
FINAL REPORT



**State of Washington
LTC Public Transportation Study**



Stage 1

**Comprehensive, Statewide Policy Review of
Public Transit Systems**

January 1992

List of Products

1. History of Governance of Public Transit Systems in Washington State (Task 1A)
2. Planning Processes, Missions, Services, and Impediments in Washington State (Task 1B)
3. Public Transportation Roles and Relationships in Washington State (Task 1C & D)
4. Current Financing Mechanisms of Public Transit Systems at the State and Local Level (Task 2A)
5. Historical, Current, and Projected Transit Revenue (Task 2B)
6. Federal Revenue Sources - Addendum #1 (Task 2B.3)
7. New Revenue Sources for Public Transportation Purposes - Addendum #2 (Task 2B.3)
8. Financing Mechanisms in Comparable States (Task 2C)
9. Capital Financing Practices (Task 2D)
10. Appropriateness and Adequacy of Current Funding (Task 2E)
11. Federal, State and Local Policy Issues (Task 3A)
12. The Qualitative and Quantitative Benefits of Public Transportation (Tasks 4B & 4B)
13. System Costs and Service (Task 4A)
14. Relationship of Local Transit Revenues to Costs (Task 4C)

PUBLIC TRANSPORTATION STUDY

Task 2D

CAPITAL FINANCING PRACTICES

Prepared for:

STATE of WASHINGTON

The Legislative Transportation Committee

Prepared by:
Gannett Fleming

in association with:

Moss Adams (Management Design Associates)
Mr. William H. Ostenson
Booz • Allen & Hamilton
Berk and Associates

September 5, 1991

CAPITAL FINANCING PRACTICES

TABLE OF CONTENTS

Abstract - Capital Financing Practices	1
I. Description of Capital Financing Practices	3
A. Objective Setting	3
B. Needs Assessment	5
C. Revenue Projections for Capital Facilities	7
D. Project Scoping	8
E. Evaluation Criteria	9
F. Prioritization and Programming	9
G. Financing Solicitation Practices	10
H. Amortization Practices	12
I. Assumptions Regarding Continuing Federal Role	13
J. Joint Use Arrangements	14
K. State Restrictions	15
L. Reserve Practices	16
M. Other Fiscal Policies	17
II. Conclusions	18

Abstract - Capital Financing Practices

The purpose of this review is to analyze current capital financing practices and determine whether these practices are adequate. We have defined "adequacy of capital financing practices" to mean meeting defined missions and key goals, focusing on system operating needs and desired service levels, and the following of prudent business practices.

Capital financing is obtained in all districts from a combination of federal, state, and local revenues, although the majority of financing is available through the MVET and sales tax revenues. These revenues, in conjunction with the farebox return, are used jointly for capital and operations.

While financing is obtained from a variety of sources, capital programs and projects are largely funded through depreciation reserves and federal assistance. The financing process generally follows conservative and prudent business planning practices. This is because districts generally know what funds will be available and budget for these funds accordingly. Debt financing is not regularly used unless done on an exception basis, i.e., for a major capital acquisition like the Seattle Downtown Tunnel Project (SDTP).

Long-term capital needs are identified by all districts through an annual planning process. These needs and related planned financing are adequately documented in the state-required Transit Development and Financial Plan (TDFP).

Although supporting written documentation describing the capital financing process is not always available capital financing practices appear to address district missions and goals, meet system needs and follow prudent business practices. Further, appropriate practices appear to be readily established under existing Washington State policies. State laws and regulations are generally adequate regarding accounting and financial planning practices although some improvements may be possible in the area of formalizing and strengthening the overall process.

Capital planning occurs in all districts by necessity. Most planning is done on both a short and long-term basis and is reflected in associated planning documents. Capital planning is an integral part of a district's overall planning processes. Most districts have separate operating and capital plans. Capital plans are almost always incorporated into the annual budget and in statewide planning documents. Most frequently, these plans are included in the Transit Development Program (TDP) and related plans (TDFP) used to fulfill state and federal mandates. Specifically, capital planning is usually discussed under the multi-year Development Program listed under the caption of "5, 6, or 10 year Capital Improvements" and also under the related "Financial Plan."

Capital Plan components usually include:

- Capital Projects scheduled by year;
(i.e., fleet replacement and maintenance facilities)
- Assumptions regarding costs and revenues;
- Expenditures by type of service; and
- Revenues by source.

Some districts proceed through an extensive capital planning process and go well beyond statutory guidelines. Often these organizations develop long-term plans (many times exceeding ten years) and conduct a detailed review of alternatives and mobility issues. Several larger districts conduct this type of comprehensive planning, some on an on-going basis. Examples of districts conducting such a process include Community Transit, Intercity, Pierce, C-Tran, Spokane and Metro. This level of planning is a reflection of particular districts having the resources necessary to conduct an extensive process.

Many districts have met planning requirements by hiring consultants to assist in the process. The plans meet state requirements and have clearly addressed basic needs thus providing adequate and packaged results.

Transit capital planning is currently undergoing extensive change on two major fronts. First, is the incorporation of new government requirements associated with ADA, clean air guidelines and High Capacity Transportation (HCT), etc.. This process, now underway, is requiring new procedures, additional time and often new staff expertise. The second change is the increased coordination between numerous organizations into the planning process as a result of Transit Demand Management (TDM), Growth Management Act (GMA), and land-use planning initiatives. Other groups include bordering districts, MPO's and RTPO's. The extent to which these additional responsibilities will affect transit capital planning is not fully understood. Transit will likely be involved in numerous aspects of implementation, with potentially significant impacts on capital plans, both in terms of capital that is necessary to support these programs, and in the way in which the planning process will account for these increased demands.

I. Description of Capital Financing Practices

Discussed below are the steps followed in the development of a financing plan and in the associated acquisition of capital. The steps identified below follow the process chronologically (as identified in the study scope) beginning with objective setting, continuing through such steps as project scoping and evaluation and ending with the financing acquisition. Also discussed are reserve practices and other pertinent fiscal policies.

A. Objective Setting

Objective setting is typically part of a more comprehensive planning process, including review and interpretation of a specific district's mission statement. Goals and objectives are derived from the district's mission statement, with additional input from board members staff and the public. Goals are generally defined as an end or aim to be worked towards over a period of time. Objectives tend to be more specific, and are often tangible and measurable.

An example of this structure is provided by the following mission statement and selected goals and objectives from Intercity transit as defined in the 1987-1991 Transit Development Plan.

Mission Statement:

"The business of Intercity Transit is to provide a system of rider transportation which responsibly integrates all organization functions and resources in the single pursuit of rider use, comfort and satisfaction."

Goal 1: To provide a comprehensive system of rider transportation.

Objective A: Operate fixed-route service in those areas where population characteristics would support cost-effective services.

Objective B: Operate paratransit service in the less densely populated areas of the PTBA, integrated with fixed-route services.

Objective C: Operate services capable of meeting the special needs of handicapped and elderly residents of the PTBA.

Goal 2: To be responsive to local needs.

Objective A: Provide regular and frequent opportunity for public and employee comment and participation, using a well rounded program of outreach.

Objective B: Work closely with other local jurisdictions to integrate public transportation services with other public programs.

Objective C: Identify the specific market segments likely to respond to transit.

Objective D: Determine what, if any, unmet needs exist and if service expansion is therefore necessary.

Objective E: Maintain and improve information side and activities.

Goal 3: To operate effective public transportation services which best use local funding resources.

Objective A: Increase fixed-route system operating efficiency.

Objective B: Increase fixed-route service productivity.

Objective C: Develop and improve monitoring procedures for paratransit services.

Objective D: Maintain a strong financial base.

Goal 4: Increase ridership and improve community awareness of transit.

Objective A: Improve service quality.

Objective B: Maintain the positive public image of Intercity Transit.

Objective C: Promote services on a comprehensive and continuing basis.

Objective D: Pursue implementation of incentives for using transit, disincentives for using private automobiles.

Goal 5: To effectively plan for the future.

Objective A: Maintain and improve the information about rider and area population characteristics.

Objective B: Assess opportunities for using alternative operating and service concepts.

Objective C: Continue to participate in the transportation planning process with the Thurston Regional Planning Council.

Objective D: Assess the opportunities for coordination with other transit service providers.

The typical objective setting process is part of a set of structured procedures which are followed in most types of significant decision making by a specific district. We have capsulized these procedures in three basic steps as follows:

- First, district staff analyze alternatives and assemble information on a specific recommendation (in this case a set of objectives). Potential alternatives are identified from various sources including the public, district management, staff or at the request of the transit board.
- Second, formal recommendations are submitted to the board for review and discussion.
- Third, and finally, objectives are confirmed with public input through a review process which usually includes a board meeting. Objectives may also be discussed in public hearings prior to being finalized.

B. Needs Assessment

Another step in the capital planning process is the needs assessment. Needs may be any of number and/or type and are typically identified, including such things as:

- specific route changes;
- service additions;
- passenger shelters;
- security requirements;
- additional staffing;
- communications equipment; and
- staff training.

Needs assessment is an integral part of all transit planning processes. Needs tend to be identified early in the planning process before being assessed by the district's staff. Input to this process is typically obtained through ridership surveys, public workshops, citizen advisory committees, board meetings and hearings.

The typical needs assessment process lacks a defined set of procedures and is not well documented. The process is different from district to district and may change within a particular district from year to year. Despite the lack of a standardized process, most needs are identified and adequately assessed, often on an ongoing basis.

A key to the assessment process is that many needs surface as direct "user requirements" focusing on operations and/or service. Capital financing is undertaken by design after needs are assessed and is directly based upon the service or operational plan.

Capital financing needs are generally defined as a response to service or program expansion requirements. For example, the routine need for additional buses or vans may be in response to increased commuter demands, requests for night or Sunday service, or recently expanded service boundaries.

Staff needs assessment tends to blend the practical aspects of what is achievable with the broad spectrum of needs introduced by the general public. Requests that can be accommodated within existing district operations and policy framework may be acted upon immediately by staff. Other significant, costly, or policy-oriented needs are brought to the board's attention, where they can be more thoroughly addressed.

Capital needs assessment includes consideration of costs and a comparison to mission. Other factors may also be considered, including environmental, political, social, land use, and economic factors.

Important to the process is an assessment of federal, state, and local regulations, laws and guidelines. Examples of these requirements include:

- ADA - where capital needs assessment is looking at lift equipping vehicles; and
- Clean Air - where particulate traps and alternative fuels are being evaluated.

These needs further impact other aspects of transit capital. For instance, the switch to the use of alternative fuel vehicles requires a reconfiguration and retooling of maintenance facilities. These additional factors must also be accounted for the planning process.

C. Revenue Projections for Capital Facilities

For the purposes of this report, revenue projections include all sources of revenue that may be applied for capital purposes, including MVET, sales tax, farebox interest, and federal grants and formula monies. Capital facilities include fleet, facilities, transfer centers, park-and-ride shelters, infrastructure, and other capital items. Typically federal assistance provides a major portion of funding for capital projects. Federal assistance includes money from UMTA program Sections 3, 9, 16(b) and 18.

Revenue projections are developed by all districts to varying degrees. Differences are based upon projected timeliness and level of detail in budgets. In most districts, revenue projections and budgeted expenditures are developed separately and then reconciled to determine which projects will be funded. Expenditures are almost always made within revenue constraints.

Revenue projections drive planning for services and capital facilities acquisitions. Revenue projections and expenditures are also based upon the assumptions of continued availability and predictability of MVET and sales tax revenues, along with an associated demand for services.

Revenue projections are developed and are then tied to actual replacement schedules and other capital projects. Cash flow statements provide a key to detailed financial planning and commonly identify the status of a capital project. These statements also directly tie capital projects to revenue sources, such as federal monies.

Forecasting is essential to transit because of the capital-intensive nature of the business. Forecasting therefore plays a key role in determining the timing and amount of financing. The capital projections developed in these forecasts are developed commonly in the six-year TDFP plan. In addition, ten-year plans are often completed for such purposes as fleet replacement. As expected, the longer the planning time horizon, the more global in nature revenue projections become.

Both costs and revenues need to be forecasted. Again the relationship between capital planning (i.e., fleet replacement) and projected revenues is heavily integrated. This is largely because transit districts spend and reserve as much money as is available to meet needs.

Washington transit systems' forecasts appear relatively predictable. Forecasted revenues are generally based upon historical trends and future anticipated economic conditions. This predictability is largely due to stable revenues including MVET and sales taxes being known and easily forecasted.

The difficulty in transit forecasting, and thus in planning for capital projects and programs, is tied to the availability of federal money. A relevant question arises, "What federal money is available for transit?" The resulting answer is to identify federal monies and financing shortfalls ahead of time, and adequately prepare for alternative sources of funding. If problems arise, capital projects are often the first to be reduced or delayed, or even postponed altogether.

The State's current forecasting challenge is much the same as it is for industry. State systems must plan for future capital requirements caused by ADA and clean air legislation. Local transit has already recognized these issues and is currently analyzing the impact and developing an appropriate financial response. This process will be ongoing for sometime as new and refined requirements are identified and alternative solutions evaluated.

Current forecasted revenues and costs are generally considered adequate. Baseline strategies, as well as expanded and reduced service options, are also being updated to address the current uncertainties in the rapidly changing transit environment.

D. Project Scoping

Project scoping entails identification and definition of projects, and estimation of related tasks and costs. Project specifications are identified which in turn assist in determining the scope of a project and its associated cost. The time required to complete a project often covers multiple years. Project schedules help determine scope and costs in these and other instances.

It should be noted that many capital projects are routine in nature. For example, bus replacement is completed on a planned and on-going basis. Scoping of these projects tends to be a function that is internally managed. However, the more significant a project becomes the more involved both the public and board are in the process.

E. Evaluation Criteria

Evaluation criteria are used as standards to review capital plans, programs and projects and to determine whether these capital initiatives should be undertaken. Although used in most situations, criteria are not standardized nor well documented.

Criteria frequently vary district to district. Different types of projects may be evaluated using different types of criteria, even within a specific district. Different sets of criteria may also be used for different types of plans, programs or projects. For example, in routine bus procurement, extensive evaluation is not always necessary.

Projects are normally evaluated based upon some combination of criteria including the:

- degree of adherence to a district's mission;
- level of public demand (many projects appear to be implemented based upon a high level of public input);
- degree of benefit accruing to the community (including environment, economic, social and political benefits);
- cost effectiveness of a specific program; and
- compliance with legislative mandates and other local regulations and guidelines.

Projects are normally based upon a service plan and evaluated in relation to available capital. The evaluation often includes reviews of alternative modes of achieving the same objective as well as the consequences of not proceeding. All projects ultimately are evaluated on the level of public service being provided.

F. Prioritization and Programming

Prioritization of capital projects appears to be straightforward in most districts. Generally, districts use the following priorities:

- First, money is spent for current capital replacement (i.e., fleet acquisition);

- Second, for improved and expanded services; and
- Third, for other new equipment and facilities.

The mix of prioritization varies system to system but generally follows the same pattern. Some systems add to the mix and have additional levels of priority. Community Transit for example prioritizes projects in the following order:

- Capital projects under current contract;
- Capital projects for which UMTA grants currently exist;
- Capital projects replacement of assets;
- Capital projects required to enhance safety and environmental protection;
- Capital projects resulting in cost savings; and
- Acquisitions of expanded service.

Prioritization processes commonly follow the same consensus building procedures that are followed in the mission and needs assessment processes previously discussed. In short, staff analysis, public review and board acceptance is involved. Finally, all prioritization appears to be tied to funding availability, which often changes in the short or long term, thus requiring a periodic reprioritization of projects.

G. Financing Solicitation Practices

Financing solicitation entails acquisition of money for capital and operations purposes. Operations are generally financed through ongoing revenues provided by taxes and fares. Capital is generally financed by these sources in addition to federal assistance.

Most districts uniformly restrict the use of debt. This is a reflection of both the conservative posture of transit boards and a result of available and predictable revenue from other sources. Debt, therefore, has not traditionally been a source of capital funding for operations. Debt is, however, increasingly being considered by large districts for major capital projects.

At this time, only Metro has significant debt outstanding (\$169 million). This debt was used to finance the DSTP. A few other systems are planning to use debt including Pierce and Community Transit Districts, for the purpose of supporting future capital acquisitions. Smaller districts currently have very little debt and do not appear ready to tap debt as a significant source of financing in the near future.

Financial solicitation works the same way for transit districts as for any other government entity. Initially, projects are analyzed through needs assessment, evaluation and prioritization processes. Once a project or program is defined at a detailed level (to gain an understanding of its true scope including costs and timing) financial options are evaluated. This process includes coordination of a debt package with expert advisors including a combination of underwriters, investment bankers, CPA's, and attorneys. Once a package is assembled, the team conducts solicitation of the funds.

When defined in the broadest sense, financial solicitation also occurs when districts pursue federal grants and formula monies. The grant application process is involved and well documented. How the process actually works (i.e., who writes and processes the request, including the information presented in the application) may be different for each district.

The application process essentially entails analysis, application development and allocation or rejection of funds. Districts routinely adjust capital priorities depending on the outcome of this process, therefore, UMTA decisions may actually change what projects will be undertaken or continued.

The application process and resulting funding levels are often different for different sized systems. For example, the state allocates money for both section 9 and 18 programs and the monies are directed to systems on different bases. Because requests always exceed the amount of money that is available, the different sized districts involved in these programs also do not know what funds, if any, will be distributed.

While debt financing is rare, the request for, and use of, federal assistance is routine. The requests are based upon need for the following basic three grants and formula monies:

Section 3 funds are available on a discretionary basis to urban and rural transit systems for capital improvements.

Section 9 is a formula grant program for urbanized areas with populations greater than 50,000. UMTA apportions the funds according to a complex formula including population, population density and operating characteristics.

Section 18 provides capital and operating assistance to non-urbanized public transit systems. Capital grants are funded up to 80 percent of the total project cost and operating grants are funded up to 50 percent of the net project cost (total operating cost less operating revenue). Section 18 funding is heavily weighted toward capital assistance and maybe used for private non profit operations. Because more requests for money are made than is available, the state has determined capital grants will be funded at the 35 percent level.

H. Amortization Practices

Amortization is the allocation of the cost of an asset over its useful life. Amortization is important to account for the fiscal impact of consuming assets over time. This activity is then reflected in an organization's financial records and reports.

Transit district's key capital assets include facilities and buses. Typically, depreciation is taken on assets where expenditures total over a certain amount, say \$1,000. In most districts the straight-line method of depreciation is used, although the term varies by the type of asset being capitalized. For example, typically:

- buildings are depreciated over 20-40 years;
- buses over 12 years;
- other light duty vehicles over 5-10 years;
- improvements over 10 years;
- furniture over 5 years; and
- equipment over 5-20 years.

Salvage value is usually not factored into the accounting for these assets.

Depreciation is funded and accounted for as a reserve in many districts. Depreciation is funded in a range from zero to 100 percent and if funded, the average appears to be ranged between 30-70 percent of depreciation. Funding levels are a result of many factors including how conservative management is, assumptions regarding the availability of federal assistance, tax revenues, economic growth and the health of local and state economies.

Funding depreciation is a prudent business practice followed by many conservative organizations especially ones involved in a capital intensive business. Funding, therefore, may be considered appropriate in transit organizations and is only a concern if reserves are funded at levels far above

or below forecasted needs which is not a situation that appears to exist in Washington State. It should be noted that most other states do not fund depreciation at any level.

I. Assumptions Regarding Continuing Federal Role

Most districts assume that large amounts of continued federal funding will be available. Districts rely on federal assistance generally for capital purposes. Without continued funding, both operating and capital programs would be significantly affected.

Districts are actively conducting contingency planning in anticipation of some reduced level of federal funding. As such, capital programs would likely be cut back first, prior to any major cuts in operating programs. If significant federal cuts are initiated, in most cases Washington transit systems current reserves would be tapped and substantially reduced within 1-3 years to meet basic ongoing needs (for some districts this may happen anyway due to the impact of ADA, Clean Air, etc.).

A sample of district responses regarding continued federal funding highlighted in the study survey include:

- Federal assistance is anticipated to be similar to current levels (with several districts assuming a higher local match);
- Less UMTA Section 3 assistance will be available;
- One districts view that "Federal assistance will meet 75 percent of current capital needs";
- Major portions of required funding will continue to be available through Section 3; and
- Many of the smaller districts rely heavily on Section 18 assistance.

Although each district has a slightly different view of what funding will be available, all agreed that substantial funds will be provided. Districts plan to continue to seek federal assistance whenever feasible and their current capital and expansion plans reflect this strategy.

J. Joint Use Arrangements

Joint use arrangements are associations where multiple organizations share resources to meet separate but related aims. Joint use arrangements exist throughout the state's transit system but are isolated to points where specific additional benefits accrue to the public. These types of arrangements are not always formally planned for unless an obvious connection exists between parties or unless no other immediate alternative is available. There appears to be a trend toward considering more joint arrangements as a result of the GMA and other integrated planning efforts. Several districts operate with joint use arrangements currently, including Everett, Clallam and Metro. Examples of such arrangements include:

Park and Ride lots - built with a district often teaming with another organization. Examples of this arrangement exist where religious organizations are provided capital for building a lot on the organizations land, and the lot is accessible to commuters during the work week.

Facilities - used in the cities of Yakima, Everett, Longview and Bellingham where the city plays a major part in running the transit operation. Facilities and sometimes equipment, administrative personnel and systems are shared to gain economies of scale within the city's domain.

Routes - are often jointly operated between systems, where multiple districts combine scheduling and service efforts. A prime example of this arrangement is the arrangement between Pierce and Intercity transits where some routes are planned and operated in a totally integrated fashion such that each of the districts schedules show the combined systems routes times.

Van procurement - being one of the most obvious arrangements where economies of scale are achievable. Systems periodically get together to buy coaches in larger lots by jointly using a master contract.

Joint use partnerships between the public and private sectors in this state are difficult to find. This option is technically feasible, but inhibited by the state's constitution under the premise that private enterprise should not benefit from public tax dollars. Given the prohibition of lending public credit for private purposes, projects must be carefully planned and structured. Some indirect joint relationships, however, continue to exist, especially in the area of paratransit, where subcontractors routinely provide dial-a-ride services.

K. State Restrictions

In this study, the focus of potential state restrictions is twofold: first, whether restrictions exist prohibiting or inhibiting good accounting; and second, whether restrictions exist which significantly impact financial planning practices. No significant restrictions were found regarding the effect of state laws and regulations in accounting. Districts indicated some degree of frustration regarding the state's Budgeting and Accounting Reporting System (BARS) in that it is not specifically tailored for transit organizations. However, BARS fully supports American Institute of Certified Public Accountants (AICPA) standards for governmental reporting and other generally accepted accounting principles and appears to provide a reasonable system for recording, classifying and summarizing transactions. The State Auditors Office is fully aware of the BARS limitations and is initiating a project to tailor the accounting and reporting system for transit. This study has been delayed at the request of the Policy Advisory Committee (PAC) until the results of Phase One are available.

Some restrictions were found in state laws and regulations impacting financial planning practices. We do not consider these restrictions to be a major state-wide problem and most focus on the availability of funds. The key restrictions expressed by the districts are noted as follows:

- Numerous districts exhibited some degree of frustration with the availability and process surrounding Section 18 monies. The frustration comes from the process being reliant on the application, competition and priority of distribution. There is no guarantee of funding in this process. Smaller districts were especially frustrated with the acquisition process. This situation is not so much of a frustration with state law, as it is with federal process and associated state implementation. This is also a prime example of why appropriated funding (as opposed to dedicated funding) is so difficult to plan for, thus resulting in inefficiencies in the resource allocation process.
- A second prohibition is the lack of availability of tax increment financing. This type of financing provides for the selling of bonds against a projected future value of piece of real property.
- A third prohibition, (previously noted as a means to stretch a dollar as much as it is to promote sound financial planning practices) is the often debated public-private development partnership. Some kinds of partnerships may well meet the broadly stated mission of transit. An example of this potential, is a day care facility built and operated on a park and ride lot.

- The fourth restriction is the MVET matching requirement. Districts have a desire to access all available MVET revenues, perhaps by matching these revenues at lower or more flexible levels.
- The fifth restriction is the requirement for perceived cumbersome state reporting. This was a concern voiced repeatedly by smaller districts where resources were scarce to complete the required paperwork. The view is that some information is not useful or used by the state.

L. Reserve Practices

Transit districts typically maintain reserves for future planned and unplanned needs. Both capital and operating reserves are common. Capital reserves are maintained by most districts and are largely used for fleet replacement and sometimes facilities. Operating reserves are also maintained by most districts, but are used for working capital purposes and contingency funds.

Other types of reserves are used but are less common. One example of this type of reserve is an insurance reserve used for self-insured districts. Nine of the State's transit districts pool insurance money together to spread the risk of providing for claims and damages. In addition, other districts maintain their own reserves, including Metro, Spokane, Pierce and Community Transit systems. Because of the current level of self insurance activity, both the State Insurance Commissioner and the State Auditors Office have increased their oversight role in insurance regulatory matters.

Capital reserves range from zero to 70 percent of depreciation. The average capital reserve appears to be in a broad range of between 30 percent to 70 percent of depreciation. Many districts fund reserves at a board approved percentage of annual depreciation. This percentage is often tied to an assumption of what percentage of future capital acquisitions the federal government is likely to fund, with the districts financing the non-funded portion.

Larger districts are more likely to have capital reserves and associated policies. Smaller districts do not always have the financial strength necessary to maintain significant funded reserves. Example Districts with no capital reserves include Longview, Cowlitz, Twin and Prosser.

Most of the capital reserves are restricted, that is, committed for a planned purpose - usually fleet replacement. A couple of districts are accumulating funds that have not been specifically earmarked for an exact purpose. In these cases, the money involved was minimal and could easily be spent on a range of needs.

The capital reserve policy is one of the many policies that is routinely addressed and reviewed annually. Board review was extensive in all cases. Capital reserves are also maintained and funded based upon a particular district's fiscal outlook and assumptions regarding operational and economic factors.

M. Other Fiscal Policies

Fiscal policies focus on management direction related to the financial affairs of an organization. These policies are considered essential to guide management in accountability and fiscal responsibility. Fiscal policy is used to set the parameters on which daily management and operations decisions are based. Of course, fiscal policies exist at all districts, but many are informal. The reserve policies discussed above are key exceptions.

Fiscal policies must be differentiated from accounting policies. Accounting policies provide more direction for accounting procedures and the production of financial information. These policies are generally detailed, well documented and are routinely reviewed by appropriate internal and external parties (i.e., Office of State Auditor).

Many districts indicated that fiscal policies are under current review and enhancement. It must be noted that fiscal policies cover high level financial decisions and action (including depreciation levels, reserve funding, cash management, procurement processes, budgeting and forecasting, fare structure, system performance, revenue sources, etc.) but do not require extensive detailed documentation.

Formal written policy documentation ranged from limited to minimally adequate. Some formalization of these policies should be considered.

II. Conclusions

The capital financing practices of Washington's public transportation agencies appear adequate. Further, the same agencies have adequate abilities to establish appropriate practices under existing state policies. Specifically, state laws and regulations are generally adequate regarding financial planning practices and no apparent restrictions exist prohibiting or inhibiting institution of good accounting or planning practices for capital facilities.

The study team arrived at these conclusions based upon review of the statewide transit system performance, current service levels provided, business practices followed, capital financing plans and follow-up implementation. The above conclusions are also supported by transit district operations generally following conservative and prudent business planning practices. These practices include directing processes under defined missions and goals, identifying and analyzing system needs and developing and documenting the results in Transit Development and Financial Plans.

In summary, several detailed observations support the above overall conclusions as follows:

- The majority of financing is available through MVET and sales tax revenues. These revenues, in conjunction with other federal and local sources are used jointly for capital and operations.
- Capital programs are largely funded through depreciation reserves (provided by MVET and Sales tax revenues) and other federal assistance.
- The capital planning process is relatively straight forward and based upon needs analysis and combined revenue and expenditure planning.
- The capital financing process follows conservative and prudent business planning practices. This is because districts generally know what funds will be available and budget accordingly.
- Needs and related financing for capital projects are adequately documented in the State required Transit Development and Financial Plan (TDFP). Capital needs are therefore dealt with by all districts through the annual planning process.

PUBLIC TRANSPORTATION STUDY

Task 2E

APPROPRIATENESS AND ADEQUACY OF CURRENT FUNDING

Prepared for:

STATE of WASHINGTON

The Legislative Transportation Committee

Prepared by:

Gannett Fleming

in association with:

Moss Adams (Management Design Associates)

Mr. William H. Ostenson

Booz • Allen & Hamilton

Berk and Associates

September 5, 1991

APPROPRIATENESS AND ADEQUACY OF CURRENT FUNDING

TABLE OF CONTENTS

Abstract - Appropriateness and Adequacy of Current Funding	1
I. Appropriateness and Adequacy of Current Funding	2
A. Introduction	2
B. Local Transit Missions	2
C. Criteria for Evaluation	5
D. Mission Fulfillment	7
II. Conclusion	24
Appendix A - Appraising Appropriate Levels of Service and Developing Descriptive System Profiles	

Abstract - Appropriateness and Adequacy of Current Funding

Transit systems in Washington State are generally rather recent additions to local communities. These systems have been structured to respond to the travel requirements of the residents and have expanded to serve new markets as the communities have grown. Services offered by the transit systems reflect the varied needs of area residents, including paratransit, commuter and fixed route bus services. New requirements of State and Federal law (TDM and ADA) are being incorporated into the local network plans.

The performance of the 21 transit systems in the State is best measured against the goals each community sets for the local system. However, the absence of specific targets or quantifiable measures in local mission statements precludes such an analysis. In order to complete the evaluation, therefore, a peer city comparison techniques was used. Transit systems in Washington were grouped by population, fleet size and annual ridership. Five general groups were established, and a set of peer systems (with similar characteristics) for each group were chosen to use as yardsticks for Washington systems. Three basic categories of performance measurement were defined. These are Cost Efficiency, Cost Effectiveness, and Service Effectiveness. Specific indicators in each category were established as representative policy level performance measures. A total of fourteen specific indicators were compiled for each system and the peers.

Peer system data by group was aggregated and averaged for comparative purposes.

Generally, the comparative analysis shows that local communities in Washington are providing higher levels of service than the peer groups, and are responding to the economic growth of the local areas with new services. The recent introduction of transit services in some communities and the expanded services show most comparisons with peer city data that is based on mature and stable transit networks. However, the recent trends in most Washington systems indicate that performances improving relative to peer cities.

The impact of new mandates has not been fully assessed by all agencies. It appears from the initial data that the first phase of implementation can be accommodated within the agencies' financial resources. Responding to the new requirements of ADA, for example, beyond the first few years is expected to have an impact on the financial capability of local agencies to continue programmed expansion plans in response to development and growth pressures.

I. Appropriateness and Adequacy of Current Funding

A. Introduction

The history of public transportation legislation in the State of Washington clearly points to the intent that transit be a local responsibility. Substantial authority for raising local revenues and for receiving MVET matching funds has been provided to reinforce these local transit responsibilities. Communities throughout Washington have responded by creating public agencies or restructuring existing operations to take advantage of the legislative directions. Twenty-two systems now exist in the state, eleven having been created since 1980. On the whole, therefore, the transit systems in Washington are young and maturing, local networks designed to respond to the specific needs of the community.

B. Local Transit Missions

Local public transportation systems operate within a legislative framework that was initially adopted in 1965. The State's broad directive for transit systems to be supportive of "development and prosperity" of the community, generally set a foundation for local transit missions. However, within the four types of transit structures authorized by the legislature, there is no requirement for an agency to develop a mission or ensure it complies with the State's goal.

Notwithstanding the absence of this requirement, each agency has defined a local mission for their own operation. Public transit throughout Washington is responsive to the specific local mobility requirements, the geography and the level of local financial support. These are reflected in the type of service offered (e.g. Snohomish County and Pierce County PTBAs offer commuter bus services to Downtown Seattle, and Pullman offers student bus services to Moscow, Idaho), the size of vehicles used to deliver fixed route services, the method of providing paratransit service (i.e. by contract or directly operating the service), and the varied level of local sales tax and B&O taxes to support public transportation services.

The missions for local transit services in Washington are documented in an earlier part of this study (i.e., Task 1.B).

In 1965 the State provided a broad public transportation directive. Local public transportation missions fit within the policy and respond to the State's action. The breadth of the 1965 policy provides the latitude for locally generated program objectives and the requirement for local planning (6 year plans) has contributed to a strong local industry throughout the State. The elements of public transportation at the state level in Washington, including the enabling legislation, funding authorities and technical support have contributed to the development of local mobility systems.

Funding authority, for example, has provided a sound financial basis for long range planning, and a level of certainty that facilitates service and capital decisions. It is evident that the secure, dedicated funding for public transportation at a local level has enhanced the agencies' ability to plan for system development. Notwithstanding the dedicated funding, transit agencies have generally adopted conservative capital financing strategies. The nature of the sales tax revenue source, as it relates to changes in the economy, has resulted in a practical approach by agencies to both capital and operating budgets. Reserve accounts for capital acquisitions and operating revenue contingencies have been established by most agencies. In this way the agencies are positioned to continue transit service in the event of lower than expected sales tax revenue.

Local transit plans for both fixed route and paratransit services have been developed in conjunction with community groups and reflect local priorities for service types, standards, and levels of fare recovery. For example:

- Island County and Chelan-Douglas County PTBA's have developed prepaid fare services based on planning studies and community support. Local sales tax levels that include the fare revenue have been approved by local residents in both counties;
- Kitsap County PTBA has targeted expansion of service primarily to the commuter market, attempting to relieve congestion at ferry terminals and employment centers. Furthermore, in response to the particular market they are attempting to attract, Kitsap offers fully padded cloth seats and drivers with change to improve comfort and convenience;

- Lewis County PTBA patrons (Twin Transit) have identified improved frequency (reducing the one hour headway) and route extensions as priorities for planned expansion; and
- Pullman Transit is examining the potential for a joint fare program with Washington State University to improve access to the campus area in conjunction with the University's new parking program.

Each of these specific objectives are related to the missions of the agency, and have been developed as part of a public process and approved by locally elected representatives.

State and Federal governments have added new responsibilities to local transit programs in recent years. New mandates in the clean air and civil rights (Americans with Disabilities Act) fields have been imposed by the Federal government in the past two years. Similarly, Growth Management and Transportation Demand Management initiatives by the State have added both specific and implied responsibilities to local agencies. As a result, the local agencies are developing response programs that deal with these new areas of responsibility:

- Metro has estimated that ADA will mean annual expenditures of \$6.3 million in 1992 to \$23.3 million in 1997 to accommodate 2 million door-to-door passengers per year;
- Pierce Transit has committed to convert to natural gas powered vehicles as a clean air program. Conversion requires new vehicles, fueling stations, and facility modifications beyond current plans; and
- Spokane Transit is studying the costs and operating implications of meeting the new clean air requirements; and
- Growth Management and TDM will require addition agency administrative personnel and potentially new public transportation services to deal with the integration requirements.

Transit agencies in Washington State legally must live within their means. Expenditure levels, on an annual basis, are governed by the expected revenues and are, on a whole, planned conservatively. Many transit agencies, like Community Transit in Snohomish County, maintain reserve accounts to provide capital funding for planned projects and to off-set potential revenue shortfalls in fares or sales tax. Revenues are allocated to these accounts and to

existing service levels first, before considering expansion programs that are in response to local missions. The new mandates are being added to the existing service level budget for planning purposes throughout the state in order to estimate the impact of ADA, for example, on overall expenditures. Local missions are being revised to ensure that they are consistent with the agency's programs and new mandates.

As these priorities and new mandates are being sorted out, transit agencies have advised that expansion plans to meet growing demands, particularly in suburban areas, will be curtailed. Service changes that were part of a priority program may be delayed in order to make provision for program priorities such as ADA. From the interviews, however, it appears that the transit agencies throughout the state believe that they can accommodate the new requirements by delaying/postponing existing plans for new service, for example. This accommodation will set up a conflict between earlier objectives and missions and the revised missions with state/federal mandates included. Those jurisdictions such as Pierce, Whatcom and Clallam that have the ability to seek more sales tax revenue to address the initial requirements and increasing fiscal impacts of the new mandates have some flexibility. However, any increase in sales tax levels must be approved by the local community. Local economic conditions may be opposed since such increases could be an additional burden. In Clark County, this option is particularly complex due to the proximity to Oregon where no sales tax is charged.

The issue remains unquantified. All analysis concerning the impacts of ADA, Clean Air and GMA for example is not complete. In the short term, the immediate requirements are being accommodated. Beyond the first 2 to 3 years, however, it appears from the analysis of the agencies' financial projections and local service plans, that the impact of these programs and planned service adjustments will be greater than existing revenue projections. Fulfillment of the missions of the transit agencies will be constrained by the existing levels of revenue. Agencies may be faced with curtailment of planned expansion and reductions in existing service levels.

C. Criteria for Evaluation

In order to evaluate the performance of each transit system to determine the appropriateness of funding levels, a measurement process was established. The PAC and LSC approved a set of measures and grouping of transit properties for peer city comparison. The major elements of this background paper are summarized below, and the entire report is contained in Appendix A of this Interim Report.

The general state-wide mission statement for transit and the individual missions of the local agencies contain three important elements of performance. They are cost efficiency and effectiveness, and overall service effectiveness. The latter is a surrogate for the benefits derived from local transit services. The three elements, above, may be measured as direct outputs of the transit network and are defined in the following ways:

- Cost efficiency describes how well such factors as labor and facilities are used to produce outputs such as vehicle hours of service;
- Cost effectiveness measures the use of such inputs as capital and labor in achieving certain goals such as passengers carried; and
- Service effectiveness integrates the outputs of the two previous measures to represent the benefits that are delivered on a community wide basis.

