

## MEMORANDUM

To: Anna Dearman, AICP  
Nashville Department of Transportation (NDOT)

From: Leo Espelet, P.E.  
Alainie Sawtelle, E.I.

Date: June 16, 2023

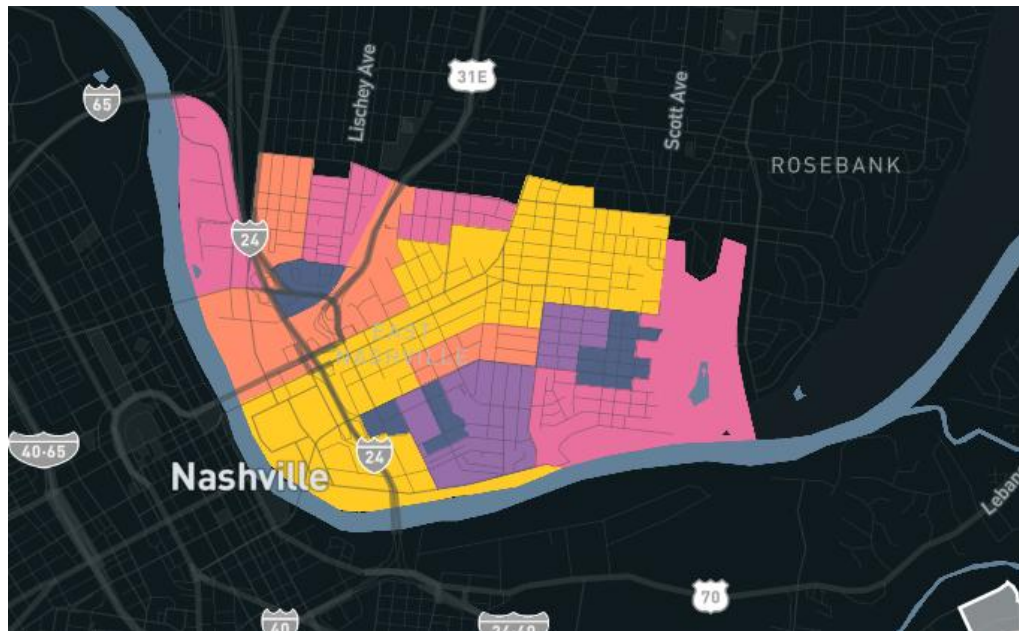
RE: ***East Nashville Spokes Mode Shift Process and Assumptions***

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This memo identifies the methodology for estimating a potential mode shift (i.e. reduction in passenger car trips with an increase in multimodal trips) as result of the implementation of the East Nashville Spokes Project.

The analysis used Replica to identify existing patterns in vehicle trips that occurred on a typical weekday within the project area. Replica is a travel demand data vendor that uses location-based service (LBS) data to identify origin-destination pairs and estimate travel behavior. For this particular analysis, it was determined that Replica's Traffic Analysis Zones (TAZ) level origin trip data was most adequate.

**Figure 1** shows the TAZs within the study area used in the analysis. It is anticipated that travelers in these TAZs will be directly impacted by the Spokes project, and therefore, where most of the mode shift trips will happen.

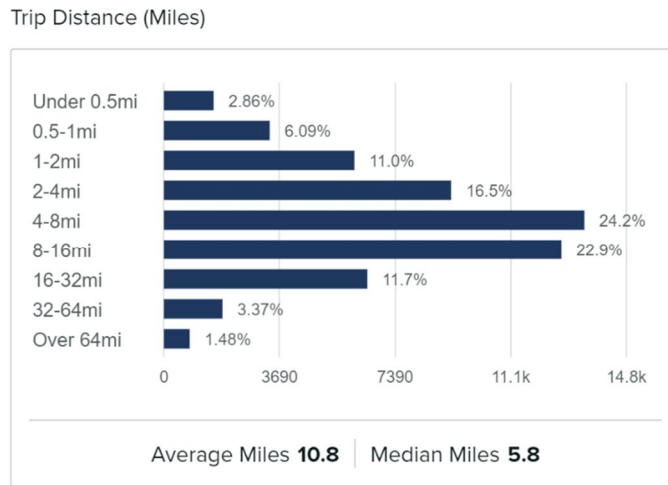


**Figure 1: Anticipated Impacted TAZs**

The dataset that is provided using the selected TAZs is considered by Replica's algorithm to be of high certainty, since the trip summaries are based on approximately 55,600 trips taken by 41,700 trip takers. This data represents a typical Thursday in Fall of 2022.

Trip distance summaries were determined to be the best indicator to predict conversion of vehicle trips to pedestrian or bicycle trips, once the Spokes project is implemented. The assumption is that those with the shorter existing trip distances would be more likely to convert to an active transportation option if better and safer facilities were available.

**Chart 1** provides the trip distance summaries taken directly from Replica.



**Chart 1: Trip Distance Summary**

Using the chart above, assumptions were made on what percentage of trips by distance would be likely to shift from vehicle trips to multimodal trips.

The following assumptions were used in the calculation:

- 50% conversion in trips under 0.5 miles
- 35% conversion in trips between 0.5 and 1 mile
- 25% conversion in trips between 1 and 2 miles
- 10% conversion in trips between 2 and 4 miles
- 5% conversion in trips between 4 and 8 miles

It is predicted that there would only be a marginal shift in trip types for those that are more than 8 miles, therefore no decrease was assumed on those trips for this exercise. Based on the assumptions above, the anticipated conversion from passenger trips to active transportation trips was calculated. Results are shown below:

- Trips under 0.5 miles, total trip conversion of 1.43%
- Trips between 0.5 and 1 mile, total trip conversion of 2.13%
- Trips between 1 and 2 miles, total trip conversion of 2.75%
- Trips between 2 and 4 miles, total trip conversion of 1.65%
- Trips between 4 and 8 miles, total trip conversion of 1.21%

The total expected trip conversion equals 8.44%, or approximately **9.2%**.

## CONCLUSIONS

Based on the results of this analysis and methodology, using Replica's origin-destination data, it can be estimated that there could be an overall **shift of 9.2%** from vehicle trips to active transportation trips (walking and biking trips) with the implementation of the Spokes project.

We hope this information is helpful. Please contact us at [leo.espelet@kimley-horn.com](mailto:leo.espelet@kimley-horn.com) or [alainie.sawtelle@kimley-horn.com](mailto:alainie.sawtelle@kimley-horn.com) should you have any questions.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

Leo Espelet, P.E.  
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