Demand Reduction Assumptions Used For Travel Demand Analysis of EIS Alternatives

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Background

ODOT policy supports strategies and programs to reduce traveler demand on State facilities. As part of the alternatives screening process, Transportation System Management (TSM) and Transportation Demand Management (TDM) measures were explicitly analyzed for their ability to reduce travel demand and minimize infrastructure needs to satisfy the project purpose and need. This previous analysis has been documented in the "TSM/TDM (Transit and Roadway Efficiency) Concept – Analysis and Results Memorandum" (August 2007). This analysis considered a wide range of system management measures to reduce river-crossing demand including land use, transit, and parking pricing policies. This analysis demonstrated that demand reduction strategies could lower travel demand. However, these reductions alone did not eliminate the need to add highway capacity to improve mobility consistent with the project purpose and need.

In order to validate the need for additional highway capacity even with improved transit service and TSM/TDM options, the Salem River Crossing EIS alternative designs will be based on reduced travel demand forecasts that assume successful implementation of a more aggressive transit and TSM/TDM program than is reflected in the baseline SKATS model. The Draft EIS will document any difference in performance in the event this level of demand reduction is not realized. This approach is documented in the "Approach to Analysis of Transit/TSM/TDM Options Memorandum" (October 14, 2008).

The purpose of this memorandum is to examine the regional forecasted travel demand in order to make corridor-specific demand reduction assumption recommendations for the purposes of EIS analysis.

Travel Demand

The SKATS regional travel demand model forecast has two primary elements: 1) internal travel demand based on land-use forecasts within the SKATS boundary and 2) external travel demand estimated at cordon stations around the region (e.g., western end of Highway 22). External trips fall into two categories: trips that pass entirely through the region (referred to as "external to external" travel) and trips that have one trip leg within the region (referred to as "external to internal" and "internal to external" travel). The figure below illustrates the SKATS model area divided into seven districts. Internal travel includes trips where at least one end of the trip starts or ends inside one of these districts.

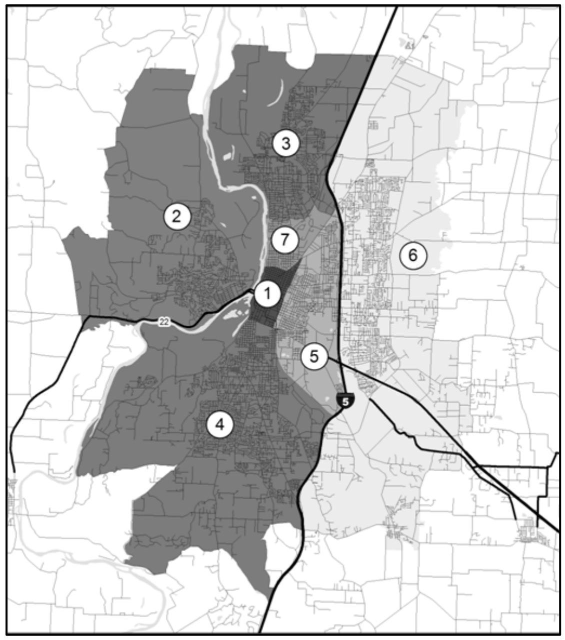

Figure 1 *- SKATS Model Area District Boundaries*

The SKATS travel demand model is an advanced state-of-the-practice four-step travel demand model. The four model components are trip generation, trip distribution, mode choice and assignment. A brief summary of each step is as follows:

- Trip Generation – Estimates the total number of trip productions and attractions by traffic analysis zone (TAZ) based on land use using households and employment.
- Trip Distribution – Estimates the trips between TAZ's (from and to) based on attractiveness calculated from travel time accessibility and quantity of activity types (e.g. retail employment).
- Mode Choice – Estimates the mode of travel (auto (single occupancy vehicle or SOV), auto (shared ride), transit, bike, or walk)) used for trips between TAZ.
- Assignment – Daily trips are divided into hourly trips by time-of-day slices (e.g. 5 P.M. to 6 P.M.) and assigned to the network to determine peak hour volumes.

Transit and TSM/TDM measures can impact several of these "trip components." For example, a TDM telecommuting program could impact trip generation by eliminating the trip from being made and thereby reducing the total number of trips produced. Regional Rideshare programs, better bicycle facilities or express bus service from distant cities would provide alternatives to SOV trips. However, feedback and sensitivities to these kinds of measures are difficult to replicate in the SKATS travel model. Also, because of the relatively low transit system usage, sensitivity to high quality frequent service in attracting new riders could be underrepresented in the current SKATS model.

