

Deadhead Minimization with a Flexible Facility Locator Tool

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Background

- As transit agencies expand their services, their vehicle fleets and service facilities must grow accordingly.
- The time buses spend traveling to and from these facilities represents a large operational cost that can be reduced by well-placed additional facilities.
- This analysis aims to provide decision support for the selection of a new bus depot through a tool that computes the reduction in deadhead miles and bus driver hours for each potential depot site. MARTA's potential north-side depot serves as a test case.

Data

- Information on **existing bus maintenance and storage facilities** was obtained directly from MARTA for this case study.
- The **candidate depot sites** are a set of vacant properties in North Fulton County pulled from the Fulton County Tax Assessor database.
- The tool requires **General Transit Feed Specification (GTFS)** data to determine the start and endpoints of all bus routes.

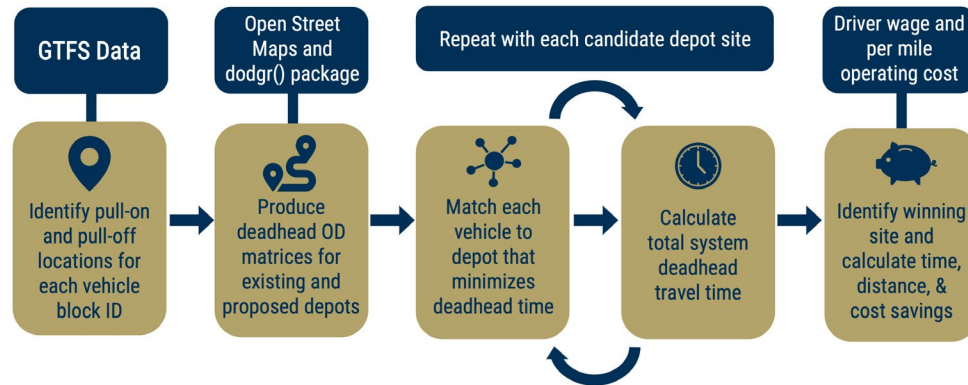
Methodology

Assumptions

- In calculating travel times and distances, the tool does not consider smaller roads, including residential streets.
- The tool only considers weekday trips in estimating and minimizing deadheading.
- If no user input is provided for hourly bus driver wage and operating cost per mile, the default values are based on current MARTA driver wages and operating expenses.

Analysis

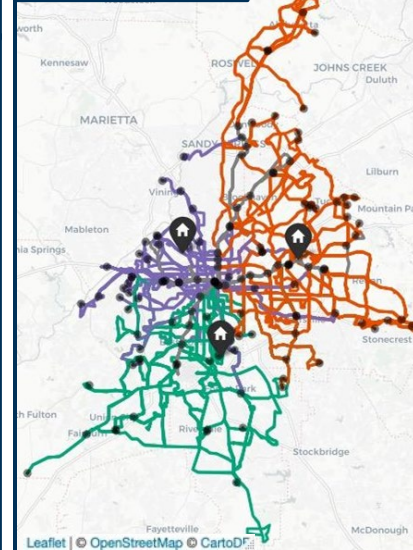
- The depot locator tool was built in R 3.6.1, as it is a free program that almost any transit employee could access.
- The flow chart below shows the overall analysis process.



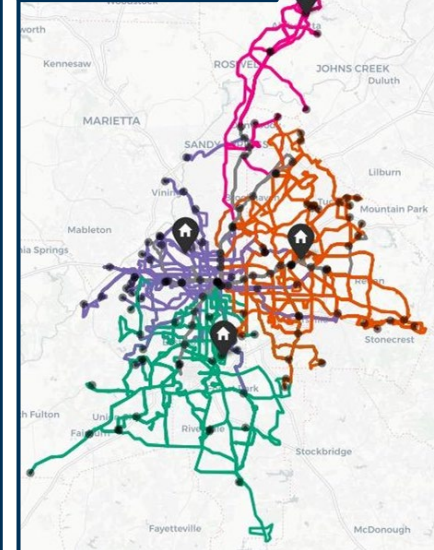
Results

- 67 vehicle blocks are reassigned to the chosen site.
- Proposed system saves 29.82 hours of travel time, \$488 in wage costs, and over \$12,000 in overall operating costs per weekday.

Existing System



Proposed System



Conclusions

- Narrowed down 17 candidate sites to one.
- Tool is usable by any agency via github.com/karagtodd/depot_locator
- Potential to analyze environmental impacts, fuel types, and facility size and service restrictions in future studies and program iterations.

Acknowledgments

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