



BULB-OUTS

Bulb-outs, also known as curb extensions or bump-outs, visually and physically narrow the street by extending the sidewalk, reducing pedestrian crossing distance, and increasing pedestrian visibility and line of sight. At signalized locations, reduced crossing distances enables shorter walk phases and greater flexibility in signal timing. At intersections, the narrower street profile, coupled with the tighter turn radii, can encourage slower driving, calm traffic, and increase safety for everyone.

- **Corner Extensions:** The most common type of bulb-out, these are located at intersections and typically wrap around the corner, extending the curb into both intersecting streets.
- **Midblock Extensions:** Also known as pinch points or chokers, midblock extensions are installed along a block face. Midblock extensions can be used to narrow a street for traffic calming, additional sidewalk space, or in conjunction with a midblock pedestrian crossing. Midblock extensions also provide space for street trees.
- **Transit Extensions:** Also known as bus bulbs, these extend the sidewalk to enable buses to board and alight passengers. Transit extensions provide critical space to install transit stop amenities and helps modestly decrease transit travel time. They can occur at far, near, or midblock locations. When used on high priority bicycle lanes, the bicycle lanes should wrap behind the transit shelter.

USE

- Bulb-outs are appropriate on all streets, but especially encouraged on higher volume streets such as Urban Center, Network Residential, Neighborhood Commercial, and Crosstown Connector.
- Bulb-outs on streets that accommodate transit vehicles will need to carefully consider the turning radii of those vehicles. Regardless of street type, bulb-outs shall only be used where a curb lane is present and used for parking or loading, not travel.
- Bulb-outs are particularly beneficial in commercial frontage contexts where pedestrian volumes are high and activity concentrated, where traffic calming is desired, on very wide streets, and/or where sidewalks are narrow.

DESIGN

- Bus-bulbs may be used at near-side, far-side or midblock locations, though far-side and midblock locations are preferred.
- Bulb-outs shall not narrow any bicycle or general traffic lanes to an unsafe width. The width of extensions shall preserve one to two feet of shy distance between the curb face and the first travel lane or bicycle lane. When applied to streets with on-street parking, bulb-outs are typically six to seven feet wide; alternatively, bulb-outs can shadow the length of the parking stall if parking is on the diagonal.

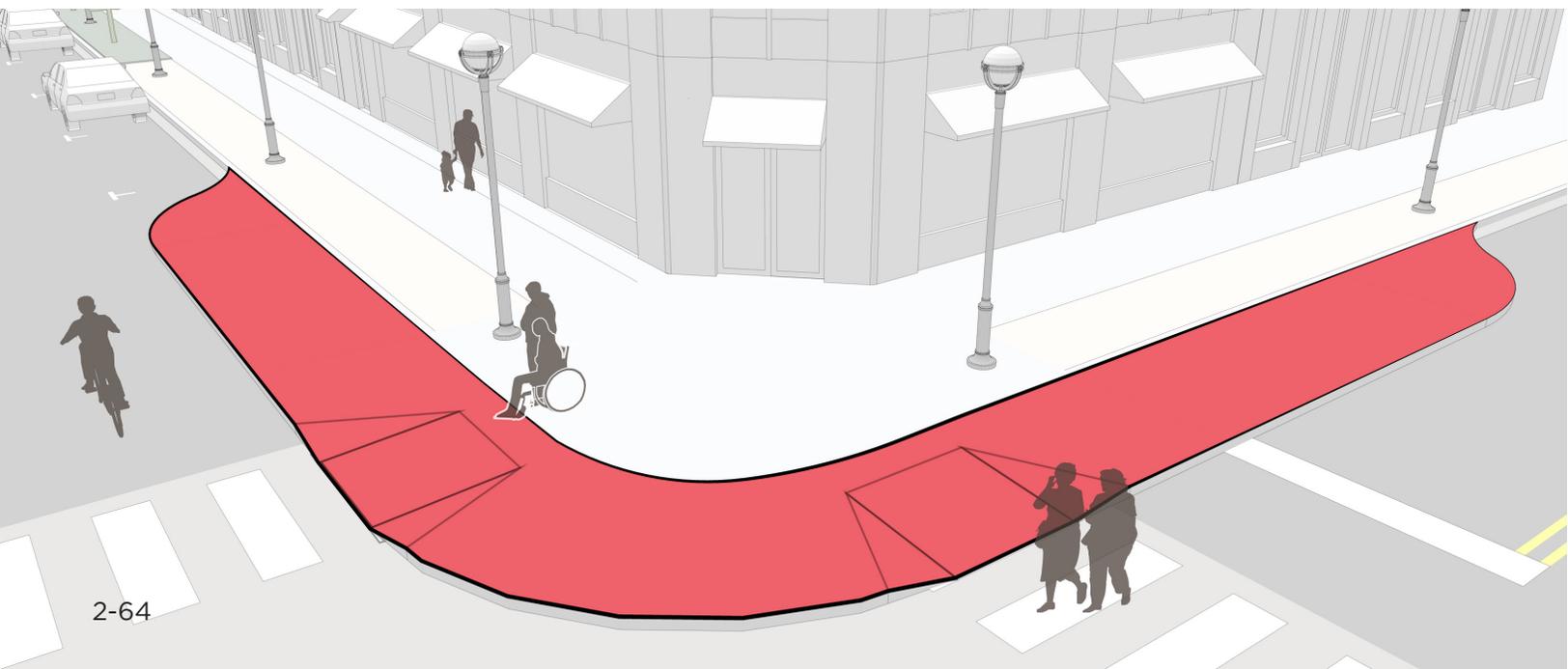
- Corner or midblock extensions with crosswalks shall be at least as wide as the crosswalk, and ideally extend to the stop bar. The curve of the extension must fit outside of any crosswalks.
- Bulb-outs are intended to narrow pedestrian crossing distance and slow traffic speeds. To accomplish this, maintain tight turning radii no greater than 20 feet. The effective turning radius may be wider.
- At corners with turn restrictions, use the turning radius of the extension to make the turn more difficult, ensuring that transit vehicles or through-traffic are not delayed by motorists turning. Where vehicles may be expected to mount the curb during turning, a thicker concrete section should be used to ensure durability.
- Bulb-outs shall have a 45-degree return to the street.
- Fire hydrants should be located in bulb-outs, if present.
- Combine bulb-outs with stormwater management features, such as rain gardens, trees, landscaping, or bioswales, to absorb and collect rainwater and reduce impervious surface area. However, green infrastructure in curb extensions should not create safety hazards for pedestrians.
- Bulb-outs with green infrastructure should not be located on streets with more than 5% slope.

