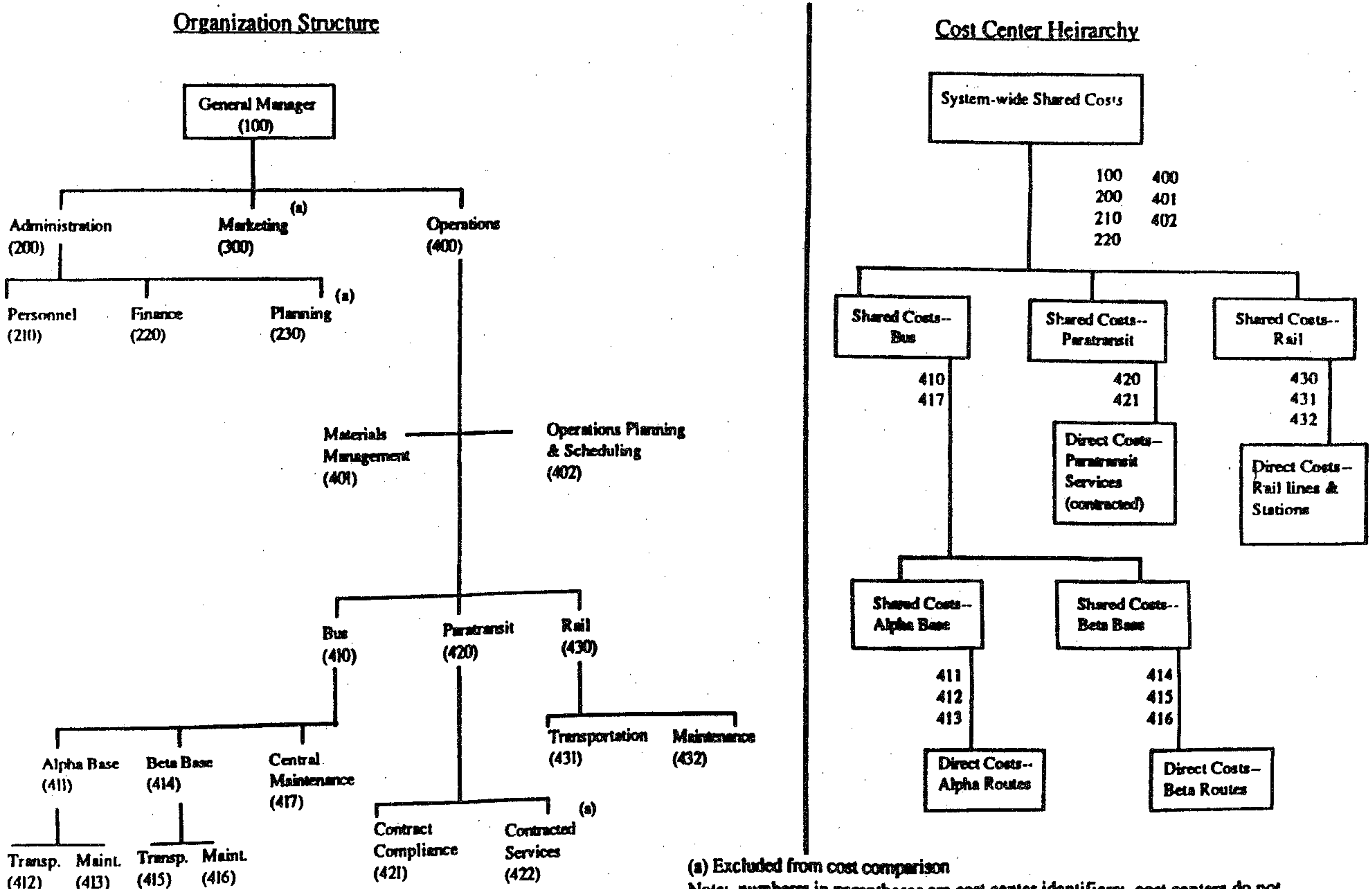
- Identify costs to be excluded from the public-private cost comparison -- Generally, these costs would include those which exclusively support both publicly and privately operated services, as described previously.

- Identify direct and shared costs -- This step identifies those costs which are shared among modes, shared among operating facilities within a mode, or contribute to direct or shared costs within a specific facility. An example of identifying these relationships is illustrated in Exhibit 18 for a three mode, three facility transit system.

- Allocate expense object classes to allocation variables -- This step is slightly different than in previous cases because the typical bases for cost allocation (i.e., vehicle hours, vehicle miles and peak vehicles) will probably not be uniform across all modes. Peak buses, peak rail cars and peak paratransit vans, for example, are logically not uniform. Accordingly, the allocation of systemwide costs shared among modes should be performed using a consistent system of measurement, such as pro rata costs, employees or ridership. These costs can be interpreted as an additional expense object class at the modal

EXHIBIT 1

SAMPLE RELATIONSHIP OF ORGANIZATION STRUCTURE TO COST CENTER HEIRARCHY FOR A MULTI-MODAL, MULTI-FACILITY TRANSIT SYSTEM



(a) Excluded from cost comparison

Note: numberrs in parentheses are cost center identifiers; cost centers do not necessarily represent an accounting system accumulation of costs level, and then allocated via a common allocation variable (such as peak vehicles) within a mode. The process of allocating expense object classes to variables within each mode and facility should proceed in the same manner as described in the other cases, with the exception that different variables can be used as a basis of allocation within each mode.

- Allocate systemwide shared costs to individual modes -- This step consists of three tasks: 1) sum expenses allocated to each variable (e.g., employees) across all costs which are shared among all modes; 2) calculate unit costs by dividing the summed expenses by the relevant value of the variable, systemwide; 3) calculate the costs to be allocated to each mode based on each mode's respective variable value. In the example shown in Exhibit 19, a system wide unit cost of $7,617 per employee was calculated. This resulted in costs of $13.6 million, $2.8 million and $0.1 million being allocated to bus, rail and paratransit services respectively based on the number of employees in each of these modes.

- Calculate unit costs for costs shared among operating facilities within each mode -- This step consists of two tasks within each mode: 1) expenses are summed by allocation variable (e.g., vehicle hours) across all relevant expense object classes; 2) these summed expenses are divided by the appropriate value of the variable within that mode. A sample calculation is presented in Exhibit 19 for the hypothetical three-mode system. Note that this step includes the systemwide costs allocated to each mode from the previous step.

- Calculate unit costs for costs within each operating facility within each mode -- The same two tasks are performed as in the previous step, with the exception that facility-specific data are used. A sample calculation is presented in Exhibit 19 for the bus mode, since the sample rail service operates from a single facility, and since paratransit services are contracted out.

- Calculate unit costs to be applied to all services operated from each operating facility -- The "true" unit costs for the services operated from a given facility is the sum of the above two sets of unit costs: modal-specific shared unit costs (including allocated systemwide costs), and facility-specific shared and direct unit costs. A sample calculation of

SAMPLE CALCULATION OF U… COSTS FOR A MULTI-MODE, MULTI-FACILITY TRANSIT SYSTEM

System-Wide Shared Costs
$16,483,000

$16,483,000 / 2,164 employees
= $7,617 per employee

Bus Costs

- System-wide shared cost
  = $7,617 * 1,784 employees
  = $13,588,728
- Bus-only shared cost
  = $2,462,101
- Unit cost (per vehicle) for bus share of system-wide cost plus bus-only shared cost
  = ($13,588,728 + 2,462,101) / 418
  = $38,399

Operating Facility	Allocation Basis	Facility Only: Shared and Direct Cost	÷	Service Units	=	Unit Cost	+	Allocated Unit Cost	=	Total Unit Cost
Alpha	Veh Hrs.	$21,497,566		990,558		$ 21.70		-		$ 21.70
	Veh Mi.	16,805,623		14,080,397		1.19		-		1.19
	Peak Veh.	2,212,145		251		8,813		$38,399		47,212
Beta	Veh. Hrs.	$17,588,918		660,372		$ 26.63		-		$ 26.63
	Veh Mi.	13,750,055		9,386,932		1.46		-		1.46
	Peak Veh.	1,809,937		167		10,838		$38,399		49,237

Paratransit Costs

System-wide shared cost
= $7,617 * 13 employees
= $99,020

Allocation Basis	Paratransit Costs	+	System-wide Shared Costs	=	Total Costs	÷	Service Units	=	Unit Cost
Peak Vehicles	$2,298,904		$99,020		$2,397,924		95		$25,241

Rail Costs

System-wide shared cost
= $7,617 * 367 employees
= $2,795,419

Allocation Basis	Rail Costs	+	System-wide Shared Costs	=	Total Costs	÷	Service Units	=	Unit Cost
Veh. Hrs.	$ 553,840		-		$ 553,840		23,920		$ 23.15
Veh. Miles	1,004,440		-		1,004,440		478,400		2.10
Peak Veh.	2,096,844		$2,795,419		4,892,263		40		122,307

these unit costs is also shown in Exhibit 19, and is labelled as the "total unit cost".

