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MICROSIMULATIONS OF THE IMPACT OF ACCESS MANAGEMENT PRACTICES ON VEHICLES AND PEDESTRIAN OPERATION

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Abstract

The study focuses on developing a microsimulation model using VISSIM and VISWALK software to analyze the impact of access management features to the mobility and accessibility of vehicles and pedestrians. The model utilized features of access management such as access density, signal density, and presence of median to create base model for analysis. The effect of access density on speed, delay and travel time was very vivid for the vehicles within the corridors, thus speed decreased with the increase in access density consequently delay increased and number of stops increased. The results suggested vehicle travel times were more affected by signal density as compared to access density. Pedestrian speeds and travel time are also more influenced by signal density. The findings provide useful understanding to state policy maker in implementing Access Management guidelines in Tennessee.

Introduction

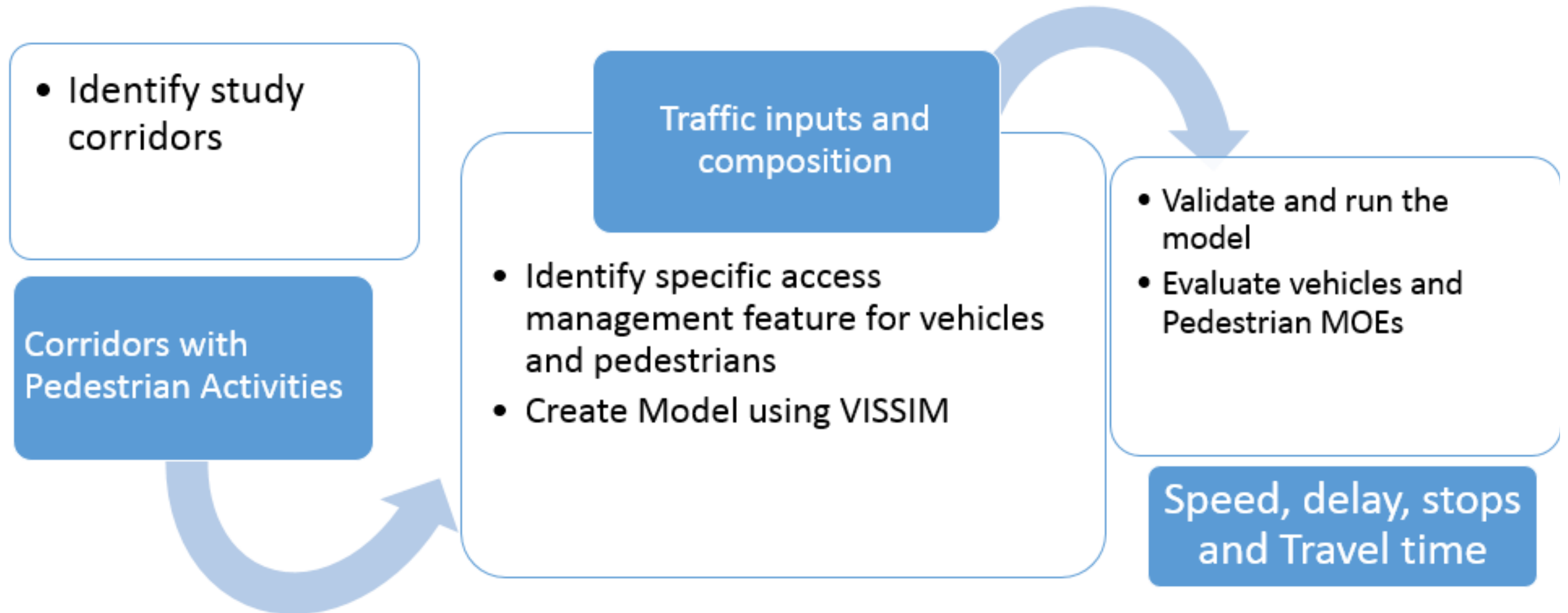
Increase in access points in the roadways and consequently leads to increase in conflict points. The effects on the operations for both vehicles and pedestrians are yet to be fully analyzed on impacts of access features in Nashville. This study aimed to develop a microscopic simulation model using VISSIM to analyze the impact of access features on the mobility and accessibility with respect to both vehicles and pedestrians.

