

GUIDELINES FOR EVALUATION OF  
HUMAN SERVICES TRANSPORTATION PROGRAMS

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## ABSTRACT

This report expands upon an earlier research effort which reviewed several human services transportation programs in Texas and recommends an Evaluation Procedure and a Monitoring System for consideration by various human services agencies. The Evaluation Procedure is designed to be flexible to meet specific program needs while accomplishing the objective of allowing human services agencies to evaluate existing or alternative transportation services. The proposed Monitoring System presents a three-level reporting system utilizing uniform accounting definitions and data elements. A test of the suggested Monitoring System on the human services transportation programs surveyed during the first phase of this research effort indicates that roughly half of the required data elements are available. Currently, this allows for the computation of approximately one-third of the suggested performance indicators.

## ACKNOWLEDGEMENTS

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## DISCLAIMER

This report was prepared by the Texas Transportation Institute for the Texas State Department of Highways and Public Transportation in cooperation with the U.S. Department of Transportation, Urban Mass Transportation Administration.

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## SUMMARY

This report recommends an Evaluation Procedure and a Monitoring System for consideration by various human services transportation programs. It complements a previous report (Technical Report 1065-1) entitled "Evaluation of Selective Human Services Transportation Providers in Texas."

A brief summary of the major research findings is presented in the remainder of this section.

### Evaluation Procedure

A suggested "Evaluation Procedure" is outlined in a separate section of this report. The procedure has been designed to be flexible to meet specific program needs while accomplishing the objective of allowing human services agencies to evaluate existing or alternative transportation services. The components of the evaluation system are:

- Project Operator/Manager;
- Data Summary/Analysis;
- Feedback;
- System Monitoring/Modification; and,
- Technical Assistance.

### Monitoring System

The proposed "Monitoring System" presents a three-level reporting system utilizing uniform accounting definitions and data elements. The three levels provide for a minimum, desirable (recommended), and ultimate record and reporting system for consideration by human services agencies. Terms, definitions and report forms are included for the three principle segments of transportation operations:

- Pre-Trip (Scheduling/Dispatching);
- Service Delivery (Driver/Trip); and,
- Post-Trip (Office/Summary).

The suggested monitoring system is tested by comparing data elements and related performance indicators to the requirements of the human services transportation programs surveyed during the first phase of this research effort.

### Implementation Plan

The "Implementation Plan" suggests the use of a pilot program in a single agency. The pilot program would develop the necessary forms, assist agencies in training personnel, collect the necessary reports, analyze the results, and provide feedback to the various participants. Upon its completion, the program's effectiveness would be evaluated to determine the degree of improvement (if any) in the efficiency and effectiveness of the various systems. If the program is shown to be effective, it could then be easily recommended to other agencies as an effective program.

## IMPLEMENTATION STATEMENT

As a result of the first phase of this project which found a limited amount of available information for analytical purposes, an Evaluation Procedure and a Monitoring System was developed for use by all human services transportation providers. The proposed system represents a flexible, three-level evaluation and reporting system for both financial and operating information. The proposed system should be useful to both the providers and the SDHPT in evaluating the efficiency of a system, in comparing its service to that provided by other agencies, and in deciding if purchased or coordinated services are warranted. Implementation of the proposed system is found to be difficult due to the nature of the government. Therefore, the recommended approach is a phased implementation using a pilot program in a single agency. A two-year program to implement and evaluate the pilot program would be required. If the program is shown to be effective, it could then be easily promoted to other agencies as an effective program.

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## 1. INTRODUCTION

Transportation services have been provided by human services agencies and organizations on an ad hoc, piecemeal, and uncoordinated basis. Many special transportation delivery systems have evolved in support of other, more primary, social service programs with little or no guidance from skilled transportation professionals or from state and federal funding agencies.

The purpose of this research effort was to review several human services transportation programs in Texas and to recommend an Evaluation Procedure and Monitoring System for consideration by the various human services agencies. This report expands upon the first phase of the project which included collection and analysis of cost and operating data from the following three human services transportation programs.

TPCAC - Texas Panhandle Community Action Corporation Transportation Program, Amarillo, Texas.

CARTS - Capital Area Rural Transportation System, Austin, Texas.

DHR Region 10 - Department of Human Resources Medical Transportation Program Region 10, Nacogdoches, Texas.

The data collection and analysis work was published in August, 1980 and entitled "Evaluation of Selective Human Services Transportation Providers in Texas" (Texas Transportation Institute's Technical Report 1065-1). This second phase of the research effort uses the available data from the three human services transportation programs to develop and test a proposed monitoring system and to suggest an evaluation procedure for possible state-wide implementation.

This report is organized into the following seven major sections:

- Urban Mass Transportation Act;
- Section 15: Uniform System of Accounts and Records;

- Performance Indicators;
- Data Availability: Human Services Transportation Programs;
- Evaluation Procedure;
- Monitoring System; and,
- Implementation Plan.

Human services transportation has developed, for the most part, outside of the traditional transportation planning process and, until just recently, without technical assistance from the U.S. Department of Transportation and state transportation agencies. The section on the Urban Mass Transportation Act discusses some of the programs related to human services transportation delivery which are administered by the U.S. Department of Transportation.

Section 15 of the Urban Mass Transportation Act is presented in a separate section of this report to highlight its importance and significance to human services transportation programs. The process used in developing and implementing Section 15 with participation from the operators is discussed; the cooperative and participatory process is suggested as an effective means to gain support from human services agencies in implementing an evaluation procedure and monitoring system of transportation delivery.

Evaluation methodologies, all too often, use many more performance indicators than can effectively be used by the operator or are appropriate for routine program review. A separate section on "Performance Indicators" has been included which discusses the importance of the following considerations when developing a performance evaluation system:

- Audience;
- Purpose;
- Level-of-Detail;
- Frequency; and,
- Resources.

Performance measures now in common use are investigated and assessed for their data requirements and their adaptability to human services transportation programs.

Data availability from seven Texas paratransit operations is investigated and assessed prior to the development of an evaluation procedure or monitoring system. Logical transition from the present system of data collection and reporting to a uniform system will be necessary if the recommendations are to be implemented.

A suggested "Evaluation Procedure" is outlined in a separate section of this report. The procedure has been designed to be flexible to meet specific program needs while accomplishing the objective of allowing human services agencies to evaluate existing or alternative transportation services. The components of the evaluation system are:

- Project Operator/Manager;
- Data Summary/Analysis;
- Feedback;
- System Monitoring/Modification; and,
- Technical Assistance.

The proposed "Monitoring System" presents a three level reporting system utilizing uniform accounting definitions and data elements. The three levels provide for a minimum, desirable (recommended), and ultimate record and reporting system for consideration by human services agencies. Terms, definitions and report forms are included for the three principle segments of transportation operations:

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The suggested monitoring system is tested by comparing data elements and related performance indicators to the requirements of the human services transportation programs surveyed during the first phase of this research effort.

The "Implementation Plan" suggests the use of a pilot program in a single agency. The pilot program would develop the necessary forms, assist in training personnel, collect the necessary reports, analyze the results, and provide feedback to the various participants. Upon its completion, the program's effectiveness would be evaluated to determine the degree of improvement (if any) in the efficiency and effectiveness of the various systems. If the program is shown to be effective, it could then be easily recommended to other agencies as an effective program.

## 2. URBAN MASS TRANSPORTATION ACT

The Urban Mass Transportation Act of 1964, as amended, provides for capital improvements, operating assistance, technical assistance, planning, management training, research, development and demonstration, and university research and training programs. A summary of the funding programs or sections of the Act are presented in Table 1 (1).\*

TABLE 1: URBAN MASS TRANSPORTATION ACT OF 1964,  
AS AMENDED FUNDING PROGRAMS

Urban Mass Transportation Act	Program Purpose	Matching Requirements Federal Non-Federal (Percent)
Section 3 Section 5	Capital Improvements Operating Assistance Capital Improvements	80/20 50/50
Section 6	Research, Development and Demonstration	100/0
Section 8 Section 10	Technical Studies Management Training	80/20 75/25
Section 11	University Research and Training	50/50
Section 16 (b)(2)	Capital Aid to Private, Nonprofit Organizations	80/20
Section 18	Operating Aid to Nonurbanized Areas Capital Aid to Nonurbanized Areas	50/50 80/20

Source: Reference (1), page 3.

Section 16 of the Act provides grants and funding for transportation services that meet the needs of the elderly and handicapped. These funds are available to state and local agencies and to private, nonprofit organizations.

\*Denotes reference number listed at end of main body of report.

The Urban Mass Transportation Administration (UMTA) allocates 16 (b)(2) funds to the states, which in turn solicit applications from private, nonprofit organizations and administer the program. A 1980 study of the 16 (b)(2) program by the Transportation Systems Center (2) examined and assessed the federal and state administration of the program. This study identified several shortcomings, including: 1) lengthy delays in grant processing and approval; 2) confusing and vague policy interpretations; and, 3) lack of definitive regulations on the program. States are responsible for establishing monitoring procedures, compiling data as submitted by participating agencies, obtaining annual certification on each program, and submitting semiannual reports to UMTA. The basic elements of state monitoring usually consist of the following (2).

1. Status of vehicle procurement activities.
2. Periodically collecting and compiling data on operations, vehicles, and costs from participating agencies.
3. Obtaining annual certification that the equipment is being used in accordance with the State/Agency contract and is being maintained properly.
4. Maintaining a permanent state vehicle record.
5. Soliciting and evaluating any requests for changes in the operation and/or ownership of vehicles.
6. Evaluating data received from agencies to see if all federal and state requirements are being met.
7. Repossessing vehicles or otherwise dealing with cases in which vehicles are not being used properly.

In response to the study by the Transportation Systems Center, UMTA's Office of Program Evaluation has recommended the determination of minimal reporting requirements to fulfill the legitimate national evaluation needs and that state data requirements and monitoring efforts be described in a State Management Plan for the 16(b)(2) Program (3).

Section 18 of the Urban Mass Transportation Act of 1964, as amended, provides capital and operating funds for public transportation in nonurban areas. The Section 18 program is administered by the Federal Highway Administration (FHWA) and focuses on the transportation needs of the general public in rural areas.

Section 18 funds are apportioned to each state and are distributed by the state for public transportation in nonurbanized areas. Up to 15 percent of the state's funding appropriation may be used for administration and for technical assistance to recipients. Such technical assistance may include planning, management development, coordination of programs, and research.

Eligible recipients for Section 18 funding include both public and private organizations. A certain amount of overlap exists between the Section 18 program and the Section 16 (b)(2) program; some rural nonprofit organizations have utilized capital grants from the 16 (b)(2) program and operating grants from Section 18. Table 2 shows the similarities of the two programs (2).

TABLE 2: PROGRAM SIMILARITIES

Program	Eligible Areas		Type of Grant		Type of Organization	
	Rural	Urban	Capital	Operating	Public	Private
Section 16 (b)(2)	x	x	x			x
Section 18	x		x	x	x	x

Source: Reference 2, page 9.

The 1980 assessment by the Transportation Systems Center found that many states with large rural populations see the Section 16 (b)(2) and Section 18 programs as inextricably linked. Since the market group for rural public

transportation is heavily (but not exclusively) elderly and/or handicapped, there is a natural urge on the part of these states to funnel both 16 (b)(2) and Section 18 funding to the same operators or to similar types of programs. As a result of the study, the UMTA Office of Program Evaluation has recommended the development of procedures to improve the relationship between the two programs and, in particular, the clarification of the coordination requirement with special service transportation programs (3).

Section 15 is frequently associated with the Urban Mass Transportation Act but is not a funding program for transportation service. Section 15 is a "Uniform System of Accounts and Records" promulgated by the Urban Mass Transportation Administration in January, 1977.

Human service transportation providers and agencies attempting to coordinate with public transit systems will need a familiarity with, and the ability to relate to, the Section 15 Systems. Due to the relative importance of Section 15, a separate section of this report is dedicated to describing the components and the application of the Uniform System of Accounts and Records, known as the Section 15 Systems.

### 3. SECTION 15: UNIFORM SYSTEM OF ACCOUNTS AND RECORDS

Compliance with the Section 15, Uniform System of Accounts and Records, is necessary for any special transportation project which intends to coordinate with local transit operators. The Urban Mass Transportation Administration regulations require local transportation projects to ultimately maintain Section 15 Accounts and Records to be eligible for federal capital and operating assistance. This section of the report provides background data on the Section 15 requirements and the applicability of Section 15 to human services transportation programs.

#### Background

The increase in public ownership of transit systems during the late 60's and the 70's, plus the resulting increase in financial burden on local taxpayers, forced local municipalities and agencies to reexamine their urban transportation system in the context of other public services provided. The need to examine transit service and cost within the public domain resulted in a substantial increase in analytical activity at all levels of government (local, state and federal). This analytical activity, in turn, increased the need for uniform, consistent, and accurate data for the transit system.

Prior to the development and implementation of Section 15, the American Public Transit Association (APTA) collected financial and operating statistics from its membership. The APTA reporting system was the primary source of comparative information for transit system operators and managers, the research community, and governmental planners, administrators and managers. However, the reporting system had several shortcomings including a lack of data element "definitions," a lack of conformity in data supplied,

and limitations in the basic structure of the reporting elements for future policy and planning needs. The recognition of these shortcomings by the transit industry, governmental agencies, and the research community was a major factor in establishing the Section 15 requirements (4).

In November 1974, the Urban Mass Transportation Act was amended to include Section 15 with its requirement for a uniform system of accounts and records and a uniform reporting system.

#### Development of Section 15

The major objective was to develop a single system which would be adopted by, and satisfy the requirements of, all levels of government. Although there was a clear need for vast amounts of public transportation data, there was also a need to minimize the burden of data collection. An Industry Control Board (ICB), consisting of transit operating managers, financial administrators, and representatives of local and state planning agencies, was established to actively participate in the design and development of the Section 15 System. The ICB participants realized that to prescribe the most meaningful data for analyses, the system of accounts would be more detailed than any existing systems maintained by transit properties or operators. There was also a limit to the level of detail which could be mandated by a federal agency due to the constraints of the Federal Reports Act of 1942. Thus the ICB participants faced the dilemma of needing detailed information to satisfy the data requirements of all levels of government but being unable to mandate the detailed requirements at the federal level. The solution was to "mandate" less detailed reporting requirements under Section 15 and to provide for a more detailed, "optional" reporting system for use by transit system operators.

The Uniform System of Accounts and the Reporting System, known as Section 15, was issued on January 10, 1977 by the Urban Mass Transportation Administration in the Federal Register. The detailed features of the Section 15 System were documented in a four volume companion report entitled "Urban Mass Transportation Industry Uniform System of Accounts and Records and Reporting System" by Arthur Andersen & Company. The title and content of the four volumes are (4):

Volume I - General Description presents an overview of the systems, and an identification of the analytical potential provided by comparative data generated by the systems.

Volume II - Uniform System of Accounts and Records contains the definitions for the uniform systems of accounts and records. Modes of transit service subject to Section 15 systems are also defined.

Volume III - Reporting System Forms and Instructions - Required contains illustrative forms for each of the reports required under Section 15 and instructions for completing the forms.

Volume IV - Reporting System Forms and Instructions - Voluntary contains illustrative forms and instructions for optional revenue and expense reporting.

The structure of the Section 15 System is basically a two-dimensional classification of expenses. One dimension is the type of expenditure known as "object classes," while the second dimension is the activities performed or "functional categories." The minimum level of detail requires the reporting of expenditures by the following 13 different object classes (5).

1. Labor
2. Fringe Benefits
3. Services
4. Materials and Supplies Consumed
5. Utilities
6. Casualty and Liability Costs
7. Taxes

8. Purchases Transportation Service
9. Miscellaneous Expense
10. Expense Transfers
11. Interest Expense
12. Leases and Rentals
13. Depreciation and Amortization

Each expenditure for the 13 object classes is further broken down into one or more of the following functional categories (5).

1. Operations
2. Maintenance
3. Administration

All transit systems receiving federal funds were required to implement the Section 15 system of accounts and records by July 1, 1978. The implementation schedule varied among transit properties, dependent upon the fiscal year of the transit system.

### System Description

The Section 15 System consists of two distinct but interrelated parts:

- Uniform System of Accounts and Records; and,
- Reporting System.

The "Uniform System of Accounts and Records" consists of:

- Various categories of accounts and records for classifying financial and operating data;
- Precise definitions of the data elements to be included in the various categories; and,
- Definitions of practices for systematic data collection and recording.

The "Reporting System" consists of various records, forms and procedures for:

- Transmitting information and data to the central processing agency;
- Editing and storing information; and
- The central processing agency to report the information to the various user groups.

Section 15 makes provision for both mandatory and voluntary collection and reporting of data by "expense object classes" and by "functional categories." The expense object classes consist of 16 required expense line items plus optional reporting of expenses in 70 additional line items. Both the required and recommended expense object classes for Section 15 are shown in Appendix A along with definitions of required classes (4).

The manner in which expenses are required to be distributed by functional category varies according to a transit system's size. Three levels of reporting expenses by function are identified in the Section 15 requirements.

Level A - Operations with more than 500 vehicles

Level B - Operations with 101 to 500 vehicles

Level C - Operations with 100 or fewer vehicles

The number of functional categories for smaller operations, qualifying for Level C reporting, is three (Administration, Maintenance, and Operations). Functional Categories required for Level B reporting total 20; while Level A reporting consists of some 44 different elements. Functional Categories defined by Section 15 for expense classification for Level C (small) and Level A (large) operations are shown in Table 3 (4).

In addition to standardized expense reporting, Section 15 specifies "revenue" object classes consisting of 15 required elements plus 54 optional

TABLE 3: FUNCTIONAL CATEGORIES

Level C 100 or Fewer Vehicles	Level A Over 500 Vehicles
Operations	Transportation Administration Revenue Vehicle Movement Control Scheduling of Transportation Operations Revenue Vehicle Operation
Maintenance	Maintenance Administration--Vehicles Maintenance Administration--Facilities Servicing Revenue Vehicles Inspection & Maintenance of Revenue Vehicles Accident Repairs to Revenue Vehicles Vandalism Repairs of Revenue Vehicles Servicing and Fuel for Service Vehicles Inspection and Maintenance of Service Vehicles Maintenance of Vehicle Movement Control Systems Maintenance of Fare Collection and Counting Equipment Maintenance of Roadway and Track Maintenance of Structures, Tunnels, Bridges & Subways Maintenance of Passenger Stations Maintenance of Operating Stations, Buildings, Grounds & Equipment Maintenance of Garage & Shop Buildings, Grounds & Equipment Maintenance of Communication System Maintenance of General Administration Buildings, Grounds and Equipment Vandalism Repairs of Buildings, Grounds and Equipment Operations & Maintenance of Electric Power Facilities
Administration	Preliminary Transit System Development Ticketing and Fare Collection System Security Injury & Damages Safety Personnel Administration General Legal Services General Insurance Data Processing Finance and Accounting Purchasing and Stores General Engineering Real Estate Management Office Management and Services General Management Customer Services Promotion Market Research Planning General Function

Source: Reference (4)

elements. All 69 revenue object classes plus key definitions are included in Appendix A. The following are required object classes for reporting revenues (4).

1. Passenger Fares for Transit Service
2. Special Transit Fares
3. School Bus Service Revenues
4. Freight Tariffs
5. Charter Service Revenues
6. Auxiliary Transportation Revenues
7. Nontransportation Revenues
8. Taxes Levied Directly by Transit System
9. Local Cash Grants and Reimbursements
10. Local Special Fare Assistance
11. State Cash Grants and Reimbursements
12. State Special Fare Assistance
13. Federal Cash Grants and Reimbursements
14. Contributed Services
15. Subsidy from Other Sections of Operations

The Section 15 System also defines certain "nonfinancial" operating data elements. The required operating data is periodically supplemented by user surveys and demographic data frequently provided by the MPO's for the larger urbanized areas. Some 26 data elements are required to be reported in the following 7 categories.