In summary, the cost allocation process for a multi-modal, multiple-facility operation should explicitly account for: 1) systemwide costs which are shared among modes including the costs of any services provided by other units of state or local government, where appropriate; 2) modal-specific costs which are shared among services operated from all operating facilities within a mode; and 3) the shared and direct costs specific to each operating facility.

DIFFERENCES IN PUBLIC AND PRIVATE SECTOR COST STRUCTURES

Cost Element	Unique to Private Sector	Unique to Public Sector
(1) Income Tax--The private carrier is required to report income from operation and pay federal and possibly state income taxes. These taxes are returned to government and therefore do not represent a public cost. Accordingly, in determining the minimum public cost for transit service, these taxes should not be counted as an element of cost. In computing taxable income, the private carrier can deduct depreciation as an expense--reducing the tax burden. The public carrier has no comparable tax benefit from depreciable capital except through safe-harbor leasing provisions which provides for the sale of certain public tax benefits to private investors.	X	
(2) Profit--The private carrier is allowed a profit which is passed on as a cost in the bid. This is a legitimate cost of doing business with a private carrier and should be included in the cost comparison.	X	
(3) Registration and licensing fees--This is a legitimate cost of doing business with a private carrier, however, it represents a form of taxation and the revenue flows to the public.	X	
(4) Administration of Carrier Contracts--When the public carrier also serves as the local/regional planning and policy organization, costs may be		X

DIFFERENCES IN PUBLIC AND PRIVATE SECTOR COST STRUCTURES

Cost Element	Unique to Private Sector	Unique to Public Sector
incurred to administrate the contracting process. These costs are borne on behalf of the general public and not for the purpose of delivering service by the public operator. Accordingly they may be considered as separate from the normal cost of the public provider for service delivery.		
(5) Local/Regional Public Transportation Administration--certain costs of the public provider are borne on behalf of the public for the purposes of planning, coordinating, marketing, administering services. These costs benefit both public and private carriers and are separable from the cost of service delivery and the administrative aspects directly attributable to service delivery. In fact, several local/regional organizations are formally separating these functions and activities with institutional restructuring (e.g., Chicago RTA, Minneapolis). Where they are combined (most public transportation authorities), the costs should be separately accounted for in determining an appropriate comparison between public and private service delivery costs.		X
(6) Fuel, sales and other taxes--These taxes are paid by private carriers and are a legitimate cost of business. <u>However</u>, they are not always paid by public carriers who may have tax-exempt status for many taxable items used in the course of providing transit	Not necessarily Unique to Private or Public Sector	

DIFFERENCES IN PUBLIC AND PRIVATE SECTOR COST STRUCTURES

Cost Element	Unique to Private Sector	Unique to Public Sector
service. This tax exempt status represents a form of subsidy to the public carrier.		
(7) "Cost" of Capital Interest expense related to loans for capital investment--The private carrier needs to borrow to invest, whereas the public carrier has invested largely with grant income. The interest cost associated with private carrier borrowings is therefore a cost which is typically not borne to the same extent by the public carrier due to the public subsidy program.	**Not necessarily Unique to Private or Public Sector**	
8) Cost associated with funding prior unfunded pension liabilities--Many public carriers have plans in place which are intended to fully fund-over a period of time-past unfunded pension liabilities. This is a cost which is largely unique to the public carrier.		X

V. PRINCIPLES FOR THE TREATMENT OF COSTS THAT ARE UNIQUE TO PUBLIC AND PRIVATE SECTOR TRANSIT PROVIDERS

The costs of public and private sector transit providers are to a certain extent inherently different. Therefore, to conduct a fair comparison of service proposals made by public and private entities it is necessary to consider the implications and appropriate treatment of these inherent differences. This section of the report presents principles for treating costs that are unique to public and private sector transit providers when conducting cost comparisons.

A. Differences in Public and Private Sector Costs

The significant costs which are unique to public and private sector transit providers are summarized in Exhibit 20. As shown in this exhibit, the costs which are unique to the private sector largely reflect the for-profit status of private sector transit providers. These costs include the profit charged by the private provider and the taxes and fees paid by the private provider - these are common costs of doing business with a private carrier and are appropriately included in the private carrier's bid for transit service.

The taxes and fees paid by the private carrier are unique to the private sector because in many instances, public carriers have been exempted from the responsibility to pay these taxes and fees. This exemption represents a form of subsidy to the public carrier. Further, these taxes and fees are returned to the government for public use and in certain instances are used to fund publicly subsidized transportation services.

The costs shown in Exhibit 20 which are unique to the public sector are largely related to the unique "public" responsibilities of public transportation operators. These "public" responsibilities encompass functions and activities that are of broad public benefit and extend beyond the basic function of delivering transit services. They include planning, coordinating, and promoting publicly subsidized transportation services whether those services are delivered by public or private providers. This "public" responsibility includes the implementation of UMTA's Private Enterprise Policy and therefore the related costs for administration of carrier contracts.

Each of the unique costs shown in Exhibit 20, could be treated in a variety of ways when conducting a comparison of the service proposals of public and private entities. The potential treatment of these cost elements in a cost comparison could generally include one of the following approaches:

- Deducting the unique public or private sector cost from the public or private sector providor when making the cost comparison. For example, deducting income tax from the private sector's cost basis when making the cost comparison
- Adding or adjusting the cost structure of the public or private provider to compensate for unique costs "avoided" by virtue of public or private operation. For example, adding an estimate for registration and licensing fees to the public provider's cost basis when making the cost comparison
- Making no adjustment to the cost structure of the public and private providers

Each potential treatment, however, has its associated merits and shortcomings. The selection of an appropriate treatment is a significant policy issue which (1) requires a delicate balancing of public and private sector interests and (2) takes into consideration the impact of any potential adjustment to the fully allocated cost estimates associated with competitive transit service proposals.

B. Principles for Treating Differences in Public Sector and Private Sector Costs

In order to address these and other issues associated with the use of contracted services, UMTA, in cooperation with the American Public Transit Association (APTA), established the Competitive Services Board (CSB). As shown in Exhibit 21, the Competitive Services Board consists of a broad cross-section of public and private sector interests assembled to establish consensus principles for the comparison of public and private sector transit costs. Through a series of meetings and workshops, the CSB developed principles of common understanding and consensus relating to the important cost comparison issues outlined above.

The principles developed the CSB are presented in Exhibit 22. Although these principles may be further developed and clarified by the Competitive Services Board as experience with implementation of the Private Enterprise Policy increases, they represent a logical and balanced consideration of the appropriate treatment of unique public and private sector costs.

In addition to these principles, which relate directly to specific cost elements and their treatment in a cost comparison, the Competitive Services Board concluded its deliberations on cost comparison issues with the development of the following significant statement of public and private consensus:

"The public agency has a responsibility to minimize public-sector costs and to maximize the amount of service that can be provided. Guided by this objective, the Board has

EXHIBIT 21

MEMBERSHIP OF THE COMPETITIVE SERVICES BOARD

I. Regular Membership

Transit Operators (6)
Doug Wentworth (Houston)
Jerry Premo (New Jersey)
Michael Grovak (New York CTA)
Raleigh D'Adamo (St. Louis)
Tom Niskala (Corpus Christi)
Roger Snoble (San Diego)

Private Operators (6)
Gene Stalians (Taxi Operator, S. Calif.)
Byron Fanning (Greyhound)
Ted Knappen (Trailways)
Phil Ringo (ATE)
Terry Van Der Aa (School Bus Operator, Chicago)
John McCarthy (Continental Air Transport, Chicago)

State DOTs (2)
John Hartz (Wisconsin)
Dave King (North Carolina)

Local Governments/Transit Board (2)
Elliot Perovich (RTB-Twin Cities)
Florence Boone (RTA-Chicago)

Regional Councils (2)
Mark Pisano (SCAG)
Peter Levi (Mid-America Regional Council)

Special System Operators (2)
Linda Wilson (Charlottesville) (Section 18)
Tom Phillips (Hartford) (Section 16b(2))

II. Ex Officio Membership

Ralph Stanley (UMTA) Cochairman
Jack Gilstrap (APTA) Cochairman
Frank Francois (AASHTO)
Norm Sherlock (ABA)
Wayne Smith (UBOA)
Al LaGasse (ITA)
Ray Mundy (AGTA)
Karen Finckle (National School Transportation Association)
David Raphael (Rural America)
Randy Isaacs (National Association of Transportation Alternatives)
Richard Hartman (NARC)

COMPETITIVE SERVICES BOARD PRINCIPLES FOR TREATMENT OF UNIQUE PRIVATE AND PUBLIC SECTOR COST ELEMENTS

Cost Element	Exhibit 20 Reference	Principle/Treatment
Taxes and Fees	Items (1), (3), (6)	Taxes and fees paid by some operators and not others should be recognized by decisionmakers as revenue to the public sector. To some extent, these revenues may be available for local public transportation purposes, and to that extent should be considered as an offset against the bid costs of those operators that pay them. Ideally, efforts should be made to remove these tax and fee differentials through changes in relevant laws and regulations.
Nonattributable Public Sector Costs	Item (5)	Public sector costs that benefit both public and private operators should not be included by the public carrier in a fully allocated cost comparison if they are not attributable to the service up for bid. Fundraising, grants management, and financial reporting, among others, generally fall into this category. Other activities, such as marketing and planning, may be partly attributable and partly nonattributable. For example, to the extent that a private operator is responsible under the contract for planning and marketing a proposed service, the public agency's costs of performing the same functions should be included in the cost comparison.
Costs Imposed by Federal and State Requirements		Public agencies incur some costs as a result of federal and state requirements for grant fund recipients. Some of these costs are not attributable to the service up for bid (such as financial reporting) and should not be included in a fully allocated cost comparison. Other costs, such as handicapped accessibility, will be attributable and should be included in both public and private sector costs.

