

WRTA

Worcester Regional Transit Authority

Bus Stop Design Guide

October 2026

NELSON NYGAARD

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Glossary

Alight: To exit or get off of a transit vehicle.

The Americans with Disabilities Act of 1990 (ADA): The Americans with Disabilities Act (ADA) is one of America's most comprehensive pieces of civil rights legislation that prohibits discrimination and guarantees that people with disabilities have the same opportunities as everyone else.

Board: To enter or get onto a transit vehicle.

Bus Pad: Concrete pads installed in-street at a bus stop to mitigate the wear and warping of regular asphalt caused by heavy vehicle use at bus stops.

Bus Stop: A fixed location where a bus can stop to serve riders.

Curb Extension/Bulb Out: An extension of the sidewalk into a parking lane to create an in-lane bus stop on a road with on-street parking or a shoulder.

Dwell Zone: The space needed for a transit vehicle to stop at the curb, or edge of roadway, and serve the stop.

Far-Side: Bus stop located just after an intersection.

Landing Area: Location at the front of a bus stop, directly adjacent to the bus stop sign, where riders get on and off the bus and where bus operators deploy the mechanical access ramp.

Merge Zone: The merge zone is the space needed to maneuver into and out of a bus stop (when the bus stop is not in the travel lane).

Mid-Block: Bus stop not located at an intersection.

Near-Side: Bus stop located just before an intersection.

Path of Travel: A continuous and clear path that connects the bus stop to destinations.

Public Right-of-Way Accessibility Guidelines (PROWAG): Recommended guidelines for designing and constructing facilities within the public rights of way, originally developed in 2011, as a best practice for accessibility issues in the public right of way not covered by the ADA at the time. Effective January 17, 2025, these guidelines are requirements for all new construction or altered transit stops, enforceable under Title II of the ADA.

Pull Out Bus Stop: A bay where a bus can pull out of the roadway to serve a stop.

Rear Door Clear Zone: The space located where the back doors of the bus open onto the sidewalk. Clear zones for the rear door of the bus are critical for rear door customer activity to occur safely.

Introduction

Bus stops are the gateway into transit systems. When bus stops are thoughtfully designed to prioritize the safety, comfort, and accessibility of riders, individuals using the bus system enjoy enhanced mobility and increased access to destinations across the region.

A well-designed, safe, comfortable, and accessible bus stop significantly contributes to an improved overall bus riding experience, as well as a safer environment for pedestrians, cyclists, drivers, and bus operators. This document provides guidance for bus stops served by the Worcester Regional Transit Authority (WRTA).

Purpose

The purpose of this guide is to provide direction on creating a network of bus stops that improve the customer experience and bus operations. With the exception of federal and state accessibility requirements cited in this document, the guide provides recommendations and direction, rather than strict standards. They are intended to be flexible, if need be, to the different situations of each bus stop.

Using this Guide

The guide should be used as a tool by people involved in bus stop planning and design – planners, engineers, landscape architects, and others, representing WRTA, municipalities, state and regional agencies, consultants, and developers – to build a network of safe and accessible bus stops that not only improve the customer experience, but also benefit bus operations by reducing dwell times and travel times and ensuring safe operating conditions. While the design guide has a technical audience, anyone who is interested in the details of bus stop design will find this guide informative.

WRTA operates in a variety of roadway environments ranging from urban to rural, and entirely on roads that are not owned or maintained by the agency. The existence and conditions of sidewalks and pedestrian crossings vary along these roads, and land use decisions are controlled by municipalities. Thus, this design guide was developed, and should be followed, with an understanding of WRTA's limited authority over its operating environment.

The WRTA Bus Stop Design Guide is organized into the following chapters:

- **Chapter 1: Design Principles.** What are the guiding principles for locating and designing bus stops?
- **Chapter 2: Bus Stop Location and Configuration.** Where are bus stops located? How can bus stops be configured in different roadway environments?
- **Chapter 3: Accessibility and Connectivity.** What requirements must be met or exceeded for a bus stop to be accessible?
- **Chapter 4: Roadway Context.** What roadway design elements can enhance bus stop visibility? How does the bus stop interact with and support facilities for cycling and transit priority?
- **Chapter 5: Amenities.** What amenities can be found at bus stops? How should they be placed?
- **Chapter 6: Bus Stop Typology and Standards.** What are the different types of bus stops in the system? How do they differ in terms of their minimum, preferred, and optional amenities?
- **Chapter 7: Implementation.** How do bus stop investments get prioritized? Who is responsible for adding/removing or improving bus stops? Who installs and maintains amenities?

1. Design Principles

A high-quality bus stop is one that is well connected to the neighborhood or community it serves, accommodates the needs of all transit riders freely and comfortably, increases the safety of those waiting for the bus, and enables efficient operations.

Bus stop design should be guided by the following principles:

Locate Stops in Convenient and Comfortable Locations

Stops and stations should be located in places that are convenient to where people are traveling to and from, including near where housing or jobs are concentrated and key destinations such as social services or shopping.

Locate Stops in Safe Locations

Stops and stations should be located where customers feel comfortable, which is a location with enough people, activity and/or lights to not feel isolated. In addition, the location of the stop itself should be well lit and should provide adequate space for waiting riders to sit or stand, with considerations for other people using the street or sidewalk.

Make Stops Visible and Easily Identifiable

Stops and stations should consistently be located in easily identifiable places, so they can be found without difficulty by riders and bus drivers alike. Stops should follow WRTA branding guidelines so that they are a recognizable component of the transit infrastructure.

Make the Wait Comfortable

Providing amenities, such as benches, shelters, etc. at stops makes it more comfortable for riders to wait for the bus. While it is not practical nor cost effective to provide all amenities at all stops, more extensive amenities should be provided where area and stop characteristics warrant the investment.

Provide Information on Available Services

Bus stops should make it intuitive for riders to know when and where they're traveling. Bus stop signs should provide basic service information such as stop ID, route number, and route name. Higher volume stops should have schedule and route information at the stop.

