

Regional Trip Planner Cost-Benefit Analysis



November 2004
Draft

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Prepared by the Agency Council on Coordinated Transportation, with support from the Washington State Department of Transportation.



**Washington State
Department of Transportation**





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Executive Summary

The Regional Trip Planner is an internet-based system for gathering, integrating and providing information about public transportation routes, schedules, and fares. The trip planner envisioned for Washington and Oregon will make public transportation easier to use for our residents, reducing frustration for users and savings money for organization that use public transportation to transport their clients.

Currently, trips that are made across service areas often require time-consuming coordination of travel with the schedules of several transportation providers. Users must interpret complex schedules and route maps to determine transfer points and scheduling. With a trip planner, users go to a single web site where they provide their starting and destination points and are given a list of transportation providers to meet their needs and relevant information to planning their route.

This report evaluates the system proposed for Washington and Oregon and quantifies costs and benefits whenever possible. The report also discusses costs and benefits that are difficult to quantify but which may have significant impacts on the organizations using the new system.

The Regional Trip Planner Function

The Washington State Department of Transportation, the Oregon Department of Transportation, and their transportation partners envisioned a new tool for transportation users linking rail, bus, local transit, and demand responsive services. The resulting Regional Trip Planner is an innovative system that will compile timetables, fixed route stops, accessibility data, and other public transportation information into one convenient website.

Once the Regional Trip Planner system is in place a person can access the web portal through the Internet and plan a multi-modal trip to anywhere within the bi-state region. Currently trips that are made across county or state borders require time-consuming coordination of travel with several transportation providers' schedules. The web portal will assist the public in cross-state trips by providing information about transportation services that facilitate traveling from one state to another.

The Benefits of the Regional Trip Planner System

The Regional Trip Planner will produce a number of significant benefits:

- increase customer satisfaction
- improve services to persons with disabilities
- facilitate communication between transportation agencies
- create uniform transportation data exchange
- render positive environmental benefits by getting single passenger cars off the road

Washington State's employment statistics indicate that greater information availability and coordination in transportation is necessary for economic growth and improved quality of life in Washington State. More than 16 percent of Washington residents work in a Washington county other than their county of residence. However, some public transportation agencies have limited services across county borders. The large number of job commuters makes the availability of public transportation information imperative to the economic growth and environmental well being of our state.

Social service agencies can access the Regional Trip Planner and assist clients to plan necessary trips when a wheel chair list, infant car seat, or day care stop are needed. A caseworker can assist a client more efficiently when they can learn about the best transportation options for their clients on one website.

The Cost-Benefit Ratio

Preliminary estimates of costs and benefits for Release 1 of the project over a five-year period indicate a project cost of approximately \$1.6 million and approximate benefits total of over \$10.2 million – a cost-benefit ratio of one to six.

The costs associated with the Regional Trip Planner involve the development of the web portal, the creation of a data-sharing mechanism, the associated software, employee salaries, and system implementation and maintenance.

The benefit estimates are based on saved caseworker time as well as conservative increases in public transportation ridership among key groups including current riders, Temporary Assistance for Needy Families recipients, vocational rehabilitation clients, and others.

Based on this analysis, creating a Regional Trip Planner for Washington and Oregon would repay the State's investment many times over, both in terms of increased efficiencies as well as customer satisfaction.



1. Purpose of Cost-Benefit Analysis

As part of the preliminary analysis phase for design and development of the Regional Trip Planner this document will estimate and evaluate costs and benefits associated with the proposed bi-state trip planning system developed by stakeholders in Washington and Oregon.

This document provides project costs and the resulting quantifiable benefits, while avoiding quantifying some primarily social costs and benefits. Quality of life benefits and other less tangible or more collateral benefits are discussed but not assigned dollar values as part of this analysis. This report does not quantify environmental benefits, customer satisfaction, enhanced marketing resources, and increased accessibility to social service programs' benefits since they are not as susceptible to objective measures.

The presentation of project costs and benefits will make it clear that the Regional Trip Planner provides a high return on investment for project partners in alignment with the Washington State Department of Transportation mission.

Our Mission is to keep people and business moving by operating and improving the State's transportation systems vital to our taxpayers and communities.

2. Project Description and Objective

The Regional Trip Planner system is an inter-modal transportation and alternative mode of transportation information portal to facilitate statewide and inter-state travel. Release 1 will improve alternative transportation by combining information on organized links and services in one web portal, thus providing greater specificity and breadth of information. The Washington State Department of Transportation (WSDOT), the Oregon Department of Transportation (ODOT), and their transportation partners have envisioned a system to allow users to access rail, bus, and local transit and demand responsive services. The user interface is being designed for public transportation users and agency personnel scheduling rides – including general public, human services case workers, transportation brokerage services, and transportation service providers – to get comprehensive transportation information to meet their transportation needs or the needs of their customers.

The Regional Trip Planner system development is broken initially into two releases to ease the transition process for participating agencies and to break down the cost burden over time. Two releases are currently planned for and discussed in this paper, though more releases are envisioned for the future. Release 1 will build the architecture and organize the information sharing; funding is in place and implementation will be completed during summer of 2005. Release 2 will select and deploy an itinerary building engine for door-to-door itineraries; at this point there is no confirmed funding source for Release 2.

Release 1 of the system will build a web-based transit, demand responsive, intercity bus and rail transportation information portal. This first release will neither be point-to-point trip planning nor will it generate actual trip itineraries. The Release 1 web-based portal will be based on Geographic Information System (GIS) locations and provide schedule and accessibility information for travelers to utilize public transportation and providers to generate statewide and bi-state travel plans. The information provided to travelers can

use a single mode of travel or can combine multiple modes in a single trip depending on the request. The requester will be able to specify their requirement for special needs transportation. Release 1 places in use the required basic infrastructure for the Release 2 including databases, data and updates, hardware, communication methods, and system operation.

Transportation modes currently considered for the system include fixed route transit, inter-city bus, train, ferry services, and demand responsive transportation (general and special needs) services. Oregon has already undertaken the project to design and develop the web-based portal.

Release 2 will focus on the development and implementation of point-to-point trip planning functionality. Since the basic infrastructure will be in place when funding for Release 2 is confirmed, Release 2 will incorporate design, development (or acquisition), and integration of point-to-point itinerary planning software into the web-based portal. When Release 2 is complete, a person will be able to request a door-to-door itinerary for their trip.

A system of objectives created by stakeholders early in the project development has guided the design and development of both Release 1 and Release 2. The main objectives are the following:

1. Provide detailed transportation information to system stakeholders via the Internet
2. Give system users the ability to locate and identify connections across multiple transportation providers
3. Work incrementally towards providing true trip planning itinerary functionality
4. Provide an interface that accommodates users with disabilities
5. Provide detailed information to assist system users with disabilities

6. Allow system users the ability to provide feedback
7. Provide an interface for transportation service providers to submit and maintain their service information
8. Provide system administration and user-level management capabilities
9. Allow participating transportation providers the ability to obtain system usage information and service provider reports
10. Design a system that can be regionally and functionally expandable as stakeholders from bordering states elect to build and interface

and promoting legislation; information sharing; professional development of its members through communication and cooperation; as well as promoting support and awareness of other transportation agencies within the state.

Community Transportation Association of the Northwest

The Community Transportation Association of the Northwest strives to improve travel options for people who need public transportation. Their goal is to allow people to remain independent and have access to medical offices as well as everyday services through public transportation. The Association consists of members from non-profit organizations, for-profit organizations, and community representatives.

Puget Sound Regional Transportation Group

The Puget Sound Regional Transportation Group consists of representatives from King, Pierce, and Snohomish counties who solicit advice from stakeholders including transit, human services, schools, private and non-profit providers, advocates, and consumers. The Group's members are committed to coordinating all modes of public and private transportation in order to improve customer service, specifically for special needs clients. As a part of their coordination efforts, the group is promoting the use of the Puget Sound trip planner (see discussion in Section 3.3). The Regional Trip Planner is a natural expansion of the Puget Sound's trip planner.

Washington Statewide Information Coordination Consortium

The Statewide Information Coordination Consortium promotes data collection on issues including transportation in Washington State in order to create greater understanding of the different roles of the divisions of government – state, county, city, and special district. By gathering information the Statewide Information Coordination Consortium increases the accountability of government and raises the understanding citizens' have of important issues. They also support increased citizen access to information through technology.

