

DESIGN MEMO 6.04

To: Designers, Contractors, and City Departments
Date: January 10, 2023
Subject: Curb Extensions
Category: Pedestrian and Bicycle Facilities

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1 Purpose

Curb extensions can be used at intersections and mid-block crossings to extend the sidewalk or curb line into the parking lane. Curb extensions reduce crossing distance for pedestrians and bicyclists, improve sight distance for all road users, and prevent parked cars from encroaching into the crosswalk area. At intersections, curb extensions can reduce the effective turning radius and may be used in conjunction with truck aprons; see City of Columbus Design Memo 9.04: Turning Radii.

2 Applicability

Until further notice, this direction will be used for scoping, design, and construction of curb extensions within the City of Columbus right-of-way. Curb extensions shall only be installed on streets where on-street parking or other full-time stationary curb uses are present; they shall not be used where a curbside peak period travel lane exists. Curb extensions should not be installed on roadways that are candidates for new or expanded transit service, bike lanes, or additional vehicular capacity.

Curb extensions are recommended at, but not limited to, locations where:

- Pedestrians must cross 4 or more lanes of moving traffic (2 or more lanes per direction);
- Pedestrian volumes are high;
- There are nearby pedestrian generators such as schools or parks;
- There are unsignalized pedestrian crossings;
- The crash history shows collisions or near misses occur between turning motorists and pedestrians;
- An increase in bus stop waiting area capacity is desired or to facilitate in-lane stopping of buses;
- Motorists routinely park or stop illegally (including taxi and ride-hailing services) within a no-parking zone approaching or departing pedestrian crossings;
- It is used to provide space for ADA-compliant, uni-directional curb ramps where sidewalks or shared use paths are narrow;
- It is desired to provide a protected intersection to support a separated bike lane or to transition a conventional bike lane to a separated bike lane; or
- A shared use path intersects a street and it is desired to increase the queuing area or to shorten the crossing distance of the street.

3 Definitions

Definitions of key terms in this memo are provided in City of Columbus Design Memo 1.00: Introduction.

4 Design Guidance

4.1 Geometry

4.1.1 Corner Radii

Corner designs should maximize pedestrian safety and comfort by minimizing the actual curb radius for the design vehicle while providing an adequate effective radius to accommodate the check vehicle in accordance with the City of Columbus Encroachment Policy. See City of Columbus Design Memo 9.04:



Turning Radii for more information on the design vehicle and check vehicle and for guidance on selecting the curb extension design radius.

The turning needs of larger vehicles should be considered in curb extension design; truck aprons may be used to ensure speeds of smaller vehicles are managed while ensuring larger vehicles are accommodated and will not track over the curb or sidewalk. See truck apron guidance within City of Columbus Design Memo 9.04: Turning Radii.

4.1.2 Width

Curb extensions should have a width of 7 feet. Where parking lanes are greater than 8 feet in width, the width of the curb extension may be greater than 7 feet, with the width of the curb extension 1 foot less than the width of the parking lane. Curb extensions shall not extend into bicycle lanes or other travel lanes. The gutter pan, if present, shall be outside of the bicycle lane.

4.1.3 Length

Curb extensions should extend at least the length of the parking restriction at intersections and at mid-block crosswalks (see Columbus City Code Section 2151.01):

- On the approaches to signalized intersections and on stop-controlled approaches to intersections, the curb extension should extend at least 30 feet from the stop line or stop sign.
- On uncontrolled approaches to intersections and on the departure from intersections, the curb extension should extend at least 20 feet from the crosswalk. If the crosswalk is unmarked, the measurement shall begin 5 feet from the center of the curb ramp.
- Where used at mid-block crosswalks, the curb extension should extend 30 feet from the crosswalk on both the approach to and departure from the crosswalk.

The curb extension taper may be included in these distances. The curb extension length may be extended to accommodate a particular use (e.g., stormwater management or bus loading) or to provide additional parking restrictions.

