

CURB EXTENSIONS

Background

Curb extensions or “bump-outs” are geometric street design features under the responsibility and jurisdiction of the municipality who owns and maintains the curbing and pavement. The following are guidelines for the installation of bump-outs within the City of Rochester based on input from both City and County staff. Implementation of these guidelines is at the discretion of the City of Rochester and should be guided by engineering judgment.

The intent of using bump-outs is:

- Establish the transition to a curb line that delineates narrower travel lanes
- Improve safety for pedestrians through a reduced crossing distance
- Provide positive parking control so that reasonable sight distance is maintained

Because the bump-outs recess parked vehicles, there may be opportunities for creating parking while providing a raised physical feature that prevents illegal parking too close to the intersection.

Some disadvantages of using bump-outs are:

- Can be an impediment to snow plowing and street sweeping
- They are fixed objects that can be struck by passing or turning vehicles
- They can restrict enough on-street parking to generate resistance from business people

While we recognize the need to create as much parking as possible in urbanized areas, there should still be enough parking clearance at unsignalized intersections to at least provide enough sight distance that allows the primary street traffic to stop in time to avoid an accident. Minimum stopping sight distance should also be provided at signalized intersections to accommodate the right turn on red movement.

Methodology

Bump-outs should be designed and constructed to restrict parking so as to provide minimum sight distance to the intersection for a motorist approaching on the major street so that the motorist can come to stop before a collision occurs. The stopping sight distance recommended is 200 feet for an approach speed of 30 MPH, which is the City speed limit. Although some roads have 85th percentile speeds that may exceed 30 MPH, experience has found that designing bumpouts for speeds faster than 30 MPH would create recommended lengths that are not practical given the urban character of the area.

The methodology is based on the AASHTO publication A Policy on Geometric Design of Highways and Streets (or “Green Book”), the standard for stopping sight distance. The desired bump-out length is defined as from the side street curb extension to the closest bumper of the first parked car. A bump-out of compliant length will establish a reciprocal sightline across the corner between the approaching motorist on the major street (200 feet away from the intersection) and the motorist stopped on the side street. The side street motorist is assumed to have their front bumper

even with the curb line extension, which places the driver eight (8) feet back (the distance between the front bumper and the driver's seat for a sedan assumed for design in the Green Book). Under highly urbanized conditions, a driver sitting much further than eight feet back would probably not be able to see along the major street due to fixed obstructions on the corners and would advance as far forward as possible without entering the intersection. The driver is also assumed to be positioned three (3) feet to the right of the side street's centerline. Figure 9 on the next page illustrates the methodology described above.

Application

Marked crosswalks and potential pedestrian crossings (based on pedestrian traffic patterns) are the most common application of bump-outs. They narrow the pavement width that needs to be crossed and restrict parking where it can limit sight distance. Bump-outs can also be effective where positive parking control is needed for business development and/or safety reasons.

Bump-outs should be designed with the overall road geometry in mind. Isolated bump-outs may be unexpected by motorists and can be hit. Ideally, the travel lane should be transitioned away from the bump-out through a shift in the curb line that guides motorists into the intended path of travel. If tapered curbing is not feasible, then an edge line could be striped to visually shift the lane over. Delineation by object markers and/or safe hits should also be considered in the design.

Recommendations

Table II specifies the recommended bump-out length for various combinations of intersection skew, bump-out width, and travel lane width. It lists the total parking clearance needed to achieve the desired reciprocal sightline at an unsignalized intersection for a 30 MPH approach speed and with some general geometric parameters. This parking clearance can either be achieved by constructing the bump-out to this length, or by adding enough parking clearance to the bump-out's length to achieve this distance. A full length bump-out is preferable because parking enforcement is not needed to maintain the parking clearance.

However, the recommended bump-out lengths often reduce available on-street parking, which can be a disadvantage in areas where on-street parking is in demand. Therefore, the safety record in the area where bump-outs are proposed needs to be considered. If the location has significant existing accident patterns that could be corrected by installing bump-outs, then the guidelines in Table II should be followed. If the safety history is good (i.e. – no accident patterns related to sight distance), and an on-street parking demand exists, clearance lengths less than those specified in the table may be considered to accommodate more parking. However, any such variance from the guidelines should be justified and clearly documented in writing by the designer. If safety problems develop after construction of the shorter bump-outs, countermeasures (such as additional parking restrictions) may need to be implemented.