Integrate Stops into Street Design Processes

In the development of other roadway enhancement projects, including new private development, roadway restriping and redevelopment projects, and projects developed through the MPO process, bus infrastructure should be included as part of the overall project, rather than placed as an afterthought. Similarly, when roads and/or sidewalks are reconstructed, stops should be developed as part of the overall design and brought to current stop or station amenity level standards.

Provide Good Pedestrian and Bicycle Access to Stops

Bus stops should be located at sites that provide safe, ADA-accessible pedestrian access to the surrounding area, especially to the other side of the street. This should include well-defined and contiguous pathways to and from the stop, as well as crosswalks. As pedestrian and bicycle infrastructure develops, the responsible agencies will need to encourage pedestrian pathways, especially pathways to/from high volume bus stops.

2. Bus Stop Location and Configuration

Appropriate bus stop locations are determined by a variety of factors, including surrounding land use and pedestrian networks, operational and safety considerations, and intersection and curbside conditions. All of these elements inform both the siting and the configuration of bus stops.

This chapter includes guidance on how to locate bus stops along the roadway to improve bus efficiency, rider accessibility, and pedestrian safety, under the following key considerations:

- Bus Stop Spacing
- Context and Environment
- Operations and Safety
- Placement at Intersection
- Curbside Interaction
- Bus Stop Length and Configuration

Bus Stop Spacing

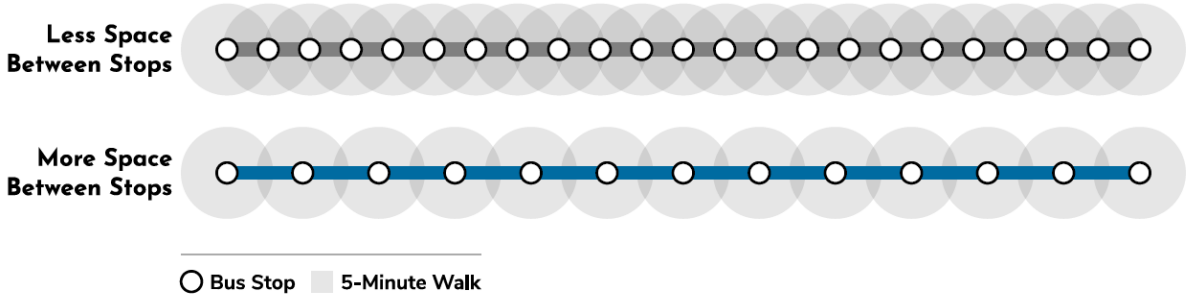
The distance between bus stops significantly impacts travel times for buses. It can also both positively and negatively impact the experience of riders and their willingness to use transit. Bus service runs more efficiently when stops are optimally spaced, balancing the need for rider access with service performance. Stops placed closer together can provide riders with shorter walk times, but lead to slower, less reliable travel times once on board the bus:

- **Speed:** On average, it takes a bus up to 20 seconds to slow down, stop and pick up a passenger, and accelerate back up to speed. Each additional stop requires the bus to slow down, come to a complete stop and load and unload riders before speeding up and re-merging into traffic
- **Reliability:** The number of stops along a route can affect how easily a bus can run as scheduled, affecting reliability for riders. When there are more stops close together, it is harder to predict how many times the bus will need to stop from trip to trip (and whether a trip might take longer or shorter than scheduled). When there are fewer stops, the bus is

more likely to consistently stop at each stop on each trip, making it easier to schedule service and to stick to that schedule.

Most riders want transit service that balances convenience and speed, and the number and location of stops is a key component of determining that balance. Providing fewer, safer, and more accessible stops enhances rider experience over more stops that are less accessible.

Figure 1: Bus Stop Spacing and Access to Bus Stops

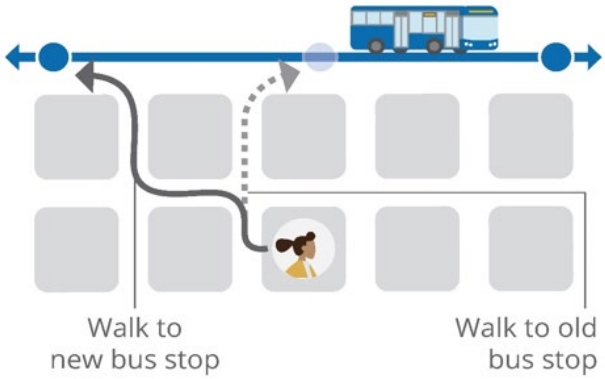


The recommended bus stop spacing for WRTA service is 4 stops per mile (about 1,300 feet) in higher-density areas and 5 stops per mile (about 1,000 feet) in lower-density areas. Urban areas have better pedestrian environments and higher intersection density, so the bus stops can be spaced farther from each other compared to less dense areas. This distance can typically be covered in a 5- to 10-minute walk, meaning most locations along a bus route would be no more than a 5-minute walk between bus stops. As shown in Figure 3, rebalancing closely spaced bus stops maintains walkability to bus stops even if one is removed.

Figure 2: Stop Spacing Thresholds

Population Density	Maximum Spacing
High	1,320 feet (4 stops per mile)
Low	1,056 feet (5 stops per mile)

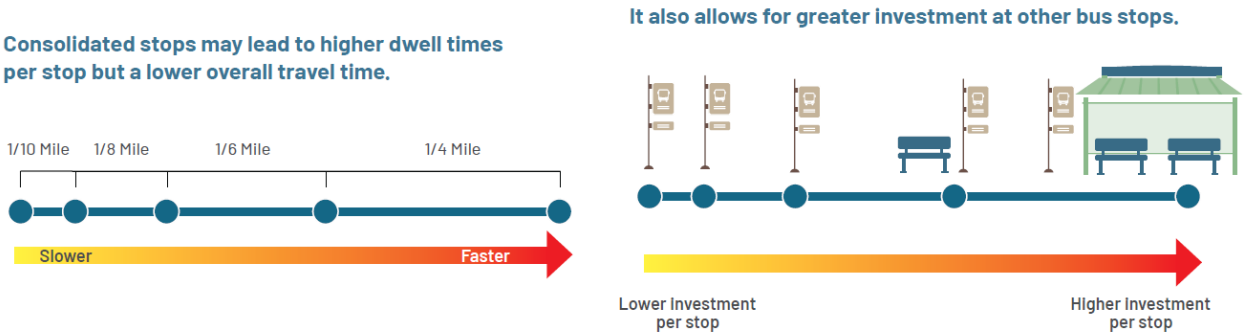
Figure 3: Change in Bus Stop Access with Optimized Bus Stop Spacing



Bus stop spacing of 4 stops per mile will help create optimal conditions for customers, WRTA operators, and others traveling along bus corridors by:

- Reducing conflicts between buses, other vehicles, and cyclists by minimizing the number of times buses need to pull over to access the curb.
- Minimizing curbside space needed for bus stops, which may provide more space for parking along a corridor.
- Maximizing the efficiency of bus service by reducing the number of times the bus stops along a route.
- Enabling upgrades to and maintenance of a greater proportion of bus stops, and/or higher investment in other bus stops.

