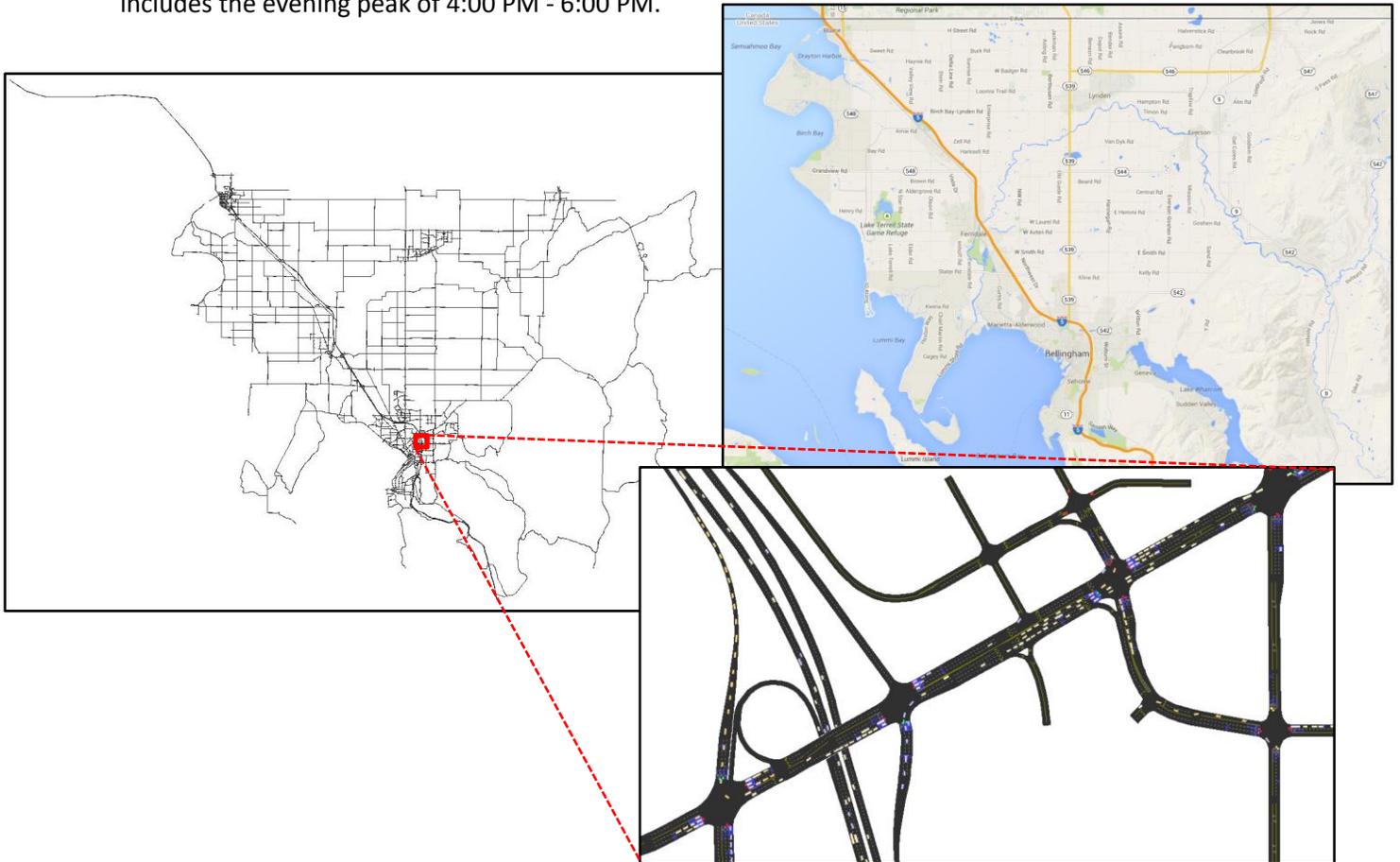


## Development of a Calibrated County-Wide Microscopic Traffic Simulation Model for Whatcom Council of Governments, Washington

Caliper has developed a detailed, geographically accurate microscopic traffic simulation model of the entire Whatcom County located in the state of Washington. The model, in Caliper's TransModeler traffic simulation platform, covers a geographic extent of nearly 1,000 square miles. The simulation has been calibrated using time-varying segment and turning movement counts, and a portion of the model has further been validated against speed measurements. The simulation period of 12:00 PM - 6:00 PM includes the evening peak of 4:00 PM - 6:00 PM.

