On Track or *Off Course*?

Evaluating regional rail in Atlanta

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Background

ATL Trains is a recently unveiled **proposal for regional rail covering the wider Atlanta** metro region, designed by Caleb Stubbs, a railroad planning engineer at Norfolk Southern and train enthusiast.

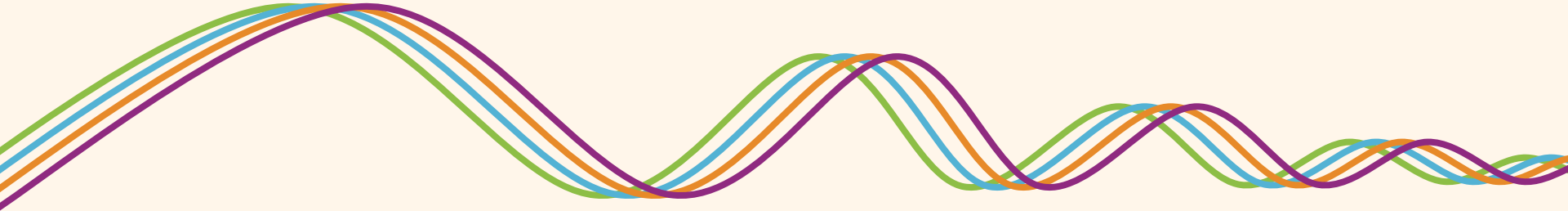
It is meant to be **comprehensive**, covering the majority of the population, **connected**, integrating into existing Atlanta transit networks (MARTA, CobbLinc, etc.) and **financially feasible**, by re-using currently extant freight rails instead of building new.

Proposed coverage and lines from ATL Trains

Research Question

ATL Trains looks good on paper, but with long rail lines and infrequent service intervals, ***does it provide a real alternative to commuting by car?***

The goal is to quantify **where**, **how**, and **for whom** regional rail would be an attractive proposition by **estimating travel times** for different origins and destinations **across metro ATL**.

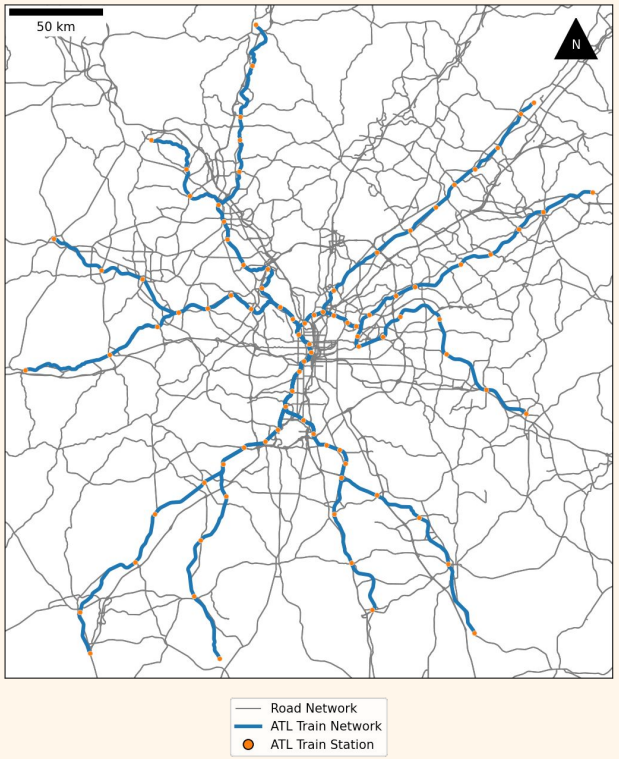


Building the Networks

The **road network** was downloaded from OpenStreetMap using OSMnx, with a focus on driving and walking.

The specific routes of the **train network** was then constructed by joining the stops and schedules that were provided by ATL Trains.

These were then loaded together in Valhalla, the open source routing engine, to allow for **multimodal routing between points**.

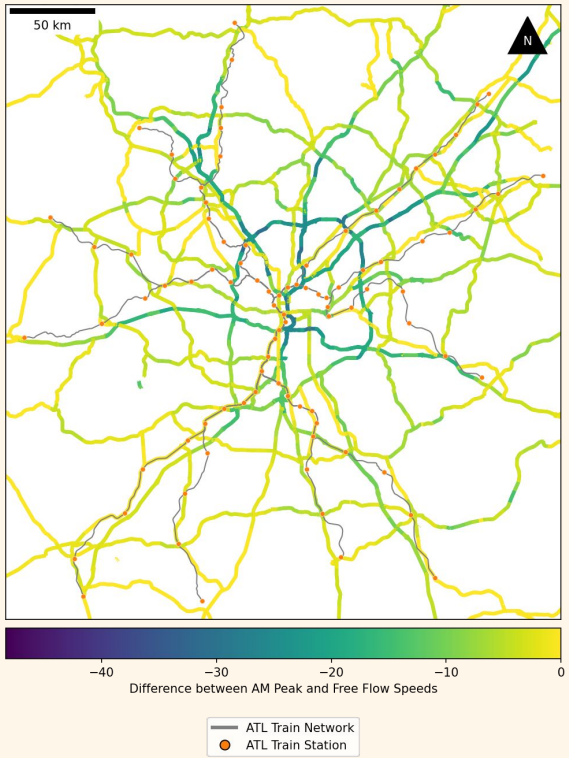


Adding Traffic Speeds

A second road network was then created to **simulate congested traffic conditions**, as opposed to free-flow traffic speeds.