Figure 4: Bus Stop Spacing, Improved Travel Time, and Bus Stop Investments



Context and Environment

The environmental context of an area impacts bus stop placement. Environmental factors, such as surrounding land use, street network, and the infrastructure conditions surrounding a bus stop are often important considerations for placement and design of bus stops.

Existing and Future Land Uses

Placing bus stops near activity centers, such as shopping areas, civic buildings, schools, medical centers, or multi-unit residential complexes attracts ridership by enhancing the convenience of transit service.

In areas where there are several activity centers in close proximity, such as a block with several popular shopping destinations, bus stop placement will depend more on bus stop spacing and other factors. However, for major standalone activity generators (industrial areas, the airport, malls, hospitals, etc.), the stop should be located close to the entrance of the destination.

Pedestrian Environment

Connections and Condition: Sidewalks should be present at the stop and connected to the bus stop zone as well as to the surrounding area. Bus stops should be established or relocated to better, more level sidewalk surfaces, away from pinch points, and/or to wider sidewalk areas.

Crossings: Bus stops should connect to a marked pedestrian crossing, preferably a crosswalk behind the stop, so that riders are encouraged to safely cross behind the bus instead of in front of it. Ideally crossings should be signalized, especially in high traffic volume and higher speed areas. Intersections and at-grade driveway crossings should have existing or the potential to add ADA-compliant curb ramps. This is particularly important to ensure that riders can reach both stops of a stop pair, since nearly all riders will need to make a round trip using a pair of bus stops.

Placement of sidewalks and other roadway infrastructure is largely outside the control of WRTA. Local planning decisions about bus infrastructure are made dependent ROW ownership, resulting in multiple processes and partnerships to ensure roadway enhancements include public transit investments.

Demographics and Ridership

Existing and projected stop boardings and alightings at a stop should be considered, as well as the ridership profile at the stop (e.g., older adults, people with disabilities). Low-ridership stops, and specifically low-ridership stops in close proximity to higher-ridership stops, may be considered for consolidation or removal. The threshold for a low-ridership stop will be determined when it is compared to ridership at other stops along the same or a similar bus route, and the frequency of service provided at the stop.

Existing Service and Connections

Bus Stop Pairs: Riders need to be able to make a round trip using transit. Where possible, a bus stop should be paired with the companion stop serving in the opposite direction located nearby to make taking a round trip convenient and intuitive. This makes it simpler for riders to navigate the transit system and provides a similar level of access to a location when making a round trip.

Transfer Activity: Bus stops in areas with high transfer activity should be as close to each other as possible to facilitate quick and easy transfers between routes. Consideration should be given to maintaining or improving bus stops where transfers between two or more routes are most likely to occur.

Operations and Safety

Sight Distance

Sight distance is the length of roadway visible to a driver. Consider sight distance for transit riders, bus operators, and other drivers. Avoid obstructions to sightlines between bus operators and transit riders such as trees, signs, buildings, shelters, and topography.

For optimal sight distance between bus operators and other drivers, bus stops should not be located over the crest of a hill, immediately in or after curve in the roadway to the right, or at locations that might prevent visible connectivity between buses and other vehicles. Following vehicles need to have good visibility of stopped buses, particularly when bus stops are located in the travel lane, as well as buses decelerating when entering a stop and accelerating when exiting a stop. Similarly, bus drivers need to be able to see vehicles approaching from behind when exiting a stop.

Worcester presents unique operational challenges relative to sight distance due to several unique characteristics of the city. Due to the seven hills throughout the city, WRTA operators pay attention to roadway conditions, including blind spots and the cresting of hills. In addition, Worcester is a New England mill town developed primarily before the advent of passenger cars. This development pattern created roadways that are generally narrower than newer, more car-centric cities. Worcester's road network also developed without a grid pattern, causing many intersections to have complicated operating patterns.

The following table shows the recommended sight distance for bus stops, given the posted speed limit. This allows drivers to see and anticipate a stopped bus and potential pedestrian crossings.

Figure 5: Sight Distance for Siting Bus Stops

Speed Limit (Miles per Hour)	Sight Distance (Feet)
15	200
20	265
25	335
30	400
35	465
40	530
45	600
50	665

Calculations are based on time gaps provided in the AASHTO 2016, adjusted for right turn movements that AASHTO 2011 considers to be equivalent to pulling into traffic from a bus stop, and intersection sight distance also provided in AASHTO 2011.

Intersection Operations

The bus stop location should account for high-turning volumes, bus turning movements, bike lanes, three- or five-leg intersections, and other unique conditions like turn restrictions. Bus stop siting should reduce potential conflicts with vehicles, pedestrians, and bicyclists as much as possible. While bus stops can provide some traffic calming properties, placement should reduce conflict to allow for all roadway users to traverse the area safely. The WRTA and partner agencies should avoid siting stops in rotaries because the curved roadway geometry doesn't allow for safe and accessible boarding and alighting.

Bus Turning Movements

Stop locations should also ensure bus stops are long enough to accommodate the turning radius of buses, to allow buses to pull parallel to and within 12 inches of the curb, and to minimize friction with other vehicles. Avoid near-side bus stops before left turns unless there is only one travel lane. If a bus is turning right after a near-side bus stop, NACTO guidance specifies there should be a 20-foot to 30-foot curb radius to accommodate buses turning;[1] stop bars may need to be moved back.