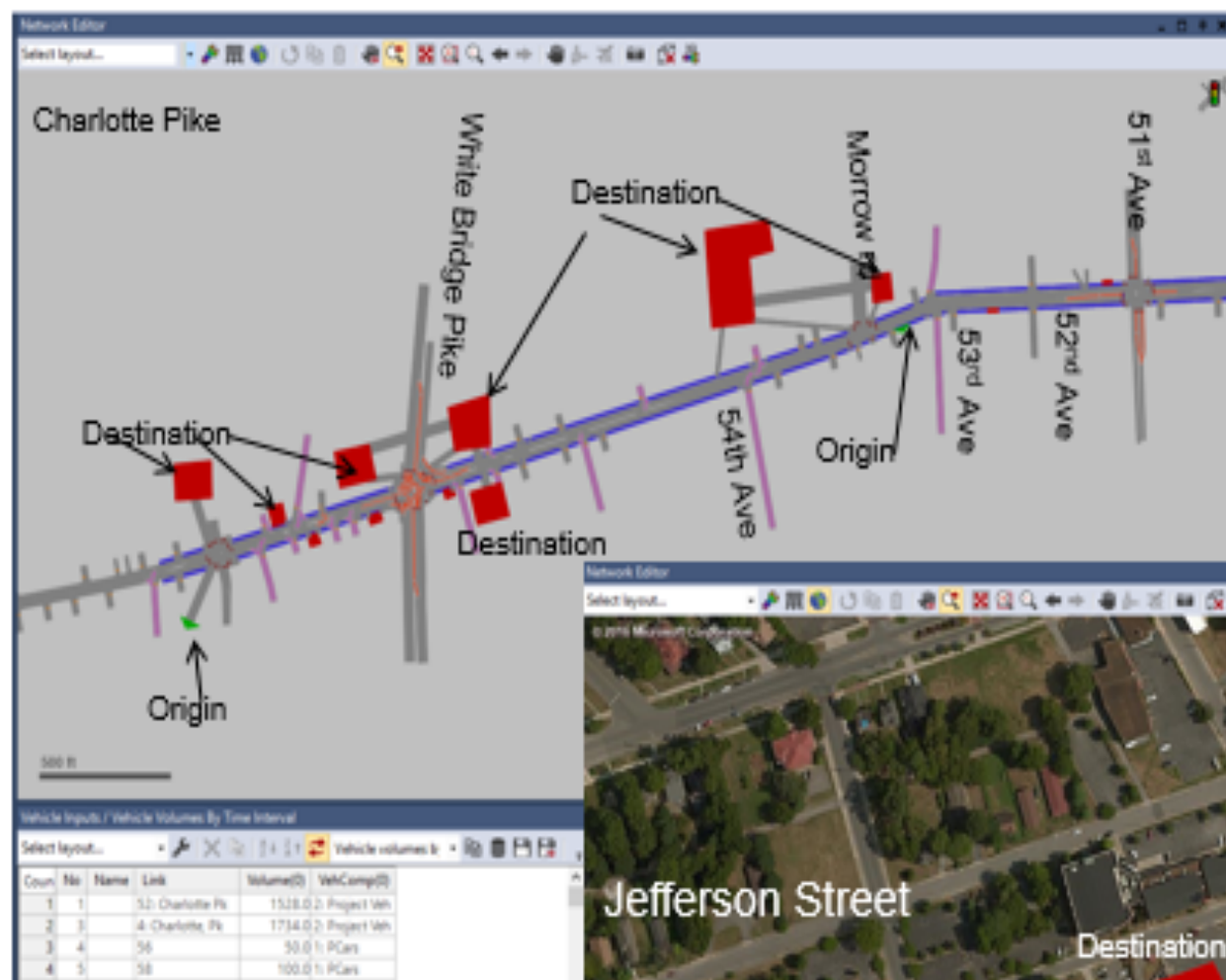
Objective

- Develop a microsimulation model using VISSIM software.
- Analyze effects of access density, signal density and median types on vehicles and pedestrians on speed, delay and travel time.