This was done using estimated traffic speeds during the **AM Peak** time period from the ARC's Activity-Based Model, and joining those speeds onto the original network.

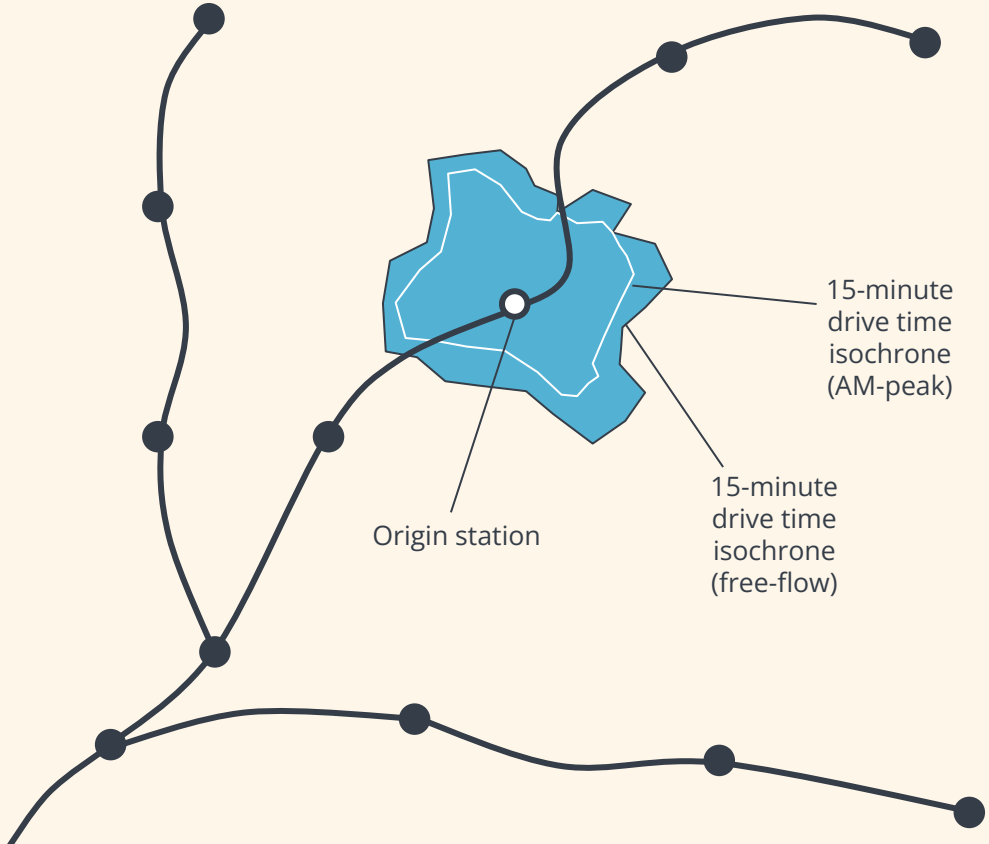
These **reduced speeds** would theoretically **lengthen the amount of time** it would take to travel a given route, especially on highways.



Estimating Multimodal Journeys

First, a **15-minute drive time isochrone** was created around each station, at both free-flow and AM-peak conditions.

For any TAZ within this isochrone, **the "actual" drive time** from TAZ to station was re-calculated to get an accurate number.

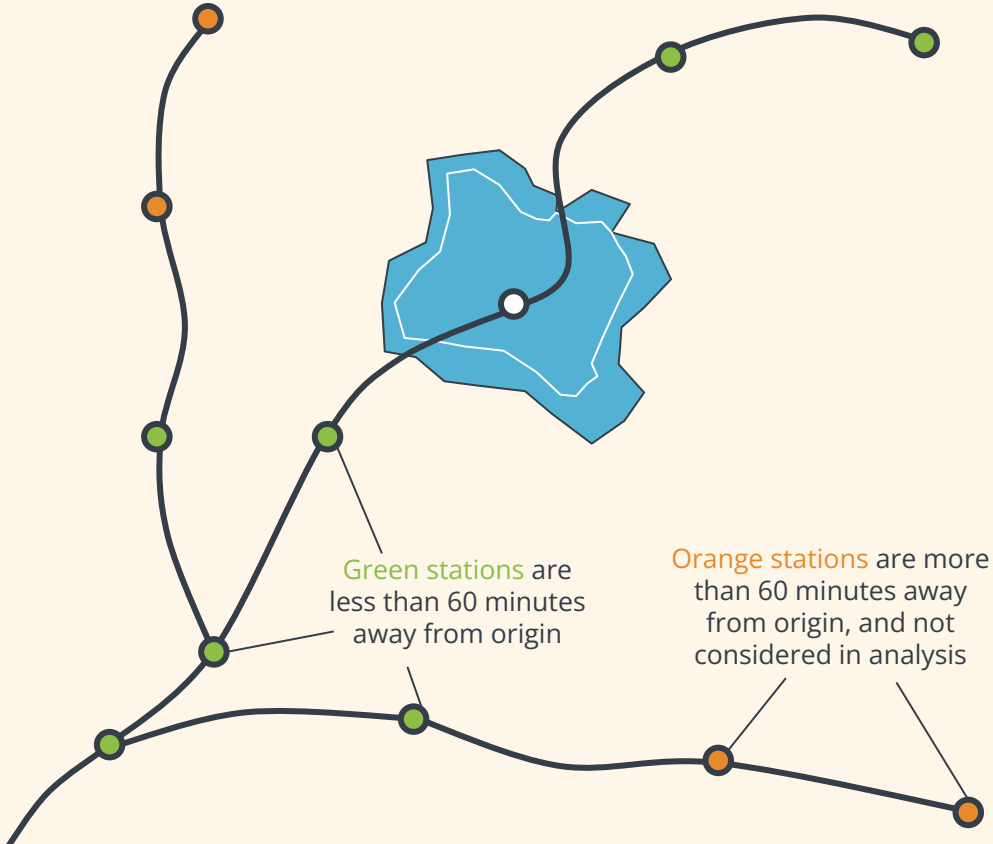


Estimating Multimodal Journeys

Next, the **journey time from each station to every *other* station** was calculated using the synthetic GTFS schedules that were provided.