OPERATIONS AND MAINTENANCE

- Bulb-outs can be a temporary installation, using low-cost materials such as paint, bollards, and planters. This may be useful for a location where a more expensive installation may not be warranted, or as a trial for a permanent solution. Temporary extensions, defined by rubber curbing, flexible posts, or similar, should be removed in winter months to facilitate snow removal.
- All green infrastructure applications in bulb-outs should have well developed and committed maintenance plans prior to installation.
- Bulb-outs may make snow removal and/or street sweeping more complicated, though special equipment should not be necessary if they are designed with return radii adequate to accommodate snow removal and sweeping vehicles.

SPECIAL CONSIDERATIONS

- Any street furniture or landscaping in a bulb-out shall maintain clear pedestrian accessible routes and access to ramps. Any objects located in the extension such as furnishings or landscaping, must not interfere with corner sight triangles.
- Bulb-outs are an effective way to restrict parking near intersections and maintain or increase visibility at corners. Consider making the extension at least 20 feet long, to prevent motorists from parking within 20 feet of an intersection. However, if trees are planted in a bulb-out, ensure that sight distances are not impacted at intersections.



- Bulb-outs may be ideal locations for bicycle parking. Ensure parked bicycles do not obstruct pedestrian paths nor block the sight triangle at corners.
- Bulb-outs may have an impact on business loading, delivery access, garbage removal, and street sweeping. If well-managed and designed, they can serve as a location to consolidate business waste for removal where alleys do not exist.
- Bulb-outs may limit the ability to change the street design in the future, such as the location of bus zones, lane layout, and crosswalks. They may also make the street less flexible for construction routing.
- The design of bulb-outs must be cognizant of stormwater drainage and avoid ponding of water at the curb. Where bulb-outs conflict with stormwater facilities, the stormwater facilities must be relocated, additional inlets provided to enable proper drainage, or replaced with green infrastructure where soil conditions allow.
- Bulb-outs may require relocating utilities. They may also require moving a fire hydrant closer to the extended curb to ensure emergency vehicle access, which may increase cost. Alternatively, bulb-outs help enforce parking restrictions, making hydrants more readily available.
- Curb painting is not necessary, but subject markers or proper signage should be installed.

REFERENCES

- City of Grand Rapids Standard Construction Specifications, 1993 Edition
 - Standard Details P-5 Curb and Separate Gutter, Roll Curb and Gutter and Combined Curb and Gutter Details
- City of Grand Rapids Street Classification Policy, 1996
 - Section 9. Bus Movement
 - Section 10. Streetscape
- City of Grand Rapids Downtown Alliance Streetscape Design Guidelines
 - Corner Bump-out with Transit Stop Option
- NACTO: Urban Street Design Guide, 2013
 - Street Design Elements: Bulb-outs <http://nacto.org/publication/urban-street-design-guide/street-design-elements/curb-extensions/>
- AASHTO: Guide for the Planning, Design, and Operation of Pedestrian Facilities, 2004
 - Section 2.6.2: Traffic-Calming Methods
 - Section 3.3.1: Curb Radii
 - Section 3.3.2: Crossing Distance Considerations
 - Section 3.3.3: Turning Movements
- AASHTO: Guide for the Development of Bicycle Facilities, 2012
 - Section 4.12.6: Bicycles and Traffic Calming
- AASHTO: A Policy on Geometric Design of Highways and Streets (Green Book), 2011
- ITE Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, 2010
 - Chapter 10. Intersection Design Guidelines: Bulb-outs <http://library.ite.org/pub/e1cff43c-2354-d714-51d9-d82b39d4dbad>

DETAILS

- City of Grand Rapids Standard Construction Specifications, 1993 Edition
 - Standard Details P-5 Curb and Separate Gutter, Roll Curb and Gutter and Combined Curb and Gutter Details