3.3 Puget Sound Region's Trip Planner

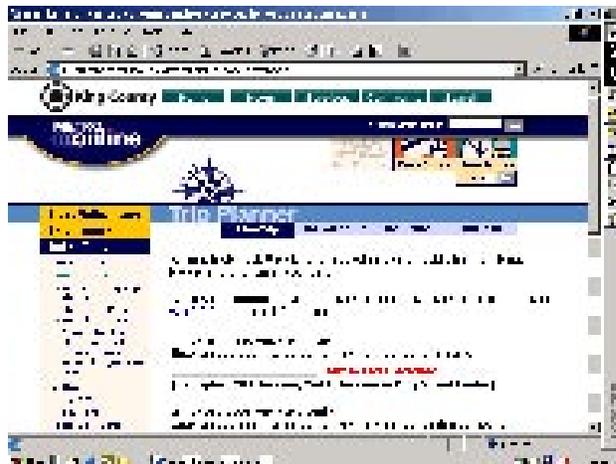
Within Washington there are already three point-to-point web-based trip planners available: Amtrak, Greyhound, and Puget Sound's trip planner. Amtrak's system (<http://www.amtrak.com>) allows station-to-station trip planning for anywhere in the United States, including Amtrak's thruway bus connections. The Amtrak website also allows users to make reservations and purchase tickets online. Similarly, Greyhound (<http://www.greyhound.com>) has a website that will allow a person to plan a trip to one of over 3,000 destinations nationally.

A three-city trip planner that began with the King County Metro, Pierce Transit, and Community Transit in 1996 had by 2002 grown to include Everett Transit, Sound Transit, the Seattle Monorail, and the Sounder commuter train. The intercity trip planner, which began with a small federal grant and the vision of King County Metro, is a web portal for accessing bus and rail information in the seven transit districts. Through this web portal the user can enter a specific addresses for the leaving point and destination, and receive a trip itinerary without a map.

The Puget Sound transit agencies' on-line trip planner has received a great deal of positive feedback from users, but most of such evidence is anecdotal, as no formal survey of user satisfaction has been conducted. The trip-planner has also contributed to King County Metro cutting its call-center support staff in half due to the decreased number of calls and the ability of staff to process calls much faster than before since the

call center staff themselves were using the on-line trip planner to give customers information.

Figure 3 – Seattle Metro Trip Planner Website Snapshot – Similar to Release 2





4. Proposed Regional Trip Planner System

To facilitate statewide and interstate travel between Washington and Oregon the overall Regional Trip Planner system will provide a traveler information about public transit, intercity bus, rail, and alternative transportation systems and services. Both Washington and Oregon states will implement the system to allow this planning of bi-state travel and services on public transportation. Both the Washington and Oregon systems will provide services that can send travel requests to the other system for trip legs that extend across the state boundary, process such requests, and send and receive results forwarded by the other system. The proposed Regional Trip Planner system will be comprised of several sub-systems discussed below.

4.1 Public and Alternative Transportation Web Portal

The Release 1 web portal will provide comprehensive information on available public transportation and alternative transportation services and their providers for both Washington and Oregon states. Information provided through websites maintained by both WSDOT and ODOT will facilitate travel on those modes of transportation throughout each state and across the state boundary in a seamless manner. In Release 2 the same web portal will incorporate the point-to-point public transportation itinerary planning for the two-state region.

4.2 Web Based Data Maintenance

Timely maintenance of the system data is crucial to maintain up-to-date information about service providers and their services. The data maintenance subsystem will provide a web-based interface with enabling functionality for the service providers to update their data regularly as it changes. A secured login system will authenticate users and provide appropriate levels of review and edit privileges. The editing interface will include both non-spatial and limited spatial update features. This subsystem will

also provide limited report generation functionality to evaluate usage of respective service provider information and data status.

4.3 Data Exchange

The data exchange subsystem focuses around tools that will allow agencies to easily exchange information with their stakeholders and other providers through a common data exchange protocol. The XML format will provide a common data exchange process. Agencies and their stakeholders will convert data to this format from their respective systems and will load data from this format into the Regional Trip Planner system. The data exchange subsystem will utilize tools to facilitate data transfer to and from the XML format developed for that purpose.

4.4 External Connector

One of the primary requirements of the Regional Trip Planner system is to have the functionality to connect to similar Regional Trip Planner systems in neighboring regions and states to provide continuous solutions for journeys that extend across state and regional boundaries. The external connector subsystem will allow for travel plans across Washington and Oregon state boundaries. Features of this subsystem will allow the system to send trip request to the other system for journey legs between the state boundary and the other end of the journey. After receiving the results from the other system, the host system will integrate two parts of the journey into a complete itinerary.

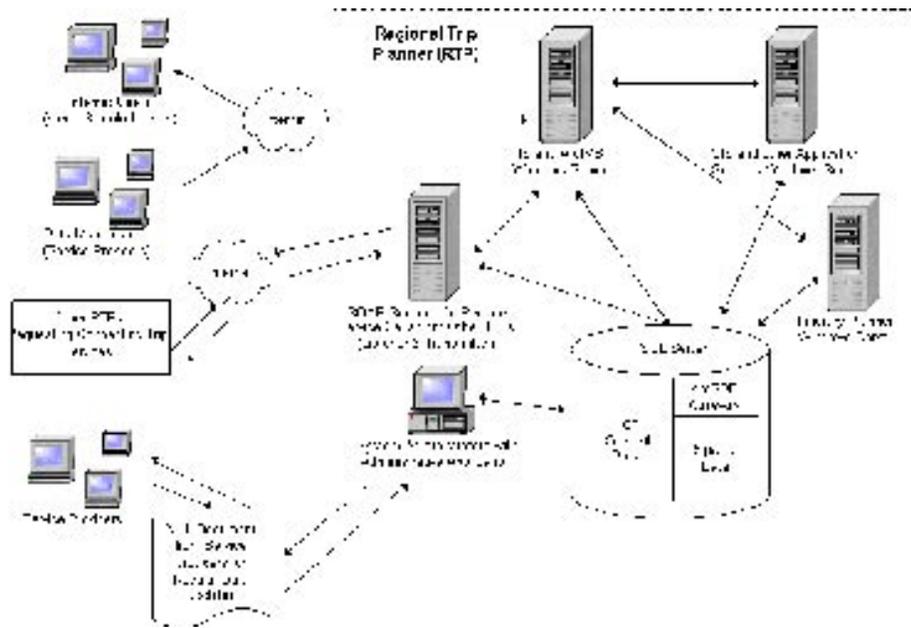
4.5 System Administration

The system administration subsystem provides functionality for user administration, report generation, and review of system log files. It will allow the system administrators to perform their functions with greater ease, as well as allow for review of the system files, which can assist in tracking changes to data.

4.6 Components

The components that make up the Regional Trip Planner system include a web portal, GIS and web mapping services, point-to-point itinerary planning services, a central transportation database (spatial and non-spatial), common data exchange services, web-based data maintenance services, and services to serve requests from similar remote Regional Trip Planner systems. In Release 1 the design and implementation of both spatial and non-spatial data elements for the central data repository and the database structure will take place. The Release 1 infrastructure is then available for an itinerary planner and provides the level of information necessary for WSDOT to take the step to Release 2.

Figure 4 – Proposed System Architecture



Source: Oregon Department of Transportation "Regional Trip Planner: Release 1.0 Cost-Benefit Analysis (P+290)"



5. Cost-Benefit Analysis Process

5.1 Methodology

This Cost-Benefit Analysis report provides the analysis and economic evaluation of the software solution that is under consideration, listing and reviewing factors influencing the costs and benefits as accurately as possible. The costs and benefits are quantified, and those that are difficult to quantify will be included in the discussion because they provide significant added value or have enduring positive effects on the organization. These quantitative and qualitative factors enable the decision-making processes for proceeding with the solution.

From a cost perspective, it is anticipated that WSDOT and ODOT will have similar development and implementation costs since these costs mainly involve software development. However, since Washington's population and transportation system base is significantly larger than Oregon's, it is anticipated that Washington will likely incur a higher magnitude of benefit. To read more about the costs and benefits for Oregon, please see the ODOT publication "Intelligent Transportation Systems: Regional Trip Planner Release 1.0 Cost-Benefit Analysis (P+290)".