Data and Methodology



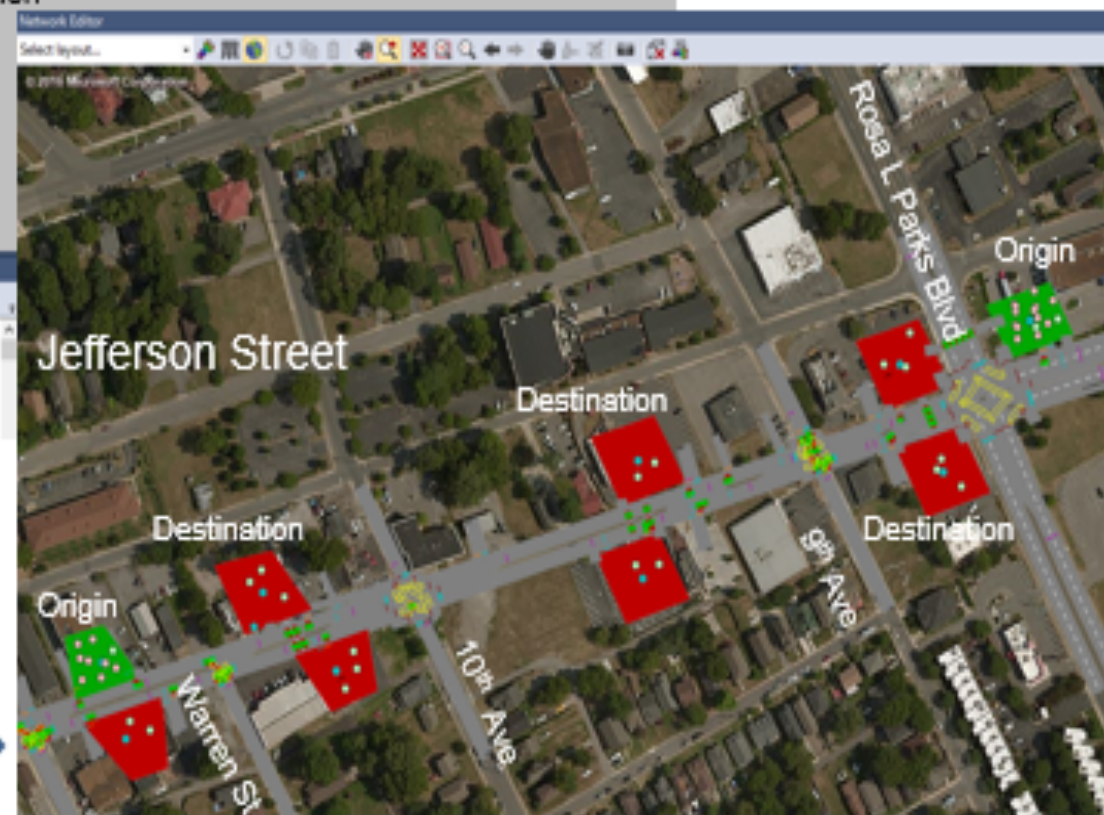


Charlotte pike network without a background image.

