



# Technical Memo

Value of Time Analysis

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Submitted To:



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## Value of Time Analysis

As part of the C-470 Express Lane Feasibility Study financial feasibility sensitivity analysis, various factors used in the calculation of the financial feasibility were varied to determine what impact modifying a value has on the overall results. One of the key input values in the microsimulation model is drivers estimated value of time. In the base model, the value of time was taken directly from the C-470 Express Toll Lanes Market Demand Survey, June 2004, which calculated corridor user's value of time as being approximately \$6.00/hr. This value was calculated by developing a linear regression equation that best fit drivers responses to what they'd be willing to pay based on given time savings. Based on documented results from a similar survey completed for the SR 91 corridor in Orange County, CA, drivers surveyed on that corridor placed their value of total travel time as being \$8.50/hr in today's dollars. The total travel time value only assumes congested conditions are only present during a small portion of the commute. This would tend to resemble what current drivers of the C-470 corridor are currently experiencing based on current day congestion levels. As traffic volumes along the corridor continue to grow, the degree and period of time in which the congestion is experienced will continue to increase, as will driver's value of time.

A report completed by the NCHRP (Report 431 Valuation of Travel Time Savings and Predictability in Congested Conditions for Highway User-Cost Estimation), indicates that an adjustment factor needs to be applied to account for travel during highly congested travel conditions. The NCHRP Report noted that driver's value of time increases by a factor of 2.5 during periods of highly congested travel conditions. The AASHTO User Benefit Analysis for Highways recommended applying a 2.0 factor during highly congested periods. Using the results from the C-470 User Survey and a \$6/hr value of time, the C-470 corridor's user value of time during highly congestion periods would increase to between \$12-\$15/hr.

The sensitivity analysis also looked at researching other methods that past studies have used to calculate drivers value of time during congested conditions. Five different sources were identified that had computed drivers value of time based on various input values that could be applied as nation wide averages. The studies used in the analysis and their respective values of time are noted below.

**Value of Time Summary Table**

Study	Based of Data from Year	Value of Time Rates (\$/hr)	CPI (Study Year)	CPI (2004)	2004 Value of Time Rates (\$/hr)
AASHTO User Benefit Analysis for Highways	2000	10.96	174.0	189.4	11.93
NCHRP Report 431 Valuation of Travel Time Savings and Predictability in Congested Conditions for Highway User-Cost Estimation	1999	13.25	168.3	189.4	14.91

Study	Based of Data from Year	Value of Time Rates (\$/hr)	CPI (Study Year)	CPI (2004)	2004 Value of Time Rates (\$/hr)
Measure the Economic costs of Urban Traffic Congestions	2002	14.30	180.9	189.4	14.97
Uncovering the Distribution of Motorists Preferences for Travel Time and Reliability: Implications for Road Pricing	2002	14.83	180.9	189.4	15.53
Value of Time Savings	1999	11.38	168.3	189.4	12.81
<b>Average</b>					<b>14.03</b>

The AASHTO User Benefit Analysis for Highways noted that a rough calculation that is typically used to calculate driver's value of time is to take fifty percent of their hourly income level. In order to derive this value, US census data for the year 2000 for the block groups surrounding the corridor was compiled to determine the average household income for typical corridor users. Based on the data obtained, the average household income for households surrounding the corridor is \$85,881 in 2004 dollars. The next step in calculating the value of time is to determine average number of earners per household that would typically be commuting during normal peak hours. This assumes that the earners in the household would be commuting during typical AM and PM peak hours. Based on data taken from the 1997 DRCOG Household Survey for the Metro Denver Area, on average 1.37 persons make up the overall household income. This takes into account all household income levels found throughout the metro area which averages approximately \$37,787 for Metro Denver. Based on the much higher average household income level of \$85,881 for the C-470 corridor, it could be determined that drivers have higher paying jobs and that more people per household earn wages. This thought was confirmed in reviewing a survey that was completed in 2003 by the US Bureau of Labor Statistics and US Bureau of the Census. It showed for households with average income levels of approximately \$85,000, the factor of earners per household was 1.90. Therefore, for a comparative analysis, the 1.37 and 1.90 factors were used to compute the average income levels for a peak hour commuter along C-470. The table attached to this document summarizes the results from calculating drivers along the corridor average hourly wage rate. It shows the using the average annual income using the 1.37 and 1.90 factors is \$62,686 and \$45,200 respectively. Using the methodology that driver's value of time under normal commuting conditions is approximately 50% of a driver's hourly wage, the 1.37 and 1.90 factors result in a \$15.07/hr and \$10.87/hr average value of time. Taking the average of these two values results in a value of \$12.97/hr.

It is shown based on the documented values of time and previous studies and the results from the C-470 User Survey that an \$11-\$15/hr value could be used for driver's value of time during highly congested periods. During the off peak and shoulder peaks, where the congestion levels are much lower, the driver's value of time will be closer \$6/hr value.