5.2 Organization of Cost-Benefit Analysis

This Cost-Benefit Analysis report presents the tangible and intangible factors to enable the decision-making processes through the following analysis categories:

- **Quantifiable System Costs** – Estimated pre-implementation through post-implementation costs. For financial analysis purposes, costs have been projected for a five-year period (2006-2009) and a range established (plus or minus ten percent) from the estimated baseline.
- **Quantifiable Benefits** – Those benefits that provide measurable returns to the organizations or to the general public. For financial analysis purposes, benefits have been projected for a five-year period (2006-2009).

- **Qualitative Costs** – The costs which cannot be accurately estimated and which may or may not be incurred.
- **Qualitative Benefits** – The benefits that cannot be quantified but will provide an added value or have positive effects on the organization or on the general public.

5.3 Cost-Benefit Analysis Methodology

Develop Quantifiable Costs and Benefit Estimates

The project team developed cost estimates for hardware, software, and personnel required to plan, implement, and operate the proposed solution. In the benefits category cost avoidance and improved operational efficiencies are estimated based on discussions with representatives of the WSDOT and the ODOT user and information technology community combined with experience from past implementations. The quantitative costs and benefits are not exclusive; the benefits section cannot be used to establish overall savings and must be used with the costs section to determine overall system costs, operational efficiencies and staffing. The qualitative costs and benefits should also be taken into account when considering overall system savings.

Identify Qualitative Costs and Benefits

The qualitative or non-tangible benefits component of this report consists of those benefits which provide significant added value or have enduring positive effects on the organization, but that cannot be easily quantified. These benefits were deemed important to evaluating the full impact of the Regional Trip Planner. The qualitative costs component of this report consists of those costs that could slow down the project or detract from the overall system value.

6. Proposed Regional Trip Planner System Costs

The costs related to system design, development, implementation, and maintenance and operation are grouped into two categories: quantifiable costs and qualitative costs. The quantitative costs are those that are tangible and can be calculated relatively accurately. The quantitative costs are further divided into two categories: Recurring and Non-Recurring costs. The Non-Recurring or initial start-up costs are those that are associated with the infrastructure, initial design, development, and implementation of the system and which will include development and implementation costs of Release 1 system functionality. Recurring costs are all costs reasonably expected to arise yearly.

Qualitative costs are losses or sacrifices that are incurred or are made by people involved in a process for which they are not compensated. A dollar amount cannot always reasonably be attached to these costs. An example would be a project delay that prevents a manager from reassigning staff to other important projects or tasks. The project suffers from having staff with no assignments and another project suffers that has assignments but no staff. Qualitative costs are important to the overall system cost consideration.

6.1 Quantitative Costs

Quantitative costs are actual tangible costs incurred as a result of implementing the web portal release of the trip planner. These costs are based on the system requirements of Release 1. Quantitative costs are all assigned dollar amounts after applying assumptions and making calculations. The charts below reflect the quantitative costs that do not yet have appropriations; in the appendix A are charts showing the full cost, including those cost items which already have funding out of WSDOT project budgets. Please see the appendix for detailed discussion of assumptions.

6.1.1 Non-Recurring

The following quantitative costs are considered non-recurring:

- **System Development** – This cost includes all items associated with consultant costs for system design and development of the fully functional Regional Trip Planner web portal and includes all components described under the Proposed System section, except the point-to-point trip planner. The design costs will cover the detail design of the system including database, functionality, and architecture. It also includes the development of all P+ deliverables related to the system design. These development costs will cover the actual coding for both server and client side functionalities of the system.
- **Implementation** – Implementation costs are associated with placing the already developed and tested system into production as well as requiring start-up tasks, which may vary depending on the agency and the implementation location. For example, one of the state agencies may already have one or more software applications or may have certain data that the other agency may not have. Because of these differences, the approach for data acquisition from the service providers will vary between the two agencies.
 - Items that are included in implementation costs include, but are not limited to, hardware and software acquisition and installation costs, basemap acquisition costs, database implementation costs for data acquisition and development, and system installation, testing and launching costs.
 - Due to the differing factors in the implementation phase compared to development the cost of implementation is shown as a separate item. Implementation costs include consultant costs and significant work hours in system setup.

- **Training and Documentation** – The training costs included assume sufficient operational and technical training necessary for both the agency personnel and the transportation providers to operate and maintain the system after the implementation. Costs for writing the accompanying operational documentation is included in the documentation costs. Existing WSDOT project budget will pay for the training and documentation component. It is possible that training could be provided together for both Washington and Oregon stakeholders, but that is not included as part of the costs at this time.
- **Software** – Various application software components required for the development of various features of the system are recommended for the proposed system architecture, including ArcGIS – ArcSDE for GIS functionality, ArcIMS for web-based mapping and spatial functionality, SQL Server for the central database, and Win2K and IIS as operating system and web server. ArcIMS also requires a Servlet Engine. It is assumed that both WSDOT and ODOT already possess an IIS Server as part of their existing architecture. All other software costs are included in the cost analysis since WSDOT does not already have licenses for them.
- **Hardware** – The hardware costs assume that two servers are needed for the system. Existing hardware utilization would lower the costs. It is assumed that the project will utilize one existing server and purchase two new servers. Server hardware includes one machine for the database, one for web mapping, and the third one for serving GIS application and business logic services.

- **Project Management and Coordination** – A significant amount of time and resources will need to be spent in managing the development of the system, coordinating with the stakeholders from the respective states, and providing guidance to the consultant. This cost item is calculated based on the assumption that one person from each agency is involved full time for approximately 9 months during the design, development, and implementation of the system.

6.1.2 Recurring Costs

Once implemented the system incurs regular costs for ongoing operation and maintenance. These costs items include the following:

- **System Maintenance** – Cost for system maintenance covers the time and resources that will be required to maintain the system infrastructure annually after installation. The tasks and personnel for system administration, network administration, and minor improvements or enhancements will fall under this item. These costs are assumed to begin at \$40,000 a year and increase at a rate of 3 percent annually.
- **Database and Data Maintenance** – For ongoing administration of the database and data entry, ODOT estimates that 0.25 FTE of a database administrator and analyst will be required. However, WSDOT currently assumes that no new staff will be hired in Washington State as the current staff has the training to assume the required duties of database and data maintenance. Thus costs for Washington State data and database maintenance are assumed to be zero.

Table 1 – Summary of Unfunded Non-Recurring Life Cycle System Costs

Non-Recurring Initial System Costs	# of Units	Unit Costs	Item Costs
System Development	–		\$ 540,000
Implementation	–		450,000
Software	–		42,900
Hardware	2	\$10,000	20,000
Total Non-Recurring Costs			\$1,052,000

Please see Appendix A for further discussion of assumptions.

Table 2 – Summary of Unfunded Recurring Life Cycle System Costs

Recurring Costs	2006**	2007	2008	2009	2010
System Maintenance*	\$20,000	\$41,200	\$42,436	\$43,709	\$45,020
Database and Data Maintenance	–	–	–	–	–
Software License Maintenance	2,500	5,150	5,305	5,464	5,628
Basemap Licensing	5,000	10,000	10,000	10,000	10,000
Hardware Depreciation	–	–	–	–	20,000
Total Recurring Costs	\$27,500	\$56,350	\$57,741	\$59,173	\$80,648

*Assuming \$40,000 salary.

**Year 2006 has smaller costs since the project is assumed to begin July 2006. Costs assume a 3% increase due to inflation.

■ **Software License Maintenance Fees** – Annual license maintenance fees are required to receive regular technical support on software applications such as ArcGIS-ArcSDE, and ArcIMS.

■ **Basemap License** – A transportation basemap is required for the system to provide GIS functionalities. In the absence of an appropriate bi-state basemap, agencies may need to procure a basemap from a vendor, which is regularly updated for an annual maintenance fee. Generally, there is no upfront basemap purchase cost, just the annual license fee for usage and updates. Some vendors have license structure for quarterly, bi-annual, or annual updates of the basemap data. Annual updates are generally sufficient for trip planning systems. The annual license fee is included as a recurring cost.

The following table summarizes the total unfunded system costs, both recurring and non-recurring for a five year period.

6.2 Qualitative Costs

As mentioned earlier, qualitative costs are those that are difficult to measure, or intangible. These costs are not generally calculated on monetary terms, but rather are perceived as a loss or sacrifice. Some of the qualitative costs identified are listed below.

