

The Washington State Travel Demand Forecasting Decision Process: From Vision to Products

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ABSTRACT

There are a number of elements that can contribute to the successful implementation of a vision. The application of travel demand forecasting, a fundamental planning tool, is no exception.

Our current vision is to develop a coordinated travel forecasting process where local, regional and state roles are played out in a collaborative manner to produce output necessary to answer the policy questions derived through the planning process.

In order to ensure that our view of the vision is clear, it is critical to have a clearly stated outcome to achieve. Currently at the Washington State Department of Transportation we have one primary outcome we are striving to achieve: Enhanced data and analysis assisted decision making (opposite of so called “data-free” analysis).

In order to continue to move in the right direction to achieve this outcome, we have identified four primary objectives necessary for the state to fulfill its role in the travel forecasting process:

1. Ensure that all travel forecasting efforts within Washington State are coordinated and follow a set of agreed upon procedures (Travel Demand Forecasting Framework).
2. Provide each of the 8 Metropolitan Planning Organization (MPO) regions of the state, existing and forecasted interregional travel.
3. Determine how much travel occurs as statewide throughput (e.g., between Canada, Oregon, Idaho and Washington Ports).
4. Test effectiveness of “new corridors” for passenger and freight statewide travel.

To achieve these four objectives we will need to create two products: 1) a best practices' procedures manual, used statewide at the local, regional and state level, for the application of travel demand forecasting; and 2) a statewide travel demand forecasting model.

When we are successful in developing these two high quality products, we will be able to meet our four objectives that will lead us to the desired outcome and ultimately fulfill our vision.

The key issue which I have observed thus far in this process, is that it is very important to “go slow” to “go fast”. In other words, promising too much too soon can jeopardize the entire process. Being clear about the objectives and making steady progress towards those objectives with incremental deliverables will give the greatest likelihood for success.

VISION

Travel forecasting and analysis are fundamental to planning and project development in the department.

These technical methods provide data to determine, the location of congestion and the extent to which various strategies solve congestion problems, benefit-cost analysis, project design, safety analysis and system performance. Currently, the Washington State Department of Transportation (WSDOT) relies largely on Metropolitan Planning Organization's travel demand models for regional forecasting and analysis of travel. These models can not provide the needed forecast and analysis data for statewide and inter-regional movement of people and goods, which is a fundamental mission of the WSDOT.

Our vision is to develop a coordinated travel forecasting process where local, regional and state roles are played out in a collaborative manner to produce output necessary to answer the policy questions derived through the planning process.

During the 1998 legislative session, numerous legislators requested that the Legislative Transportation Committee (LTC) staff provide information on how effective past and proposed system improvements have been or will be in relieving traffic congestion. Without a system analysis tool, we were limited to providing benefit/cost analysis for "spot" (e.g., new construction of interchanges) improvements. Although knowing the benefit of individual congestion relief projects is an important part of the equation, the ability to answer the larger questions of, "are we improving the overall performance of the system and thus improving the quality of life for our customers?", will become even more important as we enter an era of performance-based budgets and expectations for effective investment of limited dollars.

Within Washington State, the planning profession continues to struggle to implement the state Growth Management Act and the consistent themes of the Intermodal Surface Transportation Efficiency Act and now the Transportation Equity Act for the Twenty First Century. In order to appropriately forecast and evaluate the impacts that growth (population and job growth) has on the transportation system, planning professionals continue to pursue more effective tools to link the impact of land use changes, technology advances, and environmental constraints on the transportation system.

At the WSDOT, we are currently striving to fulfill our role in this struggle. Even after nearly 10 years of growth management, the analytic understanding of the movement of people and goods between Washington, Canada, Idaho, Oregon and through Washington ports remains too great a mystery. Our effort must resolve both our role as coordinator of regional processes and provider of interregional (statewide) and interstate travel.