This was done in 5-minute intervals over a 1-hour period to find the "best" time to take the train, **accounting for departure times and transfers**.

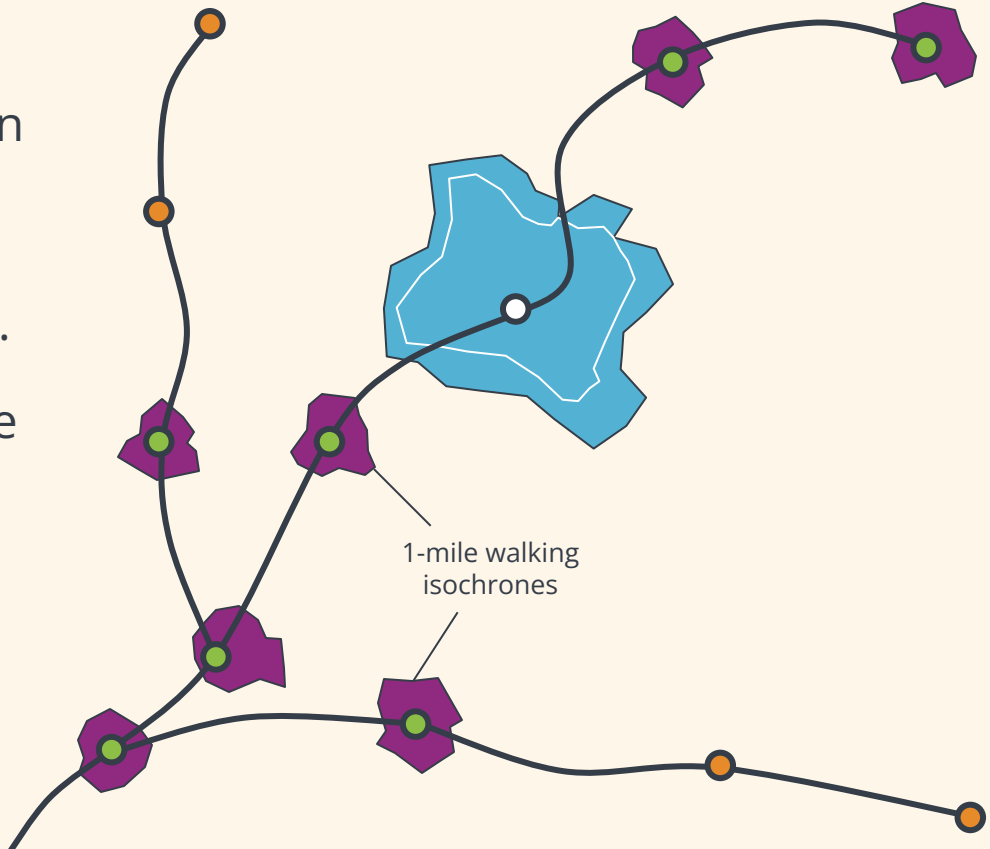
Any station more than 60-minutes away was considered **unsuitable**.



Estimating Multimodal Journeys

Finally, a **1-mile walking isochrone** was created around each destination station, and the **“actual” walking time** was then calculated from the station to each TAZ in the isochrone.

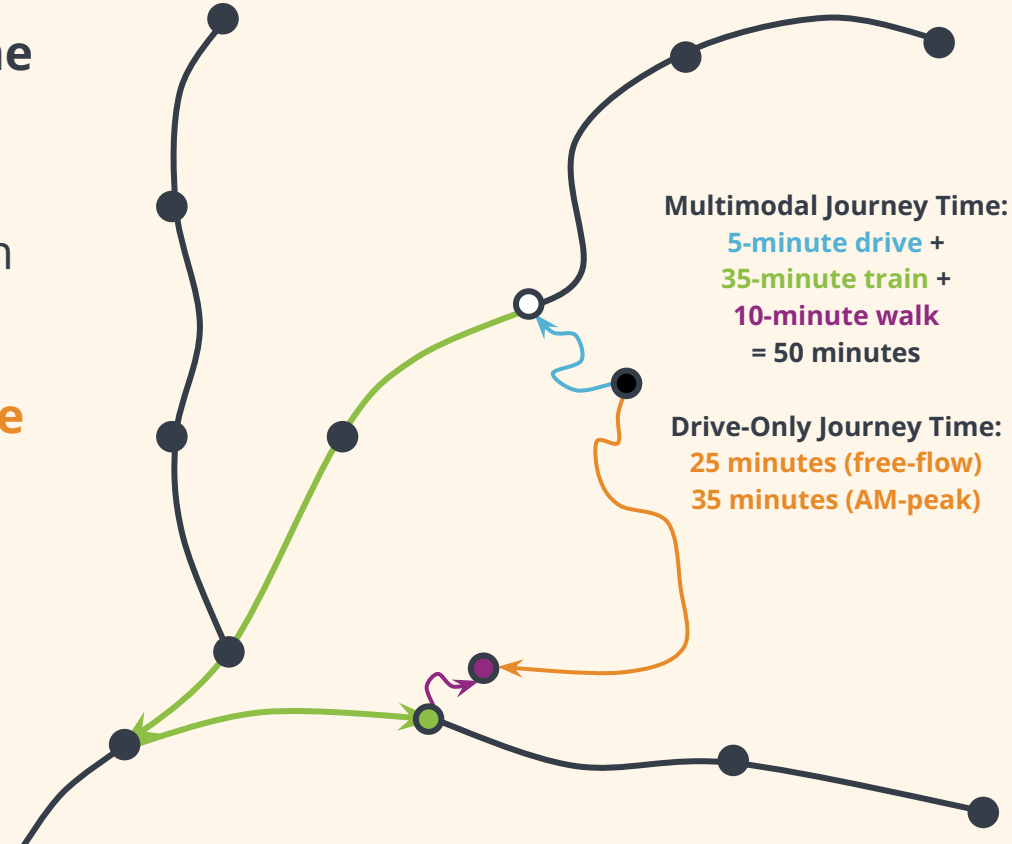
Note that the walking isochrones are drastically smaller than the driving isochrones - this is because people walk *much* slower than they drive!

