

# Research in Progress

## Effectiveness of Two-stage Turn Queue Boxes in Massachusetts: A Comparison with Bike Boxes

### Research Need

Existing research has investigated motorist and bicyclist behavior at bike boxes and has assessed their effectiveness in improving safety. However, studies on the effectiveness of two-stage turn queue boxes are limited. Most importantly, a comprehensive comparison of the effectiveness of the two treatments in the Commonwealth that can guide future implementations is missing.

### Goals/Objectives

1. Create an inventory of two-stage turn queue boxes and update the existing bike box inventory for Massachusetts. These two inventories will summarize locations, design characteristics, intersection geometric characteristics, and bicycle infrastructure treatments in the vicinity of two-stage turn queue boxes and bike boxes.
2. Characterize bicyclist and motorist behaviors at intersections with two-stage queue turn boxes and compare them with those at bike boxes. This will allow for an improved understanding of the effectiveness of two-stage turn queue boxes based on the proportion of bicyclists turning left that utilize them vs. the proportion of bicyclists turning left that utilize bike boxes. Conflict analysis will also be performed to assess their effectiveness in improving bicycle safety.
3. Provide guidelines on the design and implementation of two-stage turn queue boxes and bike boxes to promote safety.

### Project Information

This project is being conducted as part of the Massachusetts Department of Transportation (MassDOT) Research Program with funding from Federal Highway Administration (FHWA) State Planning and Research (SPR) funds.

#### Principal Investigators:

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#### Performing Organization:

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#### Project Champion:

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#### Project Start Date:

September 2022

#### Expected Project Completion Date:

February 2024

### Methodology

Task 1: Literature review on two-stage turn queue box design, driver and bicyclist behavior, as well as safety implications of two-stage turn queue boxes.

#### Task 2: Bike box inventory

Subtask 2.1: collection of two-stage turn queue box design and location information from existing sources

Subtask 2.2: inventory of two-stage turn queue box locations and their characteristics using LiDAR.

Task 3: Field data collection on selected sites to analyze motorist and bicyclist behavior at bike boxes and two-stage turn queue boxes.

Task 4: Final report summarizing findings and outlining guidelines on the design, location, and implementation of bike boxes and two-stage turn queue boxes.

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