OBJECTIVES

In order for the WSDOT to contribute to our vision, we have identified four primary objectives:

1. Ensure that all travel forecasting efforts within Washington State are coordinated and follow a set of agreed upon procedures (Travel Demand Forecasting Framework).
2. Provide each of the 8 Metropolitan Planning Organization (MPO) regions of the state, existing and forecasted interregional travel.
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The state of the art and application of travel demand forecasting (TDF) today varies greatly from one region of the state to another. Major urban areas, like the Central Puget Sound in Washington State (Seattle metropolitan area), pose very different challenges than sparsely populated rural areas. In addition, a variety of local governments, regional agencies and consultants are doing work in the field creating a coordination challenge to the Washington State Department of Transportation (WSDOT).

With so many professionals involved in the process, the opportunity for miscommunication, while working on these complex processes, can and does occur with surprising regularity. These miscommunications can result in the need to simply re-evaluate the analysis done for a particular location. Yet in other cases procedural or methodological inconsistencies can result in the inappropriate design and ultimate construction of an inadequate or inappropriate transportation facility. This can result in very costly mistakes.

Ultimately to avoid making costly mistakes and to achieve statewide consistency in plans, programs and project delivery, a common set of assumptions and procedures is essential. A framework will help to ensure that all of the public sector agencies and private consultants, which are required to forecast travel, do so in a coordinated and collaborative process.

If in fact the WSDOT does have trained, educated and effective planners and engineers working the issues in the field (within the MPO structure), we will greatly increase our ability to deliver the appropriate transportation systems for our customers.

OUTCOME

If we are successful in meeting the four objectives state above, we will have attained the technical ability to answer key questions within our planning, programming and evaluation process and from our customers (the public, Legislature, Governor, Transportation Commission, local elected officials, WSDOT executives etc.).

PRODUCTS

The resulting products from this process will be first a collaboratively designed procedures manual (patterned after the Oregon Department of Transportation) with an incrementally created statewide model.

Travel Demand Forecasting Framework Development Process

(Five Phased Approach)

In order to make the process to achieve our four objectives more understandable and implementable, we have divided the process into five distinctive phases:

Phase One – Review of TDF at WSDOT

During 1996, a series of regional meetings were set up with WSDOT regional planners to clarify and define travel forecasting applications and issues. The primary purpose of these meetings was to gain an understanding of regional needs, and our collective roles and responsibilities in travel demand forecasting.

This phase was designed to determine the WSDOT's desired policy direction before any visits to non-WSDOT forecasting stakeholders took place. In order to develop a policy recommendation, a one day meeting was held to choose one of many possible policy recommendation scenarios or create some hybrid.

These scenarios addressed two fundamental questions: 1) how should WSDOT forecast travel demand to determine deficiencies on state owned facilities? and; 2) who (what group, etc.) will be responsible to "carryout" this function? Based on these meetings and the work of the WSDOT TDF Steering Committee, the Olympia Service Center's Transportation Planning Office produced "The Washington Travel Demand Forecasting Framework: Phase I—A Review of Travel Demand Forecasting at The WSDOT – Issue Paper"

Phase Two – Outreach

This phase consisted of visiting non-WSDOT travel demand forecasting stakeholders (such as MPOs, and Universities, etc.). It was critical to assess their needs, roles and responsibilities as they are tied to similar WSDOT planning requirements. The outcome of these stakeholder meetings forged an understanding and working agreements regarding how the WSDOT and other stakeholders will carryout forecasting within the adopted framework.

A future feedback loop may be necessary to revisit other scenarios or refine the existing one based on stakeholder discussions.

Phase Three – Policy Direction

At the end of phase two, we presented the WSDOT Steering Committee's recommendation to the WSDOT Executive Board. The Board agreed to pursue the framework and encouraged the Steering Committee to continue with the process.

Phase Four – Procedures and Methodology (beginning winter '99)

Phase four will focus on the development of a procedures/methodology manual. The intent of this manual is to help put forecasters (with different forecasting purposes, needs, budgets, abilities, etc.) around the state on the same page concerning procedures/ methodologies. This is very important for abutting jurisdictions with differing models, data sources, and informational requirements. This document will focus on the best practices of forecasting.