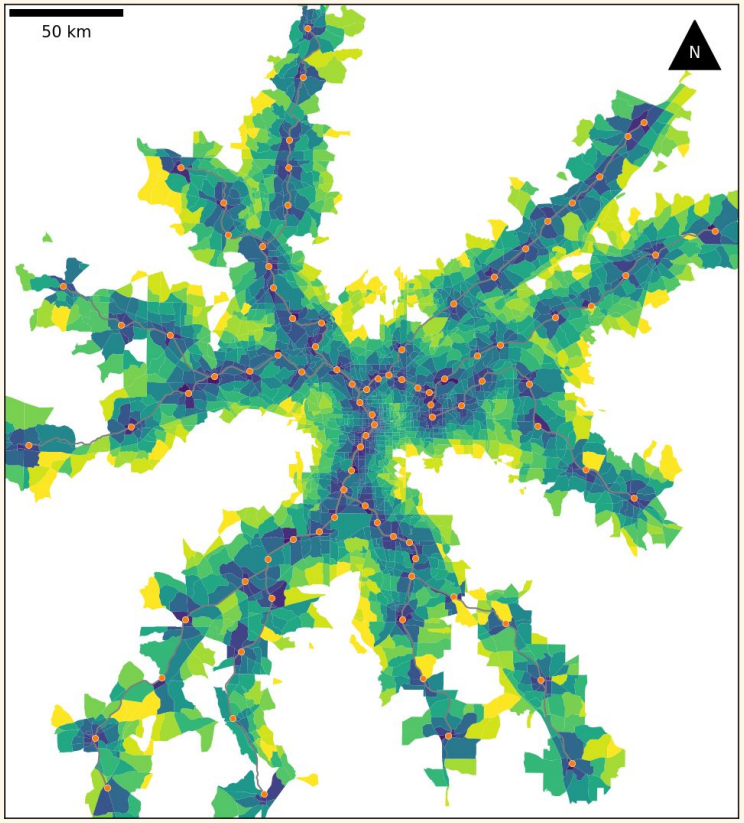


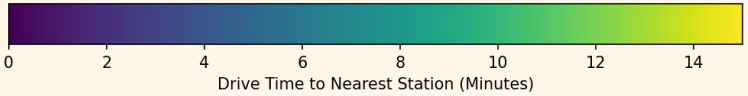
Comparing to Drive Times

The **total multimodal journey time** was calculated as the time spent **driving to the station**, **riding the train to the next station**, and then **walking to the destination**.

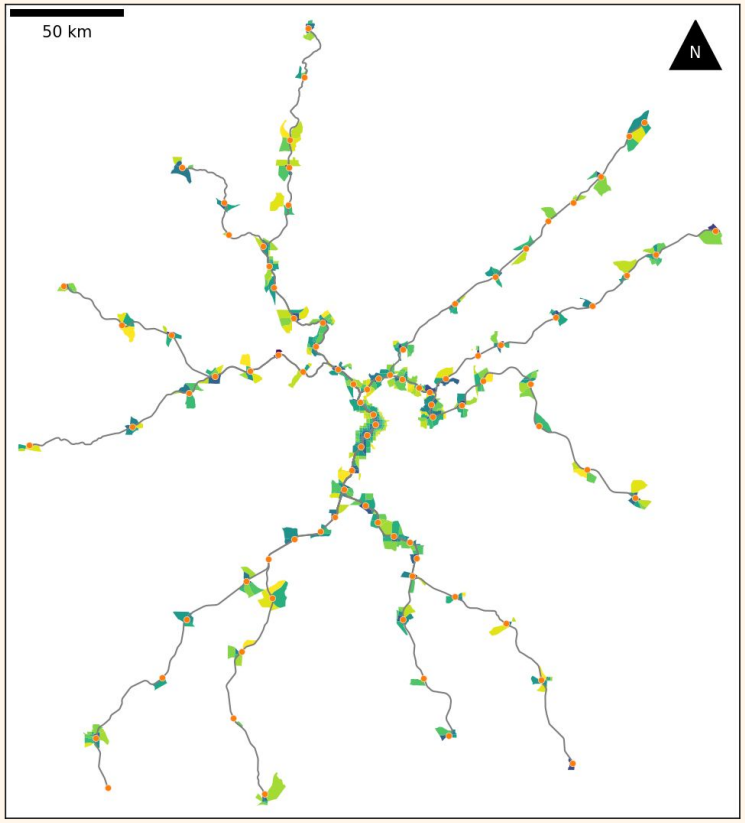
This was then compared to the **time it would take to drive from the *same* origin and destination TAZ**, at both free-flow and AM-peak speeds.