4.1.4 Taper

Tapers to curb extensions shall be constructed at a 45-degree angle (1:1 taper) from the street curb line with a 2.5-foot radius at either end of the taper (see **Figure 1**). The 2.5-foot radius may be omitted at locations where granite/stone curbs are used or where a drainage inlet is installed at a low point adjacent to the curb extension.

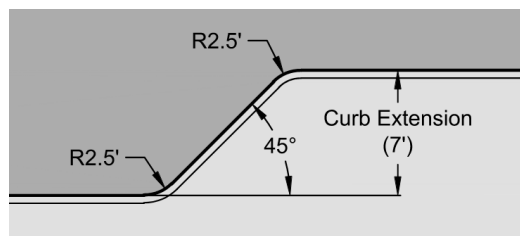


Figure 1: Curb Extension Taper Detail

4.1.5 Other Considerations

Curb extension installation on both ends of a pedestrian crossing is preferred, but where curb extension installation on one side of the street is infeasible or inappropriate (e.g., no full-time parking), this does not preclude installation on the opposite side of the street.



Reflective vertical elements shall be provided at mid-block curb extensions to alert drivers and snowplow operators to the presence of curb extensions. At intersections, designers should consider providing reflective vertical elements where signs are not present within the curb extension.

Applicable signage (such as stop signs and crosswalk warning signs) should be placed within the curb extension to increase visibility where possible.

The construction of a curb extension may require the relocation of existing storm drainage inlets and above ground utilities (e.g., fire hydrants, light poles, signal poles, signal cabinets, etc.) where they conflict with desired curb ramp locations.

Curb ramps shall be located within curb extensions in accordance with the process outlined in the City of Columbus *ADA Rules & Regulations*.

Non-walkable space within curb extensions may be filled with grass where appropriate based on the surrounding context. This area may also be utilized for other low-height landscaping (less than 24 inches in height) and amenities, however, this will require Department of Public Service approval and a separate maintenance agreement to be executed with the Department of Public Service.

Fixed objects installed within curb extensions shall comply with the operational offset required per ODOT Location & Design Manual Volume Section 600.2.3. Sight distance should be checked following the process outlined in City of Columbus Design Memo 4.11: Sight Distance for Urban Locations. Objects located within a required sight triangle should be no higher than 2.5 feet above the centerline elevation of the adjacent roadways.

4.2 Drainage Considerations

Drainage must be carefully evaluated as part of the design to determine if the curb extension will significantly alter the drainage characteristics of a street. Curb extension designs shall facilitate adequate drainage, either by providing inlets upstream of the curb extension or providing grading that maintains drainage flows along the curb line. A minimum 0.5% slope along the curb and within the sidewalk area shall be provided.

Consideration for drainage along the block length is necessary, particularly for mid-block curb extensions, as curb extensions may create a low point where stormwater is not able to travel around the new gutter line and the installation of new drainage inlets may be necessary. The designer should consider factors such as maintenance in the selection of drainage facilities, as some options may be more prone to clogging and require more routine maintenance to function properly, and the ability of bicyclists or pedestrians to safely traverse the structures or grating.

In addition to creating new low spots along the curb, the existing cross slope of one or both intersecting streets may introduce challenges with curb ramp design and identification of the walkable area within the curb extension. To maintain a full height 6-inch curb at the edge of the curb extension, the portion of the curb extension not within the curb ramp will likely have a reverse slope. Where the curb extension has a reverse slope, the curb ramp slope shall not be less than 2% towards the street. Valleys created from reverse slopes shall be drained back to the curb. If positive surface drainage cannot be achieved, a drainage structure may be considered. A lower curb reveal of no less than 4 inches may be used where necessary to prevent reverse slope or to connect with existing curb.



4.3 Curb Extension Design Details

See **Figure 2** and **Figure 3** for additional design details for curb extensions.