1. Methodology

Fourteen specific indicators were adopted for use in the state wide evaluation. These have been chosen to target policy level performance issues not to represent a management review. They are important only in that they indicate trends in performance. This is largely due to the fact that specific performance targets that relate to the local mission for transit do not exist. The measures adopted for use in this study are contained in Figure 1. An independent review and evaluation of the Washington transit agencies was conducted by the consulting team using these indicators to compare performance with expectations (as defined in mission statements).

The similarities between transit missions in Washington properties is not unusual. Across the country transit agencies of comparable size and structure have similar missions. In light of this, and in the absence of specific performance targets at either the state or local level, a group of peer cities was identified to act as the performance yardstick. Listings of the grouping of Washington properties and the peer cities chosen for the comparison appears in Appendix A. For each measure, a peer group average trend line was developed in order to relate Washington's transit performance to that of comparable systems throughout the country. Although Section 15 data (used for peer city comparisons) is not available past 1988, the trends of indicators, particularly since 1985 were verified by literature research and contacts with selected agencies. The observations concerning the performance of local transit systems in relation to their missions and funding levels are drawn from this data base.

D. Mission Fulfillment

The absence of specific targets for performance of local transit networks has led to the use of peer city groupings and indicators to evaluate Washington State agencies. A number of similarly sized cities with fleet and ridership characteristics that parallel Washington properties form the basis of the prime measurement of fulfillment. Data for these cities listed in the Appendix, Figure 5 has been derived from UMTA Section 15 reports.

FIGURE 1

PERFORMANCE INDICATORS

CHARACTERISTIC	PERFORMANCE MEASURE	DATA REQUIRED
1. COST EFFICIENCY	OPERATING COST/REVENUE MILES	OPERATING COST
	OPERATING COST/REVENUE HOUR	TOTAL VEHICLE HOURS
	TOTAL VEHICLE HOURS/TOTAL EMPLOYEES	TOTAL EMPLOYEES
	PEAK VEHICLES/NON PEAK VEHICLES	PEAK VEHICLES NON PEAK VEHICLES
2. COST EFFECTIVENESS	OPERATING REVENUE/OPERATING COST	OPERATING REVENUE
	OPERATING COST/PASSENGER	SUBSIDY
	SUBSIDY/PASSENGER	CAPITAL BALANCE
	CAPITAL BALANCE/OPERATING COST	
3. SERVICE EFFECTIVENESS	PASSENGER/REVENUE HOUR	PASSENGERS (UNLINKED)
	PASSENGER/REVENUE MILE	REVENUE HOURS
	PASSENGERS/CAPITA	REVENUE MILES
	ROUTE MILES/CAPITA	ROUTE MILES
	REVENUE MILES/CAPITA	POPULATION
	REVENUE HOURS/CAPITA	

1. Initial Observations

During the preparation of the data base a number of unique characteristics of the Washington transit agencies were revealed. Most significant is the inclusion of capital depreciation and/ or reserve accounts in annual budgets. In this state virtually every system makes provisions for a depreciation charge, equipment sinking fund or capital projects account each year. Contributions are made to these accounts annually in accordance with local financial policies. This practice is not common throughout the industry. There are two primary reasons why other agencies do not have such funds. First, in some State transit programs the local capital costs of vehicle replacement are assumed by the State (e.g. Michigan). The second reason is historical. Funding limitations in the 1970's forced many agencies to incur long term debt to purchase new equipment. This practice continues for major capital acquisitions.

The result of such an accounting difference is an imperfect picture of performance indicators such as Operating Revenue to Operating Cost. Washington State ratios for this indicator, when compared to comparable states and peer cities, will appear low. The variance can be as much as 2% annually. For purposes of consistency in the analysis, the data for Washington transit agencies has been modified to exclude these account balances from annual operating cost summaries. In this way a more accurate comparison can be developed and the trends in cost recovery indicators examined. Trend line information is an important indicator of the local acceptability of public transportation services. Policy decisions of elected officials with respect to fare structures determine the cost recovery ratios and the acceptable level of subsidy for local services.

2. Data Consistency

The consistency of reported information was verified by the consultants in conjunction with transit agencies and the Department of Transportation. To ensure completeness of the database, each transit agency confirmed/completed a ten year summary of the relevant measures of performance. Verification tests of the final database were conducted by the consulting team and minor differences were corrected.

There remain only differences in definitions and data collection (estimating) procedures between the relevant sources (i.e. Section 15 and WSDOT Summary of Public Transportation Systems in Washington State). These outstanding variances can be corrected in future reports

by standardizing the State's report requirements with those of UMTA's Section 15. The data estimating techniques used for passenger volumes produce the greatest variances between reports. A single methodology will simplify reporting for transit agencies and eliminate the differences in published reports.

To ensure compatible data, the survey utilized the Section 15 definitions and reports. This facilitated the comparison with peer city statistics.

3. Analysis

The analysis of the general performance of local transit systems in Washington State is documented below primarily using peer city data. However, a key component of the study of transit performance involved the interviews of transit managers throughout the state. From these interviews a second element of the evaluation of "appropriateness and adequacy" was developed. This evaluative measure involves the annual budget process in each local agency. Defined below are these two evaluative measures.

a. Annual Budgets

Although not specifically included in mission statements, every transit agency has a set of priorities and local policies that are used to direct the annual budget cycle. In most cases the following spending/budgeting priorities have been established and are followed:

- Capital Accounts (amounts determined by Board policy);
- Operating Cash Flow reserve;
- Base-line service costs (i.e. existing service levels);
- Additional operating expenses related to current services;
- Expansion of service based on the highest demands; and
- Expansion of service based on expected demands.

Revenues are compared to projected cost factors and a cut off point established. In most budgets (1990, 1991) provision was made for some continued expansion of service. The budget process provides an array of options for local agencies to pursue. If the level of revenues (i.e. income from all sources, Federal Section 9, MVET, Sales Tax, Farebox, contracts and other operating revenue) is not sufficient to address the complete list of service requirements the local transit board has options for fulfilling the agency's mission.

A significant option facing most transit boards is the additional sales tax levy that is available to permit service expansion. At this time only Metro and Community Transit are at the limits of their authority. Community recently received approval of the voters to increase the sales tax levy to 0.6 percent in response to the local desire to improve service levels.

The second option to increase revenues is in the operating revenue category. This includes farebox, advertising, contract services and similar revenue obtained through operating agreements. Farebox revenue comprises the largest single share of this revenue component. Increasing fares has proven to have a negative impact on ridership in a variety of studies. Most recently (May 1991), a study of fare impacts on ridership revealed that a ten percent increase in bus fares resulted in an average four percent decrease in ridership. In addition, fare increases impact those on fixed incomes and young people who use public transportation exclusively.

Other operating revenues are often established through contracts, such as advertising space on buses or in bus shelters, and leases for property. The capability to realize significant increases in the other revenues in these cases is limited in the short term.

A third option is to impact the cost side of the ledger, either by reducing service expansion plans, modifying existing service levels or changing capital account policies. One or any combination of these elements may be considered as a budget measure that does not require new revenues.

The new environment that transit agencies in Washington face, as a result of GMA, TDM, ADA and Clean Air Acts, will force each agency to consider these remedies. The requirements of these state and federal statutes will place new demands on transit operating budgets. As a result, it has been reported in interviews with transit managers that expansion plans will be delayed, capital programs cut and revenue increases sought to deal with these new requirements. Community Transit, for example, has planned to postpone planned suburban bus service expansion in order to accommodate the paratransit requirements of ADA. An examination of the preliminary estimates of similar programs throughout the State indicates that the experience in Snohomish County is expected elsewhere. As transit agencies address the requirements of ADA, Clean Air,

Growth Management, and TDM they are projecting revenue shortages. In most cases current plans foresee a two to three year period before the new service requirements will cause base level bus services to be impacted. At this point current projections in many agencies indicate that there will be insufficient revenue to fund the new required services and the present levels of bus service.

b. Performance Review

Using the three categories of indicators approved by the Policy Advisory and Legislative Steering Committees it is possible to develop a picture of the historical trends of transit performance in the State. These local indicators have been compared to trend lines of factors for similar systems (i.e. peer cities) in order to identify issues of policy significance in Washington. Based on the reviews and analysis by the consulting team, the following general observations apply to the survey results:

- Washington's transit systems are newer than their peers. More than half of Washington's 22 systems began service during the last decade and have been subject to greater demands for service and capital facilities than the peer city groupings. Population and economic growth in Washington have been larger and stronger than in most parts of the country, and the indicators show transit's response in terms of increasing hours and miles of service;
- Transit managements have established broader program directions than peer city groups, generally including significant paratransit responsibilities. In most peer cities, transit responsibilities are limited to fixed route bus services. These broader responsibilities have resulted in higher total operating costs for Washington's transit agencies; and
- Suburban growth particularly in King, Snohomish, Pierce and Clark Counties has resulted in extended length fixed route bus services targeted at commuter markets to Downtown Seattle, Bellevue, University of Washington and Downtown Portland. The extent of these commuter services is unparalleled in the peer city groupings.

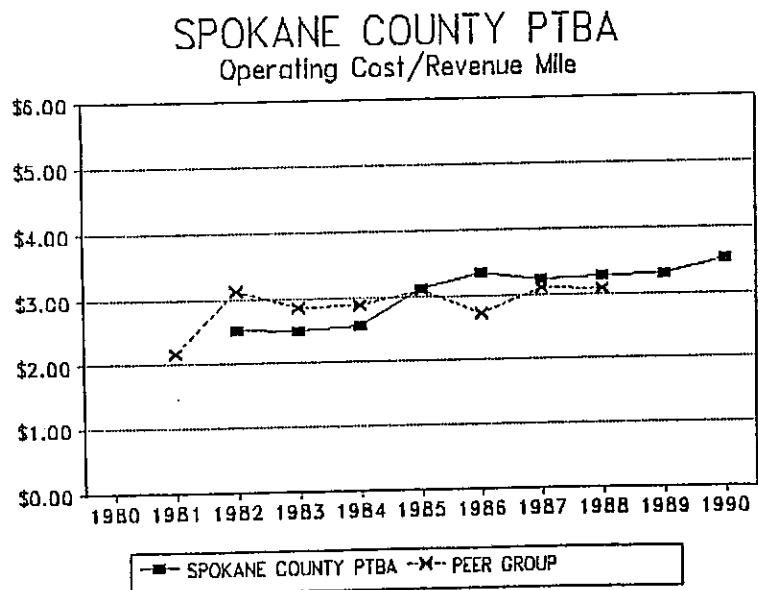
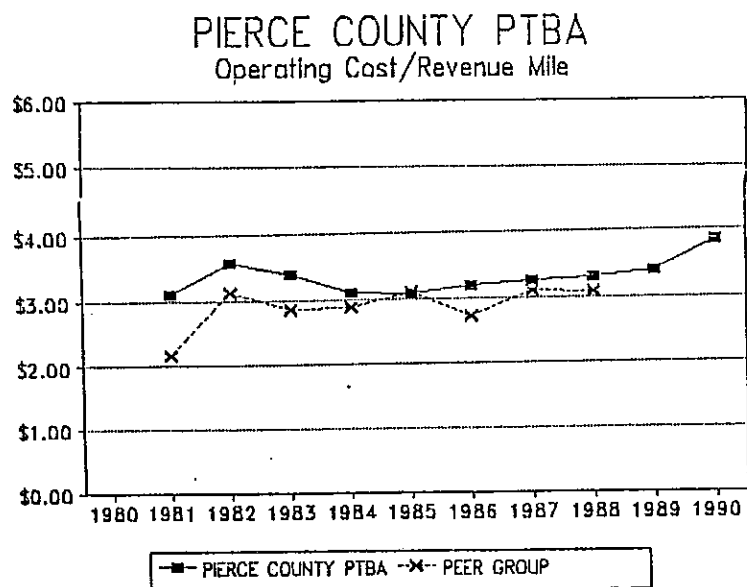
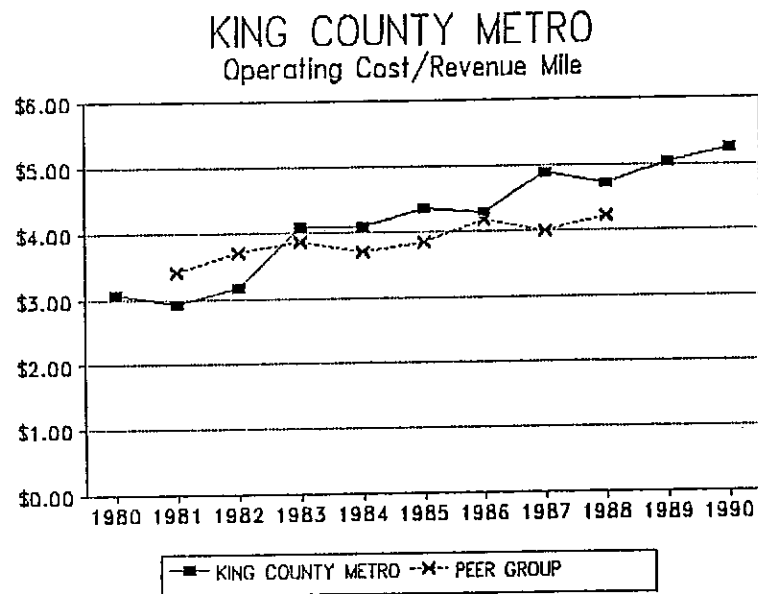
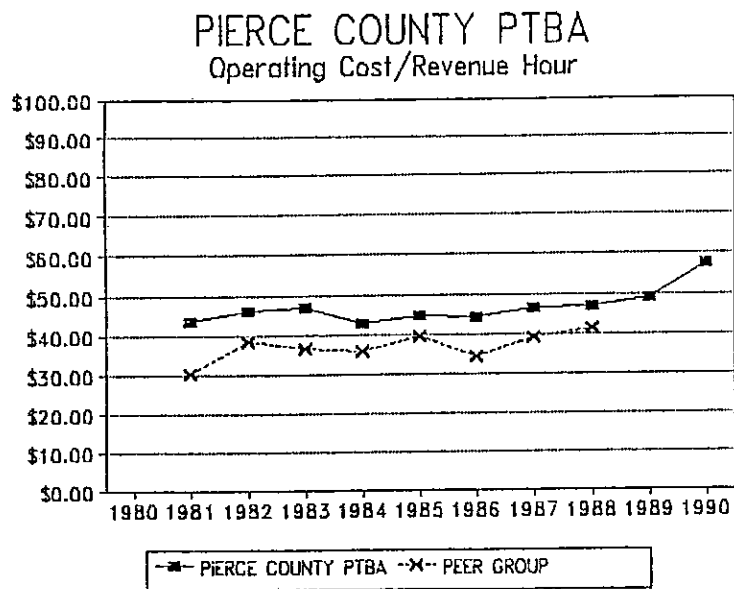
(i) Cost Efficiency

This category of indicators is intended to reflect the use of the resources available to transit agencies in the production of services. Factors having the greatest impact on these indicators include the labor environment in the state and the wage levels of employees. In the case of Washington transit agencies, organized labor is a major element of virtually every operating entity and wage levels, historically, particularly in the Puget Sound region, have been impacted by the State's employers (e.g. Boeing) and the now high technology industries.

Generally, the indicators of cost efficiency reflect characteristics in terms of historical performance and levels of performance similar to the peer cities in each category. In the case of Metro and the three next largest systems (Spokane, Community and Pierce) the operating cost per revenue mile and revenue hour are comparable to the peer cities. In light of the impact that labor costs have on total operating cost (70%+) the graphs reflect a significant degree of cost containment by Washington properties given the differing levels of growth in this state and the peer cities. Figure 2 displays indicators from these properties that reflect this situation.

Figure 2 highlights the efficiency indicators using operating cost and variables for service (miles and hours). The Operating Cost/Revenue Hour indicator shown for Pierce Transit displays a historic pattern that matches the peer cities. The indicator is particularly sensitive to labor costs and the impacts of congestion. The upturn in the final two years of reporting is mirrored in the Operating Cost/Revenue Mile graph for Pierce Transit, and reflects the impact of increasing congestion on performance. Metro's indicator of Operating Cost/Revenue Mile has been affected by the same traffic conditions. Spokane, on the other hand, displays a consistent measure that reflects cost management during the period of expansion.

FIGURE 2 COST EFFICIENCY INDICES



The next three groups of Washington systems have very similar performance profiles in the operating cost per revenue mile indicator when compared to the peer cities. The picture is somewhat different when the comparison focuses on the operating cost per revenue hour. The economic strength of the region is reflected in the latter statistic by the cost per hour of service that is largely driven by wage levels, and is masked in the first by the higher service levels provided in Washington properties. Figure 3 indicates those relationships.

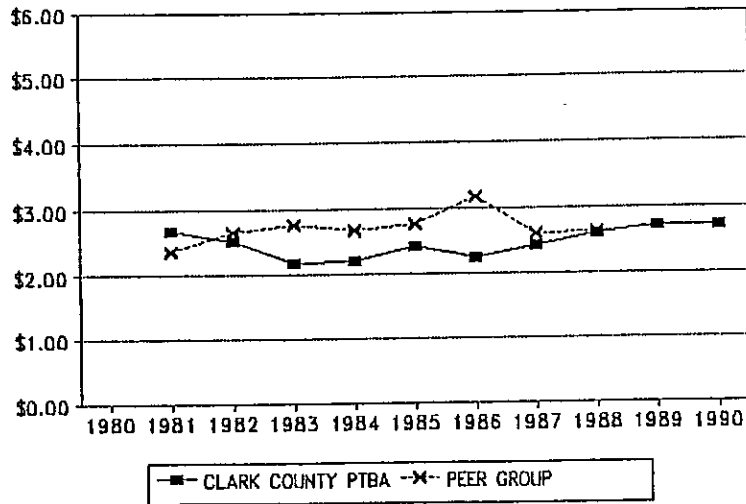
In Figure 3, indicators of four properties are displayed to reflect the performance. These historical graphs show that the ratio of Operating Cost/Revenue Mile is growing. The background data indicates that during this time frame the service expansion of these systems far outdistanced their peers. Therefore, the indicators show that Clark and Kitsap provided more service than their peer cities. The strength of the economy is reflected in the hourly costs of service (Operating Cost/Revenue Hour). Peer cities in weaker economies have not experienced the same budget impacts as Washington agencies.

(ii) Cost Effectiveness

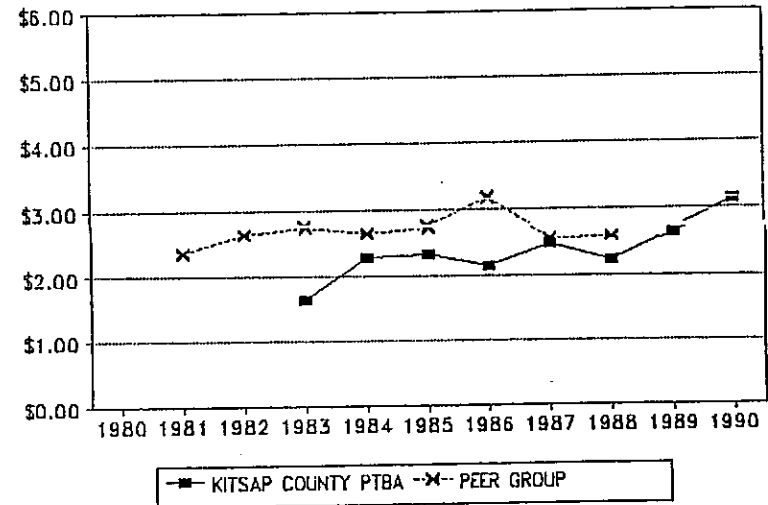
As measures of the relationships between the resources used to provide the service and the consumption or use of the service, these indicators (such as operating cost/passenger and subsidy/passenger) relate to the primary function of the services provided. Throughout the evaluation, the age of the majority of local systems has been identified as a factor influencing performance. Evidence throughout the nation points to the conclusion that the more mature the system the greater the degree of utilization by a community that is familiar with the services. In Washington, the newer systems display lower levels of performance related to operating cost per passenger for example than do peer cities that have more mature systems. Generally, the trend in revenue/operating cost ratios in the state is to maintain or increase the local ratio, while peer cities show a decline in this statistic. In virtually all groupings, the total subsidy per passenger in Washington is equivalent

FIGURE 3
COST EFFICIENCY INDICES

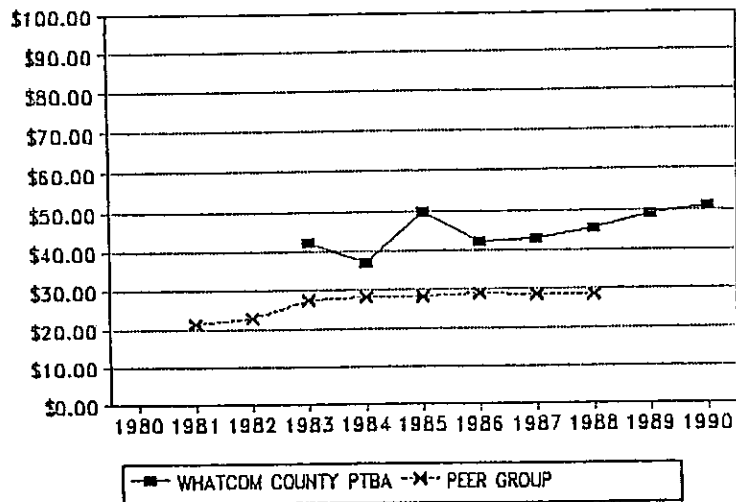
CLARK COUNTY PTBA
Operating Cost/Revenue Mile



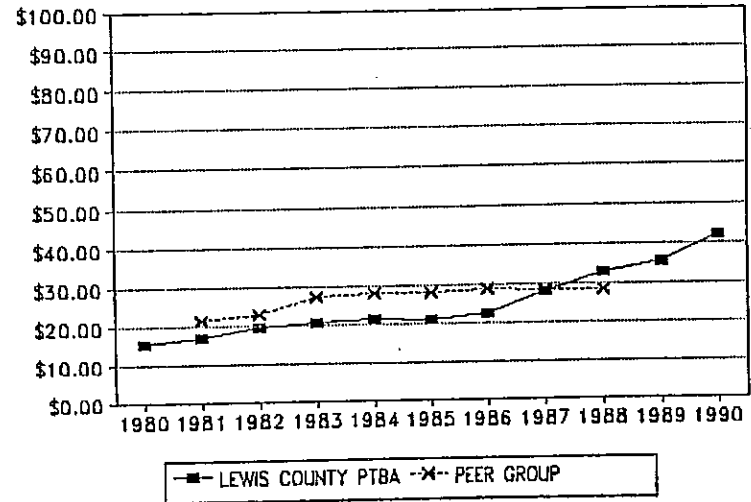
KITSAP COUNTY PTBA
Operating Cost/Revenue Mile



WHATCOM COUNTY PTBA
Operating Cost/Revenue Hour



LEWIS COUNTY PTBA
Operating Cost/Revenue Hour



to the subsidy levels in the peer cities. This indicates that Washington's financial support for transit is not out-of-line with programs throughout the country. Figures 4 and 5 indicate these relationships.

Operating Cost/Passenger shown in Figure 4 examines the service effectiveness of transit agencies. There are some unusual situations (e.g. CUBS Transit) that may be explained by initial capital expenditures or start-up costs. Generally, however the historical trends are reasonably close to the peer cities indicators. In the case of both Metro and C-Tran in Figure 4, 1986 signalled a departure from previous years. In both cases, new services and added costs of congestion in commuter periods, with longer trips are variables that impacted these indicators. The industry as a whole was impacted during the 1980's by the declining price of oil (and thus gasoline). The price advantage of public transit, particularly in the metropolitan areas, was eroded as more people could afford the cost of commuting by automobile.

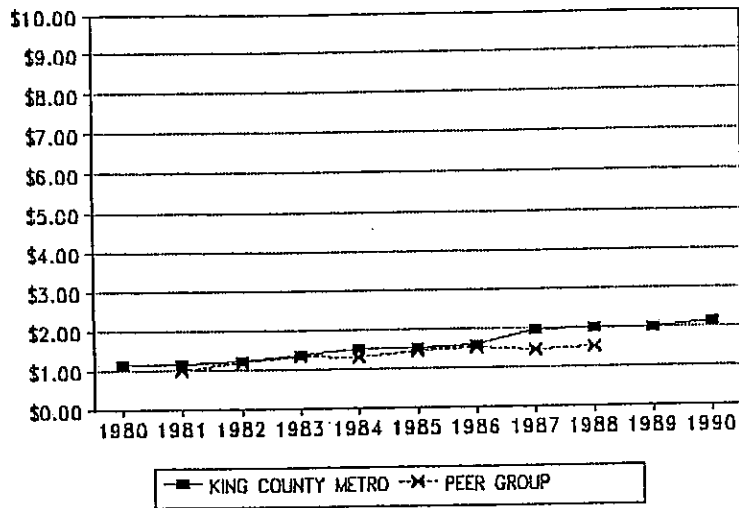
The indicators in Figure 5 show that although more service has been provided, the subsidy (i.e. the amount of public financial support) per passenger is approximately equivalent to the peer cities. The indicators show that the patronage levels of Washington transit systems are higher than their peers given the greater state and local levels of public support in Washington vis-a-vis those documented in the Comparable States Interim Report. The Operating Revenue/Operating Cost measure indicates that Washington agencies are increasing the effectiveness of the systems particularly in comparison with peer cities. The ratios of Operating Revenue to Operating Cost are improving in Washington (e.g. Clark and Pacific) while declining in peer cities.

(iii) Service Effectiveness

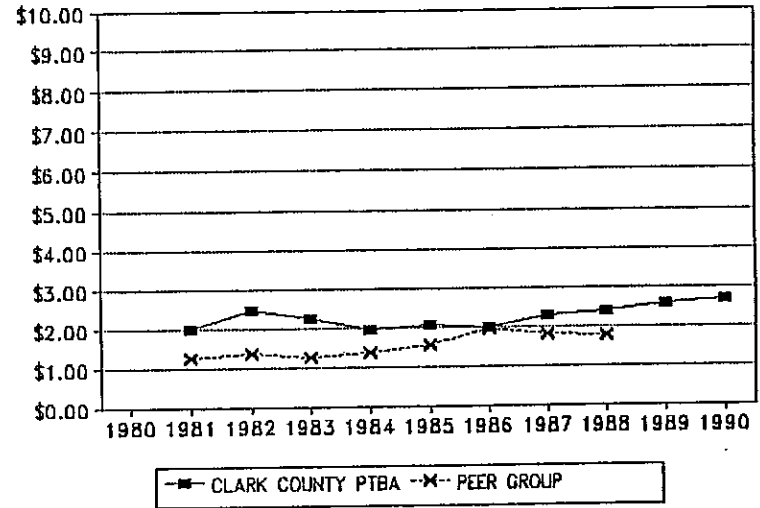
Service effectiveness measures are surrogates for some of the benefits transit delivers within a community. Service levels (i.e. the amount of service offered) are shown by indicators of Revenue Hours/Capita in Figure 6. Metro, an older, stable system, has maintained a consistent level of service during the growth of King County particularly

FIGURE 4
COST EFFECTIVENESS INDICES

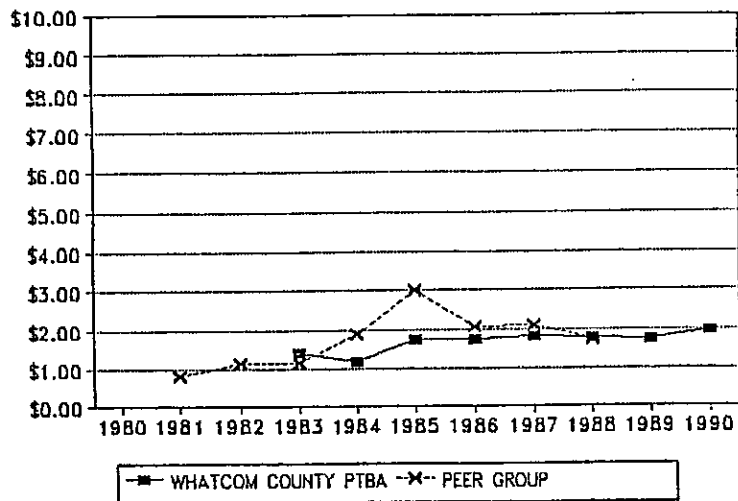
KING COUNTY METRO
Operating Cost/Passenger



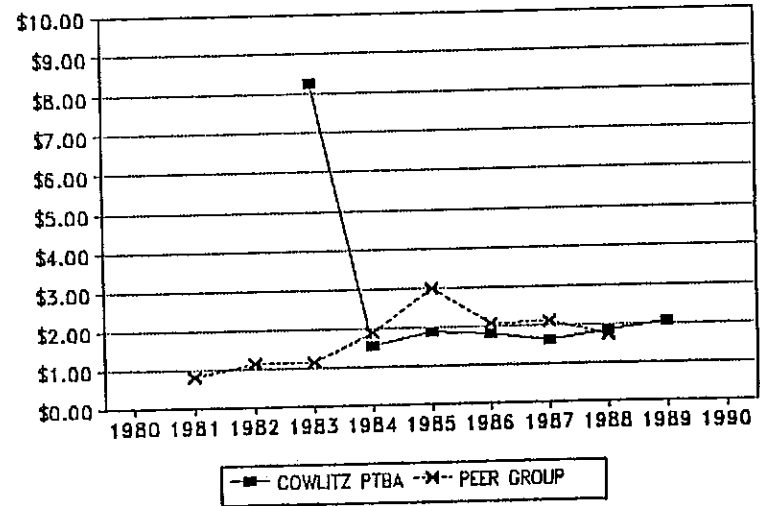
CLARK COUNTY PTBA
Operating Cost/Passenger



WHATCOM COUNTY PTBA
Operating Cost/Passenger

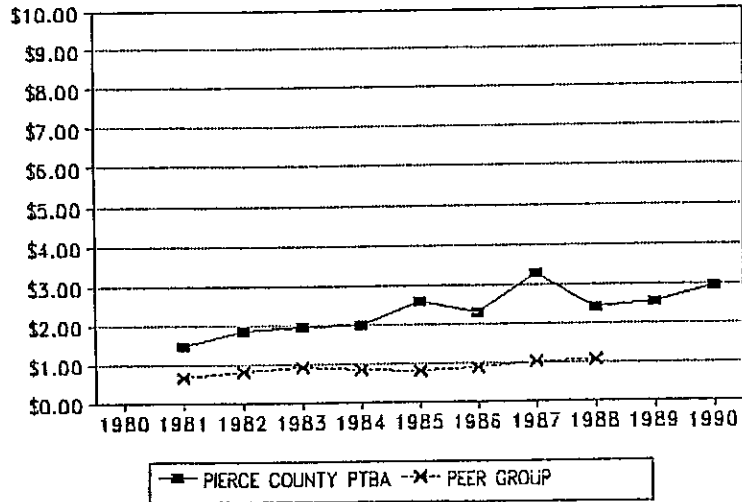


COWLITZ PTBA
Operating Cost/Passenger

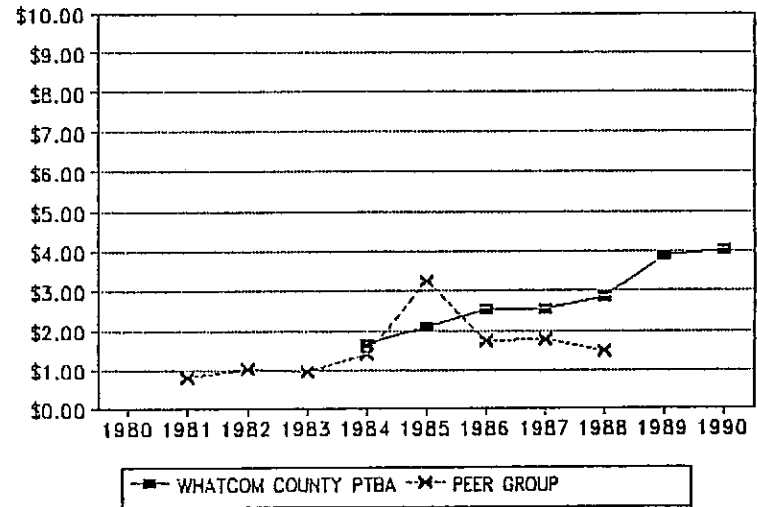


**FIGURE 5
COST EFFECTIVENESS INDICES**

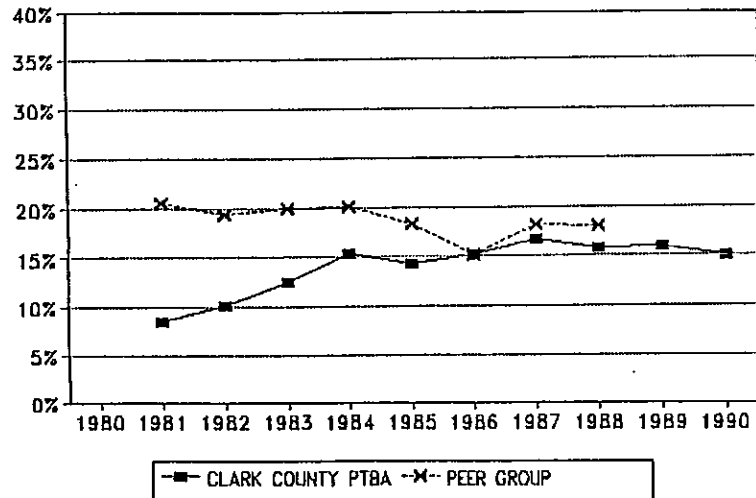
PIERCE COUNTY PTBA
Subsidy/Passenger



WHATCOM COUNTY PTBA
Subsidy/Passenger



CLARK COUNTY PTBA
Operating Revenue/Operating Cost



PACIFIC COUNTY
Operating Revenue/Operating Cost

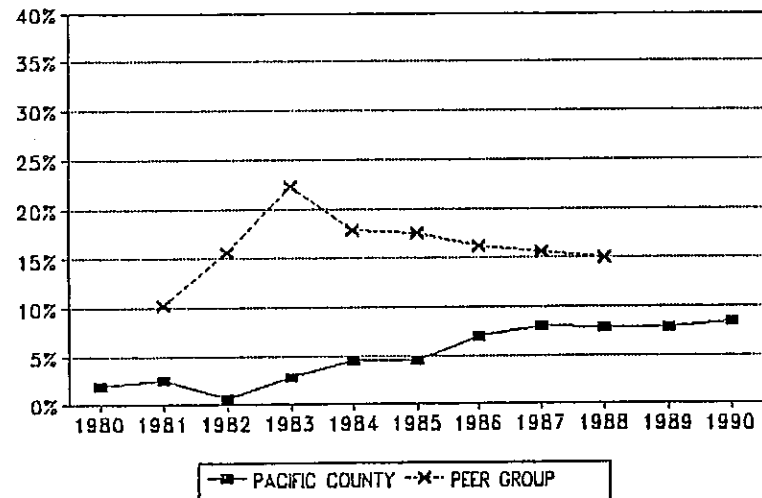
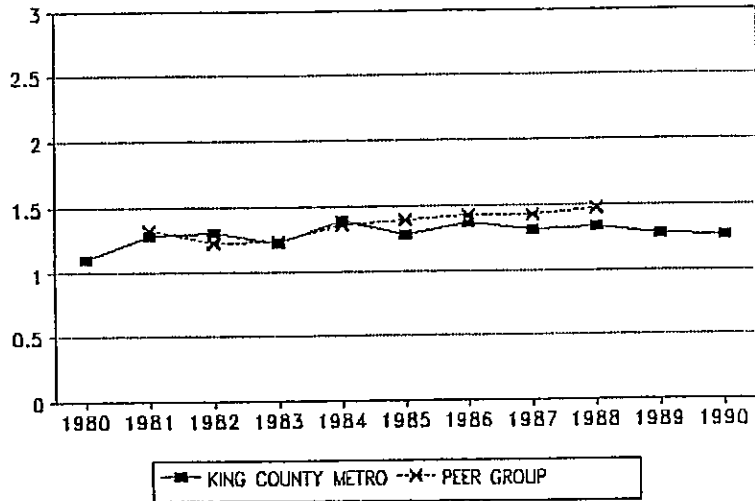
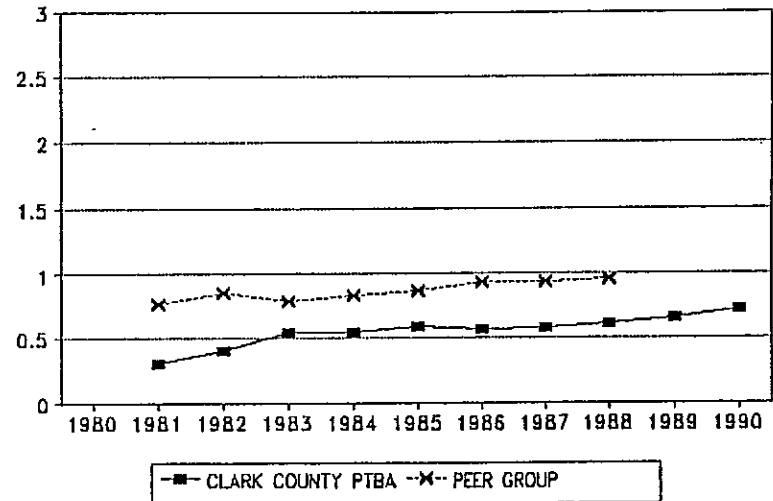


FIGURE 6
SERVICE EFFECTIVENESS INDICES

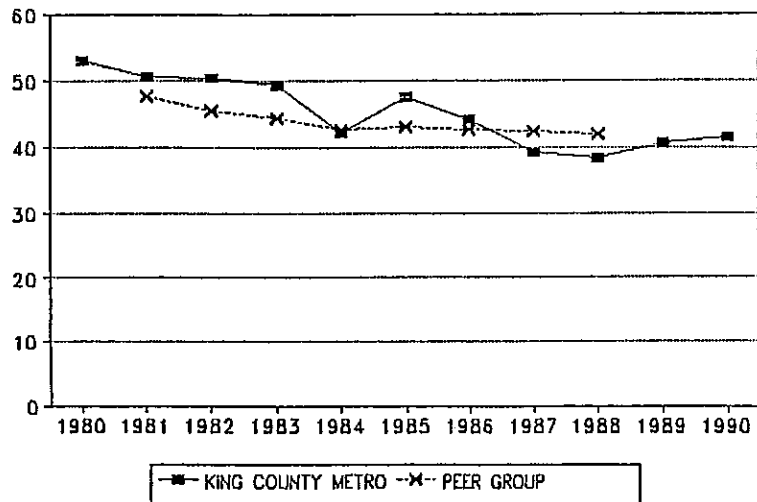
KING COUNTY METRO
Revenue Hours/Capita



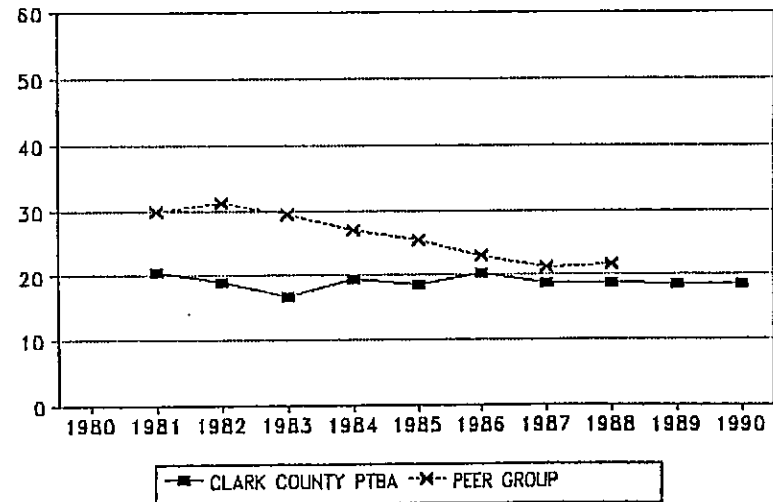
CLARK COUNTY PTBA
Revenue Hours/Capita



KING COUNTY METRO
Passengers/Revenue Hour



CLARK COUNTY PTBA
Passengers/Revenue Hour



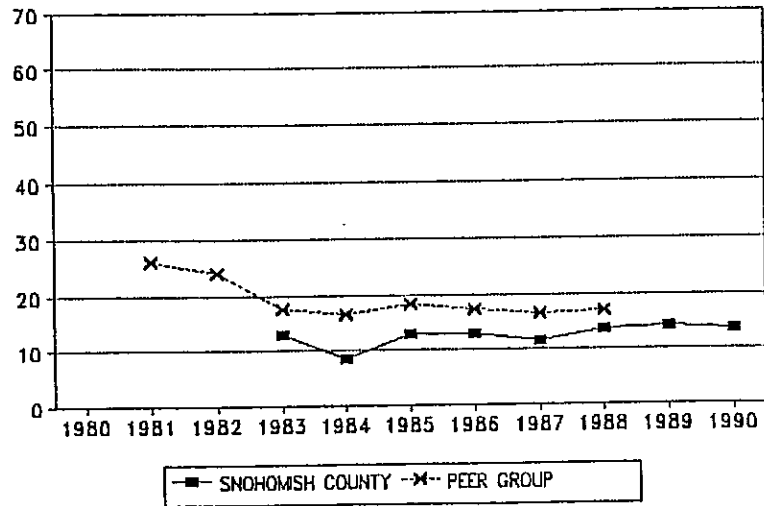
in the last few years. Clark has added more service per capita during this time period, but as a relatively new system with a large service area and growing population this may be expected. The decline in Passengers/Revenue Hour in Metro in the mid-80's may be a result of increasing congestion, decentralized employment centers, and the tunnel construction disruption in Downtown Seattle. C-Tran in Clark County, on the other hand, has not experienced the performance decline that affected peer cities during the 80's. The growth in the community and service options (particularly for commuters) maintained passenger levels.