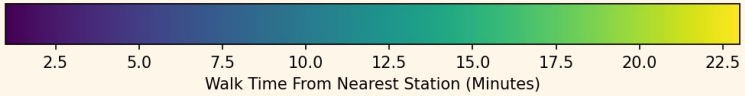


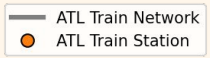

50 km
N


0
2
4
6
8
10
12
14
Drive Time to Nearest Station (Minutes)

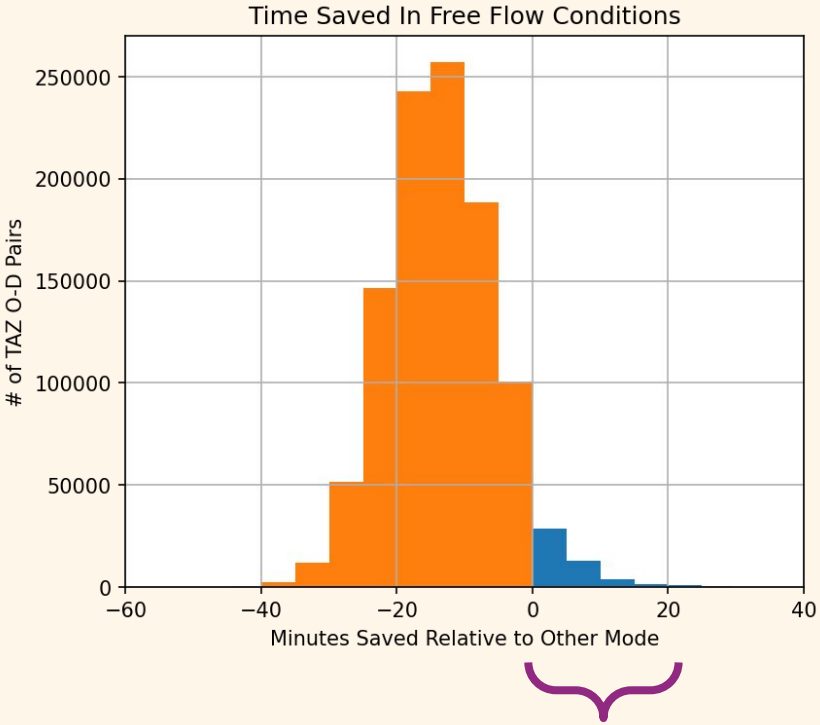

ATL Train Network
ATL Train Station

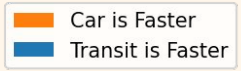

50 km
N

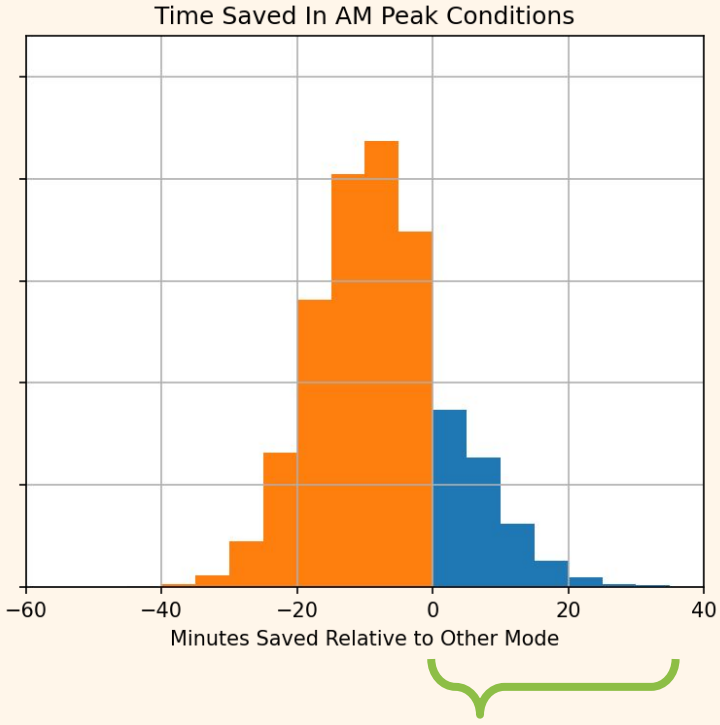

2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0
22.5
Walk Time From Nearest Station (Minutes)