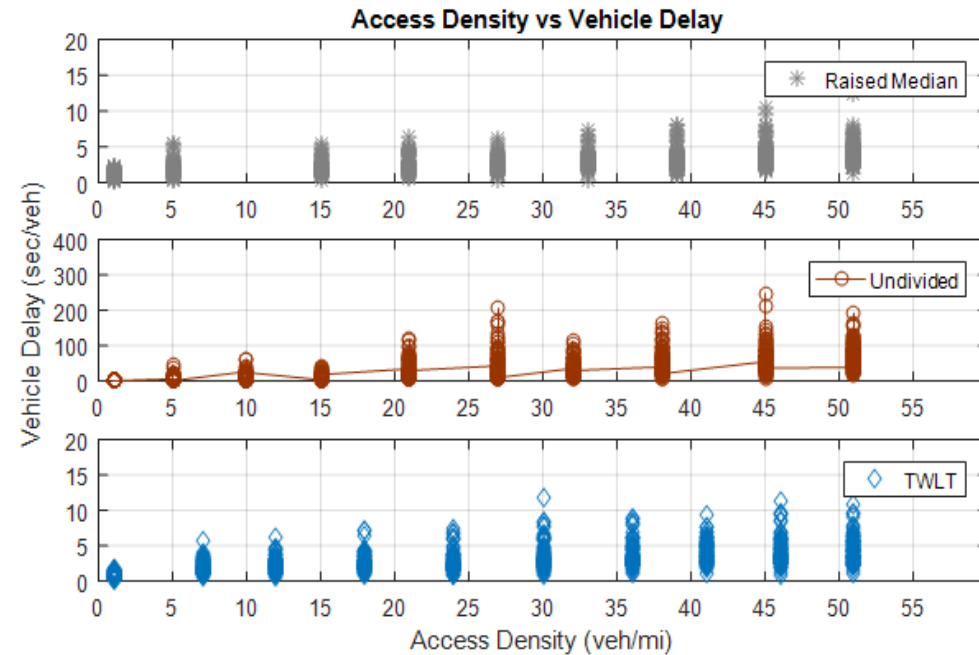
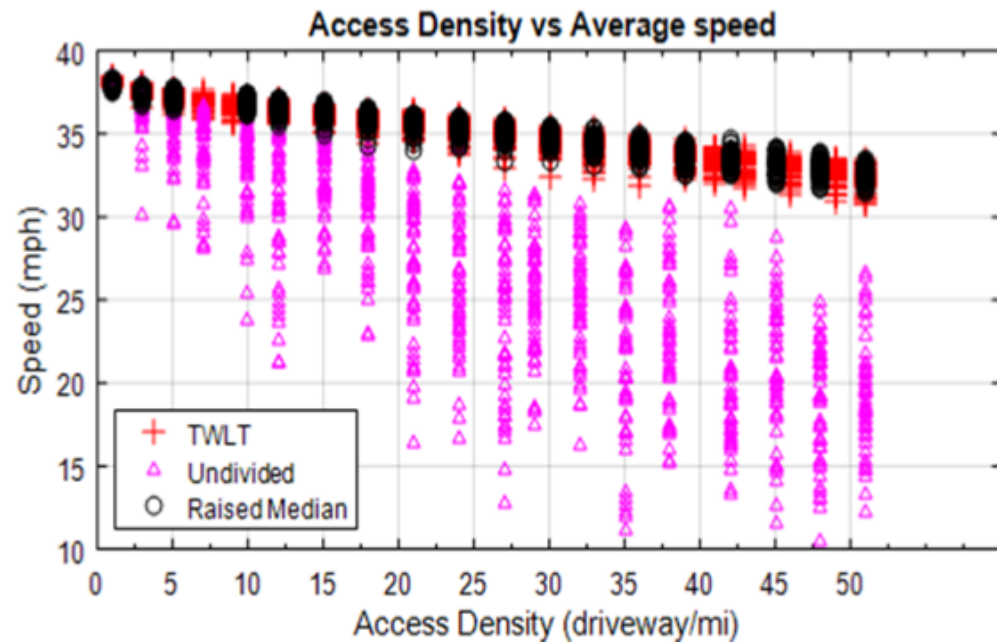
The red areas show destinations for pedestrians.