The increasing levels of transit use to provide access to employment centers and community services, while contributing to air pollution reductions and congestion relief, may be seen in Figure 7. Passengers per capita is the measure that reflects the levels of usage. Population increases in the state during the decade mask the percentage growth in ridership. For Washington transit agencies of all sizes, the overall trend for measure of use is increasing while the peer city indicators are declining. Transit usage is growing in Washington as more residents become familiar with local bus services and the services are targeted at specific community needs.

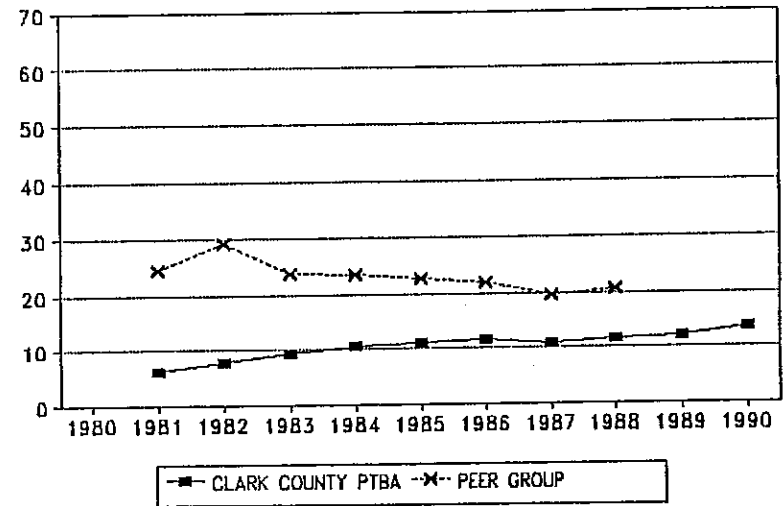
Finally, Figure 8 reflects the growth in service and passenger response in two specific systems. At Ben Franklin Transit, where there has been a 200% increase in service (as evidenced by the revenue miles per capita indicator) during the past decade, ridership has responded. Unlike peer cities in this grouping, Ben Franklin has maintained a constant ridership level (Passengers/Revenue Mile) during this service build up. Similarly in the case of Pacific Transit, one of the smaller systems in the State of Washington, service increases outpace peer cities and ridership has increased to maintain a relatively constant service effectiveness performance.

FIGURE 7
SERVICE EFFECTIVENESS INDICES

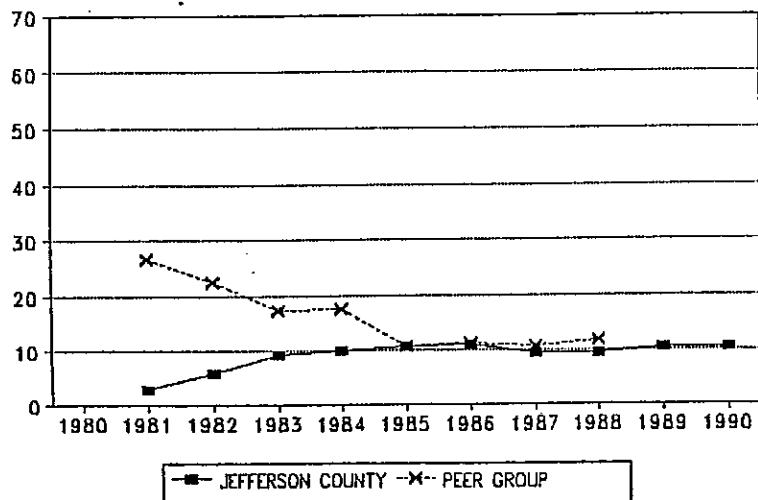
SNOHOMISH COUNTY PTBA
Passengers/Capita



CLARK COUNTY PTBA
Passengers/Capita



JEFFERSON COUNTY PTBA
Passengers/Capita



GRAYS HARBOR COUNTY
Passengers/Capita

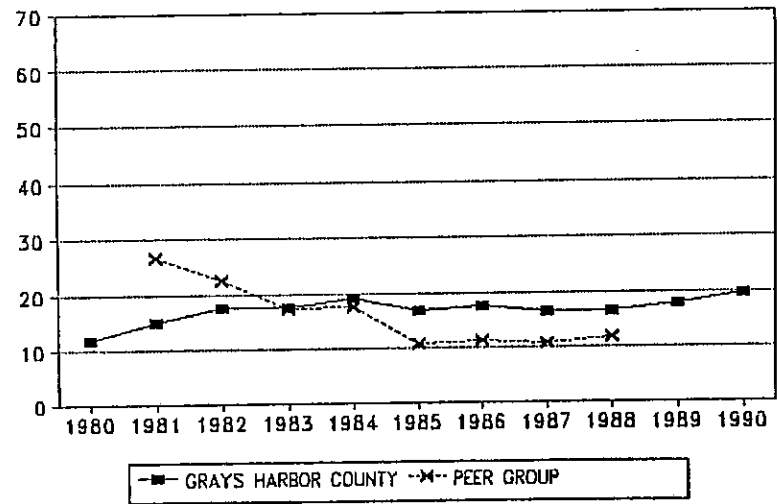
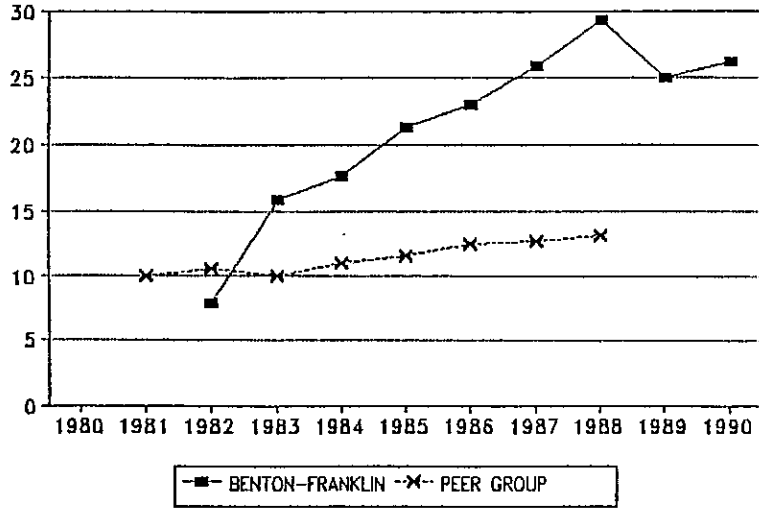
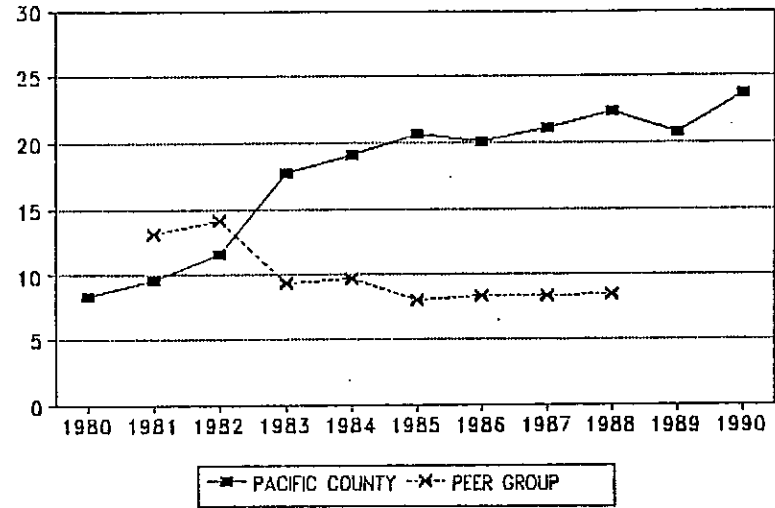


FIGURE 8 SERVICE EFFECTIVENESS INDICES

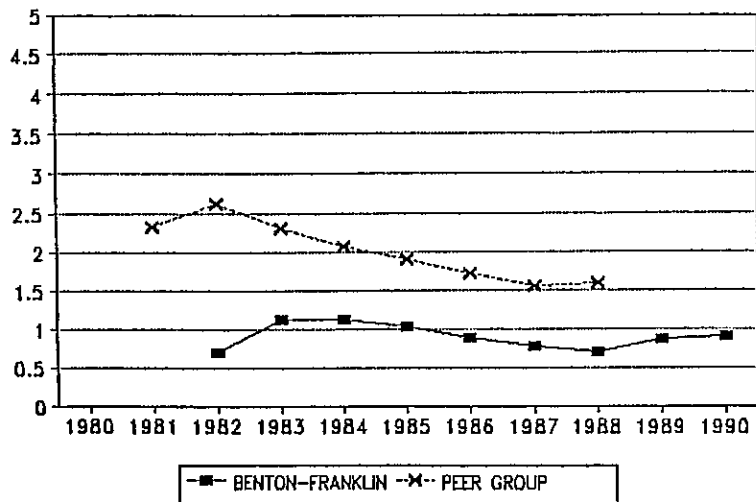
BENTON-FRANKLIN PTBA
Revenue Miles/Capita



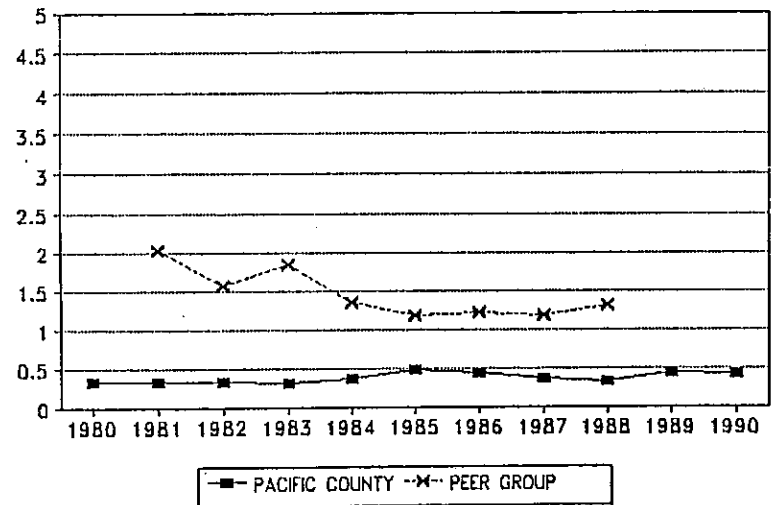
PACIFIC COUNTY
Revenue Miles/Capita



BENTON-FRANKLIN PTBA
Passengers/Revenue Mile



PACIFIC COUNTY
Passengers/Revenue Mile



II. Conclusions

Based on the analysis of historical system performance and projected futures, it may be concluded that Washington's local transit agencies are responding to the economic growth in the State. More service is being provided and ridership levels are being maintained. Factors external to the transit management, such as traffic congestion development patterns and new programs (e.g. TDM, ADA, GMA) are having (or will have) an impact on transit performance. The implications of these programs have not been totally calculated but initial indicators point to a series of operating budget issues in the next two-three years.

During the past ten years a number of Washington agencies began service and these systems will take time to mature. Peer cities from throughout the nation have not (on the whole) experienced the same levels of population growth or economic stability as Washington cities. As a result, while Washington systems expand, others in the peer group are contracting. Developing a stable ridership base during this period of expansion would normally be difficult yet indicators show (Figure 8) that ridership has grown in proportion to the new services.

Transit agencies are responding to the local conditions, directed by mandates and locally adopted missions. Performance is generally in line with or better than peer cities in all categories, or is improving at a reasonable rate. The outstanding question of the capabilities of agencies to respond to new demands such as ADA is unanswered. Transit systems have not yet been able to fully assess the projected impacts particularly of programs such as ADA. It appears from early responses that sufficient funding is available for a 2 - 3 year period before current levels of service may be impacted.

In summary, the transit agencies in Washington are providing more service and carrying more passengers per capita than their peers. Traffic congestion and a stable economic base have contributed to higher cost structures, but the subsidy per passenger in Washington is approximately equivalent to the peer cities. New program requirements (specifically ADA and Clean Air) will create funding problems in the next 2 - 3 years but in the interim, transit agencies are planning to accommodate these programs and maintain existing service levels.

PUBLIC TRANSPORTATION STUDY

APPENDIX A

**APPRAISING APPROPRIATE LEVELS
OF SERVICE AND
DEVELOPING DESCRIPTIVE SYSTEM PROFILES**

Prepared for the
State of Washington
Legislative Transportation Committee

EXECUTIVE SUMMARY

Throughout the work program for the Washington State Public Transportation Study is the requirement to both establish evaluative criteria to assess funding adequacy compared to service provision and to comparatively analyze the State's systems. We have attempted to draw these requirements together. This Interim Report deals with the components of this task. In Part I, there are a series of measures identified for the purpose of providing an overview of performance. The second section, Part II establishes an evaluation process by grouping the transit properties and developing a list of peer cities.

A second component of this assessment involves the identification and quantification of the benefits derived by the local community, the state and the nation from public transit. In this initial set of measures - developed from transit operating statistics a number of surrogate performance indicators are used to represent community benefits. Later components of this study will deal more specifically with the community benefits that are transit related. Tasks 3 and 4 will provide an identification of benefits, anecdotal examples provided by the survey data and quantification of benefits, wherever possible, that accrue within the state.

This framework for the analysis of funding issues, community benefit and future revenue needs is developed at a policy level to provide a picture of the issues state-wide. Often performance indicators are used for management purposes with the system to evaluate the effectiveness of specific routes for example. This analysis is not aimed at that level, but at the more aggregate data for the network of local transit systems.

This evaluation must be measured against the legislative mission for local transit systems established in 1965. At that time the Legislature set as public policy the following:

"All persons in a community benefit from a solvent and adequate public transportation system, either directly or indirectly, and the responsibility of financing the operation, maintenance and capital needs of such systems is a community obligation and responsibility which should be shared by all. We further find and declare that the maintenance and operation of an adequate public transportation system is an absolute necessity and is essential to the economic, industrial and cultural growth, development and prosperity of a municipality and of the state and nation, and to protect the health and welfare of the residents of such municipalities and the public in general."

(Chapter 11, 1st Ex. Session, Laws of '65, RCW 35.95.010).

The performance measures (and data requirements) form the basis of the system surveys and interviews of local transit agencies throughout Washington that will be carried out as part of the overall study. Based on the reported performance, an overview of the "health" of transit in the state, both now and into the future, will be developed.

APPRAISING APPROPRIATE LEVELS OF SERVICE AND DEVELOPING DESCRIPTIVE SYSTEM PROFILES

INTRODUCTION

Several of the tasks in the Washington State Public Transportation Study require an analysis of "appropriateness, adequacy, and mission fulfillment" and indices "that evaluate appropriate comparisons". One way of addressing at least part of these requirements is with transit performance measures and the comparative statistics from across the country.

PART I TRANSIT PERFORMANCE MEASURES

Determining the appropriateness of transit funding levels throughout the State will involve the measurement of the performance of each transit system over time. The practice of measuring system performance is not new, and is carried out by individual transit managers, regulatory agencies and funding authorities on a regular basis. Each of these reviews is usually aimed at different goals and may use a variety of measures. A study of background materials related to performance measures reveals five important considerations. They are:

- a clear understanding of the purpose of the performance measures is required;
- the characteristics of efficiency and effectiveness must be defined;
- the list of performance measures should capture all of the important characteristics;
- the data requirements should be administratively simple and the data categories well defined; and
- a set of comparable data examples should be established for evaluative purposes.

For the purposes of policy level evaluation of funding issues, legislative programs and institutional arrangements, including community benefits, the appropriate measure must provide a picture of the trends. These trend lines for efficiency and effectiveness indicators and community benefits can then be evaluated by comparing Washington State trends to those of transit properties elsewhere in the country. Naturally, the process of comparison must respect the size differences of the properties and, therefore, a grouping of agencies within the State has been developed in Part II.

The major purpose of preparing this comparative analysis is to determine the underlying reasons for variations in trends. These variations both within the grouping of Washington properties, and between these groups and their peers may be traceable to local practices, state program support levels, and the impact of Federal programs. There obviously will be variances that are due to the size of the service area, population density, socio-economic factors and system age to name only a few. These too will be accounted for in the analysis.

Since this study focuses on the State's role in future transit programs, it is most important that other states' transit policies be investigated. Innovation and creative programs that support local transit initiatives, and deliver benefits to a broad community will be the focus of this research effort.

A. PURPOSE:

Performance indicators may be used for a number of purposes. Transit managers often use a host of measures to determine labor negotiating strategies and to revise service plans. Policy boards may use certain measures to judge the performance of a manager. In every case the purpose is clearly defined and the measures tailored to fit this purpose.

In the case of this study, it is the intent of LTC to evaluate the performance of the systems in Washington vis-a-vis the State's role. Attempting to judge what an efficient or an effective transit system looks like is a difficult task and one that depends on "the eye of the beholder." Each system has been developed in response to a set of conditions in a specific community and, therefore, the performance of each system must be judged on the basis of these initial issues. A significant function of the survey will be to probe for these linkages - the local benefits derived from the transit system.

A generic general set of criteria has been developed and can be applied broadly and used for comparative purposes. These criteria encompass the varied mission statements, goals, and objectives of each transit district. Based on general background information, the following characteristics of local transit missions have been developed:

- transit services should provide effective transportation;
- operations should be efficiently carried out; and
- services should support the economic, social, and environmental well-being of the community.

The purpose of the measures developed for this study therefore, is to provide quantitative evaluative criteria that cover the factors of efficiency and effectiveness, and the benefits of transit to the community. Examining these same quantitative measures for similar communities provides a test of reasonableness for the Washington properties.

Further examination and quantification of the broader community benefits that are secondary impacts of the local transit program, such as air quality and congestion improvements, will be provided in reports dealing with Tasks 3 and 4. The material used in this phase of the work involves data directly generated by transit agencies and is not specifically oriented to the secondary benefits. The later reports will provide the link between the system performance measures and a variety of benefits that the communities derive from their local transit program.

B. TRANSIT DELIVERY SYSTEMS

The development of useful performance measures can only take place when there is an understanding of the transit delivery system. The actual operation of fixed route or paratransit systems are single components of the broader context within which these services are delivered. A practical model has been presented in the literature outlining the various components of the general transit delivery system. Figure 1, that follows, reproduces this model.

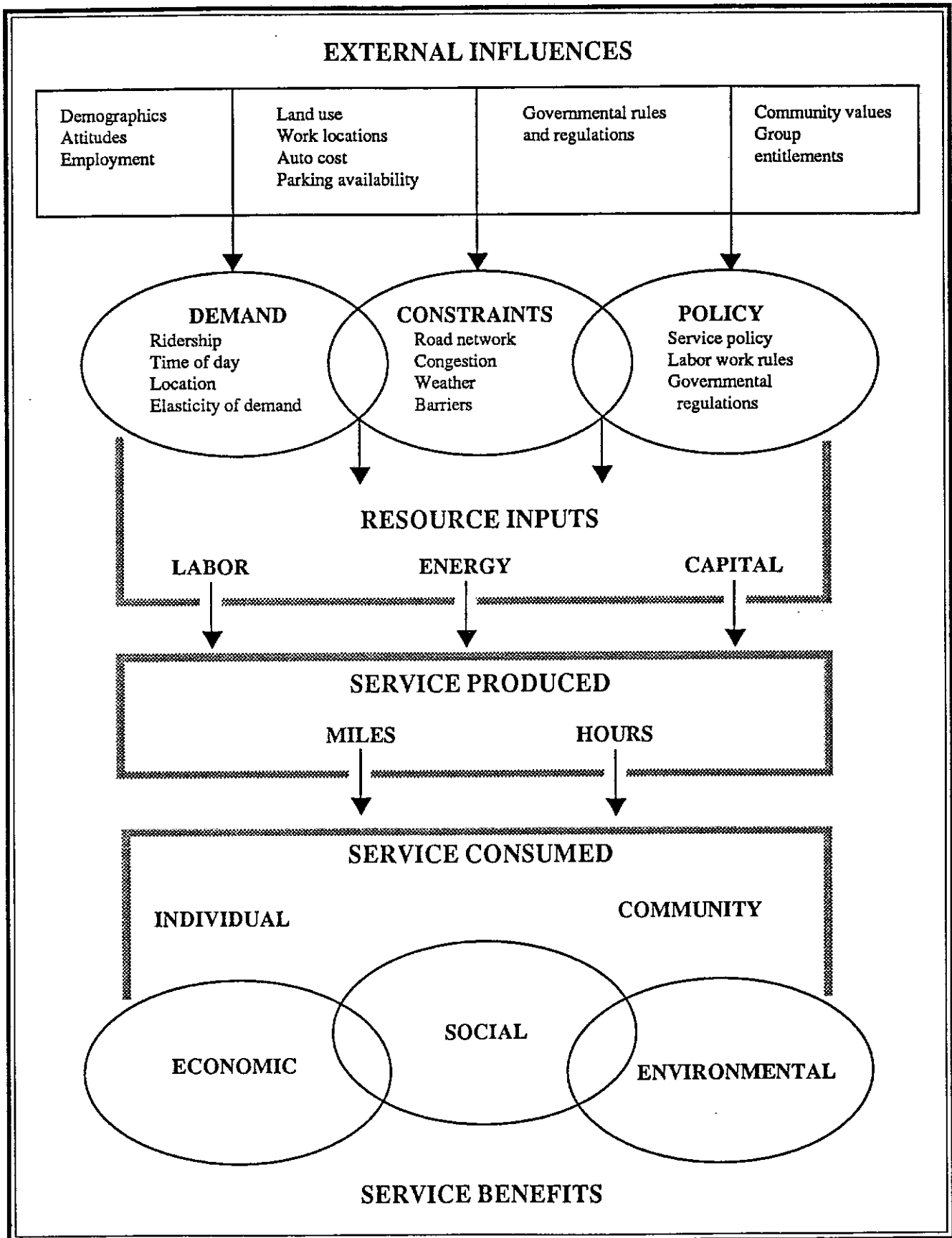
The relationships between the external influences, such as population, land use plans and government regulations, and the benefits derived by individuals and the community are identified in this model. The services produced function includes both fixed route and demand-responsive systems, designed to respond to particular market requirements. The resources that are necessary to create the services that the public consumes are influenced by factors that include the existing infrastructure and public policy direction. Managerial choices (and thus specific performance) are constrained by policy decisions that are directly (fare levels), and indirectly (site planning guidelines), related to transit programs.

The successful manipulation of the resources available will be dependent upon the environment in each community. Markets will differ, relative to employment patterns and demographics, as will the ability to serve various parts of the community due to the road network and land use form. Direct comparisons between community systems, without knowledge of the context of local goals and desired benefits is not practical. Finding common measures and establishing yardsticks by which to judge general performance is a reasonable way to monitor performance.

C. MEASURING PERFORMANCE

Based on the general mission of local transit properties presented earlier, there are three important measures of performance. They are cost efficiency, effectiveness, and overall service effectiveness.

Figure 1: Transit Service Delivery System



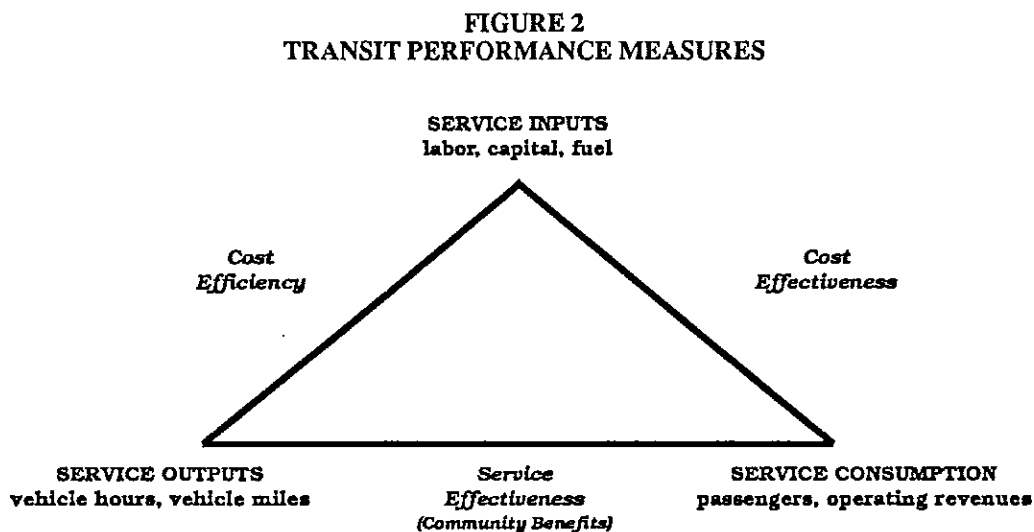
Source: Fielding, Gordon J., *Managing Public Transit Strategically*
Jossey-Bass Publications, 1987, p.3

Cost efficiency describes how well factors such as labor and facilities are used to produce outputs such as vehicle hours of service.

Cost effectiveness measures the use of such inputs as capital and labor in achieving certain goals such as passengers carried.

Service effectiveness integrates the measures of cost efficiency and cost effectiveness. These measures are often more difficult to quantify and often have less reliable input data. Service characteristics such as convenience, comfort, reliability etc. are factors that attract passengers but are not easily or uniformly quantified. The indicators utilized in this section represent measures of benefit and will be augmented with later research.

Figure 2, that follows, graphically displays the relationships between service inputs, outputs and consumption. These relationships, when measured, provide insight into the degree to which the transit and system is reaching its stated mission and delivering community benefits.



The goal of any transit authority is to find a balance between the efficiency and the effectiveness factors. The history of performance measurement includes concern for the rising costs of producing service (e.g. fuel and labor), the impacts of new capital investments, the introduction of expensive peak hour services, declining revenues, and the inability to generate greater market share. The measures utilized may be very detailed, if being used as a management tool with preestablished targets, or may be more generalized for policy purposes. The latter level of measurement is seen to be most appropriate for a state-wide study such as this.

D. PERFORMANCE INDICATORS

Drawing on a background of research by transit properties, funding agencies, APTA, and academic institutions, a set of measures have been developed for this study. They are divided into three categories - Service Effectiveness, Cost Efficiency and Cost Effectiveness. The measures presented in Figure 3 are indicators of the relationships between inputs and outputs, and the utilization of the services. Programs in California and New York, for example, have been in place for some years, and have been revised over time to reduce complexity and the number of items measured. A simple set of measures has proven more effective on a state-wide basis than a complex report.

There are fourteen specific measures recommended for state-wide purposes. Considerably more could be used if locally oriented to a distinct issue or program. The data resources necessary to create the measures are common categories recorded by agencies. It will be most important, however, to ensure that the components used to produce a data base of "operating revenue" for example is uniform throughout the state. Therefore, a set of definitions has been included as an Appendix. These definitions draw together both Federal Section 15 requirements and the State of Washington standard terms for similar data.

The use of these measures as indicators of performance relates to the components of the legislative mission for transit and the three elements of this general mission. For example, the Cost Efficiency measures of Operating Cost/Revenue Mile and Total Vehicle Hours/Total Employees are indicators of the ability of the local system to utilize the various components such as labor to produce service for potential users. These measures are tied to the financial health of the system. Similarly, the Cost Effectiveness measures are indicators of passenger usage of the system. Maximizing the number of riders is a corporate objective that must be related to the financial/service availability. Hence, measures such as Operating Cost/ Passenger are used.

Finally, the measurement of service quality and the benefits the community derives from transit are represented by Service Effectiveness measures. The degree to which transit services can be deemed to support social, environmental and economic goals of the community are not easily measured and are not directly reported in transit agency statistics. For the purposes of this component of the study a number of surrogate measures have been developed to provide indicators of local trends. For example, the utilization of the system - Passengers/Revenue Mile and Revenue Hour, Passengers/Capita - not only represent productivity measures but also indicate the impact of transit on general mobility in the community including access to jobs and the number of trips that were not made by autos - resulting in lower air pollution and less congestion. The productivity measures such as Route Miles, Revenue Miles, and

FIGURE 3

PERFORMANCE INDICATORS

CHARACTERISTIC	PERFORMANCE MEASURE	DATA REQUIRED
1. SERVICE EFFECTIVENESS	• PASSENGERS/REVENUE HOUR*	PASSENGERS (UNLINKED)
	• PASSENGERS/REVENUE MILE*	REVENUE HOURS
	PASSENGERS/CAPITA	REVENUE MILES
	ROUTE MILES/CAPITA	ROUTE MILES
	REVENUE MILES/CAPITA	POPULATION
	REVENUE HOURS/CAPITA	
2. COST EFFICIENCY	OPERATING COST/REVENUE MILE*	OPERATING COST
	• OPERATING COST/REVENUE HOUR*	TOTAL VEHICLE HOURS
	• TOTAL VEHICLE HOURS/TOTAL EMPLOYEES	TOTAL EMPLOYEES
	PEAK VEHICLES/NON PEAK VEHICLES	PEAK VEHICLES NON PEAK VEHICLES
3. COST EFFECTIVENESS	OPERATING REVENUE/OPERATING COST*	OPERATING REVENUE
	• OPERATING COST/PASSENGER*	SUBSIDY
	SUBSIDY/PASSENGER	CAPITAL BALANCE
	CAPITAL BALANCE/OPERATING COST	
*USED IN PARA TRANSIT EVALUATION		

Revenue Hours/Capita indicate the level of transit service availability on a local basis to permit access to employment places, social services, and recreation facilities. These latter indicators also provide a convenient measure of comparative service levels between systems.

PART II EVALUATION PROCESS

The evaluation of the performance of transit properties is not to rank properties or to portray one as better or worse than any other. With the variances in size of the systems in the state such a ranking would be inappropriate. Rather the evaluation process will be aimed at future actions that State Legislators may consider to improve the operating environment for transit. The trends over the past decade will be examined, looking for patterns of peaks and valleys that affect overall performance. The factors both internal and external that are the foundation for these variables must be identified in order that appropriate State action be taken. The portrayal of performance measures will focus the detailed interview with each transit property on the factors that impact success.

The evaluation process has a number of steps, beginning with the collection of existing data and its verification. Using information available from UMTA and WSDOT a set of indicators will be plotted for each system in the State, going back as far as 1980. The information about each system will be circulated to the transit managers in the State for verification. Is the data base correct? If figures are missing can they be filled in now?

Charts of historical records can then be produced for analytical purposes.

To identify areas of further research and discussion, a two part evaluation will be conducted. First, the Washington State transit properties will be grouped into five divisions. Figure 4 outlines the proposed groupings and the basic characteristics of each property. For each grouping, a set of peer cities has been developed. Using the peer city averages and the measures of other systems in the State, anomalies in the performance of individual systems can be identified. This will provide direction for further research.

FIGURE 4

GROUPINGS OF TRANSIT PROPERTIES

	SYSTEM 2	'89 POP ('000)	'89 VEH		'89 RIDERSHIP ('000)
GROUP A	METRO SEATTLE	1414	BUS 1096	VAN 235	92,347
GROUP B	PIERCE	531	BUS 150	VAN 20	10,506
	COMMUNITY	350	BUS 159	VAN	4,023
	SPOKANE	352	BUS 130	VAN 36	6,670
GROUP C	C-TRAN	192	BUS 75	VAN 7	2,747
	KITSAP	121	BUS 84	VAN 36	2,398
	BEN FRANKLIN	117	BUS 50	VAN 17	2,312
GROUP D	INTERCITY	87	BUS 40	VAN 10	2,216
	EVERETT	70	BUS 32	VAN 5	1,291
	GRAY'S HARBOR	63	BUS 28	VAN 18	1,142
	CLALLAM	52	BUS 27	VAN 6	599
	WHATCOM	60	BUS 27	VAN 11	1,660
	YAKIMA	50	BUS 18	VAN 3	1,228
	VALLEY	41	BUS 15	VAN 1	721
GROUP E	PULLMAN	23	BUS 8	VAN 2	652
	PACIFIC	17	BUS 11	VAN 5	161
	COMMUNITY URBAN	40	BUS 6	VAN	287
	ISLAND	32	BUS 8	VAN 3	331
	JEFFERSON	18	BUS 7	VAN 3	176
	TWIN TRANSIT	18	BUS 6	VAN	188
	PROSSER	4	BUS 4	VAN	17

*Data Source

1989 Summary - Public Transportation Systems in Washington State -
 December 1990, WSDOT
 1989 APTA Membership Directory

Figure 5 lists the peer city properties with characteristics most closely resembling the Washington groupings. A similar set of performance data will be developed for these cities and an average measure calculated for each indicator. These will be used as a yardstick to gauge the unique aspects of this State's transit properties.