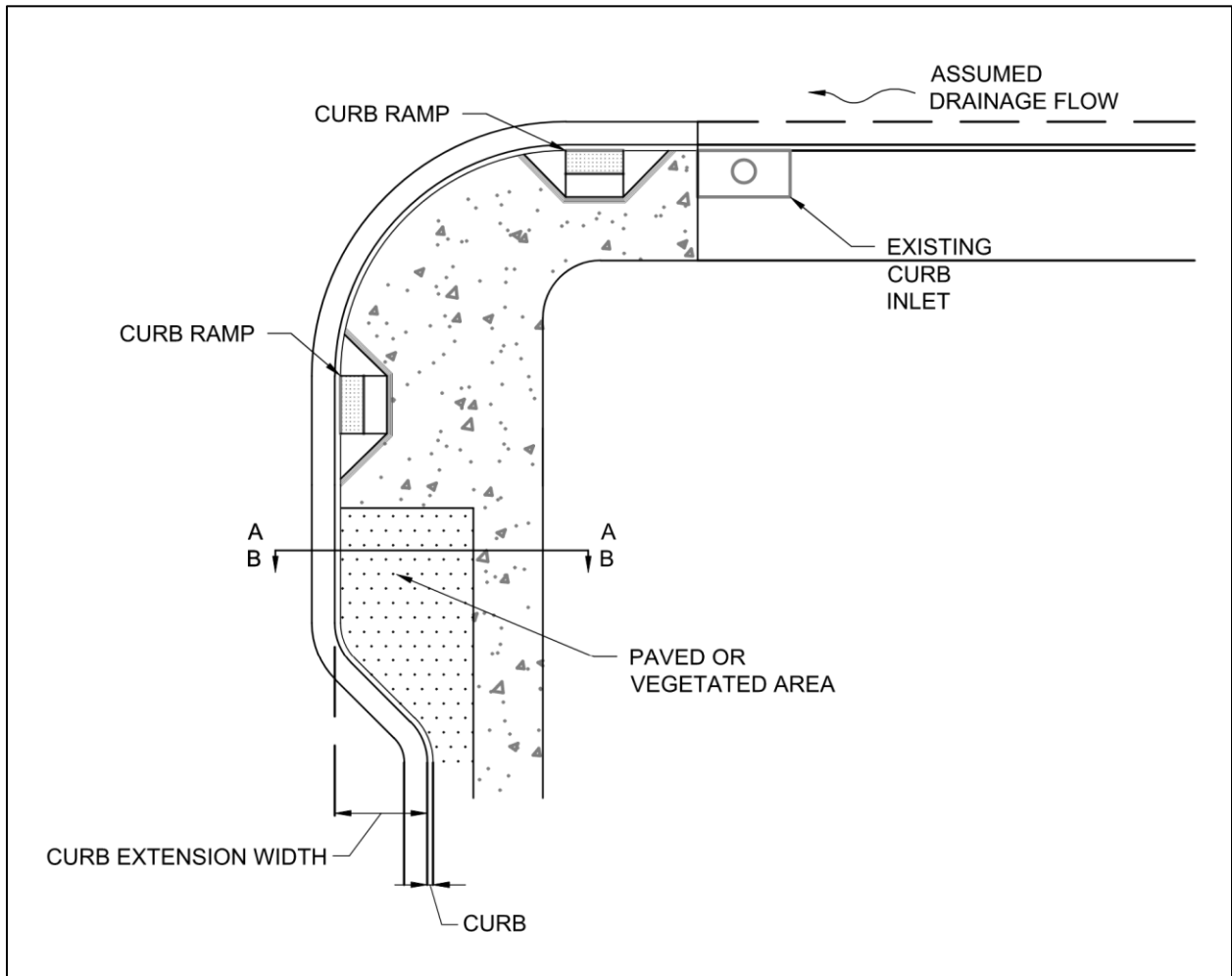


Figure 2: Curb Extension Design Details



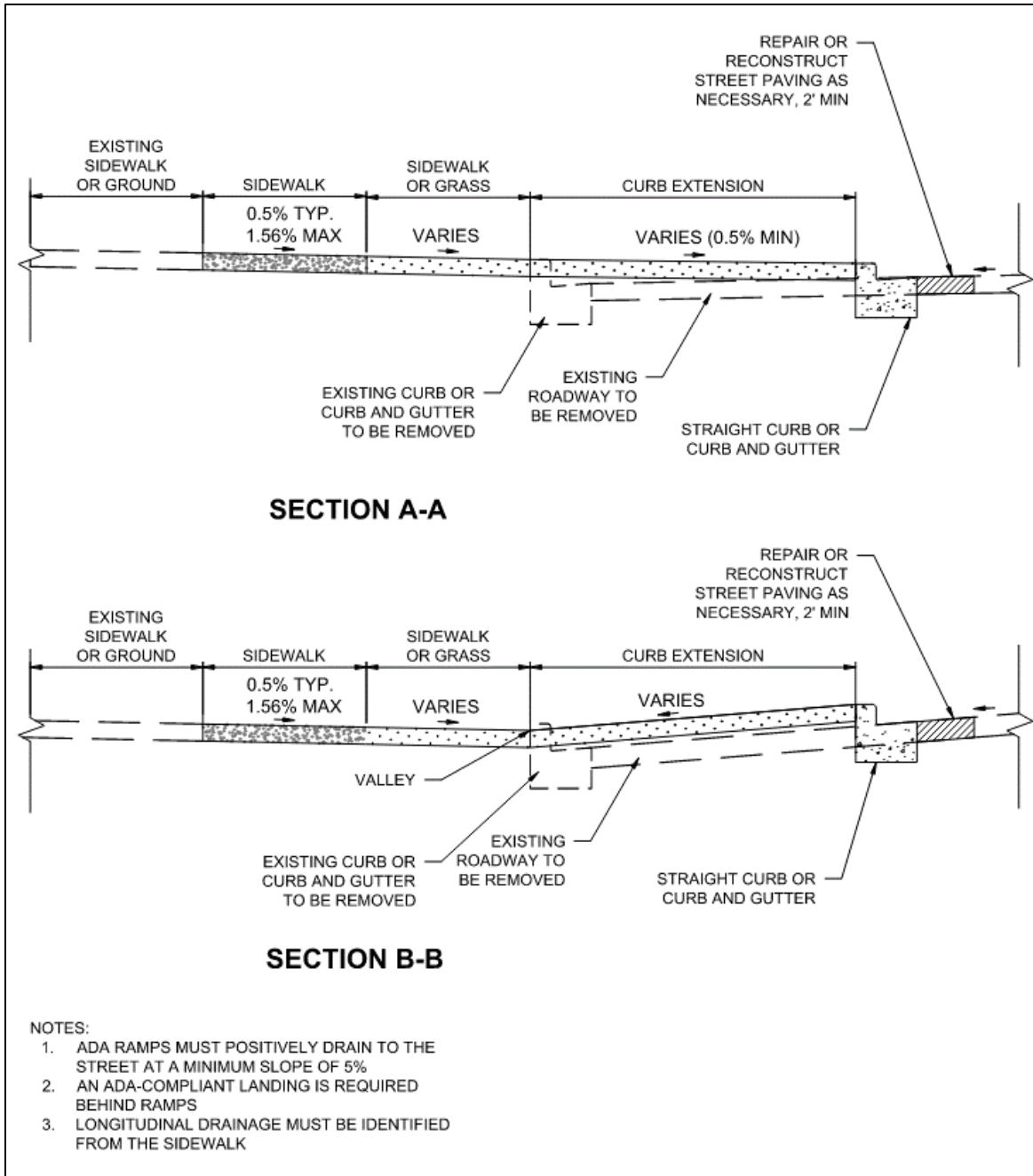


Figure 3: Curb Extension Design Details – Sections



5 Types of Curb Extensions

5.1 Standard Attached Curb Extensions

5.1.1 Intersections

Where full-time curb use such as parking is present on both streets, a curb extension is possible on both intersecting legs. Examples of a curb extension on both intersecting streets are shown in **Figure 4**.