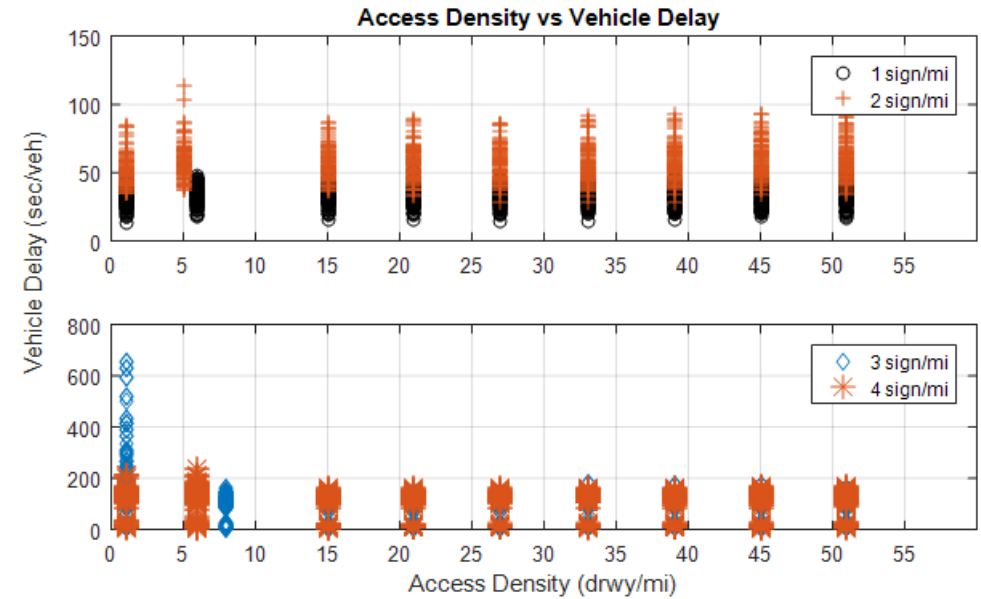
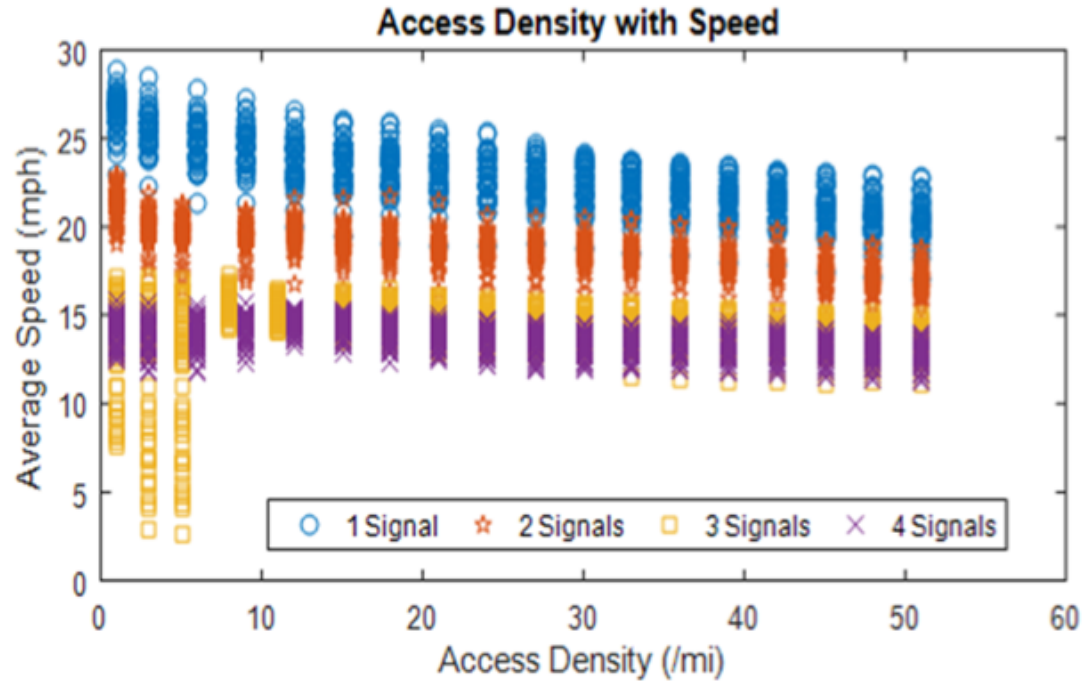
Jefferson street showing red areas as destinations and green as origins for pedestrians.