Phase Five – Continuous Improvement

This final phase is the continuous improvement process. Items such as training and continual updating of the forecasting framework (procedure's manual, etc.) are examples of work that will occur within phase five.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) ROLES AND RESPONSIBILITIES

At the WSDOT TDF Steering Committee's meeting in April 1996, a consensus was reached to create a core travel forecasting group by re-focusing existing resources. Additionally, it was agreed to introduce a decision package that would augment the existing *core group* of forecasting staff with 1 new position. The *core group* will provide support to WSDOT regions, consultant forecasting oversight, develop quality standards for all WSDOT traffic forecasting efforts and manage the research and design of a statewide model.

Generally, the WSDOT Regional offices are the forecasting model *user group* and are to be lead in all planning activities, including travel demand forecasting, unless otherwise specified. This is to assure that those closest to the activities direct the WSDOT actions.

The lead role for technical forecasting overview and partnering with MPOs, local governments, transit agencies, and consultants should clearly be the responsibility of the WSDOT regions' *user group*. This lead role will be supported directly by the *core group* that will supplement both the technical work of the regional planner and communications with our public and private transportation partners. Some functions of the *core group* will be lead but will also require that regional planners be acutely aware and involved in all of those processes.

The primary responsibility of the *core group* is to support regional planners' *user group* in their planning and engineering travel forecasting applications. This support is intended to supplement or take the place of the lack of resources that can not be feasibly maintained at each regional office. This *core group* will function as an interdepartmental (cross service center) team serving the specific needs of each travel forecasting application.

The following table lists the lead and support roles of either the Regional Office *User Group* or the Olympia Service Center (OSC) *core group*:

Core Group & Regional Roles and Responsibilities

Activity	Regional Office (User Group)	OSC (Core Group)
<p>◆ Long and mid range travel forecasting activities in urban and rural areas.</p> <ul style="list-style-type: none"> • MPO Metropolitan Transportation Plans, • RTPO Regional Transportation Plans, • MPO three year Transportation Improvement Program, • RTPO six year Transportation Improvement Program, • Major Investment Studies, • Assuring consistency of MPO/RTPO plans with the modal components of the Washington Transportation Plan (primarily the Highway Systems Plan). 	<p>Direct, manage and validate results locally</p>	<p>Support and offer training and forecasting services</p>
<p>◆ Technical forecasting overview and partnering with MPOs, local governments, transit agencies, and consultants</p>	<p>Primary lead - direct responsibility to represent WSDOT at all intergovernmental meetings and communications (e.g., RTPO TAC, TPB etc.)</p>	<p>Secondary support - responsibility to the WSDOT regional <i>user group</i> Validate technical travel demand modeling process and product</p>
<p>◆ Development Services applications (distribution and assignment for new development)</p> <ul style="list-style-type: none"> • Review traffic distributions for all applicable traffic impact analysis • Ensure plans are updated based on land developments 	<p>Direct, manage and validate results</p>	<p>Support and offer training and forecasting services</p>
<p>◆ Environmental Impact Statements analysis applications.</p>	<p>Direct, manage and validate results</p>	<p>Support and offer training and forecasting services</p>
<p>◆ Travel demand forecasting for special projects.</p>	<p>Direct, manage and validate results</p>	<p>Where appropriate If necessary to add value to process and discussion</p>

◆	Travel forecasts for project scoping and design, highway safety analysis and benefit-cost analysis.	Direct, manage and validate results	Support and offer training and forecasting services
◆	Lead the development and continually update the Washington Travel Demand Forecasting Framework.	Secondary support	Primary lead
◆	Lead MPO/RTPO Forecasting Capabilities Review.	Secondary support	Primary lead
◆	Lead acquisition/dissemination of Census, Employment Security and Licensing data.	Primary WSDOT staff role	Primary lead
◆	Organize and staff the Washington State Modelers' Group meetings.	Secondary support	Primary lead
◆	Attend Technical Advisory Committee and Transportation Policy Board meetings when appropriate.		