1. Time Periods
2. Facilities and Equipment
3. Employees
4. Maintenance Performance and Fuel Consumption

5. Safety
6. Service Supplied and Vehicle Utilization
7. Passenger Utilization

The complete list of Operating Data Elements and definitions for "Service Supplied and Vehicle Utilization" plus "Passenger Utilization" are included in Appendix A.

#### Relevance to Human Services Transportation

Accurate records of transportation service and operations by social service agencies of their transportation programs will permit: 1) Internal monitoring of a project for effective operations, productivity, and budgeting of resources; 2) precise pricing of service units to reflect the actual input of resources; 3) equitable allocation of costs to their respective beneficiaries; and 4) a higher level of accountability on the part of social service agencies to establish or maintain eligibility for federal, state, and local funding programs.

Numerous studies of special transportation programs have experienced problems with the collection of reliable data. Limitations of data collection and analyses plus problem areas identified in recent studies include the following:

- Lack of Detail;
- Unavailability of Information;
- Missing Information;
- Definition of Specific Expense Objects;
- Definition of Expense Functions or Categories;
- Exclusion of Non-Perceived Costs (i.e., donated vehicles; volunteer drivers; free garaging and/or maintenance);

- Bookkeeping and Accounting Techniques;
- Vague Ideas of Actual Costs;
- Diverse types of Client Trips;
- Unavailable Operating Characteristics (i.e., scheduling; trip lengths; origin-destination patterns; trip frequencies; ridership);
- Billing for Services;
- Keeping of Financial Records;
- Reporting of Service and Financial Data;
- Independent Delivery of Transportation Services with Little or No Coordination; and,
- Confusion and Misunderstanding About Capital Depreciation.

As previously mentioned, compliance with Section 15 Accounts and Records is necessary for any special transportation project which intends to coordinate with local transit operators. But more importantly, the process used and experience gained through the development and application of Section 15 by the transit industry can be directly translated to the human services transportation programs. The transportation operators, program managers and local, state and federal agencies are interested in useful data collection and analysis to assist in the delivery of cost-effective services. Data supplied by transit operators and Metropolitan Planning Organizations (MPO's) are combined by the Section 15 System to reflect various indicators, ratios, indices or values which focus on specific characteristics of the transit system. This provides managers with the capability to analyze their operation over time or to compare it to other similar operations. The Section 15 System provides some six analytical categories which are useful in assessing specific characteristics of the transit system (4):

1. Facilities and Equipment;
2. Resource Utilization;

3. Financial Structure and Condition;
4. Service Supplied;
5. Passenger Utilization; and
6. Operating Performance.

"Facilities and Equipment" provide a profile of a system based upon miles of line, number of vehicles and total passenger capacity per day. Typical questions that the indicators shown in Table 4 for this category help to answer are:

1. What is the overall passenger-carrying capacity of the system per day?
2. How much of this capacity is seated-capacity?
3. What is the age distribution of the fleet? Is the average age increasing or decreasing? How does the age compare with other similar systems?
4. What effect have recent vehicle purchases had on the age distribution of the fleet?

TABLE 4: SYSTEM INDICATORS

Facilities and Equipment	
Indicator	Data Elements Used
Miles of Transit Line per Square Mile	Miles of Line/Urban Area
Miles of Transit Line per Capita	Miles of Line/Urban Population
Active Revenue Vehicles in Fleet by Age	Inventory of Vehicle by Age
Active Revenue Vehicles in Fleet by Seating Capacity	Inventory of Vehicles by Seating
Active Revenue Vehicles in Fleet by Passenger Capacity	Inventory of Vehicles by Capacity
Active Revenue Vehicles in Fleet per Capita	Inventory of Vehicles/Urban Population
Average Age of Fleet	Vehicle Age Distribution
Passenger Capacity per Day	Active Vehicles x Average Capacity
Passenger Capacity per Capita	$\frac{\text{Active Vehicles} \times \text{Average Capacity}}{\text{Urban Population}}$

"Resource Utilization" indicators show how a system's resources (i.e., vehicles, manpower, materials, etc.) are used. Total vehicle mileage, rather than revenue mileage, is used as the variable. Vehicle miles per vehicle indicates how intensively the vehicles are used during the year. Likewise, vehicle miles per operator man-hour indicates how intensively the operators are used. Typical questions addressed by the resource utilization indicators shown in Table 5 follow:

1. How much of the active fleet is used at the maximum level-of-service during the average weekday?
2. What employee occupations are used and in what proportions?
3. How fuel efficient is the system relative to other similar systems and other modes of urban transportation?

"Financial Structure and Condition" indicators relate financial and operating information within the two-dimensional system of Section 15. The classification of financial information (expenses and revenues) by object class and by function allows comparative analysis by:

1. Object Class and Function Together;
2. Object Class Alone; and
3. Function or Activity Alone.

The distinction between object class and functional expenses will allow cost changes to be identified and analyzed in key object areas such as labor costs, fringe benefit cost or fuel expenses and in key functions such as maintenance, operations or administration. It is possible, therefore, to perform analysis of the financial condition of a transit operation and compare it on a uniform and consistent basis with other operations or categories of other operations. This comparative analysis is essential to all levels of government in the planning and administration of financial assistance and to the transit manager responsible for service provision.

TABLE 5: SYSTEM INDICATORS

Resource Utilization	
Indicator	Data Elements Used
Annual Vehicle Miles per Vehicle	Total Annual Miles/Revenue Vehicles
Annual Vehicle Miles per Line Mile	Total Annual Miles/Line Miles
Annual Vehicle Miles per Employee	Total Annual Miles/Employees
Annual Vehicle Miles per Vehicle Operator	Total Annual Miles/Operators
Annual Vehicle Miles per Operator Manhour	Total Annual Miles/Annual Operator Hours
Annual Vehicle Miles per Vehicle Hour	Total Annual Miles/Annual Vehicle Hours
Annual Vehicle Miles per Capita	Total Annual Miles/Urban Population
Annual Vehicle Hours per Vehicle	Total Annual Hours/Revenue Vehicles
Annual Vehicle Hours per Line Mile	Total Annual Hours/Line Miles
Annual Vehicle Hours per Employee	Total Annual Hours/Employees
Annual Vehicle Hours per Vehicle Operator	Total Annual Hours/Operators
Annual Vehicle Hours per Vehicle Hour	Total Annual Hours/Vehicle Hours
Annual Vehicle Hours per Capita	Total Annual Hours/Urban Population
Maximum Vehicles Operated/Total Active Vehicles	Percentage for Average Weekday
Number of Employees	Total Number of Employees
Number of Employees by Occupation	Percentage Distribution
Number of Employees per Vehicle	Total Employees/Vehicles
Annual Fuel Consumption	Total Fuel Consumed
Annual Fuel Consumption per Vehicle Mile	Fuel/Annual Vehicle Miles
Annual Fuel Consumption per Capacity Mile	Fuel/Average Passenger Capacity
Annual Fuel Consumption per Passenger	Fuel/Unlinked Passenger Trips
Annual Fuel Consumption per Passenger Mile	Total/Passenger Miles

Table 6 shows the indicators and data elements for analysis of financial structure and condition of the Section 15 System.

"Service Supplied" indicators describes the amount of service offered by the transit system without considering the number of passengers using the service. The Section 15 System captures information on levels-of-service offered during morning and afternoon peak periods, off-peak periods, plus weekend and includes data on revenue vehicle miles, hours and capacities. These variables are essential to the analysis of a system's supply of services. Typical questions which the "Service Supplied" indicators, shown in Table 7, help to answer are:

1. How much service is offered during the peak period relative to the midday or "base" service period?
2. What is the intensity of service (capacity offered) during an average weekday relative to the extent of the system (line miles) and fleet size (number of vehicles)?
3. How much capacity is offered during the peak hour relative to the total offered during the day?
4. What is the average frequency of service (vehicles) per hour for a 24-hour period?
5. How much "boardable" service is within walking distance of the general public? How much of the urban area is served by "boardable" transit?
6. How much capacity is offered per day relative to the urban area's population?

"Passenger Utilization" indicators measure passenger use of services, ridership characteristics, and trip purposes. These indicators are shown in Table 8 and help answer such typical questions as:

1. How many passengers are transported by the vehicles and by the system?
2. What is the average passenger density on the lines?
3. What is the average trip time and distance on a vehicle or on the system?

TABLE 6: SYSTEM INDICATORS

Financial Structure and Condition	
Indicator	Data Elements Used
Total Annual Capital Expenditure	Annual Capital Expenditure
Annual Capital Expenditure by Asset Type	Expenditure by Asset Type
Annual Capital Expenditure by Source of Funds	Expenditures by Source of Funds
Annual Capital Expenditure per Capita	Expenditures/Urban Population
Total Annual Operating Expenditure	Annual Operating Expenditures
Annual Operating Expenditure by Object & Function	Percent Distribution by Object and Function
Annual Operating Expenditure by Object	Percent Distribution by Object
Annual Operating Expenditure by Function	Percent Distribution by Function
Annual Operating Expenditure per Capita	Expenditure/Urban Population
Total Annual Operating Revenues	Annual Operating Revenues
Annual Operating Revenues by Object	Percent Distribution by Object
Annual Operating Revenues per Capita	Revenues/Urban Population
Net Operating Income (Deficit)	Operating Revenues Less Expenditures
Net Operating Income (Deficit) per Vehicle Mile	Income (Deficit)/Annual Vehicle Miles
Net Operating Income (Deficit) per Capita	Income (Deficit)/Urban Population

TABLE 7: SYSTEM INDICATORS

Service Supplied	
Indicator	Data Elements Used
Time Period When Service is Offered	Schedules of Service
Vehicles Operated on Average Weekday	Distribution of Vehicles Operated
Vehicles Operated on Average Weekday; Maximum	Distribution of Vehicles Operated
Vehicles Operated on Average Weekday; Midday/Base	Distribution of Vehicles Operated
Vehicles Operated on Average Weekday, Per Hour	Based on 24-Hour Period
Vehicles Operated on Average Weekday, Per Line Mile	Based on Total Line Miles
Vehicles Operated on Average Weekday, Per Capita	Based on Urban Population
Vehicles Operated on Average Weekday; Per Square Mile	Based on Urban Area
Boardable Transit Service by Land Area	Area Within 1/4 Mile of Routes x No. of Vehicles/Route/Day
Boardable Transit Service by Population	Population Within 1/4 Mile of Routes x No. of Vehicles/Route/Day
Revenue Capacity Miles	Average Weekday Revenue Miles x Average Capacity
Revenue Capacity Miles Per Line Mile	Number of Line Miles
Revenue Capacity Miles Per Vehicle	Number of Revenue Vehicles
Revenue Capacity Miles Per Capita	Urban Population
Revenue Capacity Miles Per Peak Hour	Percent of Capacity Miles During Peak Hour
Revenue Capacity Hours	Average Weekday Revenue Hours x Average Capacity
Revenue Capacity Hours Per Line Mile	Number of Line Miles
Revenue Capacity Hours Per Vehicle	Number of Revenue Vehicles
Revenue Capacity Hours Per Capita	Urban Population
Revenue Capacity Hours Per Peak	Percent of Capacity Hours During Peak-Hour

TABLE 8: SYSTEM INDICATORS

Passenger Utilization	
Indicator	Data Elements Used
Average Weekday Unlinked Passenger Trips	Total Average Unlinked Trips
Average Weekday Unlinked Trips Per Line Mile	Number of Line Miles
Average Weekday Unlinked Trips Per Vehicle	Number of Revenue Vehicles
Average Weekday Unlinked Trips Per Capacity Mile	Average Weekday Capacity Miles
Average Weekday Unlinked Trips Per Capita	Urban Population
Average Weekday Unlinked Trips Per Square Mile	Urban Area
Average Weekday Passenger Miles	Total Average Passenger Miles
Average Weekday Passenger Miles Per Link Mile	Number of Line Miles
Average Weekday Passenger Miles Per Vehicle	Number of Revenue Vehicles
Average Weekday Passenger Miles Per Capacity Mile	Average Weekday Capacity Miles
Average Weekday Passenger Miles Per Capita	Urban Population
Average Weekday Passenger Miles Per Square Mile	Urban Area
Average Weekday Linked Passenger Trips	Total Average Linked Trips
Average Weekday Linked Trips Per Capita	Urban Population
Average Weekday Linked Trips Per Square Mile	Urban Area
Average Weekday Linked Trips Per Vehicle	Number of Revenue Vehicles
Average Trip Distance: Linked Trips	O-D Distance in Miles (User Survey)
Average Trip Distance: Unlinked Trips	Passenger Miles
Average Trip Time: Linked Trips	O-D Times in Minutes (User Survey)
Average Trip Time: Unlinked Trips	Trip Times from Observations

4. What is the average load factor and the utilization of the transit system's capacity?

"Operating Performance" indicators pertain to the transit system's ability to accomplish its operating objectives in one or more of the following categories.

1. Operating Efficiency.
2. Passenger Use of Service Supplied.
3. Operating Cost to Passenger Utilization.
4. Revenue Generation Capability.
5. Safety Performance.
6. Maintenance Performance.

The six Operating Performance Categories are shown in Table 9 with their respective "indicators" and "data elements."

The principal usefulness of the Section 15 System Indicators is to enable transit operators to compare their operations to other similar properties through the use of uniformly defined and reported data. Significant differences in system indicators between two similar operations may identify problems in such areas as management policies, funding or political programs, operating inefficiencies or mechanical methods.

A familiarity with the Section 15 System will enable the reader to relate the recording and reporting system proposed within this research report for human services transportation programs to the Section 15 System.

TABLE 9: SYSTEM INDICATORS

Operating Performance	
Category/Indicator	Data Elements Used
<b><u>OPERATING EFFICIENCY:</u></b>	
Total Annual Operating Cost	Total Operating Cost
Annual Operating Cost Per Line Mile	Operating Cost/Line Miles
Annual Operating Cost Per Vehicle	Operating Cost/Revenue Vehicles
Annual Operating Cost Per Vehicle Mile	Operating Cost/Vehicle Miles
Annual Operating Cost Per Vehicle Hour	Operating Cost/Vehicle Hours
Annual Operating Cost Per Capacity Mile	Operating Cost/Computed Capacity Miles
Annual Operating Cost Per Employee Manhour	Operating Cost/Employees
Annual Operating Cost Per Operator Manhour	Operating Cost/Operators
Total Annual Operating Cost by Function	Breakdown of Costs by Function
Annual Operating Cost by Function per Vehicle Miles	Cost by Function/Vehicle Miles
Annual Operating Cost by Functional Distribution	Percentage of Cost by Function
Total Annual Operating Cost by Object Class	Breakdown of Costs by Object
Annual Operating Cost by Object Class Per Vehicle Mile	Cost by Object/Vehicle Miles
Annual Operating Cost by Object Class Distribution	Percentage of Cost by Object
<b><u>PASSENGER USE OF SERVICE SUPPLIED:</u></b>	
Average Weekday Unlinked Passenger Trips	Total Average Unlinked Trips
Average Weekday Unlinked Trips Per Vehicle Mile	Trips/Average Revenue Vehicle Miles
Average Weekday Unlinked Trips Per Capacity Mile	Trips/Average Capacity Miles
Average Weekday Passenger Miles	Total Average Passenger Miles
Average Weekday Passenger Miles Per Vehicle Mile	Passenger Miles/Average Revenue Vehicle Miles
Average Weekday Passenger Miles Per Capacity Mile	Passenger Miles/Average Capacity Miles
<b><u>OPERATING COST TO PASSENGER UTILIZATION:</u></b>	
Total Operating Cost	Annual Operating Cost
Total Operating Cost Per Unlinked Trip	Cost/Computed Unlinked Trips
Total Operating Cost Per Linked Trip	Cost/Computed Linked Trips
Total Operating Cost Per Passenger Mile	Cost/Computed Passenger Miles
<b><u>REVENUE GENERATION CAPABILITY:</u></b>	
Annual Passenger Revenue Per Line Mile	Total Revenue/Annual Line Miles
Annual Passenger Revenue Per Vehicle	Total Revenue/Revenue Vehicles
Annual Passenger Revenue Per Vehicle Mile	Total Revenue/Vehicle Miles
Annual Passenger Revenue Per Vehicle Hour	Total Revenue/Vehicle Hours
Annual Passenger Revenue Per Capacity Mile	Total Revenue/Computed Capacity Miles
Annual Passenger Revenue Per Employee	Total Revenue/Employees
Annual Passenger Revenue Per Unlinked Trip	Total Revenue/Computed Unlinked Trips
Annual Passenger Revenue Per Passenger Mile	Total Revenue/Computed Passenger Miles
<b><u>SAFETY PERFORMANCE:</u></b>	
Total Annual Number of Collision Accidents	Total Collision Accidents
Annual Collision Accidents Per Vehicle Mile	Accidents/Vehicle Miles
Annual Collision Accidents Per Passenger Mile	Accidents/Computed Passenger Miles
Annual Collision Accidents Per Capita	Accidents/Urban Population
Total Annual Number of Fatalities	Total Fatalities in System Accidents
Annual Fatalities Per Vehicle Mile	Fatalities/Vehicle Miles
Annual Fatalities Per Passenger Mile	Fatalities/Computed Passenger Miles
Annual Fatalities Per Capita	Fatalities/Urban Population
Total Annual Number of Injuries	Total Injuries in System Accidents
Annual Injuries Per Vehicle Mile	Injuries/Vehicle Miles
Annual Injuries Per Passenger Mile	Injuries/Computed Passenger Miles
Annual Injuries Per Capita	Injuries/Urban Population

#### 4. PERFORMANCE INDICATORS

Evaluations and subsequent decisions about public transportation service programs are regularly made by a variety of different groups including clients or passengers, system operators, program managers, local, state and federal agencies, and the general public. Each interested group views the transportation programs and services with different goals and objectives in mind and bases its decisions and/or opinions on how the group perceives the performance of the system. Performance Indicators are frequently used in the decision-making process for funding, operations and policies. When these indicators are developed to reflect the goals and objectives of the transportation service, they can provide valuable information on the efficiency and effectiveness of the service being provided.

Numerous transit system indicators are required under Section 15 of the Urban Mass Transportation Act of 1964, as amended. The Section 15 indicators and required data elements for calculating the indicators are discussed in a separate section of this report. Unfortunately, the same level-of-effort has not been devoted to developing system indicators for human services transportation programs. The unique characteristics of paratransit systems, including human services transportation programs, must be considered when conceptualizing an analytical framework for performance evaluation.

##### Defining Performance Indicators

A large number of performance indicators can be developed and used in the evaluation of human services transportation programs. All too often, however, evaluation methodologies use more indicators than what might be appropriate for a routine review of performance and operations. Numerical

indicators, by themselves, are of little value if they are not organized in a logical structure suitable for use by interested groups in the evaluation of system performance.

Several terms, including the following, are frequently used in discussing the evaluation of transportation services:

- Performance;
- Productivity;
- Efficiency;
- Effectiveness;
- Impact; and
- Quality.

For the purposes of this study, the following definitions for these frequently used terms are offered (6).

Performance is the most general of the terms and refers to any technique used in evaluating an activity. All other terms are included under the general area of performance.

Productivity is a more precise term involving the ratio of inputs to outputs. Productivity studies normally address entire industries and evaluate the conversion of such factors as labor and/or materials into some product or service over a period of time or in comparison to other firms.

Efficiency indicators are used to measure how well a transit system is using its resources to produce services without regard to how many passengers or clients are served (Efficiency is "doing things right").

Effectiveness measures always include some aspect of service consumption by clients or passengers. (Effectiveness is "doing the right things").

Impact measures refer to the social, economic, and environmental effects produced by a transit system and reflect the "output" of the system without regard to the "inputs."