Bus Priority

Bus stop placement may affect whether and what types of transit priority the WRTA and partner agencies can implement. Transit signal priority is most compatible with far-side stops because it can extend the green or change the signal cycle to give the bus a green light at the intersection. If a stop is near-side, the bus may not be able to take advantage of these technology upgrades. Far-side stops also help maximize rider benefits for bus stop improvements like bus bulbs and floating bus stops, ensuring buses are not stopped at red lights after they are done boarding and alighting.

Lighting

Adequate lighting is important to illuminate the stop for rider comfort and security, as well as visibility for bus operators to see passengers waiting at a stop. Lighting can be cast by pedestrian scale lighting, lighted shelters, overhead streetlights or brightly lit signs. Bus stops should be located near streetlights or other overhead/residential lights that illuminate the bus stop zone, path of travel, curb ramp, and crosswalk. In poor lighting conditions, consider lit shelters or stand-alone pedestrian-scale lighting. Lighting considerations are discussed further in Chapter 5: Bus Stop Amenities.

Driveway Interaction

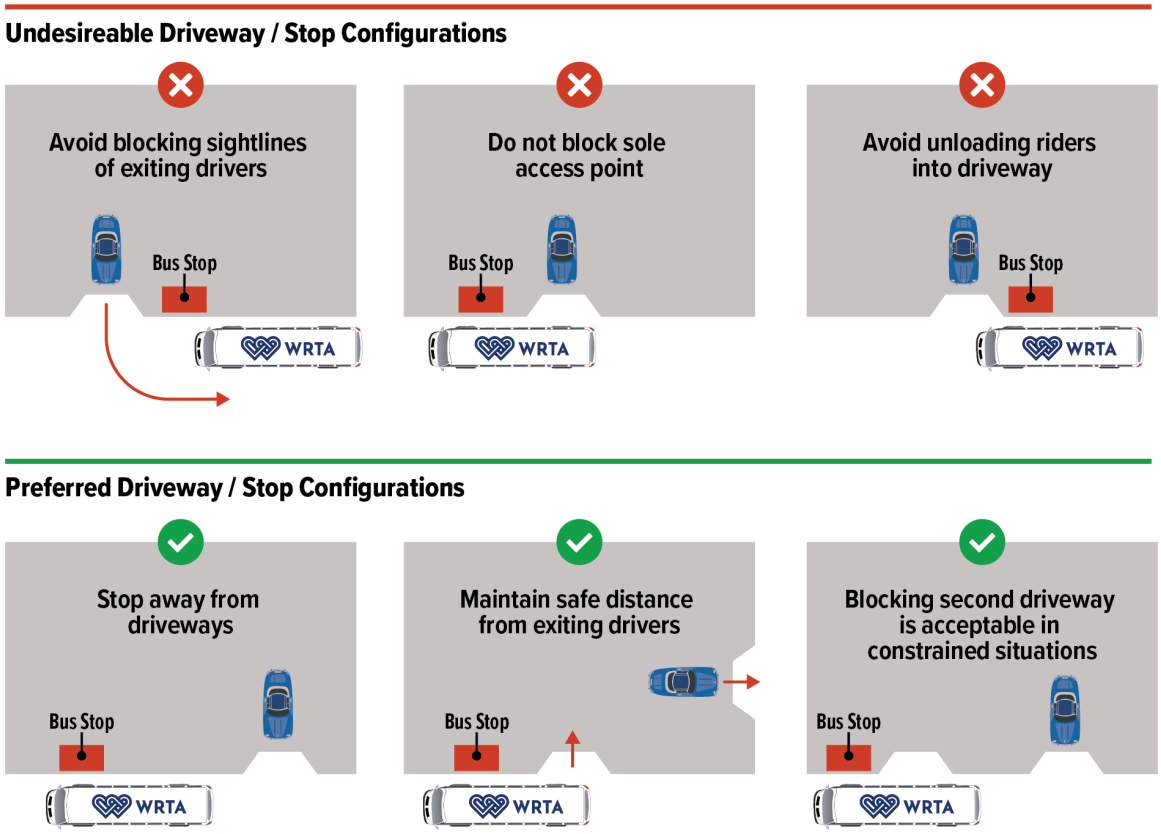
Driveways and other curb cuts near bus stops can pose safety hazards for customers getting on and off the bus and for bus operators. Buses should generally not overhang onto side streets or obstruct

[1] The minimum turning radius of a 40' bus is 21'-6" according to the NACTO Transit Street Design Guide.

driveways. There are six principles that guide the siting of stops in relation to driveways, listed and illustrated below:

1. Avoid blocking sight distances for exiting vehicles.
2. Avoid blocking a driveway that provides the only access to a property
3. Avoid unloading riders into driveways.
4. Stop on the far side of a driveway if there is adequate sidewalk length close to the intersection.
5. Allow for safe sight distances for exiting vehicles.
6. Where there are two driveways in a constrained location near an intersection and the best stop location is on the far side of the second driveway, a transit vehicle may block the second driveway.

