

AN ABSTRACT OF A THESIS

**APPLICATION OF NONTRADITIONAL U-TURN BASED
TREATMENTS AT NARROW-BRIDGED DIAMOND
INTERCHANGES**

Christopher M. Berry

Master of Science in Civil Engineering

The objective of this thesis was to analyze the application of nontraditional U-turn based interchange treatments at narrow-bridged interstate interchanges. I-75 at APD 40, I-40 at Genesis Road, and I-40/75 at Watt Road served as the test sites located in Tennessee.

A simulation model of each nontraditional treatment was created for each of the three sites using VISSIM, a microscopic traffic simulation model. The simulation models attempt to replicate real-life traffic operations and records the operational characteristics. All of the nontraditional treatments resulted in significantly improved interchange performance characteristics. The nontraditional treatments investigated were the Median U-Turn Interchange, Superstreet Based Interchange, and the 'Free Range Eagle' Interchange. The more traditional Single Point Urban Interchange (SPUI) was also investigated for comparison. None of the investigated treatments except the SPUI modified the interchange bridge.

The 'Free Range Eagle' Interchange out-performed all of the non-bridge modifying treatments studied in both this thesis as well as treatments previously analyzed. The SPUI, which widens the interchange bridge, provided superior performance across the test sites. However, the results of the non-bridge modifying treatments indicate that they could be used to significantly improve congestion and performance of narrow-bridged interchanges without modifying the existing bridge structure.