Quality does not involve any comparison of input to output and only refers to the attributes of the service provided such as convenience and comfort.

The scope of this research effort does not include the "Impact" or "Quality" performance measures, but concentrates on the "Efficiency" and "Effectiveness" measures for human services transportation. A review of selective research projects and relevant literature indicates a significant variation in the definition and application of "Efficiency Indicators" and "Effectiveness Indicators." Table 10 shows, in matrix format, some 23 efficiency measures and 21 effectiveness measures included in the cited references (6,7,8,9,10, and 11). It will be noted that 4 of the indicators (Cost/Passenger, Revenue/Expense, Peak Passengers/Off-Peak Passengers, and Deficit/Passenger) have been used as measures for both Efficiency and Effectiveness. This duplication shows the inconsistency and variance in defining and applying performance indicators. In addition, several of the measures listed are very similar in nature and only vary as a result of terminology and/or data manipulation.

Applying the strict definitions of Efficiency and Effectiveness to the 44 indicators listed in Table 10 reduces the number of measures for efficiency to 16 and the measures for effectiveness to 14, as shown in Table 11.

TABLE 10: PERFORMANCE INDICATORS

Summary: Selective Literature Review						
Indicators	References					
	(6)	(7)	(8)	(9)	(10)	(11)
<u>Efficiency Measures</u>						
1. Cost/Vehicle Mile	x	x	x	x		
2. Vehicle Hours/Employee	x	x	x		x	
3. Cost/Vehicle Hour	x	x		x		
4. Vehicle Miles/Employee	x	x			x	
* 5. Cost/Passenger		x		x		x
6. Revenue Miles/Vehicle		x	x		x	
7. Total Miles/Vehicle	x	x				
8. Cost/Seat Mile	x	x				
* 9. Revenue/Expense		x	x			
10. Revenue Hours/Vehicle	x				x	
11. Cost/Loaded Vehicle Mile Passenger				x		
12. Cost/Loaded Vehicle Hour				x		
13. Passengers/Employee			x			
*14. Peak Passengers/Off-Peak Passenger			x			
*15. Deficit/Passenger			x			
16. Average System Speed			x			
17. Transfer Passengers/Total Passengers			x			
18. Revenue Miles/Road-Calls			x			
19. Revenue Miles/Driver					x	
20. Revenue Hours/Driver					x	
21. Cost/Employee	x					
22. Fuel/Vehicle Mile	x					
23. Fuel/Vehicle Hour	x					
<u>Effectiveness Measures</u>						
1. Passengers/Revenue Mile	x	x	x	x	x	
2. Passengers/Vehicle	x	x			x	x
3. Passengers/Capita	x		x		x	
4. Passengers/Revenue Hour		x		x	x	
* 5. Cost/Passenger	x	x				
6. Cost/Passenger Mile	x	x				
7. Passengers/Route Mile		x		x		
8. Passengers/Hour	x			x		
* 9. Revenue/Expense	x	x				
10. Percent Population Served	x					
11. Passengers/Loaded Vehicle Mile				x		
12. Passengers/Loaded Vehicle Hour				x		
13. Average Trip Length				x		
14. Revenue/Mile		x				
15. Revenue/Hour		x				
16. Revenue Miles/Capita			x			
*17. Peak Passengers/Off-Peak Passengers			x			
18. Passengers/Seat Mile						x
19. Passenger Miles/Seat Mile						x
*20. Deficit/Passenger	x					
21. Deficit/Vehicle Mile	x					

\*These indicators were listed as both "Efficiency" Measures and as "Effectiveness" Measures in the literature.

TABLE 11: PERFORMANCE INDICATORS UTILIZING EFFICIENCY AND EFFECTIVENESS DEFINITIONS

Indicators for Efficiency	Indicators for Effectiveness
1. Cost/Vehicle Mile	1. Passengers/Revenue Mile
2. Vehicle Hours/Employee	2. Passengers/Vehicle
3. Cost/Vehicle Hours	3. Passengers/Capita
4. Vehicle Miles/Employee	4. Passengers/Revenue Hour
5. Revenue Miles/Vehicle	5. Cost/Passenger
6. Total Miles/Vehicle	6. Cost/Passenger Mile
7. Cost/Seat Mile/Road Calls	7. Passengers/Route Mile
8. Revenue/Expense	8. Passengers/Hour
9. Revenue Hours/Vehicle	9. Passengers/Loaded Vehicle Mile
10. Average System Speed	10. Passengers/Loaded Vehicle Hour
11. Revenue Miles/Road Calls	11. Peak Passengers/Off-Peak Passenger
12. Revenue Miles/Driver	12. Passengers/Seat Mile
13. Revenue Hours/Driver	13. Passenger Miles/Seat Mile
14. Cost/Employee	14. Deficit/Passenger
15. Fuel/Vehicle Mile	
16. Fuel/Vehicle Hour	

The purpose of this discussion is not to resolve the varying definitions and the inconsistent application of various performance indicators used in transit evaluation. It is important, however, to recognize that such differences do exist prior to developing a framework and methodology for evaluation of human services transportation programs.

#### Performance Evaluation Methodology

If properly designed, a monitoring and evaluation system for human services transportation programs may have the following benefits.

1. Information for the control and management of the transportation service by the operator or program manager.
2. Data for an objective assessment of the transit operation over time or in comparison to similar operations.

3. Immediate cash savings and/or service improvements to clients.
4. Documentation of the efficient and equitable use of program funds.

The basic features of the performance evaluation process are established by:

- The Audience - Who will use the evaluation results?
- The Purpose - How will the evaluation results be used?
- The Level-of-Detail - How extensive should the evaluation be? Will the evaluation address overall system performance or analyze individual functions and activities?
- Frequency of Evaluation - How often must data and information be collected, analyzed, and reported?
- Availability of Resources - What is the appropriate level of effort and required resources for the performance evaluation process?

The "Audience" or user group is an important consideration in developing a performance evaluation methodology and will influence the purpose, the level-of-detail, and potentially the frequency of evaluation. The two primary audiences for performance evaluations are: 1) internal management or the operator; and 2) external organizations or interests. The external interests include the general public, local and state public officials, local, state, and federal funding agencies, and administrative agencies.

The "Purpose" of performance evaluations varies with the audiences involved but typically is designed to assure program accountability, diagnose problems, enable a comparison of performance to established objectives, and to assist in resource or funding allocations.

The "Level-of-Detail" required also varies with the audience. In most instances, a systemwide evaluation is most appropriate for external reporting while more detailed information is desirable for internal management and control.

A critical consideration that affects both level-of-detail and frequency of performance evaluations is "Availability of Resources." To insure that monitoring and evaluation efforts are not more ambitious than the available resources, it is important to consider resource constraints when:

- Developing the evaluation methodology; and,
- Determining the frequency of evaluations of human services transportation programs.

With these important considerations in mind, the methodology used in developing the performance evaluation system for human services transportation programs consisted of a 3-phase process including:

- I. Assessment of data elements and data needs for common transit performance indicators;
- II. Assessment of data availability from selective human services transportation programs; and
- III. Development of minimum and desirable uniform data collection and reporting systems.

Phase I of the process is contained in this section of the report while Phase II and III are contained in separate sections.

#### Assessment of Data Elements/Needs for Performance Indicators

The data elements required for the 30 efficiency and effectiveness indicators shown in Table 11 amount to 25. These 25 elements include:

1. Passengers,
2. Cost,
3. Revenue Miles,
4. Revenue Hours,
5. Vehicles,
6. Vehicle Miles,
7. Vehicle Hours,

8. Seat Miles,
9. Employees,
10. Passenger Miles,
11. Fuel,
12. Drivers,
13. Expense, and
14. Revenue,
15. Total Miles,
16. Route Miles,
17. Road Calls,
18. Loaded Vehicle Hours,
19. Loaded Vehicle Miles,
20. Peak Passengers,
21. Off-Peak Passenger,
22. Deficit,
23. Population (Capita),
24. Hours, and
25. Average System Speed.

However, the listing of 25 data elements may be simplified by combining similar terms and deriving certain data from other common elements. This simplification results in 18 basic data elements plus 4 derived elements as follows:

Base Elements:

1. Population of Service Area (Capita),
2. Total Vehicles,
3. Vehicle Capacities,
4. Total Employees,

5. Total Drivers,
6. Cost (Expense),
7. Revenue,
8. Fuel,
9. Road Calls,
10. Peak Passengers,
11. Total Passengers,
12. Revenue Hours (Hours),
13. Vehicle Miles (Total Miles),
14. Vehicle Hours,
15. Loaded Vehicle Hours,
16. Loaded Vehicle Miles,
17. Revenue Miles (Route Miles), and
18. Passenger Miles.

Derived Elements:

1. Deficit = (Cost) - (Revenue),
2. Off-Peak Passengers = (Total Passengers) - (Peak Passengers),
3. Seat Miles = (Vehicle Miles) x (Vehicle Capacities), and
4. Average System Speed = (Revenue Miles) ÷ (Revenue Hours).

Table 12 shows, in matrix format, the basic elements required for computing the 30 performance indicators. The frequency that a data element is used in calculating performance indicators gives an indication of its relative usefulness in the assessment of data requirements for human services transportation programs. The performance indicators shown in Table 12 are not intended to be all inclusive but are intended to be typical and representative of commonly applied transit evaluators.

TABLE 12: COMPUTATION REQUIREMENTS

PERFORMANCE INDICATORS	Total Passengers	Cost (Expense)	Revenue Miles (Route Miles)	Revenue Hours (Hours)	Total Vehicles	Vehicle Miles (Total Miles)	Vehicle Hours	Total Employees	Total Drivers	Passenger Miles	Vehicle Capacities	Revenue	Fuel	Road Calls	Loaded Vehicle Hours	Loaded Vehicle Miles	Peak Passengers	Population	
Cost/Vehicle Mile		x				x													
Vehicle Hours/Employee							x	x											
Cost/Vehicle Hour		x					x												
Vehicle Miles/Employee						x		x											
Revenue Miles/Vehicle			x		x														
Total Miles/Vehicle					x	x													
Cost/Seat Mile		x				x				x									
Revenue/Expense		x									x								
Revenue Hours/Vehicle				x	x														
Average System Speed		x		x															
Revenue Miles/Road Call			x											x					
Revenue Miles/Driver			x						x										
Revenue Hours/Driver				x					x										
Cost/Employee		x						x											
Fuel/Vehicle Mile						x							x						
Fuel/Vehicle Hour							x						x						
Passengers/Revenue Mile	x	x																	
Passengers/Vehicle	x				x														
Passengers/Capita	x																		x
Passengers/Revenue Hour	x			x															
Cost/Passenger	x	x																	
Cost/Passenger Mile		x								x									
Passengers/Route Mile	x	x																	
Passengers/Hour	x			x															
Passengers/Loaded Vehicle Mile	x																x		
Passengers/Loaded Vehicle Hour	x													x					
Peak Passengers/Off-Peak Passengers	x																		x
Passengers/Seat Mile	x				x					x									
Passenger Miles/Seat Mile					x					x	x								
Deficit/Passenger	x	x										x							
FREQUENCY OF USE OF ELEMENT	12	8	6	5	4	7	3	3	2	2	3	2	2	1	1	1	1	1	1

## 5. DATA AVAILABILITY: HUMAN SERVICES TRANSPORTATION PROGRAMS

The complexities of multiple federal funding programs, numerous state administrative agencies, and local operating programs with varying service delivery systems pose a challenging framework for the development of a uniform monitoring system and a commonly acceptable evaluation procedure for human services transportation providers. The study methodology includes an assessment of current data collection procedures and the availability of key data elements for performance evaluation from the following paratransit programs:

1. Texas Panhandle Community Action Corporation (TPCAC) Transportation Program, Amarillo;
2. Capital Area Rural Transportation System (CARTS), Austin;
3. Department of Human Resources (DHR) Medical Transportation Program for Region 10, Nacogdoches;
4. Metrolift, Houston;
5. Social Service Transportation, Inc. (SST), Dallas;
6. Community Council of South Central Texas, Incorporated (CCSCT), Rural Dial-A-Ride, New Braunfels; and
7. Mobility Impaired Transportation Service (MITS), Fort Worth.

No attempt is made to analyze the certification criteria or procedure used in determining client eligibility for the various human services programs.

### Identified Paratransit Performance Indicators

Of the 7 paratransit programs reviewed, 4 of the programs reported some form of performance indicators in describing the system operation. Table 13 presents the performance indicators reported by these 4 programs.

TABLE 13: REPORTED PERFORMANCE INDICATORS

Performance Indicator	*Para-Transit Program			
	C.	D.	E.	G.
Average Miles/Passenger Trip	X			X
Cost/Vehicle Mile	X			X
Cost/Passenger Trip	X	X		X
Deficit/Passenger Trip		X		
Revenue/Passenger Trip		X		
Revenue/Cost		X		
Passengers/Vehicle Hour		X		
Average System Speed		X		X
Average Vehicle Miles/Gallon			X	
Cost/Vehicle Hour				X
Cost/Passenger Mile				X
Cost (Excluding Maintenance)/ Passenger Trip				X
Percent Late Pick-Ups				X
Percent Late Deliveries				X
Percent Excessive Trip Times				X
Percent Complaints				X
Passenger Miles/Passenger				X
Average Vehicle Load				X

\*Programs:

- C. DHR, Nacogdoches, Texas (12)
- D. Metrolift, Houston, Texas (13)
- E. SST, Dallas, Texas (14)
- G. MITS, Fort Worth, Texas (15)

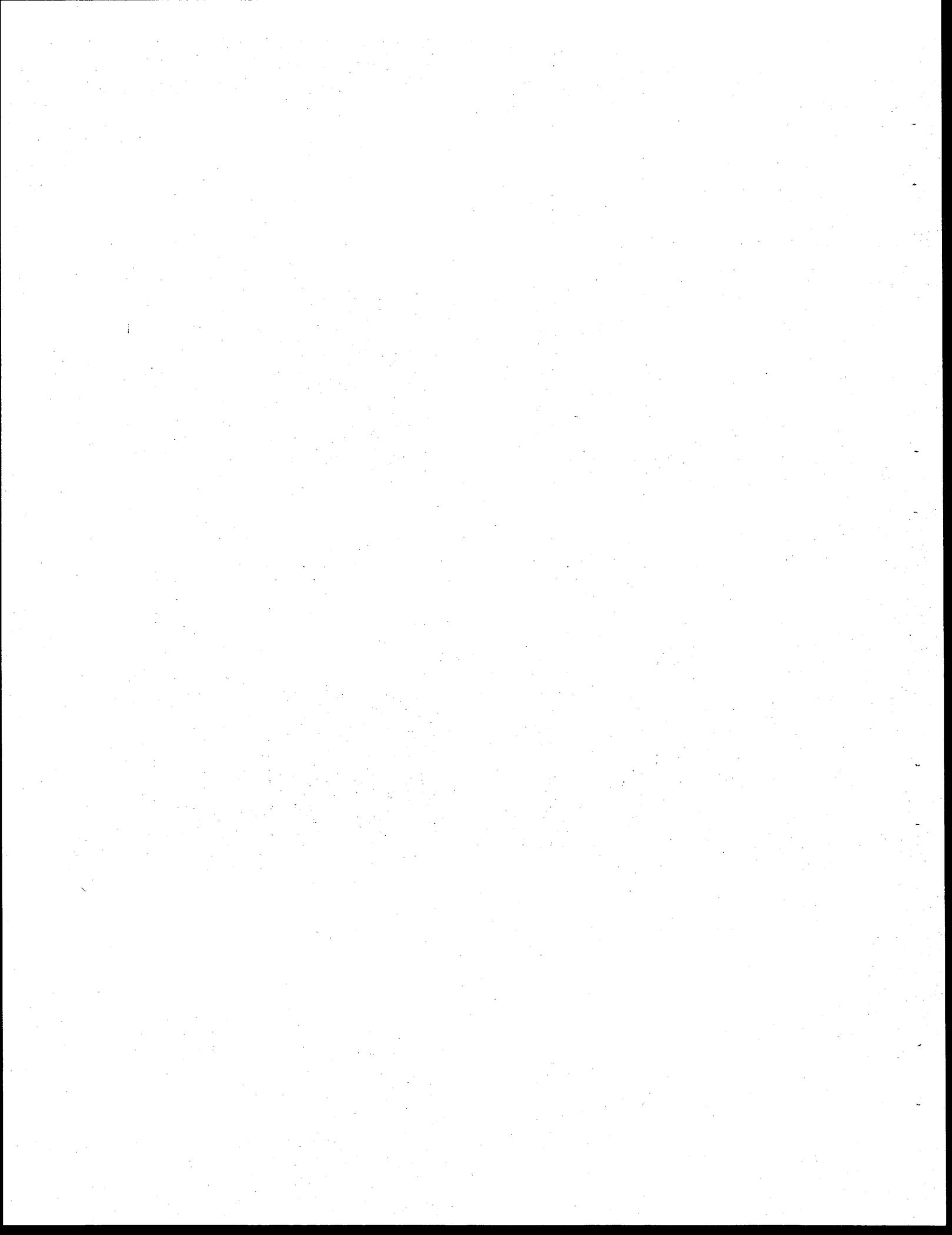
It should be noted, however, that all 7 paratransit programs were capturing information which could be used in developing and reporting performance indicators on their system operation. All 7 programs reviewed were recording data on the 3 essential elements used in analyzing system performance:

- Passengers,
- Vehicles, and
- Cost.

Three basic problems were identified in the review of the paratransit programs:

1. Lack of Common Terms and Definitions;
2. No Standardized List of Essential Data Elements or Reporting Format; and
3. Inconsistent Application of Performance Indicators.

These problems are addressed as a part of this research effort in the development of the recommended "evaluation procedure" and the proposed "monitoring/feedback system" for human services transportation programs.



## 6. EVALUATION PROCEDURE

### General

One of the principle objectives of this research effort was to develop an "evaluation procedure" for use by human service agencies to evaluate existing or alternative transportation delivery systems. Human services transportation developed as a needed support activity to other, more primary, program goals and objectives. These transportation projects, for the most part, have been designed, implemented and operated outside of the normal transportation planning process. With numerous federal and state funding programs, plus multiple administrative agencies, very little coordinated direction and/or guidance has been provided to the managers and operators of human services transportation projects. Therefore, much diversity exists in record keeping, reporting, and operations.

The significance of Section 15 of the Urban Mass Transportation Act was investigated and is contained in a separate section of this study. Human service programs desiring to coordinate transportation delivery with urban transit systems must be familiar with the Section 15 requirements. The development process used for Section 15 is also of interest and relevant to the development of an effective evaluation procedure for human services transportation. The Section 15 requirements were developed with cooperative participation from the ultimate users of the system -- the transit operators.

This research effort has included an investigation of performance indicators and discusses the application of efficiency and effectiveness

measures. In addition, an assessment of data availability from several Texas paratransit operations was undertaken by the research team.

The evaluation procedure outlined herein, plus the more detailed monitoring system and implementation plan, considers these relevant factors and attempts to provide an implementable, multiphase evaluation system.

### System Components

Key to the success (or failure) of an evaluation procedure is its "usefulness" to the program operators and managers. Given the multitude of human service programs, and the varying rules, regulations, and requirements associated with the different programs, the evaluation system must provide flexibility for meeting specific program needs while accomplishing the objective of allowing agencies to evaluate existing or alternative transportation services.

The proposed evaluation procedure consists of the following system components:

- Project Operator/Manager,
- Data Summary/Analysis,
- Feedback,
- System Monitoring/Modification, and
- Technical Assistance.

The interaction of system components and subsystem elements are graphically portrayed in Figure 1.

Each system component is essential to the evaluation procedure and plays a critical role in the process. A brief description of each component and supporting subsystem elements is provided.