ATL Train Network
ATL Train Station

Comparison of Travel Times





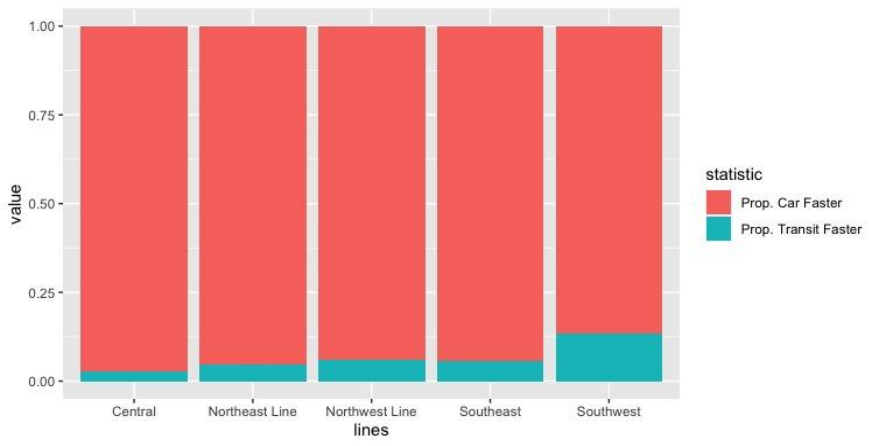


In free-flow conditions, only **~5% of trips** are faster via transit, and most are < 10 minutes faster

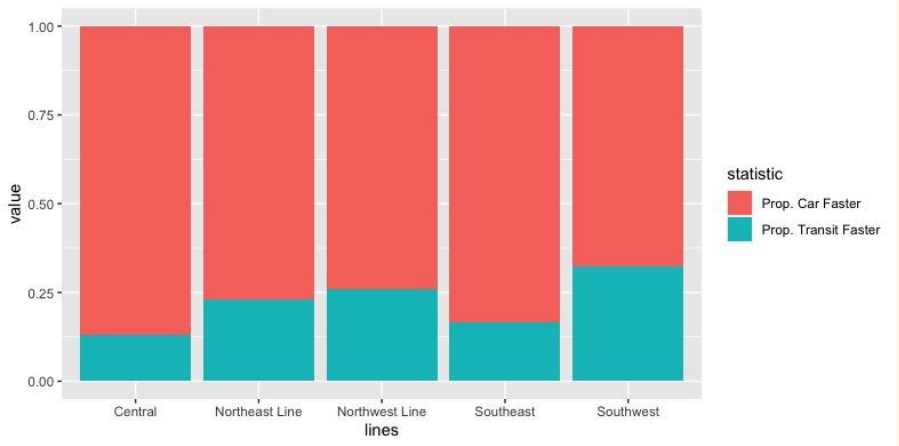
During the AM Peak, up to **20% of trips** are faster via transit, and time saving as higher overall