Figure 6: Driveway/Bus Stop Configurations

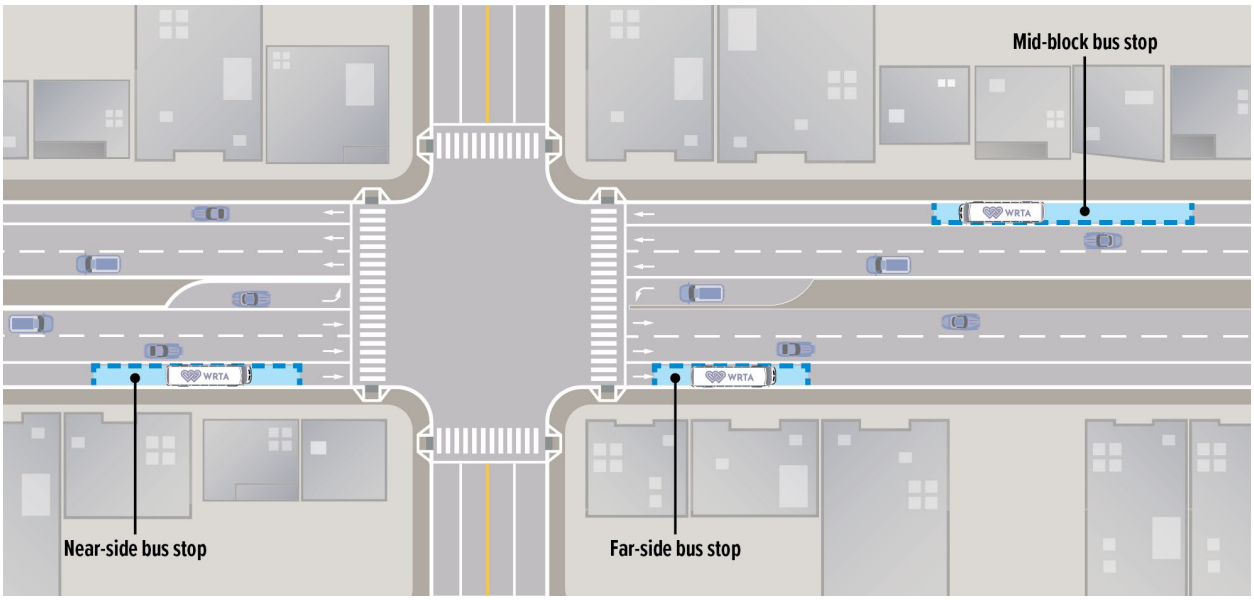


There may be locations where it is not possible to meet all six principles for driveway arrangements to create or preserve equal access to the bus stop. Safety and accessibility are the most important considerations when siting stops around driveways and curb cuts.

Types of Placement Relative to Intersection

Bus stop position directly impacts the convenience and accessibility of the transit system. Determining the proper position of bus stops relative to intersections involves choosing between far-side, near-side, and mid-block stops. While many other factors should be considered when choosing a bus stop position, including adjacent land use, space availability, and pedestrian access, the location of the stop relative to the intersection is an important consideration. If all other factors are similar, far-side stops are preferable, since they encourage people to cross behind the bus and not in front.

Figure 7: Bus Stop Placements Relative to Intersection



Far-Side

Far-side stops are located after the intersection, and are generally preferred because:

- Crosswalks are located behind the stop, encouraging pedestrians to cross behind the bus and not in front of it
- At signalized intersections bus operators can utilize opportunities in the signal phasing and gaps in traffic flow to re-enter the travel lane
- Transit priority measures, including bus queue jump lanes and transit signal priority, can more easily and effectively be used in conjunction with far-side stops
- At curbside stops buses can utilize the intersection to pull into a stop, thereby requiring less curb space and minimizing the impacts to on-street parking

However, far-side stops can cause vehicles to block the intersection if traffic is held up behind a stopped bus.

Near-Side

Near-side stops are located before the intersection, and may be used:

- At stop-controlled intersections to reduce the number of times the bus needs to stop
- If there is a large trip generator on that side of the intersection
- If a shared stop is desired to facilitate through and right turning bus movements

Near-side stops are generally not preferred over far-side stops because:

- Crosswalks are located in front of the stop and less visible to bus operators
- Crossing bus riders/pedestrians have the potential to further delay the bus
- At signalized intersections, buses have the potential to be stopped twice, once serving the stop, and again for the traffic signal, increasing delays to service, and affecting the passenger experience
- Buses require more space to pull into a stop, increasing the impacts to on-street parking
- Right turning vehicles and through moving buses have the potential to be in conflict with each other
- It is more difficult to integrate bus priority measures

Mid-Block

Mid-block stops are usually located between two intersections or large commercial access driveways. Mid-block stops are generally not preferred over far-side or near-side stops unless there is a large trip generator mid-block, or there is insufficient curbside space or vehicle travel lane capacity at the intersection. Mid-block pedestrian crossings are less desirable and so it may be difficult to directly connect a bus stop and crosswalk, especially when an intersection is close by, but not immediately adjacent to the stop.

Figure 8: Bus Stop Placement Considerations

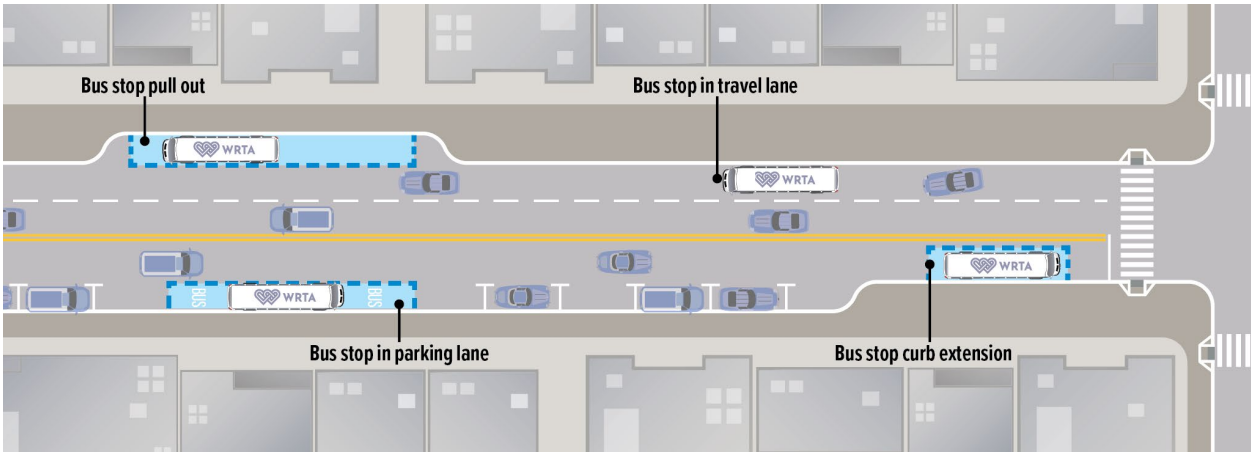
Stop Placement	Benefits	Considerations	Ideal Locations
Far-Side	▪ A bus can merge more easily back into the travel lane due to gaps created by the traffic signal. ▪ Riders exiting the bus will cross behind the bus, which is safer.	▪ Consider traffic signal priority to increase the likelihood the bus makes it through an intersection to reach the stop. ▪ If the stop is part of a high-transfer stop pair, near-side may be preferable.	▪ Consider at all stop locations, but especially those with high right turn volumes or where bus travel time delay occurs.
Near-Side	▪ Not preferred, but may be best fit for places where transfer pairs would be improved, where space constraints limit far-side options, or where it is closest to a destination many riders are going to.	▪ Near-side stops may obscure the sightlines between pedestrians and drivers turning right. ▪ Near-side stops may impact vehicle operations and schedule reliability. ▪ Minimize space that would be left in front of stopped vehicles so that drivers do not attempt to go around the bus to make a right turn.	▪ High transfer locations. ▪ Locations with high bus turn volumes. ▪ Locations where preferred far-side placement is not feasible.
Mid-Block	▪ Allows a stop to be located directly in front of a high-demand destination even if not at an intersection. ▪ Mid-block stops allow buses to avoid complexity at intersections (turning vehicles, pedestrians, etc.). ▪ Can be used to achieve desired stop spacing.	▪ Mid-block placements require pedestrian crossing treatments. ▪ Drivers may not expect a bus to stop mid-block. ▪ Walking distance for transfers may increase.	▪ Where spacing guidelines and destinations dictate.