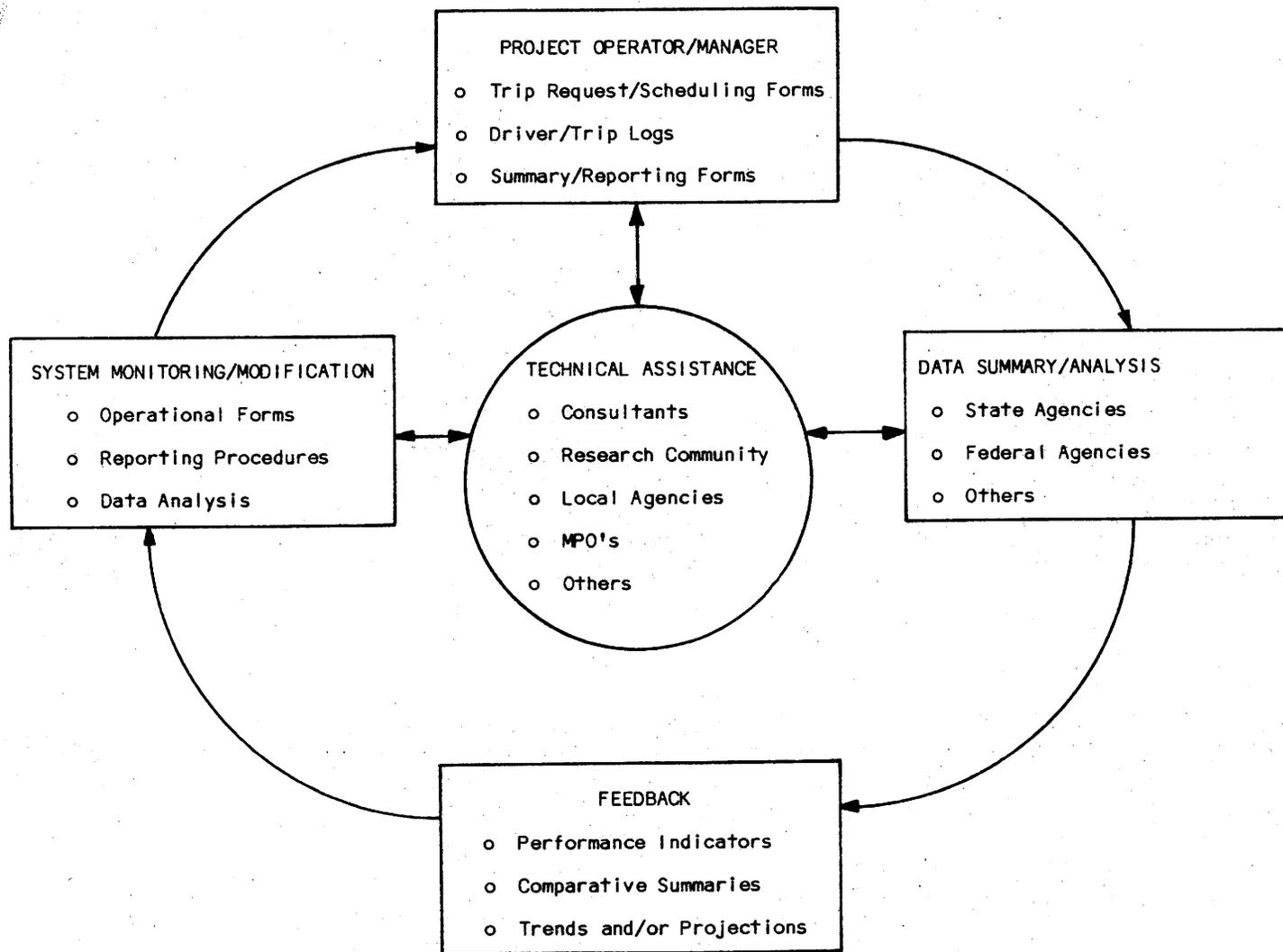


FIGURE 1: EVALUATION SYSTEM

## Project Operator/Manager Component

The ability to implement an effective and useful evaluation procedure for human services agencies is contingent upon the acceptance of the procedure by the Project Operators and/or Managers. The Project Operators are the only source of operational data necessary for developing performance indicators on human services transportation. Likewise, the Project Operators stand to benefit the most from the evaluation system if the performance indicators are useful in assessing the operation's efficiency and effectiveness and are provided in a timely fashion. Recognizing that transportation is normally a support activity to the human service agencies, the recommended monitoring system (described in another section of this report) makes provision for different data requirements of differing programs and concentrates on the following 3 segments of transportation delivery.

- Pre-trip Information
- Service Delivery Information
- Post-trip Information.

The suggested reporting forms for trip Request/Scheduling, Driver/Trip Logs, and Summary/Reporting provide the data foundation for the evaluation system.

## Data Summary/Analysis Component

The evaluation system proposed for human service agencies in Texas is similar to Section 15 procedures for national transit operators. Section 15 data is compiled by the transit manager and submitted to the Urban Mass Transportation Administration (UMTA) for centralized processing and subsequent distribution. Human services transportation data compiled by the State's Project Operators and Managers will be submitted to a centralized agency for processing. The State agency may supplement the operating data with data from other sources (i.e., federal agencies, other State agencies, local MPO's) to provide additional performance indicators for comparative purposes.

## Feedback Component

Centralized processing of data will provide a statewide information base to develop consistent and standardized performance indicators for human services transportation programs. The importance of timely and useful "feedback" information to Program Managers and Project Operators cannot be overly emphasized. In addition to providing performance indicators on individual projects, the centralized data processing will allow the development and feedback of trends, projections and comparative summaries over time and between operating systems.

## System Monitoring/Modification Component

Drawing from the participatory experience of developing the Section 15 requirements, the evaluation system makes provision for continuous monitoring and, when appropriate, modification of the system. This component of the evaluation process allows the system to be dynamic and

responsive to the needs of program managers, administrators and operators. An interagency coordinating committee consisting of a wide range of agency administrators and program operators is suggested. Membership on the committee should include, at a minimum, representatives from the following State agencies (16).

1. Texas Department of Community Affairs
2. Texas Department on Aging
3. Texas Department of Human Resources
4. Texas Rehabilitation Commission
5. Texas Department of Health
6. Texas Department of Mental Health and Mental Retardation
7. Texas Education Agency
8. Texas Commission on Alcoholism
9. Texas Department of Highways and Public Transportation

The recommended data reporting system and related forms are evolutionary in design and are intended to be modified or expanded as needed and deemed appropriate. The data analysis and reporting system must be useful to administrators and operators and be flexible to meet changing needs of the various programs.

#### Technical Assistance Component

State and local human service agencies have experienced dramatic increases in the range and number of programs which they administer, with related expansion in the amount of necessary technical knowledge in the various fields (17). The expansion of human services to include transportation delivery systems has created the need for: 1) direct technical assistance to improve transportation efficiency and effectiveness; and, 2) indirect technical assistance in the form of research and related technology transfer. An important component of the evaluation system is the availability of technical assistance and training to the project operators and managers during implementation of the system. In addition, technical assistance will be necessary or desirable after initial implementation to supplement operating data and to refine or improve the system design.

#### Expected Results

Implementation of the described evaluation system will enable, for the first time in Texas, program administrators and project operators to evaluate their transportation service delivery in comparison to other similar systems. The procedure outlined for data collection, analysis, reporting and monitoring will provide the framework and mechanism for evaluating human services transportation programs on a continuous basis using common terms

and definitions. The dynamic, interactive nature of the evaluation system will allow for cooperative modifications to meet changing needs of the various programs.

## 7. MONITORING SYSTEM

The monitoring system described herein provides the necessary data collection and reporting procedures to support an ongoing evaluation of human services transportation systems. The required forms and records for project operators to collect both operating and financial information are designed to be adaptable to unique program requirements. Consideration is given to three levels of reporting detail.

- Level C - Section 15: Ultimate
- Level D - Desirable
- Level E - Minimum

A uniform system of accounts with recommended line items and common definitions is provided for use by the project operators and managers. In addition, a data reporting system with recommended performance indicators has been developed and applied to the human services transportation programs surveyed in this research effort.

### System Structure

The monitoring system involves the recording, reporting and analysis of data from five key individuals or sources.

- Dispatcher or Scheduler
- Driver
- Accountant or Clerk
- Program Manager
- External Agencies (i.e. MPO's, State, Federal)

A large variation exists in the size and organizational structure of human services transportation programs. Small programs may have one

individual performing all service delivery functions (i.e., scheduling, dispatching, driving, accounting and managing) while larger operations with more staff and/or volunteers may have several individuals assisting in each activity area. Recognizing the differences in program size and staff capability, the monitoring system provides a uniform set of data elements in three levels of detail. However, all levels of reporting detail can be graphically portrayed in the same reporting system structure as shown in Figure 2, entitled Monitoring System.

Essential data elements for each of the three principle segments of service delivery have been compiled by reporting level and are referred to as:

- Pre-trip Information,
- Service Delivery Information, and
- Post-trip Information.

The source of "pre-trip information" is the dispatcher/scheduler activity. "Service delivery information" is derived during vehicle operation and recorded by the driver. "Post-trip information" is recorded in the office by either the accountant/clerk or the program manager and includes such data elements as revenues and expenditures.

### Definitions

A review of data collection and reporting procedures by paratransit and human services transportation programs (contained in the "Data Availability" section of this report) indicates a wide range of terms and varying definitions now in use. Detailed definitions for expense terms, revenue terms, and nonfinancial operating terms are contained within the "Section 15" portion of this report and in Appendix (A). Since Section 15 requirements

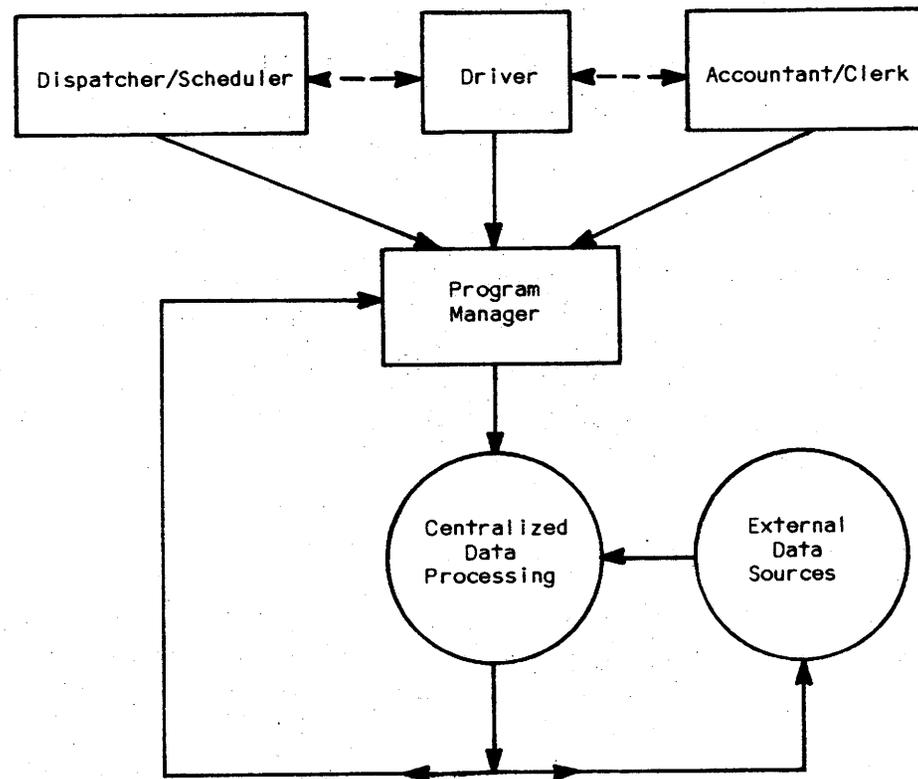


FIGURE 2: MONITORING SYSTEM

apply to human service agencies attempting to coordinate with urban transit operators, the definitions and terms contained therein will be used for the purposes of this research effort.

For the readers' convenience and for common reference, an abbreviated list of terms and definitions, identified in the assessment of "Data Availability: Human Services Transportation Programs," is provided herein for Pre-trip, Service Delivery, and Post-trip data elements.

#### Pre-Trip Data Definitions

Agency - the passenger's sponsoring agency; the agency affiliation of the client.

Affiliation - the passenger's sponsoring agency; the group or agency with which the client is affiliated.

Ambulatory Status - the passenger's mobility classification (i.e., elderly but ambulatory; elderly and nonambulatory; handicapped but ambulatory; handicapped and nonambulatory; transferable; nontransferable).

Appointment Time - the passenger's scheduled time for a doctor's appointment; the time required for completion of the trip or drop-off time.

Client Address - the passenger's place of residence; frequently (but not always) the trip origin.

Client ID - a unique identification number assigned to the passenger usually by a human service agency or other client sponsor.

Client Phone - the telephone number where the passenger can be contacted prior to the requested trip (home, office or other)

Destination - the address or place of the passenger's trip end; requested drop-off point.

Name - the name of the passenger or client requesting transportation.

Origin - the address or place of the passenger's trip beginning; pick-up point.

Pick-Up Time - the scheduled time-of-day for passenger pick-up at trip origin.

Request Date - the calendar date of when passenger made the request for the trip (not to be confused with "trip date").

Return Time - the scheduled time-of-day for the passenger's return trip; the pick-up time from the original or first trip's destination."

Sponsor - the passenger's agency or client's affiliation; the organization certifying passenger's eligibility and/or underwriting all or part of the transportation cost.

Trip Purpose - the reason for the passenger making the trip; may include the following categories or reasons: medical, nutrition, social/recreational, educational, shopping, employment, civic/community, church, welfare, home, other.

Trip Date - the calendar date of when the trip is being requested; the date for service delivery.

#### Service Delivery Data Definitions

Case Number - a unique identification number assigned to a particular passenger or a particular trip, usually assigned by a human service agency or other client sponsor.

Client ID - a unique identification number assigned to the passenger, usually by a human service agency or other client sponsor.

Date - the calendar date of when the passenger trip was made; when transportation is provided to the client; date of service delivery.

Destination - the address or place of the passenger's trip end; actual drop-off point.

Driver - the vehicle operator; the person providing service delivery to the passengers (usually identified by name, initials or signature on vehicle log sheets).

Drop-Off Point - the address or place of the passenger's trip end; the trip destination.

Drop-Off Time - the actual time-of-day when a passenger trip is completed; the time-of-day when the destination is reached and the passenger disembarks from the vehicle; the trip end time.

Odometer Mileage - the actual mileage shown on the vehicle's speedometer mechanism recorded to the nearest 1/10th mile; "begin" and "end" odometer mileages recorded at the trip origin and trip destination results in trip

distance; "begin" and "end" odometer mileage at the start and finish of the day results in total vehicle miles.

Origin - the address or place of the passenger's trip beginning; actual pick-up point.

Passenger - an individual or client being provided transportation from an origin to a destination; a person making a trip on a service vehicle.

Passenger's Age Group - one of three age groups for the passenger being provided service; age groups of less than 15, 16 to 60, and over 60 have been used.

Passenger's Case Number - a unique identification number assigned to a particular passenger for a particular trip or trips, usually assigned by a human service agency or other client sponsor.

Passenger's Classification - the passenger's mobility or ambulatory status (i.e., elderly but ambulatory; elderly and nonambulatory; handicapped but ambulatory; handicapped and nonambulatory; transferable; nontransferable).

Passenger's Name - the name of the passenger or client being provided service.

Passenger Trip - an individual or client traveling from an origin to a destination on a service vehicle; a passenger trip can be described in terms of distance and/or time (only "unlinked" passenger trips are considered applicable to human service transportation programs).

Pick-Up Point - the address or place of the passenger's trip beginning; actual origin of trip.

Pick-Up Time - the actual time-of-day when a passenger trip is started; the time-of-day when the passenger boards the vehicle at the trip origin; the trip start time.

Trip Destination - the address or place of the passenger's trip end; actual drop-off point.

Trip Mileage - the distance traveled by a passenger from a trip origin to a trip destination; the difference between the beginning and ending odometer readings of a passenger trip.

Trip Number - a unique identification number assigned to each passenger trip; may be assigned by the dispatcher/scheduler or by the driver.

Trip Origin - the address or place of the passenger's trip beginning; actual pick-up point.

Trip Purpose - the reason for the passenger making the trip; may include the following categories or reasons: medical, nutrition, social, recreational, educational, civic/community, church, welfare, home, other.

Trip Time - the time traveled by a passenger from a trip origin to a trip destination; the difference between the pick-up and drop-off times of a passenger trip.

Vehicle Number - a unique identification number assigned to each service vehicle; may be the vehicle license number or an assigned equipment number.

#### Post-Trip Data Definitions

Administrative Expense - a functional category of all expenses or costs associated with administering the human services transportation program; composed of several expense object classes as defined by the Section 15 Reporting Requirements.

Average System Speed - is an effectiveness measure of system performances and is expressed in miles per hour; may indicate total system operation (i.e., total miles per total hours) or service delivery operation (i.e., total trip mileages per total trip times).

Capital Expense - is the outlay of funds for nonexpendable equipment (i.e., vehicles, buildings, furniture); the cost or expenditures for capital assets are recorded separately as the program's tangible operating property; in computing the cost of providing human services transportation, only depreciation and amortization of the capital items are included.

Complaints - may be used as a performance indicator of the operation and are an effectiveness measure of the service quality; the number of complaints received from passengers or clients, when used as an indicator, are usually expressed as a percentage of passenger trips or a ratio of complaints to trip mileage.

Cost - is the expense of providing human services transportation and may be distributed to functional activities (i.e., operations, maintenance, administration) by a number of expense object classes as defined by the Section 15 Requirements.

Deadhead Mileage - is the vehicle miles traveled without a passenger on board; deadhead mileage can be computed by taking the difference between the total vehicle miles and total revenue or service miles.

Deadhead Time - is the time spent by vehicles without a passenger on board; deadhead time can be derived by taking the difference between total vehicle hours and total revenue or service hours.

Depreciation - is a cost or expense that reflects the loss in service value of the system's assets or capital items.

Excessive Trip Times - may be used as a performance indicator for a particular system's effectiveness; no standardized time for all systems can be established for defining "excessive" since trip time varies as a function of average system speed and trip mileage.

Expense - is the cost of providing human services transportation and may be distributed to functional activities (i.e., operations, maintenance, administration) by a number of object classes as defined by the Section 15 Requirements.

Expense Object - is a defined class for various cost items associated with providing human services transportation; expense object classes are listed in the Section 15 Requirements.

Expense Function - is a defined category for allocating all or part of the various expense object classes; functions are typically operations, maintenance and administration cost categories and are further defined in the Section 15 Requirements.

Income - is the revenue produced by service delivery of the human services transportation program; income is frequently in the form of passenger fares or charter revenues; "income," as used herein, will not include subsidies or grants.

Late Deliveries - can be a performance indicator for a system's effectiveness or quality of service; late deliveries are determined by comparing "actual" drop-off times to "appointment times."

Late Pick-Ups - can be a performance indicator for a system's effectiveness or quality of service; late pick-ups are determined by comparing "actual" pick-up times to "scheduled" pick-up times.

Maintenance Expense - a functional category of all expenses or costs associated with maintaining the equipment,

vehicles or facilities of the human services transportation program; composed of several expense object classes as defined by the Section 15 Reporting Requirements.

Operating Expense - a functional category of all expenses or costs associated with providing transportation delivery (i.e., fuel, oil, drivers, etc.); composed of several expense object classes as defined by the Section 15 Reporting Requirements.

Passenger - an individual or client being provided transportation from an origin to a destination; a person making a trip on a service vehicle.

Passenger Hours - is the sum of the trip times or the sum of time spent traveling by each passenger; the total number of person-hours of travel by all passengers.

Passenger Miles - is the sum of the trip mileages or the sum of distances traveled by each passenger; the total number of person-miles of travel by all passengers.