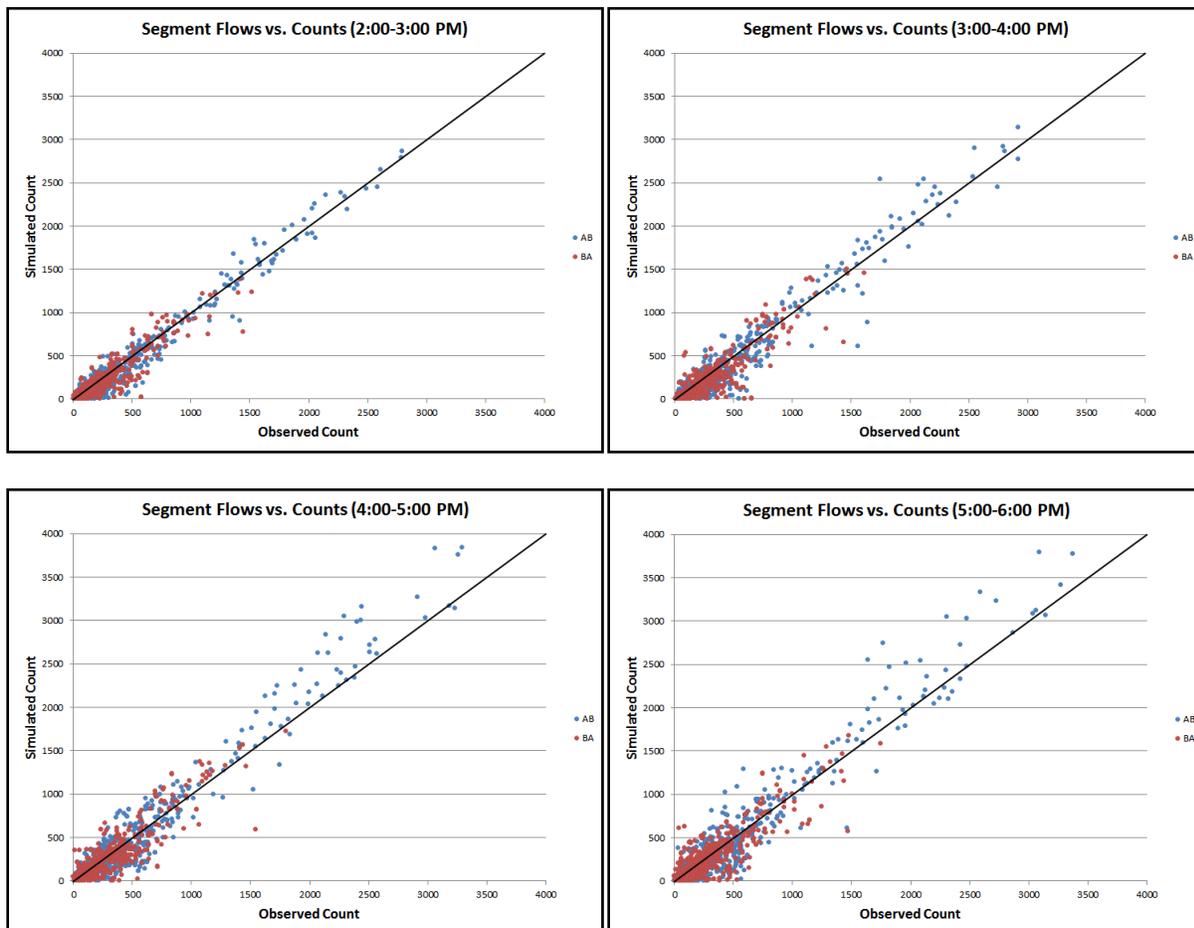


Serving as another example of Caliper's application of micro-simulation-based dynamic traffic assignment (DTA) to large-scale problems, the Whatcom model handles several challenges. The network includes numerous roundabouts, actuated signals and left center turn lanes. In addition, a busy border crossing on I-5 between the US and Canada shines the spotlight on TransModeler's powerful, lane-level micro-simulation that captures a variety of vehicle mixes, lane restrictions, and managed lane configurations. A significant number of heavy vehicles also traverse the county.

A state-of-the-art calibration module for estimating time-varying origin-destination (OD) trip tables was coupled with TransModeler's high-fidelity micro-simulation DTA and iterated until a satisfactory fit to the observed traffic data was realized. The calibration module and other useful software utilities are a

result of Caliper's on-going research into developing practical tools to simplify and accelerate the deployment of large-scale, calibrated, high-fidelity simulation models.

The calibrated Whatcom model replicates field count measurements to a high degree of accuracy. Charts illustrating model fit are shown below for each of the hours between 2:00 PM and 6:00 PM. Analyses through the root mean square normalized (RMSN) statistic quantify the modeling error between 9% and 19% on freeways, between 25% and 32% on major arterials, and between 22% and 30% on ramps, which auger well for a network of this size and fidelity.



The county-wide Whatcom model is expected to serve as a platform for regional micro-simulation modeling and policy analyses, while simultaneously allowing smaller sub-areas to be extracted for more detailed operations planning and optimization. The sub-area models should benefit from more realistic regional sensitivities of modes, routes and departure times in response to broad policy scenarios. The Whatcom model has already been used for one such real-world analysis, involving traffic safety studies under a host of current and future year roadway configuration scenarios on a portion of Alabama Street.

Future work on the Whatcom model may explore the inclusion of a more integrated transit component based on schedules and/or available data on boardings and alightings. A detailed route system of the bus routes has been prepared in anticipation of this step. A border crossing model of greater sophistication may also be considered, in light of the rather complex border operations currently in effect (and proposed for the future).