Line-specific Analysis

Free Flow Conditions



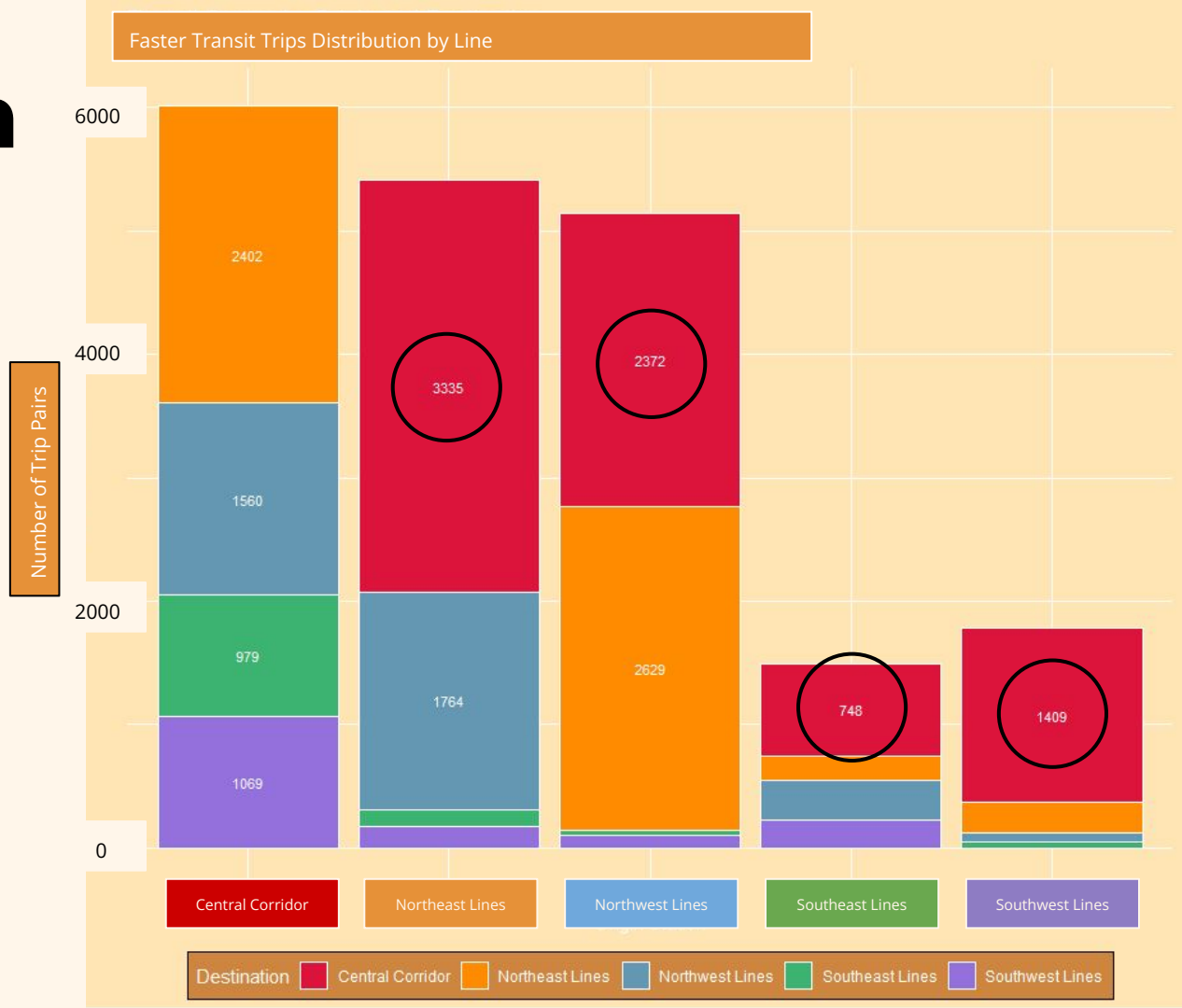
AM Peak Conditions



Certain lines display more time saved than others: the **Northwest** and **Northeast** lines in particular benefit from avoiding congestion on I-75 and I-85 north of downtown, while **Southwest** provides an attractive alternative to I-85 south of downtown, which is lower-speed than it's companion I-75 route

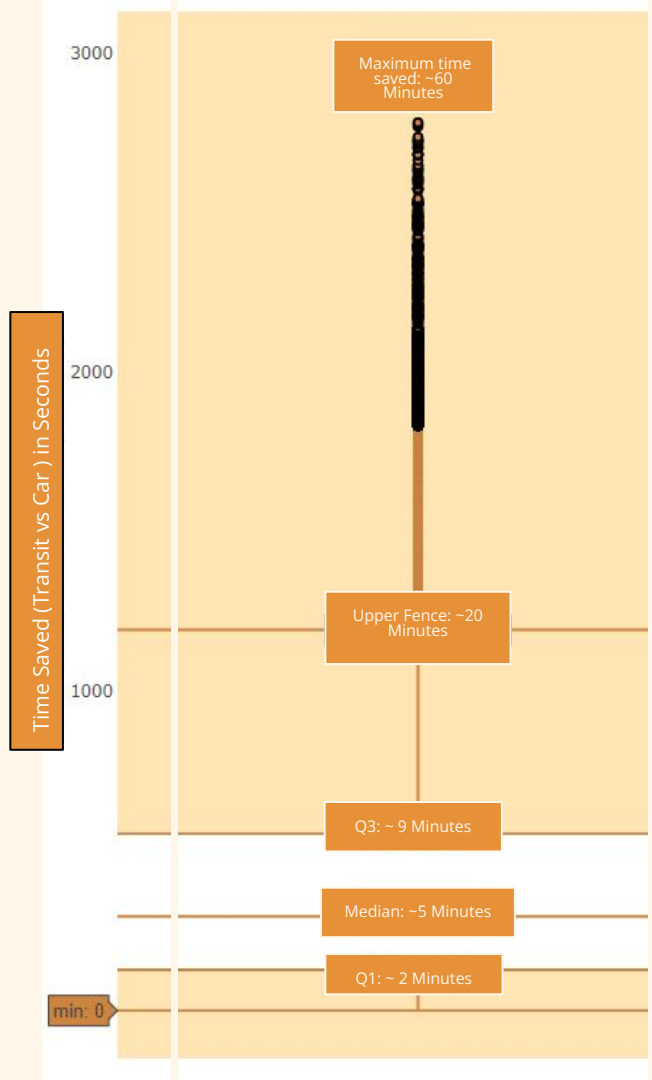
Distribution By Lines

~ 3300 TAZ Pairs that go from Northeast Lines to Central Corridor where Transit is faster. The distribution of faster transit trips align with a commuter rail system.



How are transit times saved distributed?