**FIGURE 5
GROUPINGS OF PEER CITY TRANSIT PROPERTIES**

	SYSTEM 2	'89 POP ('000)	'88 VEH		'88 RIDERSHIP ('000)
GROUP A	HOUSTON, TX	2,700	BUS 1027	VAN 176	64,425
	PITTSBURG, PA	1,810	BUS 925	VAN 339	79,243
	MINN, MN	2,200	BUS 1091	VAN	71,272
	ATLANTA, GA	1,613	BUS 871	VAN 20	82,345
GROUP B	READING, PA	312	BUS 57	VAN 51	4,371
	AKRON, OH	364	BUS 130	VAN 73	5,542
	SPRINGFIELD, MA	300	BUS 150	VAN 77	5,749
	FRESNO, CA	331	BUS 92	VAN 12	8,372
	BIRMINGHAM, AL	400	BUS 120	VAN 18	6,293
GROUP C	TALTRAN, FL	127	BUS 63	VAN 11	3,595
	ROCK ISLAND, IL	129	BUS 58	VAN	2,338
	ANN ARBOR, MI	208	BUS 65	VAN 33	3,649
	DULUTH, MN	139	BUS 100	VAN 5	3,221
	SALEM, OR	145	BUS 48	VAN	2,380
GROUP D	POCATELLO, ID	55	BUS 13	VAN 5	146
	BLOOMINGTON, IN	54	BUS 16	VAN 3	523
	ST. CLOUD, MN	58	BUS 19	VAN 7	1,217
	JOHNSON CITY, TN	50	BUS 11	VAN 9	485
	CHARLOTTESVILLE, VA	60	BUS 16	VAN	753
GROUP E	ITHACA, NY	28	BUS 9	VAN	790
	NEW CASTLE, IN	20	BUS 7	VAN	98

Sources: APTA 1989 Transit Operating and Financial Statistics
 APTA 1989 Membership Directory

PUBLIC TRANSPORTATION STUDY

Task 3A

FEDERAL, STATE AND LOCAL
POLICY ISSUES

Prepared for:

STATE of WASHINGTON

The Legislative Transportation Committee

Prepared by:
Gannett Fleming

in association with:

Moss Adams (Management Design Associates)
Mr. William H. Ostenson
Booz • Allen & Hamilton
Berk and Associates

September 5, 1991

**FEDERAL, STATE AND LOCAL POLICY ISSUES
PUBLIC TRANSPORTATION STUDY**

TABLE OF CONTENTS

Abstract - Federal, State and Local Policy Issues	1
I. Federal, State and Local Policy Issues	3
A. Introduction	3
B. Americans with Disabilities Act (ADA)	4
C. Transportation Demand Management (SSHB 1671)	7
D. "Buy America" Law	9
E. The Federal Clean Air Act and the Washington State Clean Air Act	10
F. Transportation Policy Plan for Washington State	13
G. Growth Management	15
H. High Capacity Transit	17
I. State Transportation Commission	19
J. Environmental Protection Agency Guidelines	22
K. State Energy Policy	23
L. Social Service Programs	24
M. Environment 2010	27
II. Conclusions	30

Abstract - Federal, State and Local Policy Issues

This paper discusses the relationship of public transportation to federal, state, and local goals, objectives, and services. As such, this paper fulfills the Task 3A component of the LTC's Public Transportation Study. Included in this discussion are summaries of:

- ADA;
- TDM;
- "Buy America" Law;
- Federal and State Clean Air Acts;
- State's Transportation Policy Plan;
- Growth Management;
- High Capacity Transit;
- State Transportation Commission;
- Environmental Protection Agency Guidelines;
- State Energy Policy;
- Social Service Programs; and
- Environment 2010.

Each item is summarized in this report and the major implications for public transportation are identified. Those items discussed below in this abstract have the greatest implications for public transportation.

Federal Policy Issues

The Americans with Disabilities Act of 1990 impacts public transportation agencies in a number of ways. There are regulations relating to the acquisition of accessible vehicles and requirements for complementary paratransit by public agencies operating fixed route services for persons who cannot board, ride or disembark from accessible vehicles. The legislation does not provide funds with which to comply with the Act's requirements. Therefore, costs associated with implementation will have to come from other sources and will have to be borne by the transit agencies.

The federal Clean Air Act Amendments of 1990 made changes which require states to play an increasingly important part in the implementation and funding of federal air quality policy. The Act, in part, requires a reduction in urban ozone emissions, limits on particulate emissions, engine rebuilding requirements, and limits on the sulfur content of diesel fuel.

State Policy Issues

Transportation Demand Management legislation was passed in 1991. This legislation stated that automotive traffic is the major source of emissions of air contaminants and that increasing automotive traffic is also aggravating traffic congestion. In urban counties, employers of more than 100 must reduce single-occupancy trips by 15 percent by 1995, 25 percent by 1997, and 35 percent by 1999.

The Washington State Clean Air Act, adopted in 1991, mandates a sweeping series of steps to implement the federal Act and improve the quality of the air we breathe by setting standards for the reduction of ozone, particulate emissions, and the sulfur content of diesel fuel.

Washington's State Transportation Policy Plan contains recommendations regarding the development of statewide transportation policies. These policies reflect the mission of providing safe, efficient, dependable, and environmentally-responsive transportation facilities and services.

Washington's new Growth Management Act sets a new planning framework in which transportation planning and land use planning are closely linked. State law requires that counties (and cities within the counties), subject to the Act, adopt comprehensive plans by July 1, 1993. There are specific requirements for the provision of transportation improvements concurrently with development activity.

The High Capacity Transit legislation (adopted in 1990 and amended in 1991) defined high capacity as "a system within an urbanized region operating principally on exclusive rights-of-way...which provides a substantially higher level of passenger capacity, speed, and service frequency than traditional public transportation systems operating principally in general purpose roadways". Eight urban counties are authorized to impose a broad range of local option taxes for financing system development. High Capacity Transportation Account funds (derived from a shift in Motor Vehicle Excise Taxes) are also available for HCT planning costs.

I. Federal, State and Local Policy Issues

A. Introduction

Public transportation services that are provided in the 21 jurisdictions (soon to be 22) within the State of Washington exist in a complex policy and regulatory environment. Actions at all levels of government have impact on the efficiency and effectiveness of transit services as well as on the governance structure that provides direction to them. Many of the regulatory functions of the Urban Mass Transportation Administration have become determinants of transit management strategies throughout the nation. These regulations have shaped the operating and administrative procedures of public transit agencies for the past decade.

New policy initiatives that have been introduced at both the federal and state levels are about to have more far reaching impacts on transit operations. Congress and the Washington State Legislature have enacted laws that create new demands for transit service and specify compliance methods. A survey of the State's transit agencies and industry representatives generally has identified those measures that are likely to have the greatest impact. A total of 15 public policy initiatives or regulations have been summarized in the following paper. These range from the Federal Clean Air Act and Americans with Disabilities Act (ADA) to the State's Growth Management Act.

A significant element of the transit legislative environment that is not included in this summary is the Surface Transportation Act. This piece of legislation, currently undergoing revisions and reauthorization, is the subject of a separate interim report.

The summaries of state and federal policies provide an overview of the relationship between the law and transit operations management in Washington State. Following the 15 summaries, an evaluation of the collective impacts of these actions is presented. In this final section there is no attempt to quantify the fiscal impacts of such measures as ADA (since the regulations are not yet available) or the Clean Air mandate (due to incomplete local responses). However, the areas of impact and the considerations for policy makers at the State level are presented qualitatively for review. This will be particularly important in light of the stated intent of the Surface Transportation Act drafts to place greater reliance on the state level for program oversight.

B. The Americans with Disabilities Act (ADA)

The Americans with Disabilities Act of 1990 was signed by President Bush in July of 1990. While certain provisions of the Act are already in effect, others will be phased in over several years. Implementation Plans by local transportation agencies are required to be developed and in place by early 1992.

The ADA statute is strongly considered to be a landmark civil rights bill rather than a transportation bill. It is designed to open all aspects of American life to individuals with disabilities. These include employment opportunities, state and local governmental services, public accommodations, telecommunications, as well as transportation services. As a civil rights law, civil fines and injunctive relief are available to those who successfully litigate a claim of discrimination against a transportation agency "in connection with the provision of its transportation services for the general public."

At the federal level, the Department of Transportation published its final rule to implement the transportation portions of the ADA on September 6, 1991. In addition to the Department of Transportation, the Equal Employment Opportunity Commission, the Department of Justice, the Architectural and Transportation Barriers Compliance Board, and the Federal Communications Commission all issue regulations to carry out the ADA. Because the new rules have not been tested in practice and the required plans are in the development phase, many of the potential additional costs incurred by the implementation of the ADA will remain uncertain for some time. It is a certainty, however, that transit agencies in Washington State, as well as all their counterpart jurisdictions throughout the nation, will face substantial additional costs which are not recoverable from any existing or proposed federal legislation.

The following points regarding the provisions of the ADA will provide some general guidance or "flavor" with regard to the directions mandated by the ADA.

1. Accessible Vehicles

The U.S. Department of Transportation has published regulations relating to the accessible vehicle acquisition requirements of the ADA. Highlights include:

- When public entities acquire new, used, or remanufactured buses and rail vehicles for fixed route service, the vehicles must, with few exceptions, be accessible to individuals with disabilities, including individuals who use wheelchairs.
- Public entities operating demand responsive service must acquire a sufficient number of accessible vehicles to be able to provide equivalent service to individuals with disabilities.
- Private entities (such as non-profit or for-profit social service agencies) also have to acquire accessible vehicles. In many cases, the precise requirements depend upon whether the private entity is primarily engaged in the business of transporting people, the size of the vehicle, the type of service provided (demand responsive or fixed route), and whether existing service to individuals with disabilities is equivalent to service for other persons.

2. Complementary Paratransit

The ADA requires public entities operating fixed route transportation service to provide paratransit as a complement to their fixed route service. This paratransit service, intended for people with disabilities which makes them unable to use accessible fixed route transportation, must be comparable to the fixed route system. The following categories of individuals would be "Paratransit Eligible:"

- Persons who cannot board, ride or disembark from accessible vehicles.
- Persons who are in a situation in which the interaction of barriers in the environment and the person's disability prevent the person from getting to or from a stop.
- A transitional category of persons who can use accessible transportation but who do not yet have accessible transportation available to them on the route they must use.
- In addition, one companion and a personal care attendant can accompany each Paratransit Eligible person to assist that person; each public transit agency would have a process for determining eligibility; and, Paratransit Eligible persons would be eligible for service in other cities to which they travel, as well as at home.

With regard to service criteria, service must be provided during the same days and hours as fixed route service; next day service would be provided in response to a call for service; and, there could be no restrictions based on trip purpose, the number of trips, or capacity constraints. Fares may not be more than double the full fare for a similar fixed route trip. Paratransit must serve origins and destinations within corridors three-fourths of a mile wide on each side of a bus route. Finally, there could not be any administrative capacity limits, such as waiting lists or limits on trips per month.

3. Planning Process

The Act and regulations provide that each public entity is required to provide complementary paratransit would submit a paratransit plan to the Urban Mass Transportation Administration by January 26, 1992. Transit providers must begin to implement their plans by the same date. The transit providers would consult with the public and hold a hearing during the plan preparation period. UMTA would review the plans and order changes to be made, if necessary. A transit agency is permitted to request an "undue financial burden" waiver, and UMTA will consider them on a case by case approach, based on ten factors. These factors include impacts on fares and services, available resources and budget impact, per capita trips to fixed route and ADA eligible complementary paratransit passengers, efficiencies that could be or have been put in place, and unique local circumstances.

4. Costs

Because few cost assessments have been made to date, and much of the regulatory framework which would impact costs is not yet in place, it is difficult to predict specific costs of implementation at this time; however, it is possible to put forth a few generalizations:

- A Regulatory Impact Analysis has been completed by the USDOT to estimate the costs of providing the service required by the ADA. The projected costs for all ADA transportation requirements under the proposed regulations range between \$850 million and \$1.3 billion per year. The single largest component of this cost is complementary paratransit, estimated to range between \$590 million and \$940 million annually.
- Because of the greatly expanded scope of the ADA over existing federal requirements, costs among the public transportation agencies in the State of Washington are likely to grow

significantly as a result of the new federal requirements. Seattle's METRO, for example, has made preliminary estimates that the requirements of Paratransit will grow to between \$23 and \$24 million per year by 1997 (compared with approximately \$2 million for 1991).

5. Acknowledgements

U.S.D.O.T. "Fact Sheet" on the ADA Final Rule

Miscellaneous Articles from "Passenger Transport"

Article from "U.S. News and World Report", September 18, 1989

"ADA: What it says", by John L. Wodatch, "Worklife", Fall, 1990

C. Transportation Demand Management (SSHB 1671)

The 1991 Regular Session of the Washington Legislature passed new legislation which addressed long- and short-term issues relating to the reduction in air contaminants and congestion, and in part moved toward meeting the requirements of the Federal Clean Air Act and its 1990 Amendments. More specifically, the Legislature found, to paraphrase:

- The Legislature finds that automotive traffic in Washington's metropolitan areas is the major source of emissions of air contaminants. This air pollution causes significant harm to public health, causes damage to trees, plants, structures, and materials and degrades the quality of the environment.
- Increasing automotive traffic is also aggravating traffic congestion in Washington's metropolitan areas. This traffic congestion imposes significant costs on Washington's businesses, governmental agencies, and individuals in terms of lost working hours and delays in the delivery of goods and services. Traffic congestion worsens automobile-related air pollution, increases the consumption of fuel, and degrades the habitability of many of Washington's cities and suburban areas. The capital and environmental costs of fully accommodating the existing and projected automobile traffic on roads and highways are prohibitive. Decreasing the demand for vehicle trips is significantly less costly and at least as effective in reducing traffic congestion and its impacts as constructing new transportation facilities such as roads and bridges, to accommodate increased traffic volumes.

- The Legislature also finds that increasing automotive transportation is a factor in increasing consumption of gasoline and, thereby, increasing reliance on imported sources of petroleum. Moderating the growth in automotive travel is essential to stabilizing and reducing dependence on imported petroleum and improving the nation's energy security.
- The Legislature further finds that reducing the number of commute trips to work made via single-occupant cars and light trucks is an effective way of reducing automobile-related air pollution, traffic congestion, and energy use. Major employers have significant opportunities to encourage and facilitate reducing single-occupant vehicle commuting by employees.
- The intent of this (law) is to require local governments in those counties experiencing the greatest automobile-related air pollution and traffic congestion to develop and implement plans to reduce single-occupant vehicle commute trips. Such plans shall require major employers and employers at major worksites to implement programs to reduce single-occupant vehicle commuting by employees at major worksites. Local governments in counties experiencing significant but less severe automobile-related air pollution and traffic congestion may implement such plans. State agencies shall implement programs to reduce single-occupant vehicle commuting at all major worksites throughout the state.

1. Implementation Plans

In brief, Transportation Demand Management (TDM) is the concept describing transportation strategies for reducing the number of vehicles on the roads and highways, particularly single-occupant vehicles. Examples of the strategies are car pool and van pools, improved fixed-route service, employer subsidized transit passes, and parking fees at market rates.

The program will apply to counties whose populations are greater than 150,000 and to any other counties which chose to participate. Currently, King, Pierce, Snohomish, Clark, Spokane, Kitsap, Thurston, and Yakima counties are included. In applicable counties, all public and private employers with 100 or more employees who commute during rush hour must develop a program for reducing the number of single-occupancy vehicle miles by their employees. Employers must reduce single-occupancy vehicle miles by 15 percent by 1995, 25 percent by 1997, and 35 percent by 1999.

A statewide Commute Trip Reduction Task Force composed of representatives of local, state and private employers or owners of major work sites, and private citizens must establish guidelines for the counties and cities to ensure their consistent implementation of Transportation Demand Management goals.

Commute trip reduction plans adopted by local jurisdictions must be consistent with state or regional transportation plans and local comprehensive plans, and must be coordinated with adjacent jurisdictions. Interagency or interlocal agreements are encouraged.

2. Funding

Certain funding can be made available from the State Clean Air Act and from a clean air excise tax on vehicles of \$2.25 per year.

The law has the potential of substantially increasing costs for local transit systems depending on local circumstances. For example, if the transit agency becomes the "lead agency" for TDM development, or if it needs additional equipment or additional hours of operation because of additional ridership demand, costs could increase more than additional farebox revenue. Also, if "transfer payments" are not made from employers, local governments, or state and local transportation revenues to transit agencies to reimburse them for additional costs of providing increased conventional transit services, additional costs will be incurred.

3. Acknowledgments

METRO Transportation Committee Briefing Outline - June 18, 1991

Final House Bill Report on 2SHB 1671

"Passenger Transport" articles

"Transportation Planning Provisions Under the New Clean Air Act", presentation by Ann Martin, King County Department of Public Works

D. "Buy America" Law

The "Buy America" provisions of the Urban Mass Transportation Administration authorizing legislation were adopted many years ago to provide a preference for public transportation purchases that had a preponderance of domestic content.

The most recent changes were adopted in 1987 in an UMTA effort to provide further definition and consistent interpretation of the domestic content rules.

The basic law and regulations provide that if a domestic transit agency purchases a manufactured product with federal assistance, the product must be 100 percent manufactured in the United States. However, there is a significant exception for "rolling stock", which would include buses, passenger rail cars, or any other vehicles which are self-propelled, as well as related equipment, such as trackside sensors, radios, etc.

If there is a mix of domestic and foreign bids on "rolling stock", domestic bids are entitled to a 25 percent favorable differential in the bid evaluation process.

If all bids are of foreign origin, UMTA funding will not be available unless at least 50 percent of the cost of the components are of U.S. origin and final assembly takes place in the U.S. For a component to be considered of U.S. manufacture, at least 50 percent of the cost of its subcomponents must be of U.S. origin. The typical configuration in current purchases involves assembly of bodies or shells off-shore, and final assembly and the addition of domestic components in the U.S.

While it is generally useful to describe the basic rules of this UMTA requirement, it applies to all transit agencies throughout the United States, so it is set forth as universally illustrative of the federal requirements that must be complied with to receive federal resources.

1. Acknowledgements

Articles in "Passenger Transport"

Telephone Discussion with Ed Gill, Asst. General
Counsel of APTA

CFR's interpreting Domestic Content Legislation

E. The Federal Clean Air Act and the Washington State Clean Air Act

The Federal Clean Air Act Amendments of 1990 were signed into law in November of 1990, and made a number of important changes to the 1970 Clean Air Act, including modifications which mandate states to play an increasingly-important role in implementation and funding of federal air quality policy.

The Washington State Clean Air Act was adopted by the Legislature during its 1991 regular session. It mandates a sweeping series of steps to implement the Federal Act and improve the quality of the air we breathe.

1. Key Provisions of The Federal Act

- To reduce urban smog, of which ozone is a prime component. The Act classifies ozone nonattainment areas and requires that states prepare SIP's (State Implementation Plans) to reduce ozone-causing emissions.
- Particulate emission limits for urban buses will be reduced by more than one-half in 1993 and one-half again in 1994. If EPA tests find that the standards are not being met, urban buses operating in areas with a 1980 population of more than 750,000 must use low-polluting fuels.
- Presently, operating urban buses serving areas with more than 750,000 in population which have their engines replaced or rebuilt after January 1, 1995, must meet a particulate emission standard yet to be developed by the EPA. The regulation setting this standard must also reflect the "best retrofit technology and maintenance practices reasonably achievable."
- The sulfur content of diesel fuel cannot exceed one-half of one percent after October 1, 1993.
- The clean air legislation also requires conformity on a nonattainment area's transportation plan, sanctions on nonattainment areas that do not submit State Implementation Plans, and reports on transportation and air quality. The Act calls for EPA and the U.S. Department of Transportation to update guidelines estimating the emissions reduction potential of improved public transit, trip-reduction ordinances, employer-based transportation management plans and incentives, and programs to reduce the need for single-occupant vehicle travel.

2. Key Provisions of the Washington State Act

In its adoption of the Act, (ESHB 1028 - 1991 Regular Session), the Legislature made several key findings which govern the thrust of the specific findings:

- The Legislature finds that ambient air pollution is the most serious environmental threat in Washington State. Air pollution causes significant harm to human health; damages the environment, including trees, crops, and animals; causes deterioration of equipment and materials; contributes to water pollution; and degrades the quality of life.
- Over three million residents of Washington State live where air pollution levels are considered unhealthful. Of all toxic chemicals released into the environment more than half enter our breathing air. Citizens of Washington State spend hundreds of millions of dollars annually to offset health, environmental, and material damage caused by air pollution. The Legislature considers such air pollution levels, costs, and damages to be unacceptable.
- It is the intent of this Act that the implementation of programs and regulations to control air pollution shall be the primary responsibility of the Department of Ecology and local air pollution control authorities (Section 101).
- While Washington State has had a framework of air pollution statutes and regulations for a number of years, much of the new 1991 law was for the purpose of implementing the provisions of the Federal Clean Air Act.

3. Impact of New Clean Air Statutes

- Urban diesel-powered buses are included in both the inspection programs and in the pollution reduction provisions of the federal legislation.
- Considerable research has been conducted on alternative fuels, including methanol, propane, compressed natural gas and liquified natural gas, as well as cleaner burning diesel fuel.
- Research has also been directed at improving engine technology by both manufacturers and individual transit systems.
- The new federal legislation regulating particulates and sulphur content will increase diesel fuel costs, although it is difficult to make estimates of precise costs at this juncture. Costs several years away will be impacted by changes in fuel quality regulations if the mitigation regulations do not result in the

needed reduction in pollutants. The costs of increased standards for buses requiring engine replacement after 1994 are also difficult to estimate at this time. It is the case, however, that all of these costs will be significant for many systems in the State of Washington.

- The intent of the 1990 federal legislation is to make air quality planning a continuous and integral part of transportation planning. The law links the development of transportation programs directly to the success of regional air quality plans, in that if transportation programs are not successful in achieving the emissions reductions required from mobile sources, new highway projects or other projects or other facilities using federal funds would not be able to proceed. This new relationship, coupled with changes in laws and strategies which require a strong integration between transportation plans and land use plans, have made it necessary for transit agencies to add staff to address these additional requirements for planning and integration.

4. Acknowledgments

Articles in "Passenger Transport"

ESHB 1028

PSCOG staff memos

Final Bill Report

F. Transportation Policy Plan for Washington State

Since its beginning in early 1988, the State Transportation Policy Plan process has assisted in the preparation of statewide policy recommendations to direct future decision making throughout Washington's transportation systems. R.C.W. 47.01.071 directs the Transportation Commission to develop statewide transportation policies, and a State Transportation Policy Plan Steering Committee, which represents a broad range of disciplines and interests in and out of state government, has been making recommendations for action to the Transportation Commission since the inception of this process. The Committee, which is appointed by the Secretary of Transportation, is staffed by the Washington State Department of Transportation.

1. Mission and Goals of the Policy Plan

The 1990 Transportation Policy Plan for Washington State set forth the following Mission: "Provide safe, efficient, dependable, and environmentally-responsive transportation facilities and services..."

The Policy Plan Goals include: "Promoting a positive quality of life by ensuring mobility alternatives that provide safe, reliable and convenient access...for all citizens in urban and rural environments, and reinforce a sense of community statewide; contribute to the economic vitality of the state providing cost-effective accessibility for goods and people to work and commerce centers; by linking land use development directly with transportation system development;...; and, by helping to revitalize blighted urban and economically isolated rural areas in the state; protect the natural environment and improve the built environment by conserving scarce resources and reducing pollutants and other waste by-products of transportation systems. They also call for facilitating inter-jurisdictional and regional coordination and clearly connects land use planning and transportation planning..."

The 1991 report adds new transportation policy recommendations to the existing statewide guidelines in three important issue areas: Environmental Protection and Energy Conservation; Transportation Programming; and Transportation Finance.

2. Environmental Quality and Natural Resource Issues

These issues have been grouped by the report into the following areas: Air quality, water quality, habitat protection, wetlands conservation, use of hazardous substances, visual quality, noise abatement, and use of non-renewable energy resources.

3. Transportation Programming

The 1991 Report goes on to outline recommendations on the coordination of transportation programming, the role of the local Six-Year Transportation Improvement Programs, and priority programming for local governments.

4. Transportation Finance

Policy recommendations have been set forth in the 1991 Report to address: Use and dedication of transportation user revenue sources; local flexibility; revenue sources; transportation use patterns; needs definition; and jurisdictional and modal cooperation.

5. Future Policy Development Agenda

The Policy Plan workplan identifies three new issue topics requiring high-priority attention: transportation demand/systems management; privatization and joint development; and special needs transportation. In addition, the Transportation Commission identified two other areas for study in February 1991: land use and transportation linkages; and transportation systems of statewide significance.

6. Acknowledgments

1990 Transportation Policy Plan

1991 Transportation Policy Plan

"Transportation Futures", May 1991

G. Growth Management (SHB 2929 Chapter 17, Laws of 1990 E1) (ESHB 1025 Chapter 32, Laws of 1991 E1)

The two major growth management bills (coupled with the new Clean Air and Transportation Demand Management statutes) set a new planning framework in which transportation planning and land use planning are closely linked by state law. While it is certain that these new laws will have a significant impact on Washington's transit agencies, it is most difficult to estimate that impact until regulations and the formal transportation planning process moves forward.

The Growth Management Act requires that counties with a population of at least 50,000 and growth of at least 10 percent over the last 10 years, or counties of any size with at least 20 percent growth over the last 10 years must meet the various growth management provisions. (The law also applies to cities within these counties.) A county not required to comply may opt to put itself and the cities within the county under the terms of the Act. Twelve counties are required to plan under the statute, and a number of others have decided to participate voluntarily.

Counties and cities required to plan under the Act must adopt comprehensive plans by July 1, 1993, and zoning ordinances must be consistent with and implement the plan within a year from the adoption of these comprehensive plans. The adopted plans are required to include:

- Urban growth areas designated by each county after consultation with cities. Each city's comprehensive plan must allow urban densities, while a county's comprehensive plan must allow urban densities within urban growth areas, and only allow growth outside of urban growth areas if it is not urban in nature;
- Natural resource lands;
- Critical areas; and
- Other planning elements include land use, housing, capital facilities, utilities, transportation, and, for counties, a rural element. Perhaps most importantly, the transportation element includes specific requirements for the provision of transportation improvements concurrently with development activity.

1. Transportation Planning

The Growth Management Act requires that the comprehensive plans must be internally consistent, and the elements relating to transportation facilities must be consistent with and coordinated with land use elements.

The Act authorizes Regional Transportation Planning Organizations (RTPO's), which are voluntary associations of local governments within a county, or within geographically contiguous counties. The RTPO's are to certify that local comprehensive plans are consistent with regional transportation plans, develop a regional transportation plan, and assist the state Department of Transportation in ensuring that regional transportation plans are consistent across the state.

As of May, 1991, twelve RTPO's have been initiated, which cover 30 of Washington State's 39 counties, with several more locations under active consideration. Within the growth management framework, this requirement that localities plan together for transportation and land use represents a major institutional change.

2. Potential Impacts on Transit Agencies

It is apparent that the planning requirements adopted by the Legislature over the past three years are highly likely to result in important new missions, responsibilities, challenges, and opportunities for the transit agencies. Some of these might include:

- The mandated responsibility to actively participate in the transportation and land use planning processes;
- Providing additional service to and among Urban Growth Areas;
- Broadening or protecting sources of revenue by being "at the table" when decisions are made which impact the costs of providing transit services.

3. Acknowledgments

Final Bill Report

Articles in "Passenger Transport"

Legislative Bill Analyses - WSDOT

H. High Capacity Transit (Chapter 43, Laws of 1990) (ESHB 1677, 1991 Regular Session) (ESHB 2151, 1991 Regular Session)

In its 1990 session, the Legislature established state policies relating to high capacity transportation planning and development, and to encourage intercity passenger systems. In the 1991 session, amendments were adopted to clarify the state role and more closely integrate its provisions with the intent of the Growth Management Act.

The Legislature has mandated that local government should be responsible for the coordination for high capacity transit policy development, program planning, and implementation. Local agencies are directed to cooperate in encouraging land uses compatible with high capacity transit development and to improve local land use and transportation planning decisions.

A high capacity transportation system has been defined by the Legislature as "a system of public transportation services within an urbanized region operating principally on exclusive rights-of-way, and the supporting services and facilities necessary to implement such a system, including high occupancy vehicle lanes, which taken as a whole, provides a substantially higher level of passenger capacity, speed, and service frequency than traditional public transportation systems operating principally in general purpose roadways."

1. Local Option Taxes for System Development

The Counties of King, Pierce, Snohomish, Thurston, Clark, Spokane, Kitsap, and Yakima are authorized to impose voter approved taxes for financing the development of high capacity transit systems. The local option taxes include an up to one percent sales tax, an up to 8/10th of one percent motor vehicle excise tax, and a \$2.00 per month per employee tax on employers. Before any transit agency or agencies can impose any of these taxes, they must comply with the planning requirements set forth in the legislation.

2. High Capacity System Planning

Funds for high capacity system planning by transit agencies are derived from the High Capacity Transportation Account (HCTA). This account is funded through a reduction in the amount of MVET from 0.89 percent to 0.7824 percent for which public transportation agencies located in King, Pierce, Snohomish, Thurston, Clark, Spokane, and Kitsap counties can qualify. Funds in this account may be used to provide up to 80 percent in matching assistance for HCT planning costs.

With regard to the planning process, Expert Review Panels are required in areas carrying out High Capacity Transit planning for the purpose of evaluating the forecasts, cost estimates, and conclusions of the analysis of alternatives. The Panels are appointed jointly by the governor, the secretary of transportation, and the chairperson of the Legislative Transportation Committee. Membership may range from five to ten as established by the Legislature. For planning processes that include counties adjoining another state or nation, the Panels are to be selected cooperatively with representatives of the adjacent nation or state.

For HCT planning in the Central Puget Sound Region, the creation of a Joint Regional Policy Committee is mandated. The Committee is to consist of locally elected officials serving on transit system boards, and representation is proportional, based on population. Transit systems outside the Central Puget Sound Region may designate a Metropolitan Planning Organization for HCT planning to reduce overlap or duplication.

3. Public Votes

With regard to public votes to authorize local taxes, the legislation defines and differentiates system planning from project planning, and authorizes a vote prior to the detailed identification of alignments, station locations, equipment and systems, construction schedules, costs and environmental effects. (The Expert Review Panels focus their attention on system planning rather than project planning.)

Funding from more than one of the local option tax sources may be on the same ballot, and MVET rates need not be uniform in all counties within a system.

4. Acknowledgments

Final Bill Reports

LTC Bill Summaries

I. State Transportation Commission

1. Long and Short Term Goals and Their Applicability to the State's Transit Districts

The State Transportation Commission has adopted several goals as a means of addressing critical transportation policy issues in the State of Washington.

In their status report dated May 15, 1991, the Commission identified: the term of the goals, either short or long; whether legislation is required for implementation; if funding is available; and the schedule for implementation of the goals.

Nineteen transportation program goals and ten public relations goals have been adopted by the Commission. Of these, eight transportation and five public relations goals were designated as high priority.

In general, the Transportation Commission goals do not require specific actions from the transit districts. In fact, transit is never specifically mentioned in the goals. However, "opportunities" for transit district involvement exist, or are implied, in the various goals. The opportunities fall into three categories:

- Support of the goals;
- Coordination with the Commission or other agencies; and
- Active participation.

Again, though not expressly stated in the goals, the items listed below present opportunities for the districts to involve themselves, to have a voice, in the planning and implementation processes that will establish a wide range of Statewide transportation policies.

2. Policy Support

As indicated, district involvement may simply consist of supporting the Commission's goals. The attached chart identifies six goals in this category. For example, districts could "support" the Commission's goals to:

- "Establish environmental policies for the Washington State DOT;" or
- "Develop policies on land use decisions and transportation needs;" or
- "Support the development and implementation of the most cost effective and feasible solutions to transportation needs throughout the state."

"Support," in this regard, would include acknowledgement and/or perhaps written support or endorsement (or disapproval) of the Commission's position.

3. Agency Coordination

Transit districts may want to participate to a greater extent in the development and implementation of other Commission goals. Three goals have been identified for which this level of interaction may be appropriate. For example, with the goal to:

- "Support the concept of growth management processes to minimize the need for additional transportation facilities,"

It may be beneficial for the transit districts to provide input/feedback into the process of determining which transportation facilities may or may not be needed. Districts may also want to coordinate their efforts with other agencies in their area in this effort.

Another example of this type of goal would be to:

- "Encourage and motivate other state government agencies, as employers, and selected major private sector employers to be leaders in instituting transportation demand management programs."

In this instance, transit districts, if they choose to involve themselves, would need to coordinate their efforts with other agencies in their jurisdiction that may also contemplate leadership roles in instituting TDM programs.

4. Active Participation

The final category involves active participation on the part of transit districts. Four goals were placed in this category. Examples of this type include the goal to:

- "Conduct periodic surveys to determine the public's opinion on existing and potential new transportation services and use results in the Transportation Policy Planning Process."

Most districts presently conduct an evaluation of their services, including rider and public opinion surveys. A duplication of effort be eliminated if the districts coordinated their survey efforts with those intended by the Commission.

Another example of this type of category is the goal, mentioned above, to encourage other agencies to be leaders in TDM activities. In this instance, the districts have the chance to "actively participate" in the Commission's goal by leading the institution of TDM programs within their own district, as well as being designated as the review agency within their jurisdiction that is responsible for approval of all TDM plans. At the very least, the districts may want to coordinate with the responsible agency in their jurisdiction in developing the local TDM program and strategies to ensure that transit service will meet new rider demand in a timely manner in order to retain these new riders.

As indicated, the Transportation Commission's goals do not specifically identify transit's role in implementation of their strategies. The adopted goals do, however, provide several opportunities for transit to influence the direction and effectiveness of the Commission's policy implementation and to insure that the Commission's expectations are coordinated with transit district plans and the resources with which they can accomplish their objectives.

It should be noted that some of the items listed above overlap with other state policies. For example, some of the Commission's goals relating to TDM efforts are also part of the recently enacted TDM legislation. Therefore, based on the TDM legislation, transit districts may already have intentions (or may be required) to actively participate in TDM activities and would automatically be in support of the Commission's efforts.

J. Environmental Protection Agency Guidelines

1. EPA Guidelines and Their Applicability to the State's Transit Districts

The U.S. Environmental Protection Agency (EPA) is responsible for implementing federal laws that protect the environment. Nine comprehensive environmental protection laws are under EPA authority including: the Clean Air Act; the Clean Water Act; the Safe Drinking Water Act; the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund); the Resource Conservation and Recovery Act; the Federal Insecticide, Fungicide, and Rodenticide Act; the Toxic Substances Control Act; the Marine Protection, Research, and Sanctuaries Act; and the Uranium Mill Tailings Radiation Control Act.

Of the nine environmental laws listed above, four are applicable to transit districts and their operations. These include: the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, and the Resource Conservation and Recovery Act.

The implications of the Clean Air Act for transit districts are outlined in a separate policy paper. In general, however, districts must comply with the pollutant standards set forth in the Act which regulate carbon monoxide, nitrogen oxides, lead, sulfur dioxides, ozone, and particulates from both stationary and mobile sources. This would include their maintenance facilities and their vehicles. One important aspect of the Clean Air Act that is of significance to transit districts is

the change to alternative fuels and clean-fueled vehicles, a change which will also occur as part of the State of Washington's Clean Air Act. Greater specification of these acts are outlined in the separate summary of the Clean Air Acts.

Transit districts need to also comply with regulations set forth in the Clean Water Act and the Safe Drinking Water Act. Aspects of these acts that pertain to transit districts include the control of toxic pollutants and the reduction of pollutants in runoff. These regulations are not new: the Safe Drinking Water Act was passed in 1974 and the Clean Water Act in 1972, with amendments in 1977, 1981, 1987, and 1988. Therefore, districts are most likely currently or in the process of observing the standards set forth in those laws in their general course of business. As a result, no new demands are expected to be placed on the districts regarding these regulations.

Districts must also comply with waste disposal regulations set forth in the Resource Conservation and Recovery Act (enacted in 1976) and those regulations which relate to underground storage systems (developed in 1984). As with the clean water regulations, these laws are not new and therefore the districts are most likely in compliance. However, since the underground storage regulations include requirements for tank registration, leak detection, and leak prevention, the districts will, if they are not already, need to monitor their storage tanks on an on-going basis to ensure compliance with every aspect of the law.

With the exception of the recent Clean Air Act amendments and aspects of the underground storage regulations with which districts may not be in compliance, none of the EPA guidelines are expected to significantly affect transit districts and their operations above those impacts for which they have already accounted. As indicated, most of these regulations have been in effect for many years; thus, transit operations will in the majority of cases already have taken the costs of compliance into consideration.

K. State Energy Policy

The State does not presently have a state energy policy. The last policy was developed under the governorship of Dan Evans and has not been updated since then.

Governor Booth Gardner recently signed legislation (ESHB 5245) that directs the State Energy Office to develop an energy plan for the state. The Energy Office staff must bring their energy policy recommendations to the legislature in 1993. This policy plan will, among other factors, address energy trade-offs associated with growth and how people will be moved most efficiently given a defined amount of resources.

A regional organization, the Northwest States Power Planning Council, does have an electricity plan for the four northwest states. The plan projects 20 years into the future and determines the portfolio of resources that are required to meet the electricity needs of these states. The costs of this portfolio, both to the economy and to the environment, are then outlined. This plan has no direct application to transit.

Since no energy policy presently exists at the state level, there is no implication for the state's transit districts.

L. Social Services Programs

Social services are sponsored by several state agencies including the Departments of Social and Health Services (DSHS), Health, Employment Securities, and Community Development. A critical component of the provision of social services is access to the programs.

To ensure access, many social and health programs have found it necessary to sponsor transportation services for their clients. A variety of transportation services has resulted, ranging from self-reimbursement for mileage, to volunteers, to contracts for services with various community providers. There is also a heavy reliance on local transit. Because of the fragmented nature of these services, the costs and ridership of these services is unknown.

Transportation services have been traditionally viewed as supplementary to the primary services provided. Nonetheless, a significant amount of resource is expended annually. In spite of this, the formal role of DSHS and the other entities is unclear. What is clear is the potential impact of access requirements on local transit. Several social service system initiatives merit consideration.

1. Deinstitutionalization

Deinstitutionalization describes a broad-based effort to move clients from institutional arrangements (i.e., nursing homes, mental health hospitals, etc.) into community-based situations. The underlying motives of this effort include lower costs and better environment for the clients.

The Omnibus Reconciliation Act of 1987 (OBRA) is a key piece of legislation related to this process. OBRA directs DSHS to move developmentally disabled (DD) clients from nursing homes to tenant support and other arrangements. A similar example is the State Operated Living Alternatives Program (SOLA) which is moving DD clients from facilities like Fircrest into smaller, state-supervised community facilities.

Clearly, the ability to support clients in community-based facilities is dependent upon being able to access needed services and activities. Transit districts will be called upon to provide some of the necessary services. Transit's ability to accommodate the demand will be dependent upon the location of the community-based facilities, the number of clients, and trip frequencies.