Passenger Revenue - is the total amount of revenue earned by the transportation system from transporting passengers.

Passenger Trips - the total number of individual trips made by all passengers; the number of revenue trips.

Passenger Trips by Purpose - the total number of individual trips made by passengers and classified by trip purposes.

Revenue - is the income produced by service delivery of the human services transportation program; revenue is frequently in the form of passenger fares or charter income; "revenue," as used herein, will not include subsidies or grants.

Revenue Hours - are the total number of hours that a revenue or service vehicle is providing transportation to one or more passengers; the total vehicle hours less the deadhead time; same as service hours.

Revenue Miles - are the total number of miles traveled by a service or revenue vehicle which is providing transportation to one or more passengers; the total vehicle miles less the deadhead mileage," same as service miles.

Revenue Trips - the number of passenger trips; the total number of individual trips made by all passengers.

Revenue Vehicles - the total number of service vehicles in operation during any given time period.

Seat Miles - is a performance indicator measuring the amount of service available; computed by multiplying the vehicle's seated capacity by the number of vehicle miles traveled.

Service Hours - are the total number of hours that a revenue or service vehicle is providing transportation to one or more passengers; the total vehicle hours less the deadhead time; same as revenue hours.

Service Miles - are the total number of miles traveled by a revenue or service vehicle which is providing transportation to one or more passengers; the total vehicle miles less deadhead mileage; same as revenue miles.

Service Vehicles - the total number of revenue vehicles in operation during any given time period.

Vehicle Hours - the total hours that a revenue or service vehicle is in operation; includes both service (revenue) hours and deadhead time.

Vehicle Miles - the total miles traveled by a revenue or service vehicle in operation; includes both service (revenue) miles and deadhead mileage.

Vehicle Trips - the total number of individual trips made by all passengers; same as "passenger trips" and "revenue trips."

### Uniform System of Accounts and Records

The Uniform System of Accounts and Records makes provision for three levels of data collection and reporting.

- Level E - Minimum
- Level D - Desirable
- Level C - Section 15: Ultimate

Level E is the simplest system of accounts and records for human services transportation program. This level, considered the minimum acceptable level, only addresses basic data elements for collection and reporting. This level should be considered by only the very smallest programs.

Level D requires slightly more data and results in the ability to monitor more aspects of the transportation service delivery system. Level D reporting is considered very desirable in terms of developing more detailed performance indicators and the ability to assess the effectiveness and efficiency of human services transportation. This level of reporting is recommended for the majority of human services programs.

Level C reporting is suggested for those human services transportation programs which are considering the coordination of their services with urban transit operations. Detailed discussion of required reporting under Level C is contained in a separate section of this report, entitled Section 15 Requirements.

All three reporting levels (C, D, and E) require the "accrual method of accounting." The accrual basis of accounting calls for all expenditures to be recorded as soon as they result in liabilities for benefits received, even if payment of the expenditure is not made during the accounting period. Likewise, all revenues should be recorded when earned, regardless of whether or not actual receipt of the revenue occurs during the reporting period.

#### Level E - Minimum System

The Level E System of Accounts and Records is intended for only the smallest human services transportation programs. This level of reporting will provide only the basic data elements and very limited performance analysis. Data elements captured from each of the three segments of service delivery for the Level E system are shown in Table 14.

TABLE 14: LEVEL E DATA ELEMENTS

Pre-Trip Elements (Scheduler/Dispatcher)	Service Delivery Elements (Driver)	Post-Trip Elements (Accountant/Manager)
Date of Service Request	Vehicle Number	
Trip Date	Driver	
Pick-up Time (Scheduled)	Date	
Return Time (Scheduled)	Beginning Odometer (Day)	Vehicle Miles
Origin	Ending Odometer (Day)	
Destination	Origins	
Name	Pick-up Times	Passenger Trips
Phone Number	Destinations	Service Hours
	Drop-off Times	
	Beginning Time (Day)	Vehicle Hours
	Ending Time (Day)	Deadhead Time
		Revenues
		Costs

Level E provides only the basic data for each segment of service delivery. It should be noted, however, that Level E also provides the most flexibility to the program manager in tailoring the Scheduling/Dispatching Form and Service Delivery Form to individual program requirements. The following suggested forms, with optional data recording space, are provided in Appendix B:

- Scheduling/Dispatching (Level E),
- Service Delivery (Level E), and
- Post-Trip Summary (Level E).

If the program manager or agency does not desire or need the "optional space," the Post-trip Summary (Office Use Only) form can be readily combined with the Service Delivery (Driver/Trip Log) form.

Cost and Revenue data for both Level E and Level D reporting are the sum totals of all costs and revenue; no attempt is made to categorize costs or revenues by functional area.

Table 15 provides a sample worksheet for use by office personnel in totaling revenues and costs for Level E and D reporting. In addition, both revenue and cost columns have been included on the post-trip summary form for possible use by human services programs which itemize income and/or expenditures on a trip-by-trip basis.

Level E Reporting will enable monthly totals or summaries of the following data elements for the human services transportation program:

- Monthly Revenue,
- Monthly Cost,
- Vehicle Miles,
- Passenger Trips,
- Service Hours,
- Vehicle Hours, and
- Deadhead Time.

Table 16 shows some of the derived effectiveness and efficiency measures for Level E Reporting, which may be computed by the centralized data processing center (described in the Evaluation Procedure section).

TABLE 15: REVENUE/COST WORKSHEET  
(Level E and Level D)

For Time Period: \_\_\_\_\_ through \_\_\_\_\_

Revenues:

Passenger Fares	\$ _____
Charter Service	_____
Reimbursements from Agencies	_____
Service Agreements	_____
Non-Transportation Revenue	_____
Volunteer Services (Estimated)	_____
Donated Equipment (Estimated)	_____
Other Revenue (Specify):	
_____	_____
_____	_____
_____	_____
<b>TOTAL REVENUE</b>	<b>\$ _____</b>

Costs:

Salaries	\$ _____
Fringe Benefits	_____
Indirect Charges	_____
Insurance	_____
Fuel and Oil	_____
Maintenance	_____
Volunteer Services (Estimated)	_____
Donated Equipment (Estimated)	_____
Depreciation	_____
Other Cost (Specify):	
_____	_____
_____	_____
_____	_____
_____	_____
<b>TOTAL COST</b>	<b>\$ _____</b>
<b>DEFICIT: (TOTAL COST)-(TOTAL REVENUE)</b>	<b>\$ _____</b>

TABLE 16: PERFORMANCE INDICATORS

Level E Reporting	
Efficiency Measures	Effectiveness Measures
Cost/Vehicle Mile	Passengers/Vehicle Mile
Cost/Service Hour	Passengers/Service Hour
Cost/Vehicle Hour	Passengers/Vehicle Hour
Cost/Passenger	Deadhead Time/Service Hour
Deficit/Vehicle Mile	Deadhead Time/Vehicle Hour
Deficit/Service Hour	Passengers/Capita
Deficit/Vehicle Hour	Service Hours/Capita
Deficit/Passenger	Vehicle Hours/Capita

Note: Population data for "per capita" indicators originates from sources other than the human services program.

Level D - Desirable System

The Level D System of Accounts and Records is recommended for the majority of human services transportation programs. This level is considered desirable in terms of developing more detailed performance indicators. It also allows a better assessment of the effectiveness and efficiency of human services transportation than Level E. The data elements captured from each segment of service delivery, at the "D" reporting level, are shown in Table 17.

Suggested operational forms for the Trip Request/Scheduling, Driver/Trip Log, and Post-Trip Summaries are contained in Appendix B. The Revenue/Cost Worksheet shown for Level E reporting (Table 15) is also applicable to Level D reporting.

TABLE 17: LEVEL D DATA ELEMENTS

Pre-Trip Elements (Scheduler/Dispatcher)	Service Delivery Elements (Driver)	Post-Trip Elements (Accountant/Manager)
Request Number	Vehicle Number	Seat Miles
Date of Service Request	Vehicle Capacity	Vehicle Miles
Trip Date	Driver	Passenger Miles
Pick-up Time (Scheduled)	Date	Passenger Miles
Return Time (Scheduled)	Beginning Odometer (Day)	Service Hours
Origin	Ending Odometer (Day)	Service Miles
Destination	Number of Passengers on Board	Deadhead Miles
Name	Origins	Passenger Hours
Phone Number	Pick-up Times	Vehicle Hours
Client Address	Pick-up Mileage	Deadhead Time
Client ID	Destinations	Revenues
Trip Purpose	Drop-off Times	Costs
Passenger Classification	Drop-off Mileage	
Agency	Beginning Time (Day)	
	Ending Time (Day)	

Level D Reporting will provide monthly totals or summaries of the following data elements for the human services transportation programs:

- Monthly Revenue,
- Monthly Cost,
- Vehicle Miles,
- Passenger Trips,
- Service Hours,
- Vehicle Hours,

- Deadhead Time,
- Seat Miles,
- Passenger Classifications,
- Passenger Miles,
- Trip Purposes,
- Service Miles,
- Passenger Hours, and
- Deadhead Mileage.

All of the above elements except "passenger classifications" and "trip purposes" are contained on the suggested post-trip summary form. The classification and purpose information is available from the scheduling/dispatching forms.

Table 18 shows example performance indicators for system effectiveness and efficiency measures which maybe derived from the reported data for Level D.

TABLE 18: PERFORMANCE INDICATORS

Level D Reporting	
Efficiency Measures	Effectiveness Measures
Cost/Vehicle Mile	Passengers/Vehicle Mile
Cost/Service Hour	Passengers/Service Hour
Cost/Vehicle Hour	Passengers/Vehicle Hour
Cost/Passenger	Deadhead Time/Service Hour
Deficit/Vehicle Mile	Deadhead Time/Vehicle Hour
Deficit/Service Hour	Passengers/Capita
Deficit/Vehicle Hour	Service Hours/Capita
Deficit/Passenger	Vehicle Hours/Capita
Cost/Seat Mile	Passengers/Seat Mile
Cost/Passenger Mile	Passengers/Service Mile
Cost/Service Mile	Deadhead Mileage/Service Hour
Cost/Passenger Hour	Deadhead Mileage/Vehicle Hour

## Level C - Section 15: Ultimate System

Human services transportation programs which coordinate, or anticipate coordinating, their services with urban transit operations must be familiar with and conform to Section 15 Requirements. Level C is the lowest reporting level for Section 15, but the highest proposed for human services agencies. The most significant difference between Levels E and D reporting and the ultimate Level C reporting is the method of accounting for expenditures. As discussed in the Section 15 portion of this report, a two-dimensional classification system of accounting is used.

1. The type of expenditure (object classes).
2. The function or activity performed.

Figure 3 presents an outline or matrix chart for the distribution of expenses required for Level C reporting. The chart shows all of the required functions (operations, maintenance and administration) and, with an "x," the required object class expenses to report with each function.

A 1978 Technical Memorandum by the Institute of Public Administration, sponsored by the Administration on Aging, suggested a uniform record keeping system based upon Section 15 requirements (19). The memorandum presented the following 8 forms for consideration by human services agencies, which are consistent to Level C Reporting:

- Individual Trip Request,
- Group Trip Request,
- Daily Dispatcher Report,
- Monthly Agency/Program Report,
- Monthly Vehicle Report,

EXPENSE OBJECT CLASSES	FUNCTIONS FOR DISTRIBUTING EXPENSE OBJECT CLASSES		
	OPERATIONS	MAINTENANCE	ADMINISTRATION
LABOR:			
Operators' Salaries & Wages	X	X	X
Other Salaries & Wages	X	X	X
FRINGE BENEFITS:	X	X	X
SERVICES:	X	X	X
MATERIALS AND SUPPLIES CONSUMED:			
Fuel and Lubricants	X	X	
Tires and Tubes	X	X	
Other Materials and Supplies	X	X	X
UTILITIES:		X	X
CASUALTY AND LIABILITY COSTS:		X	X
TAXES:	X	X	X
PURCHASED TRANSPORTATION SERVICE:			X
MISCELLANEOUS EXPENSE:			X
EXPENSE TRANSFERS:	X	X	X
INTEREST EXPENSE:			X
LEASES AND RENTALS:	X	X	X
DEPRECIATION AND ADMINISTRATION:	X	X	X

SOURCE: REFERENCE 4-11, PAGE 7.4-8.

FIGURE 3: EXPENSE REPORTING (LEVEL C)

- Monthly Cost Report, and
- Monthly Productivity Report.

These forms and reports, along with a description of specific data elements required for completion of the forms, are contained in Appendix B.

### Testing of Monitoring System

The following three transportation programs were studied during the first phase of this research effort.

TPCAC - Texas Panhandle Community Action Corporation Transportation Program, Amarillo, Texas.

CARTS - Capital Area Rural Transportation System, Austin, Texas.

DHR Region 10 - Department of Human Resources Medical Transportation Program Region 10, Nacogdoches, Texas.

Table 19 summarizes the available data elements for all three operating systems, as reported in Technical Report 1065-1 (Study 2-10-79-1065) entitled "Evaluation of Selected Human Services Transportation Providers in Texas," (9) for the proposed Level E and Level D reporting.

Of the seven recommended data elements for Level E reporting, approximately 48% of the elements are available from the three human services programs. Some 52% of the data elements are currently available for the suggested Level D reporting. Table 20 presents the computed performance indicators for system efficiency and effectiveness of the three operations based upon the available data.

Data from the three human services programs are currently available to allow computation of approximately 29% of the suggested 16 Level E performance indicators and about 27% of the suggested 32 Level D indicators.

TABLE 19: AVAILABLE DATA FOR MONITORING SYSTEM

Data Elements	Human Services Program			Reporting Level	
	TPCAC	CARTS	DHR	E	D
Monthly Revenue	NA	*	NA	E	D
Monthly Cost	\$13,616	\$ 9,865	\$20,099	E	D
Vehicle Miles	18,146	7,529	40,637	E	D
Passenger Trips	5,130	1,830	3,080	E	D
Service Hours	NA	NA	NA	E	D
Vehicle Hours	NA	NA	NA	E	D
Deadhead Time	NA	NA	NA	E	D
Seat Miles	NA	NA	NA		D
Passenger Classification	Yes	Yes	Yes		D
Passenger Miles	39,239	27,774	NA		D
Trip Purposes	Yes	Yes	Yes		D
Service Miles	11,911	5,593	NA		D
Passenger Hours	NA	NA	NA		D
Deadhead Mileage	6,235	1,936	NA		D

\*Revenue Reported but not available for analysis.

TABLE 20: COMPUTED PERFORMANCE INDICATORS

Performance Indicator	Human Services Program			Reporting Level	
	TPCAC	CARTS	DHR	E	D
<u>Efficiency Measures</u>					
Cost/Vehicle Mile	\$ .75	\$1.31	\$ .49	E	D
Cost/Service Hour	NA	NA	NA	E	D
Cost/Vehicle Hour	NA	NA	NA	E	D
Cost/Passenger	\$2.65	\$5.39	\$6.53	E	D
Deficit/Vehicle Mile	NA	*	NA	E	D
Deficit/Service Hour	NA	NA	NA	E	D
Deficit/Vehicle Hour	NA	NA	NA	E	D
Deficit/Passenger	NA	NA	NA		D
Cost/Seat Mile	NA	NA	NA		D
Cost/Passenger Mile	\$ .35	\$ .36	NA		D
Cost/Service Mile	\$1.14	\$1.76	NA		D
Cost/Passenger Hour	NA	NA	NA		D
Deficit/Seat Mile	NA	NA	NA		D
Deficit/Passenger Mile	NA	*	NA		D
Deficit/Service Mile	NA	*	NA		D
Deficit/Passenger Hour	NA	NA	NA		D
<u>Effectiveness Measures:</u>					
Passengers/Vehicle Mile	.28	.24	.08	E	D
Passengers/Service Hour	NA	NA	NA	E	D
Passengers/Vehicle Hour	NA	NA	NA	E	D
Deadhead Time/Service Hour	NA	NA	NA	E	D
Deadhead Time/Vehicle Hour	NA	NA	NA	E	D
Passengers/Capita	**	**	**	E	D
Service Hours/Capita	NA	NA	NA	E	D
Vehicle Hours/Capita	NA	NA	NA	E	D
Passengers/Seat Mile	NA	NA	NA		D
Passengers/Service Mile	.43	.33	NA		D
Deadhead Mileage/Service Hour	NA	NA	NA		D
Deadhead Mileage/Vehicle Hour	NA	NA	NA		D
Seat Miles/Capita	NA	NA	NA		D
Passenger Miles/Capita	**	**	NA		D
Service Miles/Capita	**	**	NA		D
Passenger Miles/Seat Mile	NA	NA	NA		D

\*Revenue reported but not available for computing deficit and related analysis.

\*\*Data available from Human Services Program but not required population data from other sources.

## 8. IMPLEMENTATION PLAN

Implementation is the most difficult task in bringing about a standardized data collection and monitoring system. A previous cooperative effort undertaken by several State Agencies to address common problems was largely ineffective in solving any problems. However, previous efforts should be viewed as valuable experience for future efforts, rather than a predication concerning future activities.

The approach taken in this research effort was first to conceptualize how a data collection and monitoring scheme would be ideally structured without regard to known problems. While this approach might seem unrealistic, it has the distinct advantage of not precluding any alternatives by limiting the thought process. After constructing an "ideal" concept, it is then possible to critique its limitations based on existing knowledge of the real environment under which it would have to operate. Modifications, or phased implementation, can then be proposed to overcome identified problems. The result is hopefully an implementable program.

Given the overlapping programs among several state agencies, it is obvious that state agencies, as well as transportation providers, should coordinate their efforts in order not to duplicate efforts or impose conflicting requirements. During the course of this study it was observed that providers were, in fact, struggling with conflicting requirements in reporting to different agencies. Ideally, a mechanism would be desirable for developing an interagency coordinating group.

The first task of the interagency coordinating group would be a review of recommendations by the various state agencies and program participants.

The recommendations would then be modified as required to address any significant problems.

The next task would be the development of detailed reporting requirements for individual agencies according to the overall statewide plan developed by the interagency coordinating committee. The last phase would be the actual implementation.

In examining the above concept, it becomes obvious that flaws exist. One basic problem is that the interagency coordinating group has already been tried on a limited basis with little tangible results. Like many well-intentioned efforts, it lacks the financial resources and staff necessary for making significant accomplishments.