Types of Curbside Interaction

The position of a bus stop relative to the travel lane affects how easily buses can reenter traffic flow and continue on their route. The four most common bus stop configurations are a curbside bus stop in a parking lane, curbside in a travel lane, at a curb extension/bus bulb, and a pull out/bus bay.

Bus stop layout and configuration depend on the location of a stop at the intersection, configuration of parking, bus and bike lanes, and other features like curb extensions. Some bus stops may need more curb space to allow the bus to align with the curb, and others may require more sidewalk space/public ROW to separate the bike lane and boarding areas.

Figure 9: Bus Stop Placements Relative to Curb



Curbside – Parking Lane

Bus stops in a parking lane allow buses to serve a stop primarily or entirely outside of the travel lane, thereby having minimal effect on traffic flow and reducing the chance of rear-end crashes. However, bus stops in a parking lane are prone to encroachment from adjacent parked vehicles and to drivers who may park in the bus stop.

- When vehicles park in a bus stop located in a parking lane, buses must stop in the travel lane to serve the stop. This creates accessibility and safety concerns for bus passengers who must walk around parked cars and into the street to board a bus.
- Having bus stops in parking lanes requires diligent and consistent enforcement of parking regulations by local authorities to limit encroachment and allow the bus stop to be safely used as designed.

Curbside – Travel Lane

In-lane bus stops refer to buses that stop in a travel lane. This may also mean the bus is stopping partially within a shoulder or bike lane along the curb. Bus stops in the travel lane are typically preferred by transit agencies because they eliminate the need for buses to merge into traffic after

stopping, which can increase the bus travel time. The tradeoff for having buses stop in the travel lane is that other vehicles or bicyclists may not be able to pass a stopped bus on a road with one travel lane in the direction of the bus route, which may cause queuing and traffic congestion.

Curb Extension/Bulb Out

Curb extensions, which are also known as bulb outs or bump outs, extend the sidewalk into the parking lane to facilitate an in-lane bus stop on a road with on-street parking or a shoulder. Curb extensions provide several notable benefits to bus operations and the customer experience, including:

- Reduced parking impacts, in some cases by over 50%, since deceleration and acceleration zones are not needed and less curb space is required.
- Enabling sufficient space for an accessible landing pad on narrow sidewalks.
- Additional space for customers to queue when boarding a bus.
- Reduced dwell time by eliminating the deceleration and acceleration time needed to serve bus stops in the parking lane.
- Shorter crossing distances for people walking across the street.

Curb extensions can take up the entire or partial width of the parking lane. At near-side bus stops, partial curb extensions should only be used if a vehicle can pass a stopped bus without encroaching on the opposing travel lane, or when a vehicle cannot pass a stopped bus. Applying partial curb extensions in these situations only will help prevent issues with pedestrians walking in front of a bus and not expecting a vehicle to pass. Like in-lane bus stops, buses stopped at curb extensions on roads with one travel lane may cause vehicles to queue behind the bus. In addition, curb extensions may impact snowplow operations. The entity responsible for plowing, such as a local Department of Public Works, should be consulted when considering installing a curb extension. The design of curb extensions must accommodate the turning radii of WRTA's 40-foot buses.

Pull Out

A pull out bus stop allows a bus to stop outside of the travel lane(s) on roads without shoulders or parking lanes. These are typically used on higher speed suburban roads where in-lane bus stops may not be safe, at bus stops with extended dwell times (such as at a mall or supermarket), and at bus stops where buses layover.

The most typical pull out is a closed bay, but pull outs can also be configured as open, or partially open as described below.

- Open pull out: Open to traffic on its end closest to the intersection and can be situated on the far-side or near-side of the intersection.
- Far-side open pull out: Open on the bus stop approach. The curbside space is shortened, as the bus can use the intersection to pull in, but buses may be delayed in reentering traffic on high volume streets.

- Near-side open pull out: Open on the bus stop egress. This configuration can be used to enhance bus operations at high traffic volume intersections when used with queue jump lanes and active transit signal priority.
- Partial open pull out: Closed on one side with a partial curb extension on the other side at the pedestrian crossing. This configuration reduces the pedestrian crossing distance, but also allows easier access or egress from the pull out, compared to a closed pull out. It can be provided on the near-side or far-side of an intersection.

Pull out bus stops at intersections can also be paired with curb extensions at one end. Pull out bus stops with curb extensions pair the benefits of a pull out bus stop with the benefits of a curb extension, including shortening crossing distances for customers crossing the street.

Parking Impacts

Bus stops require dedicated curb space for safe and accessible bus service. In areas with on-street parking, limited curb space means that there may be tradeoffs between how curb space is allocated to bus stops versus on-street parking spaces. However, there are strategies to address or mitigate impacts on parking.