2. Program Reforms and Reauthorizations

Several initiatives are underway to reform or reauthorize key programs. In 1989, the Legislature passed a landmark bill to reform the mental health system in the state. Its purpose was to establish a community mental health program which "shall help people experiencing mental illness to retain a respected and productive position in the community." The bill created a system of regional support networks that are county-based.

The Legislature has recently been considering reform of the long-term care system. House Bill 1569, which passed the House last session, provides for community-based, long-term care and support services for functionally disabled persons (those who have a recognized chronic physical or mental condition or disease, or meet other conditions). HB 1569 identifies transportation as a key issue but it provides no direct funding support. The bill encourages the use of services funded by local taxes (i.e., transit).

The federal Older Americans Act is up for reauthorization this year. There has been extensive public debate about the act, and some effort was made to create a special subtitle for transportation. The current version being considered has no special subtitle. Transportation is recognized as important (particularly in rural areas), but is generally regarded as a support service.

These initiatives are representative of transportation issues surrounding social services. Some funding is provided, but in a fragmented fashion as a support service. Reliance on transit and other community-based services is strongly implied. The role and responsibility of DSHS and other state agencies is unclear.

3. Childcare

Childcare will be a key issue in the 1990's. Availability, cost, and quality are three obvious dimensions of the problem. A fourth dimension is logistics. For most families, the parents will be working. Taking children to childcare will be a barrier for many wanting to choose public transportation. This problem exists also for clients of social and health service agencies. The transporting of children, particularly young children, will present new problems for transportation providers. DSHS is exploring childcare issues in association with its Family Independence Program (FIP) and the new

federal JOBS Programs designed to encourage people to get off welfare. Local transit will want to work closely with DSHS and other state agencies to ensure appropriate services are provided.

4. The DSHS Brokerage Program

DSHS and WSDOT have jointly undertaken a demonstration project to evaluate the potential of instituting a statewide brokerage program. This is being done by DSHS in recognition of the strategic importance of effective transportation services in the provision of access to social and health services.

Title 19 element of the broker operation, which relates to medicaid, is in effect. This program creates regional brokers who receive requests from clients needing access to services, screen the requests for eligibility and needs, and match the request to the lowest cost, most appropriate provider in the community. The intent of the program is to create a "single point-of-entry" for clients, streamline and simplify reporting/billing requirements, ensure economies of scale, and create effective data bases for future planning and management decisions.

Another element of the program that uses the brokers to coordinate more enhanced efforts is pending future funding availability. Despite this, however, Seattle Metro and DSHS are working together to develop a broker program to implement ADA.

In these more enhanced endeavors, public transit is identified both as a sponsor of services and as a provider. As a sponsor, transit would be encouraged to jointly participate in the brokerage by cooperatively contracting for broker services. As a provider, the brokers would endeavor to assign as many trips to transit as would be appropriate to the clients' needs.

The future funding of this program is in doubt, as mentioned above. Support for the program is evident at DSHS, but problems with the general fund create uncertainties about funding a new program. Transit systems may want to be involved, because this may be the best mechanism for establishing a formal role for DSHS.

M. Environment 2010

1. Environment 2010 and Its Applicability to the State's Transit Districts

The Washington Environment 2010 Advisory Committee was formed in December, 1988, to determine the current condition of Washington's environment, to identify critical environmental issues, and to develop strategies to address these issues in the future. The Environment 2010 project is a comprehensive approach to "preventive" management rather than "crisis" management.

Per Executive Order 90-06, the 2010 Advisory Committee prepared a State of the Environment Report and an environmental action agenda. The committee also prepared "A Citizen's Guide to Washington's Environment." These three documents are supplemented by extensive technical reports.

"The State of the Environment Report," released in October, 1989, provides an overview of the research conducted for this project. The report documents the condition of the state's environmental and natural resources and identifies the major threats to those resources. Resources addressed in this report include: air, water, land, wetlands, fish and shellfish, wildlife, and cross-media issues (i.e., those impacts that do not fit neatly into a land "box" or an air "box" but rather have potential impacts on more than one environmental resource).

"Toward 2010: An Environmental Action Agenda," released in July, 1990, summarizes key recommendations for each of the resource areas (air, water, land, wetlands, fish and wildlife, waste management, pesticides, global warming) and discusses the role of education, conservation, and most importantly, implementation of the action agenda. The recommendations state very clearly what needs to be developed, implemented, or monitored but do not always identify the agencies responsible for implementation of the recommendations. Nonetheless, public transit will be expected to be involved in certain aspects of the agenda, most particularly the section entitled, "Clearing the Air: The Challenge of Clean Air."

The Clean Air section identifies key recommendations within four categories: reducing driving, reducing driving-related pollution, reducing pollution from major "area" sources, and further reducing "point source" pollution. Transit will have a role in each the first two of these areas. In the first category, goals include the establishment of employer based incentive and disincentive programs that discourage single-occupant vehicle commuting and the development, in conjunction with WSDOT, of mass transit opportunities that provide competitive alternatives to SOV's. Most of these goals will be met as counties, cities, and transit districts begin to comply with the regulations of the recently enacted TDM legislation (which was derived from Environment 2010). Specific TDM actions required of the transit districts are detailed in the policy component on TDM.

The second category of the Clean Air section includes recommendations to "encourage transitions to cleaner fuels and more fuel efficient vehicles," and "to explore and develop approaches to controlling emissions from diesel powered vehicles." Transit districts will begin to comply with both of these objectives or recommendations as they begin to comply with the federal and state Clean Air Act amendments.

"A Citizen's Guide to Washington's Environment," released in October, 1990, provides an overview of Washington's environment and outlines steps individual citizens can take to improve the environment at home and at work, during recreation, and in their community. The report also provides an extensive list of resources and contacts for further information or opportunities for participation.

Environment 2010, specifically the "Action Agenda," does not contain any specific regulations or directives with which state or local agencies must comply. Rather, the reports contain strategies, recommendations, or suggestions as to what **should** be accomplished by a myriad of

agencies, governments, employers, and individuals in the future to clean up the state's environment. This is exemplified by a statement in the implementation chapter that says: "We *pledge* to move toward the solutions outlined here: to refine them, to debate them, and, ultimately, to implement them" (Action Agenda, p. 55). The Advisory Committee has no authority to mandate the recommendations and is relying on many others to be supportive and assist in the effort of implementing their recommendations.

Some of the strategies can be implemented through various state department actions. For example, the Department of Ecology has initiated a strategic planning process that reallocates resources based on the results of Environment 2010. However, many of the strategies, to be effectively carried out, must be addressed by the legislature. The implementation chapter indicates that many of the issues identified in the Environment 2010 reports are being or have been addressed by the state legislature.

Given this, and the fact that districts will be supporting many of Environment 2010's recommendations through compliance with legislative acts, direct impact on transit districts of the specific Environment 2010 reports is minimal.

II. Conclusions

The impacts of these legislative programs and the regulatory environment they create will be felt in a number of areas. Each transit system will be affected differently, depending on their service plan, financial situations and age. For ease of presentation, the impacts have been categorized into three groups; governance, service, and financial.

1. Governance

Transit agencies will be required to participate in the land use planning process (TDM & GMA) and in the economic development/growth programs in the local air shed, (Clean Air).

New demands for multi-jurisdictional solutions for transit improvements will require broader participation in decision making (HCT).

Operations of parallel transportation services which may be provided by local non-profit organizations will need to be controlled by transit agencies to ensure compliance with ADA.

Management of the setting of priorities for appropriation and expenditure of new MVET account funds could impact the relationship between WSDOT and local transit agencies.

The level of State assistance in the implementation of HCT programs (specifically shared right-of-way etc.) will require realignment of the existing process (HCT).

2. Service

New services will be required to meet demands of GMA, TDM and State Health Care initiatives.

The introduction of new fuels and fleet requirements may have an impact on current operating procedures, manpower planning and maintenance requirements.

Additional services to meet mitigation measures of GMA and Environmental Impact Statements may be required.

Services, particularly fixed routes in rural areas, may be withdrawn to

avoid costs of parallel service required by ADA.

Non-traditional programs may be required to accommodate specific needs of TDM.

3. Financial

Administrative costs will increase to accommodate the planning requirements of TDM, GMA and the Clean Air Acts.

Costs associated with emissions testing, new equipment and fueling systems will be borne by local agencies (Clean Air).

Fleet replacements and conversions (at an estimated 25 percent premium) will be a significant cost exposure (Clean Air).

Law suits that may be expected as a result of ADA could be a burden and the cost of service, fleet and facility conversion will impact annual budgets by as much as 15 percent (ADA).

Additional administrative costs will be incurred in the planning reviews (GMA).

It is expected that services now provided by some non-profits will be abandoned in favor of transit service required by ADA.

New regulation for underground tanks etc. will create cost exposure (EPA).

PUBLIC TRANSPORTATION STUDY

Task 3B and 4B

THE QUALITATIVE AND QUANTITATIVE
BENEFITS OF PUBLIC TRANSPORTATION

Prepared for:

STATE of WASHINGTON

The Legislative Transportation Committee

Prepared by:
Gannett Fleming

in association with:

Moss Adams (Management Design Associates)
Mr. William H. Ostenson
Booz • Allen & Hamilton
Berk and Associates

September 5, 1991

THE QUALITATIVE AND QUANTITATIVE BENEFITS OF PUBLIC TRANSPORTATION

TABLE OF CONTENTS

Abstract	1
I. Introduction	1
A. Purpose	1
B. Contents	2
II. Overview of Benefits	5
A. Approaches to Evaluating Benefits Found in the Literature	7
B. Benefit Categories Used in the Survey	10
C. Benefit Categories Used for this Paper	10
III. Discussion of Benefits	13
A. Social Benefits	13
B. Community Benefits	34
C. Environmental Benefits	45
D. Land Use Benefits	56
E. Economic Benefits	64
IV. Conclusions	74
A. Emerging Role of Transit	74
B. Summary of Benefits	75
C. Washington State Applicability	79

Abstract

This paper examines the qualitative and quantitative benefits of public transit, focusing primarily on those identified from existing literature and in the responses to the survey conducted for this study. Benefits are discussed in five categories: social, community, environmental, land use, and economic; and include, but are not limited to: improved quality of life for both those using and not using the system; increased mobility for carless populations; improved access to social, recreational, employment, and other opportunities; an alternative and cheaper mode of transportation for carless and low-income individuals, and commuters; alternative mode of travel to special events; and increased efficiency and effectiveness of the public transportation system. The increase in efficiency and effectiveness may be classified in terms of trip convenience and reliability for the transit patron and infrastructure cost avoidance. Businesses can also benefit from transit service. Employers receive the benefits of: 1) a larger labor pool from which to draw prospective employees; and 2) a larger potential customer/client base from which to generate economic activity. Transit can also encourage more efficient land use development, conserve energy, and facilitate conformity with federal and state policies and laws.

I. Introduction

A. Purpose

The purpose of this paper is to provide a discussion of the qualitative and quantitative benefits of public transit. As such, this paper fulfills the components of Tasks 3B and 4B of the LTC's Public Transportation Study. This is not a cost/benefit analysis. Rather, it is intended to provide, as stated in the scope of work, a preliminary analysis and quantification of community and state benefits of public transit systems, to provide order-of-magnitude estimates, to give a flavor for the myriad of public transit benefits. Primarily, the paper is

WHAT PUBLIC TRANSIT CAN DELIVER

Congestion Relief:

- *Every bus full of passengers at rush hour removes 40 cars from traffic; every van full of passengers removes 13 from traffic.*

Reduced Highway Cost:

- *One high-occupancy vehicle lane carries the same amount of people as three regular highway lanes.*
- *Major highways can cost \$100-120 million per mile and busways can be built for \$4-12 million per mile.*

Energy Conservation:

- *A savings of ten to 15 gallons of gasoline is realized every time 40 single-passenger-car drivers take a 10-mile trip to work on the bus.*
 - *30-40 million gallons of gasoline would be saved each day if average commuter-vehicle-occupancies were increased from 1.1 passengers per vehicle to 2.1 passengers per vehicle.*
-
-

to summarize the benefit discussions found in existing literature.

Air Quality:

- *When one commuter leaves the car behind and uses transit to travel to and from work for one year, the health of millions of Americans can be improved through the removal of nine pounds of hydrocarbons, 63 pounds of carbon monoxide, five pounds of nitrogen oxides and one pound of particulates, annually.*

Safety:

- *The highway death toll--46,644 in 1988--can be reduced, along with 1.8 million annual auto-related injuries.*

Economic Growth:

- *Every \$10 million in transit capital investment supports 770 jobs; every \$10 million in transit operating investment supports 960 jobs.*
- *Every \$10 million in transit capital investment produces \$33 million in business revenues.*
- *Every \$10 million in transit operating investment produces \$30 million in business revenues.*

- APTA Transit 2000 Task Force Final Report

The above task required a qualitative summary of community, environmental, and social benefits of public transit from existing published sources and a quantitative analysis, to the extent allowed by existing information, of the monetary value of beneficial effects of existing systems on the community and the rest of the transportation system. This paper also provides a summary of the results from the survey conducted for the Public Transportation Study.

This paper also places the benefit discussion in a more local and non-theoretical context. To accomplish this, transit agencies in Washington State submitted lengthy descriptions of the benefits to their community provided by their transit systems. Additional material, such as newspaper articles, was gathered from the agencies, the Puget Sound Council of Governments, and Chambers of Commerce, to supplement the agencies' documentation. This information is provided in the sidebars or margins throughout this paper.

The portion of the Task 3B interim report which reviews and analyzes the policy components from all levels of government is presented in a separate interim report.

B. Contents

This introduction is followed by three sections. The first section provides an overview of the benefits found in the literature and in the survey responses, and develops the framework from which benefits will be discussed in this paper.

The second part of this report summarizes mass transit benefits within each of the five identified categories: social, community, environmental, land use, and economic; focusing on benefits discussed in the literature and highlighted in the survey responses. This section also includes the quantitative evidence of public transit benefits. The final section provides conclusions,

considering the emerging role of transit and the applicability of the benefit discussion to Washington State.

A note of caution is in order about the methodology used to quantify benefits in the various categories. Clearly the benefits accruing to a district are a function of local conditions in each community and the types of service provided by each agency. It is thus difficult to quantify in general terms the benefits of transit to the state. Further, attempting to quantify specific benefits to districts is challenging because many of the benefits of transit are intangible in nature. Increased mobility options, enhanced quality of life, and improved economic development climate are perceived benefits which are difficult to translate into monetary terms.

Whenever possible, we attempted to develop an indicator or measure of a benefit that could be applied to each district and then aggregated on a statewide basis. We relied on existing literature or other sources for a "tested" indicator or an aggregated number. For example, to quantify economic benefits we found an APTA study that showed the number of direct and indirect jobs created by each investment of \$100 million in either transit capital and operations. For environmental benefits, we found that Tri-Met in Portland had produced a figure for the number of cars removed from the road by each bus. We then contacted the authors or agencies to determine how these numbers were derived so we could then apply them to each district in Washington State for a combined total. This was not an easy task.

In most cases, the original source of the aggregated estimate was not able to provide the answer, or was not confident about how the number was derived. We found that many times numbers are developed on the "back of an envelope" and that they cannot be disaggregated. If a number could be disaggregated, it was done so with many assumptions. And assumptions, as we found, are developed for particular conditions and are not always translatable to other situations or areas.

"The benefits of transit systems include:

- reduced congestion on urban arterials by reducing the number of vehicles on the road, especially during peak periods;*
- safety improvements by reducing the number of vehicles on the road and using buses, which are safer vehicles;*
- reduced fuel consumption and other vehicle operating costs by reducing the number of vehicles on the road;*
- increased air quality by reducing the number of vehicles on the road;*
- increased mobility for those who do not have access to an automobile;*
- increased income and employment resulting from expenditures in the transit systems."*

*- Texas Transportation Institute,
1989*

A lack of precise data does not negate an attempt to quantify the benefits of public transit. The "back of the envelope" numbers or even those calculated with more accuracy can provide some "order of magnitude," a general idea of what mass transit can do for a community. Until more reliable means of quantification are developed, this is the method we must use for future attempts to quantify benefits. However, the numbers generated for any such effort should be viewed with caution and the assumptions underlying the methodology should be considered. With those disclaimers in mind, an exercise in quantifying benefits can provide some interesting results, as shown below.

II. Overview of Benefits

"Transit Spending is Strong Economic Stimulus"

A recent article in Passenger Transport highlighted the conclusions of a top economist's report, "Transportation Spending and Economic Growth."¹

David Alan Aschauer's "report explored four questions about the relationship of transportation investment and economic growth, and found that:

- there is a strong, positive relationship between transportation spending and economic growth;*
- the economic benefits of increased transportation spending outweigh the costs;*
- when determining the effect on worker productivity and economic growth, transit investment has an edge over highway investment; and*
- the general benefits of transit and highway spending outweigh their costs."*

Specifically, he found that "a 10-year, \$100 billion increase in transit investment would result in improved worker output worth \$521 billion."

What are the benefits of public transit? Do they extend beyond the simple provision of an efficient and effective means of transporting large groups of people? And if they do, why do these apparent advantages of transit not render it undeniably worthy of continued financial support? Why is transit not more often regarded as a worthwhile investment, a public service like any other that provides benefits beyond those immediately served, similar to way that police and fire services are funded by taxpayers who hope to never use the service?

Part of the answer to these questions lies in the fact that when most decision-makers look for reasons to continue funding a public service, they tend to look only at the bottom line, seeing primarily the significant subsidies that went to operate and maintain the service and trying to determine just what they got for those expenditures. The question arises in their minds as to whether the system, transit in this case, is economically justified, whether the benefits it generates outweigh the costs of the resources allocated. The "benefits" considered in these analyses are often those to which a numerical value, preferably cost savings, can be attached; decision-makers want only tangible and quantifiable benefits.

Some benefits of public transit can indeed be quantified, as will be demonstrated throughout this paper. Others are far less tangible. And to just evaluate transit on quantifiable benefits alone is to view the glass as half empty, only to identify the most obvious benefits to which a numerical value can be attached while neglecting to discover the multitude of benefits beneath those that are immediately identifiable.

What we will uncover in this paper, from the literature review and the survey results, is a vast array of benefits of public transit. Benefits from public transit (e.g., commuters using less gas) can have repercussions or disbenefits for others (e.g., a reduction in revenue for gasoline station owners). But the benefits of transit

"More not less public money needs to be spent at the federal, state and local levels for the improvement, maintenance and expansion of mass transit...Mass transit is something positive government can do to protect air quality, conserve energy, promote desirable land use patterns, and provide access to jobs and convenient, safe travel. It's hard to think of a government spending program where so much bang can be gotten for the buck."

*- Joanne R. Denworth,
APTA Mass Transit Report*

must be viewed from a larger perspective--it is a public service intended to provide transportation mobility, and accessibility for a region. What it ends up accomplishing is much more. Transit can:

- Provide carless populations with enhanced mobility and increased access to social, employment, educational, and recreational opportunities.
- Provide commuters with a cheaper and less stressful form of transportation to work.
- Provide a more efficient and effective public transportation system in terms of trip convenience and reliability for the transit patron.
- Provide infrastructure cost avoidance, measured in terms of the cost of the transportation investment that would be required to accommodate the rush-hour transit riders if they were in single-occupant vehicles. With approximately 40% of Seattle commuters traveling by bus to downtown, this is a material consideration.
- Provide environmental benefits to the community in the form of reduced vehicle emissions and, hence, improved air quality.
- Provide economic benefits to local communities, provide businesses with larger labor pool from which to draw and additional patrons for their businesses, and provide employees with access to wider range of employment opportunities.

As indicated in the introduction, the quantification of benefits in this paper is not intended to be a thorough cost-benefit analysis, or even to address all the disbenefits associated with public transit. Rather, it is intended to provide a preliminary analysis and quantification of community and state benefits of public transit systems, to provide order-of-magnitude estimates, for the myriad of public transit benefits. Primarily, the paper is to summarize the benefit discussions found in

existing literature. With that, we will review some of the approaches to evaluating benefits found in the literature.

A. Approaches to Evaluating Benefits Found in the Literature

Before presenting the benefits discussion, some discussion about the approaches used in the literature to evaluate benefits may be helpful. As indicated, the qualification and quantification of benefits required a review and summary of existing published material of the community, environmental, and social benefits of public transit. An extensive review of the literature was conducted to accomplish this task, many of the sources of which appear in the bibliography at the end of this document. To the extent possible, resources documenting benefits in Washington State were used. Analyses or reports from other parts of the country were also used to supplement state data.

Unfortunately, there is not an extensive literature on the subject of public transit benefits. Not a single document could be found that comprehensively evaluated all types of benefits. Most of the documents referred to a benefit in a sentence or two or was simply an introduction to a larger discussion on the shortcomings of public transit service today. Very few provided extensive documentation on public transit advantages. This paper presents a compilation of the benefits found in the various documents.

A few of the documents reviewed for this effort are worthy of special note; these papers in particular begin to outline what is important to consider in a benefit analysis. One of the most comprehensive papers was authored by Margaret J. Heraty.² This paper focuses on the benefits of specialized services provided for the disabled population and pertains, in particular, to transport services in the United Kingdom. Therefore, some of her references, such as those relating to reduced health care costs, cannot be directly applied to districts in this state given the differences in the provision of health care. She does, however, provide insight into an effective means for evaluating benefits.

One of the most important elements in her paper is her method of classification. Heraty classifies benefits in a much broader sense than is normally encountered in the literature. Her paper considered not only the direct effects of a system to its users, as is commonly done in traditional cost-benefit analyses of transit, but also the indirect benefits to non-users of the system, the benefits to other private sector individuals and organizations, and the cross-sector benefits between different governmental or other public sector agencies. As Heraty points out:

"The reason for identifying and quantifying benefits produced by transport services for disabled people is to make it possible to assess whether these services, although expensive to operate in themselves, might overall save the community resources, for example by avoiding the use of an even more expensive form of transport, by enabling a disabled person to have institutional care. These are wider benefits than are usually included in a cost-benefit analysis of a transport service, but that is no reason for not trying to quantify them."

What we can take from this quote and her analysis, then, is the importance of looking beyond the primary effects of mass transit. An analysis of the public transit benefits should be all-encompassing and should address the effects of these benefits as they multiply or ripple through a community.

Donald S. Warrick³ also provided one of the most thorough analyses of transit benefits found in the literature. This analysis provided a more quantifiable snapshot of benefits than that provided by Heraty. Warrick considered the benefits of public transit to be:

- auto operating cost savings;
- parking cost savings;
- accident cost savings;
- economic development benefits;
- capital expenditure savings;
- time savings;

- noise pollution savings; and
- aesthetic, social, vocational.

Warrick also discussed many of the intangible benefits of a transit system including:

- increased social, recreational, cultural, and educational opportunities;
- access to jobs for the unemployed; and
- access to essential health and medical facilities for elderly and handicapped.

Warrick attempts, in many ways, to respond to the questions raised about an economically-justifiable public investment. In doing so, he provides insight into the difficulties of truly quantifying the benefits of public transit (i.e., even in a 76-page Masters of Business Administration thesis, he was only able to quantify those eight to ten benefits listed above. Many of the more obscure, yet nonetheless valid, benefits remain unquantifiable). Despite this, Warrick provides information of pertinence to this paper.

TRC Environmental Consultants⁴ also provided an analysis of benefits, in particular air quality advantages, that can be directly related to this state's districts. In "Air Quality Implications of Transit in the Year 2000; Metro Air Quality Analysis," TRC states that:

"An effective and vital mass transit system reduces air pollutant emissions from the transportation sector by replacing low-occupancy vehicle miles traveled with high-occupancy bus or rail transit miles. The magnitude of the emissions reductions are proportional to the number of low-occupancy vehicle miles displaced with more efficient mass transit miles."

This air quality analysis, prepared in November, 1990, provides information of relevance to this benefit paper and is discussed in more detail in the Environmental Benefit Section.

"Citizens Speak Out on Public Transit"

"Thousands of the America's Coalition for Transit NOW postcards are being received in Washington [D.C.]. Here is what citizens across the country are saying about public transit and the need to support transit with increased federal funding."

"Public transit is our future."

"Public transit is important to keep the nation moving."

"If we are going to clean up the air, mass transit is the way to go."

"Economic and environmental considerations combine to make the public transit issue critical."

"There is a tremendous need for public transportation, especially for the elderly and people with disabilities."

"It seems such an obvious solution to the crisis on the highways."

"America needs an energy policy, and public transit must be a key part."

"I think it's obscene to cover our land with more highways."

- Passenger Transport, August 19, 1991

Finally, a more recent cost and benefit analysis was conducted by Timothy J. Lomax and Jeffery L. Memmott for the Texas Department of Highways and Public Transportation.⁵ Their report summarized data collected from transit systems in Texas, evaluating the benefits of transit compared with its costs of operation. Their paper provided more recent quantifiable evidence of public transit.

B. Benefit Categories Used in the Survey

The Public Transportation Study survey, which was distributed to each of the state's transit agencies in April, 1991, requested information on benefits in five general areas. These included:

- Social;
- Community;
- Environmental;
- Land Use; and
- Economic.

The survey also included an "other" category, which allowed for responses that did not fit neatly into one of the established categories.

C. Benefit Categories Used for this Paper

For purposes of this discussion, benefits found in the literature and summarized from the survey are classified into the five categories used in the survey. These five categories are listed and defined below, with examples of each type of benefit included.

- **Social:** Those benefits which provide a service or help to an individual or particular group of people, generally serving a minority rather than a majority population.

Example: The enhanced quality of life or improved mobility that transit-dependent individuals (elderly, disabled, youth, and carless) receive as a result of the provision of transit service.

- **Community:** Those benefits which apply to a larger concentration of people, a neighborhood or town, for example.

Example: The provision of shuttle services to special community events, fairs, and festivals and the reduced congestion in surrounding neighborhoods during these events.

- **Environmental:** Those benefits which improve or enhance the quality of the environment, including air resources, traffic levels, and energy resources.

Example: The reduction in vehicle trips or vehicle miles traveled and the resulting reduction in vehicle emissions and improved air quality.

- **Land Use:** Those benefits which affect or improve aspects of urban form such as open space, clustering of activities, and development density.

Example: The ability of transit to shape land use patterns by providing a high capacity link between trip ends. The reduction in parking requirements for new developments resulting from the provision of transit service to that property is another example of a land use benefit.

- **Economic:** Those benefits which increase expenditures in the financial aspects of the local or state environment.

Example: The creation of jobs in the community as a result of operation and maintenance of a transit agency. The creation of these jobs has a "ripple" effect in the community through the broadened tax base from transit employees' wages, the increased spending in the local economy from their wages, and the jobs or businesses generated to provide services to both the transit agency and their employees.

It should be noted that benefits of public transit do not fit into only one category or another. The categories used in this study were developed for compilation of data and ease of discussion. In cases where there is overlap, it will be so noted. For example, a "social" benefit (e.g., transportation for disabled) may also provide an "economic" advantage (e.g., a cheaper form of transportation which frees up money for other purposes) which in turn can provide an overall value to the "community" (e.g., provision of other services which would not have been available otherwise). Similarly, economic benefits will in most cases be of value to a community at-large. Where possible, this overlap will be cross-referenced within the various categories.

III. Discussion of Benefits

A. Social Benefits

Social benefits, as identified by local community members:

Kitsap ParaTransit, a non-profit company, offers door-to-door transportation to disabled residents under contract to Kitsap Transit. A resident of South Kitsap said of the service (as quoted in The Sun):

"My son is severely handicapped but he is getting to the point where he could be somewhat independent. By using the bus, he can travel to parks and recreation programs, a Friday night dance in Bremerton and eventually to a job, after he graduates from South Kitsap High School."

- August 9, 1991

Social benefits, as defined for this study, are those which provide a service or help to an individual or particular group of people, generally serving a minority rather than a majority population (e.g., generally the carless population encompassing elderly, disabled, and youth). This type of benefit is the most widely discussed in the literature, probably due to the heavy reliance of these groups on public transit. However, social benefits are not limited to those who have a need for public transit; they also accrue to those who choose public transit as an alternative mode of transportation (e.g., commuters). Social benefits also accrue to non-users of the public transit system (e.g., social-service providers and other motorists) that result, or trickle down, from use of the system. These benefits are discussed below in the following categories:

1. Carless populations;
2. Non-users of the system; and
3. Commuters.

Many of the benefits in the social category, as well as the other four categories, are not quantifiable but are important elements nonetheless to consider in an evaluation such as this. How can the benefit of access to employment be measured for the unemployed? Or, how can increased access to social events or essential medical facilities for the elderly or other carless populations be given a numeric value? The simple fact that these benefits cannot be measured does not detract from their importance in a benefit evaluation. For this reason, we have included an extensive discussion of these qualitative type of benefits.

1. Carless Populations

As indicated, most of the existing literature focused on transit services for the elderly and handicapped. Most of the documents on this subject critique these

services, describing what still needs to be done to achieve equal mobility for all or what problems "carless" individuals encounter on a day-to-day basis. Very few reports describe the benefits of these specialized services, other than in a sentence or two. Despite the overwhelming amount of criticism about these services, there is sufficient data to document the positive social aspects of specialized transit services.

Margaret Heraty provides the most comprehensive discussion of transit benefits for people with disabilities. She focuses on four types of benefits in her discussion:

- direct benefits to system users;
- indirect benefits to non-users of the system;
- benefits to other private sector individuals and organizations; and
- cross-sector benefits between different governmental or other public sector agencies.

The significance of evaluating public transit benefits by these four categories is twofold:

- 1) benefits do not just accrue to those that use the system; they can be realized by other populations as well; and
- 2) to effectively evaluate public transit, benefits in all four categories should be taken into consideration.

This is demonstrated numerically below.

In the analysis, Heraty places particular emphasis on the fourth category, the "cross-sector" concept, the notion that expenditures on transportation can often lead to savings in other public and private sectors.⁶ While the provision of these specialized services may be expensive, they may in fact be cheaper than providing other forms of transportation, or they can allow a disabled person to live at home rather than in an institution resulting in a reduction in costs for institutional care. Therefore, by spending money for paratransit services, savings are realized in other areas.

An example of the first scenario, where bus transit is a cheaper form of transportation than paratransit, is provided by Heraty. As an experiment, the local bus authorities in Boras, Sweden, combined regular, fixed-route bus service with special paratransit services on one route for disabled persons. In a study comparing one of the new service areas with an area without a combined route, it was shown that the number of special service permits granted was lower. This suggests that if disabled persons have access to [and more importantly can use] regular fixed-route transit service that meets their needs, they will use that as opposed to applying for special permits to use the specialized service. This is demonstrated in Table 1 below.

Table 1
Cross-Sector Savings Accrued by Specialized Transport Service*

Cost of providing bus services	(\$361,333)
Cost savings from canceled services	\$117,000
Fare revenues	\$ 80,500
Savings in cost of special transport services	\$191,666
Net savings	\$ 27,833

*Note: Numbers originally calculated in 1989 Swedish Kroner (US\$1 = SwK 6.0). This exchange rate was used to convert these numbers to US dollars, however, other variables in the equation may have changed.

Source: Heraty (1989), p. 108.

As shown in Table 1, a cross-sector savings of \$27,833 was realized by combining paratransit with fixed-route service. This assumes, of course, that disabled and elderly currently using paratransit are able to access and use fixed-route, the implication being that, if they can, fixed-route service can provide some of the same

transportation opportunities at an overall lower cost than other forms of transportation.

It is important to recognize, however, that the overall cost savings, or cross-sector benefits, are not realized when viewed from the perspective of the bus operator. The net savings accrued and shown in Table 1 are cross-sector savings; that is, they accrued when they were viewed from all agencies involved in providing the service, including social-service agencies. If the example is calculated from just the bus operator's perspective, there is actually a net cost, as shown in Table 2.

Table 2
Cost to Bus Operator*

Cost of providing bus services	(\$361,333)
Savings from canceled services	\$117,000
Fare revenues	\$ 99,166
Net cost to bus company	(\$145,166)

*Note: Numbers originally calculated in 1989 Swedish Kroner (US\$1 = SwK 6.0) in 1989. This exchange rate was used to convert these numbers to US dollars, however, other variables in the equation may have changed.

Source: Heraty (1989), p. 108.

The implication from these tables is that, even though one agency may incur additional costs, when the "benefits" are viewed from a broader perspective, cost savings are actually realized. There will be a trade-off between bearing an additional cost, on the part of the transit agency, for operating potentially more centralized and efficient transportation services and having social-service agencies provide their own, more costly transportation services. These estimates, though from a European country in which health care services are

distributed differently, can provide a useful example by which to begin to quantify benefits of a district's paratransit services.

"Panel hears of needs of disabled on Peninsula"

"Disabled people in rural areas need more transit buses," according to an article in the Peninsula Daily News about a meeting held in Port Angeles in June 1991.

"Everyone at the meeting [held by a governor's panel on the disabled] mentioned transportation. Most disabled people get to their jobs, their doctors and their services by bus. Though the Clallam Transit and Paratransit systems are good, the panel was told, there are too few runs between the major towns on the Peninsula and paratransit runs take too long."

- Peninsula Daily News, June 23, 1991

We attempted to quantify this cost savings in Washington State. However, in contacting the Department of Social and Health Services (DSHS) we learned that paratransit trips are not tracked by who the rider is and whether they are a DSHS client. Therefore, we could not calculate the cost savings to DSHS, for example, from the provision of service from a transit agency since not all riders will not necessarily be from DSHS. From the information above, however, we can imply that while the transit agencies would incur an additional cost from providing specialized services, the social-service agency would realize a savings. Again, when viewed from a cross-sector perspective, a net savings is realized. Or as stated above, by operating more centralized and efficient paratransit services, savings are potentially realized by other non-transportation agencies and those savings can be spent, or redirected to their own specialized service.

Another type of cross-sector benefit is accrued by saving costs of professional care-givers and saving the cost of institutional care. If disabled persons have access to public transit, their reliance upon and cost for professional support or their need to be institutionalized is diminished. There is a resulting cost savings to the individual for these types of facilities.

A government study in the U.K. compared costs of various living arrangements for elderly person. These costs are shown in Table 3.

The numbers in Table 3 do not include the cost of providing special transit services. But as indicated in the study, the savings realized from living at home could be applied to, and may cover, the cost of transportation, depending on the number of trips made each week. The point from this British study is that a significant savings could potentially be realized from living at home, and that the availability of accessible transit service can help to make that arrangement a reality.

Table 3
 Cost for Different Living Arrangements in UK*
 (Cost Per Week)

Own home	\$54.00
Local authority residential home (institution)	\$74.00
Private/voluntary residential home (with no long-term nursing care)	\$77.00
Private/voluntary nursing home	\$102.00
National health service hospital (geriatric ward)	\$164.00

*Note: Numbers originally in 1989 British pounds (US\$1 = 1.8 pounds). This exchange rate was used to convert pounds to US dollars, however, other variables in equation may have changed.

Source: Heraty (1989), p. 110.

In addition, there are other benefits realized from living at home that are not quantifiable but are no less important. These include a sense of greater well-being, and greater psychological and physical health of these individuals. As Heraty states:

"There is some evidence [though not quantified in this report] that enabling disabled people to travel has a beneficial effect on their health and that this saves the cost of health care and drugs immediately, and may postpone the time at which institutional care becomes necessary."

Again, the implication is that by spending money on paratransit services, cost savings, as well as other immeasurable, quality-of-life issues, are realized in other areas.

"Paratransit helps make life bearable"

"In 1986, the Paratransit started here in Port Angeles. I have made use of it ever since, to the doctor's offices and just trips and rides. Every Saturday they pick me up at 2 p.m. We go to the West End, then we go to Sequim, getting back around 4 p.m. - all for \$1.

"Vince Scully has been the driver. He is one of the kindest men I have ever met. He and his wife have been taking me to the Chuck Wagon. They are moving and I am going to miss them and I wish both a long, healthy life. The staff and all are angels in disguise. They have made my lonely life bearable."

- Marjorie Maisey, Port Angeles, in Peninsula Daily News, June 24, 1990

There are other qualitative benefits of accessible public transit that are worth noting. For the disabled person, being able to access transit can provide relief from the depression or frustration of being trapped at home, or it can provide the freedom of choice to carry out a wider range of activities. Benefits are also derived when a disabled person, able to access public transit, visits a friend, a benefit which can accrue to the friend as well as the disabled person.

Public transit can also provide increased social, recreational, cultural, health and educational opportunities for the "captive" rider (aged, young, handicapped, and poor). With increased mobility to these various activities comes reduced isolation, improved social integration, and enhanced independence. For disabled individuals, the increased interaction can result in greater visibility and potentially greater recognition of the needs of the disabled.

K.C. Koutsopoulos and C.G. Schmidt⁷ support these concepts by discussing the repercussions for society of an inadequate or nonexistent public transit system. The authors indicate that these individuals' social, educational, and recreational opportunities are limited and that they are restricted from being fully productive members of society. For elderly persons, the "lack of adequate transportation can have a more deleterious effect than the loss of the transportation service alone. Transportation has a 'multiplier' effect." With it, a couple or single person can more easily cope with adjustments or hardships that come with age. Without it, they may enter into what has been described, by the authors, as a "syndrome of deprivation."

If the lack of transportation can produce such negative results on an individual's life, then the opposite is also true: that the provision of suitable transportation reduces some of the barriers to full participation in society, creates opportunities for interaction, and improves an individual's quality of life. The benefits to society as a whole from these advantages are immeasurable.

The carless population can also benefit on an economic level from accessible public transit. This aspect of public transit benefits is discussed here in the social benefit category because it relates to the captive rider population. According to a 1985 nationwide Harris survey of disabled individuals, mobility, employment, and quality of life are clearly related (see sidebar, this page). As stated in an article about the Harris survey:⁹

"Standards of living depend on income derived from jobs. Most jobs require traveling to the workplace. And travel generally requires transportation."