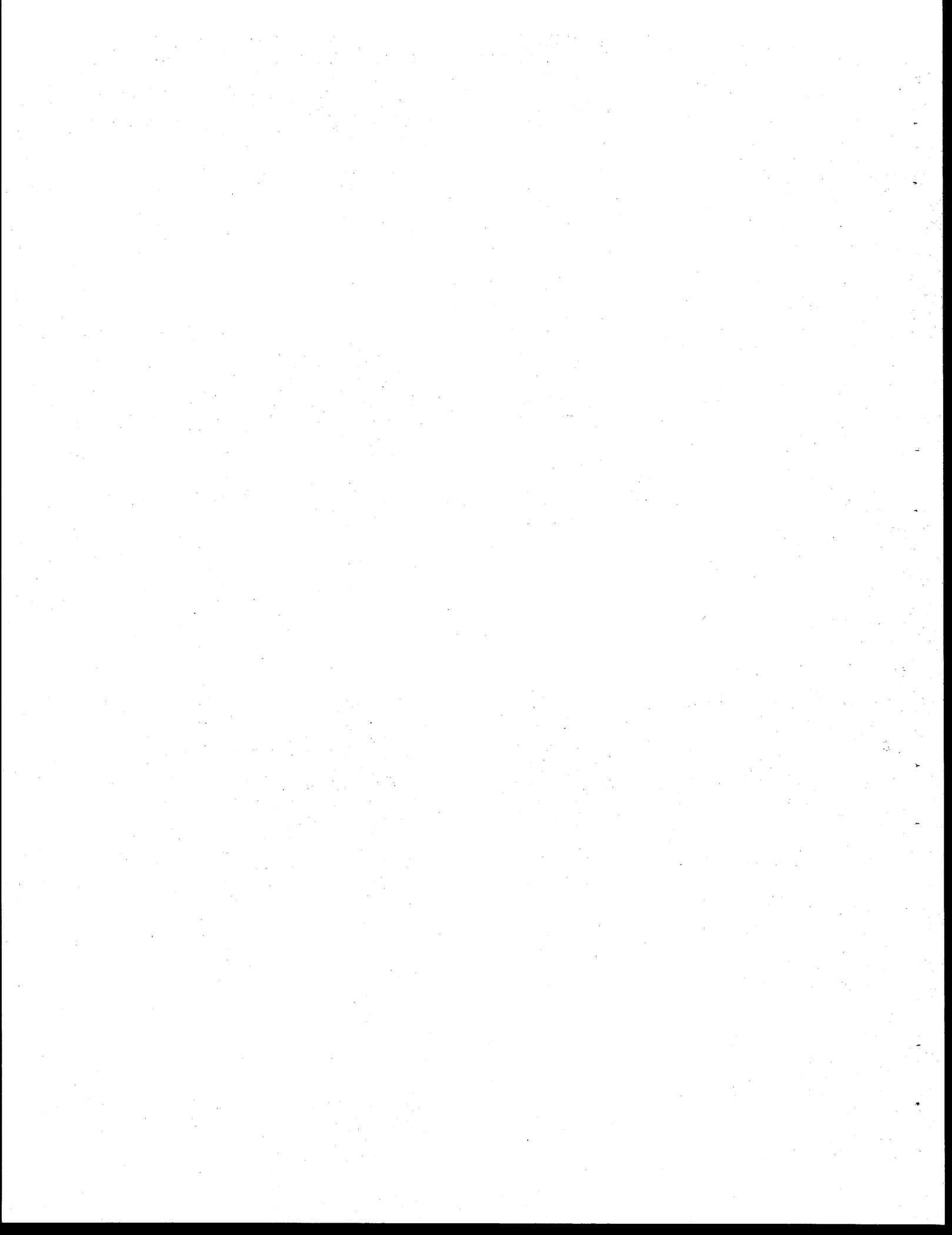
Another basic question in examining the concept as suggested is what will be done with the data after it is collected? To be most useful, the data must be tallied, analyzed, and summarized. This also requires financial and staff resources which are not now readily available. It is also frustrating to participants in any reporting scheme not to see tangible results and not to receive feedback.

It becomes clear that implementation of a data collection and monitoring system is a significant undertaking. Given the existing state organizational structure, total implementation of a multiagency program appears to be a remote possibility.

The recommended approach is a phased implementation using a pilot program in a single agency. Logical candidates include the three agencies with the largest transportation programs: the Texas Department of Human Resources, the Texas Department on Aging, and the Texas State Department of Highways and Public Transportation. The minimum resources required would be one professional staff person with some clerical support. One possible

funding source would be the Urban Mass Transportation Administration. A two-year program to implement and evaluate the pilot program would be required.

The pilot program would develop the necessary forms, assist agencies in training personnel to properly collect data, collect the necessary reports, analyze the results, and provide feedback to the various participants. At the end of the pilot program, its effectiveness could be evaluated to determine if it improved the efficiency and effectiveness of the various systems. If the program is shown to be effective, it could then be easily promoted to other agencies as an effective program.

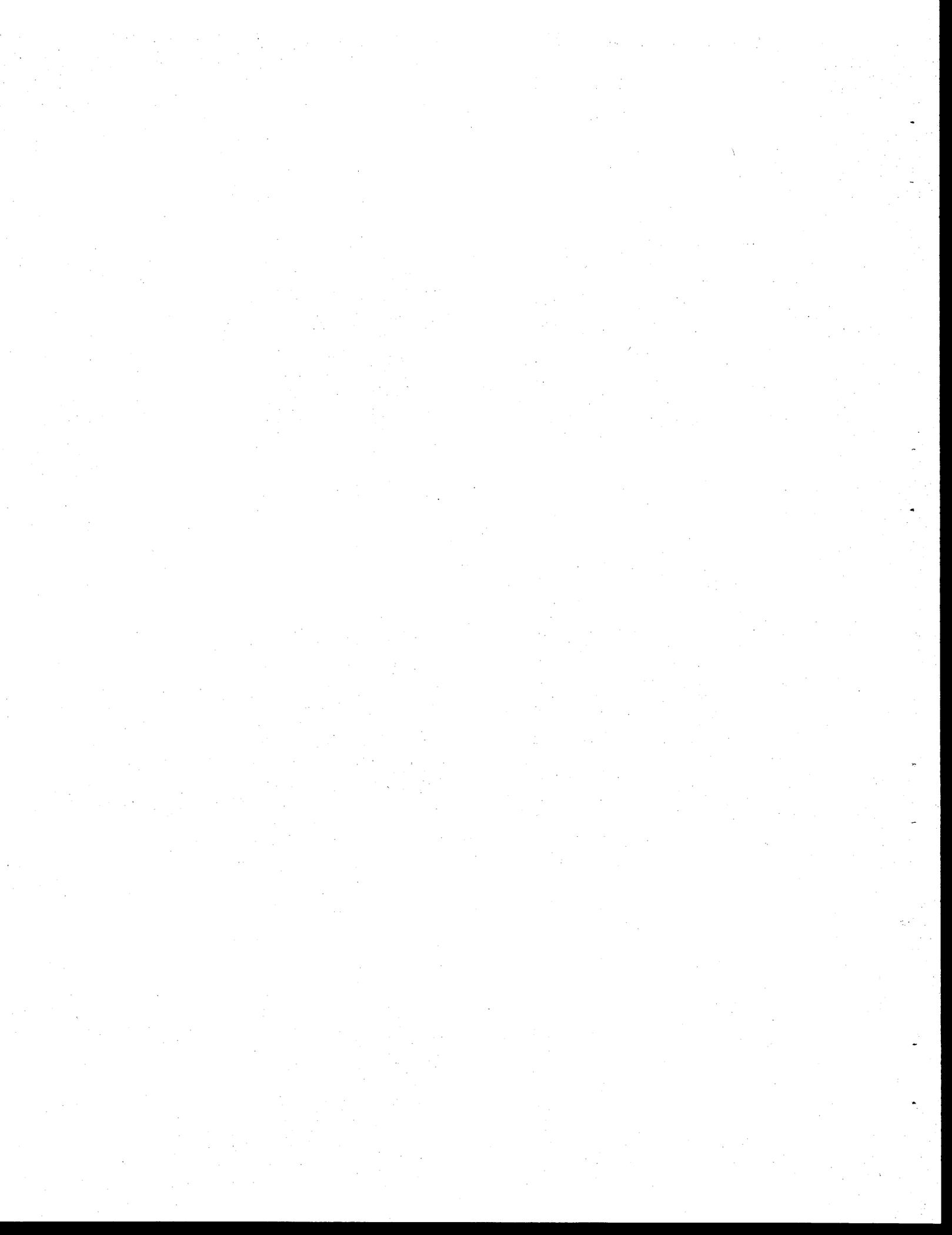


## 9. SUMMARY AND CONCLUSIONS

This study evaluated human services transportation providers in the State of Texas and found a dearth of useable data for agencies to evaluate and monitor their systems. The research effort included the development of a flexible data collection system and procedures for evaluating operations. Unfortunately, implementation was found to be a difficult hurdle to overcome. The difficulty in implementing a data collection and monitoring system results from the nature of the government.

Large private endeavors are profit oriented. In order to determine where a large company is making money, it often implements a management information system to collect and analyze data. It is a cost of doing business. However, in the public sector, data collection and analysis is more readily viewed only as a cost. Since there is no "profit" to monitor in the public sector, it is more difficult to judge what is a reasonable expenditure of funds.

The changing economy and public attitudes are beginning to put more pressure on government to justify expenditures. Thus, it is likely that over time data collection and evaluation are likely to receive more attention. The framework for such an undertaking has been laid for human services transportation providers.



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APPENDIX A

SECTION 15: OPERATING DATA ELEMENTS  
(All Elements Required)

Time Periods

Facilities and Equipment

Miles of roadway or track.  
Railway classifications.  
Bus roadway classifications.  
Revenue vehicle inventory classifications.  
Number of passenger stations.

Employees

Transit operating personnel classifications.  
Employee count classifications.

Maintenance Performance and Fuel Consumption

Roadcalls for mechanical failure.  
Roadcalls for other reasons.  
Labor hours for inspection and maintenance of revenue vehicles.  
Fuel power consumption.  
Number of light maintenance facilities.

Safety

Collision accident classifications.  
Noncollision accident classifications.  
Injury and damage classifications.

Service Supplied and Vehicle Utilization

Average and total vehicles operated.  
Miles of revenue service.  
Miles of total service.  
Miles of charter and school bus service.  
Hours of revenue service.  
Hours of total service.  
Hours of charter and school bus service.

Passenger Utilization

Unlinked passenger trips.  
Passenger miles.  
Average time per unlinked trip.

## I. Definitions of Service Supplied and Vehicle Utilization Elements and Classifications

Revenue Vehicles in Operation: The maximum number of vehicles operated during a time period.

Revenue Vehicle Miles: Total miles traveled by revenue vehicles while in revenue service. Excludes miles traveled to and from storage facilities and other deadhead travel.

Revenue Vehicle Hours: Total number of scheduled hours that a vehicle is in revenue service. Excludes hours consumed while traveling to and from storage facilities and during other deadhead travel.

Revenue Capacity-Miles (Computed): Revenue vehicle miles times the average passenger capacity of the active vehicles in the fleet. Average passenger capacity is determined by averaging the sum of the seated capacity and standing capacity of all active vehicles in the fleet.

Vehicle Miles: The total distance traveled by revenue vehicles, including both revenue miles and deadhead miles.

Vehicle Hours: The total hours of travel by revenue vehicles including scheduled hours consumed in passenger service and deadhead travel.

Charter Miles: The total vehicle miles traveled by a revenue vehicle while in charter service. It includes miles traveled while carrying passengers and deadhead miles.

Charter Hours: The total vehicle hours of travel by revenue vehicles while in charter service. It includes revenue hours and deadhead hours.

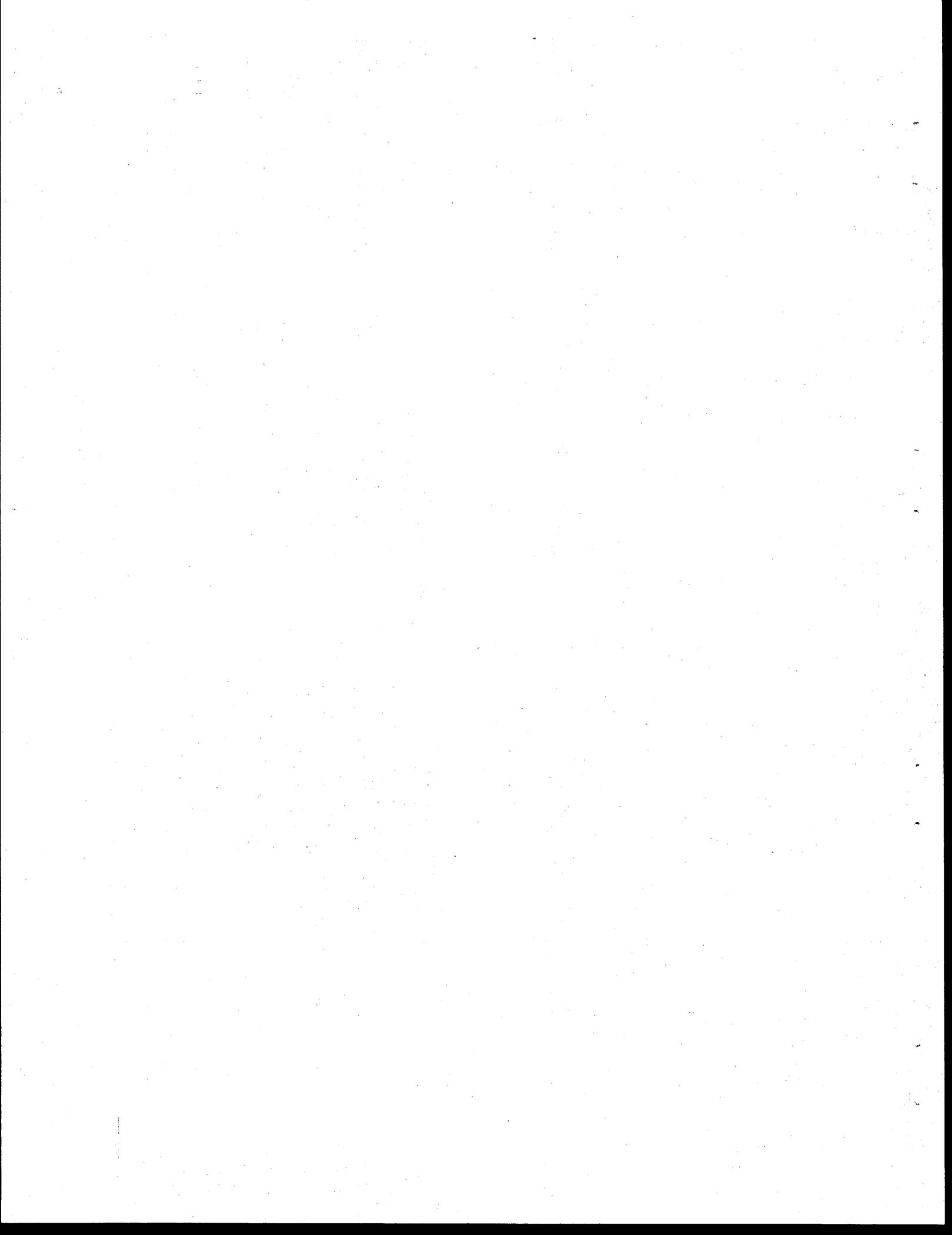
School Bus Miles: The total vehicle miles traveled by a revenue vehicle while serving as a school bus. It includes revenue miles and deadhead miles. School bus miles are only miles where a bus is primarily or solely dedicated to carrying school passengers.

## II. Definitions of Passenger Utilization Elements and Classifications

Unlinked Passenger Trips: The number of passengers who board public transportation vehicles. Passengers are counted each time they board a vehicle even though it may be on the same journey from origin to destination.

Passenger Miles: The sum of the distances ridden by each passenger. This measure may be derived by multiplying the number of unlinked passenger trips by the average distance ridden per unlinked passenger.

Average Time Per Unlinked Passenger Trip: The average (i.e., arithmetic mean) number of minutes that the passenger spends aboard the revenue vehicle for an unlinked passenger trip.



SECTION 15: EXPENSE OBJECT CLASSES  
(\*Denotes Required Object Classes)

\*Labor

- \*Operators' Salaries and Wages.
- \*Other Salaries and Wages.

\*Fringe Benefits

- FICA or Railroad Retirement.
- Pension Plans (including long-term disability insurance).
- Hospital, Medical and Surgical Plans.
- Dental Plans.
- Life Insurance Plans.
- Short-Term Disability Insurance Plans.
- Unemployment Insurance.
- Workmen's Compensation Insurance or Federal Employees Liability Act Contributions.
- Sick Leave.
- Holiday (including all premiums paid for working on holidays).
- Vacation.
- Other Paid Absence (bereavement pay, military pay, jury duty pay, etc.).
- Uniform and Work Clothing Allowances.
- Other Fringe Benefits.
- Distribution of Fringe Benefits.

\*Services

- Management Service Fees.
- Advertising Fees.
- Professional and Technical Services.
- Temporary Help.
- Contract Maintenance Services.
- Custodial Services.
- Security Services.
- Other Services.

\*Materials and Supplies Consumed

- \*Fuel and Lubricants.
- \*Tires and Tubes.
- \*Other Materials and Supplies.

\*Utilities

- Propulsion Power.
- Utilities Other Than Propulsion Power.

\*Casualty and Liability Costs

- Premiums for Physical Damage Insurance.

Recoveries of Physical Damage Losses.  
Premiums for Public Liability and Property Damage Insurance.  
Payouts for Uninsured Public Liability and Property Damage Settlements.  
Provision for Uninsured Public Liability and Property Damage Settlements.  
Payouts for Insured Public Liability and Property Damage Settlements.  
Premiums for Other Corporate Insurances.  
Other Corporate Losses.  
Recoveries of Other Corporate Losses.

\*Taxes

Federal Income Tax.  
State Income Tax.  
Property Tax  
Vehicle Licensing and Registration Fees.  
Fuel and Lubricant Taxes.  
Electric Power Taxes.  
Other Taxes.

\*Purchased Transportation Service

\*Miscellaneous Expense

Dues and Subscriptions.  
Travel and Meetings.  
Bridge, Tunnel and Highway Tolls.  
Entertainment Expense.  
Charitable Donations.  
Fines and Penalties.  
Bad Debt Expense.  
Advertising/Promotion Media.  
Other Miscellaneous Expense.

\*Expense Transfers

Function Reclassifications.  
Expense Reclassifications.  
Capitalization of Nonoperating Costs.

\*Interest Expense

Interest on Long-Term Debt Obligations (net of interest capitalized).  
Interest on Short-Term Debt Obligations.

\*Leases and Rentals

Transit Way and Transit Way Structures and Equipment.  
Passenger Stations.  
Passenger Parking Facilities.  
Passenger Revenue Vehicles.  
Service Vehicles.  
Operating Yards or Stations.  
Engine Houses, Car Shops and Garages.

Power Generation and Distribution Facilities.  
Revenue Vehicle Movement Control Facilities.  
Data Processing Facilities.  
Revenue Collection and Processing Facilities.  
Other General Administration Facilities.

#### \*Depreciation and Amortization

Transit Way and Transit Way Structures and Equipment.  
Passenger Stations.  
Passenger Parking Facilities.  
Passenger Revenue Vehicles.  
Service Vehicles.  
Operating Yards or Stations.  
Engine Houses, Car Shops and Garages.  
Power Generation and Distribution Facilities.  
Revenue Vehicle Movement Control Facilities.  
Data Processing Facilities.  
Revenue Collection and Processing Facilities.  
Other General Administration Facilities.  
Amortization of Intangibles.

#### Definitions of Required Expense Object Classes

##### Labor

-- "Labor" is the pay and allowances due employees in exchange for the labor services they render in behalf of the transit system. It is necessary to distinguish the allowances to be included in "Fringe Benefits." The "Labor" allowances include payments direct to the employee arising from the performance of a piece of work, such as shift differentials, overtime premiums, minimum guarantees, etc. The "Fringe Benefit" allowances include payments direct to the employee, but not arising from the performance of a piece of work. The latter allowances include paid absence for illness, holidays, vacations, jury duty, etc.

##### Labor - Operators' Salaries and Wages

-- the labor of employees of the transit system who are classified as revenue vehicle operators or crewmen.

##### Labor - Other Salaries and Wages

-- the labor of employees of the transit system who are not classified as revenue vehicle operators or crewmen.

##### Fringe Benefits

-- "Fringe Benefits" are payments or accruals to others (insurance companies, governments, etc.) on behalf of an employee and payments or accruals direct to an employee arising from something other than his performance of a piece of work. These payments are transit system costs over and above "Labor" costs, but still arising from the employment relationship.

## Services

-- "Service" is labor and other work provided by outside organizations for fees and related expenses. In most instances, service from an outside organization is procured as a substitute for in-house employee labor, except in the case of independent audits which could not be performed by employees in the first place. The substitution is usually made because the skills offered by the outside organization are needed for only a short period of time or are better than internally available skills. The charge for these services is usually based on the labor hours invested in performing the service.