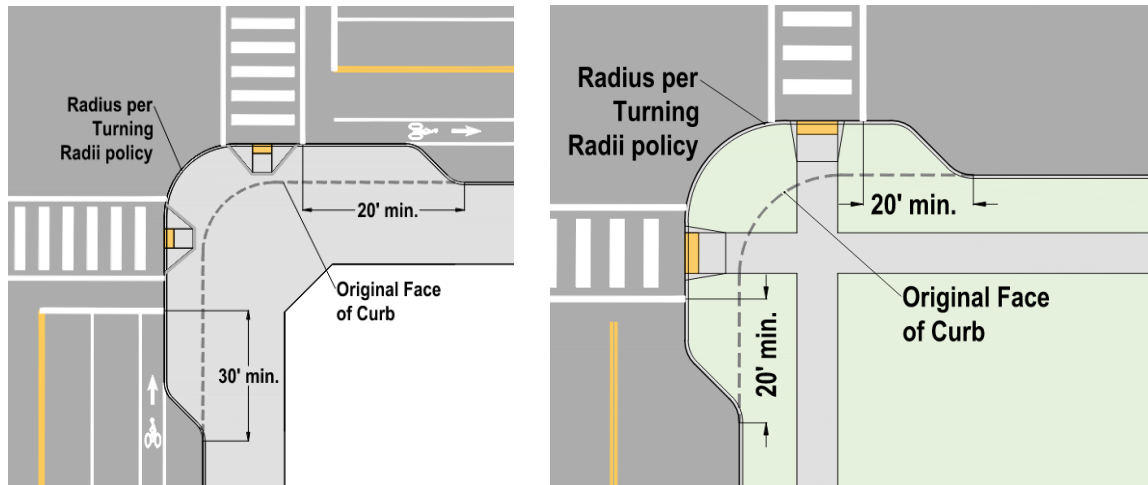


Figure 4: Curb Extension on Both Intersecting Streets

At other intersections, full-time curb use may only be present on one of the two streets. In this case, a curb extension is only possible on the intersecting leg which currently has full-time curb use such as parking. Examples of curb extensions on one intersecting street are shown in **Figure 5**.