COMPETITIVE SERVICES BOARD
PRINCIPLES FOR TREATMENT OF UNIQUE
PRIVATE AND PUBLIC SECTOR COST ELEMENTS

Cost Element	Exhibit 20 Reference	Principle/Treatment
Interest Expense	Item (7)	The cost of capital equipment used to provide transit service will often include interest charges. These charges should be included in the cost comparison to reflect the cost of capital. Although the public agency will often have access to a lower interest rate than private operators, this appears to be an advantage inherent to the public sector, and there is no valid reason to compensate for it in the cost comparison. Where public sector interest charges are much lower, it may be preferable for the public agency to obtain the vehicles, regardless of who operates them.
Costs of Contracting	Items (4), (8)	Certain costs will arise as a result of contracting services to the private sector, such as bid preparation, labor protection, and contract management. To the extent that these costs are identifiable and unavoidable, they should be included in the costs associated with the contracting option.

adopted the principle that public/private cost comparisons should employ a fully allocated costing procedure. Fully allocated costs include all direct and shared costs of capital, operations, and administration attributable to the services under consideration for competition. Fully allocated cost comparisons in competitive bidding require that all public-sector costs be shown with an explanation of what is attributable and what is not. Such cost comparisons will provide the information necessary for decisionmakers to assess both the short-run and long-run cost implications of public versus private-sector transit operations. In the evaluation of the bids, however, decisionmakers should take into account the fact that upon contracting out existing service, some or all of the shared public-sector costs attributable to such service may not be eliminated, and therefore may not produce cost savings for the public agency, and the fact that public operators bidding on new services under fully allocated costs may not actually incur some of the costs identified."

The complete text of the CSB Principles on Cost Comparison in Competitive Bidding is presented in Appendix I.

Competitive Services Board

The Competitive Services Board was established by the Urban Mass Transportation Administration (UMTA), in cooperation with the American Public Transit Association (APTA), as a forum for a broad cross-section of public and private sector interests to consider issues related to the competitive provision of transit services. The Board seeks to develop a thorough understanding of these issues with the objective of reaching a consensus on principles for the guidance of local decisionmakers. For issues on which agreement cannot be reached readily, the Board clarifies and documents the concerns and identifies potential actions to address them.

The Board's membership (listed overleaf) is a diverse group representing a wide variety of interests, including public transit agencies, private operators, state departments of transportation, local governments, regional councils, and rural and specialized transit operators. In addition, the administrator of UMTA, the executive director of APTA, and senior representatives of other national associations serve as ex officio members. They help provide policy direction and are encouraged to attend and participate at all Board meetings.

The Board has been established for a two-year initial period. It is expected to meet at least twice a year, with working groups convening in the interim to consider specific issues in depth. The Board's inaugural meeting was held in Washington in September 1986.

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APPENDICES

APPENDIX A

SELECTED REFERENCES FOR COST ANALYSIS AND COST ESTIMATION

REFERENCES

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APPENDIX B

GLOSSARY OF TERMS USED FOR COST ALLOCATION AND COST ESTIMATION

GLOSSARY

1. Average Cost - Total cost to produce a number of units divided by the number of units produced

2. Capital Costs - Expenses incurred for long term capital acquisitions (e.g., buses, facilities)

3. Cost Center - An activity or organizational unit within a transit system for which costs can be accumulated.

4. Depreciation Cost - Decrease in value of a capital asset due to age as determined by purchase price and useful life of the asset

5. Fixed Costs - Expenses that do not vary with the level of production

6. Incremental Cost - Same as marginal cost

7. Marginal Cost - Change in cost resulting from an increase or decrease in the level of output

8. Mode - A type of transit service which is differentiated by its vehicle technology or operational characteristics.

9. Operating Costs - Expenditures for resources consumed during a single year

10. Operating Facility - A facility from which vehicles are dispatched

11. Peak Vehicles - Maximum number of vehicles required to provide service at the hour of most concentrated service

12. Revenue Hours - Number of hours of service operated (does not include time required to travel to and from storage facilities or other "deadhead" travel)

13. Revenue Miles - Number of miles of service operated (does not include miles required to travel to and from storage facilities or other "deadhead" travel)

14. Spare Ratio - Number of unassigned vehicles on hand compared to the required number of peak vehicles

15. Variable Costs - Expenses which are directly related to and vary with the level of production

16. Vehicle Hours - Number of revenue and non-revenue hours of service operated during any given period

17. Vehicle Miles - Number of revenue and non-revenue miles of service operated during any given period

APPENDIX C

GENERALLY ACCEPTED METHODS FOR ESTIMATING SPECIFIC COST ELEMENTS

GENERALLY ACCEPTED METHODS FOR ESTIMATING SIGNIFICANT TRANSIT COST ELEMENTS IN A FULLY ALLOCATED COST ANALYSIS

The purpose of this appendix is to describe generally accepted methods for estimating selected significant cost elements associated with transit service operation and maintenance when conducting a fully allocated cost analysis. The appendix does not comprehensively describe the treatment of all potential objects of transit service cost but is limited to the most significant cost elements.

EXHIBIT C-1

GENERALLY ACCEPTED METHODS FOR ESTIMATING OPERATOR WAGE COSTS

Method of Estimation	Circumstances/Rationale	Merits/Shortcomings
1. Cost Build-Up Method This method typically develops estimates of operator pay hours and/or staffing levels, then applies appropriate cost rates (e.g., hourly wage rate) to estimate wage costs. Operator staffing levels and pay hours are usually derived from joint consideration of service levels, scheduling practices, pay practices and extraboard requirements.	Generally, this method is most appropriate if the service(s) being considered differs significantly from the "average" service profile (e.g., peak to base ratio or span of service). This approach is also appropriate when a transit system is undergoing substantial changes which may negate the use of average historical data.	The cost build-up method usually is the most accurate method for estimating operator wage cost, but can be data and analysis intensive. The availability of automated cost build-up methods eases the application of this approach, but start-up efforts may still require a material investment of time.
2. Peak-Base Unit Cost Method This method includes the development of peak and base period adjustment factors which serve to adjust average unit cost (e.g., cost per vehicle hour) to reflect variations in labor productivity typically caused by crew scheduling constraints and pay penalties.	This method is generally applicable to all services and can be easily included as part of the development of a cost allocation model. Its application is more appropriate for small rather than large amounts of service.	This method is easy to apply and accounts in a broad way for labor cost differences which do exist in the peak and base period. However, this method was found to be most accurate in respect to very small-scale services in a cost evaluation study (Booz, Allen, 1984). It would probably be relatively accurate for

GENERALLY ACCEPTED METHODS FOR ESTIMATING OPERATOR WAGE COSTS

Method of Estimation	Circumstances/Rationale	Merits/Shortcomings
		large-scale services as well, to the extent that the services with which it was calibrated are reflective of the services being estimated.
3. Payhour – Platform Hour Ratio Method This method estimates wage cost based on the number of relevant platform hours to be contracted, a payhour to platform hour ratio, and an average hourly wage rate. The payhour to platform hour ratios can be disaggregated by operating facility, type of service, type of assignment (e.g., split run) or day of week.	This method is useful when a specific type of service is being costed, where data exists to develop the payhour to platform hour ratio for that service.	This method is easy to apply, and is equivalent to the peak-base method in respect to calibration effort. It is potentially more accurate than the peak-base method, provided that appropriate adjustments are made to account for non-scheduled wage cost (e.g., for the extraboard).
4. Unit Cost Method This method estimates operator wage cost on an average cost per vehicle hour basis.	This method is generally applicable to all services. It comprehensively considers operator wage cost.	This method's simplicity and ease of use are also its major shortcomings to the extent that the services being costed do not reflect the average service profile.

