GUIDELINES FOR THE USE OF BICYCLE LANE SEPARATORS – CAMBRIDGE, MA

Updated November 2018

OVERVIEW

Following the creation of multiple street-level separated bicycle lanes in Cambridge in recent years, the City has gained experience with the installation and maintenance of the separators (often referred to as flex posts) that are installed between these types of separated bicycle lanes and the adjacent travel or parking lane. We continue to refine our use of these separators based on the lessons learned, based on the following factors:

- **Protection of the bike lane:** separators improve compliance with the restricted use of the bike lane, reducing the likelihood that vehicles will drive, park, stop, or stand in the bike lane.
- **Snow clearance:** separators create an additional obstacle for snow clearance, since they narrow the space available for a snow plow and make it difficult to clear snow from the street all the way back to the curb line. This leads to other consequences, including the creation of an additional snow bank in the buffer between the bike lane and the travel/parking lane, the potential for ice to form across the bike path between the two snow banks, and narrowing of the bike lane.
- **Street sweeping:** separators require the use of a smaller street sweeper, although they also create the opportunity to remove street cleaning-related parking restrictions in some locations.
- **Maintenance:** separators increase maintenance needs, particularly in terms of the need to replace separators that are hit or damaged. In addition, the point where the separators are attached to the pavement can become a location where potholes form.

The purpose of this document is to provide guidelines for how the City of Cambridge will use bicycle lane separators, while also acknowledging that the characteristics of each street are different, and that different solutions may be required based on factors such as street width, land use, and multimodal traffic volumes. This document is subject to change and update based on additional experience and as additional projects are implemented.

USE CASES

There are three main locations where bicycle lane delineators may be used, each of which have a different level of criticality to the safe operation of the bicycle lane:

- **Clear Zones:** Locations (generally at the beginning and end of blocks, or at major driveways) where parking is prohibited to provide visibility between cyclists and turning motor vehicles. If anything is blocking the clear zone, this can create an immediate safety hazard because cyclists cannot see motor vehicles that are preparing to turn across the bicycle lane and turning motor vehicles cannot see cyclists approaching in the bicycle lane. The clear zones also provide sight distance for vehicles entering the roadway to see cross traffic. As a result, the presence of

separators that prevent parking, standing, or stopping in clear zones is highly critical to the safe operation of a separated bicycle lane.

- **Adjacent to a Travel Lane:** Locations where the separated bicycle lane is located adjacent to a travel lane, without any parking present. In this case, the separators are the only physical object preventing motor vehicles from driving, parking, standing, or stopping in the bicycle lane. As a result, the presence of separators where the separated bicycle lane is adjacent to the travel lane is critical to the safe operation of a separated bicycle lane.
- **Adjacent to a Parking Lane:** Locations where the separated bicycle lane is located adjacent to a parking lane, such that parked cars provide additional separation to prevent other motor vehicles from driving, parking, standing, or stopping in the bicycle lane. In this case, the main function of the separators is to physically prevent motor vehicles from parking in the bicycle lane and require drivers to align themselves in the designated parking lane that is inside the bicycle lane. If all the motor vehicles are parked correctly, then the separators are not needed, since the parked vehicles serve the same purpose as the separators. A subset of this situation is a loading zone, where anecdotal evidence indicates that loading vehicles are more likely to try to park close to curb due to the need to unload their cargo. In general, it appears that it is more likely that motor vehicles will park improperly when there is higher turnover (i.e., a loading zone or short-term parking meters) than in locations with longer duration/more stable parkers.

SNOW OPERATIONS

In general, the use of bicycle lane separators does not represent a significant problem during the non-snow months (generally April-November). Although there are still issues associated with street sweeping and the maintenance of the separators themselves, these are manageable. As a result, the main question is whether to remove the separators during the winter, either proactively at the beginning of snow operations season, or immediately in advance of a major approaching snow storm. Although the latter approach seems attractive, there are several reasons why this is challenging in practice:

- **Prior Conditions:** even if there have not been any major storms prior to the point when a storm is forecast that is large enough to warrant removal of the separators, it is not uncommon for smaller snow events to lead to a build-up of snow and ice around the separators, making them very difficult to remove. As a result, it may not be physically possible to remove the separators when the major snow event is approaching.
- **Staffing:** in advance of a major storm, there are many ongoing preparations for the storm, and the same operational personnel who are making those preparations would be the ones responsible for removing the separators. This may make it difficult or impossible to remove the separators without impacting other critical storm preparation activities. In addition, those staff who may be working for many hours straight during a storm and its aftermath may potentially need to rest in advance of a storm's arrival, rather than working overtime to remove the separators.

- **Quality of Weather Forecasts:** given the unpredictability of many winter storms, it can be difficult to know whether a storm is going to result in a small accumulation that will melt quickly (which might not require removal of the separators) or a large storm that will then freeze solid for multiple days (which makes removal of the separators much more important).

There are a number of other issues that are important to note about snow operations:

- The types of storms experienced in Boston are different from those experienced in more midwestern/continental climates such as Chicago, Toronto, or Montreal. We experience large snow storms (i.e., nor'easters) with large accumulations of wet snow, in ways that are not as common in many other winter cities. At the same time, as the farthest north major coastal city in the United States, it is more likely that large accumulations will not melt quickly, as they often do in New York City or Philadelphia.
- Most Canadian cities (which can provide examples for snowy cities in the US) invest significantly more resources in snow clearance, and often have higher tax rates. So while we will continue to learn from what other cities are doing to address snow clearance in separated bicycle lanes, we are also likely to need solutions and approaches that are unique to this area.
- Separated bicycle lane projects require more snow removal (where snow is picked up and moved to another location), as opposed to snow clearance (where snow is plowed to the edge of the traveled way). This has impacts on fiscal, human, and operational resources, and can lead to safety issues if crews don't get adequate sleep. In addition, as the region continues to develop, many of the locations available for snow dumping are becoming unavailable, and the use of snow melters has cost and environmental impacts that may not be sustainable.
- Regardless of the official guidelines or plans, there may be storms that require or lead to the removal of separators even in locations where they are critical. This may occur purposefully through a last minute decision to remove separators that had been intended to remain in place, or accidentally due to a plow hit in the midst of a storm event.