DEVELOP TRAINING AND TECHNICAL ASSISTANCE

Clearly there is an ongoing need to supply the appropriate training and technical assistance to the *user group* and the *core group*. Currently a new travel demand forecasting course is under development, under the direction of University of Washington Professor Scott Rutherford. This course will be the baseline for training in the application of travel forecasting (both statewide traffic growth factors; and land use based travel demand models).

In addition to the U of W course, the OSC *core group* will offer informal training and technical assistance opportunities to the WSDOT regional *user group*.

Recruit and Retain Qualified Planners

It is, and will continue to be, critical to bring in the necessary travel forecasting talent to the WSDOT. Equally important is the ability to retain those professionals who have institutional experience and have been trained within the organization. With these two objectives met, the WSDOT will have the capability to lead and participate in statewide travel demand forecasting.

Seek Additional Resources

As opportunities present themselves, it will be imperative that WSDOT executive leadership recognize the importance and necessity to support the TDF effort within WSDOT. In addition to the one new FTE requested in the 1999/01 decision package, as existing staffing patterns change, a reorientation of positions should take place within both the OSC and Regional offices.

How do we ensure we “fail”?

Clearly this decision process is ambitious. One of the tools that is useful in determining potential problems,

which most likely will be encountered along the way, is a contingency diagram. This tool uses counter logic to identify the most likely and serious problems that could occur by inverting the desired outcome.

In this case, we asked: How do we ensure that we fail to achieve our four objectives?

The following are ratings that reflect the extent to which the identified issue is either likely or serious (1 = low & 5 = high). After the scoring is completed, we multiply the likelihood by the seriousness to get an overall score.

	likelihood	seriousness	total
1. Lack of inter-agency communication	3	4	12
2. Instability in staffing commitment	5	4	20
3. Lack of leadership			
• Legislative	5	5	25
• Executive (MPO/WSDOT)	3	5	15
• Staff	1	4	4
4. Failure to product a quality product for customers	4	5	20
◆ Too onerous of a project (dies of its own weight)	4	3	12
◆ Inadequate resources (WSDOT)	5	5	25
◆ Inadequate staff resources (partners)	4	4	16
◆ Lack of legislative mandate	5	5	25
◆ Failure to identify the right goals	1	5	5
◆ Incorrect approach (failure to get buy-in from stakeholders)	1	4	4
◆ Process precipitateness	1	3	3
◆ Mandate the procedures manual	1	5	5
◆ Failure to acknowledge the need for differing outcomes	3	4	12

Collaborative Process

With the above issues identified a marketing strategy is necessary. Currently we have simply been

communicating with the individuals and groups identified in the contingency diagramming exercise.

First we have developed a partnership with Legislative Transportation Committee staff. This is a very natural partnership in order to give LTC staff the ability to answer members question through legislative session as well as during off session.

During the last two years, we have continued to present varying aspect of the planning process to LTC members in order to answer their policy questions, involve them in the policy debate and gain their confidence that we are capable of providing the necessary investment decision information that they need.

As Legislators grow in their knowledge of the travel demand forecasting process, we will encourage legislators to champion the vision of the TDF framework. And, as opportunities provide themselves, we will continue to develop support from our Washington State Transportation Commission, the WSDOT Executives, regional planners and the MPOs.

Research and Design Issues

In a response to the challenge to achieve the four objectives stated thus far, a research and design effort must be undertaken.

Following up on Phase three -- Policy Direction, we wrote a request for a two year research and design process to begin in July 1999. This could be funded out of an increase to our planning budget or through the research program.

To begin this process, in 1997 the WSDOT Transportation Planning Office directed a consultant to draft a "conceptual design" for a Washington statewide forecasting model. This report sketched out the requirements for the development of that model as well as looked at a few other states' programs. The next phase is to develop a detailed design of the model based on the conceptual design and driven by the application needs shown above.

We anticipate that if we are successful in securing the necessary funding, we could begin model development as early as July 2000.