EXHIBIT C-2

GENERALLY ACCEPTED METHODS FOR ESTIMATING MAINTENANCE LABOR COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost Method A unit cost factor is developed based on total maintenance labor cost, and the level of service operated, usually in respect to vehicle miles (yielding a unit cost per vehicle mile). The unit cost may be calculated for different vehicle fleets or for different maintenance facilities. A separate unit cost could be developed for servicers (as opposed to mechanics) based on peak vehicles.	This method is most appropriate if the service to be contracted uses vehicles which have maintenance characteristics similar to those of the entire fleet on average.	It is simple to calculate and is valid as long as the overall vehicle fleet is generally interchangeable.
2. Cost build-up Method An estimate of mechanic and servicer personnel and pay hours is built up from detailed maintenance data for each fleet type, based generally on miles operated, mean miles between maintenance actions, and mean time required to complete the action. Pay hours are then multiplied by prevailing rates.	This method is useful when different vehicle fleets exist which are not interchangeable and have substantially different maintenance costs.	This method is the most accurate way to estimate maintenance labor costs but requires greater effort than the unit cost approach. An alternative method which may be simpler to apply yet sensitive to different fleet maintenance characteristics would be to develop fleet-specific unit costs.

GENERALLY ACCEPTED METHODS FOR ESTIMATING SUPERVISORY LABOR COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost Method Generally, supervisory labor costs are allocated to services based on a reasonably associated measure of service. These measures typically vary according to the types of supervisory labor: - transportation supervision is generally allocated based on vehicle hours - mechanic supervision is generally allocated based on vehicle miles - servicer supervision is generally allocated based on peak vehicles If the transit system operates from multiple facilities, these unit costs should be computed for each facility in order to reflect the relevant scale economics.	Supervisory labor is generally a a fixed cost which applies to all services operated out of individual facilities. It typically is not affected by the characteristics of the services to be considered for contracting. Accordingly, the most commonly-applicable approach is to allocate these costs to all services on a unit basis.	The unit cost method should be applied whenever the service to be contracted does not have an effect on the number of supervisory shifts required. This is because the unit cost does not reflect differences in productivity that may exist among different shifts.

GENERALLY ACCEPTED METHODS FOR ESTIMATING SUPERVISORY LABOR COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
2. Cost build-up		
This method may be applied when the use of a unit cost approach is invalidated by the extent of or types of service to be considered for contracting. This could be caused by, for example, the contracting out of night service which could reduce the number of shifts operated.	In those special cases where the contracting of service would affect the number of shifts to be operated, a cost build-up method should be used.	Particularly applicable when number of shifts may be affected. Normally more difficult to apply than unit cost method.

GENERALLY ACCEPTED METHODS FOR ESTIMATING ADMINISTRATIVE LABOR COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost		
This method calculates a unit cost based on some broad measure of the scale of service and is typically expressed in terms of peak vehicles (i.e., cost per peak vehicle). The unit cost of administrative labor which is specific to certain types of services (e.g., demand-responsive) or facilities should be calculated based on the relevant number of peak vehicles operated.	A unit cost approach is almost always applicable to estimating the amount of administrative labor cost associated with a specified service level. This is because these costs are typically fixed over a wide range of service levels.	This method is easy to apply and is applicable in almost situations.
2. Ratio Method		
In this method, administrative labor costs are simply estimated as an overhead multiplier to be applied to direct and supervisory labor costs. This multiplier is based on the existing ratio of	The rationale for the ratio method is similar to that for the unit cost method. It is a generally applicable approach.	The ratio method has the same merits as the unit cost method.

GENERALLY ACCEPTED METHODS FOR ESTIMATING ADMINISTRATIVE LABOR COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
administrative labor cost to direct and supervisory labor costs. As is the case with unit costs, above, these ratios should be developed and applied specifically for certain services and facilities where appropriate.		
3. Cost Build-up This method is based on determining the labor requirements and associated costs of administrative staff. The labor requirements can be built up using time standards or other measures of productivity that are tied to the amount of service being considered for contracting.	This method should be used in those instances when the service being considered for contracting would cause a differential impact on one or more groups of administrative labor.	The cost build-up method is normally not warranted in considering the administrative labor costs for contracted services.

GENERALLY ACCEPTED METHODS FOR ESTIMATING FRINGE BENEFITS COSTS FOR ALL LABOR CATEGORIES

METHODS OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Ratio Method In this method, fringe benefits are allocated as percentage of wage cost. This method is most accurate when the fringe benefits ratio can be established on a cost-center basis (as opposed to a systemwide ratio). This is due to the tendency for paid leave and workers compensation cost to vary among cost centers.	This is a generally applicable method. Benefits cost is almost directly associated with labor cost, and accordingly the ratio method will typically yield an accurate estimate of fringe benefits cost to the extent that the labor cost estimate is accurate. It is most accurate when developed on a cost-center basis.	This method is simple to develop and to apply. It can be used in almost all costing situations without reservation.
2. Cost build-up This method is often used in combination with a build-up method for direct wage cost. It differentiates among benefits cost associated with labor requirements (such as medical insurance), as opposed to those which are associated with the amount of wages paid (such as social security contributions).	This method is more detailed than the ratio approach and should be considered for use when fringe benefits costs can be expected to be non-uniform for the services being considered. This can occur, for example, when the services to be contracted would affect the ratio of part-time to full-time operators, since part-time operators typically have lower benefits costs.	This method requires estimates of labor requirements as well as labor costs in order to apply it. It is useful, however, as an alternative to the ratio approach in those cases where a more accurate estimate is required.
3. Unit Cost In this method, fringe benefits cost is allocated based on cost per vehicle hour, cost per vehicle mile or cost per peak vehicle, depending on the type of labor (e.g., transportation, maintenance, administration) being considered.	This is a generally applicable method. It is most accurate when developed on a cost-center basis. It should not be used, however, if labor (or wage) costs were developed using anything other than a unit cost method.	This method is simple to develop and to apply. It can be used in almost all costing situations.

EXHIBIT C-6

GENERALLY ACCEPTED METHODS FOR ESTIMATING PURCHASED SERVICES COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS SHORTCOMINGS
1. Unit Cost		
In this method, purchased services are estimated based on a unit cost, such as cost per peak vehicle. Usually, there is no need to develop disaggregate unit costs (e.g., for each facility) since purchased services cost are most closely associated with administrative activities. It may be appropriate, however, to develop disaggregate unit costs for different types of transit services (e.g., bus, rail, demand-response).	The unit cost method is generally applicable to all costing situations. Purchased services represent a general overhead cost which must be allocated to the cost of transit services to properly reflect the cost of that service. To the extent that systemwide purchased services costs are not generally applicable to all transit services, separate unit costs should be developed for each type of transit service. For example, the cost of a janitorial services contract for rail stations would not be applicable to bus service costing.	The unit cost method, including the use of disaggregate unit costs where appropriate, is a generally accepted and fundamentally sound approach for allocating purchased services cost to the cost of transit service.
2. Ratio Method		
In this method, purchased services costs are estimated based on the current ratio of these costs to direct operating expenses. As with the unit cost method, separate ratios should be developed for different types of transit services.	The same qualifications listed for the unit cost method are applicable to the ratios method.	The merits listed for the unit cost method are also applicable to the ratios method.

GENERALLY ACCEPTED METHODS FOR ESTIMATING FUEL AND LUBRICANTS COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/ RATIONALE	MERITS/ SHORTCOMINGS
1. Unit Cost In this method, fuel and lubricants cost is allocated to transit services based on vehicle miles (i.e., cost per vehicle mile). Separate unit costs may be required for transit services which have significantly different fuel consumption rates.	The unit cost method for determining fuel and lubricants cost is generally applicable to all costing situations. Fuel and lubricants cost is directly related to vehicle miles travelled.	This method is easy to apply and in most cases will produce accurate estimates of fuel and lubricants cost. Disaggregate unit costs should be developed if cost per mile is significantly different for different types of transit services.
2. Cost build-up This method relies on an estimate of fuel and lubricants consumption rates (e.g., miles per gallon of fuel or per quart of oil), prevailing vendor costs and vehicle miles travelled to determine fuel and lubricants cost.	The cost build-up method is a useful alternative to the unit cost method in those cases where the financial reporting system does not provide a valid basis for determining unit costs to be applied to certain transit services. For example, commuter bus service generally experiences better fuel consumption rates than do local bus services. If the financial reporting system does not report fuel expense at this level of detail, then a cost build-up method would be appropriate.	This method is more accurate than the unit cost method in those cases where an average unit cost would significantly understate or overstate fuel and lubricants cost. It may however require substantially more effort to apply. Further, the results from applying a cost build-up approach should be periodically reconciled against actual cost to ensure that all fuel costs are being include in the calculation.