GENERAL GUIDELINES

Based on the information described above and experience to date with bicycle lane separators in Cambridge, the following general guidelines will be used for the deployment of these separators. These are intended to provide overall guidance as a starting point; as noted above, each street is unique in terms of land use and width, so different decisions may ultimately be made on a location-specific basis (see table below).

- In clear zones, bicycle lane separators will be maintained throughout the entire year, to physically prevent motor vehicles from parking, standing, or stopping in these safety-critical locations. The City is currently experimenting with the exact placement of separators within the clear zone, to maximize their effectiveness in stopping vehicles from blocking the zone while minimizing impact on snow clearance. We may install two

rows of separators during non-winter months, and leave only one row, closer to the travel lane, during winter months.

- In separated bicycle lanes adjacent to travel lanes, bicycle lane separators will be maintained throughout the entire year, to physically prevent motor vehicles from driving, parking, standing, or stopping in the bicycle lane. The City does intend to experiment with increasing the distance between the separators to make it easier for vehicles to pull into the bicycle lane when an emergency vehicle is passing, but this would not become a standard practice if it also leads to an increase in the number of vehicles pulling into the bicycle lane for other reasons when an emergency vehicle is not present.
- In separated bicycle lanes adjacent to parking lanes, bicycle lane separators will be installed in two situations:
    - Immediately after a project is installed, separators may be deployed on a temporary (likely 3-6 month) basis to train drivers to park away from the curb. These separators will then be removed for the winter (likely around Thanksgiving) and not reinstalled (unless the initial installation took place during the fall, which case they might be reinstalled for some period of time the following spring).
    - In high turnover locations, separators will be deployed on an ongoing basis, but will be removed for the winter to improve snow operations. High turnover locations include loading zones and 30-minute meters, and do not include 1- and 2-hour meters.

  Where separators are to be removed for the winter, removal will take place around Thanksgiving, although it may be delayed further based on predicted weather conditions. Reinstallation will take place once temperatures have consistently risen high enough to eliminate the threat of a large snow storm that does not melt quickly.

The City is taking a number of other actions to improve snow operations in relationship to separated bicycles lanes:

- Use of screw-in separators than can more easily be removed and reinstalled, particularly in the case of a last-minute decision to remove separators. The City has outstanding concerns about the impact the long-term use of this type of separator will have on pavement conditions and will continue to experiment with other options.
- Installation of additional "flip signs" that allow us to easily create/extend temporary parking restrictions after snow storms, improving the process of snow removal.
- Creation of special snow removal areas (as has been done on Hampshire Street), where residents are notified in advance that temporary overnight parking restrictions may be needed to accomplish snow removal operations.

The table below indicates the specific plans for each street segment where street-level separated bicycle lanes have been installed.

	CLEAR ZONES		ADJACENT TO TRAVEL LANE		ADJACENT TO PARKING LANE	
	NON-WINTER	WINTER	NON-WINTER	WINTER	NON-WINTER	WINTER
AMES STREET *Main Street to Broadway*	TBD	TBD	TBD	TBD	TBD	TBD
CAMBRIDGE STREET *Quincy Street to Fayette Street*	Single or double row (TBD)	Single row	Installed	Installed	After project startup and in high turnover locations	Not installed
BROADWAY *Hampshire Street to Galilei Way*	N/A	N/A	Installed	Installed	N/A	N/A
BRATTLE STREET *Eliot Street to Mason Street (1)*	Single or Double row (TBD)	Single row	N/A	N/A	After project startup and in high turnover locations	Not installed
CAMBRIDGEPARK DRIVE *Steel Place to Turnaround*	Single or Double row (TBD)	Single row	N/A	N/A	Not installed (2)	Not installed
MAIN STREET *Longfellow Bridge to Cycle Track*	TBD	TBD	TBD	TBD	TBD	TBD
MASSACHUSETTS AVENUE *Sidney Street to Douglass Street (3)*	Single or Double row (TBD)	Single row	N/A	N/A	Installed (4)	Installed (4)
MASSACHUSETTS AVENUE *Waterhouse Street to Everett Street*	N/A	N/A	Installed	Installed	N/A	N/A
MASSACHUSETTS AVENUE *Trowbridge Street to Quincy Street*	Single or Double row (TBD)	Single row	N/A	N/A	After project startup and in high turnover locations	Not installed
MASSACHUSETTS AVENUE *Sidney Street to Memorial Drive*	Single or Double row (TBD)	Single row	Installed	Installed	After project startup and in high turnover locations	Not installed

NOTES:

(1) Additional separators will installed on the centerline of the two-way bicycle lane at entry points during non-winter months, to reduce the likelihood of motor vehicles pulling into the lane. These will be removed for winter months.

(2) This location has been in place long enough to avoid the need for separators, based on observations of current parking behavior.

(3) This location is subject to change based on ongoing construction.

(4) Separators will remain installed at this location because the width of the bicycle lane provides enough space for snow operations.