■ **Possible Project Delays** – For many projects, delays in development and implementation of a system can negatively impact the budget. Delays can still negatively impact the goals and objectives of the system even if no financial costs are incurred. For example, if delays occur they can cause negative perception in the minds of system beneficiaries as the anticipated benefits are delayed. Project delays also prevent staff from being reassigned to other important projects or tasks.

Table 3 – Total Unfunded Life Cycle System Costs

	Build	2006	2007	2008	2009	2010
System Development	\$ 540,000					
Implementation	450,000					
Software Procurement	42,900					
Hardware Procurement	20,000					
System Maintenance		\$22,500	\$46,350	\$47,741	\$49,173	\$50,648
Database Maintenance		–	–	–	–	–
Software and Basemap Licensing		7,500	15,150	15,305	15,464	15,628
Hardware Depreciation		–	–	–	–	20,000
Total	\$1,052,900	\$30,000	\$61,500	\$63,046	\$64,637	\$86,276

■ **Difficulty Reaching Consensus Among Participants** – A high degree of cooperation is required for the development and operation of the Regional Trip Planner system. Cooperation from stakeholders is very important for the success of the system as a functional, usable entity depends on the quality and timely updates of the service provider data and proper marketing. Lack of cooperation can become very costly for the agencies, as they will have to put more resources and time to maintain the system. A regional system like this one requires all stakeholders to be on-board with the system’s goals and work toward the success of the system. For a statewide trip planning system that required up-to-date data from all public transportation service providers, out-of-date or stale data from any service provider can cause the entire system to become ineffective. Lack of cooperation from the stake-

holders can make the data in the system dated. With expired or incomplete information, users will turn away from the system costing both the agency and users. Insufficient cooperation from the stakeholder may also force host agencies to spend increased resources to maintain the quality of information provided by the system.

■ **Change in the Status Quo** – As in any other newly developed and implemented information technology system, this system will bring certain changes to the day-to-day activities of the agency staff involved with the system. Though in almost all cases the changes are positive, people will not always accept them that way. Negative perceptions can result in an unwillingness to make adjustments to regular activities to accommodate the new system and can result in some qualitative costs.

7. Proposed Regional Trip Planner System Benefits

This section will analyze the quantitative and qualitative benefits realized from the implementation of the system. Quantitative benefits are those that can be assigned a dollar amount according to justifiable conditions and assumptions. Qualitative benefits are those that cannot be quantified, but have an identifiable benefit in concept or perception.

Each of the proposed subsystems – web-based data maintenance, data exchange, external connector and system administration – has the ability to produce benefits in the form of either cost savings or improved operational efficiencies that can be estimated in dollars. For the purpose of this analysis of costs and benefits, the benefits are presented as the difference between operating under the current system and operating under the recommended system. Therefore, cost savings and cost avoidance figures are a comparison to current figures. The areas of operation where benefits are identified are quantified based on reasonable assumptions.

7.1 Quantitative Benefits

The Regional Trip Planner provides a variety of benefits to travelers, transportation providers, commuters, caseworkers, and agencies. There are specific areas where benefits are identified and quantified based on reasonable assumptions. These benefits fall into five categories:

- Better Utilization of Service or Filling More of the Available Seats
- Increased Capacity Utilization in the Number of Rides
- Increased Capacity Utilization in the Number of Riders
- Increased Efficiency for Rides by Agency
- Reduced Program Costs for State Agencies

Quantitative benefits are assigned dollar amounts after applying assumptions and making calculations. Unless otherwise noted, each quantitative benefit is calculated with the following assumptions:

- Benefits are homogenous and apply statewide unless otherwise indicated by Region
- Benefits begin in the implementation year (year 2006) unless otherwise noted
- Five year amortization (lifecycle)
- All benefits identified in this document pertain to web portal Release 1

7.1.1 Increased Ridership from Existing Public Transportation Users

One of the first places where quantitative benefits will be realized with the Trip Planner system is with the already existing users of public transportation. This customer base has already broken the initial barrier of using public transportation as a viable option, and is likely to utilize it more if provided a tool such as the Trip Planner. While national and international studies are guarded in terms of their analysis of increased ridership, a common consensus is that trip planners have increased public transportation usage by providing specific journey-based information meeting the needs of a traveler.

There are approximately 1,292,270 Washingtonians who ride fixed route transit regularly on a yearly basis. The marketing strategy for the web portal will plan to target the existing transit rider base with the goal of increasing their usage of existing transportation services. It is estimated that these existing riders will increase their ridership by two unlinked passenger trips a year, which equates to one round-trip a year. The increase of one round-trip per customer will bring in \$1,602,414.80 in new revenue for fixed route transit annually.

An increase in ridership for demand responsive or dial-a-ride service is also anticipated. However, the profile of a demand responsive transportation client indicates that regional transportation information will not have the same marginal value for that client as improved local information would. Since many demand responsive transportation clients are already familiar with their local transportation options, the conservative estimate of 0.5 new unlinked passenger

Table 4 – Existing Riders Anticipated to Use Public Transportation More Often

Service Type	Annual* Number of Rides	Number of Existing** Riders	Annual Increase in Rides per Rider	Fare per Ride	Annual Benefit
Fixed Route	155,434,737	1,292,270	2	\$0.62	\$1,602,415
Demand Responsive	4,669,472	103,871	0.5	\$0.50	25,968
Taxis	6,468,750	Unknown	0.10%	\$10.00	64,688
Inter-City Rides (Rail)	817,405	Unknown	1.00%	\$10.00	81,741
Total					\$1,774,811

*Number of Annual Rides is based on 2002 figures collected by the transit authorities.
 **Please see Appendix B for assumptions and calculations of the number of riders.

trips per demand responsive transportation client is made, or one round-trip per four demand responsive clients. The benefit for demand responsive transportation providers from increased rides by existing users would be \$25,968.

An increase in taxi ridership is anticipated as well since the Regional Trip Planner incorporates taxi service as an option for users. However, Washington State does not collect reliable information on the number of taxi trips taken by individuals annually. Oregon, on the other hand, calculated the approximate number of taxi rides taken in Oregon as 5,625,000 by extrapolating from an estimate of the number of taxi rides in the City of Portland. Since the population of Washington State is almost 2.5 million people, or 72 percent, higher than Oregon's, this paper added 15 percent as a conservative estimate to the number of taxi rides in Oregon to derive approximately 6,468,750 taxi rides annually taken within the State of Washington. With so many taxi rides taken within the state, even 0.1 percent increase in taxi ridership

would yield a benefit of \$64,688, assuming a fare of \$10 per ride.

7.1.2 Increase Ridership from New Riders General Population Impact on New Ridership

The proposed Regional Trip Planner system has the potential to attract new users to the public transportation system as a result of providing comprehensive and easy to access information in one web portal. The Trip Planner will provide an array of transportation modes, such as bus, shuttle, or dial-a-ride, increasing the attractiveness of the service for new users. Also, the web portal will have the style of a trip planner into which the user enters a starting location and a destination, and then receives a list of service providers that could potentially fulfill part of the trip. Both Washington and Oregon plan to leverage the current exposure of their websites to market the Regional Trip Planner. A measurable number of new riders anticipated is summarized in Table 5.

Table 5 – New Riders Anticipated

Service Type	Annual Number of Rides	Number of Existing Riders	New Riders	Annual Number of Rides per Rider	Fare per Ride	Annual Benefit
Fixed Route	155,434,737	1,292,270	0.50%	50	\$0.62	\$200,302
Demand Responsive	5,454,868	103,871	0.50%	48	\$0.50	12,465
Taxi	6,468,750	Unknown	NA	0.25% of total	\$10.00	161,719
Rail Service	817,405	Unknown	NA	0.50% of total	\$10.00	40,870
Total						\$415,355

A recent survey by the FTA of fixed route transit agencies indicates that several transit agencies felt that trip planner service accessible through the Internet leads to new customers as well as existing customers making new types to trips on fixed route transit (*Trip Planning: State of the Practice*, FTA 2002). Any increases in public transportation ridership translate to additional revenues for transportation stakeholders.

Currently, nearly 1.3 million people ride fixed route transit in Washington State. With marketing targeted at new riders, an estimated 0.5 percent increase in ridership is anticipated. The number of rides taken by each new rider is assumed to be 50 trips annually, meaning 25 round-trips a year, which would place these new riders in the infrequent rider category of 1-4 trips a month. Even assuming that all of the new riders will be infrequent riders of fixed route transit, the annual revenue from the increased ridership would be \$200,302.