GENERALLY ACCEPTED METHODS FOR ESTIMATING FUEL AND LUBRICANTS COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/ RATIONALE	MERITS/ SHORTCOMINGS
1. Unit Cost		
In this method, fuel and lubricants cost is allocated to transit services based on vehicle miles (i.e., cost per vehicle mile). Separate unit costs may be required for transit services which have significantly different fuel consumption rates.	The unit cost method for determining fuel and lubricants cost is generally applicable to all costing situations. Fuel and lubricants cost is directly related to vehicle miles travelled.	This method is easy to apply and in most cases will produce accurate estimates of fuel and lubricants cost. Disaggregate unit costs should be developed if cost per mile is significantly different for different types of transit services.
2. Cost build-up		
This method relies on an estimate of fuel and lubricants consumption rates (e.g., miles per gallon of fuel or per quart of oil), prevailing vendor costs and vehicle miles travelled to determine fuel and lubricants cost.	The cost build-up method is a useful alternative to the unit cost method in those cases where the financial reporting system does not provide a valid basis for determining unit costs to be applied to certain transit services. For example, commuter bus service generally experiences better fuel consumption rates than do local bus services. If the financial reporting system does not report fuel expense at this level of detail, then a cost build-up method would be appropriate.	This method is more accurate than the unit cost method in those cases where an average unit cost would significantly understate or overstate fuel and lubricants cost. It may however require substantially more effort to apply. Further, the results from applying a cost build-up approach should be periodically reconciled against actual cost to ensure that all fuel costs are being include in the calculation.

GENERALLY ACCEPTED METHODS FOR ESTIMATING TIRES AND TUBES COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost In this method, tires and tubes cost is estimated based on a current cost per vehicle mile. It should be noted that the true unit cost can vary materially among different types of vehicles. Vans, for example, typically have a lower unit cost than do standard buses because they have fewer tires. Conversely, articulated buses have a relatively higher unit cost because they have more tires than a standard bus. These differences are important only if these vehicle types are not interchangeable for the type of service being considered for contracting. Typically, unit cost is the sole type of method applied to estimate tires and tubes cost.	The unit cost method is generally applicable to all costing situations. Disaggregate unit costs should be developed and applied for materially different vehicle types, where these vehicles are not interchangeable. Vans and standard buses, for example, are not generally interchangeable. Standard buses and articulated buses, on the other hand, are generally interchangeable.	The method is simple to develop and to apply

EXHIBIT C-9

GENERALLY ACCEPTED METHODS FOR ESTIMATING OTHER MATERIALS AND SUPPLIES COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost In this method, materials and supplies cost is allocated to transit service cost based on some measure of the amount of service operated, such as peak vehicles (i.e., cost per peak vehicle). For maintenance materials only, cost per vehicle mile would be the appropriate unit cost.	This method is generally applicable to all costing situations. Other materials and supplies cost is an overhead cost which is typically attributable to all types of transit services. Accordingly, it is usually not necessary to develop disaggregate estimates of unit cost.	This method is easy to apply and yields a reasonably accurate estimate of the other materials and supplies cost attributable to a portion of transit service.
2. Ratio Method In this method, materials and supplies cost is allocated to transit service cost based on the existing ratio of other materials and supplies cost to direct operating cost.	Same as for the unit cost method.	Same as for the unit cost method.

GENERALLY ACCEPTED METHODS FOR ESTIMATING UTILITIES COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost In this method, utilities costs are allocated to transit service cost based on some measure of level of service operated, such as peak vehicles. In certain cases, however, span of operation would be a better choice for determining unit cost. This approach would be valid, for example, when considering the contracting of all night or weekend services operating from a single facility, thus allowing the facility to be closed during these times and thereby reducing facility-related utility costs. Unit costs should be developed on a disaggregate basis if multiple facilities are used.	Utilities cost is an overhead cost which should be allocated to transit services, and to the extent possible this allocation should reflect the economics of the facilities from which the service is being provided. A unit cost approach is a generally applicable basis for allocation. Normally, peak vehicles would be the appropriate choice for developing a unit cost, because this reflects the scale of the facility. In cases where some definable services require a facility to have extended operating hours (such as nights and weekends), the span (or clock hours) of operation may be a more appropriate basis for developing a unit cost.	This method is easy to apply and yields a reasonably accurate estimate of the other materials and supplies cost attributable to a portion of transit service. However, certain potential contracting situations may require careful consideration of how the unit cost is developed in order to realistically reflect the true cost of service.
2. Ratio method In this method, utilities costs are allocated to transit service cost based on an existing ratio of utilities cost to direct costs.		

GENERALLY ACCEPTED METHODS FOR ESTIMATING CASUALTY AND LIABILITY COSTS

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost		
This method allocates casualty and liability cost to transit services based on some measure of the amount of service operated. These measures may vary according to the type of casualty and liability cost being considered: - Vehicle miles is generally used as an allocation basis for property loss and property damage cost, and for workers compensation cost attributable to maintenance activities. - Vehicle hours is generally used as an allocation basis for workers compensation cost attributable to revenue vehicle operations.	Casualty and liability cost is attributable to the amount of exposure to the risk of loss. Since the sources of exposure vary for the principal components of casualty and liability cost, it is appropriate to use different bases for developing the unit cost of each.	The ease of developing this method is somewhat dependent on the ability of the financial reporting or claims control systems to report these costs on a cost-center basis. At a minimum, however, the basic cost components (PL/PD, Workers Compensation, and "other") should be used to develop distinct unit costs. The attribution of workers compensation costs to maintenance, revenue vehicle operations and administrative staff will increase the accuracy of the allocated cost estimate.

GENERALLY ACCEPTED METHODS FOR ESTIMATING MISCELLANEOUS EXPENSE

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost This method allocates miscellaneous expenses to transit service cost based on some measure of the level of service operated, typically peak vehicles (i.e., cost per peak vehicle).	Miscellaneous expense is an overhead cost which should be allocated to all relevant services. The unit cost method is a reasonable basis for allocating overhead costs in general to portions of transit service.	This method is simple to develop and to apply and yields a reasonably accurate estimate of shared cost at the route level.
2. Ratio Method This method allocates miscellaneous expenses to transit service cost as a percentage of direct operating cost.	The ratio method is an acceptable method for allocating miscellaneous expense to transit service cost.	Same as for the unit cost method.

GENERALLY ACCEPTED METHODS FOR ESTIMATING INTEREST EXPENSE

METHOD OF ESTIMATION	CIRCUMSTANCES/RATIONALE	MERITS/SHORTCOMINGS
1. Unit Cost This method allocates interest expense to transit service cost on the basis of the level of service operated, typically in respect to peak vehicles (i.e., cost per peak vehicle).	Interest expense is an overhead cost that typically reflects short-term borrowing needs. It should be allocated to all services and the unit cost method is a reasonable basis for this allocation.	This method is simple to develop and to apply and yields a reasonably accurate allocation of interest expense to the route level.
2. Ratio Method This method allocates interest expense to transit service cost as a percentage of direct operating cost.	Same as for the unit cost method.	Same as for the unit cost method.

APPENDIX D

GENERALLY ACCEPTED APPROACHES FOR ESTIMATING DEPRECIATION EXPENSE

GENERALLY ACCEPTED METHODS FOR COMPUTING DEPRECIATION EXPENSE

The purpose of this Appendix is to describe generally accepted methods for computing the depreciation expense of capital assets used in connection with the delivery of transit service. The Appendix also includes a listing of useful lives for selected capital assets and indicates accepted methods for computing salvage value as a percentage of acquisition cost.

GENERALLY ACCEPTED DEPRECIATION METHODS

The depreciation methods listed below describe generally accepted accounting methods. Some entities will use one method for book reporting and another method for tax reporting. The methods described here are the most commonly used in business.

1. Straight Line Depreciation: Each year of service absorbs an equal portion of the acquisition cost.

   $$\text{Depreciation per year} = \frac{\text{cost - net salvage value}}{\text{\# of years}}$$

2. Accelerated Depreciation: Assets yield a greater quantity of service in the early years of service life.

   2a. Fixed percent of declining balance method: a percentage depreciation rate is computed which when applied to the book value of the asset at the beginning of the period will result in decreasing the asset's book value.

   Depreciation per year = book value x depreciation rate

   $$\text{Depreciation rate} = 1 - \left(\sqrt[n]{\frac{\text{net salvage value}}{\text{cost}}} \right)$$

   where n = useful life (years)

   2b. Sum-of-the-years-digits method: is computed by a simple mathematical procedure relating to arithmetic progressions.

$$\text{Depreciation per year} = \text{Book Value X} \frac{(\text{Total \# of Years - Years Depr})}{[\text{Life of Asset X} \frac{(\text{life + 1})}{2}]}$$

3. Units of Output Method: (cost of asset less estimated net salvage value) X estimated unit of output divided by life of machine - note: depreciation per unit is constant.