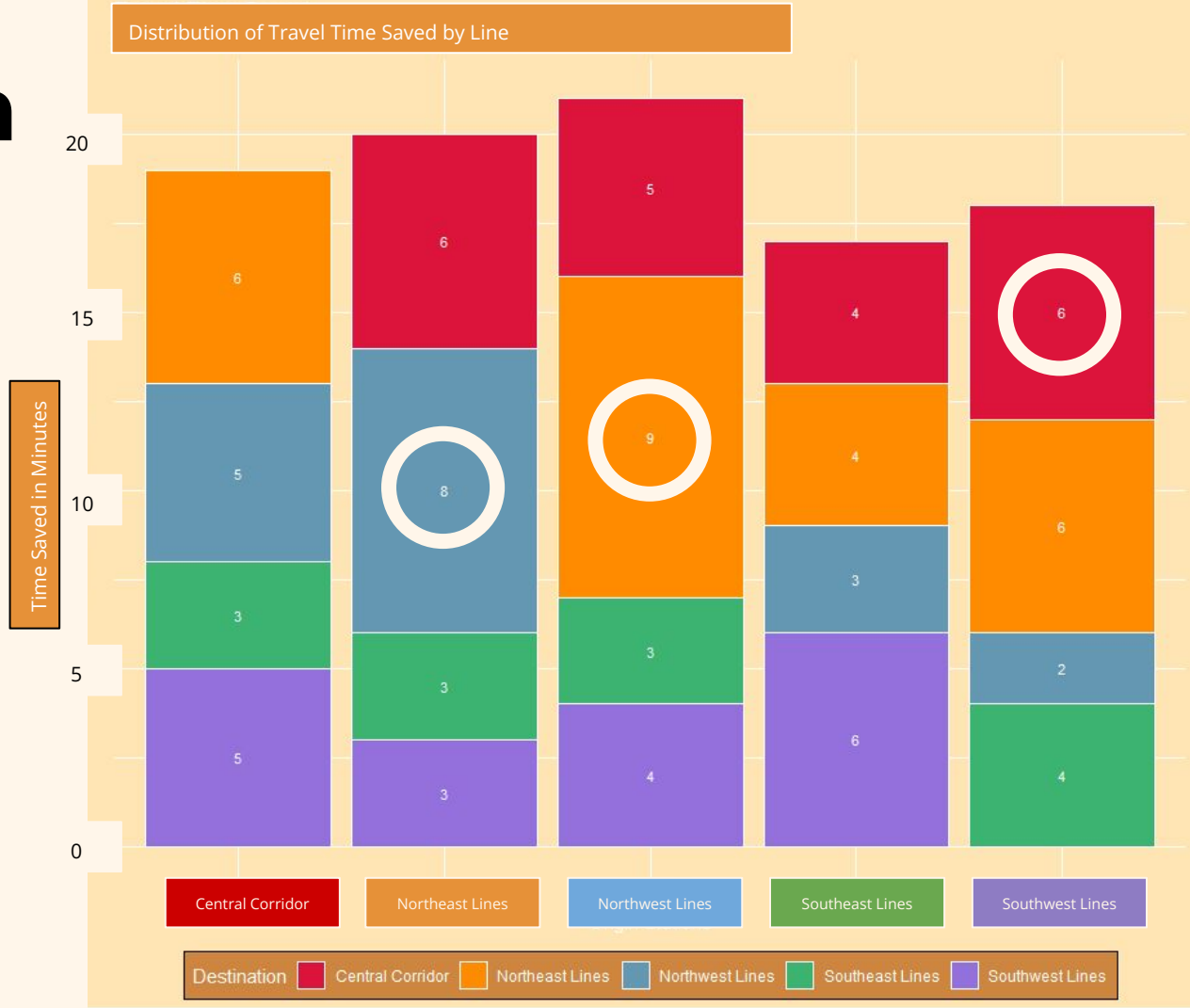
For the trips where transit is faster, on average you save around ~ 5 Minutes.



Distribution By Lines

Not quite that much.

Going from the Northwest to the Northeast saves you ~9 Minutes on average.



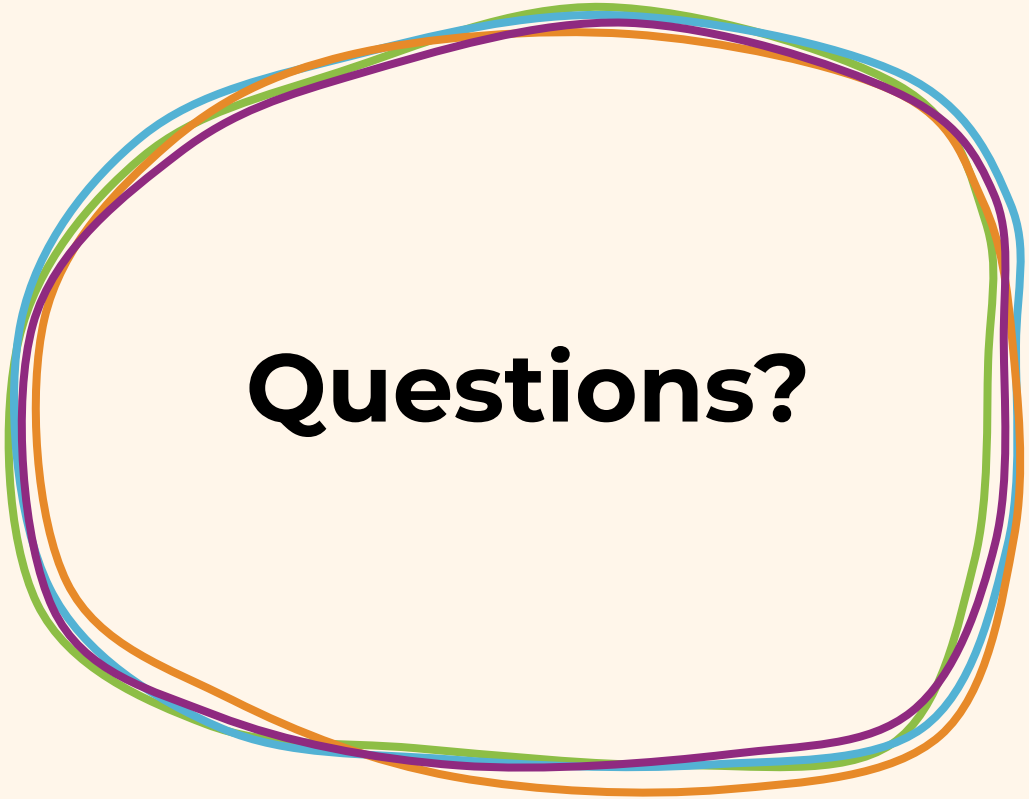
Conclusions

ATL Trains **could shift 20-25% of commuter trips away from cars**, which would help alleviate traffic congestion and reduce carbon emissions

The time saved by transit overall is small, though time savings could be further enhanced through more frequent schedules, and first/last-mile connector transit, like shuttles

Most trips are still significantly faster by car, which will continue to be the most popular mode unless other measures are enacted, such as congestion pricing

Impact could be magnified through transit oriented design, with a focus on creating spaces for living, working, and “playing” within a short walk of each station


Questions?