In other words, there is a strong correlation for anyone, but particularly disabled individuals, between the ability to access some form of transportation, and hence a job, to earn a wage, and to improve their quality of life. Some statistics will bear this out.

Information from the Washington State Office of Financial Management (OFM) and the Governor's Committee on Disabilities was evaluated for comparison with the Harris survey. OFM produced 1988 estimates of the disabled population in the state based on 1980 census data of the disabled population (1990 disabled population data was not available at the time of the LTC transportation study).

OFM estimates indicated that, in 1988, the civilian, non-institutionalized population of disabled persons the same age as the Harris survey respondents (16-64) was 249,182. Based on 1980 disabled persons employment data, 67% of this population was unemployed. Assuming that the 67% held constant from 1980 to 1988, OFM estimated that a total of 167,000 disabled persons would not be working (i.e., would be unemployed) in 1988. Nationally, however, the rate of disabled **employment** fell dramatically, from 30% in 1980 to less than 20% in 1988. Therefore, the 167,000-person estimate may be optimistic (i.e., it would imply that 33% of the disabled population was employed in 1988). Or, the rate of employment for this population may have improved but it did so in contrast to the national trend.

According to a 1987 article, "Mobility and the Quality of Life: The Importance of Public Transportation to Disabled Americans,"⁸ a 1985 nationwide Harris survey of disabled individuals revealed that:

- 2/3 of disabled Americans between 16 and 64 do not work;
- 1/2 of those that work earn less than \$15,000 per year; and
- 40% did not finish high school.

559 of the 1,000 respondents identify themselves as "mobility-impaired." Nearly half of the 559 respondents indicate that transportation barriers inhibit their employment opportunities.

"Specifically, 49% of the mobility-impaired respondents either work part time or are unemployed because they cannot use public transit or gain access to special-needs transportation."

Nonetheless, there are significant numbers of disabled persons who are unemployed.

Seattle Metro indicates that the biggest impact of the American with Disabilities Act (ADA) will be the increased door-to-door service they need to provide to comply. Metro estimated the program costs to be:

1991 - \$ 2.4 million;
1992 - \$ 6.3 million;
1993 - \$ 9.7 million;
1994 - \$13.6 million;
1995 - \$17.7 million;
1996 - \$22.3 million;
1997 - \$23.3 million.

They intend to be in compliance with ADA by January, 1997, after which date program costs are adjusted for inflation only.

- Seattle Metro, 1991¹⁰

While ADA requirements obviously add significant cost impacts to Seattle Metro, as well as other agencies in the state, the costs are not without their potential benefit.

The ability to access public transit was given by respondents of a nationwide survey as a major obstacle to employment opportunities (see previous sidebar). If just some of these individuals are able to access public transit, many of their quality-of-life issues (improved mobility, self-esteem, etc.) will be moderated and they can be empowered to be more productive members of society.

What is the reason for the unemployment rates in the disabled population in Washington State? We can postulate, based on the Harris survey results, that a large percentage of the **employable** disabled individuals in Washington State are unemployed because they do not have the **ability** to access public transportation. The ability for these individuals to access public transit is, however, changing, as transit agencies around the state (and nation) begin to comply with the American with Disabilities Act (ADA) requirements, which are designed to open all aspects of life, including transportation, to persons with disabilities. In fact, Seattle Metro has estimated that the increase of their door-to-door service will be the largest impact of ADA (see sidebar, this page). Until then, we can say that transit has the potential benefit of increasing employment opportunities for these individuals and, in turn, providing the state with increased economic activity, but that these benefits are not fully realized at this time.

The Harris survey of disabled persons also indicated that the majority of the employed disabled persons were far happier and wealthier than those who were unemployed. Employed individuals can in turn acquire greater dignity and self-esteem, which can result in reduced costs for counseling or other health care activities. Mobility, employment, and quality of life are undeniably interrelated.

The transit survey responses provided numerous **qualitative** examples to support the type of cross-sector benefit described in the literature (i.e., benefits that transcend agency boundaries). **Quantification** of this data was not available, except in the cases noted; in some cases is not possible to tabulate given that social-service agencies do not track which of the paratransit riders are their clients or other non-social service clients. It should also be noted that Link Transit in Chelan-Douglas did not provide data because they have not initiated service at this time.

This list is by no means exhaustive. Some districts provided **extensive** detail of their services. For purposes of brevity, we have included some of their highlights.

- Ben Franklin Transit relates how some of the local social-service agencies have no other transportation service available and "could not exist or serve their clients" without the provision of service from Ben Franklin. Therefore, rather than the service agency folding, they are partially kept afloat--and they realize transportation cost savings--from this transportation service.
- C-Tran provides mobility training for persons with mobility impairments for both fixed-route and paratransit service.
- Clallam Transit provides transportation to social-service agencies, health services, senior centers, and nutrition sites.
- Community Transit sponsors elderly and disabled services through a contract with a private, non-profit agency. Service is provided utilizing lift-equipped vans providing curb-to-curb service throughout the service district. CT hopes to increase paratransit service hours from 26,775 to 38,525 in the first year (1991-1992); 47,068 in the second; and 49,859 in the third.
- CUBS provides transportation of elderly to the senior center, medical facilities, meal sites, parks, libraries, and day disability centers with wheelchair lift-equipped buses and vans.
- Everett Transit provides outreach to the disabled and elderly community and responses to social-service agencies "Work Opportunities" which rehabilitates people and returns them to the workforce. They also provide service to low-income housing projects and to youth programs.

- Grays Harbor co-operates with all health and human service agencies in the county. Nursing homes, hospitals, day care, mental health agencies all utilize fixed-route, Dial-a-Ride or both.
- Intercity Transit's central transfer center is across from the Olympia Center where numerous senior and social-service activities are located. IT and the Lewis-Mason-Thurston Area Agency on Aging jointly operate specialized services, which allows more cost-effective service delivery than having two separate programs, and allows both agencies to maximize the number of trips provided per dollar invested.
- Island Transit provide transportation for seniors from all over the Island to the only public swimming pool in Oak Harbor, senior centers, and meal sites.
- Jefferson Transit deviates from one of its fixed-route buses on weekdays to pick up a group of mentally handicapped young adults and transport them to a local recycling station where they work. During the severe weather in December 1990, Jefferson Transit was standing by ready to evacuate a local nursing home that had lost heat and electricity.
- Kitsap Transit also indicates that the availability of transit displaced the requirement for the regional Area Agency on Aging funds to be used for transit. At the time of the systems inception, this replacement of funds amounted to \$70,000 per year in purchased transportation services by the Area Agency on Aging. Services and cost have grown, by their estimate approximately 3-fold since then, so the benefit to Kitsap's Senior Service Program, in the form of transportation provided just to meal sites and adult day treatment centers is probably in excess of \$200,000 in '90-'91 (estimated by Kitsap).
- Pacific Transit is an active participant in social-service related benefits such as the Willapa Harbor

Hospital long-range plan development and Pacific County Health and Human Services Department Comprehensive Plan. They also provide demand-response service for school-age children that attend alternative education programs.

- Pierce Transit provides social-service benefits to students who use transit for various reasons; seniors who use transit for shopping, medical, recreational purposes; low-income persons who cannot afford a car; and disabled persons who must rely on transit as their means of transportation.
- Prosser provides transportation for elderly to daily lunch programs and health-related activities; to nursing homes for home visits and field trips; and to local girls and boys clubs.
- Pullman Transit transports disabled and elderly to social centers.
- Spokane Transit provides fixed-route, fixed-route accessible, and paratransit service to: Employment Security Office, Social Security Office, Community Mental Health, Job Training Sites, Rehabilitation Center, Senior Service Centers, Senior Nutrition Centers, and Recreational Programs. Private schools in the service area rely to a large extent on STA for transportation in that few of the schools maintain a bus fleet.
- Twin Transit's service area has a population with twice the state average of persons 65 years of age and older. One out of five households do not own a car. Twin provides transportation for these "transit-dependent" at reduced fares. Senior citizens and handicapped comprise 40% of the ridership.
- Valley Transit states that some of their local service agencies discontinue their own transport services due to the existence of Valley's system and that they apply these savings to the provision of other non-transportation services.

"Van fans pool their resources"

A recent article in Tacoma's The News Tribune highlighted the benefits of vanpooling:

"Dale Olson figures he was spending a good \$100 a month, just for fuel' to commute from his home on Puyallup's South Hill to work at the Auburn Boeing plant.

"Now, he drives for free.

"Pat Estes, who commutes from Olympia to Boeing's Renton plant, pegs his commuting savings at \$4 to \$5 a day.

"How do they do it?"

Both men are drivers of vans, which are part of a joint Pierce Transit and Metro program that brings "together workers in 8-, 12- and 15-passenger vans so they cut their individual driving costs by sharing expenses...[and] cut down auto pollution and traffic congestion."

"It works out to \$35.81 a month for each rider. But since Boeing started giving its workers a \$15 transit subsidy a couple of months ago, the out-of-pocket expense to each rider dropped to \$20.81 a month - or about \$1 a workday."

- June 17, 1991

- Whatcom Transit makes discounted fixed-route passes available to elderly and disabled to encourage fixed-route use. The WTA currently commits 15.8% of its funding to specialized services (compared with an average of 5.6% spent state-wide).
- Yakima Transit has separate programs that provide contract services, including Handicapped Dial-A-Ride and Elderly and Handicapped Shuttle. In total, these programs enjoyed ridership of 61,736 in 1990, covered 162,434 miles, and cost \$288,142 to operate.

2. Non-users of the System

Non-users of the system (care-givers, other motorists) can also benefit from the existence of the transit service. The literature outlined a situation where a disabled person using public transit was able to care for an ill parent who would otherwise have to be in an institution. Transit can also allow disabled persons to "get out of the caring environment and be independent of the carer," to possibly do their own shopping or attend to other activities.¹¹ This can enhance the disabled person's self-esteem and sense of independence and reduce the reliance and pressure placed on the care-giver.

In addition to care-giver benefits are those received by other motorists (i.e., other non-users of the system). A study sponsored by the Texas Department of Highways and Public Transportation indicated that increased use of transit by commuters reduces the burden of the system (i.e., congested roadways, higher fuel consumption due to lower travel speeds, and higher accident rates) for all motorists (see also excerpts shown in the sidebar, next page). Therefore, if this reduced congestion is not quickly filled by other motorists, there is a net benefit to the community.

Motorist Benefits of Transit

"One of the biggest benefits transit systems provide is to take motorists and vehicles off the road and put them as passengers in higher occupancy buses. This reduces the congestion, fuel consumption, and accidents for all motorists. This is particularly true in urban areas with significant congestion during peak periods. There is an incentive for motorists making work trips during peak periods to switch to a viable alternative. This is one of the reasons high-occupancy lanes, park-and-ride lots, etc. are becoming increasingly popular."

"Overall transit systems in these [18 Texas cities] are providing about \$348 million in benefits to motorists, which is estimated to increase to about \$484 million in 1992. Of this, about 50% consists of lower motorist operating costs, 40% lower time costs, and 10% lower accident costs. There is also a substantial reduction in fuel consumption, about 69 million gallons in 1987, and about 90 million gallons in 1992."

- Texas Department of Highways and Public Transportation, (see Lomax, 1989)

Benefits can accrue to non-users even if this capacity is quickly refilled. Many will argue that any reduction in congestion (as mentioned above) will be refilled to capacity. This scenario assumes that there were trips not previously made due to high levels of congestion. Now that the roads are less congested, these trips will be made. As a result, no net benefit would accrue to the other motorists, or non-users, since congestion levels quickly return to normal.

However, even if this were the case, and congestion returned to previous levels, the transportation system would be operating more efficiently and effectively. The system is now carrying more people per hour than before trips were diverted to transit. Thus, the benefit, in this case, is not necessarily congestion relief but rather more efficient use of the existing transportation network.

3. Commuters

Commuters also benefit from the provision of public transit. For them:

- The availability of express bus service to a downtown can increase their mode choices for commuting to and from work. Their decision to travel by transit can consequently have a positive impact on the environment.
- The availability of transit can also provide dual-income households with an alternative mode to work which can eliminate the purchase of a second car.
- By changing their mode to bus, commuters will also receive economic benefits in the form of automobile operating cost savings, fuel savings, parking cost savings, accident cost savings, and potentially time savings.
- Motorists can also realize cost savings by joining a vanpool, as discussed below.

For the individual motorist or commuter, traveling by bus or vanpool is generally cheaper than driving alone in an automobile. Transit patrons incur the cost of a bus or vanpool ride (except in Washington State's two pre-paid systems) but this cost is more than offset by the savings realized from not operating a private automobile for commuting purposes. This assumes that only the marginal costs of the trip, and not total costs, are considered, as discussed below.

*Improved Quality of Life from
Cost Savings*

"Costs Savings - Rideshares and vanpools can save commuters up to \$500.00 in parking and gasoline per year, not including savings on wear and tear or maintenance costs."

*- LACTC Commuter's Guide,
1991*

The commuter, before making a trip by bus or car (vanpools are discussed later), considers the marginal cost of that trip: Just how much will the trip cost for each type of vehicle. According to Sno-Tran's, "A Guide to Land Use and Public Transportation,"¹² cost, the extra costs, in this instance includes fuel costs, parking costs, and fares. As stated in the Sno-Tran guide, "While there are other costs of driving a car (insurance, depreciation), few people think of these other costs when they decide to take a trip." In many cases, individuals have already purchased and will continue to own and operate a private vehicle for non-work trips (shopping, school, other travel, etc.) even if they commute by bus to work. Therefore, the costs associated with the purchase of an automobile, operation of the vehicle for non-work trips, maintenance, insurance, and depreciation will not be considered in the estimation of savings to the commuter.

It should be noted that there are other components of automobile ownership and operation also not often accounted for in cost estimates. For example, parking costs usually include only the cost incurred by the commuter (i.e., parkers do not pay the full price of parking). The true cost of parking should include the commuter's cost plus any amount paid by the employer, the implication being that charging the full cost of parking to commuters would act as an incentive to alter their travel behavior. In addition, many external costs of automobile operation (e.g., health costs of air pollution, costs of traffic congestion, road construction and maintenance) are also not generally included in the total costs. These costs will not be quantified for this study since it is only evaluating the marginal costs of traveling

by bus as opposed to car. A recognition of these costs and a full accounting for them in a comprehensive cost/benefit analysis of automobiles would provide a more accurate evaluation of traveling by this mode.

a. Fuel Cost Savings

Fuel cost benefits for commuters traveling by bus were calculated by the following: First, the cost of fuel for a round-trip was estimated by multiplying the average round-trip commute length (11.3 miles each way) by the average cost per mile of gasoline and oil (6.6 cents), based on an American Automobile Association guide.¹³ (For purposes of this analysis, we used the estimated average, one-way commute for all workers (11.3 miles each way) as estimated by the Puget Sound Council of Governments (PSCOG)).

Fuel and oil costs per day were then multiplied by the number of commute days per year (5 days x 50 weeks = 250 days) to achieve a yearly total of fuel/oil costs that would not be spent if a commuter switched to transit. An example of the annual fuel/oil savings for an average commuter is shown in Table 4.

Table 4
Fuel and Oil Cost Savings for an Average Commuter

Gas/oil cost per round-trip	22.6 miles round-trip x 6.6 cents per mile =	\$ 1.49 per round-trip/day
Gas/oil cost saved per year	\$1.49 per round-trip x 250 commute days per year	\$372.50 saved on fuel costs per year

Note: These are averages. Therefore, some commutes will be longer, others will be shorter. The savings on fuel costs would be larger and smaller, respectively.

As shown in Table 4, based on fuel/oil costs alone, a commuter can save \$372.50 per year. If their commute is longer than 11.3 miles one way, they would obviously save more. Conversely, if their commute is shorter, they would save less. The savings will be greater for all commuters, regardless of commute length, when added to parking cost savings (calculated below).

b. Parking Cost Savings

As indicated, commuters can also realize parking cost savings when they ride the bus. Not every employee will incur parking costs so this benefit will not apply throughout Washington State. For those commuters that do pay for parking, those driving to downtown Seattle or downtown Bellevue, the savings can be substantial.

A review of parking costs for downtown Seattle revealed the following:

- The lowest daily cost for parking in the Seattle CBD, according to information provided by the Downtown Association of Seattle and parking providers in the CBD, is \$4.25 (early bird rate).
- The highest daily rate is \$18.00 (\$18.00 if you do not buy a monthly stall which most would do if they drove everyday).
- The daily average is \$11.12.

Multiplying the average daily rate of \$11.12 by 20 (5 days of parking per week for 4 weeks) results in a monthly parking rate of \$222. Therefore, a commuter could potentially spend up to \$222 per month, or \$2,780 per year (based on 250 commute days/year), on parking costs alone. For comparison purposes, it should be noted that commuters who drive every day can opt to purchase a space in a garage. This would lower their monthly rate. Columbia Center, for instance, charges \$136.33 per month for tenants. This results in a much lower yearly total of \$1636. Or they can opt to park at the "early bird" lots at a daily rate of \$4.25 (with monthly

and yearly rates of \$85 and \$1,063, respectively). A summary of these parking costs is shown in Table 5.

Any of the parking cost figures shown in Table 5 represent large expenditures for parking, particularly if it can be saved by traveling by bus. This savings is greater when added to the savings in fuel and oil costs, as shown below in Table 6.

Table 5
Parking Costs

Daily Rate	Monthly Rate	Yearly Rate
\$ 4.25 (lowest rate)	\$ 85	\$1,020
\$11.12 (average rate)	\$222	\$2,780
\$18.00 (highest rate)	\$360	\$4,500

Table 6
Monthly and Annual Fuel and Parking Costs

	Monthly	Yearly
Gas and oil cost savings	\$ 29.80	\$ 372.50
Parking cost savings (based on avg. daily rate of \$11.12)	\$222.00	\$2,668.00
Total savings	\$251.80	\$3,040.50

Based on the data in Table 6, an average commuter could potentially save \$3,040 per year, or what is spent each year on gas, oil, and parking. This amount represents the marginal cost of traveling by automobile to work only. What is the marginal cost of traveling to work by another vehicle choice, e.g., the bus?

*Improved Quality of Life
through Reduced Stress*

"Driving alone to work is stressful and can cause health problems such as higher blood pressure and heart rate irregularities. To reduce stress resulting for commuting, commuters have altered travel schedules, changed their travel choice to other than driving alone and/or moved closer to work.

"Employers have also found providing commuting options has increased employee productivity and lowered tardiness and absenteeism."

*- LACTC Commuter's Guide,
1991*

c. Bus Fare Costs

In twenty of the state's twenty-two systems, commuters pay a fare for bus travel. For example, an annual, two-zone, peak-period bus pass for Seattle Metro costs \$47 per month, or \$517 per year. (A one-zone, peak-period pass costs \$346.10 but limits travel to within the Seattle city limits, which in some cases may not encompass the average one-way commute of 11.3 miles. Therefore, for purposes of this paper, the more conservative estimate of the two-zone pass will be used.)

A commuter purchasing an annual bus pass will therefore pay more for the bus pass than for gasoline and oil (\$517 versus \$372.50). But when compared with the total savings from gasoline, oil, and parking, the net savings to the bus commuter is **\$2,523.50 per year** (total annual savings from Table 6 of \$3,040.50 minus the annual cost of a two-zone bus pass of \$517).

In addition, since a bus pass can be used for any travel, not just commute trips, further savings can be realized by using a bus pass for non-work trips. Commuters traveling to work on pyre-paid systems (Island Transit and "Link" Transit) may potentially, depending on the length of their commute and the cost of parking, realize even greater savings since they do not pay for transit passes. The advantages of pre-paid systems will be discussed in more detail in the following section.

d. Vanpool Savings

As alluded to in a previous sidebar ("Van fans pool their resources"), vanpooling is another way commuters can realize savings. Vanpools offer alternatives to traveling by bus (and single-occupant vehicle) and provide similar benefits in terms of cost savings, and in some instances, time savings. In addition, transit agencies through their vanpool programs can concurrently work toward reduced automobile pollution and traffic congestion.

"Vanpools are really attractive to people who have to drive a lot of miles," said Daphne Tackett, who oversees Pierce Transit's vanpool program. The majority of our vanpools cross county lines."¹⁴

"Express Tacoma-Seattle bus runs play to standing-room-only crowds"

Some highlights of an article in The Seattle Times:

"Seattle Express, Pierce Transit's direct bus service between Tacoma/Seattle has proved so popular...that more buses will be added this month to meet demand."

"Our expectation was so far surpassed we are already getting the ridership today that was not projected until 1994."

"Running only at peak hours and at more than the buses' seating capacity, Seattle Express is recouping 35 percent to 40 percent of its cost at the fare box."

- February 6, 1991

"The express service, which began in September [1990], is so popular that some commuters have to stand or sit in the aisles. The number of trips already has been expanded from 18 to 28 (14 round trips) each weekday. Now Pierce Transit is planning to increase that to 62...at a cost of about \$976,000."

- Tacoma News Tribune, December 17, 1990.

The two agencies cited in The News Tribune article quoted above, Pierce and Metro, together have 320 vans with a daily ridership of about 3,500 (3,300 of those are in King County and 200 are in Pierce County). The vanpool programs are expected to grow substantially over the next 10 years: Metro will have a total of 400 vans by the end of 1991 and 1,100 by 2000. Pierce will have 41 vans by the end of 1991 and 100 by 2,000.

According to the Tribune article, "A commuter on the Bainbridge-to-Bellevue vanpool can save \$1,700 a year, largely because of the huge incentive offered by the state ferry system to vanpool members. Instead of \$8.80 a day for a round-trip vehicle-passenger fare, vanpool riders pay only a walk-on passenger rate of \$2."

Other advantages for vanpoolers include:

- Vanpools can travel in the high-occupancy vehicle (HOV) lanes (as can buses), thereby saving travel time in areas where these lanes exist.

Completion of the HOV system (approximately by 1995) is estimated to reduce travel time by 23 minutes on the northbound stretch of Interstate 5 between Tacoma's South 320th Street and Seattle's Mercer Street. Travel time will be reduced from 32 minutes to the current 55-minute commute. The same commute heading southbound will be reduced 36 minutes from the present 77-minute commute.¹⁵

- Both vanpoolers and bus agencies can benefit from the flexibility of vanpools. "...they go where there are too few riders to warrant hourly bus service, and too many riders for a neighborhood carpool."¹⁶

- Vanpoolers, as indicated above, can realize cost savings when compared with single-occupant commuting and, in some cases, bus travel. Monthly costs for those in Pierce or Metro vanpools is approximately \$35.81, or \$430 annually. This is slightly cheaper than a two-zone Metro bus pass, which is \$517, and is significantly cheaper than the combined annual cost of gas, oil, and parking of \$3,040.
- Vanpools provide large employers, such as Boeing or Microsoft, with a high concentration of employees, particularly those that have shift schedules.

Lastly, vanpools will provide commuters with an option for reducing their vehicle miles traveled as local jurisdictions and major employers begin to comply with the transportation demand management requirements.

B. Community Benefits

A public transit system provides benefits to the entire community, an example of which is provided by a recent article in the Real Estate section of the Spokane Spokesman Review article. As the article states:

"Although Spokane is something of a 'tween-size city, its public transportation would do a larger city proud.

"For a variety of reasons--not the least of which is a demand for clear air--Spokane's transit system is designed for the future. As outsiders continue to discover the community and population increases swell traffic on city streets, public transit will play a bigger role in personal transportation.

"STA operates 11 park-and-ride lots, most with express service to downtown; a Vanpool and Ridesharing program...[and a] demand-responsive service for elderly and disabled riders.

"Spokane is a town which mobilizes itself for community events, and when it does STA is there with supplemental service, whether it's for a Spokane Indians baseball game, the Interstate Fair or Bloomsday. Other special-event service is provided for Neighbor Day at Riverfront Park on the Fourth of July, and Armed Forces Day at Fairchild Air Force Base."

- August 18, 1991

Community benefits in this study pertain to those advantages of public transit accrued to a larger concentration of people, a neighborhood or town, for example. With social benefits, a particular population within the community received an advantage from the availability of public transit. In this section, the community at-large benefits. The state's revised legal code summarizes this concept:

"All persons in a community benefit from a solvent and adequate public transportation system either directly or indirectly..." (Chapter 11, 1st. Ex. Session, Laws of '65, RCW 35.95.010).

Community benefits are generally more intangible than social benefits. They include the special event services provided by a transit agency that reduce the number of automobiles traveling through and parking in neighborhoods, or the education provided by a district to school children on the benefits of riding public transit, or the special crime prevention programs in which bus drivers are trained to watch for criminal activities along their routes. Without question, these transit-related activities provide benefits to the community as a whole but they are not easily quantifiable benefits.

There are also many of the other types of benefits, such as social and environmental benefits, that can be considered in this category. This is particularly evident from the literature, as described below.

An area where benefit categories overlap is in the provision of transportation for disabled or elderly persons. As discussed in the social benefit section, the provision of transportation services can reduce the reliance and cost of professional care; transit dependent individuals can shop on their own or attend to other activities and do not need the support of care-givers on a continual basis. As a result of these social benefits, the community receives advantages from increased productivity of the transit-dependent individual and the

"C-Tran tours acquaint children with bus system"

"Over 600 children have traveled to C-Tran from Clark County schools in the past year (1987), and 400 are scheduled to tour the facility during the first three months of [next year]."

"The trip[s are] designed to educate children about the advantages of riding public transportation."

- The Reflector, March 16, 1988

more efficient use of home help, assistance which can now be redirected to other parts of the community. As S.R. Bowlby, et.al. suggests in their paper on elderly and disabled paratransit services,¹⁷ this reduction in professional care costs could be estimated and compared with the amount of subsidy required to run the transportation service. The savings may not completely offset the cost but a more realistic picture of the benefits accrued from the service, the benefits to the various sectors rather than just the user, will be better understood. This analysis was not done as part of their study.

The literature also indicates that public transit can produce "environmental" benefits which then accrue to the "community." Several examples of this are presented in The Regional Plan Association's "The Renaissance of Rail Transit in America."¹⁸ This document discusses the benefits of rail transit but some of the benefits are also applicable to bus transit, including:

- The use of public transit reduces the number of vehicles on the road which lowers vehicle emissions and contributes to more rapid progress in the attainment of clean air.
- Transit can also improve the overall environment or ambiance of a community by decreasing the car and truck traffic on local roadways.

Quantification of these first two benefits can be found in the environmental benefit section of this paper.

- Finally, transit has the ability to handle "surge" loads of people attending special events, potentially increasing the attendance at such activities and reducing the parking and littering impacts of attendees on residential areas.

All of these environmentally-related benefits provide value to the community as a whole.

1. Special Event Service

The provision of transit services to special events was one of the most important community benefits identified by the transit agencies and is offered by virtually all districts. Though not quantified, significant benefits are cited by many districts in increased event attendance and tourism and tourism-related business as a result of transit service to major fairs and festivals. While local businesses benefit via increased sales, local and state governments benefit by receiving increased sales tax revenues. Less tangible and less quantifiable benefits are created in the form of:

- reduced traffic congestion at events;
- reduced parking requirements;
- reduced impact on neighborhoods adjacent to event locations; and
- generally positive community feeling as a result of successfully organized special events.

Specific examples of special event service provided by the state's transit agencies are listed below. Services include those identified in the survey responses; agencies may provide more than those listed below.

- | | |
|--------------|--|
| Ben Franklin | <ul style="list-style-type: none">• Hockey games• Benton-Franklin Fair |
| C-Tran | <ul style="list-style-type: none">• Clark County Fair• 4th of July activities |
| Clallam | <ul style="list-style-type: none">• Sequim Irrigation Festival• Forks 4th of July Celebration• Port Angeles Derby Days• Clallam County Fair |
| Community | <ul style="list-style-type: none">• Evergreen State Fair• Paine Field Air Show• Aqua Festival• Goodwill Games |

A letter to the editor of the Peninsula Daily News highlights some of the community benefits. While this article is on Clallam Transit, it is applicable to all transit agencies in the state:

"Clallam Transit gives comfort in storm"

"Being able to count on safe, reliable transportation during the past weeks of inclement weather provided me with a sense of comfort and security."

"The Clallam Transit System is part of the network of community services like fire, police and ambulance that are often unsung heroes in the community. Their existence ensures services that are continuous, dependable and designed to meet a variety of needs. Appreciation of these services often is not forthcoming until one becomes one of the needy."

"A measure of the quality of life in a community is the services offered those that are unempowered. The bus system presents an opportunity for this population--children, disabled, those without personal transportation--to partake of the cultural, educational and social activities provided by this community."

- Paula Epstein, Port Angeles, February 28, 1989

Spokane Transit Authority became involved in 1987 with the Lilac Bloomsday Roadrace at the request of the Bloomsday Association. The Association's intent in involving STA was to relieve traffic congestion in downtown Spokane caused by the convergence of over 50,000 participants and an equal number of spectators for a 7.2 mile running event. STA buses and vans transported 24,764 people for the early May Sunday morning event in 1991, up over 94% from the 1987 figures. STA buses and vans are also used to block downtown streets and channel runners in the starting line area. The majority of the Bloomsday passengers are moved between 6:30 a.m. and 9:00 a.m. into downtown and between 10:30 a.m. and 1:00 p.m. away from downtown. The service has grown so rapidly that the private sector will be approached in 1992 to provide additional coaches should STA's be unable to meet the expected service demand.

In 1987, 12,831 passengers were carried by 50 coaches utilized; in 1991, 24,764 passengers in 121 coaches.

- Spokane Transit, October, 1991.

- | | |
|--------------|---|
| CUBS | <ul style="list-style-type: none"> • 4th of July activities • Highlander Festival • County Fair |
| Everett | <ul style="list-style-type: none"> • Salty Sea Days |
| Grays Harbor | <ul style="list-style-type: none"> • Field trips • Day camps |
| Intercity | <ul style="list-style-type: none"> • Super Saturday • Lakefair Days • Harbor Days |
| Island | <ul style="list-style-type: none"> • County Fair • Race Week |
| Jefferson | <ul style="list-style-type: none"> • Christmas Light Tours • Fort Worden jazz Festival |
| Kitsap | <ul style="list-style-type: none"> • Kitsap County Fair • 4th of July events • Viking Fest • Fathoms of Fun • Sunday market in Pt. Orchard |
| Metro | <ul style="list-style-type: none"> • Husky games • Seafair • Puyallup Fair |
| Pacific | <ul style="list-style-type: none"> • Santa by trolley to light Christmas trees • Christmas lights tours • Trolley replicas used for festivals • Oregon shuttles for concert-goers |
| Pierce | <ul style="list-style-type: none"> • No particular events listed |
| Prosser | <ul style="list-style-type: none"> • Summer recreational activities • Field trips |
| Pullman | <ul style="list-style-type: none"> • No particular events listed |

Kitsap Transit cites as direct benefits of its shuttle service to the Kitsap County Fairgrounds the fact that the County's scarce resources have been able to be spent on construction of a major pavilion and avoidance of the need for investment in parking facilities.

A secondary benefit cited is the Fair's ability to market regionally in order to attract visitors from the entire Seattle metropolitan area who are able to attend events by using the ferries and then local transit service.

At the recent 1991 Kitsap County Fair, Kitsap Transit transported almost 19,000 riders to the fair from the ferry terminals and from parking areas, a 27% increase over last year.

This is not to imply that these bus riders would not have attended. What is important to note is that a greater number of fair attendees are traveling by bus (discounting an increase in overall fair attendance). This means these individuals are not traveling by car and are lessening the impacts associated with cars in the surrounding neighborhoods and community.

- | | |
|---------|--|
| Spokane | <ul style="list-style-type: none">• Bloomsday (see sidebar)• Fairchild AFB Open House• Holiday Lights tours• Lilac Festival |
| Twin | <ul style="list-style-type: none">• Air shows• Holiday celebrations• Sporting events• State conventions |
| Valley | <ul style="list-style-type: none">• Balloon Stampede• Summer Musical• Southeastern Washington Fair• Christmas lights tours |
| Whatcom | <ul style="list-style-type: none">• Scenic city and county tours |
| Yakima | <ul style="list-style-type: none">• Central Washington State Fair• Yakima Air Fare• Folklife Festival• Christmas Light Tour |

Transit agencies are also involved in numerous outreach activities which benefit the community:

- Transportation in Yakima is provided until 3:30 a.m. on New Years Eve, with Yakima Transit's "Be Home Free" program.
- C-Tran's "Safe Watch Program" (highlighted in a previous sidebar) instructs bus operators to be alert to and report any "unusual" circumstances that they notice along their routes. The operators can also provide assistance to individuals in need.
- Both Community Transit in Snohomish County and City of Everett Transit promote the D.A.R.E. education program at schools.
- City of Everett Transit has a disaster emergency plan.

Some of the districts also mentioned the importance of transit in reducing the need for additional parking

"Helping fire victims"

An article in the Tacoma News Tribune provides an example of how transit agencies get involved in community support. As stated in the article:

"Because many of the residents in the Hilltop's Bolivar Apartments initially thought it was just another false alarm, the three-alarm fire that struck the building Tuesday could easily have turned into tragedy.

"Fortunately, no one was hurt in the blaze. That left another problem: caring for more than 200 displaced residents, most of them Asian refugees.

"What followed was a fine example of community cooperation. The Red Cross, local churches, Explorer Scouts, Pierce Transit and several social service agencies all responded quickly in providing food, bedding and shelter for the fire victims."

- June 6, 1991

facilities. Kitsap Transit noted that the provision of transit in their community reduces parking problems at ferry terminals and at major work sites. While congestion, particularly at the ferries, is not eliminated, it is prevented from worsening with transit service because many individuals no longer need to "park and ride."

Similarly, businesses can reduce parking requirements through increased transit availability. This benefit is detailed in the land use section of this paper. In general, fewer parking demands not only reduce traffic congestion but they also improve a neighborhood's appearance, resulting in an overall benefit to the community.

2. Pre-paid Service

Some of the districts (Metro, C-Tran) provide pre-paid downtown shuttle services. This service can increase activity at local businesses and can improve the local economy. Commuters can also use the pre-paid shuttle service during the day and eliminate the need for an automobile at work. Island Transit is pre-paid throughout its service area. Pacific Transit offers pre-paid service the week before Christmas to encourage local shopping. Intercity Transit in Olympia offers pre-paid service on its legislative and state office shuttles.

The specific benefits of pre-paid service to a community arise in several ways:

- improved accessibility and circulation in the downtown core or area;
- operational efficiencies gained by being able to use both front and rear doors of the bus for boarding and exiting;
- incentives to users to ride transit on an ad-hoc basis for impulse trips (e.g., shopping on the lunch hour, errands) or when auto use is inconvenient; and

- additional retail and restaurant purchases made possible by the increased mobility provided by pre-paid zones.

This service also has important social benefits (access to concerts, social interaction, vitality) and land use benefits (provides opportunity for higher density employment and retail centers). An example of the land use benefit exists in Portland, where over 50% of all retail shoppers come by transit, detailed in the economic benefit section.

Seattle Metro's pre-paid downtown service provides an example of the benefits described above. The City of Seattle and Seattle Metro are currently in negotiations regarding Metro's pre-paid service (the service is "free" to riders but is "paid" for in part by the City; the remainder is "absorbed" or paid for by Metro). The City currently (1991) pays Metro \$150,000 each year for the service; the contract is established for a 4-year increment. The present negotiations are expected to almost double that amount annually for the next 4-year period.

It can be assumed that the City of Seattle would not continue to negotiate for this service if they did not conclude that they receive economic and other benefits. The City of Seattle has spent considerable amounts in the last decade to revitalize downtown. The amounts spent on the pre-paid service zone are part of an overall public policy to strengthen the downtown vitality, the success of which can partially be seen by the number of high-end retailers (Gucci, Barney's of New York) that have located downtown because of this effort. Therefore, the City and downtown merchants are acting in their own best interest; that they would not be prepared to spend tax dollars on this service if they and the community did not benefit.

According to the Seattle Downtown Business Association¹⁹, the pre-paid system has had a:

"tremendous impact on downtown business in general. With 185,000 people working downtown, the pre-paid system makes sense:

not only does the system allow more people to ride more efficiently (since both front and back doors are used), but it also eliminates unnecessary use of the auto during the day.

Businesses benefit, too. Shoppers may choose to shop in the retail core during lunchtime and can use the bus to access the stores."

In addition, Metro would not continue to pay the remainder of the cost for this service if they did not benefit. Metro pays for the additional cost of the pre-paid service because of the operating efficiencies (mentioned above) of the buses and increased circulation downtown of traffic.

The newest transit agency in the state, "Link" in Chelan Douglas, has also adopted a pre-paid system. In a memorandum documenting their pre-paid philosophy, the General Manager of Link indicates the following:²⁰

"The citizens of the Chelan/Douglas PTBA (dba Link) have mandated policies related to the provision of public transportation services that embody the true spirit of public service. These progressive thinkers recognize that public transportation services, like public libraries, emergency services, and water/sewage services, are a benefit to the communities beyond the cost of service. Those intangible benefits provide an improved quality of life; the value of which extends far beyond any financial benefit derived from a users fee.

"For this region of the state, the philosophy adopted acknowledges the initial cost for start of new services and an on-going need to fund continued delivery of that service. As it relates to the PTBA, this was legislated by our citizenry when they approved the sales tax initiative of four tenths of one percent in September of 1990. It was felt that an individual users fee, a fare collected for riding transportation services, double charges the

user. It presents a barrier to citizens that is contrary to the PTBA's mission and goals. It works against the benefits derived from public transportation services.

"The leaders in the Chelan/Douglas area believe that the needs of the citizenry and visitors, the quality of life, community pride and regional image, are best served by public transportation, services through a prepaid or fare free philosophy. It is believed that innovative policies, like these, better solve the issues of growth and development for our communities."

Fare elasticity research tells us that any fare reduces transit bus ridership by up to 25% versus fare-free travel. It can be argued that ridership would be significantly lower if fares were charged in the districts which now have fare-free service.