In addition to the new riders of fixed route providers a significant number of new riders will be utilizing the Trip Planner to plan “multi-modal” trips involving a taxi or a demand responsive transportation, perhaps to get to a fixed route transportation provider. The increased information about how to use demand responsive transportation and taxis provided to new riders through the web portal will be instrumental in providing mobility for rural citizens whom are not close to urban fixed route providers. Even with the modest estimate of a 0.5 percent increase in demand responsive ridership and a 0.25 percent increase in taxi ridership the benefits would be \$12,465 and \$161,719 respectively.

Increasing the number of riders is critical to the relevance of public transportation to society and to the success Regional Trip Planner. There is also a great need to increase the accessibility to trips between urban and rural areas. Frequently the information on traveling between providers is insufficient, making it difficult for people who must commute long distances to work and causing separation between communities. Also, with the demographics of an aging population, the planning of trips becomes important from a quality of life as well as from a monetary perspective. The state must play a role in supporting transportation connections between communities, whether highways or public transportation. Providing the information to make those connections more accessible and convenient is an important part of supporting mobility around the state.

The easier it is to plan multi-modal trips for people who are not used to traveling on public transportation, the more the number of new riders will increase. The new users will be encouraged to use multi-modal trip planning by emphasizing the multiple modes available to make the trip – such as bus, train, taxi, dial-a-ride, shuttle – and providing information about these modes. Trips that are made across county or state borders require the user often to coordinate their travel with several transportation providers’ schedules, which can be difficult and time consuming. By having information about transportation services that facilitate traveling from one state to another available, the web portal assists the public in making informed decisions about their cross-state trips.

As word-of-mouth recommendations and official marketing efforts increase, along with the ease of planning, new ridership of public transportation will increase. Whether visitors to the area or current residents who did not take public transportation earlier due to lack of information, with easy access to information they are more likely to make use of the transportation services available to them.

Human Services Impact on New Ridership

Increasing the number of riders from state managed programs designed to assist citizens with basic services provides a significant benefit from the Regional Trip Planner that is directly quantifiable. Please see Table 6 below for a summary of these benefits.

In March 2004 in the State of Washington 54,659 people were receiving aid under the Temporary Assistance for Needy Families (TANF) Act. Of those receiving aid, 25.8 percent or 14,103 people were also receiving transportation aid. However, only 8,264 of those receiving transportation aid had received a bus pass from the TANF program, the rest received cash assistance. If the caseworkers assisting the families in need had access to better tools regarding public transportation the caseworker could easily map out a route for the TANF recipient to get to work or another location using public transportation, and the caseworker may then be better able to judge if a person should have a bus pass or cash assistance. With improved information the TANF program could save some money on transportation assistance, thus allowing them to allocate the saved funds to other forms of assistance for TANF recipients. Assuming a 1.5 percent increase in TANF recipient ridership of public transportation, with each new rider taking

Table 6 – New Riders Anticipated From Human Services Programs

Service Type	Client Base	Clients Receiving Assistance	New Riders from Program	Number of Rides per Rider per Year	Fare per Ride	First Year Benefit
Temporary Assistance to Needy Families	54,659	8,264	1.5%	24	\$0.62	\$12,200
Vocational Rehabilitation Clients	28,036	Unknown	1%	48	\$0.50	6,728
Veterans Affairs	640,520	Unknown	0.5%	24	\$0.62	47,654
Department of Employment	194,300	Unknown	1%	24	\$0.62	28,911
Total						\$95,493

Please see Appendix C for the source of the numerical data, explanation of the calculations, and a list of assumptions.

24 unlinked passenger trips annually (or 12 round-trips a year) the benefit would be \$12,200.

28,036 individuals in 2003 received vocational rehabilitation aid in Washington State, many of whom required special transportation assistance either in the form of bus passes, cash assistance, or a disabled passenger vehicle purchased for them by the vocational rehabilitation program. Those individuals receiving vocational rehabilitation aid are disabled in a way that prevents them from engaging in the work that they previously performed. Thus the vocational rehabilitation clients are frequently in need of transportation assistance and qualify for special needs transportation. Since the number of vocational rehabilitation clients currently receiving transportation aid is not known, this paper estimates that increased information will lead 1 percent of the vocational rehabilitation clients to use public transportation. The benefit from increased use of the system by 1 percent of the vocational rehabilitation clients is estimated at \$6,728 annually. Caseworkers assisting vocational rehabilitation clients would also benefit from a tool that would allow them to plan public transportation trips for their clients.

According to the U.S. Bureau of Labor Statistics in February 2004 Washington State had an unemployment rate of 6.1 percent, of 194,300 persons. Unemployed people can have special transportation needs since they might not be able to afford their own car but require reliable transportation in

order to look for work. The State of Washington does not allocate moneys for those receiving unemployment insurance to look for work, though those individuals receiving special aid such as TANF funds will receive some transportation assistance. However, since those in need of employment may be in need of some transportation assistance, greater information about the public transportation system may help them cross one hurdle in their employment search. An estimated 1 percent of unemployed people will take the bus to interviews and to run errands when the easily accessible information from the Regional Trip Planner becomes available. The increased use of the public transportation system will lead to a benefit of \$28,911.

7.2 Qualitative Benefits

The Regional Trip Planner system will realize qualitative or intangible benefits that are of significant value to the providers, the general public, and to the agency's mission. They are as follows:

- **Improved Customer Satisfaction** – One qualitative benefit of implementing the Trip Planner system for the general public and caseworkers or brokerage services is the marked improvement in customer satisfaction. Service organizations will receive the comprehensive information about various travel alternatives available that will enable them to increase customer satisfaction. Whereas in the past a user had to call a number of public

transportation service providers to plan a trip that involved multiple service providers, they will be able to glean those options themselves through the multi-agency and multi-modal information available on the web portal. During face-to-face interaction caseworkers or brokerage services can present a wider set of alternative options to users. Also, callers can receive improved service from telephone operators at the call centers due to reduced numbers of calls.

Denver RTD, Waukesha Metro Transit, Maryland MTA, all of which are fixed route transit providers, were surveyed by the FTA and indicated improvement in customer satisfaction as a significant intangible benefit of implementing such a system (*Trip Planning: State of the Practice*, FTA 2002).

- **Increased Operational Efficiencies** – A significant benefit from the proposed Regional Trip Planner system is the increase in operational efficiency. The system presents a key benefit to state managed programs that are designed to assist citizens in need of basic services. Agency personnel from these various programs are working with citizens daily to assist them with employment, medical treatments, housing, etc. A predominant number of these citizens struggle with the logistics of transportation. Many do not have their own means of transportation, but aren't aware of the public transportation services available. As each client's transportation needs are unique, agency personnel from these programs are constantly

checking on public transportation options to meet their client's needs. In some cases, it is as easy as handling them a transit brochure. But more often, state personnel are actually assisting their clients in finding the provider that will meet their needs. The steps to find a transportation provider take up caseworker time and detract from the caseworker's ability to offer other necessary services to the client.

The proposed web portal release of the Regional Trip Planner system will reduce the barriers to effective service faced today by providing a central, comprehensive portal to enable citizens to utilize the public transportation system. Caseworkers will be able to give more individual attention to clients, assisting them in crucial matters such as health care accessibility and employment counseling.

For the purposes of this Cost-Benefit Analysis, the most direct operational efficiency gained from the Regional Trip Planner system is through the timesavings associated with state program personnel assisting citizens with transportation arrangements. From discussions with various state human services agencies, it is estimated that a state caseworker spends on average approximately 40 minutes per client on transportation issues, though the actual time varies per client. The following table 7 highlights the estimated benefit associated with just a few of the state programs. It reflects a basic assumption that state personnel could save 5 – 10 minutes per client requesting transportation

Table 7 – Time Saved by Caseworkers With Transportation Dependent Clients

Program	2003 Client Base	Clients Potentially Receiving Transp. Assistance	Average Minutes of Time Saved per Client	Number of Hours Saved Annually
Temporary Assistance for Needy Families	54,659	14,103	10	2,350
Vocational Rehabilitation Clients	28,036	14,018	10	2,336
Department of Unemployment	194,300	19,430	5	1,619
Total				6,305

Please see Appendix C for detailed explanation of assumptions and calculations.

assistance. Over the year these small time savings have a significant impact on the caseworkers time and ability to provide comprehensive services to the clients.