Table 1 below shows an estimate of the total daily person trips in the year 2031 and mode split percent for river crossing trips generated from west Salem and from the remainder of the region (eastside). As expected, more than twice as many trips are produced by households and businesses in West Salem than households and businesses east of the bridge. The table only shows person trips that stay inside the urban area (internal to internal trips). In other words, the table excludes trips on the bridge that originate or have a destination outside the urban area and also excludes trips going through the area but not stopping in the area. The table shows that trips by personal vehicle (SOV and HOV[1] drivers and passengers combined) make up about ninety-six percent of river crossing demand (55.52 + 18.37 + 21.83 = 95.72%). The remaining four percent is comprised of 2.13% transit mode share, 1.56% walk and 0.58% bike trips.

Table 1 *- 2031 Daily Person Trips (by Mode) Crossing the River (RTSP network)*

Mode	From W. Salem	%	From eastside	%	Total	%
SOV	24,206	46.30%	17,648	76.39%	41,854	55.52%
HOV Driver	11,584	22.15%	2,269	9.82%	13,853	18.37%
HOV Passenger(s)	13,368	25.57%	3,092	13.38%	16,459	21.83%
Bus	1,605	3.07%	0	0.00%	1,605	2.13%
Walk	1,109	2.12%	68	0.29%	1,177	1.56%
Bike	415	0.79%	26	0.11%	441	0.58%
Sum	52,287		23,102		75,389	

The biggest system demand occurs in the morning and afternoon peak periods. In order to estimate these hourly demands, the model converts the daily trips shown in Table 1 into origin/destination trips by hour. So, for example, a work trip from west Salem is made in the morning (AM) peak period and the return trip to west Salem is made in the afternoon (PM) peak period.

Table 2 summarizes a one-hour PM peak period river crossing trips by mode in the year 2031. (Note: The numbers in this table are vehicle trips and include internal, external, and through trips). The table shows that 59% of the westbound trips are destined for west Salem and 41% have destinations outside the SKATS area (i.e., Dallas, Monmouth and Independence). Of the trips destined for west Salem, 76% percent are SOV (3,526/4,631) trips.

[1] SOV = Single Occupant Vehicle (only one person in vehicle) and HOV = High Occupant Vehicle (driver and at least one passenger)

***Table 2** - 2031 RTSP PM Peak Period River Crossing Transit and Vehicle Trips*

Mode	Eastbound	Westbound	% Westbound
Bus	8	113	
SOV	1,318	3,526	
HOV	640	991	
Internal (sub-total)	*1,965*	*4,631*	59%
Externals	3,207	3,263	41%
Total	5,172	7,894	

For purposes of discussion, Table 3 below shows the 2031 Regional Transportation System Plan (RTSP) PM peak period bridge volumes forecast and the forecast assuming a 10% vehicle trip reduction resulting from successful implementation of Transit/TSM/TDM measures. A 10% demand reduction (that is, 790 vehicles in the westbound PM peak direction) would be a significant decrease, effectively representing about one-third of forecasted growth in the PM peak period by year 2031.

***Table 3** - 2031 RTSP Peak Period Bridge Demand by Bridge Crossing*

Bridge	Demand	Volume	Mid-Span V/C	Volume Reduction
Marion (WB)	RTSP	7,900	1.32	-
	RTSP Reduced 10%	7,110	1.19	790
Center (EB)	RTSP	5,200	0.87	
	RTSP Reduced 10%	4,680	0.78	520

Assuming that both the internal SKATS travel demand and external demand are reduced roughly proportionally to the westbound PM peak period mix of internal-external bridge travel shown in Table 2, to achieve the reduction of 790 trips approximately 60% of the demand reduction (474 trips) would come from west Salem westbound trips and the remaining 40% (316 trips) would come from external travel (e.g., trips from Dallas, Monmouth, Independence, etc.).

Based on the goals of the Salem Area Mass Transit District to provide improved station-to-station transit service between the Glen Creek and downtown transit centers consisting of 7.5 minute headways served by articulated buses, a tripling of peak period ridership is potentially achievable, especially if park and ride opportunities in the vicinity are increased. The tripling of transit ridership would result in 340 total westbound transit trips in the p.m. peak period, with new transit trips (227) representing slightly less than half of the hypothetical 474 trips described in the previous paragraph. Under these conditions, transit service would be operating at about seventy percent of seated capacity[2] and additional

[2] Assumes 60 seats for each articulated bus, 8 buses per hour = 480 seat capacity. If the route had 340 riders in the PM peak: 340/480 = 0.7 (70 percent).

growth could be accommodated. In this case, the remaining west Salem TSM/TDM trip reductions (247 trips) as well as the external (316 trips) would come largely from shifts in departure time (e.g., alternative work hours) and/or increased car/van pooling. Some of the 247 trips might also be trips that change from vehicle to bike and walk trips.