3. Education Service

Numerous transit agencies cite their support of public education through service in transporting public school students to and from school, providing service for after-school activities, and for special school events and trips. No data is available to quantify the number of trips provided in these areas and thus the dollar value of this service to communities, families, school districts and the state. Order-of-magnitude figures for the value of this community benefit can be arrived at by noting that, statewide, an average of \$229 per student was spent by the State of Washington in the 1990-91 school year to transport public school students. (The \$229 per student represents an average; the cost varies for elementary and high school students and is much higher for special education students. The number was provided by office of the Director of Transportation Services for the Superintendent of Public Instruction.)

At that funding level, about 50% of public school students were transported. The remaining 50% presumably traveled to school in one of 3 ways: walking,

being driven by parents, or using public transit. For every student using public transit to travel to and from school, \$229 in transportation costs is avoided by the state and by school districts (e.g. if 10,000 students were using transit, \$2.3 million would be saved).

C-Tran bus drivers, under a program called "Safe Watch," are trained to watch for burglaries, stranded motorists, robberies, assaults, children in danger, and other problems.

Asked about the advantage of this program, a Clark County Sheriff's community services officer stated:

"They're out there every day, doing their bus routes...They know the vehicles that belong in an area, and they know the people who belong in the area. Safe-Watch is an aspect of community-oriented policing.

"It's getting the community to team up with law enforcement so we can be working together for...public safety."

- The Columbian, September 13, 1990

Another significant benefit is provided to private school students and their families. Statewide, some 64,000 students attend private schools. While some of the larger private schools operate their own bus fleets, and while elementary school children are much less likely to be using public transit, it is possible to assume that 25% of all private school students are riding public transit to and from school. At an average cost of \$229 per student, the state's communities are receiving a benefit of \$3.7 million dollars in transportation of private school students. Viewed from another perspective, if all private school students were attending public schools and were being transported with state funds at the same rate as current public school students (50%), then the State of Washington would be incurring an additional \$7.3 million in school transportation costs.

4. Other Community Services

Transit agencies also indicated that the provision of transit service in their area improved access to community facilities such as parks, senior centers, Greyhound bus services, camps, medical facilities, outlet stores. Public transit provided by Valley Transit and Pullman Transit allows students to enroll in alternative schools for which transportation is not available and allows college students to find cheaper housing away from campus and reducing the need for building university funded housing.

Many of the transit agencies indicated that bus ridership dramatically increased during "inclement" weather (see previous sidebar). Some mentioned that they operated additional service during these periods to meet the increased demand. Clearly, this "bad weather" service allows the community to continue with its daily operations, allowing transit users and non-users to travel to work and local businesses to remain open, providing

not only community benefits but also advantages to the local economy.

As evident from the transit agency responses, the provision of transit provides numerous benefits to a community, some very discernible, others not quite so obvious. Certainly, the development of a policy for a minority population (i.e., transit service for elderly and disabled) will have implications for the majority; the benefits in one sector (e.g., social benefit to elderly/disabled groups) will cross over into other sectors (community, environment, economic). Traditional evaluations of transit tend to overlook not only the non-quantifiable factors but also the cross-sector benefits of transit. The extent to which these can and will be tracked through a community depends on the resources that can be dedicated to this effort. However, omission of those non-quantifiable benefits can diminish the vital and extensive role that transit plays in improving the quality of life in a community.

C. Environmental Benefits

The Problem?

"Almost 70% of daily peak-hour travel on the urban Interstate System in 1989 occurred under congested or highly congested (near stop-and-go) conditions. This represents an increase of almost 30% since 1983.

"The duration of daily freeway travel operating at extremely congested conditions approaching a complete breakdown, or gridlock, increased 45% from 1985 to 1988, from 5.4% to 6.2% of daily vehicle-miles of freeway travel. This was twice the rate of travel increase. Daily travel that faced heavy congestion increased almost five times as fast as the increased in added lane-miles of freeway capacity over the same period for these urbanized areas.

"The proportion of total travel under congested conditions is highest in the largest urbanized areas. An estimated 50-60% of all urban travel delay occurs in the 10 largest urbanized areas. However congestion is extending to more areas, especially to suburban areas and to facilities that connect and approach urban areas."

- from "Roadway Congestion in Major Urbanized Areas 1982-1988," cited in WTS National Newsletter, September/October 1991.²¹

Environmental benefits associated with mass transit include those benefits which improve or enhance the quality of the environment, including traffic congestion reduction, air quality, and energy resources. Environmental benefits such as these are the most commonly quantified environmental benefit found in the literature. Certainly, these benefits will be quantified more often in Washington State as the effects of Growth Management and Transportation Demand Management legislation are measured. However, the primary focus of this discussion is the summary of environmental benefits from the literature and survey responses and the quantification of some of these features.

1. Traffic Congestion

One of the major benefits of transit, according to a study conducted in Texas,²² is that motorists are taken out of low-occupancy vehicles and put into high-occupancy buses. This reduction in single-occupant vehicles (SOV) will consequently reduce congestion (or at least improve the efficiency and effectiveness of the transportation system), fuel consumption, and accidents for all motorists, not just those traveling by bus.

Air quality also has the potential to improve through the reduction of single-occupant travel. The benefits of air quality and energy conservation are discussed below. But what are the implications, if any, of a more efficient transportation system (i.e., the replacement of low-occupancy vehicles with high-occupancy modes) for Washington State?

Seattle Metro prepared an estimation of the roadway construction that is potentially avoided due to increases in transit ridership. Based on the methodology that is described below, Metro staff estimated that:

- "Increases in Metro ridership since 1973 - the year Metro assumed responsibility for transit service in King County - have substituted for about 53 freeway lane miles."²³

The Answer?

Part of the solution lies in converting low-occupancy vehicle trips for high-occupancy trips. As indicated in the APTA Transit 2000 Task Force's Final Report, the potential for public transit to reduce congestion is significant. Consider that:

- *One high-occupancy vehicle lane carries the same amount of people as three regular highway lanes.*
-
-

This freeway construction avoided was calculated by the following method. It should be noted that Metro staff indicate that their estimate "is a gross estimate in that it does not account for geographic distribution of the trips, and also assumes that the trips are converging on a single center. Given the current orientation of Metro service to downtown Seattle, however, refinements to this estimate may not produce significantly different results." As With these assumptions in mind, the following estimate was made. stated in the Metro memo (dated September 3, 1991):

- **"New weekday riders.** Between 1973 and 1990, Metro's annual bus ridership grew to 70 million from 36 million, or a net gain of 34 million. Using an annualization factor of 297 (used in the region's ridership models), this converts to 115,000 new weekday bus riders. Also, Metro's Vanpool services carry about 5,000 weekday riders. All of these can be considered new riders, since Vanpool services did not exist in 1973.
- **Peak hour ridership.** Peak hour travel has the most pronounced effect on transportation facility needs. Of these, freeway lanes are of most interest because of the proportion of peak hour trips using freeways and because of the cost and difficulty in siting freeway facilities. By reducing the above estimate to new peak hour bus and vanpool riders, some measure of Metro's impact on freeway needs can be calculated.

About half of Metro's bus riders, and virtually all of Metro's Vanpool users, travel during the peak periods. Also, about half the mileage of peak period bus trips, and virtually all the mileage of vanpool trips, is freeway-related. Thus, Metro's new weekday bus riders using freeways convert to about 14,500, as follows: $115,000 * 0.5$ (half of bus ridership is in the peak) $* 0.5$ (to reduce to one peak) $* 0.5$ (half of trips are freeway-related). Vanpool ridership during one peak period is about 2,500, nearly all of which is freeway-related. In all, then, Metro carries about 17,000 new riders on

freeway-related bus and Vanpool services during the peak period.

Each peak period lasts for about 2.5 hours, during which time the peak hour travel volume is roughly equal to the mean volume for that period. Thus, Metro's peak period, freeway-related ridership converts to about 6,800 in the peak hour."

Public transit relieves highway congestion and provides commuters with an alternative to the single-occupant vehicle.

In New York alone, businesses are losing 350,000 employee-hours a day because their employees are stuck in traffic. A recent Wall Street Journal article reported that the average Boston commuter will spend four years in traffic jams by retirement. In a General Accounting Office survey, business leaders in 13 major cities said that traffic conditions affected their employers' punctuality and productivity.

- Passenger Transport, August 19, 1991)

- "Freeway construction avoided. New, peak hour transit ridership can be considered as a substitute for freeway lane miles that otherwise would have been required to carry these riders. The extent of substitution is the net difference between the lane miles required to carry these riders in automobiles, versus the lane miles required to carry these riders in buses.

If Metro's new peak hour ridership were carried via automobile, about 57 freeway lane miles would be required. This is calculated as follows: (6,800 riders/1.2 occupants per auto/2,000 autos per lane per hour) * 2 (to convert for 2-way lane mileage) * 10 miles average work trip length.

Carrying this same passenger volume via buses requires about 4 lane miles, as follows: (6,800 riders/50 riders per bus/670 buses per lane per hour) * 2 (to convert to 2-way mileage) * 10 miles average work trip length.

Given these estimates, Metro service for new riders since 1973 substitutes for about 53 freeway lane miles."

It is important to note that while this estimate was calculated by and for Metro, the results have implications statewide. It can be assumed that similar data could be generated about the urban transit systems in the state (since that is where the greatest concentrations of population and hence vehicle trips are) and that similar results (though not necessarily as high) would occur. The conclusion, based on these

"Clean machines at Pierce Transit"

"Tacoma and Pierce County residents can breathe a little easier today thanks to some pioneering work by Pierce Transit. The public transit operation has begun running 19 buses fueled by clean-burning natural gas.

"Tests show that buses built to operate on natural gas can reduce such pollutants as carbon monoxide by 90 percent and smog-producing hydrocarbons by 80 percent.

"The most noticeable difference between the typical bus that runs on diesel fuel and one that runs on natural gas is what the average person can see coming out of the tailpipe. According to the American Lung Association, the typical diesel vehicle spews out a gallon of solid, sooty particulate pollution for every 570 miles driven. A bus running on natural gas puts out virtually no particulate emissions.

"By the end of 1992, a total of 50 buses--fully a third of the Pierce Transit fleet--will run on natural gas.

*- Seattle Post-Intelligencer
Editorial, March 27, 1991*

assumptions, is that without transit, roadway construction would have had to occur at a greater rate to accommodate the trips made by bus and van and that the economic value of that transportation investment that did not occur because of transit ridership is considerable.

2. Air Quality

All transportation sources are major contributors to air pollution. Before the amount of pollution is identified, a brief summary of major pollutants is provided.

The most common air pollutants produced by transportation sources include:

- carbon monoxide (CO) - a colorless, odorless, very toxic gas formed through the incomplete combustion of fossil fuels and one of the major air pollutants produced by automobiles;
- hydrocarbons (HC) - some of these compounds, called volatile organic compounds, are also caused by the incomplete combustion of fossil fuels, are carcinogenic, and combine with nitrogen oxides to produce smog;
- nitrogen oxides (NO_x) - formed primarily by motor vehicles; is relatively harmless except when exposed to sunlight when it converts to nitrogen dioxide, a much more poisonous gas; and
- particulates - produced primarily by industrial operations, wood burning stoves, and dust from construction activities.

Just how much of these pollutants does transportation generate? APTA has reported that 40% to 60% of ozone-producing pollutants (nitrogen oxides and hydrocarbons) come from transportation sources.²⁴

In Washington State, the Department of Ecology has estimated that motor vehicles account for 43% of

the state's air pollution.²⁵ The state's motor vehicles generate:

- 1 million tons of carbon monoxide;
- 106,000 tons of nitrogen oxides;
- 188,000 tons of volatile organic compounds (mostly hydrocarbons);
- 3,000 tons of combustion particulate; and
- 177,000 tons of fine particulate from road dust.

APTA indicates that:

"due to the large carrying capacity of transit vehicles, every time a commuter rides mass transit instead of driving, that person reduces air pollution.

"One person using mass transit for a year instead of driving to work saves our environment:

- *9.1 pounds of hydrocarbons,*
- *62.5 pounds of carbon monoxide, and*
- *4.9 pounds of nitrogen oxides.*

Riding transit cuts hydrocarbons by 90%, carbon monoxide by 75% and nitrogen oxides by 15% to 75%.

- APTA, "The Clean Air Alternative"

On a more localized level, an air quality analysis conducted by TRC Environmental Consultants²⁶ in 1990 to evaluate the air quality implications of transit for Seattle Metro estimated the potential reduction in air pollutants from the use of buses. Their study indicated that, for the King County area, transportation sources annually produced:

- 369,668 tons of carbon monoxide (79% of the CO emissions total from transportation sources in King County);
- 30,929 tons (88% of nitrogen oxide emissions from transportation in King County);
- 48,378 tons (59% of volatile organic compounds (hydrocarbons) emitted from transportation in King County); and
- 104,569 tons (88% of suspended particulate matter from transportation sources in King County).

It is clear from these numbers that transportation is a major generator of air pollutants. Therefore, if vehicle trips can be reduced, or shifted to less polluting modes of transportation, vehicle emissions can also be reduced.

Transit is one of those less polluting modes of transportation as compared to single-occupant vehicles. The study conducted by TRC Environmental Consultants calculated the potential reduction in emissions that could be attributed to transit. To do this, TRC calculated bus emissions from Metro's service area based on year 2000 calculations of 3,700,000 platform hours per year and 14 miles per hour average speed, average emission rates by bus vehicle-mile travel, and average and maximum bus occupancy rates (27 and 57 seated passengers,

*Environmental Improvements of
Public Transit:*

- *One driver using mass transit to work can eliminate 130 pounds of combined air polluting emissions over a year's time.*
- *A 4-person carpool reduces air polluting emissions by 390 pounds and saves 1,500 gallons of gasoline each year.*
- *An 8-person vanpool reduces air polluting emissions by 1,040 pounds and saves 3,300 gallons of gasoline yearly.*
- *Forty people traveling by bus helps reduce emissions by 5,200 pounds and saves 18,350 gallons of gas.*

- *LACTC Commuter's Guide,*
1991

respectively). Assuming that each platform hour of transit service could potentially replace 180 vehicle miles of low-occupancy travel, TRC then estimated the emissions from the number of displaced low-occupancy vehicles (low-occupancy vehicles have an average occupancy of 1.2 passengers and travel at an average speed of 19.6 miles). This data was input into the U.S. Environmental Protection Agency's Mobile4 emissions model to calculate emission amounts for carbon monoxide, hydrocarbons, and nitrogen oxides for bus and low-occupancy vehicles. A comparison was then made of the bus and low-occupancy vehicle emissions. This comparison is shown in Table 7.

From Table 7, and assuming that "the transit system were used at even about 1/2 its capacity (27 people/platform hour), the transportation sector would generate much less of each pollutant considered [in their analysis]...using buses instead of low-occupancy automobiles would *prevent* the emission of:

- 920 tons/year of hydrocarbons,
- 13,415 tons/year of carbon monoxide,
- 409 tons/year of nitrogen oxides, and
- 1,810 tons/year of inhalable particulate matter

that would otherwise be emitted by people driving cars."²⁷

As indicated in the TRC analysis, their emission estimations do not account for the additional savings that would accrue from using electric buses or alternative fuel vehicles. The study also indicated that transit has its greatest benefit when it is most needed. As stated in the report:

"Because internal combustion engines generally run more efficiently at higher speeds compared with very low or idle speeds, most vehicle engines emit more carbon monoxide when traveling slowly."²⁸

Table 7
Annual Emissions from Transit and Gasoline-fueled Automobiles

Pollutant	Tons Per Year (Automobiles)	Tons Per Year (Buses)	Tons Per Year (Net Reduction)	Percentage Reduction
HC	1,067	147	920	-86%
CO	14,272	857	13,415	-94%
NOx	980	570	409	-42%
PM10	1,976	166	1,810	-92%

From: "Air Quality Implications of Transit in the Year 2000," TRC Environmental Consultants, November 20, 1990, p. 2.

TRC highlighted the relationship of speed to the CO emission rate. An example indicates that "carbon monoxide emission rates at 6 mph are only about half those at 2.5 mph." As a result,

"transit has its greatest air quality benefits in congested conditions. In addition to reducing emissions in proportion to the number of low-occupancy vehicles it displaces, transit reduces the average carbon monoxide emission rate of the remaining low-occupancy vehicles because average speeds increase when congestion is reduced.

Because ridership is highest during peak-travel times, transit has its greatest benefit during the hours of the day when it is most needed."²⁹

As efforts to control vehicular traffic and improve air quality increase in the state from GMA, TDM, and Clean Air Act legislation, so too will the demand for public transit.

3. Energy Resources

In an attempt to curb Seattle's growing smog problem, [Metro, Seattle, and King County] are ready to invest in their first alternate-fuel gas station. All three agencies plan to convert at least a few of their cars, trucks, and vans this year to run on compressed natural gas.

Fred Jarrett, Metro's Transit Committee chair said of the program, "The idea is to get employees out of their car pools in the morning and into clean-air vehicles during the day."

The Ecology Department estimates that motor vehicles statewide generate 1.3 million tons of pollutants annually. Vehicles that use natural gas generate almost no soot, carbon dioxide and other harmful ozone emissions.

Fuel costs for public agencies using natural gas also should drop to as little as 36 cents per gallon.

The state estimates it could save \$1.8 million annually in fuel costs if it converted to an all natural gas-powered motor vehicle fleet.

- Excerpts from a June 24, 1991 Post Intelligencer article

This program will allow the conversion of motor pools to CNG, resulting in economic and environmental benefits. Expansion of motor pools will also enable increased transit ridership by providing daytime mobility.

The use of transit instead of automobiles can also conserve energy. Transportation modes, the dominant source of air pollution, is also the major consumer of oil in the United States.

- Approximately 63% of all oil used in the U.S. was used for transportation;
- 22% of all oil was used by motor vehicle transportation.
- In 1989, the country's bill for imported oil was greater than 40% (\$45 billion) of the U.S. \$101 billion trade deficit.³⁰

Clearly, from these figures, we are a nation dependent on oil, particularly that from foreign countries, for our mobility. Changing modes of travel from low-occupant vehicles to high-occupancy vehicles and buses can increase energy efficiency, reduce dependence on foreign oil supplies, and consequently increase our national security.³¹

Individuals can realize savings from using public transit. According to APTA, the average household:

- owns two automobiles,
- uses 1,014 gallons of gasoline each year,
- travels 18,595 miles per year, and
- spends 19% of their income on transportation.
- **200 gallons of fuel will be saved per year for each commuter switching to public transportation.**³²

Therefore, commuting to work via transit will simultaneously achieve many objectives: reduced personal expenditures on fuel, decreased demand for gasoline, reduced dependence on foreign oil, improved air quality, reduced stress levels (and potentially medical costs) associated with long commutes in congested conditions. All of these factors together will enhance

not only the individuals quality of life but also the quality of the environment.

What does this mean for Washington State? How can transit help to relieve dependence on foreign oil, reduce the number of vehicle miles traveled each year, improve the air quality, and conserve energy? The transit agencies provided some responses regarding environmental benefits. Many of the responses identified reduced congestion, fewer vehicle miles traveled (VMT), and reduced air pollution as major environmental benefits of transit. Rideshare services and implementation of TDM programs were noted as services that would significantly reduce congestion and improve air quality. Even districts that do not experience severe air pollution problems indicated that they realize air quality benefits from public transit.

Below are some numbers derived for this study that begin to quantify the contribution the state's transit agencies in achieving these goals.

The method used to quantify this benefit is a combination of methods. Ideally, to quantify energy savings, a formula would be derived that accounts for:

- the number of commuters who would otherwise drive if the bus was not available (not 100% of transit riders because some would not make the trip, would relocate and find another job, or would walk or bicycle);
- the average length of the commute trip;
- the average miles per gallon of the average automobile; and
- the average number of gallons used per commute trip.

These could be combined to determine the amount of gasoline not consumed by all commuters for each district and could then be aggregated to arrive at the amount of gasoline not consumed by all commuters in Washington State.

Improved Quality of Life from Energy Savings

"Energy Conservation

- *Every time 40 single-passenger-car drivers take a 10-mile trip to work on the bus, 10 to 15 gallons of gasoline are saved.*
- *If average commuter-vehicle-occupancies were increased from 1.1 passengers per vehicle to 2.1, 30 to 40 million gallons of gasoline would be saved each day."*

- *LACTC Commuter's Guide, 1991*

For purposes of providing an order-of-magnitude estimate of energy usage, we developed a measure for diverted auto trips (i.e., number of commuters who would otherwise drive). The Puget Sound Council of Governments published a detailed inventory in June, 1991, of all the public park and ride lots in the Puget Sound Region, including those in Island, King, Kitsap, Pierce, Snohomish, and Thurston Counties. Each lot was inventoried for the number of stalls and the weekday utilization. From this, we devised an average percent utilization and calculated the amount of energy that is saved by these commuters. This calculation can provide some order-of-magnitude of energy savings for the Puget Sound Region and, from that, can provide an indication of the energy savings for the entire state.

The PSCOG data revealed the following:

APTA indicates that:

- *A bus with as few as seven passengers is more fuel efficient than the average auto used for commuting;*
- *The full efficiency of a fully-occupied bus is six times greater than that of the average commuter auto;*
- *A 10% increase in transit ridership in the five largest U.S. cities would save 85 million gallons of gasoline a year;*
- *A 10% nationwide increase in transit ridership would save 135 million gallons of gasoline a year; and*
- *Every Commuter Who Switches From Driving Alone to Transit Saves 200 Gallons of Gasoline per Year.*

- *APTA, "Public Transit-The Vehicle for Conserving Energy"*

- A total number of 22,933 stalls are available in these five counties;
- The average utilization of these stalls in the five counties is 60.5%,³³ and
- The average number of commuters using those stalls is 13,874 per day.

This means that, on average, across these five counties, 13,874 people are traveling by bus rather than by car to work. This does not, of course, account for those commuters not using the park and ride lots but commuting by bus. In addition, when the gasoline savings are computed, it will not account for the gas used to drive to and from the park and ride lot. As indicated, this quantification is very conservative but does provides an indication of the energy savings in these five counties. The actual energy savings in the entire state will be greater than that shown in our calculation. The energy savings calculated are shown in Table 8.

Table 8
Energy Savings by Auto Trips Diverted by Transit

Commute miles saved/day	137,874 commuters at P/R x 23 miles (11.3-mile each way) =	313,553 miles not driven per day
Gallons of gas saved/day	313,553 / 20 mpg =	15,678 gals. gas not consumed per day
Gallons of gas saved/year	15,678 * 250 commute days =	3,919,500 gals. not consumed per year

Therefore:

- A total of over 3.9 million gallons of gasoline are not consumed by park and ride commuters each year in the five Puget Sound Region counties; or
- Each of the 13,874 commuters do not consume approximately 282 gallons of gasoline each year.

APTA indicates that every commuter not driving to work saves 200 gallons of gasoline per year (just slightly less than the above calculations estimated). Based on the average number of commuters above (13,874), this would result in over 2.7 million gallons of gasoline saved per year.

D. Land Use Benefits

Land use benefits of transit are those which affect or improve aspects of urban form such as open space, clustering of activities, and development density.

"Land use policies and development patterns play a major role in transit usage and effectiveness. At a recent C-Tran Board Meeting, Clark County Commissioners expressed a desire to move the C-Tran review of new projects from the post-application step to the pre-application step. As a result of the direction from the Clark County Commissioners, the development process is being modified and C-Tran will participate at the pre-application level.

"C-Tran is also working with the City of Vancouver and other cities of Clark County for a pre-application sign-off process. By including C-Tran at this early stage development, site plans can be designed which are transit/pedestrian friendly without adding cost to the developers. This change in approach to new development reflects Clark County's continued commitment to maximize opportunities for growth to occur in a manner which the transportation system can accommodate."

- Les White, C-Tran Executive Director, August 22, 1991

The relationship between land use and transportation, and the ability of one to influence the other, is well documented in the literature. Several of documents were reviewed for this study including

- Metro's publication, in May, 1987, "Encouraging Public Transportation Through Effective Land Use Actions;"
- APTA's "Building Better Communities Sourcebook" on coordinating land use and transit planning, and their Transit 2000 Task Force's Final Report;
- an article by Robert J. Spillar and G. Scott Rutherford on "The Effects of Population Density and Income on Per Capita Transit Ridership in Western American Cities;"
- an article by G.B. Arrington, Jr. on "Light Rail and Land Use: A Portland Success Story;"
- Vukan R. Vuchic's Urban Public Transportation: Systems and Technology;
- John R. Meyer and Jose A. Gomez-Ibanez's Autos, Transit and Cities; and
- Alan Altshuler's The Urban Transportation System Politics and Policy Innovation.

In addition, discussions were held with City of Portland officials on the success of their city's parking lid program. Clearly, from the literature review alone, the land use/transportation connection is a well recognized entity.

1. Land Use Density and Transit

The degree to which transportation and land use can influence each other depends on several factors, the most obvious being the correlation between land use design and density and transit usage. This relationship is clearly outlined in Spillar and Rutherford's paper.³⁴

Kitsap Transit, in their survey response, gives a direct example of using transit as a land use management tool in a development near Poulsbo's village core in which the promise of specific transit services has allowed the City and the developer to agree to a higher density development while also providing more community amenities.

A similar project, with similar related hopes and design goals, is in development stages with the City of Bremerton and a developer on a major parcel off Wheaton Way in East Bremerton, adjacent to a major strip-mall shopping area.

The reciprocal benefit is of transit helping communities develop housing situations where individuals can survive well without an automobile and of the transit agency having a residential opportunity for transit-oriented individuals along routes.

They indicate that most transit riders will walk a maximum distance to access a transit system (Metro indicates that this distance is no more than 500-1,000 feet), hence, ridership numbers will potentially increase as the density around a transit stop increases. Density increases, then ridership increases, and then demand for transit service also increases. As a result, transportation services to that facility will be improved to meet the growing demand and consequently more riders will be encouraged to use the system. Businesses are attracted to that location to take advantage of the potential customer base. Density increases ridership and ridership increases density and the cycle is complete.

The problem, however, is that this linkage, this potential for transportation to influence density, is more applicable to rail transit than to bus transit outside of traditional central business districts. The impact of rail on land use patterns is seen in many cities: Portland, Vancouver, Toronto, Paris, and Stockholm. The same impact, according to Vukan R. Vuchic, is "seldom tangible [with buses] owing to their lack of fixed facilities and the flexibility of routes."³⁵ This is not to imply that some connection between the two does not exist.

The state's transit agencies have demonstrated, as shown in the next section, that the presence of their bus systems has had a positive effect on their economy. New industries have been attracted to their area partially due to the existence of a transit system, tourism has been supported, and economic stability of many communities has been enhanced through the presence of a public transportation system. Bus transit can therefore *affect* land use economics, it simply cannot *influence* development patterns as visibly as fixed-rail (with the exception of busways, such as in Ottawa, Canada, that behave more as fixed-rail systems in terms of land use patterns than other non-fixed bus systems). It must be noted that the land use decisions still remain with the local jurisdiction and most transit agencies are not involved in the land use decision process.

Bus transit can provide a different type of land use linkage. Transit can allow growth in an area to occur,

particularly in a downtown, without the negative impacts associated with automobiles. Rather than employees and clients of a new development having to arrive by car, they can use public transit to access the facility. Additional freeway lanes are not needed (as discussed in the environmental benefit section), additional air pollutants are not generated, and congestion growth is lessened.

A number of districts, especially in the Puget Sound region, cite the benefit of transit as a land use management tool and as a major implementing force for the Growth Management Act. Planning agencies together with transit agencies are able to work to balance the need for concentrating growth in urban areas without negatively affecting the residents' quality of life. Transit services also help communities develop housing situations in which individuals can live, work, and play without an automobile, thus providing housing opportunities for transit-oriented individuals (e.g. senior citizens). The increased densities made possible by the availability of transit in dozens of communities throughout the state will generate substantial monetary benefits to cities and developers (more units per acre, avoided parking costs) as well as to local governments in the form of increased property and sales tax revenues. The less quantifiable benefits in reduced sprawl, preservation of open space and general improvement of the quality of life in our communities are difficult to attach numbers to, but are clearly perceived by the region.

Another factor influencing the land use and transportation connection is the extent to which planning policies foster this relationship. Higher density development, as mentioned above, will secure the link for the transportation system by providing potential riders and encouraging businesses to locate in the vicinity. Most communities, however, favor low-density, single-family, low-scale development; the type of development that is antithetical to the success of a transit system. Granted, this type of development will become less pervasive as the objectives of the Growth Management Act are implemented. As Pierce Transit

Almost all of the transit agency managers are involved to some extent in regional planning. District staff are often requested to review plans for large-scale developments and are involved in the regional transportation planning organization (RTPO) (see also sidebar regarding C-Tran).

In addition, transit has been identified in some communities as an important player in accommodating future growth and lessening the traffic and parking problems. Transit in other districts allows housing to be developed in areas where residents do not have to be auto-dependent. Districts indicated that transit encourages infill development, something that is compatible with GMA goals, and reduces urban sprawl.

stated in their survey response, "the stick has now been provided and the impetus to use bus transit to shape environmentally-sensitive land uses will be greater." But transit cannot act alone. The authority to establish and implement these types of policies must come from the local and state land use agencies. These groups must establish the design guidelines and zoning regulations that will create land use that is more compatible with public transit.

APTA, through its Transit 2000 Task Force, emphasized the importance of coordinating land use policy with transportation planning. In the final report, the Task Force reiterated the significance of integrating the federal transportation policy with land use programs. Their rationale for this policy linkage is that it could "provide an environment that is conducive to and encourages increased provision and use of high-occupancy, shared-ride services." This concept could also be readily extended to state and local transportation policies in Washington, a policy linkage which would clearly support other recent policy developments, namely the TDM objectives of reduced single-occupant auto use and increased high-occupant vehicle driving and the GMA guidelines of more concentrated development patterns.

2. Parking and Transit

Greater reliance on buses potentially allows for growth (which most often includes an increase in parking spaces) beyond that which could occur if single-occupant vehicles had to be accommodated within the existing infrastructure and this additional growth can occur with a reduced impact on the quality of life. Several examples will illustrate this point.³⁶

Example. Intercity Transit in Olympia will be serving the new State of Washington Department of Ecology building expected to open in October 1993. In addition to transit services, the agency provides vanpooling and ridematching services. The building is expected to house 1,185 employees but will provide only 665 employee parking spaces. This represents a reduction from DOE's

The City of Portland established a cap on the number of parking spaces in downtown. The cap was set at 41,000 in 1975 and included existing spaces, an allowance for spaces that would be approved through conditional use permits but not yet allocated, and a reserve.

This program has been instrumental because, through the provision of transit service, the city has been able to allow additional growth without the negative effects of a concurrent growth in low-occupancy vehicle traffic.

Statistics will support this. While the number of parking spaces did not increase in the 14-year life of the program:

- *Employment increased from 69,800 in 1975 to 85,000-90,000 in 1989-90.*
- *Daily 1-way transit trips increased from 79,000 to 128,000 in the same period (including MAX operating for 2 years but also attracting high numbers of non-work trips).*
- *Number of times City exceeded carbon monoxide standard was over 50 in '75 and 0 times for the last 3 years!*

While difficult to quantify, there has been SOV traffic growth but not to the extent that would otherwise travel to downtown.

current 86% SOV rate to a 55% SOV rate, or a savings of 354 employee parking spaces. Assuming capital costs of structured parking at a hypothetical \$10,000 per stall, the State will enjoy savings of \$3.5 million in avoided parking costs from just this one building. (Actual per stall costs are not available since the building is on a design/build contract.)

Example. Metro will increase its service to the University of Washington in Seattle by 60,000 hours of service (a 20% increase over existing service) under a major new program being developed to manage transportation and parking at the campus. The University plans to expand its facilities over the next 10 years and expects to add 4,300 faculty and staff.

In order to receive permission for the expansion plans from the City of Seattle, a plan was developed with Metro to provide the U-PASS program, under which a transit pass is provided to every student and employee. As part of the arrangement, the University also increased its parking fees. The University hopes to avoid building up to 800 parking stalls and to avoid an increase of 10,000 daily vehicle trips that is otherwise projected to result if the program was not implemented.³⁷

Example. Another example of coordinated land use and transportation efforts is occurring in the City of Everett, where Boeing is in the process of expanding its plant. During its expansion, Boeing will add:

- 5.6 million square feet of building area, a 60% increase over the existing and previously approved total of 9.4 million square feet;
- 9,500 employees, a 40% increase over existing 24,000 to 33,500;
- 16,000 more vehicle trips (assuming current transit and ridesharing rates).

The parking requirement for this new development, based on Everett Zoning Code formulas, is 26,409

additional spaces. The site currently provides 16,000 spaces.³⁸

Transportation demand management (TDM) strategies--coordinated by Everett Transit in conjunction with Island Transit, Community Transit, Metro, and Boeing--are proposed as a means of mitigating the impacts of increased vehicle trips. Two options are proposed, both of which:

- Increase the on-site proportion and preferential location of parking for carpools and vanpools.
- Improve circulation and access convenience for transit vehicles on-site.
- Provide high-occupancy vehicle priority from the site to the area highway system.
- Limit parking on-site to 23,000 spaces (medium TDM option) or 20,000 spaces (high TDM option), reductions of 3,000 to 6,000 spaces, respectively, from the "formula" number of spaces.
- Construct off-site high occupancy vehicle (HOV) facilities in the major travel corridors.
- Purchase vans and buses to accommodate new demand due to expansion.

The high TDM option, in which transit plays a significant role, will reduce vehicle trips by 19% and parking requirements by a similar proportion. The reduction in parking requirements will significantly reduce the "need to create additional impervious surfaces (paved parking spaces).³⁹ And as stated in the Final Environmental Impact Statement:

"Land use planning as reflected by local plans under current state legislation encourages containment of growth and compact development as well as efficient transportation solutions. The High TDM option tends to reinforce this legislative mandate best."⁴⁰

Example. Kitsap Transit provides yet another example of "the club of reduced parking [being] mitigated by the increased availability of transit service." As indicated in their survey response:

"In the case of Winslow, because of transit service increases in the last 3 years, the creation of approximately 400 [parking] spaces in the immediate vicinity of the ferry terminal has been averted, thus preserving open space for future higher uses, either residential or community facility oriented.

At the same time, the terrible congestion already present at the ferry terminal from car traffic at both arrivals and departures has been, while not alleviated, at least prevented from worsening.

It is the Transit System's opinion that while the serious congestion is only momentary in Winslow, perhaps 10 minutes out of every hour on the average during the day, it is at level C or D in terms of nation traffic standard at this time, and would certainly be at F with the resultant impact on the environment and drivers if the Transit System were not providing 400 individuals worth of transit service in lieu of parking spaces.

In this case, the direct cost can probably be calculated at about \$1.2 million, using an approximate \$3,000 per space cost for the construction of parking space on land in such a valuable location. Over and above this \$1.2 million averted cost (in construction of parking spaces) is a similar aversion of impact on individual commuters budgets in the form of lower parking fees. While some commuters blame the transit system for the advance of parking fees from \$2 to \$4, it is far more likely that without the presence of substantial transit service at a relatively low fare as an alternative, that parking fees in Winslow would

probably be (after adding 400 cars to the demand level) in the range of \$6 to \$7 a day.

This is an averted cost of \$40-60 a month to approximately 2,00 individuals, counting both the current parking population and the transit rider group currently in Winslow. That's \$4,000 to \$6,000 per month in averted unproductive expense from household budgets in that area."

Some research indicates that the ability of transportation to influence land use decisions is slowed and limited.⁴¹ Certainly, the majority of existing development will not and cannot relocate simply because of a transportation system. But the linkage between transit and land use cannot be neglected in future planning efforts. Our existing transportation infrastructure cannot accommodate all the people who want to drive alone, our air cannot absorb all the pollutants emitted from our vehicles, and our cities cannot provide enough parking for all cars. If growth is to continue, and it most certainly will, transportation alternatives need to be developed concurrently with land use planning efforts so that our quality of life does not continue to deteriorate.

E. Economic Benefits

"Transit Spending is Strong Economic Stimulus"

A recent article in Passenger Transport highlighted the conclusions of a top economist's report, "Transportation Spending and Economic Growth."^{A2}

David Alan Aschauer's "report explored four questions about the relationship of transportation investment and economic growth, and found that:

- there is a strong, positive relationship between transportation spending and economic growth;*
- the economic benefits of increased transportation spending outweigh the costs;*
- when determining the effect on worker productivity and economic growth, transit investment has an edge over highway investment; and*
- the general benefits of transit and highway spending outweigh their costs."*

Specifically, he found that "a 10-year, \$100 billion increase in transit investment would result in improved worker output worth \$521 billion."

Transit can have a significant impact on the local economy, in particular in the areas of employment, both in terms of direct employment opportunities with the transit agency and by expanding the employment opportunities for the transportation disadvantaged. Transit will create direct jobs and these direct jobs will generally have a multiplier effect in the community. Additional jobs will be created to provide goods and services for the transit employees. The quantification of these benefits to the local community are provided below.

At a statewide level, it is difficult to quantify the net economic benefit of expending public funds on transit service since the same money spent elsewhere in the state could generate the same number of jobs and similar ancilliary employment activity. For the purposes of simplification, we will assume that any public expenditure in the state will generate essentially the same state economic benefits and instead focus on the local impact of transit expenditures.

An illustration of this distinction can be seen in the economic benefits which accrue to the City of Pullman as a direct result of federal and state funding for Washington State University. While it would be difficult to say whether or not the public funds spent on the university generate a net economic benefit statewide (ignoring the benefits that accrue due to a better educated population), most would agree that the university provides economic benefits to the citizens of Pullman, many of whom depend on the university either directly or indirectly for employment.

