Two-Stage Turn Queue Box

Slide 1: Intro

This presentation will provide an explanation of the two-stage turn queue boxes along the Union Street Protected Bike Lane. These two-stage turn boxes help bicyclists turn off the Union Street Protected bikeway corridor safely. We will discuss what a two-stage turn queue box looks like, how bicyclists move through them, and where they are placed in intersections along Union Street.

Slide 2: Background

For a quick refresher, the Union Street Protected Bikeway Project is a two-way protected bike lane project that runs along East Union Street from South Arroyo Parkway to North Hill Avenue. The design process is in its final stages and construction is anticipated to be complete by spring 2022. More information on the project as a whole can be found in the first video of this series. This video will discuss two-stage turn queue boxes.

Slide 3: Two-Stage Turn Queue Boxes

First off, what are two-stage turn queue boxes?

Two-stage turn queue boxes are dedicated spaces within an intersection where turning bicyclists can wait, out of the way of moving traffic and in front of vehicles waiting for a green light. Instead of turning left across opposing traffic, bicyclists can cross one leg of an intersection, wait at the corner in the queue box for the next green light, and then cross the second leg of traffic. Bicyclists can use this to turn northbound off Union Street.

These are two examples of what a two-stage turn queue box might look like within an intersection. Both show a green-colored rectangle containing a bicycle symbol and a turning arrow symbol.

On the left, the box is positioned in front of a crosswalk and in line with a lane of vehicular traffic.

On the right, the box is positioned in front of a lane extension line, out of the way of the cross-street traffic.

Slide 4: How do you use one?

Let's look at how a bicyclist uses a two-stage turn queue box. In this video, you can see a bicyclist approaching the intersection and riding straight through to the two-stage turn queue box on a green light. When he gets to the box, he turns 90 degrees to face the red light. Then, when the next phase of traffic gets a green light, the bicyclist and can finish his turn and continue along the bikeway corridor.

Slide 5: How They Work

Let's take a closer look at how the traffic signals will work at an intersection with a two-stage turn queue box. This is the intersection of Holliston Avenue and Union Street.

The purple arrows on Union Street represent moving vehicles. The light purple lines in the left turn lane on Union Street and in both directions on Holliston Avenue represent vehicles that have a red light. The bike crossing is green to indicate that it is a conflict zone where bicyclists have right-of-way. You can see that the two-stage turn queue box is between the bike crossing and the crosswalk.

In this diagram, the through and right turn lane on Union Street have a green light.

Slide 6: How They Work

Now let's add in the bicycle movements. Bicyclists moving east and west are represented with blue arrows. Both directions of the bicycle lane on Union Street also have a green light. To keep things simple, we are not going to show pedestrian movements at this intersection. Pedestrian movements will operate as they do today.

Slide 7: How They Work

The bent blue lines turning off the arrows represent bicyclists who want to turn northbound onto Holliston Avenue. These cyclists turn slightly off the green bike crossing and enter into the two-stage turn queue box.

Slide 8: How They Work

Once bicyclists are in the two-stage turn queue box, they can turn so that they're facing their final direction. The blue line facing north represents bicyclists waiting in the two-stage turn queue box. Once in the turn queue box, they can wait in front of the stopped vehicles on Holliston Avenue, and out of the way of pedestrians using the crosswalk, while the rest of the traffic on Union Street still have a green light.

Slide 9: How They Work

Now, the light on Union Street is turning yellow. The dotted purple and blue lines represent motorists and bicyclists who are finishing crossing the intersection.

Slide 10: How They Work

Next, everyone on Union Street has a red light, and the signals on Holliston Avenue are green. When this light turns green, the bicyclists in the two-stage turn queue box can proceed through the intersection, shown here with a blue arrow. Motorists and bicyclists on Union Street, who are stopped, are shown with transparent lines.

Slide 11: How They Work

Now let's add in the motorists on Holliston Avenue. These vehicle movements are represented with purple arrows. Both drivers and bicyclists get the green signal at the same time but notice that the motorists (shown in purple) are lagging behind the bicyclists. This helps bicyclists be more visible to drivers and give them a slight head start through the intersection.

Slide 12: Locations

Along Union Street, the two-stage turn queue box might be located at a few different locations within the intersection in relation to the bicycle crossing and the crosswalk. Regardless of where it is relative to the bicyclist and pedestrian zones, it is always placed out of the path of turning drivers on perpendicular streets.

Slide 13: Placement Along Union Street

The two stage turn queue box is located between the bike crossing and the crosswalk at twelve intersections of Union Street. These intersections are: Garfield Avenue, Euclid Avenue, Madison Avenue, El Molino Avenue, Oak Knoll Avenue, Lake Avenue, Catalina Avenue, Wilson Avenue, Mar Vista Avenue, Michigan Avenue, Chester Avenue, and Holliston Avenue.

The two stage turn queue box is only located behind the crosswalk at two intersections of Union Street: Marengo Avenue and Los Robles Avenue.

At the intersection of Union Street and Hudson Avenue, the two stage turn queue box is located in front of the green bike crossing. This is the only instance of this type of two stage turn queue box on the corridor and is made possible by a wide concrete buffer island.

Slide 14

There are four other public information videos as part of the Union Street Protected Bikeway series that provide more details about each these design features:

1. **General overview**
2. **Parking and Passenger Loading Zone**
3. **Driveway Treatments**
4. **Transition to and from the Bikeway at Arroyo**

Thank you so much for taking the time to watch this video.

For more information related to this project, watch the rest of the videos in the series, and check out the project website at saferstreets.cityofpasadena.net