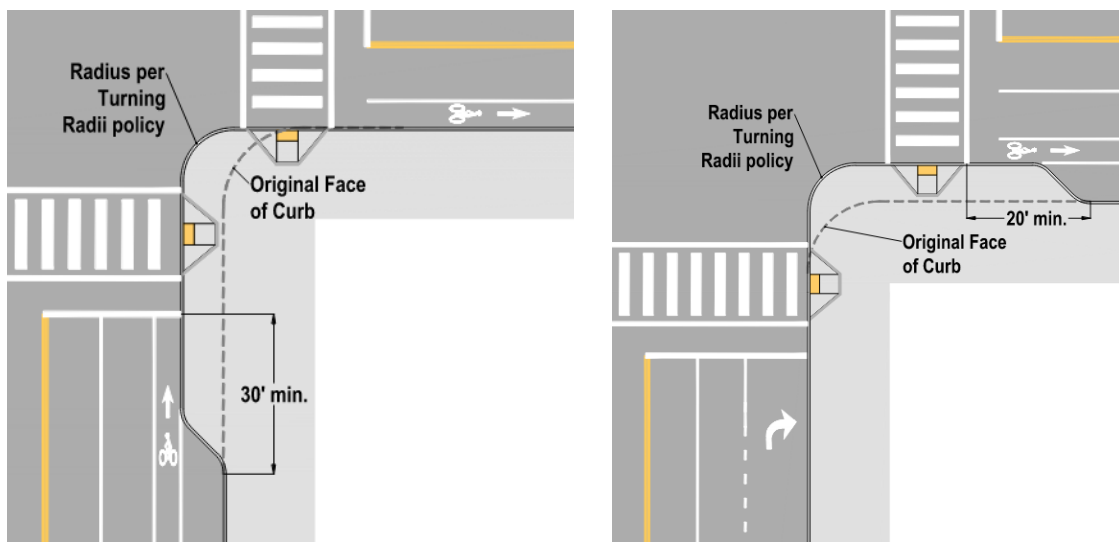


Figure 5: Curb Extension on One Intersecting Street



5.1.2 Mid-Block

A mid-block curb extension requires a full-time curb use to be present. A typical use of mid-block curb extensions is at mid-block crosswalks; however, they can also be used for general traffic calming or to provide space for a particular use (e.g., stormwater management or bus loading). Mid-block curb extensions can be co-located with fire hydrants to maintain access to hydrants and to reduce impacts to on-street parking. An example of a mid-block curb extension is shown in **Figure 6**.

The designer should ensure proper overhead lighting is present at mid-block crosswalks. Refer to the City of Columbus Division of Power *Street Lighting Design Guide* for more information.

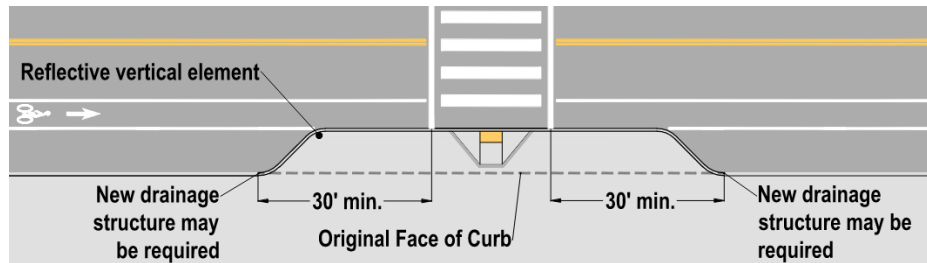


Figure 6: Mid-Block Curb Extension

5.2 Floating Curb Extensions

Floating curb extensions are islands built in the street, disconnected from the adjacent sidewalk, that provide the benefits of traditional curb extensions without impacting existing curb ramps, drainage inlets, or separated bike lanes. Floating curb extensions are also used at protected intersections (see ODOT Multimodal Design Guide Section 6.5.2). Floating curb extensions may only be provided on a project when identified in the scope. The surface treatment within floating curb extensions shall be concrete. See **Figure 7** and **Figure 8** for examples.