Table 4 *- 2031 RTSP Westbound Peak Period*

10% Trip Production Goal (790 Trips)

Category	Volume	% of Goal
Additional Transit riders (above the SKATS model forecast of 113)	227	29%
Reduction in West Salem-bound trips due to TSM/TDM	247	31%
Reduction in External Trips (to Dallas, Monmouth, Independence, etc.)	316	40%
Total	790	100%

In terms of west Salem travelers, a modest increase in **bike travel** (12 trips or 5% of the 247 remaining trip reduction), **modified departure times** (e.g., an SOV trip leaving 30 minutes early and missing the peak period (62 trips or 25%)), and **carpooling** (173 trips or 70%) is one scenario for achieving the goal of reducing trips from West Salem.

For external travel, however, single-occupant-vehicle (SOV) mode reduction is more difficult to achieve, due to limited transit service[3] and because a portion of that demand is also comprised of through travel (i.e., trips passing through the region). Regional rideshare and travel time shifting would be appropriate additional TDM measures to address external trips.

Recommendation

Based on the analysis above, we will assume that travel to/from west Salem can be reduced by 10 percent, assuming additional transit/TSM/TDM measures could be put in place as suggested above. External trips, on the other hand, will be assumed to be reduced by only 5 percent, assuming less ability to directly impact these trips without quality fixed-route transit service to support the SOV demand reduction. Given the 60/40 split between internal and external trips described above, the total reduction in trips would be approximately 8 percent. This process is summarized in Figure 2 below.

[3] CARTS (Chemeketa Area Regional Transportation System) in its current form has limited daily service to Dallas, Monmouth and Independence and a Dallas to Salem Peak Hour Express Service.

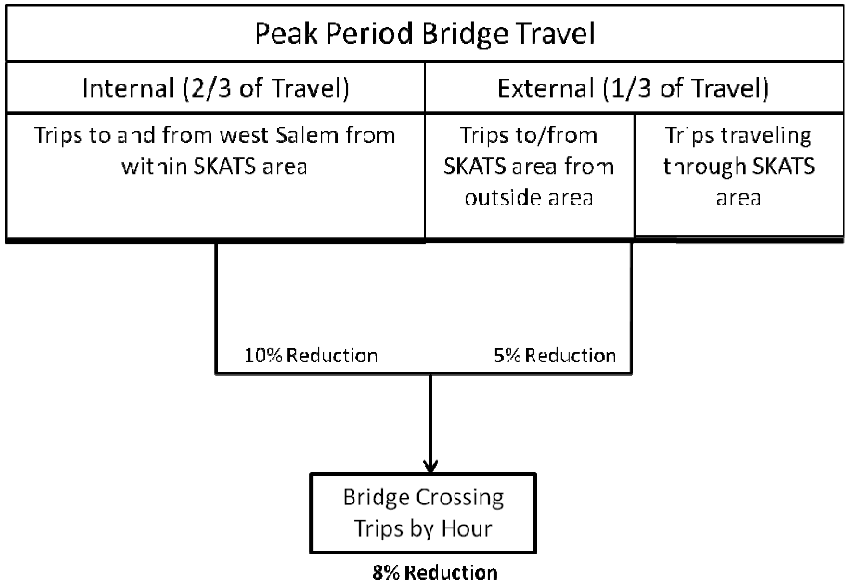

***Figure 2**- Internal and External Bridge Travel*

Table 5 illustrates the eight percent travel demand reduction applied to the 2031 RTSP forecast for westbound peak period travel. With these assumptions, westbound peak period vehicle demand would be reduced by a total of 632 trips.

***Table 5** - 2031 RTSP Westbound Peak Period Demand with Eight Percent Demand Reduction*

Category	Volume	% Reduction
RTSP (bridge Westbound)	7,900	
Transit	227	3%
Car-Pool W. Salem	173	2%
Other (bike and ped)	74	1%
Car-Pool & other External	158	2%
Total reductions	**632**	**8%**
Reduced Total Westbound bridge volume	7,268	

The transit and TSM/TDM program reductions are assumed to target and have the highest impact on peak period (AM and PM) travel, with a smaller impact on overall daily travel. Because TSM/TDM benefits cause not only mode shifts but also influence departure time and choice for travel, the net daily result (reduction) is assumed to be less than that experienced in the peak periods. As a result, analysis that considers daily traffic from the model will assume only a 3% reduction in the average weekday daily traffic forecast for bridge crossing travel.