## Materials and Supplies Consumed

-- "Materials and Supplies" are tangible products obtained from outside suppliers or manufactured internally. Freight-in, purchase discounts, cash discounts, sales taxes and excise taxes (except on fuel and lubricants) are to be included in the cost of the material or supply. Charges to these expense accounts will be for the materials and supplies issued from inventory for use and for the materials and supplies purchased for immediate use, i.e., without going through inventory.

### Materials and Supplies Consumed - Fuel and Lubricants

-- costs of gasoline, diesel fuel, propane, lubricating oil, transmission fluid, grease, etc., for use in vehicles.

### Materials and Supplies Consumed - Tires and Tubes

-- lease payments for tires and tubes rented on a time period or mileage basis.

-- cost of tires and tubes for replacement of tires and tubes on vehicles.

### Materials and Supplies Consumed - Other Materials and Supplies

-- cost of materials and supplies not specifically identified in object classes for "Fuel and Lubricants" and "Tires and Tubes" issued from inventory or purchased for immediate consumption, e.g., vehicle maintenance parts, track materials, cleaning supplies, office forms, etc.

## Utilities

-- "Utilities" are payments made to various utilities for utilization of their resources (e.g., electric, gas, water, telephone, etc.)

## Casualty and Liability Costs

-- "Casualty and Liability Costs" includes cost elements covering

protection of the transit system from loss through insurance programs.

### Taxes

-- "Taxes" are those taxes levied against the transit system by Federal, state, and local governments. Sales and excise taxes on materials and services purchased other than fuel and lubricants are not included in this category, but are to be accounted for as part of the base price of the material or service.

### Purchased Transportation Service

-- "Purchased Transportation Service" is the payment or accrual to other transit systems for providing transportation service.

### Miscellaneous Expenses

-- "Miscellaneous Expenses" are those expenses which cannot be attributed to any of the other major expense categories.

### Expense Transfers

-- "Expense Transfers" are accounts to be used for reporting adjustments and reclassifications of expenses previously recorded.

### Interest Expense

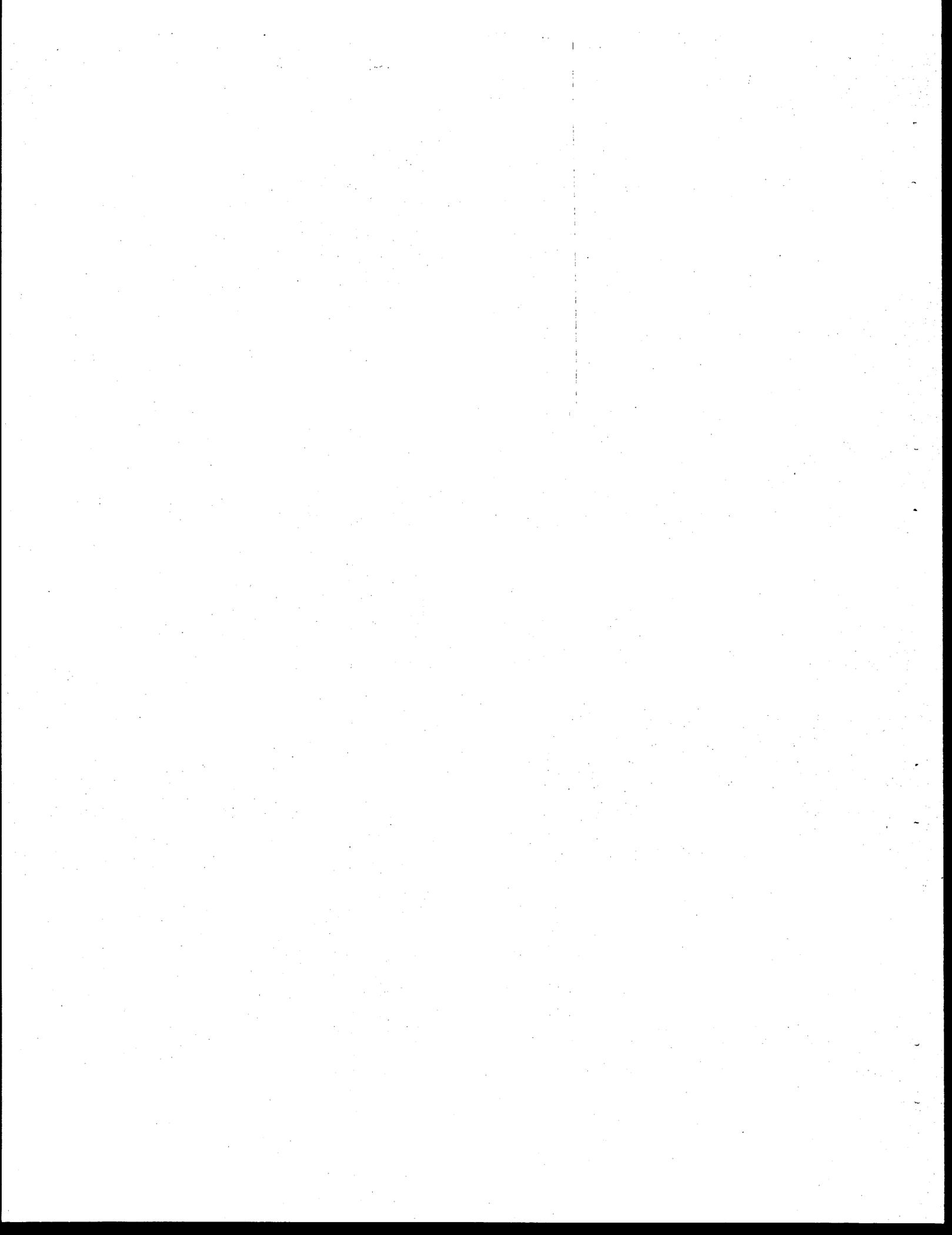
-- "Interest Expense" are charges for the use of borrowed capital incurred by the transit system.

### Leases and Rentals

-- "Leases and Rentals" are payments for the use of capital assets not owned by the transit system.

### Depreciation and Amortization

-- "Depreciation and Amortization" are charges that reflect the loss in service value of the transit system's assets.



SECTION 15: REVENUE OBJECT CLASSES  
(\*Denotes Required Object Classes)

\*Passenger Fares For Transit Service

Full Adult Fares.  
Senior Citizen Fares.  
Student Fares.  
Child Fares.  
Handicapped Rider Fares.  
Parking Lot Revenue.  
Other Primary Ride Fares.

\*Special Transit Fares

Contract Fares for Postmen.  
Contract Fares for Policemen.  
Special Route Guarantees.  
Other Special Contract Transit Fares - State and Local Government.  
Other Special Contract Transit Fares - Other Sources.  
Non-Contract Special Service Fares.

\*School Bus Service Revenues

\*Freight Tariffs

\*Charter Service Revenues

\*Auxiliary Transportation Revenues

Station Concessions.  
Vehicle Concessions.  
Advertising Services.  
Automotive Vehicle Ferriage.  
Other Auxiliary Transportation Revenues.

\*Nontransportation Revenues

Sale of Maintenance Services.  
Rental of Revenue Vehicles  
Rental of Buildings and Other Property.  
Investment Income.  
Parking Lot Revenue.  
Other Nontransportation Revenues.

\*Taxes Levied Directly By Transit System

Property Tax Revenue.  
Sales Tax Revenue.  
Income Tax Revenue.  
Payroll Tax Revenue.

Utility Tax Revenue.  
Other Tax Revenue.

\*Local Cash Grants and Reimbursements

Handicapped Citizen Fare Assistance.  
Senior Citizen Fare Assistance.  
Student Fare Assistance.  
Other Special Fare Assistance.

\*State Cash Grants and Reimbursements

General Operating Assistance.  
Special Demonstration Project Assistance - State Projects.  
Special Demonstration Project Assistance - State Share for UMTA  
Projects.  
Reimbursement of Taxes Paid.  
Reimbursement of Interest Paid.  
Reimbursement of Transit System Maintenance Costs.  
Reimbursement of Security Costs.  
Other Financial Assistance.

\*State Special Fare Assistance

Handicapped Citizen Fare Assistance.  
Senior Citizen Fare Assistance.  
Student Fare Assistance.  
Other Special Fare Assistance.

\*Federal Cash Grants and Reimbursements

General Operating Assistance.  
Special Demonstration Project Assistance.  
Other Financial Assistance.

\*Contributed Services

State and Local Government.  
Contra Account for Expense.

\*Subsidy From Other Sectors of Operations

Subsidy from Utility Rates.  
Subsidy from Bridge and Tunnel Tolls.  
Other Subsidies.

SECTION 15: REVENUE DEFINITIONS

DEFINITIONS OF REQUIRED REVENUE OBJECT CLASSES

### Passenger Fares for Transit Service

-- These categories cover revenue earned from carrying passengers along regularly scheduled routes. Each revenue object class is to include the base fare, zone premiums, express service premiums, extra cost transfers and quantity purchase discounts applicable to the passenger's ride. Also included is a category which covers "park and ride" revenue (Parking Lot Revenue).

### Special Transit Fares

-- These categories cover revenues earned for rides given in regular transit service, but paid for by some organization rather than by the rider, and for rides given along special routes for which revenue may be guaranteed by a beneficiary of the service.

### School Bus Service Revenues

-- This category covers revenues earned from operating vehicles under school bus contracts.

### Freight Tariffs

-- This category covers revenues earned from carrying freight on runs whose primary purpose is passenger operations.

### Charter Service Revenues

-- This category covers revenues earned from operating vehicles under Charter Contracts.

### Auxiliary Transportation Revenues

-- These categories cover revenues earned from operations closely associated with the transportation operations.

### Nontransportation Revenues

-- These categories cover revenues earned from activities not associated with the provision of the transit system's transit service.

### Taxes Levied Directly by Transit System

-- These categories cover tax revenues to transit systems that are organized as independent political subdivisions with their own taxation authority. Revenues to transit systems that come from local, state or Federal government and have been raised through the taxing authority of the grantor governmental unit (which is not synonymous with the transit system) are covered elsewhere.

### Local Cash Grants and Reimbursements

-- These categories cover funds obtained from local government units to assist in paying the cost of operating transit services. (The local

government units are those not synonymous with the transit system). The breakdown of local government grants and reimbursements to the subcategories is to be based on the factor that determines the amount of the grant or reimbursement. Amounts originating from Federal revenue sharing funds are included in these categories.

-- These categories do not cover grants and reimbursements to help cover the difference between full adult fares and special reduced fares (handicapped rider, senior citizen, etc.). Grants and reimbursements for local special fare assistance are included in the object class for Local Special Fare Assistance.

#### Local Special Fare Assistance

-- These categories cover funds obtained from local government units to help cover the difference between full adult fares and special reduced fares. Amounts originating from Federal revenue sharing funds are included in this category. Funds obtained from local government to assist in paying the cost of operating transit services are included in the object class for Local Cash Grants and Reimbursements.

#### State Cash Grants and Reimbursements

-- These categories cover funds obtained from state government(s) to assist in paying the cost of operating transit services. The breakdown of the state government grants and reimbursements to the subcategories is to be based on the factor that determines the amount of the grant or reimbursement. Amounts originating from Federal revenue sharing funds are included in this category.

-- These categories do not cover grants and reimbursements to help cover the difference between full adult fares and special reduced fares (handicapped rider, senior citizen, etc.) Grants and reimbursements for state special fare assistance are included in the object class for State Special Fare Assistance..

#### State Special Fare Assistance

-- These categories cover funds obtained from state government(s) to help cover the difference between full adult fares and special reduced fares. Amounts originating from Federal revenue sharing funds are included in this category. Funds obtained from state government(s) to assist in paying the cost of operating transit services are included in the object class for State Cash Grants and Reimbursements.

#### Federal Cash Grants and Reimbursements

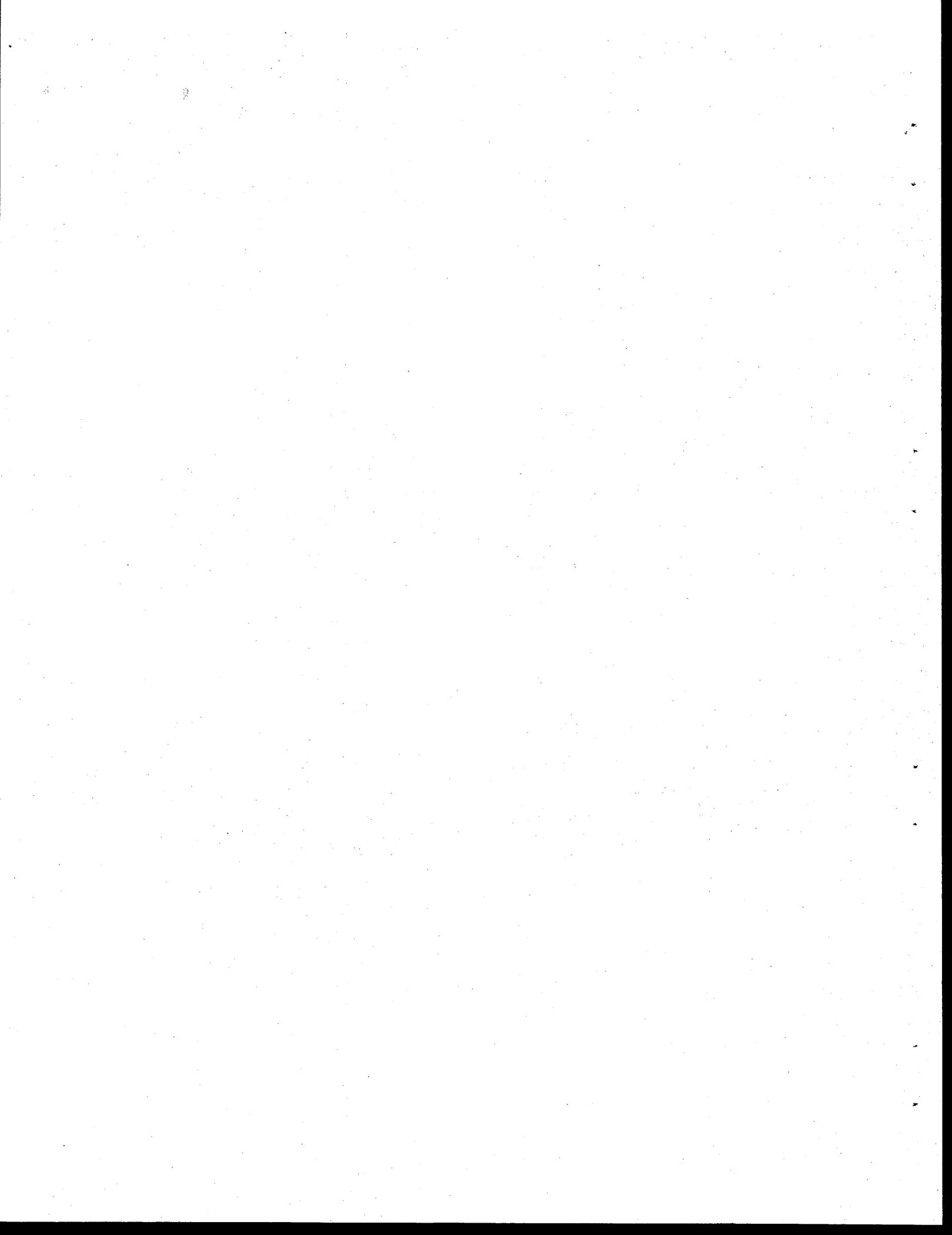
-- These categories cover funds obtained from the Federal government to assist in paying the cost of operating transit services. The breakdown of Federal government grants and reimbursements to the subcategories is to be based on the factor that determines the amount of the grant or reimbursement.

Contributed Services

-- This category covers the receipt of services (not cash) from another entity where such services benefit transit operations and the transit operator is under no obligation to pay for the services. (Under the Section 15 reporting system, contributed service is reported gross and net.)

Subsidy from Other Sectors of Operations

-- This category covers funds obtained from other sectors of a transit company's operations to help cover the cost of providing transit service.



## APPENDIX B

### SAMPLE FORMS AND DESCRIPTION OF REQUIRED DATA ELEMENTS (LEVEL C)

#### A. Daily Dispatcher Report

A separate sheet for information collected by the system dispatcher should be prepared for each daily vehicle operation. This Daily Dispatcher Report serves as each driver's manifest, identifying passengers' names, trip purposes, origins, destinations, and user characteristics. As much of this information as possible should be gathered by dispatchers and telephone operators in order for the maximum amount of driver's time to be available for vehicle operation. Dispatcher collection of this data also serves as a screening procedure for client eligibility, determined prior to service delivery. New clients intake and registration can also be performed at this time.

Specific data elements in the Daily Dispatcher Report are:

- (1) TRIP NO. - Pre-assigned identification number for advanced-reservation trips. (Subsequent Daily Driver Report permits intervening trip assignments for last-minute trip requests).
- (2) PICK-UP TIME - Scheduled pick-up time determined by dispatcher to suit client's desired arrival time and necessary travel time.
- (3) CLIENT NAME - Name of individual making trip request.
- (4) NO. OF PASS. - Number of passengers in group traveling together. (This datum determines the necessary vehicle capacity and/or number of trips which can be combined on the same vehicle movement.)
- (5) TRIP ORIGIN - Address, name of facility or nearest intersecting streets to location of trip origin.
- (6) TRIP DESTINATION - Similar to above.
- (7) SOCIAL SERVICE AGENCY/PROGRAM - Name of social service agency or other program to which cost of transportation will be charged (if eligible).
- (8) PASSENGER TRIP PURPOSE - (By number of passengers for each trip purpose.)

MED - Medical  
EMP - Employment  
REC - Recreation



- ED - Education
- NUT - Nutrition
- SHOP - Shopping
- OTH - Other

This data determines eligibility (or priority) of passenger trip requests for service by the system, and eligibility for reimbursement by the agency/program identified in (7) above.

(9) CLIENT/USER CHARACTERISTICS - (By number of passengers for each characteristics.)

ELDERLY

- AMB - Elderly Ambulatory
- SEM AMB - Elderly Semiambulatory
- WHL CHR - Elderly Wheelchair Client

HANDICAPPED

- AMB - Handicapped Ambulatory
- SEM AMB - Handicapped Semiambulatory
- WHL CHR - Handicapped Wheelchair Client

- OTH - Other than elderly or handicapped client.

This data determines the eligibility of individual clients for reimbursement of transportation costs by social service programs such as Older Americans Act programs and others.

Client/User Characteristics also meet the accountability requirements of social service agencies for clients with specific characteristics such as age and disability. Client/User Characteristics determine the need for special transportation services on each trip such as lift-equipped vehicle, travel escort or others.

(10) NEW CLIENTS - Registration of new clients for transportation service can be accomplished at their first request for travel in this element.

- AGE, SEX, RACE, INCOME - Client characteristics necessary for determination of eligibility can be requested by dispatcher/telephone operators.

This New Client data also establishes the number of unduplicated clients who receive transportation service during the life of the project.