- **Improved Information Enhances Marketing Resources** – A German developed program, *IndiMark*, allows potential public transportation users to directly access specific information about the trips they take. *IndiMark* has been successfully tested in communities around the world, including Portland, Oregon. Developing a statewide and regional system increases the effectiveness of marketing alternative transportation options in the region. On average *IndiMark* systems have been able to reduce single occupancy vehicle use by ten percent, and have been able to maintain that mode split up to three years. Timely, accurate and accessible schedule information can also be an effective marketing tool even without a specific program like *IndiMark*. A well designed website with comprehensive and accurate information encourages a positive image of public transportation resources and makes it easier to use the existing system.
- **Improved Service for Persons With Disabilities** – There are two accessibility issues that the Trip Planner must address: accessibility of the information and accessibility of the transportation services. One of the major objectives of the system is to design the web portal in accordance with the Federal Rules CFR Section 508 requirements for people with disabilities. Information provided on the web will be made available to people with disabilities through alternative methods. For example, a graphic that conveys certain information may not be useful for a user with visual impairment. The same information would be provided through alternative texts so that web text reader software can read the same information to visually impaired users. All input controls on web forms will be adequately labeled with alternate texts so that people with disability can easily understand what kind of information input is expected from them. Information that is generally presented through client-side scripting will have alternative text links provided. This will allow users with text browsers or browsers with scripting capability turned off to receive and

use the same information. The web portal will also integrate available accessibility information about public transportation services making the information more comprehensive for people with disabilities.

- **Benefits of New Types of Services** – The users benefit from several new types of services offered by the web portal, like the dynamic mapping of routes, stops, and important landmarks. These types of services will make the information easier to use for the regular public transportation patrons, but will also benefit the visitors to the area.

Dynamic maps for displaying public transportation facilities attracts more users to the web site as maps can convey information that would otherwise be difficult to present. Seeing public transportation route, stop, timepoint, and landmark locations on maps allows users to orient themselves. Maps become essential for users who are visiting the region and looking for information about public transportation services. GIS services allow users to make queries that can easily be answered through spatial analysis. For example, a user can type in an address or pick a location from a map and ask for transportation service providers in the neighborhood. GIS geocodes the address or map location and perform a proximity analysis to find out all the service providers in the area. Users can also type in a landmark name such as “Seattle Center” and ask for public transportation routes that stop there or nearby, or request demand responsive transportation providers’ contact information. This type of service expands the level of information users can access.

- **Improved Communication Between Public Transportation Partners** – Working together on a statewide system improves the communication and service between the various public transportation service providers in the state. Most people travel outside their town or city fairly regularly - including the over 16 percent of working Washingtonians who cross county borders to get to work. However, most public transportation services tend to serve specific areas rather than clients. The majority of public transportation systems can only give the user information on how to travel within their service area. This limits the

public transportation system's ability to support the types of trips the people in the transportation services areas are actually making or trying to make. Public transportation information for the entire state will allow individual service providers to provide expanded information to their customers. For proper upkeep and functioning of the system, transportation service providers have to occasionally meet and collaborate. Cooperating in information exchange and discussing inter-service area transportation increases the level of communication among transportation service providers.

- **Improved Transportation Planning for Unmet Needs** – In a system that integrates rural and urban area transportation information, the gaps in transportation services and disconnects become more evident. So, a statewide trip planning system can play a crucial role in identifying unmet transportation needs of people, especially those living in rural areas. This multi-agency, multi-modal transportation information database will highlight the disconnects between services and will lead to better service planning by the individual service providers as well as agencies responsible for sub-regional and state level public transportation planning.
- **Uniform Public Transportation Data Exchange** – The Regional Trip Planner formalizes a framework for data gathering and data sharing practices for WSDOT and ODOT and their transportation partners. This data sharing will provide significant operational and planning benefits for the two department of transportations and public transportation providers. Currently, each public transportation provider has a system suited for their internal needs. Data formats of these systems are proprietary and not readily used with other external systems. A common data-sharing format (XML) and associated export and import tools

will be utilized to allow member organizations to share their data through a common protocol. The XML based format will be developed according to applicable state and national standards.

- **Use of Information for Other Public Transportation Planning and Programming Needs** – WSDOT and its transportation partners can utilize the statewide public transportation information maintained in the system for other planning and programming purposes as well. Collection and compilation of data is frequently the most expensive item in any transportation project or plan. Maintaining public transportation service information for the entire state in an open environment allows WSDOT, ODOT, and their transportation partners to utilize information for planning and improving transportation services. Easy availability of information will make any public transportation planning exercise more cost effective.
- **Environmental Benefits of Increased Public Transportation Usage** – Increases in ridership on fixed route systems not only bring additional revenues for the public transportation service providers, they also have other positive environmental benefits for the state. Any increase in transportation modal split (or increase in total statewide public transportation trips at the expense of auto trips) translates into significant air quality and energy benefits for the states of Washington and Oregon. Each single occupancy vehicle puts over 19 lbs of pollutants in the air per gallon of gas used. Even reducing a small number of single occupancy vehicle trips can have an impact on air quality. Based on an estimated increase in modal split, transportation and air quality models used by the two states can be used to estimate these air quality and energy benefits. Also, with the decrease of auto trips, the state can save



8. Summary and Conclusions

Washington State Department of Transportation works to facilitate effective, efficient, and safe travel through the application of advanced information technologies and communications. A region's employment base and industrial development is often closely tied to the quality of the available transportation systems. Population and economic production have always been critical factors in determining the nation's travel patterns and needs. Washington and Oregon are no different, and transportation demands have been growing consistently. Through a combined Washington-Oregon partnership, the Regional Trip Planner system can help meet the increased demand for transportation by providing higher-quality aggregated transportation information via the Internet.

Itinerary planning systems are rapidly being developed across the United States and abroad, and these systems provide many positive benefits, such as reduced costs for transportation providers, improved customer satisfaction and greater accessibility. The Regional Trip Planner concept takes a broader perspective in its direction to build a uniform, scalable network that spans across cities and state boundaries. Taking incremental steps to achieve a regional itinerary planning system is a practical approach, with each release building onto the old system, rather than starting all over.

8.1 Key Conclusions

Fixed Route Transportation Service Benefits
The Regional Trip Planner system will link fixed transportation and demand responsive transportation information together; allowing fixed transportation to gain a stronger picture of where service gaps may exist. Fixed transportation providers are also encouraged to increase their communication with each other as the Trip Planner development phase progresses. Fixed route providers statewide will gain a trip planner similar to the one already in existence in the Puget Sound region without the costs that would be associated with a single transportation provider developing such a system. Fixed route service related

information will realize many of the benefits derived from this system, since most of the new riders will most likely ride fixed route transportation. Fixed route service related benefits that are not currently available and will be achieved through the Trip Planner are as follows:

- Single source for comprehensive statewide fixed route schedules and route maps
- Integrate information about fixed route and demand responsive systems around the state connecting intra-city as well as inter-city services
- Ability for service providers to maintain their service information in a central repository through web-based data maintenance screens
- Attract more fixed route transportation riders through effective and efficient information delivery, thus improving the environment by reducing the total vehicle miles traveled (VMT)
- Statewide increased consistency and improved comprehension in fixed route transportation information dissemination by allowing service providers to access the same information source
- Increase the value of statewide fixed route transportation information by accumulating and establishing a common repository for all service providers

Special Needs Populations and Caseworker Benefits

The statewide trip planning system will bring important information about all demand responsive (general and special needs) services under one central database. The benefits to access these demand responsive services and its patrons are significant.

- Integration and connectivity with the fixed route system to create statewide travel opportunity for people with special needs and people living in rural areas where fixed route services are not available

- Making information about demand responsive service providers available to people through this system may increase level of demand for these services
- Availability of comprehensive information about demand responsive services at the fingertips of riders will decrease the number of calls allowing service providers to put more focus on improving the level of service

For the brokerage service workers and human service caseworkers, the Regional Trip Planner system provides the information they need to provide comprehensive transportation information to their clients. Brokerage services will have the complete public transportation information for their service area at their fingertips. DSHS caseworkers can with the Regional Trip Planner help their clients with necessary transportation service information.

