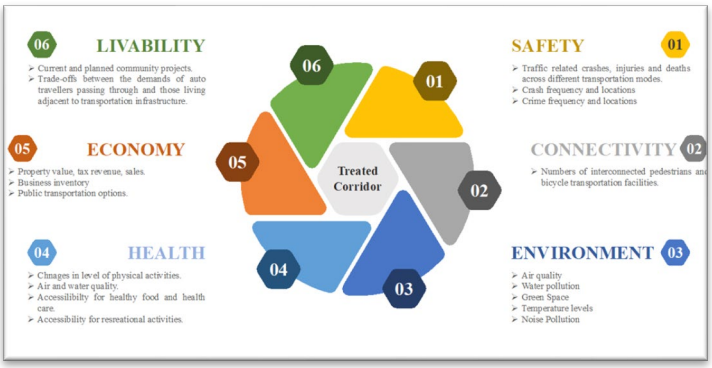
TN TDOT Department of Transportation

Research Summary

Evaluate Performance and Benefits of Road Reconfigurations in Tennessee



Project Number:
RES 2020-16

TDOT Lead Staff:
Jonathan Russell

Principal Investigator(s):
Dr. Chris Cherry | Principal investigator
University of Tennessee Knoxville

Project Term:
July 2019 to May 2021

WHAT WAS THE RESEARCH NEED?

Road diets have been widely applied or planned nationwide to address safety. In Tennessee, there have been a number of high-profile road diet projects completed, under construction, planned, or studied. Limited research has been done to develop frameworks to comprehensively assess the performance of road diets in Tennessee.

WHAT WERE THE RESEARCH OBJECTIVES?

The objectives of this research were to (1) inventory road diet projects in Tennessee, (2) develop a cost benefit analysis (CBA) framework of road diet projects, (3) conduct in-depth case study evaluations of road diet projects in Knoxville, Tennessee, and (4) make recommendations for road diet implementation planning.

WHAT WAS THE RESEARCH APPROACH?

The research considered safety analysis, traffic operations, and economic analysis in its methodology. Three statistical tests were utilized for the following three purposes: (1) to determine if there were differences in the number of crashes occurring before and after each of the road reconfiguration, (2) to determine if the crash trends on each corridor significantly differed from that of Knoxville as a whole during the same time periods, and (3) to determine the

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the significance of the change in the value of the property both along and half a mile around the treated corridor compared to the average change over Knoxville. The first test selected was a paired samples t-test (also referred to as dependent t-test) to determine the statistical significance of the crash counts on each corridor from before to after the road reconfiguration project. The Difference-in-Differences (DID) analysis method used in this report illustrated the temporal changes in the value of an acre of land before and after a road reconfiguration project.

WHAT WERE THE FINDINGS?

The key findings from the study are as follows:

- There was a 55% and 50% decrease in the number of crashes involving VRUs (Vulnerable Road Users) on Cumberland Avenue and Broadway after reconfigurations.
- After the reconfiguration project, there was a 16% decrease in peak hour traffic volume on the Cumberland Avenue corridor.
- The 85th percentile speed remained similar and under the marked speed limit for a simple restriping project.
- There was an increase in the land value for the parcels along Cumberland Avenue which, was increased at a rate five times higher than that of the land value increase over the City of Knoxville.

IMPLEMENTATION AT TDOT

Recommendations from the project were provided to support further implementation and research. The recommendations included

- Maintaining a statewide inventory of state reconfiguration projects and further develop of an evaluation framework to maintain consistency
- Site specific intervention in corridors based on respective characteristics and requirements, such as crash hotspots and neighborhood-specific insights. These can be inputs into the developed framework.
- Strengthening safety analysis of treated corridors by following up on post-analysis, possibly using Intelligent Transportation System (ITM) technology to determine different contributing factors to Vulnerable Road User (VRU) safety.
- developing a cross-sectional research design framework to compare the traffic volumes and speeds at the treated corridor and the outside the project neighborhood
- Presenting the before and after results through clear graphics that reflects changes with normalized data, which better emphasizes which parcels are being redeveloped, which are increasing in value, and which are collectively growing economic productivity by using land value as a proxy. Stack plots are preferable to parcel maps for visual representation.

MORE INFORMATION

Find the final report here: https://www.tn.gov/content/dam/tn/tdot/long-range-planning/research/final-reports/res2020-final-reports/RES2020-16_Final_Report_Approved.pdf.

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