   Example: a bus costs $30,000, useful life 200,000 miles $0 salvage value, $30,000/200,000 = $.15 per mile depreciation expense. Miles driven in year X $.15 per mile = depreciation expense.

In addition retirement and replacement methods are sometimes used in the railroad and public utility industries.

4. Retirement Method: the asset cost less net salvage value is expensed in the year of retirement.

5. Replacement Method: the asset cost less net salvage value is expensed in the year of replacement.

These methods are used when the service life of assets is difficult to estimate and the distinction between maintenance and replacement is difficult to analyze. They are normally used when considering a group of interrelated assets each of which has a relatively small unit cost.

The last two methods are used less frequently with utilities and railroads.

6. Annuity Method: the period cost of using an asset is considered to be equal to the expired cost of the asset plus the interest on the unrecovered investment in the asset.

$$\text{Depreciation} = \frac{\text{cost of asset less percent value of net salvage value}}{\text{present value of ordinary annuity of X periods at Y \%}}$$

7. Sinking Fund Method: might be used when a fund is to be accumulated to replace an asset at the end of its estimated useful life. Under this method the amount of the annual depreciation is equal to the increase in the asset replacement fund.

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
2210	Locomotives	29	16.51
2220	Rail Cars	40	10.27
2230	Right-of-Way Construction and Maintenance Equipment, Railroad	20	18.69
2240	Locomotive and Rail Car Accessories and Components	(b)	9.98
2250	Track Materials, Railroad	(b)	41.00
2305	Ground Effect Vehicles	15	
2310	Passenger Motor Vehicles	See Below	17.00
	Passenger Cars and Station Wagons	6	
	Buses (11 or more passengers)	12(c)	
	Ambulances	7	
2320	Trucks and Truck Tractors, Wheeled		
	Less than 12,500 (payload 1 ton and less)	6	
	12,500 through 16,999 (Payload, 1-1/2 through 2-1/2 tons)	7	
	17,000 and over (payload, 3 tons and over)	9	
	Multiple Drive Vehicles	6	
2330	Trailers	23	10.09
2340	Motorcycles, Motor Scooters and Bicycles	12	27.31
2350	Combat, Assault and Tactical Vehicles, Tracked	14	32.82
2410	Tractors, Full Track, Low Speed	14	27.62
2420	Tractors, Wheeled	13	22.70
2430	Tractors, Track Laying, High Speed	(b)	7.42
2510	Vehicle Cab, Body and Frame Structural Components	10	14.18
2520	Vehicular Power Transmission Components	12	16.22
2530	Vehicular Brake, Steering, Axle, Wheel and Track Components	12	12.17
2540	Vehicular Furniture and Accessories	18	6.95

a. Unless specifically noted otherwise. Source: Office of Management and Budget, "Performance of Commercial Activities," OMB Circular No. A-76 Supplement, August, 1983.
b. There is no expected useful life reported for this item.
c. Source: Urban Mass Transportation Administration.

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
2590	Misc. Vehicular Components	10	7.04
2805	Gasoline Reciprocating Engines, except Aircraft and Components	7	5.68
2815	Diesel Engines and Components	(b)	13.33
2835	Gas Turbines and Jet Engines, except Aircraft and Components	15	3.59
2845	Rocket Engines and Components	(b)	0.11
2910	Engine Fuel System Components, Nonaircraft	(b)	8.01
2920	Engine Electrical System Components, Nonaircraft	(b)	10.32
2930	Engine Cooling System Components, Nonaircraft	(b)	21.96
2950	Turbosuperchargers	(b)	8.26
2990	Misc. Engine Accessories, Nonaircraft	(b)	7.77
3010	Torque Converters and Speed Changers	(b)	5.93
3020	Gears, Pulleys, Sprockets and Transmission Chain	(b)	4.64
3040	Misc. Power Transmission Equipment	(b)	3.22
3110	Bearings, Antifriction, Unmounted	(b)	22.14
3120	Bearings, Plain, Unmounted	(b)	4.78
3130	Bearings, Mounted	(b)	7.80
3210	Sawmill and Planning Mill Machinery	15	28.41
3220	Woodworking Machines	15	27.37
3405	Saws and Filing Machines	20	30.87
3408	Machining Centers and Way-Type Machines	(b)	7.49
3410	Electrical and Ultrasonic Erosion Machines	10	9.75
3411	Boring Machines	20	49.61
3413	Drilling and Tapping Machines	15	40.16
3414	Gear Cutting and Finishing Machines	10	29.58
3415	Grinding Machines	15	35.06
3416	Lathes	20	39.84
3417	Milling Machines	20	28.22
3418	Planners and Shapers	20	27.66
3419	Misc. Machine Tools	15	17.92
3422	Rolling Mills and Drawing Machines	10	68.35

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
3424	Metal Heat Treating and Non-Thermal Treating Equipment	25	11.72
3426	Metal Finishing Equipment	20	6.63
3431	Electric Arc Welding Equipment	10	9.87
3432	Electric Resistance Welding Equipment	15	9.90
3433	Gas Welding, Heat Cutting and Metalizing Equipment	15	6.76
3436	Welding Positioners and Manipulators	30	26.88
3438	Misc. Welding Equipment	10	4.88
3439	Misc. Welding, Soldering and Brazing Supplies and Accessories	5	10.98
3441	Bending and Forming Machines	25	42.25
3442	Hydraulic and Pneumatic Presses, Power Driven	10	20.14
3443	Mechanical Presses, Power Driven	11	59.41
3444	Manual Presses	30	29.67
3445	Punching and Shearing Machines	15	44.83
3446	Forging Machinery and Hammers	20	77.56
3447	Wire and Metal Ribbon Forming Machines	(b)	24.60
3448	Riveting Machines	10	14.12
3449	Misc. Secondary Metal Forming and Cutting Machines	10	35.22
3450	Machine Tools, Portable	20	13.28
3455	Cutting Tools for Machine Tools	(b)	9.89
3460	Machine Tool Accessories	15	17.41
3461	Accessories for Secondary Metal-working Machinery	(b)	4.32
3465	Production Jigs, Fixtures and Templates	5	2.28
3470	Machine Shop Sets, Kits and Outfits	(b)	3.57
3610	Printing, Duplicating and Bookbinding Equipment	16	4.31
3611	Industrial Marking Machines	10	2.20
3620	Rubber and Plastics Working Machinery	8	45.18
3650	Chemical and Pharmaceutical Products Manufacturing Machinery	(b)	7.85
3655	Gas Generating and Dispersing Systems	12	7.35
3660	Industrial Size Reduction Machinery	9	27.30

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
3680	Foundry Machinery, Related Equipment and Supplies	10	12.61
3693	Industrial Assembly Machine	(b)	0.45
3694	Clean work Stations, Controlled Environment and Related Equipment	(b)	6.43
3695	Misc. Special Industry Equipment	4	7.58
3710	Conveyors	12	6.85
3920	Materials Handling Equipment Nonself Propelled	22	9.07
3930	Warehouse Trucks and Tractors, Self Propelled	See Below	18.60
	Gasoline		
	Fork Truck (2,000 pounds to 6,000 pounds)	8	
	Fork Truck (over 6,000 pounds	10	
	Tractor	8	
	Crane	12	
	Platform Truck	8	
	Straddle Truck	15	
	Electric		
	All types	15	
3940	Blocks, Tackle, Rigging and Slings	(b)	9.61
3950	Winches, Hoists, Craines and Derricks	13	10.23
3990	Misc. Materials Handling Equipment	30	8.71
4010	Chain and Wire Rope	(b)	5.11
4020	Fiber Rope, Cordage and Twine	(b)	6.81
4030	Fittings for Rope, Cable and Chain	(b)	13.16
4110	Refrigeraton Equipment	11	7.07
4120	Air Conditioning Equipment	10	3.82
4130	Refrigeration and Air Conditioning Components	16	4.26
4140	Fans, Air Circulators and Blow Equipment	7	4.79
4210	Fire Fighting Equipment	14	6.55
4220	Marine Lifesaving and Diving Equipment	10	5.65
4230	Decontaminating and Impregnating Equip	17	5.87
4240	Safety and Rescue Equipment	19	2.53