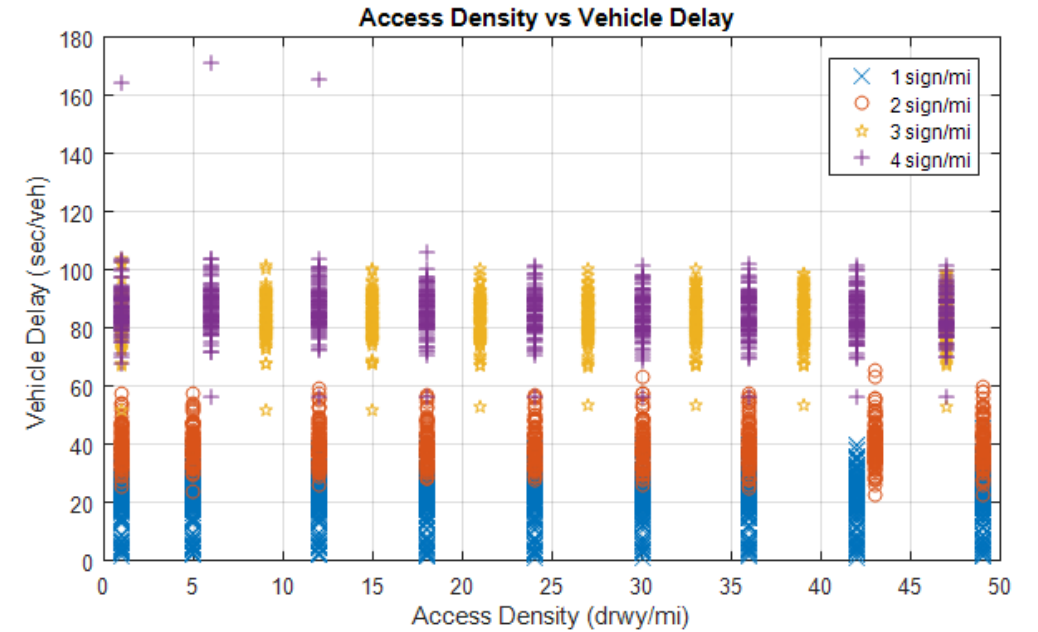
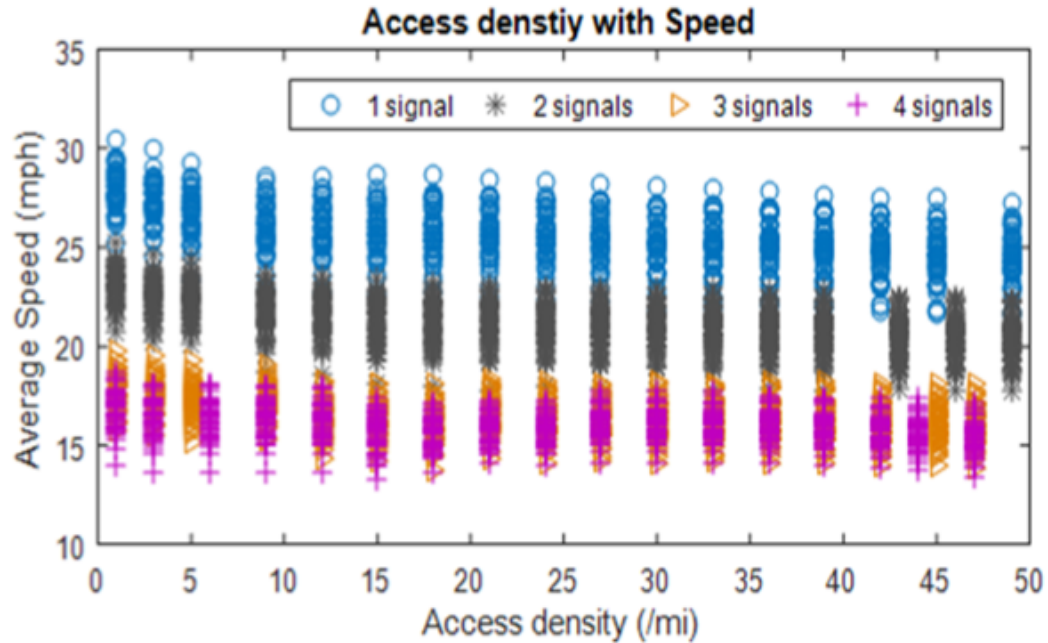
Median types and Access Density