Bus stop placements and configurations have different requirements for curb space, and so different types of bus stops can have different impacts on parking spaces depending on how much curb space they require. For example, far-side bus stops require less curb space than near-side bus stops and can save a full parking space, while installing a curb extension can reduce a bus stop's length and associated parking impacts by over 50%. Recommended bus stop lengths for a 40-foot bus (the longest bus in WRTA's current fleet) for each bus stop placement and configuration, as well as the equivalent number of parking spaces, are shown in Figure 10.

Another strategy that can affect on-street parking is addressing bus stop spacing. For example, if there are locations with bus stops that are located too closely together and there are opportunities to consolidate and improve those stops, it may be possible to restore parking spaces at the relocated or removed stops.

Figure 10: Bus Stop Lengths and Parking Equivalent for a 40-Foot Bus

Stop Placement	Preferred Length	Parking Equivalent
Far-side	70′	
Near-side	90′	
Mid-block	100′	
Curb Extension	40′-50′	
Pull Out	120′	

Assumed length of a parking space is 20 feet.

Total length of the curb extension and pull out stops do not include the tapers.

Bus Stop Length and Configuration

Bus Stop Length

Safe and accessible bus stops must have enough curbside space for bus operators to pull the bus parallel to the curb, open both doors onto the sidewalk, and pull out of the stop into the travel lane. Sufficient bus stop length will prevent buses from straddling crosswalks, blocking access for pedestrians, and will provide sufficient clearances from crosswalks. The bus stop length required at each stop varies depending on the following criteria:

- Location of the stop relative to the intersection
- Stop configuration
- Approach of bus turn movements
- Angle of the taper at curb extensions and pull outs
- Roadway speed, and thereby space for deceleration and acceleration
- Presence of crosswalks, parking, and driveways
- Location of landscaping and street furniture along the sidewalk edge
- Number of buses serving and/or laying over at the stop

Figure 11 provides the stop lengths required for a 40-foot bus for different stop placements and configurations, as well as their equivalent length in parking spaces. Bus stop lengths may need to be adjusted based on site specific conditions, and if more than one bus is expected to service a stop at one time, the bus stop length should be increased by 50 feet for each additional 40-foot bus, allowing for 5 to 10 feet between each queuing vehicle.

The length of the bus stop must also include a 10-foot clearance from the outer edge of the crosswalk or the end of the curb radius, whichever is farthest from the intersection. This clearance can be included in the pull-in and pull-out merge zone lengths.

- For far-side and mid-block stops, the rear of the bus should be at least 10 feet from the crosswalk/intersection to ensure the crosswalk is not blocked and for visibility to opposing traffic.
- For near-side and mid-block stops, the bus stop sign marking the front of the bus stop should be at least 10 feet away from the crosswalk/intersection to ensure motorists passing the bus can have full visibility of people crossing.

Figure 11: Bus Stop Lengths

Stop Placement	Pull-in Merge Zone	Dwell Zone	Pull-out Merge Zone	Additional Crosswalk / Intersection Clearance	Preferred Bus Stop Length
Parking Lane Stops					
Far-side	0′	40′	20′	10′	70′
Far-side, after left turn	30′	40′	20′	-	90′
Far-side, after right turn	60′	40′	20′	-	120′
Near-side	40′	40′	0′	10′	90′
Mid-block	40′	40′	20′	-	100′
Travel Lane Stops					
Curbside Travel Lane	0′	40′	0′	10′	40′-50′
Curb Extension	0′	40′	0′	10′	40′-50′
Pull Out Stops					
Pull Out (Closed Bay)	60′	40′	20′	-	120′

Note: Merge zone calculations assume typical 8-foot parking lane. Most WRTA buses are wider than 8 feet and may hang over into travel lanes when pulled over at a curbside stop.

Curb Extension and Pull Out bus stop lengths are exclusive of tapers.