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
4310	Compressors and Vacuum Pumps	10	7.59
4320	Power and Hand Pumps	15	4.27
4330	Certifuges, Separators and Pressure and Vacuum Filters	20	4.90
4410	Industrial Boilers	9	3.78
4420	Heat Exchanges and Steam Condensors	(b)	9.73
4430	Industrial Furnaces, Kilns, Lehrs and Ovens	10	6.59
4440	Driers, Dehydrators and Anhydrators	10	4.55
4460	Air Purification Equipment	11	3.71
4510	Plumbing Fixtures and Accessories	15	5.91
4520	Space Heating Equipment and Domestic Water Heaters	8	8.36
4540	Misc. Plumbing, Heating and Sanitation	8	3 01
4610	Water Purification Equipment	14	4.55
4620	Water Distillation Equipment, Marine and Industrial	15	15.61
4710	Pipe and Tube	(b)	7.79
4720	House and Tubing, Flexible	(b)	6.13
4730	Fittings and Specialities, Hose, Pipe and Tube	(b)	4.83
4810	Valves, Powered	(b)	2.20
4820	Valves, Nonpowered	(b)	4.91
4910	Motor Vehicle, Maintenance and Specialized Equipment	11	6 63
4930	Lubrication and Fuel Dispensing Equipment	15	5.00
4931	Fire Control Maintenance and Repair Shop Specialized Equipment	9	1.18
4933	Weapons Maintenance and Repair Shop Specialized Equipment	15	1.91
4935	Guided Missile Maintenance, Repair and Checkout Specialized Equipment	19	0.40
4940	Misc. Maintenance and Repair Shop Specialized Equipment	20	4.48
5110	Hand Tools, Edged, Nonpowered	10	9.26

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
5120	Hand Tools, Nonedged, Nonpowered	21	5.53
5130	Hand Tools, Power Driven	10	10.31
5133	Drill Bits, Counterbores and Countersinks, Hand and Machine	10	24.07
5136	Taps, Dies and Collets, Hand and Machine	10	8.08
5140	Tool and Hardware Boxes	20	26.42
5180	Sets, Kits and Outfits of Hand Tools	23	3.83
5210	Measuring Tools, Craftsmen	10	4.87
5220	Inspection Gages and Precision Layout Tools	12	3.17
5280	Sets, Kits and Outfits of Measuring Tools	25	1.01
5410	Prefabricated and Portable Building	8	2.48
5411	Rigid Wall Shelters	20	2.44
5420	Bridges, Fixed and Floating	17	7.25
5430	Storage Tanks	7	6.83
5440	Scaffolding Equipment and Concrete Form	5	6.83
5445	Prefabricated Tower Structures	23	5.23
5450	Misc. Prefabricated Structure	25	1.30
5670	Architectural and Related Metal Products	10	59.16
5680	Misc. Construction Materials	69	9.59
5805	Telephone and Telegraph Equipment	23	2.37
5810	Communications Security Equipment and Components	16	0.40
5811	Other Cryptologic Equipment and Components	11	1.25
5815	Teletype and Facsimile Equipment	22	0.99
5820	Radio and Television Communications	8	2.44
5825	Radio Navigation Equipment, except Airborne	24	1.44
5830	Intercommunication and Public Address Systems, except Airborne	24	1.74
5835	Sound Recording and Reproducing Equipment	22	1.43
5840	Radar Equipment, except Airborne	23	0.92
5845	Underwater Sound Equipment	13	1.14

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cos
5850	Visible and Invesible Light Communication Equipment	24	0.32
5855	Night Vision Equipment, Emitted and Reflected Radiation	25	1.18
5860	Stimulated Coherent Radiation Devices, Components and Assessories	25	0.71
5865	Electronic Countermeasures, Counter Countermeasures and Quick Reaction Capability Equipment	20	0.27
5895	Misc. Communications Equipment	23	0.67
5905	Resistors	8	1.02
5910	Capacitors	8	2.32
5915	Filters and Networks	25	0.93
5920	Fuses and Lightning Arrestors	25	3.12
5925	Circuit Breakers	10	7.49
5930	Switches	10	1.55
5935	Connectors, Electrical	22	20.61
5940	Lugs, Terminals and Temminal Strips	8	1.66
5945	Relays and Solenoids	25	1.36
5950	Coils and Transformers	8	1.35
5955	Piezoelectric Crystals	8	0.65
5960	Electron Tubes and Associated Hardware	8	1.00
5961	Semiconductor Devices and Associated Hardware	8	1.04
5962	Microcircuits, Electronic	8	0.54
5963	Electronic Modules	8	--
5965	Headsets, Handsets, Microphones and Speakers	24	4.28
5970	Electrical Insulators and Insulting Materials	8	34.93
5977	Electrical Contact Brushes and Electrodes	8	2.08
5985	Antennas, Waveguide and Related Equipment	8	2.02
5990	Synchros and Resolvers	14	1.65
5995	Cable, Cord and Wire Assemblies, Communications Equipment	24	4.16
5999	Misc. Electrical and Electronic Components	20	1.01
6105	Motors, Electrical	10	5.31
6110	Electrical Control Equipment	8	2.45

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
6115	Generators and Generator Sets, Electrical	19	6.50
6116	Fuel Cell Power Units, Components and Accessories	15	22.88
6120	Transformers: Distribution and Power Station	36	7.87
6125	Convertors, Electrical, Rotating	25	2.88
6130	Convertors, Electrical, Nonrotating	22	1.75
6135	Batteries, Primary	15	2.51
6140	Batteries, Secondary	25	6.91
6145	Wire and Cable, Electrical	25	16.29
6150	Misc. Electric Power and Distribution Equipment	15	2.55
6210	Indoor and Outdoor Electric Lighting Fixtures	16	3.95
6220	Electric Vehicular Light and Fixtures	10	4.58
6230	Electric Portable and Hand Lighting Equipment	17	3.44
6240	Electric Lamps	10	6.92
6250	Ballasts, Lampholders and Starters	10	3.91
6310	Traffic and Transit Signal Systems	4	3.52
6320	Shipboard Alarm and Signal Systems	4	2.68
6350	Misc. Alarm, Signal and Security Detection Systems	6	1.38
6620	Engine Instruments	15	3.04
6625	Electrical and Electronic Properties Measuring and Testing Instruments	15	1.15
6630	Chemical Analysis Instruments	5	1.70
6635	Physical Properties Testing Equipment	13	6.62
6636	Environmental Chambers and Related Equipment	10	2.20
6640	Laboratory Equipment and Supplies	20	2.12
6645	Time Measuring Instruments	25	5.54
6650	Optical Instruments	8	2.31
6655	Geophysical and Astromical Instruments	25	2.02
6660	Meterological Instruments and Apparatus	10	1.05
6665	Hazard-Detecting Instruments and Apparatus	16	1.44

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
6670	Scales and Balances	18	4.77
6675	Drafting, Surveying and Mapping Instruments	19	2.44
6680	Liquid and Gas Flow, Liquid Level and Mechanical Motion Measuring Instruments	10	2.87
6685	Pressure, Temperature and Humidity Measuring and Controlling Instruments	10	2.53
6695	Combination and Misc. instruments	8	2.06
6710	Cameras, Motion Pictures	25	5.29
6720	Cameras, Still Picture	24	1.82
6730	Photographic Projection Equipment	25	3.52
6740	Photographic Developing and Finishing Equipment	24	3.32
6750	Photographic Supplies	25	8.64
6760	Photographic Equipment and Accessories	24	1.36
6780	Photographic Sets, Kits and Outfits	22	3.24
6910	Training Aids	20	0.96
6920	Armament Training Devices	20	3.22
6930	Operation Training Devices	21	0.62
7010	ADPE Configuration	8	0.73
7021	ADP Central Processing Unit, Digital	15	0.73
7022	ADP Central Processing Unit, Hybrid	15	
7025	ADP Input/Output and Storage Devices	13	1.01
7030	ADP Software	15	0.97
7035	ADP Accessorial Equipment	13	0.72
7040	Punched Card Equipment	15	0.87
7045	ADP Supplies and Support Equipment	11	1.50
7050	ADP Components	15	0.95
7105	Household Furniture	10	9.94
7110	Office Furniture	10	16.20
7125	Cabinets, Lockers, Bins and Shelving	20	9.47
7195	Misc. Furniture and Fixtures	10	6.17
7310	Food Cooking, Baking and Serving Equipment	12	5.40
7320	Kitchen Equipment and Appliances	18	5.60

USEFUL LIFE AND DISPOSAL VALUE TABLE

FSC No.	Nomenclature	Expected Useful Life (Years)(a)	Disposal Value Factor as a Percent of Acquisition Cost
7360	Sets, Kits and Outfits: Food Preparation and Serving	10	11.41
7420	Accounting and Calculating Machine	12 Electric/ 15 Manual	1.46
7430	Typewriters and Office Type Composing Machines	12 Electric/ 15 Manual	6.10
7450	Office Type Sound Recording and Reproducing Machines	12	1.17
7460	Visible Record Equipment		2.26
7490	Misc. Office Machines	12	3.30
7910	Floor Polishers and Vacuum Cleaning Equipment	(b)	5.72
8145	Specialized Shipping and Storage Containers	22	6.55
8340	Tents and Tarpaulins	5	4.86
8345	Flags and Pennants	5	8.30
8415	Clothing, Special Purpose	5	10.81
8820	Live Animals, Not Raised for Food	3	55.05
9320	Rubber Fabricated Materials	5	19.40
9340	Glass Fabricated Materials	5	4.14
9515	Armor Plate	10	19.00
9530	Metal Bar	10	47.51
9535	Metal Plate	10	52.44

APPENDIX E

GENERALLY ACCEPTED METHODS FOR TREATING LEASED CAPITAL ASSETS

APPENDIX E

GENERALLY ACCEPTED METHODS FOR TREATING LEASED CAPITAL ASSETS

The purpose of this Appendix is to describe generally accepted methods for treating leased capital assets in a fully allocated costing analysis of public and non-profit agency service proposals.