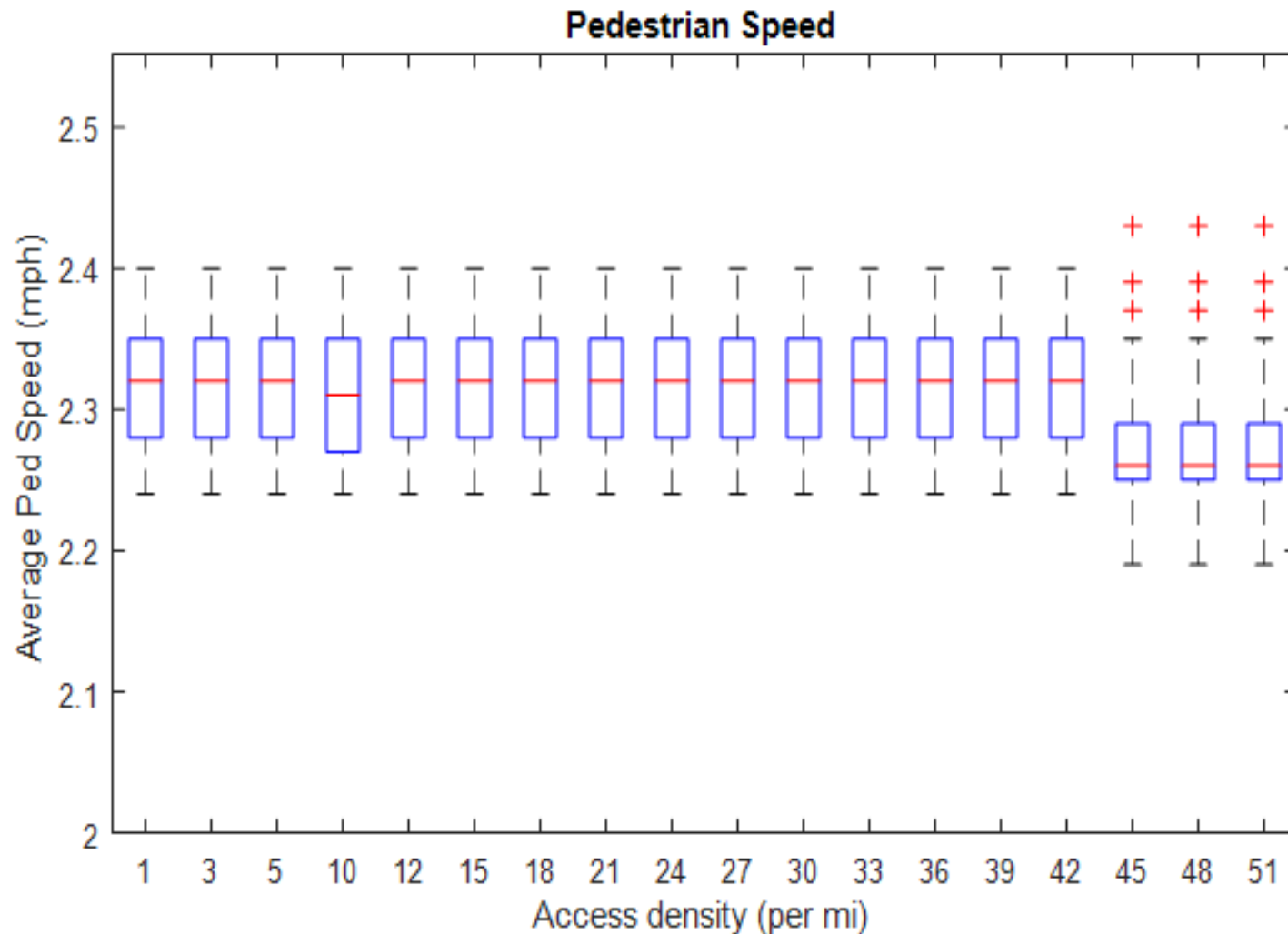
TWLT and Signal density vs Access Density