- TOTALS - Sum totals for daily number of Passengers, Passenger Trip Purposes, Client/User Characteristics, and New Clients

DATE \_\_\_\_\_

OPERATOR \_\_\_\_\_

INDIVIDUAL TRIP REQUEST

DATE \_\_\_\_\_ APPOINT. TIME \_\_\_\_\_

NAME \_\_\_\_\_

NO. OF PASS. \_\_\_\_\_

ORIGIN \_\_\_\_\_

PHONE \_\_\_\_\_ APT. # \_\_\_\_\_

DESTINATION \_\_\_\_\_

AGENCY/PROGRAM \_\_\_\_\_

PASS TRIP PURPOSE  
MED EMP REC ED NUT SHOP OTH

CLIENT/USER CHARACTERISTICS  
ELDERLY HAN CAP OTH  
AMB SEMI WCHR AMB SEMI WCHR

NEW CLIENTS  
AGE SEX RACE INCOME ELIGIBILITY

DRIVER \_\_\_\_\_ PICK-UP TIME \_\_\_\_\_

DATE \_\_\_\_\_

OPERATOR \_\_\_\_\_

GROUP TRIP REQUEST

DATE \_\_\_\_\_ APPOINT. TIME \_\_\_\_\_

AGENCY/PROGRAM \_\_\_\_\_

CONTACT \_\_\_\_\_

PHONE \_\_\_\_\_ NO. OF PASS. \_\_\_\_\_

ORIGIN(S)/DESTINATION(S):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Use Other Side, If Necessary)

PASS TRIP PURPOSE  
MED EMP REC ED NUT SHOP OTH

CLIENT/USER CHARACTERISTICS  
ELDERLY HAN CAP OTH  
AMB SEMI WCHR AMB SEMI WCHR

NEW CLIENTS  
AGE SEX RACE INCOME ELIGIBILITY

DRIVER \_\_\_\_\_ PICK-UP TIME \_\_\_\_\_

provides a daily running total of dispatched units of service.

### B. Daily Driver Report

The Daily Driver Report serves as a recorded log of vehicle operations throughout a single day. Daily Driver Report identifies the specific vehicle in operation, mode of transportation service provided, and beginning and end of each trip (in time and mileage). The preceding information must be recorded at the time of service delivery. Subsequent information on the revenue time, revenue mileage, and passenger trip distance of each trip, which is used to compute precise unit costs of service, can be calculated at end of day in order to ensure accuracy and to permit the maximum amount of driver's time for vehicle operation.

In addition to precise pricing of service units, the Daily Driver Report also provides information for internal monitoring of effective productivity and budgeting of resources. Monitoring of this data will disclose if excessive time or mileage is devoted to empty vehicle travel; or whether additional individual trips can be combined on single vehicle movements.

Specific Data elements in the Daily Driver Report are:

- (1) TRIP NO. - Trip identification numbers on Daily Driver Report should correspond with trip identification numbers on Daily Dispatcher Report for purposes of cross reference. If last minute additions to daily driver assignment are permitted after Daily Dispatcher Report is completed, then intervening trip assignment should be identified by letter. For example, if last minute trip requests are accepted between advanced scheduled trips No. 4 and 5, intervening trips should be identified as 4a, b, c, etc.

If Daily Dispatcher Report is completed at end of operating day, trip identification numbers should correspond exactly with Daily Driver Report.

- (11) MODE OF SERVICE - This data element identifies the mode of transportation service used to provide each individual trip. Examples include: Demand-Responsive, Subscription Service, Charter, Taxi and Volunteer operations.
- (12) NO. OF PASSENGERS - This data element contains the actual number of passengers transported on each trip. The number may differ from the number of passengers identified in the Daily Dispatcher Report by additional passengers added to an original group previously scheduled, or by "no-shows".
- (13) BEGIN TRIP MI. - Odometer reading at Start of Day, and at beginning of each passenger trip at a trip origin.

(1) TRIP NO.	(11) MODE OF SERVICE	(12) NO. OF PASS.	(13) BEGIN TRIP MI.	(14) END TRIP MI.	(15) BEGIN TRIP TIME	(16) END TRIP TIME	(17) REV. MI. (14-13)	(18) REV. HR. (16-15)	(19) PASS. MI. (12x17)	(20) COMMENTS
Start of Day										
Lunch and Breaks										
End of Day										
TOTAL										

- (14) END TRIP MI. - Odometer reading at Start of Day, and at beginning of each passenger trip at a trip destination.
- (15) BEGIN TRIP TIME - Similar to (13) above, clock reading at Start of Day, and at beginning of each passenger trip, including loading time and waiting time, if any.
- (16) END TRIP TIME - Similar to (13) above, clock reading at Start of Day, and at beginning of each passenger trip including loading time and waiting time, if any.
- (17) REVENUE MILES - Trip miles, produced by vehicle operations equals difference between beginning trip mileage, (13) above, and end trip mileage, (14) above. Does not include dead-head operation between trips.

Revenue Miles is a close approximation of the actual share of resource costs attributable to any trip.

Reflects proportional share of all resource inputs (i.e., labor, materials, management and administration), regardless of number of passengers sharing one trip. It does not include dead-head cost (of empty vehicle operator) which is distributed over all client trips, or extra cost for loading/unloading and waiting.

For Charter and Subscription Service only, Revenue Miles equals difference between beginning of first passenger trip mileage, and end of last passenger trip mileage for each contract charter group.

- (18) REVENUE HOURS - Trip time produced by vehicle operation equals difference between beginning trip time, (15) above, and end trip time, (16) above. Includes loading/unloading and waiting time. Does not include dead-head operation between trips.

Revenue Hours is a very close approximation of actual share of resource costs attributable to any trip, including cost of loading/unloading and waiting, regardless of number of passengers sharing one trip. Cost of dead-head operation is distributed over all client trips.

For Charter and Subscription Service only, Revenue Hours equals difference between beginning of first passenger trip time, and end of last passenger trip time for each contract charter group.

eligible trip purposes and client/user characteristics which receive service in a given month, or week if necessary.

Specific data elements contained in the Monthly Social Service Agency/Program Report are:

- (21) SOCIAL SERVICE AGENCY/PROGRAM - These should be the same agencies named in item (7) of data form A, Daily Dispatcher Report. Each agency should be named only once, with monthly, weekly or other frequency of data summary per line.
- (22) NUMBER OF PASSENGERS - This sum should equal the total of passengers, item (12) from data form B, Daily Driver Report, from each agency for the period being reported.
- (23) MODE OF SERVICE - These categories conform to modes of operation identified in Technical Memorandum No. 1, and must be identical to the Modes of Service identified in item (11) of data form B, Daily Driver Report.
- REVENUE MILES and REVENUE HOURS of OPERATION in item (23) must equal the sum of miles and hours for each mode of service identified in items (17) and (18) of data form B, Daily Driver Report.
- (24) PASSENGER TRIP PURPOSES - This is the sum of passenger trip purposes for each agency/program identified in item (8), Passenger Trip Purposes of data form A, Daily Dispatcher Report.
- (25) CLIENT/USER CHARACTERISTICS - This is the sum total of client/user characteristics for each agency/program identified in item (9) of data form A., Daily Dispatcher Report.

#### D. Monthly Vehicle Report

This recording form maintains data on the level of service provided by each vehicle during a month, or other reporting period if necessary. Information is presented on total passenger volume and vehicle operations for each piece of equipment. Total monthly vehicle operations give an indication of the level of vehicle utilization, especially the proportion of revenue operation to total operation.

The Monthly Vehicle Report also provides information on the distribution of vehicle operations among the various modes of service. Revenue miles and



revenue hours of operation for each piece of equipment is disaggregated for each mode of service in future negotiations.

Specific data elements contained in the Monthly Vehicle Report are:

- (26) VEHICLE NUMBER - This is the same datum as identified at the top of reporting forms A, Daily Dispatcher Report, and B, Daily Driver Report. Each vehicle is listed only once for each month or other reporting period.
- (27) NUMBER OF PASSENGERS - This is the sum of total passenger ridership reported in data element (12), Number of Passengers, from data form B, Daily Driver Report, for each vehicle and reporting period.
- (28) VEHICLE MILES - Sum of Total End Trip Mileage, data element (14), from data form B, Daily Driver Report, for each vehicle and reporting period.
- (29) VEHICLE HOURS - Sum of Total End Trip Time, data element (16), data form B, Daily Driver Report, for each vehicle and reporting period.
- (30) REVENUE MILES - Sum of data element (17). Revenue Miles; from data form B, Daily Driver Report, for each vehicle and reporting period.  

The ratio of this number to data element (28) total Vehicle Miles, is an indication of productive equipment utilization during the reporting period.
- (31) REVENUE HOURS - Sum of data element (18) Revenue Hours; from data form B, Daily Driver Report, for each vehicle and reporting period.  

The ratio of this number to data element (29) total Vehicle Hours, is an indication of productive vehicle utilization during the period.
- (32) PASSENGER MILES - Sum of data element (19), Passenger Miles; from data form B, Daily Driver Report, for each vehicle and reporting period.
- (33) MODE OF SERVICE - This is the same datum as element (11), Mode of Service, from data form B, Daily Driver Report. Total Revenue Miles and Revenue Hours from elements (30) and (31) are disaggregated by Mode of Service.

#### E. Monthly Cost Report

This reporting document maintains a record of total transportation costs distributed over each piece of equipment and each mode of operation, for the reporting period under consideration. Separate records should be maintained for periodic costs of each vehicle and each mode of service, because different characteristics affect the accumulation of costs for these two dependent variables. The mix of vehicles used to provide each mode of service will affect the direct operating expenses of fuel, tires, maintenance and repairs, etc., for each mode; as for example, in the use of primarily large buses to provide fixed route service, or a mix of vehicle types. Indirect operating expenses will be affected by the mode of service, such as the need for telephone operators and extensive dispatching in demand responsive operations. Fixed route operations may require additional labor for passenger assistance and record keeping by separate monitors on board the vehicle.

Monthly Cost Reports for each mode of service will permit contract price negotiations for future agreements with client social service agencies. Monthly Cost Reports for each vehicle will permit monitoring of the costliners for each piece of equipment in service.

Specific data elements contained in the Monthly Cost Report are:

(34) COST CATEGORY - These cost accounts, including direct operating expenses and indirect operating costs should correspond with the reporting period of data form D, Monthly Vehicle Report.

(35) VEHICLE NUMBER  
OR MODE OF SERVICE - These two data elements, corresponding to items (26) and (33), Vehicle Number and Mode of Service, respectively, from data form D, Monthly Vehicle Report, should be maintained on separate records.

The cost components of Direct Operating Expenses should be maintained directly for each vehicle in operation. Direct Operating Expenses should then be allocated to each Mode of Service on the basis of proportional use, as identified in data element (33), from data form D, Monthly Vehicle Report.

Indirect Operating Expenses should be maintained for each vehicle and mode of service directly, wherever possible, as for demand responsive dispatchers, fixed route monitors, etc. Otherwise, Indirect Operating Expenses should be maintained for the total operation, and then allocated to each vehicle and mode of service on the basis of proportional use, as identified in data element (28), (29), (33), from data form D, Monthly Vehicle Report.

RECORD OF TRANSPORTATION  
SERVICE AND OPERATIONS

F. MONTHLY PRODUCTIVITY REPORT

MONTH \_\_\_\_\_  
PREPARED BY \_\_\_\_\_

(36)  PRODUCTIVITY UNITS	(37) VEHICLE NO. OR MODE OF SERVICE							TOTAL
TOTAL DIRECT COSTS								
TOTAL INDIRECT COST								
TOTAL ALL COSTS								
VEHICLE MILES								
VEHICLE HOURS								
REVENUE MILES								
REVENUE HOURS								
PASSENGER TRIPS (ONE WAY)								
PASSENGER MILES								
DIRECT COST PER REVENUE MILE								
TOTAL COST PER REVENUE MILE								
DIRECT COST PER REVENUE HOUR								
TOTAL COST PER REVENUE HOUR								
DIRECT COST PER PASSENGER TRIP								
TOTAL COST PER PASSENGER TRIP								
PASSENGER TRIPS PER REVENUE MILE								
PASSENGER TRIPS PER REVENUE HOUR								
PASSENGER MILES PER REVENUE MILE								
PASSENGER MILES PER REVENUE HOUR								
REVENUE HOURS PER VEHICLE HOUR								

Request No. \_\_\_\_\_

Date of Request: \_\_\_\_\_

TRIP REQUEST FORM

Trip Date: \_\_\_\_\_

Pick-up Time: \_\_\_\_\_

Return Time: \_\_\_\_\_

Origin: \_\_\_\_\_

Destination: \_\_\_\_\_

Name: \_\_\_\_\_ Ph. No.: \_\_\_\_\_

Address: \_\_\_\_\_ ID. No.: \_\_\_\_\_

Agency: \_\_\_\_\_

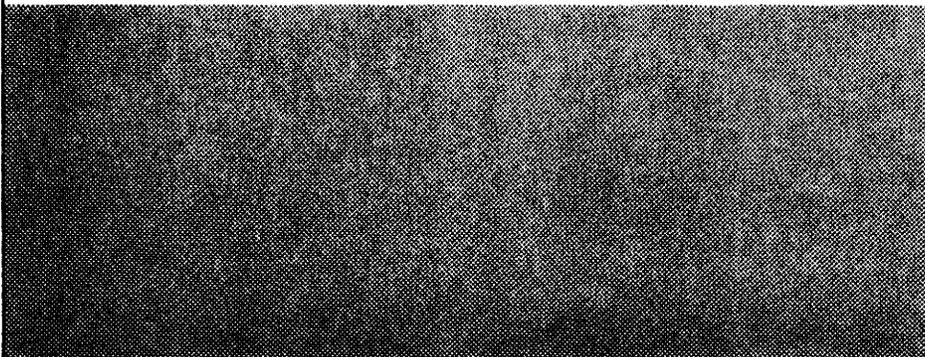
Trip Purpose:

MED. NUT. REC. EDU.:

Passenger Classification:

Elderly			
Ambul.		Non-Ambul.	

Handicapped			
Ambul.		Non-Ambul.	

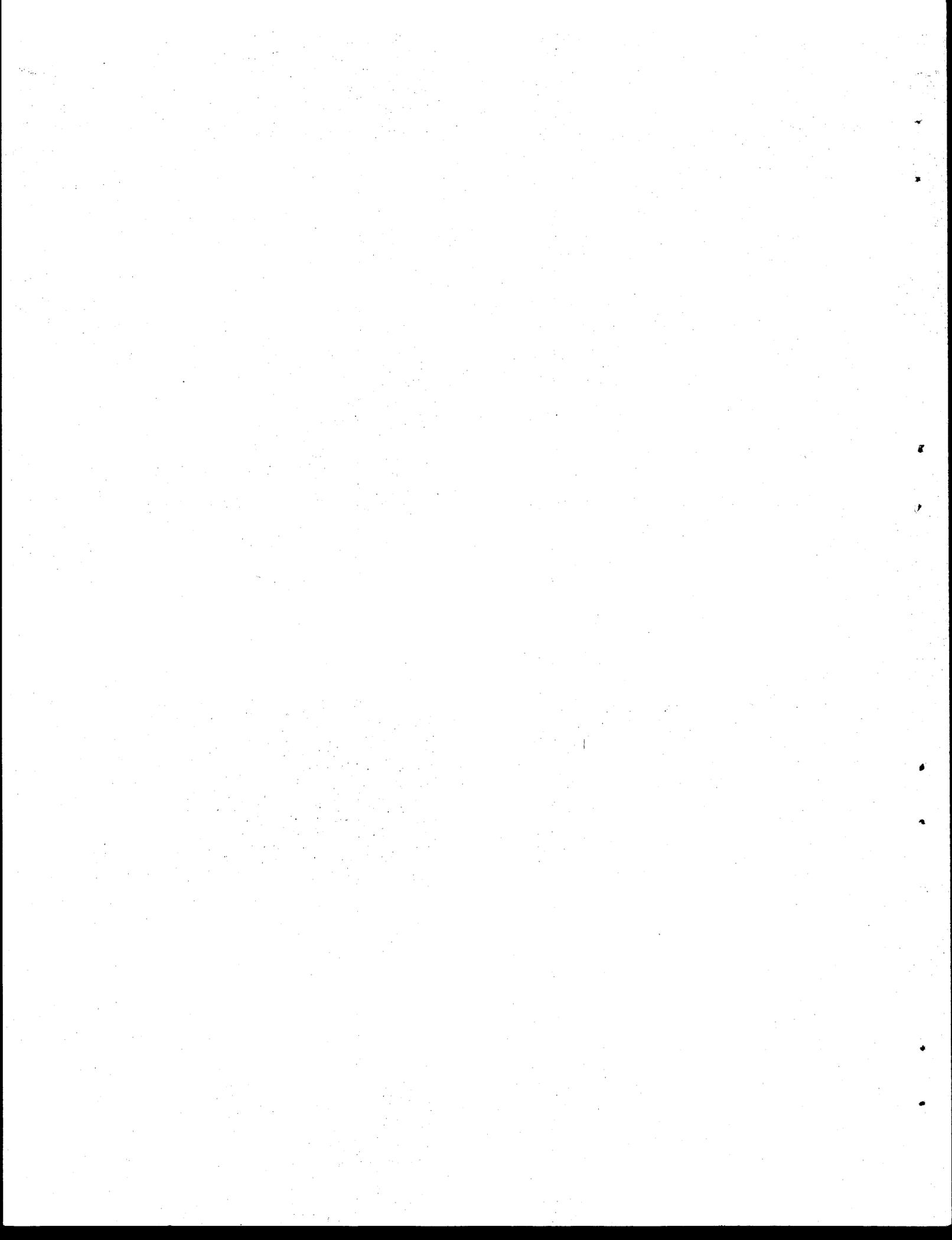


Note: Shaded Area for Optional Use by Agency.

Scheduling/Dispatching (Level D)







Date of Request: \_\_\_\_\_

TRIP REQUEST FORM

Trip Date: \_\_\_\_\_

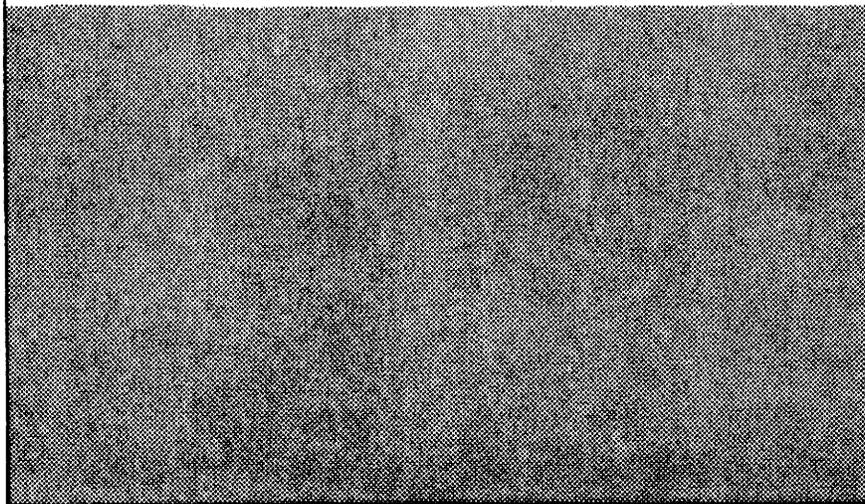
Pick-up Time: \_\_\_\_\_

Return Time: \_\_\_\_\_

Origin: \_\_\_\_\_

Destination: \_\_\_\_\_

Name: \_\_\_\_\_ Ph. No.: \_\_\_\_\_



Note: Shaded Area for Optional Use by Agency.

Scheduling/Dispatching (Level E)

Vehicle No. \_\_\_\_\_

Beginning Odometer \_\_\_\_\_

Driver: \_\_\_\_\_

Beginning Time \_\_\_\_\_

Rate: \_\_\_\_\_

DRIVER/TRIP LOG

Ending Odometer \_\_\_\_\_

Ending Time \_\_\_\_\_

	Origin	Pick-Up Time	Destination	Drop-Off Time	

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Note: Shaded Areas for Optional Use by Agency.

Service Delivery (Level E)

Vehicle Number: \_\_\_\_\_

Date: \_\_\_\_\_

Passenger Trips: \_\_\_\_\_

OFFICE USE ONLY

Vehicle Miles: \_\_\_\_\_

Vehicle Hours: \_\_\_\_\_

Deadhead Time: \_\_\_\_\_  
(Veh. Hrs.-Serv. Hrs.)

	Service Hours (Drop-Off)-(Pick-Up)		Revenues	Costs
TOTALS				

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Note: Shaded Areas for Optional Use by Agency.

Post-Trip Summary (Level E)

