2021 RESEARCH PROJECT STATEMENT

Research Topic:
Developing Massachusetts Specific Trip Generation Rates for Land Use Projects

Research Budget and Timeline:

- $120,000-$150,000
- 16-21 months (of which final 3 months are for review)

Problem Statement and Objectives
Vehicle trip generation is used to identify potential transportation impacts associated with new development projects and to provide a substantive basis for determining appropriate impact mitigation and informing transportation infrastructure management, planning and public involvement. In the United States, trip rate estimation typically relies on vehicle trip rates for specific land use types as provided in the Trip Generation Manual published and updated by the Institute of Transportation Engineers (ITE). The ITE manual uses trip generation data derived primarily from suburban project sites that are highly auto-dependent. ITE trip generation rates have been found to be overestimated for urban sites that typically benefit from their close proximity to public transportation. In many instances, the ITE data collection sample sizes for some land-use categories are relatively small, with data collection occurring many years ago. ITE trip generation rates do not accurately reflect the current trip generation trends in Massachusetts, throughout New England and across the country. Many states have conducted research to compare and modify the ITE Trip Generation information to better reflect the current trip generation trends observed locally. Collecting and updating trip rate data is both time-consuming and expensive. Each year different divisions of MassDOT collect a large amount of trip data. Trip generation data is typically collected by manual counting. This limits the amount and frequency of trip generation data (e.g., sample size) that can be collected.

This research is designed to assist MassDOT in developing trip generation rates for high-priority land uses in Massachusetts. This research includes the development of an algorithm-based model for deriving accurate trip generation rates for development projects located in Massachusetts. This research will also identify and study available innovative technologies such as machine learning models and video analytics that can be used to assist MassDOT's efforts to collect vehicular and multi-modal trip generation data that can be used to further enhance the accuracy of its trip generation rate modeling program.

The goals of this proposed research are:

• Establish state-specific trip generation rates for development projects located in high-priority land use areas, propose mixed uses, or anticipated to generate multi-modal trips.

• Identify and evaluate new trip rate data sources and innovative collection technologies, including video analytics and artificial intelligence, to improve and expand trip generation models for land uses in Massachusetts.

Anticipated Outcomes and Deliverables
The anticipated transportation research products include:

1. Massachusetts Trip Generation Model

• Literature Review - Complete a literature review of federal, state and municipal efforts to develop localized trip generation rates, including a) trip generation modeling for high-priority land-use categories, mixed use developments, and projects generating multi-modal trips, and b) innovative approaches to trip generation data collection. The results of the literature review will be used to identify opportunities to employ innovative modeling and data collection methods to develop Massachusetts trip generation rates.

• Massachusetts Trip Generation Model(s) - Develop one or more models to derive trip generation rates for development associated with high-priority land-use categories in Massachusetts. Development of the Massachusetts Trip Generation Model(s) will use existing and new trip generation data collected for completed developments projects in the City of Boston. The modeling results will be compared to ITE trip rates for high-priority land-use categories and multi-modal development projects in Massachusetts.

• Model Guidance - Develop guidance for MassDOT's use, update and expansion of the Massachusetts Trip Generation Model(s). Guidance topics will include: trip model utilization, trip generation data input, annual updates to trip generation data, and future expansion of the trip generation model applications to include additional high-priority land-use categories and multi-modal projects.

2. Innovative Trip Generation Data Collection Strategies

• This research will analyze and recommend the most applicable innovative method/capability (video analytics and Artificial Intelligence (AI)) for automating multi-modal trip rate data collection in Massachusetts. This effort will be properly documented and guidelines for applying the developed AI tool will also be provided.

• Conduct a 'pilot' project to evaluate the use of video analytics and Artificial Intelligence (AI) to collect trip generation data in Massachusetts. The pilot project will identify two developments projects in high-priority land-use categories in Boston to

serve as a project sites for the use of video analytics and Artificial Intelligence (AI) to collect trip generation data.

Deliverables:

1. Massachusetts Trip Generation Model(s) and User Guide
2. Dataset of trip rates from Massachusetts Trip Generation Model(s)
3. Final Report
4. Final Presentation