In the transit example, there are three major distinctions which separate it from other types of state and local public expenditures:

- On-going stable employer as opposed to a one-time or short-term employment impact of other state programs which can contribute to economic stability in a small, single-industry region;*

- The existence of transit property allows a county to capture its share of transit MVET and spend that money locally where otherwise the funds would flow to the state general fund with no guarantee of return to the county;
- Transit is able to draw to the state, federal transportation funds which otherwise would be spent in other parts of the country.

Local economic benefits can be divided into the following sections:

- Employment Benefits;
- Payroll Expenditure Benefits;
- Local Economy Purchase Benefits;
- Individual Benefits;
- Employer and Local Business Benefits; and
- Land Use Benefits.

Each of these is described in detail below.

1. Employment Benefits

APTA indicates that transit creates direct and indirect jobs from both capital and operating investments.⁴³ Direct jobs from capital investments are those involved in construction of facilities, including laborers, supervisors, engineers, planners, real estate managers, bankers, materials manufacturers and others. Indirect jobs from capital investments are those caused by the "multiplier effect" and usually include employment in retail stores, restaurants, and other unrelated businesses.

Jobs are also created from investments in operations. The direct jobs from these investments include drivers, traffic supervisors, schedulers, maintenance forces, and management. The indirect jobs created from these expenditures are also due to the multiplier effect and include those identified above for capital investments.

APTA estimates the number of jobs potentially created in each category. These are based on an investment of \$100 million and are as follows:

	<u>Capital Investment</u>	<u>Operating Investment</u>
<i>Downtown Retail Store Customers Arrive by Transit</i>		
Direct Jobs	3,149	4,063
Indirect Jobs	4,301	5,550
Total	7,450	9,613

A survey of selected downtown stores in various cities revealed that the following percent of customers arrive by transit:

J.C. Penney - 60%
(Portland)

The Corner - 37%
(Boston)

The Gallery - 67%
(Philadelphia)

Gimbels - 56%
(Philadelphia)

Woodward and Lothrop - 50%
(Washington)

Gimbels - 75%
(New York)

- APTA, "The Economic Benefits of Transit," May 1983

From these numbers, it is clear that transit can have a substantial impact on employment levels and can significantly enhance the local economies.

In Washington State, information provided by the transit agencies in survey responses was used to calculate the number of direct and indirect jobs created by transit. From the surveys, districts in this state had capital and operating expenses as follows:

- Total Capital Expenditures (1990): \$206,206,000
- Total Operating Expenditures (1990):\$305,588,000

Applying the APTA indicators listed above generates the following number of direct and indirect jobs for capital and operating expenses:

	<u>Capital Investment</u>	<u>Operating Investment</u>
Direct Jobs	6,497	12,416
Indirect Jobs	8,873	16,960
Total	15,370	29,376

According to APTA job-creation numbers, Washington State should generate 15,370 direct jobs from capital investments and 29,376 jobs from operating expenses, or a total of 44,746.

The actual number of jobs, particularly those due to the multiplier effect, created by transit in the state cannot be measured. In 1990 in Washington State, however, transit agencies directly employed 4,926 people. The district jobs are not directly comparable with the APTA projections because direct jobs included for the districts (consultant fees, for instance) are not necessarily identified by APTA. In addition, the district employment number does not account for all the individuals employed for contract transportation services since districts were asked to list those employees for fixed-route and paratransit services only. Both sets of numbers indicate, however, that transit has a substantial impact on employment in the state. Transit creates a significant number of direct jobs and these direct jobs in turn create demand for goods and services which creates even more jobs.

2. Payroll Expenditure Benefits

Transit agencies make significant direct contributions to the local economies of their districts by providing jobs, generating payroll expenditures and making purchases of goods and services in their communities.

The payroll including fringe benefits of transit agencies in Washington State amounts to some \$200 million. Each net dollar paid an employee turns over 2 to 3 times in the community. The secondary payroll generated by providers of contract transportation services and other feeder services, while not quantified at this time, must be assumed to be significant too. The figures provided below in Table 9 by transit agency include both operating and administrative salaries and benefits and are for 1990 unless noted otherwise. Figures are in millions.

3. Local Economy Purchase Benefits

The aggregate of all other purchased goods and services used by transit agencies for operations is approximately another \$100 million. The largest single item in this category is fuel. Equipment, supplies, parts,

and contracted services are also included. It is assumed that these purchases are largely from Washington State vendors and are thus contributing to local economies. Not included are capital purchases such as vehicles or major construction contracts since these may be awarded to out-of-state bidders. Figures in Table 9 are for 1990 unless otherwise noted. Amounts are in millions of dollars.

4. Individual Benefits

Individuals also benefit economically from their ability to access a wider range of employment opportunities through their ability to access public transit. This is of particular importance to disabled persons. As discussed in the social benefit category, a recent nationwide Harris survey indicated that:

"two-thirds of disabled Americans between the ages of 16 and 64 do not work [and] half earn less than \$15,000 per year...No other demographic group--including young blacks--has such a large proportion out of the labor force.

One half of the [559 self-identified] "mobility-impaired" individuals surveyed cited transportation barriers as inhibitors to employment opportunities; 49% of these people work only part-time or are unemployed because they cannot use fixed-route public transportation or gain access to specialized services."⁴⁴

These comments provide a strong impetus to improve and increase disabled persons ability to access to transportation services so as to potentially increase their economic opportunities.

More importantly, the Harris survey responses suggest that mobility-impaired individuals maintain significantly lower standards of living because they lack employment opportunities. Access to employment could

Table 9
 Transit Agency Payroll and Purchases of Goods and Services
 (Figures in millions)

Transit Agency	Payroll	Goods & Services Purchases
Ben Franklin	\$4.7	\$4.7
Chelan/Douglas	---	---
Clallam	\$1.7	\$1.0
Community	\$9.0	\$10.8
C-Tran	\$5.2	\$3.4
CUBS*	\$0.3	\$0.3
Everett	\$2.9	\$1.4
Grays Harbor	\$2.2	\$1.3
Intercity	\$4.8	\$2.1
Island	\$0.5	\$0.4
Jefferson	\$0.5	\$0.5
Kitsap	\$3.7	\$3.7
Metro	\$125.4	\$44.2
Pacific	\$0.5	\$0.3
Pierce	\$21.1	\$9.1
Prosser	\$0.1	\$0.2
Pullman	\$0.4	\$0.4
Spokane	\$15.7	\$5.7
Twin	\$0.4	\$0.2
Valley	\$0.9	\$0.6
Yakima	\$1.3	\$1.3
Whatcom	\$2.5	\$1.5
TOTAL	\$203.8	\$92.8

* Data provided are for 1989.

"Public transit makes retail centers more accessible, and accessibility bears directly on the ability to attract customers and increase sales."

Some examples:

- A cornerstone in the rebuilding of the Brockton, Mass., transit system is the Transfer Center in the middle of the downtown business and retail area. Some 80 percent of all transit riders pass through this center and it is credited with helping to generate over \$14 million in new private investments in Brockton.*
- The Mayor of Portland, Ore., reports a 50 percent increased rate of employment and office space in the years since the city initiated plans to limit automobiles in their downtown area and improve the transit system [see also sidebar in land use benefit section].*

The downtown occupancy rate is over 95 percent and 1.5 million square feet of new office space is under construction.

[continued, next page]

help these individuals to become full-fledged, productive members of society, which in turn could enhance their self-esteem, decrease their reliance on care-givers, and reduce their need (if it exists) for social-service or other governmental payments. Local employers can also benefit from the increased labor pool. Disabled individuals provided with adequate transportation are able not only to secure but also to retain jobs.⁴⁵

Lastly, transit provides economic benefits to individuals by providing a low-cost transportation alternative. This benefit applies to disabled, elderly, or low-income persons who may have no other mode of transportation or who use more expensive forms (e.g., taxi).

Commuters, provided with a low-cost alternative to owning a car, also receive an economic benefit from public transit (see social benefit section for further discussion). They can travel to and from work via bus and accumulate savings from reduced costs for fuel, parking, accidents, and insurance.⁴⁶ Commuters traveling via transit can experience a less stressful mode of travel which can result in reduced medical costs. Enhanced worker productivity, which benefits employers, can result from a reduction in time spent in congested traffic.⁴⁷ As previously mentioned, the provision of transit also gives dual-income households an alternative mode of travel to work which can eliminate their need for a second automobile.

5. Employer and Local Business Benefits

Business is another beneficiary of public transit. As mentioned, transit-related expenditures in the local economy generate increased sales for businesses. Transit also provides local businesses with an expanded labor pool. APTA indicates that there is a strong link between the provision of public transit and the health of a retail market (as shown in previous sidebars). Public transit makes retail accessible to a larger population. Accessibility is directly related to the ability to attract customers and ultimately increase sales. Therefore,

without transit, businesses would not reap the benefits from increased sales, worker productivity, and increased labor pool.

-
- *Major Jacksonville, Fla., downtown retailers successfully petitioned the major after 25 percent of the local bus routes, most of which ran through the heart of the central business district, were moved only 3 to 4 blocks away.*

Retail sales dropped 9 percent over a 5-month period after the routes were moved. The public, store employees and businesses began to complain about the inconveniences, so the original routes were reinstated.

- *In Iowa City, Iowa, a downtown transit interchange located next to a new shopping mall saved money for the developer by reducing the number of needed parking spaces. The transit system's ridership increased during off-peak hours, and the mall benefits through exposure to potential shoppers--the 15,000 daily transit riders.*

- APTA, "The Economic Benefits of Transit," May 1983

APTA also suggests that transit contributes to a strengthened economy. In a rather simplified scenario, transit routes are established by a district. Travel patterns develop around these transit routes and development occurs in response to the traveler's needs. A sense of stability is created, the downtown is strengthened, and the cycle is repeated. Warrick⁴⁸ indicates that the presence of Metro helped to enhance downtown Seattle's role as a commercial focal point and assisted in the recentralization of businesses in this area.

Developers and investors seeking new business opportunities consider transit an important part of their choice in location.⁴⁹ Again, the presence of transit creates a sense of stability and developers will want to capitalize on the established development and travel patterns. Cities also use the presence of public transit to attract new industries to their community and real estate agents identify the proximity to transit as a "drawing card" for new business.⁵⁰

6. Land Use Benefits

Transit also promotes land use economics. As discussed in a previous section, GMA regulations will compel developers to maximize land use given that future growth will be restricted within defined urban boundaries. The value of the remaining undeveloped land in these areas will increase significantly and property owners will seek to attain the most appropriate and best use for that land within the limitations of the land use codes and ordinances. Development of parking lots in these growth areas will inevitably become less economical and developers will search for alternatives to constructing them. A transit system can, depending on jurisdictional regulations, allow developers to build fewer parking spaces because of the diversion of single-occupant trips to transit and the reduced demand for parking (see land use benefit section for further discussion).

The economic benefits from linking land use and transportation are straightforward:

- transportation services provide savings to developers through reduced parking demands and access to an expanded labor pool, and
- developers generate trips for transit.

The cycle is self-perpetuating but the land use/transportation connection needs to be made to maximize the benefits to each group. Whether this link is secured in future planning efforts remains to be seen.

Local businesses also benefit economically from a reduction in the rate of congestion growth. The Regional Plan Association indicates that the "cost of congestion" is becoming prohibitively expensive and is driving businesses out of particularly crowded urban areas.⁵¹ Transit can reverse this "trend" by carrying a greater number of commuters on buses and reducing the number of vehicles traveling into downtown. As previously noted, each bus operating at capacity during rush hour eliminates 40 cars from traffic and each van full of passengers removes 13 from traffic. Transit can again provide significant benefits to the environment through enhanced air quality and reduced growth in traffic levels, as well as to the economy by assisting in the retention of local businesses.

7. Survey Responses

The transit agencies provided numerous examples of economic benefits in their communities including:

- CUBS Transit employs 20 individuals and has major repair work in and purchases supplies from local businesses.
- Grays Harbor provides free service during Christmas to promote shopping at local stores.

- Evening service provided by Intercity Transit enables young and low-income residents to participate in local economy.
- Jefferson Transit provides access to jobs for lower income residents that have had to purchase homes outside of Port Townsend due to escalating prices.
- Transit and ridesharing services provided by Kitsap Transit allows the shipyards to compete with naval shipyards around the country since funds are not used as extensively for parking and can be expended on other facilities.
- As an employer, Spokane Transit contributes to their employees' quality of life. Real estate brokers note proximity to transit and the presence of STA is a deciding factor in the relocation of firms to Spokane.
- Clallam Transit stated that transit contributes to tourism through the provision of services to tourist destinations. Clallam Transit also supports local businesses by increasing access to shopping opportunities.
- Valley Transit provides low-income employees with a low-cost transportation alternative, helps consumers get to shops and a range of services, and provides businesses with a larger pool of customers.
- Whatcom Transit contributes to the local economy because it brings workers and customers to businesses. The viable transportation system in Whatcom contributes to firms' decisions to locate in that county.
- Yakima Transit supports tourism through the provision of shuttle services to local events. The district employs 39 individuals, with a payroll of over \$1 million. Yakima Transit's greatest economic contribution relates to the revitalization of downtown.

IV. Conclusions

A. Emerging Role of Transit

As indicated throughout this paper, transportation is expected to accomplish far more than just providing transit trips for the least cost. Mass transit is to:

- keep fares low so the poor can afford to ride and so single-occupant drivers will find travel alternatives attractive;
- provide mobility and accessibility for all in a community who cannot drive;
- provide alternatives to congestion during peak periods;
- conserve energy by reducing SOV usage;
- reduce air pollution; and
- enhance economic development.

Yet transit cannot be expected to address all these problems, meet all these objectives, in a vacuum. Federal, state, and local policies regarding these various objectives, as well as those that pertain to funding, must be coordinated. Transit cannot hope to meet the myriad of expectations placed upon it if the objectives are attempting to achieve different goals.

In addition, transit cannot hope to achieve these goals if it is viewed only as a transportation provider. If transit's role is to be expanded, so too should the criteria by which its performance is measured. The provision of transportation in a community cannot continue to be valued just for the number of trips that are produced. More of the direct and indirect benefits (those that multiply through a community) discussed in this paper, whether quantifiable or not, should be considered in any evaluation. In this way, a greater balance can be achieved between what transit is supposed to accomplish

and what it is funded to accomplish.

B. Summary of Benefits

This paper has analyzed, and where, possible, quantified the benefits of public transit in Washington. Benefits were estimated and discussed in five categories: social, community, environmental, land use and economics. The analysis shows the following benefits for each category:

Social Benefits

Commuter Benefits and Fuel Cost Savings. Fuel/oil costs saved by commuters traveling by bus were estimated to be an average of approximately \$373 per year. This cost savings represents avoided fuel/oil costs only, and does not consider additional costs of automobile maintenance, repairs, oil, tires and insurance, which may also be saved by bus commuters.

Parking Cost Savings. Parking cost savings, on average for urban areas, was estimated to be approximately \$2,780 per year.

Net Commuter Cost Savings. Total fuel, oil, and parking costs saved, in comparison to the cost of a two-zone annual bus pass are shown below. The total annual commuter cost savings is estimated to be \$2,636.

Annual fuel costs saved	\$ 373
Annual parking costs saved	\$2,780
Total avoided commuter costs	\$3,153
Annual two-zone bus pass cost	(\$517)
Total annual avoided commuter cost	\$2,636

Community Benefits

Community benefits of public transit accrue to neighborhoods, cities and towns, and to the region as a whole. These are benefits which enhance the quality of life for the community rather than for a specific group of

transit riders. Three specific areas of community benefit are discussed: fare-free service within the central business district, special event shuttle service, and transportation services for public education.

Fare-Free Service. The benefits to communities which enjoy fare-free downtown service include improved accessibility and circulation in the downtown core; incentives to users to ride transit versus use their automobiles; and positive economic development impacts associated with retail and restaurant purchases made possible by the increased mobility fare-free service encourages. Communities, such as Seattle, consider this benefit so important that they contribute significant resources to cover the cost of this service.

Event Service. Special event shuttle service is offered by virtually all transit districts. Benefits derived from this service include increased attendance at special events; increases in tourism and tourist-related business; and increases in sales tax revenues accruing to the state and local governments.

At the 1991 Kitsap County Fair, for example, Kitsap Transit transported nearly 19,000 riders to the fair from ferry terminals and remote parking areas, a 27% increase over the previous year. Less tangible and less quantifiable benefits are created in the form of reduced traffic congestion at events and reduced impacts on neighboring residential areas.

Education Services. Many transit agencies cite their support of public education through service in transporting public school students to and from school, providing service for after-school activities, and for special school events and trips. Statewide, an average of \$229 per student (not including special education students) was spent by the state in the 1990-91 school year to transport public school students. At that funding level, about 50% of public school students were transported. Therefore, for every student using public transit to travel to and from school, \$229 in transportation costs is avoided by the state and by school districts.

Environmental Benefits

Energy Savings. Based on 1991 PSCOG data on the number of park and ride lots and stalls in the Puget Sound region, it was estimated that approximately 13,874 commuters per day use park and ride lots in Island, Kitsap, Pierce, Thurston, King and Snohomish Counties. Assuming an average round-trip commute of 23 miles/day, about 313,553 total round trip miles are not driven every day by commuters utilizing park and ride lots.

Assuming an average of 20 mpg, this translates into approximately 15,678 gallons of gasoline not consumed per day, or 3.9 million gallons saved per year. This also translates to approximately 282 gallons of gasoline that each of the 13,874 commuters do not consume each year.

Air Quality. APTA reports that 40-60% of ozone-producing pollutants (nitrogen oxides and hydrocarbons) come from transportation sources. In Washington, WSDOT has estimated (May 1991) that motor vehicles account for 43% of the state's air pollution.

APTA studies indicate that each transit commuter saves the environment 9.1 pounds of hydrocarbons, 62.5 pounds of carbon monoxide, and 4.9 pounds of nitrogen oxides. Likewise, a Metro air quality analysis found that "using buses instead of low-occupancy automobiles would prevent the emission of 920 tons/year of hydrocarbons (an 86% reduction); 13,415 tons/year of carbon monoxide (a 94% reduction); and 409 tons/year of nitrogen oxides (a 42% reduction) that would otherwise be emitted by people driving cars."

Land Use Benefits

A major land use benefit from public transit is improved community planning, including urban design, open space preservations, and neighborhood development. In addition, is the reduced cost of providing parking facilities. This benefit accrues to

property owners and developers in particular, and to the locality in general. For example, the new State Department of Ecology (DOE) building, located within Intercity Transit's service area, will house 1,185 employees, but only 665 employee parking spaces will be provided. This represents a reduction from DOE's current 86% SOV rate to a 55% SOV rate. Assuming capital costs of structured parking at about \$10,000 per stall, the State will receive a savings of \$3.5 million in avoided parking costs from this one building alone.

Other land use benefits from transit result from increases in permitted density, and the concomitant increase in property values, and the related incentive to in-city redevelopment efforts. While no sales or attendance figures have been documented, it is clear that transit is supporting the redevelopment process in many communities.

Economic Benefits

Employment. In Washington, transit agencies employ approximately 4,930 FTE's. Using APTA's multiplier of 1.36 indirect jobs created for every direct transit-created job, another 6,705 indirect jobs are transit-induced. Thus, the total number of direct and indirect jobs created by transit in the state is approximately 11,635.

Payroll. The total payroll of transit agencies (including fringe benefits) in the state is approximately \$200 million. This figure does not include the secondary payroll generated by providers of contract transportation services, which could not be estimated.

Local Economy Purchases. The total of all other goods and service purchases made by transit agencies in the state is approximately \$82 million. Of this amount, the largest budget item is fuel. Other purchases relate to equipment, supplies and parts. Capital purchases are not included in this estimate.

C. Washington State Applicability

This discussion has direct applicability to Washington State given the increased expectations placed on transit agencies. Recently enacted legislation, discussed in the policy component section of this study, highlight some of the responsibilities that are to be borne by the districts. Not only must districts meet current obligations, but they must also integrate the requirements of GMA, TDM, ADA, and the federal and state Clean Air Acts into their day-to-day operations.

The districts must become, if they are not already, more than transit agencies; they must be "mobility managers." Resolving the myriad of dilemmas listed above and throughout this paper will require more than just expanding infrastructure capacity or reducing the number of vehicles or altering the work hours and places. It will require the integration of these and more concepts, a conglomeration of options including: carpooling, vanpooling, telecommuting, alternative work hours, increased public transit usage, HOV lane construction, and possibly rail transit. Transit agencies can play an integral role in the development of this concept.

The Washington State Transit Association (WSTA) is in fact exploring this concept of "mobility managers." In August, 1991, WSTA held a "Mobility Summit" at which various participants discussed forming "a new mobility advocacy coalition which could represent everyone who has an interest in moving people in and around Washington State." Participants included transit managers, lobbyists, local officials, legislators, legislative staff, WSDOT staff, transportation consultants, and representatives of the Evergreen State Specialized Transportation Association, the Intergovernmental Resource Center, and the Washington Transportation Policy Institute.

The discussion at the Mobility Summit focused on mobility in the 21st Century. The participants were asked to comment on:

- What mobility services will be need to be provided;
- Who will be using mobility services;
- Where passengers will ride;
- What people (riders, public, and policy makers) will expect;
- Who will control decisions;
- Who will influence decisions;
- Where the money will come from; and
- What role mobility will play in overall planning.

According to WSTA, the "Mobility Summit" was more than an exercise:

"The Summit must be a foundation on which Washington State's mobility leaders can make 'A Vision Shared' a self-fulfilling prophecy. The information collected from 'A Vision Shared,' if used properly, can establish a common ground so that all of us--local and state policy makers, mobility managers, both public and private, and our constituents--can work towards a coordinated, efficient and effective mobility system that will benefit all the citizens of Washington State."

This benefit discussion presented the "other side of the story." Each year, WSDOT provides a summary of transit agencies in this state. This summary typically includes operational data (number of passengers, number of employees, number of vehicle miles), financial data (sales tax revenue, MVET revenues, farebox revenues), expense data (capital, operating, depreciation), and "other" factors. Any evaluation of the districts would most likely be based on these available factors. Significant aspects of what transit accomplishes in this state, the role they play, and the variety of

services they provide are consequently omitted. This paper hopefully provided some insight into the extent of the cross-sector benefits received from a bus or van ride and the extent to which the provision of this transportation service ripples through the local economy.

Endnotes

1. Joe Dougherty (1991). "Transit Spending is Strong Economic Stimulus," in Passenger Transport, September 30, 1991, p. 3.
2. Margaret J. Heraty (1989). "Direct and Cross Sector Benefits from the Provision of Specialised and Accessible Mainstream Transport." Specialized Transportation Planning and Practice, Vol. 3, pp. 95-114.
3. Donald S. Warrick (1976). "A Cost-Benefit Analysis of the Seattle Metro Transit System." A paper submitted in partial fulfillment of the requirements for the degree of Master of Business Administration, Washington State University, Department of Business Administration.
4. TRC Environmental Consultants (1990). "Air Quality Implications of Transit in the Year 2000; Metro Air Quality Analysis, November 20, 1990.
5. Timothy J. Lomax and Jeffery L. Memmott (1989). "The Cost and Benefits of Urban Public Transit in Texas," Report sponsored by Texas Department of Highways and Public Transportation in cooperation with U.S. DOT and UMTA, November, 1989.
6. This concept of cross-sector evaluation is an important point to consider for Washington State and is of particular significance for transit's emerging role. Transit is being looked upon more and more to solve many of society's woes. Buses and vans are no longer just to provide transportation services but they are also to ease traffic congestion, improve air quality, provide access and mobility for all on an equal basis, reduce reliance on foreign oil supplies, indirectly support education, stimulate the economy, and structure urban and suburban development. With these increased expectations come increased costs, however, and all at a time when transit is being criticized for its heavy reliance on public subsidies. Yet if transit is to meet even some of these expectations, then the evaluation of transit service, the discussion of its benefit, must be comprehensive and include savings and advantages in a variety of sectors. The evaluation must include more than those benefits which are easily quantifiable and it must include secondary benefits (often omitted in traditional cost-benefit analyses of transit due to fear of double-counting) if the true value of transit or the true saving from the service is to be known.
7. K.C. Koutsopoulos and C.G. Schmidt (1986). "Mobility Constraints of the Carless." In: Transport Sociology: Social Aspects of Transport Planning, Enne de Boer, Ed., Pergamon Press, Oxford.

8. Paul Shultz (1987). "Mobility and the Quality of Life: The Importance of Public Transportation to Disabled Americans." Community Transportation Reporter, October/November, 1987.
9. Ibid.
10. Municipality of Metropolitan Seattle (1991). "Americans with Disabilities Act (ADA) Demand Study, Summary Report," Metro, August, 1991.
11. Op. cit., Heraty, p. 110.
12. Snohomish County Transportation Authority (1989). "A Guide to Land Use and Public Transportation for Snohomish County, Washington," December, 1989.
13. American Automobile Association (1991). "Your Driving Costs," Public Affairs Publications, 1991 Edition.
14. Joseph Turner (1991). "Van fans pool their resources," in The News Tribune, p. A1, June 17, 1991.
15. Joseph Turner (1991). "Extra lane spells aid on I-5...eventually," in The News Tribune, p. A1, April 18, 1991.
16. Op. cit., Turner, June 17, 1991.
17. S.R. Bowlby, A.M. Kirby, and V. Swann (1984). "Evaluating the Benefits of Special Transport for Elderly and Disabled Persons: This Case of Readibus." In: Third International Conference on Mobility and Transport of Elderly and Handicapped Persons, Conference Proceedings, Final Report, October, 1984.
18. Regional Plan Association (1991). The Renaissance of Rail Transit in America. June, 1991.
19. Seattle Downtown Business Association (1991). Conversation with Association personnel, October 15, 1991.
20. Chelan/Douglas PTBA (1991). "Sharing the Prepaid Philosophy," Memorandum written by Ken Hamm, General Manager to the Legislative Transportation Committee, September, 1991.
21. David Ewing (1991). "One Percent Growth," article in WTS National Newsletter, p. 5, September/October 1991.
22. Op. cit., Lomax, 1989.

23. Municipality of Metropolitan Seattle (1991). "Estimate of Roadway Construction Avoided Due to Metro Ridership Gains," Memorandum prepared by Ben Porter, September 3, 1991.
24. American Public Transit Association (undated). "Mass Transit - The Clean Air Alternative."
25. Washington State Department of Ecology (1991). "Clean Air Washington, The Air Pollution Problem," Fact Sheet, May 1991.
26. Op. cit., TRC Environmental Consultants, 1990.
27. Ibid., p. 6.
28. Ibid., p. 9.
29. Ibid., p. 9.
30. American Public Transit Association (undated). "Public Transit - The Vehicle for Conserving Energy."
31. Ibid.
32. American Public Transit Association (undated). "Public Transit - The Vehicle for Conserving Energy."
33. The average utilization of 60.5% was derived from averaging the stall usage for each district (which ranged from 0% utilized to 134% utilized) and then averaging the averages.
34. Robert J. Spillar and G. Scott Rutherford (1990). "The Effects of Population Density and Income on Per Capita Transit Ridership in Western American Cities," in ITE 1990 Compendium of Technical Papers.
35. Vukan R. Vuchic (1981). Urban Public Transportation Systems and Technology. Prentice-Hall, New Jersey, p. 290.
36. This benefit of transit (the potential for reductions in parking demand) will be of particular importance in Washington State as counties and cities begin to comply with the Growth Management Act and Transportation Demand Management legislation. GMA regulations will limit urban and suburban sprawl through development of urban growth boundaries. The remaining undeveloped land in these areas will increase significantly in value and property owners will seek to maximize the use of that land; land development will be based more and more on appropriate and best use within the limitations of the land use code and ordinance. Development of parking lots in these urban growth areas will inevitably become less economical and developers will seek

alternatives to constructing these facilities. Transit provides such an opportunity by transporting commuters/employees to job locations. Commuters can leave their single-occupant vehicles and developers do not need to create daytime storage facilities for the cars. Transit will also increasingly be looked to by local jurisdictions and developers for the provision of alternatives to the single occupant vehicle as TDM measures are enacted. Both GMA and TDM laws will require greater coordination between land use and transportation planners to insure that land use is linked to transportation, that single occupant vehicle trips can be reduced, and that transit can be available to provide additional commuter services.

37. Mike Williams (1991). Conversation with University of Washington Traffic Engineer regarding the U-PASS program.
38. City of Everett, Planning and Community Development Department(1991). Draft and Final Environmental Impact Statements for the Master Development Plan for the Boeing Commercial Airplane Group, Everett, Washington.
39. Ibid., FEIS, p. 3-75.
40. Ibid., p. 3-76.
41. John R. Meyer and Jose A. Gomez-Ibanez (1981). Autos, Transit and Cities. Cambridge, MA: Harvard University Press.
42. Joe Dougherty (1991). "Transit Spending is Strong Economic Stimulus," in Passenger Transport, September 30, 1991, p. 3.
43. American Public Transit Association (1983). The Economic Benefits of Public Transit. May, 1983.
44. Op. cit., Shultz, p. 6.
45. Op. cit., Bowlby, p. 6-61.
46. Op. cit., Warrick, pp. 43-48.
47. Op. cit., Regional Plan Association, p. 82.
48. Op. cit., Warrick, p. 59.
49. Op. cit., APTA, Economic Benefits, p. 2.
50. Ibid., APTA, Economic Benefits, pp. 4, 9.
51. Op. cit., RPA, p. 29.

BIBLIOGRAPHY

- Altshuler, Alan (1979). The Urban Transportation System Politics and Policy Innovation. Cambridge, MA: The MIT Press.
- American Automobile Association (1991). "Your Driving Costs," Public Affairs Publications, 1991 Edition.
- American Public Transit Association (undated). Building Better Communities, Sourcebook. Coordinating Land Use and Transit Planning.
- American Public Transit Association (undated). "Public Transit - The Vehicle for Conserving Energy."
- American Public Transit Association (undated). "Mass Transit - The Clean Air Alternative."
- American Public Transit Association (undated). Transit 2000: Executive Summary of the American Public Transit Associations's Transit 2000 Task Force Final Report.
- American Public Transit Association (1983). The Economic Benefits of Public Transit. May, 1983.
- American Public Transit Association (1990). The 1990 Rail Transit Report. Washington, D.C., September, 1990.
- Arrington, G.B., Jr. (1989). "Light Rail and Land Use: A Portland Success Story," Tri-Met, January, 1989.
- Bowlby, S.R., A.M. Kirby, and V. Swann (1984). "Evaluating the Benefits of Special Transport for Elderly and Disabled Persons: This Case of Readibus." In: Third International Conference on Mobility and Transport of Elderly and Handicapped Persons, Conference Proceedings, Final Report, October, 1984.
- Coleman, Elsa (1990). "Parking Management," in WTS National Newsletter, January/February 1990.
- Chelan/Douglas PTBA (1991). "Sharing the Prepaid Philosophy," Memorandum written by Ken Hamm, General Manager to the Legislative Transportation Committee, September, 1991.
- Deakin, Elizabeth (1988). "Background Paper: Issues and Opportunities for Transit: An Exploration of Changes in the External Environment and Land Use and Development Trends." Prepared for APTA Transit 2000 Task Force, January, 1988.

- Dougherty, Joe (1991). "Transit Spending is Strong Economic Stimulus," in Passenger Transport, p. 3., September 30, 1991.
- Everett, City of, Planning and Community Development Department (1991). Draft Final Environmental Impact Statement for the Master Development Plan for the Boeing Commercial Airplane Group, Everett, Washington.
- Everett, City of, Planning and Community Development Department (1991). Final Environmental Impact Statement for the Master Development Plan for the Boeing Commercial Airplane Group, Everett, Washington.
- Ewing, David (1991). "One Percent Growth," article in WTS National Newsletter, September/October 1991.
- Fielding, Gordon J. (1987). Managing Public Transit Strategically: A Comprehensive Approach to Strengthening Service and Monitoring Performance. San Francisco, CA: Jossey-Bass.
- Fischler, Stanley I. (1979). Moving Millions: An Inside Look at Mass Transit. New York, NY: Harper & Row.
- Griffin, Tom (1991). "U-Pass May Cut Through District's Traffic Knot," in Columns, September, 1991.
- Heraty, Margaret J. (1989). "Direct and Cross Sector Benefits from the Provision of Specialised and Accessible Mainstream Transport." Specialized Transportation Planning and Practice, Vol. 3, pp. 95-114.
- Koutsopoulos, K.C., and C.G. Schmidt (1986). "Mobility Constraints of the Carless." In: Transport Sociology: Social Aspects of Transport Planning, Enne de Boer, Ed.. Oxford, England: Pergamon Press.
- Lave, Charles A. (1985). Urban Transit: The Private Challenge to Public Transportation. San Francisco, CA: Pacific Institute for Public Policy Research.
- Lomax, Timothy J. and Jeffery L. Memmott (1989). "The Cost and Benefits of Urban Public Transit in Texas," Report sponsored by Texas Department of Highways and Public Transportation in cooperation with U.S. DOT and UMTA, November, 1989.
- Meyer, John R. and Jose A. Gomez-Ibanez (1981). Autos, Transit and Cities. Cambridge, MA: Harvard University Press.
- Municipality of Metropolitan Seattle (1983). "A Multi-Modal Approach to Elderly and Handicapped Transportation: The Elderly and Handicapped Transportation Programs of the Municipality of Metropolitan Seattle." Metro, January, 1982; Revised August, 1983.

- Municipality of Metropolitan Seattle (1991). "1990 Rider/Nonrider Survey," January, 1991.
- Municipality of Metropolitan Seattle (1991). "Americans with Disabilities Act (ADA) Demand Study, Summary Report," Metro, August, 1991.
- Municipality of Metropolitan Seattle (1991). "Estimate of Roadway Construction Avoided Due to Metro Ridership Gains," Memorandum prepared by Ben Porter, September 3, 1991.
- New York City Department of Environmental Protection (1988). "Background Paper: Energy and Environment." Prepared for APTA Transit 2000 Task Force, January, 1988.
- Pisarski, Alan E. (1988). "Background Paper: The External Environment for Public Transit to the Year 2000: A Speculative Assessment." Prepared for APTA Transit 2000 Task Force, January, 1988.
- Portland, City of (1991). Conversations with City of Portland's Elsa Coleman regarding the parking lid program, September 25, 1991.
- Regional Plan Association (1991). The Renaissance of Rail Transit in America. June, 1991.
- Ryan, Rosemary and Irv Lefberg (1987). Persons of Disability in Washington State: A Statistical Profile 1970-1980; Olympia, Washington: April, 1987.
- Schwarz, Joel (1991). "Heading down the Wrong Track?," in Columns, pp. 26-30, September, 1991.
- Seattle Downtown Business Association (1991). Conversation with Association personnel, October 15, 1991.
- Shultz, Paul (1987). "Mobility and the Quality of Life: The Importance of Public Transportation to Disabled Americans." Community Transportation Reporter, October/November, 1987.
- Smerk, George (1968). Readings in Urban Transportation. Bloomington, Indiana: Indiana University Press.
- Snohomish County Transportation Authority (1989). "A Guide to Land Use and Public Transportation for Snohomish County, Washington," December, 1989.
- Spencer, Gregory Dr., U.S. Bureau of the Census (1988). "Background Paper: Demographic Factors and Future Demand for Public Transit." Prepared for APTA Transit 2000 Task Force, January, 1988.

Spillar, Robert J., and G. Scott Rutherford (1990). "The Effects of Population Density and Income on Per Capita Transit Ridership in Western American Cities," in ITE 1990 Compendium of Technical Papers, pp. 327-331.

Stafford, William (1991). Conversations with Executive Director of the Trade Development Alliance of Greater Seattle regarding the implications of transit on international trade, August 22, 1991.

Transportation for the Disabled and the Elderly: An Action Guide. A Report of the Elderly/Handicapped Transportation Study (1977). A Joint Undertaking of the City of Seattle, King County, and Metro, Seattle, Washington, September, 1977.

Tri-Met (1990). Tri-Met 1990 Attitude and Awareness Survey and Rider Profile, March 1991.

TRC Environmental Consultants (1990). "Air Quality Implications of Transit in the Year 2000; Metro Air Quality Analysis, November 20, 1990.

Turner, Joseph (1991). "Extra lane spells aid on I-5...eventually," in The News Tribune, p. A1, April 18, 1991.

Turner, Joseph (1991). "Van fans pool their resources," in The News Tribune, p. A1, June 17, 1991.

U.S. Conference of Mayors (1986). Mayors & Transit Finance: A Guidebook for Mayors. July, 1986.

U.S. Department of Transportation (1990). Moving America: New Directions, New Opportunities. A Statement of National Transportation Policy Strategies for Action. U.S. DOT, February, 1990.

Vuchic, Vukan R. (1981). Urban Public Transportation Systems and Technology. Englewood Cliffs, New Jersey: Prentice-Hall.

Warrick, Donald S. (1976). "A Cost-Benefit Analysis of the Seattle Metro Transit System." A paper submitted in partial fulfillment of the requirements for the degree of Master of Business Administration, Washington State University, Department of Business Administration.

Washington State Department of Ecology (1991). "Clean Air Washington, The Air Pollution Problem," Fact Sheet, May 1991.

Washington State Department of Ecology (1991). "Clean Air Washington, Alternative Motor Vehicle Fuels," Fact Sheet, May 1991.

Washington State Department of Ecology (1991). "Clean Air Washington, Motor Vehicle Emission Inspections," Fact Sheet, May 1991.

Washington State Department of Ecology (1991). "Clean Air Washington, The Benefits Add Up," Fact Sheet, May 1991.

Washington State Department of Ecology (1991). "Clean Air Washington, New Revenues for Air Quality," Fact Sheet, May 1991.

Washington State Department of Ecology (1991). "Clean Air Washington, Transportation Demand Management (TDM)," Fact Sheet, May 1991.

Washington State Department of Ecology (1991). "Clean Air Washington, Conformity," Fact Sheet, May 1991.

Williams, Mike (1991). Conversation with University of Washington Traffic Engineer regarding the U-PASS program.