Department of Transportation Benefits

- Developing a common data exchange mechanism and providing tools to transportation service organizations allows both WSDOT and ODOT to realize significant benefits in the collection of comprehensive transportation information
- Initial information sharing is a necessary foundation for implementing a more robust web portal and itinerary builder
- A regional travel planning system allows both WSDOT and ODOT to leverage their existing investments in their ITS infrastructure

- Both WSDOT and ODOT have compatible technology infrastructure, which supports their partnership opportunity
- By entering into a joint-development project, both Washington and Oregon stand to gain over separate development efforts
- An incremental release approach, starting with the web portal vision, is a practical starting point
- The relatively small investment made by each department of transportation yields significant benefit to both WSDOT and ODOT as well as participating transportation service providers
- The project is nationally scalable and increases in value over time

8.2 Cost-Benefit Ratio

Development and maintenance costs of the system are quantified using current proposed system design information. The benefits of developing and maintaining a system of regional public transportation outweigh the costs of the project. Preliminary estimates of costs and benefits for the project resulted in a cost-benefit ratio of approximately 1 to 6. For the Release 1 web portal the estimated costs total approximately \$1.6 million over 5 years whereas estimated benefits total over \$10.2 million. Later documentation will evaluate future releases.

Table 8 – Total System Quantitative Benefits

Category	2006	2007	2008	2009	2010
Increase in Existing Ridership	\$ 887,406	\$1,774,811	\$1,774,811	\$1,774,811	\$ 1,774,811
New Riders Without Special Needs	207,678	415,355	415,355	415,355	415,355
New Riders From Human Service Programs	47,746	95,493	95,493	95,493	95,493
Annual Benefit	\$1,142,830	\$2,285,659	\$2,285,659	\$2,285,659	\$ 2,285,659
Total Benefit					\$10,285,465

8.3 Recommendation

The Regional Trip Planner is in alignment with WSDOT's mission and goals of improving public transportation and increasing accessibility to transportation in Washington State. The Trip Planner allows people to plan trips outside of their public transportation district's boundaries, thus increasing their mobility. People who work outside their county or who do not have medical care near their residence can, on one website, plan itineraries that include multiple modes of travel.

This cost-benefit analysis has outlined the five-year (2006-2010) benefits for Washington State, but there is no reason to believe that the benefits of the Regional Trip Planner will be so short lived. In fact, as the Regional Trip Planner gains a reputation for reliability and ease of use, the use of the system is likely to only increase, thus bringing the State of Washington not only tangible monetary benefits but also improved quality of life for those who rely on public transportation.

The Regional Trip Planner will show a return on WSDOT's investment into the project through the increased ridership of the public transportation system. Also, the national recognition of Washington State as a unique leader in transportation accessibility and coordination will position the state favorably to receive future federal grants for other innovative projects.

The Regional Trip Planner will allow individuals and caseworkers to access information about their transportation options with greater ease, saving time and increasing appreciation for the public transportation system. As gaps in service areas become visible through increased information flow, the Regional Trip Planner system will allow transportation authorities and human services agencies to begin coordination of their services. Cooperation between transportation authorities and human services agencies will provide greater customer service to people in need as well as lower overall system costs.

The Regional Trip Planner is a necessary component in increasing information flow to maintain the relevance of the public transportation system for the citizens of the state. The Trip Planner will also create more accessibility to public transportation, thus improving the quality of life in Washington State.

Appendix A

Several key assumptions were made regarding the costs of developing the Regional Trip Planner in Washington State. These assumptions include:

1. Number of new staff members to be hired was determined to be lower than in Oregon
2. System implementation costs
3. Training costs
4. Number of servers needed to manage the Regional Trip Planner database and web portal
5. The cost of software licensing

The assumptions are discussed in detail below:

Program Coordinator – A 0.5 FTE Public Transit Division Program Coordinator is required to monitor the quality and accuracy of data, coordinate with service providers for up-to-date training, and respond to user comments and suggestion. The Program Coordinator is also responsible for regular coordination with the stakeholders is required for maintaining the system with up-to-date information. The Public Transportation and Commute Options Office budget will pay for the salary of the 0.5 FTE Program Coordinator, so no additional appropriation of funds is necessary.

Marketing – Ongoing marketing efforts are required to publicize the system and make travelers aware of the availability of such wide-ranging information about public transportation systems. Marketing efforts help maintain existing users and attract new users. Additional marketing effort is required when new services are added to the system or existing services are enhanced. Though marketing is a recurring cost, the initial cost of publicizing the system and its benefits are assumed higher than the ongoing marketing costs. It is very difficult to predict or calculate the initial marketing costs at this time, as all the variables are not known. For the recurring components of the marketing effort, it is assumed that Program Coordinator position would be responsible for the ongoing marketing effort and

thus no additional staff beyond the 0.5 FTE Program Coordinator will need to be hired.

System Maintenance – Assumes that 1 FTE at \$40,000/ year from IT is needed to maintain the system.

System Implementation Costs – Includes \$200,000 for a systems contractor and \$250,000 for ODOT IT staff to work on the Regional Trip Planner project.

Training Costs – Washington State Department of Transportation hosts many training events for state employees annually. It is assumed that the training for employees on the Regional Trip Planner system will be financed out of the existing annual training budget. Training and documentation for Washington State employees could be reduced if Washington and Oregon combined their employee training.

Software and Hardware – Washington State will have to purchase two servers to house the database and web portal, and will utilize one already owned server. The two servers, at \$10,000 each, along with software costs will raise the cost of capital expenses for Washington State to \$72,900, as reflected in Table 1 in Section 6.1.1 above. Since Washington State Department of Transportation does not have critical software these programs will have to be purchased and licensed at:

- ArcIMS for \$10,500
- ArcGIS-ArcSDE for \$10,000
- SQL server for \$14,000
- Servlet Engine for \$600
- Three Win2K servers for \$1,300 each
- Plus tax at an assumed 10 percent for Washington State

The total software acquisition cost for the above items is \$42,900.

Hardware Depreciation – It is assumed that the servers will need to be replaced every five years. The cost of servers might fluctuate in the future as complex technology becomes more affordable.

Table A.1 below demonstrates the recurring and non-recurring costs for the Regional Trip Planner in Washington State for the next five years. The costs represented in Table A.1 include both the costs for which there are no budget allocations and the costs that are included in existing project budgets.

	Build	2006	2007	2008	2009	2010
System Development	\$ 540,000					
Implementation	450,000					
Training and Coordination	40,000					
Software Procurement	42,900					
Hardware Procurement	20,000					
Project Management	55,000					
System Maintenance		\$20,000	\$41,200	\$42,436	\$43,709	\$ 45,020
Database Maintenance		–	–	–	–	–
Software and Basemap Licensing		7,500	15,150	15,305	15,464	15,628
Program Coordination and Marketing		12,500	25,750	26,523	27,318	28,138
Hardware Depreciation		–	–	–	–	20,000
Total	\$1,147,900	\$40,000	\$82,100	\$84,264	\$86,491	\$108,786

Minimum-Maximum Costs

The following Table A.2 demonstrates the possible minimum and maximum costs associated with initial system development. The figures were derived by adding and subtracting 10 percent from the original projected system costs.

Initial System Costs	Estimated Minimum Build	Projected Build	Estimated Maximum Build
System Development	\$ 486,000	\$ 540,000	\$ 594,000
Implementation	405,000	450,000	495,000
Training and Coordination	36,000	40,000	44,000
Software Procurement	38,610	42,900	47,190
Hardware Procurement	18,000	20,000	22,000
Project Management	49,500	55,000	60,500
Total	\$1,033,110	\$1,147,900	\$1,262,690

Table A.3 below demonstrates the cost range for the recurring system costs. Only two years are presented in this table, but the year 2006 demonstrates the cost range sufficiently for the 2007-2009 years not shown here. The 2005 cost range presents only 6 months of benefits for the year and thus should not be used to derive numbers for the other years' costs. 2005 is calculated as a half-year since the Regional Trip Planner will not be accessible to the users until Summer 2005.