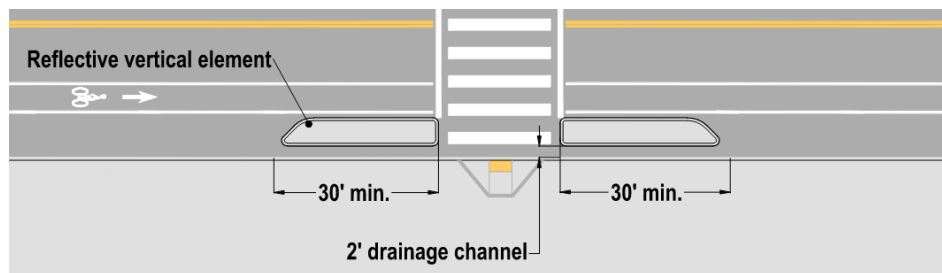


Figure 7: Floating Curb Extension at a Mid-Block Location

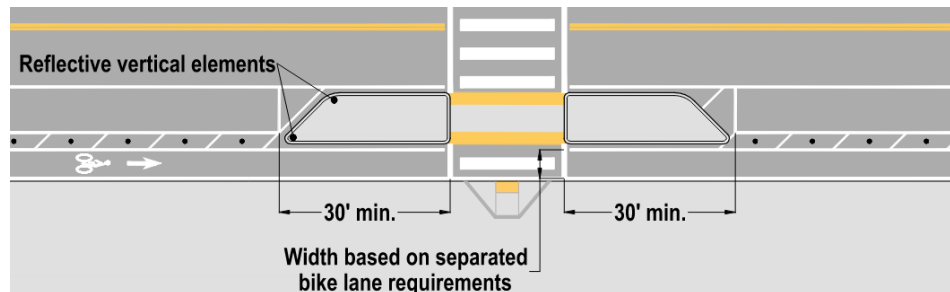


Figure 8: Floating Curb Extension at Mid-Block Location with Separated Bike Lane



5.2.1 *Signalized Intersection Considerations at Floating Curb Extensions*

Pedestrian crossing time will begin and end at the original curb, regardless of whether the floating island is sufficient for storage (6 feet minimum) or not. This will ensure adequate crossing time for all pedestrians, specifically those that are not waiting on the floating island. Pedestrian signals with pedestrian pushbuttons to cross shall remain adjacent to ADA ramps at the original curb, consistent with standard placement in the City of Columbus *ADA Rules and Regulations*. Like pedestrian islands (see City of Columbus Design Memo 6.05: Pedestrian and Median Islands), pedestrian refuge areas within floating curb extensions shall have detectable warnings on both sides of the floating curb extension where the floating curb extension is greater than 6 feet in width; floating curb extensions less than 6 feet in width shall not extend through the crosswalk.

5.2.2 *Drainage Considerations at Floating Curb Extensions*

Floating curb extensions allow for existing drainage infrastructure to remain. The following additional considerations are necessary:

- Where floating curb extensions are used at locations without a separated bike lane, as in **Figure 7**, the width of the drainage channel between the existing curb and the floating curb extension shall be 2 feet.
- The drainage channel between the existing curb and the curb extension shall not be covered unless the channel would need to be traversable, such as at a bus stop.

The drainage channel between the existing curb and the floating curb extension will require maintenance to remove debris which may collect.

5.3 **Interim Curb Extensions**

In some instances, it may be desirable to install a curb extension using temporary materials as an interim measure. This is used to test a design prior to installing with final materials. Interim curb extensions are typically built using paint and crashworthy vertical elements with retroreflective features (e.g., flexible delineator posts, longitudinal channelizers, or plastic bollards) to establish the outside edge and create a sense of enclosure and buffer from motor vehicle traffic. The interior of the curb extension may be painted as well to distinguish that space as different from the adjacent street.

Interim curb extensions have no impact on existing utilities, curb, and curb ramps. They allow for efficient and low-cost implementation and provide an opportunity to evaluate impacts prior to final installation with permanent materials. However, maintenance of the temporary pavement markings and vertical elements that indicate an interim curb extension must be maintained over time to ensure they are recognizable at all hours. Debris which may collect within the extension will need to be removed.

At signalized intersections, the pedestrian pushbutton will continue to be located at the existing curb ramp, and the signal timing for the crossing will need to be calculated from that location.

5.3.1 *Materials for Interim Curb Extensions*

The curb extension shall be outlined with double white edge line pavement markings to delineate the edge of the lane and the “no parking” areas on the approach and departure of the intersection corner.

Crashworthy vertical elements with retroreflective features shall be used along the edge line to reinforce the edge of the curb extension. The vertical elements shall be spaced no greater than 10 feet apart center-on-center within the “no parking areas” on the approach and departure; tighter spacing should be used to establish the new corner radius and the approach taper. A minimum of 3 posts shall be used.



Posts shall not be placed within the crosswalk (whether marked or unmarked) and shall not be placed at bus boarding/alighting locations if the interim curb extension is located at a bus stop.

Where marked crosswalks are present, the crosswalk markings shall extend through the curb extension to the curb ramp. The double edge lines shall not continue through the marked crosswalk.

The area within the curb extension may be painted a solid, distinct color to differentiate it from the adjacent street. The color of these markings shall be distinct from the adjacent street, using a color that is not associated with standard traffic control (e.g., yellow, white).