ACCOUNTING FOR LEASES

Lease agreements are classified as either operating leases or capital leases for financial reporting disclosure in the private sector. The classification criteria and accounting treatment described below follows the standards prescribed by the Financial Accounting Standards Board.

A. Criteria for Classifying Leases

If a lease fulfills one of the following criteria, it is treated as a capital lease. All other leases are treated as operating leases.

The lease is classified as a Capital Lease if:

1. The lease transfers ownership of the property to the lessee by the end of the lease term; or

2. The lease contains a bargain purchase option (where the lease purchase price is lower than the expected fair market value of the property); or

3. The lease term is equal to 75 percent or more of the estimated economic life of the leased property (unless the term begins in the last 25 percent of the estimated economic life); or

4. The present value of the minimum lease payments (amounts lessee is minimally obligated) excluding executory costs (insurance, maintenance, tasks, etc. that are paid by the lessor) equals or exceeds ninety percent of the fair market value of the lease property. Again, the term cannot begin in the last 25 percent of the property's economic life. The present value is calculated using the lesser of the interest rate implied in the lease or the lessee's incremental borrowing rate.

B. Treatment of Leases

1. Operating Lease Treatment

The minimum lease payments for operating leases are expensed in the period that they are due.

2. Capital Lease Treatment

The present value of the minimum lease payments less executory costs (amount must be equal to or less than fair market value) is recorded as a fixed asset and an obligation (liability). The asset is then depreciated according to the entity's depreciation policies or the term of the lease as defined in the Financial Accounting Standards Board Statements. Each minimum lease payment is allocated between reduction of the obligation (liability) and period interest expense. The allocation of the minimum lease payment is based on present value analysis.

C. Treatment of Leases--Two Examples

Example 1 describes an operating lease and its treatment. Example 2 describes an agreement to be treated as a capital lease and describes its proper accounting treatment according to Financial Accounting Standards.

1. Operating Lease Treatment--Example 1

a. Situation

The lessee enters into an agreement to use a new piece of equipment for 24 months at a monthly cost of $1,000. The stated interest rate is six percent. The lessee has the option to buy the equipment at the end of the term for $28,000. Executory costs equal $1,000 for the lessee term. The equipment has an economic life of five (5) years and a fair market value of $50,000 to the lessor. The equipment has no residual value at the end of its expected economic life.

b. Lease Classification

1. The lease does not automatically transfer to the lessee at the end of the lease term.

2. A purchase of $28,000 at the end of the lease term does not represent a bargain purchase.

3. The lease term is forty percent of the equipment's economic life, less than the required 75 percent life for a Capital Lease.

4. Present value of the minimum lease payments equals:

24 months x $1,000 =	$24,000
less executory costs	1,000
	$23,000
Present value of minimum payments at 6% interest rate	$20,470

$20,470 is less than ninety percent of fair market value ($50,000)

Therefore, none of the criteria for a Capital Lease have been met. This lease is to be treated as an Operating Lease. In the first year $12,000 would be charged to period expense and in the second year $12,000 would be changed to period expense.

2. Capital Lease Treatment--Example 2

a. Situation

The lessee enters into an agreement to lease equipment for sixty (60) months at $100,000 per month. The lease interest rate equals six percent (6%). The lessee can currently borrow funds for major equipment purchases at 6.5 percent (6.5%). At the end of the lease, the lessee can acquire the equipment for $200,000. The lessor's estimated economic life of the equipment is eight (8) years. The fair market value of the equipment is $4,600,000. The taxes equal $100,000 over the term of the lease. Maintenance and insurance is contracted for by the lessee.

b. Lease Classification

1. Ownership does not transfer at the end of the lease term.

2. A bargain purchase option does not exist.

3. The lease term is less than 75 percent of the eight-year economic life.

4. The Present Value of the minimum lease payments equals:

60 months x $100,000 =	$6,000,000
Less executory costs	100,000
	$5,900,000
Present Value of minimum payment at 6% interest rate	$4,407,300

The present value of the minimum payments equals 95.8 percent of the fair market value.

Therefore, since the minimum lease payments exceeds ninety percent of the fair market value, this lease qualifies as a Capital Lease.

c. Capital Lease Accounting Treatment

Each year payments equaling $1,200,000 are made. The present value of those payments at a six percent interest rate is $4,482,000, the amount to be initially capitalized and recorded as an obligation (liability). Each year the $1,200,000 is allocated between interest expense and depreciation based on the following schedule.

EXAMPLE 2

SCHEDULE OF ACCOUNTING TREATMENT

Minimum Lease Payments:	60 x $100,000	$6,000,000
Discount Factor @ 6% for 5 years		x .747
Present Value of Lease Payments		$4,482,000
Interest Portion Recognized in Lease Agreement		$1,518,000

YEAR	(1) LEASE PAYMENT	(2) INTEREST EXPENSE	(3) DEPRECIATION	(4) REMAINING ASSET VALUE
1	$1,200,000	$505,494	$694,506	$3,787,494
2	1,200,000	405,306	794,694	2,992,800
3	1,200,000	303,600	896,400	2,096,400
4	1,200,000	201,894	998,106	1,098,294
5	1,200,000	101,706	1,098,294	-0-
Total Lease	$6,000,000	$1,518,000	$4,482,000	

1. $100,000/Month x 12 months

2. "Rule of Eights" Interest Amortization

Year 1 $\frac{5}{5+4+3+2+1}$ = 33.3% x 1,518,000

Year 2 $\frac{4}{5+4+3+2+1}$ = 26.7% x 1,518,000

Year 3 $\frac{3}{5+4+3+2+1}$ = 20.0% x 1,518,000

Year 4 $\frac{2}{5+4+3+2+1}$ = 13.3% x 1,518,000

Year 5 $\frac{1}{5+4+3+2+1}$ = 6.7% x 1,518,000

100.0%

3. Column (1) - Column (2)

4. $4,482,000 less cumulative depreciation

APPENDIX F

COMPETITIVE SERVICES BOARD'S PRINCIPLES ON COST COMPARISONS IN COMPETITIVE BIDDING

THE COMPETITIVE SERVICES BOARD'S PRINCIPLES ON COST COMPARISONS IN COMPETITIVE BIDDING

NOVEMBER 16, 1986

The current interest in encouraging competition for the provision of public transportation services has raised a number of issues regarding the proper way to compare public and private-sector costs. The Competitive Services Board has developed the principles presented here with the intent of helping state and local decisionmakers resolve these issues. These principles are responses to actual concerns raised by state and local decisionmakers and public and private operators with respect to cost comparisons in competitive bidding. The Board recognizes that cost comparison is an important consideration, but not the sole consideration, in evaluating competitive bids. Other considerations include service quality, service continuity, financial and managerial ability to carry out the contract, and relevant experience in the provision of public transportation services.

In developing these principles, the Competitive Services Board recognized the complexities inherent in balancing the demands of public policy, sound economics and service to the public. The Board also recognized that competition which draws upon the skills and resources of both the public and private sectors is extremely valuable. Accordingly, the Board has developed these principles on cost comparisons as a practical, general guide to help in fostering an even-handed competitive environment for public transportation.

The public agency has a responsibility to minimize public-sector costs and to maximize the amount of service that can be provided. Guided by this objective, the Board has adopted the principle that public/private cost comparisons should employ a fully allocated costing procedure. Fully allocated costs include all direct and shared costs of capital, operations, and administration attributable to the services under consideration for competition. Fully allocated cost comparisons in competitive bidding require that all public-sector costs be shown with an explanation of what is attributable and what is not. Such cost comparisons will provide the information necessary for decisionmakers to assess both the short-run and long-run cost implications of public versus private-sector transit operations. In the evaluation of the bids, however, decisionmakers should take into account the fact that upon contracting out existing service, some or all of the shared public-sector costs attributable to such service may not be eliminated, and therefore may not produce cost savings for the public agency, and the fact that public operators bidding on new services under fully allocated costs may not actually incur some of the costs identified.