TWLT+ Raised Median and Signal density vs Access Density

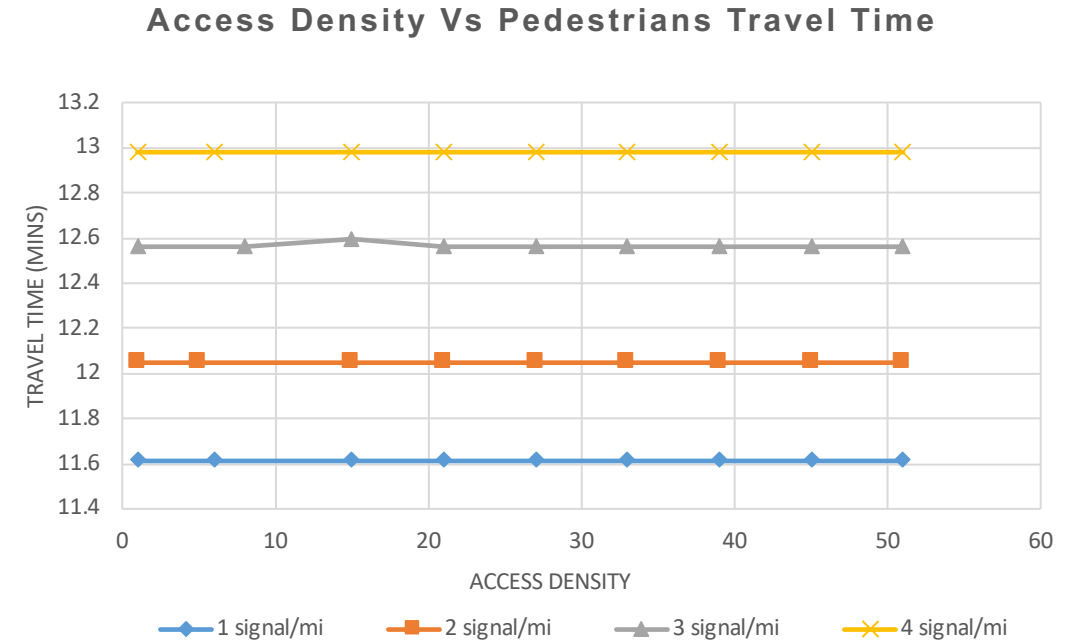
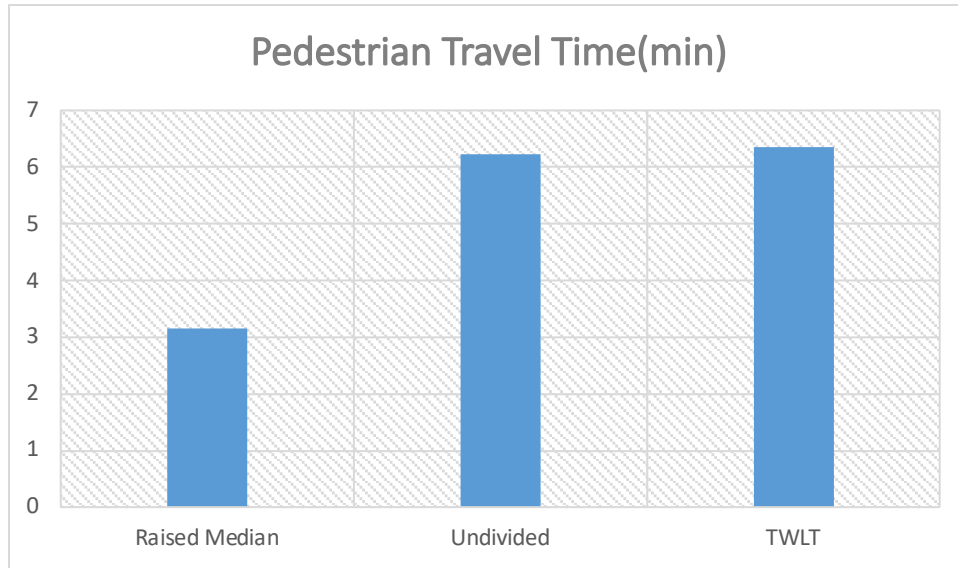


Pedestrian Speed



- Pedestrian speed results show no significant difference in speed with median or access density

Pedestrian Travel Time



- Pedestrian travel time results show raised median segments have lowest pedestrian travel time
- No significant difference in between access density
- Signal density increases travel time.

Discussion

- ❑ Undivided roadways show significant changes in speed as compared to raised median roadways and TWLT segments.
- ❑ TWLT and raised median has less number of stops as well as less delay in comparison with undivided roadways
- ❑ Travel time variations also shows access density influenced more undivided roadways than the latter two.
- ❑ TWLT measurements show that speed decreases as signal density and access density
- ❑ The average delay and number of stops, also increase with the number of signals per mile and access points.
- ❑ Pedestrian travel time appears low for raised median than undivided roadways and roadways with two left turns.
- ❑ Access density does not affect pedestrian travel times as shown in most of the scenarios
- ❑ Increase in signal density appears to influence an increase in pedestrians travel time for two-way left turn segments and for roadways with a mixture of raised median and two way left turn segments.

Conclusions

The study aimed to assess the operation effects of Access Management features on vehicle and pedestrian. The performances measures such as speed, delay, stops and travel time are evaluated through microsimulations modeling. Most of the simulation assessments carried out above involved creating a tailored corridor with traffic reflecting existing conditions. Specific feature related simulations which can provided more understanding to the effects of AM features to both pedestrian and vehicles is highly recommended