Table A.3 – Regional Trip Planner Cost Projections: Estimated Minimum and Maximum System Maintenance Costs

	Minimum 2006	2006 Maximum	Maximum 2006	Minimum 2007	2007 Maximum	Maximum 2007
System Maintenance	\$20,250	\$22,500	\$24,750	\$37,080	\$41,200	\$45,320
Database Maintenance	–	–	–	–	–	–
Software and Basemap Licensing	6,750	7,500	8,250	13,635	15,150	16,665
Program Coordination and Marketing	11,250	12,500	13,750	23,175	25,750	28,325
Hardware Depreciation	–	–	–	–	–	–
Total	\$38,250	\$42,500	\$46,750	\$73,890	\$82,100	\$90,310

Appendix B

The calculations for King County Metro ridership should be understood to contain strong bias in favor of ridership since many of the people to whom the survey was presented refused to answer the questions. Since the survey was conducted by random digit dialing in King County, those who chose not to answer the questions most likely do not ride public transportation.

The number of King County Metro riders was calculated by taking the number of people who answered that they were riders of public transportation and dividing the population of King County. The frequent riders were then assumed to ride 18 trips a month and the infrequent riders were assumed to ride 2 trips a month.

Table B.1 – King County Metro Ridership Statistics

King County Population	1,741,785
Passenger Trips 2002	93,768,146
Number Surveyed	7,577
Number Responded	2,400
Responded – Frequent Rider	576
Responded – Infrequent Rider	192
Responded – Non Rider	1,632
Non Response considered non rider	5,177
% Frequent Riders of total responded	24%
% Infrequent Riders	8%
% Non-Riders	68%
Annual Frequent Riders	418,028
Annual Infrequent Riders	139,343
Average Monthly Frequent Riders	34,836
Average Monthly Infrequent Riders	11,612
Average Annual Trips per Rider	168
Total Riders	557,371

Frequent Rider took over 5 trips a month.
 Infrequent Rider took between 1-4 trips a month.

The number of existing riders with fixed route transit was calculated by taking half of the number of trips that the average King County Metro rider takes annually ($169/2=84.5$ or 84 to round down), and dividing the number of passenger trips in each transit district by 84.

Table B.2 – Number of Existing Riders With Fixed Route Transit Annually – 2002

Transit Group	Number of Passenger Trips	Number of Passengers Annually
Urban	137,117,862	1,074,212
Small Town	13,185,252	156,967
Rural	5,131,623	61,091
Total	155,434,737	1,292,270

Many demand responsive transportation providers claimed not to track the actual number of existing riders they have. Therefore, the number of existing riders with demand responsive transportation was calculated by taking the number of known riders in two transportation organizations, calculating the average number of rides those individuals took (53 rides per person) and then dividing the number of passenger trips with the other transportation providers by 53.

Table B.3 – Number of Existing Riders With Demand Responsive Service Annually – 2002

Transit Group	Number of Passenger Trips	Number of Passengers Annually
Large Urban	2,948,484	55,632
Small Town	1,088,530	19,922
Rural	1,417,854	28,317
Total	5,454,868	103,871

Fixed route transit organizations track the fare they charge each passenger and report these amounts annually to the Washington State Department of Transportation. Some fixed route transit providers do not charge any fare or request a non-mandatory donation from riders, and such fixed route transit organization's fare is marked by a dash.

Table B.4 – Fare Collected by Transportation Agencies

Organization Providing	Fare Collected for Fixed Route	Fare Collected for Demand Responsive
Ben Franklin Transit	\$0.75	\$0.75
C-TRAN	\$1.00	\$0.50
Clallam Transit System	\$0.75	\$0.75
Community Transit	\$1.00	\$1.00
Cowlitz Transit Authority	\$0.50	\$0.25
Everett Transit	\$0.75	\$ –
Garfield County Public Transportation	\$ –	\$ –
Grant Transit Authority	\$0.50	\$0.50
Grays Harbor Transportation Authority	\$0.50	\$0.50
Island Transit	\$ –	\$ –
Intercity Transit	\$0.75	\$0.75
Jefferson Transit Authority	\$0.50	\$0.60
King County Metro Transit	\$1.50	\$0.50
Kitsap Transit	\$1.00	\$1.00
LINK Transit	\$0.50	\$0.50
Mason County Transportation Authority	\$ –	\$ –
Pacific Transit	\$0.50	\$0.35
Pierce Transit	\$1.00	\$0.50
Pullman Transit	\$0.50	\$0.40
Skagit Transit	\$0.50	\$0.50
Sound Transit	\$1.25	\$1.25
Spokane Transit Authority	\$1.00	\$0.50
Twin Transit	\$0.50	\$0.50
Valley Transit	\$0.50	\$0.50
Whatcom Transportation Authority	\$0.50	\$0.50
Yakima Transit	\$0.50	\$1.00
Average Fare	\$0.62	\$0.50

Appendix C

The following four tables explain the increased ridership from human services clients. Included are the assumptions made, the calculations followed, and the source(s) of the information.

Table C.1 – Temporary Assistance to Needy Families (TANF)	
Facts	<p>54,659 people in Washington State were on TANF in 2003 25.8% of TANF recipients are receiving transportation aid 8,264 of TANF recipients were given bus passes 23,354 automobile warrants were given to TANF recipients An automobile warrant is cash assistance for purchasing gasoline An automobile warrant is given every two weeks A client seldom needs automobile warrants for the full allowed 12 weeks 23,354 warrants with 4 warrant payments per client (4 in 8 weeks) = 5838.5 Clients The average bus fare for fixed transit statewide is \$0.62 per trip</p>
Assumptions	<p>An additional 1.5 % of TANF recipients would receive bus passes (out of 54,659) A new TANF bus pass recipient would take 2 trips a month, a total of 24 trips a year Assuming that TANF recipients on average received only 4 automobile warrants</p>
Calculations	<p>54,659 TANF recipients * 1.5 % receiving new bus riders = 819.88 new bus riders 819.88 new bus riders * 24 rides per year = 19,677.24 new rides per year 19,677.24 new rides per year * \$0.62 per ride = \$12,199.88 in new ride revenue</p>
Source	<p>TANF participation numbers were received from the WorkFirst office of the Department of Community, Trade and Economic Development (CTED)</p>

Table C.2 – Vocational Rehabilitation Clients	
Facts	In February of 2004 there were 28,036 people receiving vocational rehabilitation in Washington State The average cost of demand responsive rides statewide is \$0.50
Assumptions	Approximately half of vocational rehabilitation clients may already be receiving transportation aid Since the actual number of vocational rehabilitation clients receiving transportation aid is not known it will be assumed conservatively that 1 % of vocational rehabilitation clients will be given a bus pass as a result of increased information and accessibility to the transit system It is assumed that vocational rehabilitation clients, due to the fact that many of them are severely disabled, will ride public transportation more frequently than other individuals, and thus it is assumed that vocational rehabilitation clients will ride the bus up to four times a month
Calculations	28,036 vocational rehabilitation clients * 1 % becoming new bus riders = 280.36 new bus riders 280.36 new bus riders * 48 rides per year = 13,457.28 new rides per year 13,457.28 new rides * \$0.50 per ride = \$6,728.64 in new revenue
Source	The Division of Vocational Rehabilitation at the DSHS

Table C.3 – Department of Employment	
Facts	In February of 2004, there were 194,300 unemployed people in Washington State The Department of Employment does not provide transportation assistance
Assumptions	Unemployed people will have a higher rate of public transportation need than employed people It is conservatively assumed that if more unemployed people know about their public transportation options 1 % of them will become new bus riders It is assumed that a new bus or other transit rider rides 2 trips a month
Calculations	194,300 unemployed people * 1 % become new riders = 1,943 new riders 1,943 new riders * 24 rides a year = 46,632 new rides 46,632 * \$0.62 = \$28,911.84 new revenue
Source	Washington State Department of Employment

Table C.4 – Veterans Affairs

Facts	<p>There were 640,520 veterans in Washington State in 2003 Approximately 91,000 of Washington State veterans are disabled The Department of Veterans Affairs does not provide direct transportation assistance</p>
Assumptions	<p>If the Department of Veterans Affairs informed veterans that the Regional Trip Planner existed, it is assumed 0.5 % of veterans would become bus riders as a result It is assumed that a veteran who becomes a bus rider takes only 2 trips a month It is assumed that veterans would pay the State average bus fare of \$0.62, even though some districts give veterans discounts on ride fare</p>
Calculations	<p>640,520 veterans * 0.5 % become new bus riders = 3,202.6 new bus riders 3,202.6 new riders * 24 new rides each = 76,826.4 new bus rides 76,826.4 new rides * \$0.62 per ride = \$47,654.68 in new revenue</p>
Source	<p>Washington State Department of Veterans Affairs</p>