Figure 9

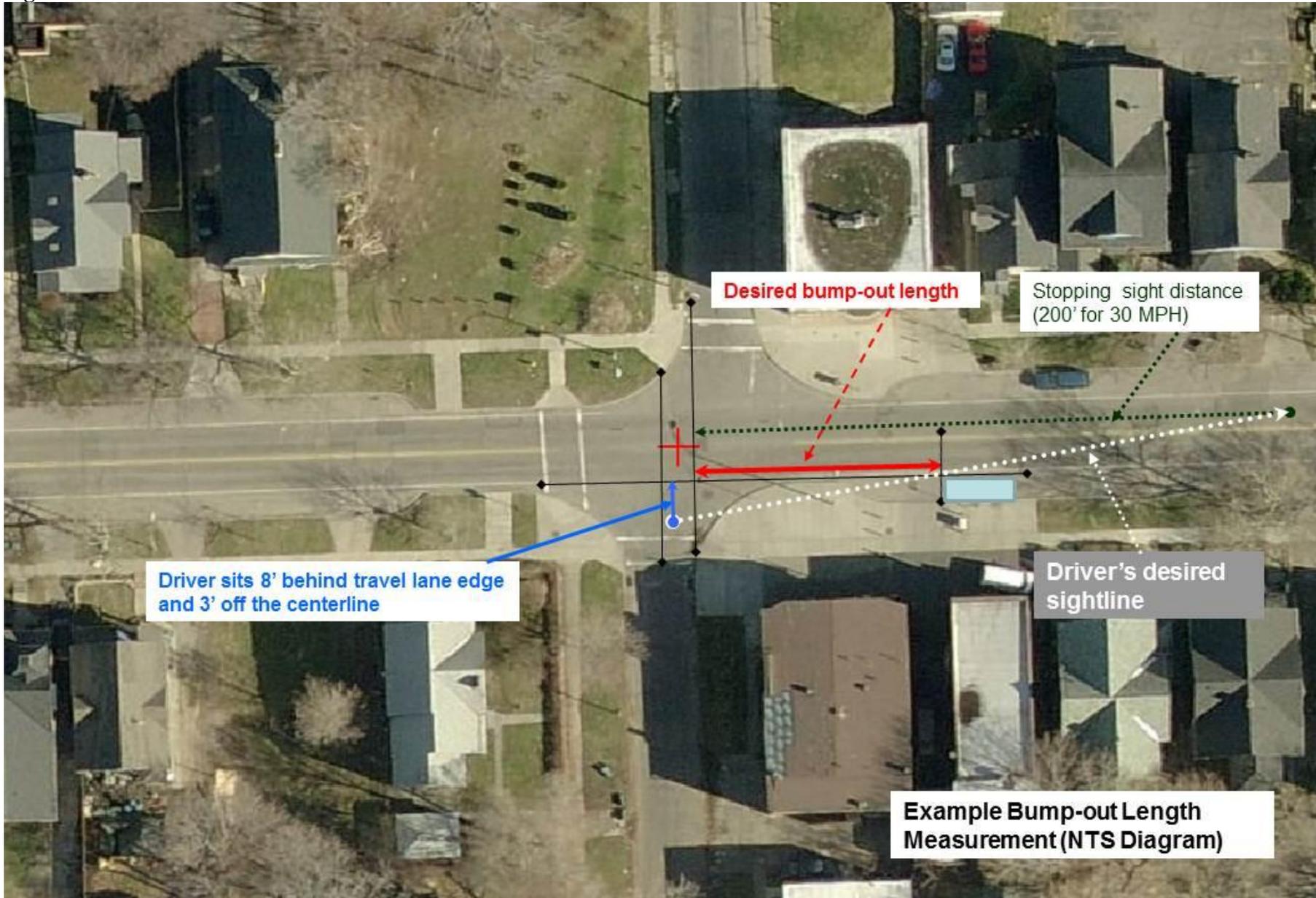


Table II

Parking Corner Clearance Required To Achieve Minimum Stopping Sight Distance

Speed	Bump-out Width	Lane Width	¹ Skew Right 25°		No Skew		² Skew Left 25°	
			Looking Left	Looking Right	Looking Left	Looking Right	Looking Left	Looking Right
30 MPH	6 Foot	11 ft	80 ft	70 ft	90 ft	75 ft	100 ft	75 ft
		13	65	65	80	70	85	70
		15	60	60	70	65	75	65
	8 Foot	11	70	60	85	70	85	65
		13	60	55	75	60	75	60
		15	50	50	65	55	70	55

For notes 1 and 2, see the diagrams below

¹ Inbound side street approach skewed to the right



² Inbound side street approach skewed to the left



While the values in Table II can be used as a general guide, Figure 9 illustrates a general procedure to determine the required clearance for any unsignalized intersection configuration. For right turns on red at signalized intersections, drivers tend to start their right turn before stopping and their position would vary with the intersection corner geometrics.