Figure 12: Bus Stop Lengths –Parking Lane Stops

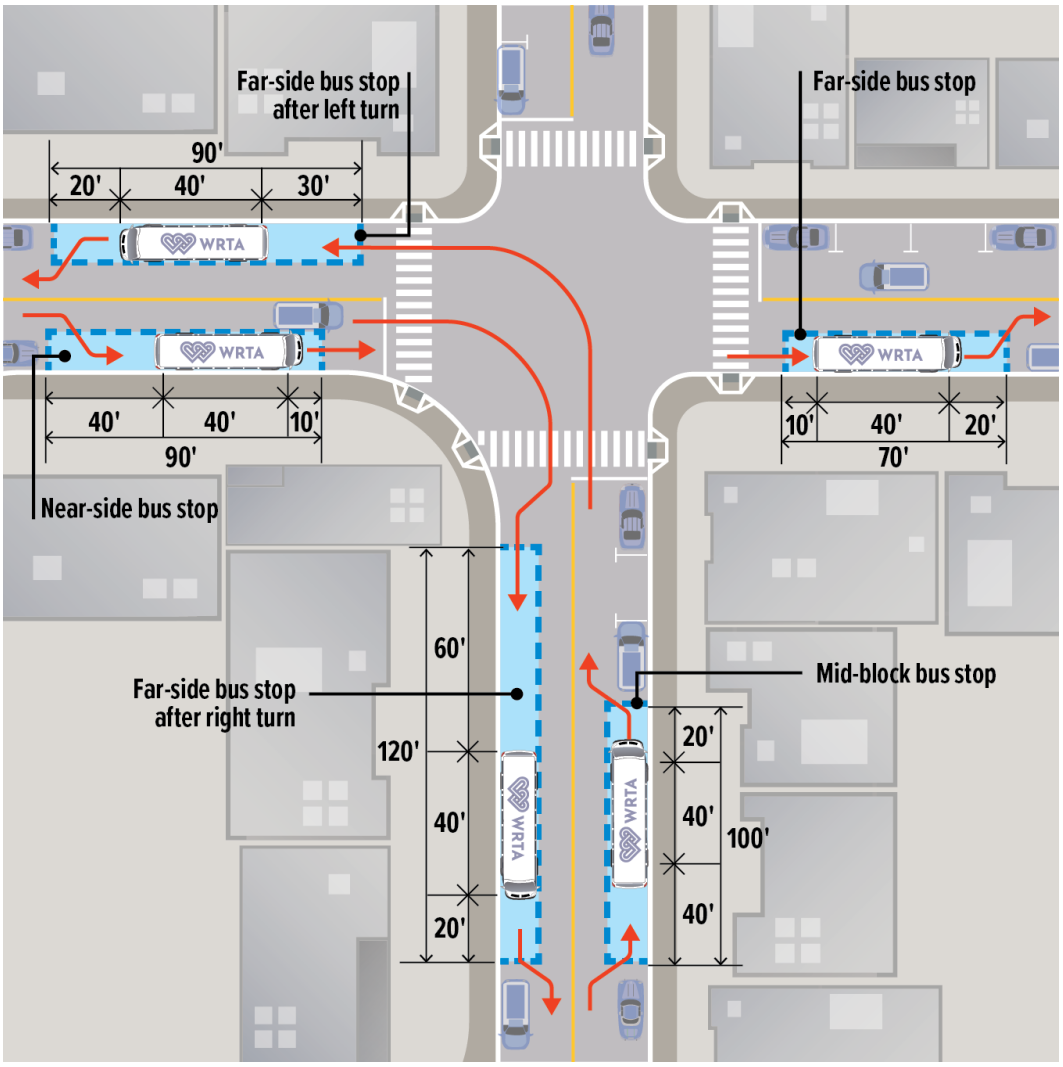


Figure 13: Bus Stop Lengths – Curb Extension Stops

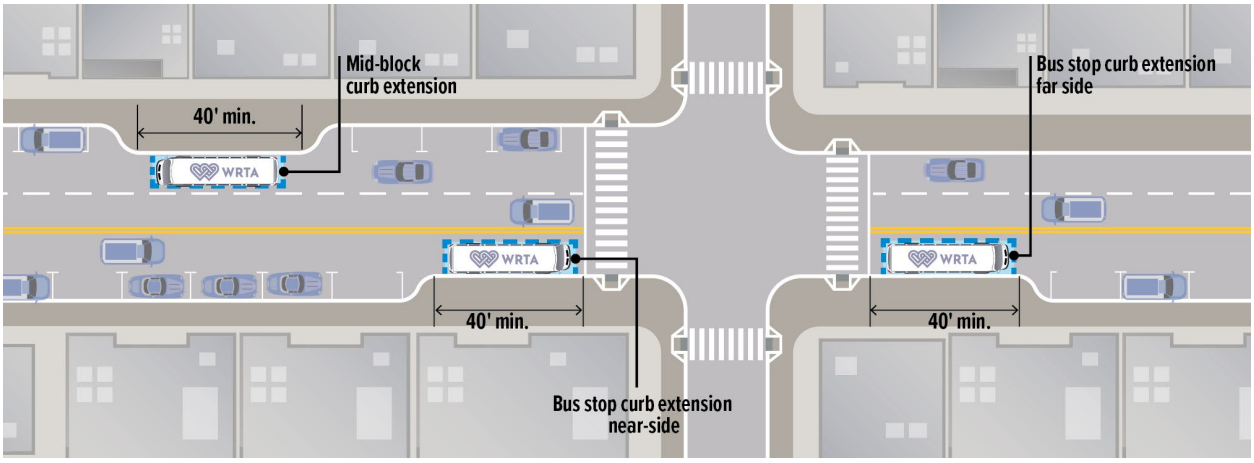
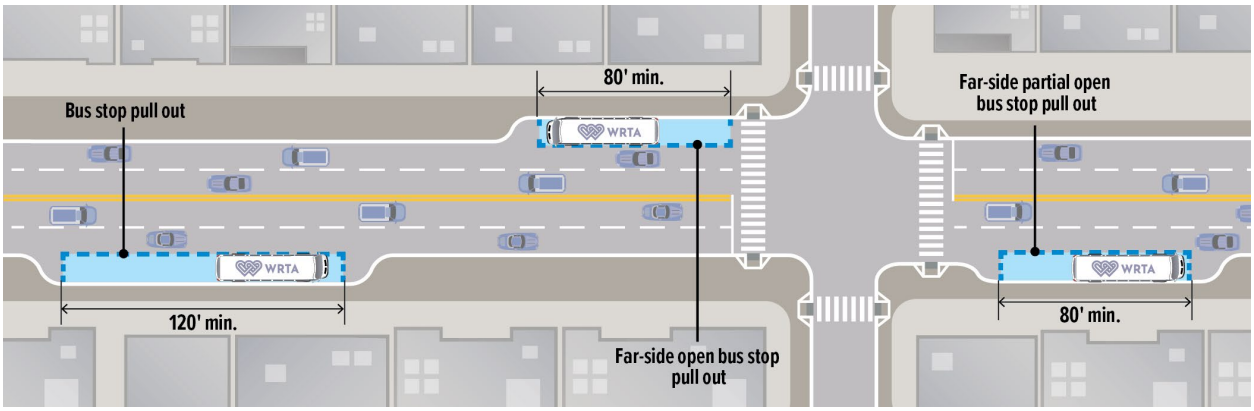


Figure 14: Bus Stop Lengths – Pull Out Stops



Far-Side Bus Stop (Parking Lane)

As noted earlier, far-side bus stops are WRTA's preferred stop location because they minimize pedestrian and merge conflicts at intersections, improve bus travel times and reliability, require the least amount of curb space, and can maximize the effectiveness of transit priority treatments.

The guidance on stop length shown in Figure 15, Figure 16, and Figure 17 is based on the lengths necessary for pull-in and pull-out merge zones with a typical 8-foot-wide parking lane. If the distance from the curb is not 8 feet, then the stop length will vary.

Layout Guidance

- Provide a minimum 10-foot clearance behind the bus to avoid stopping in the crosswalk.
- If a far-side bus stop is after a left turn, add 30 feet to the pull-in merge zone to account for the turn and align the bus with the curb. If a far-side bus stop is after a right turn, add 60 feet to the pull-in merge zone. These figures are inclusive of the 10-foot crosswalk clearance.
- Consider pavement markings to keep the bus stop zone clear.
- Consider painted parking stalls to demarcate parking spaces.
- Consider loading zones or enforcement options if bus stop zones are chronically blocked.

Figure 15: Far-Side Bus Stop

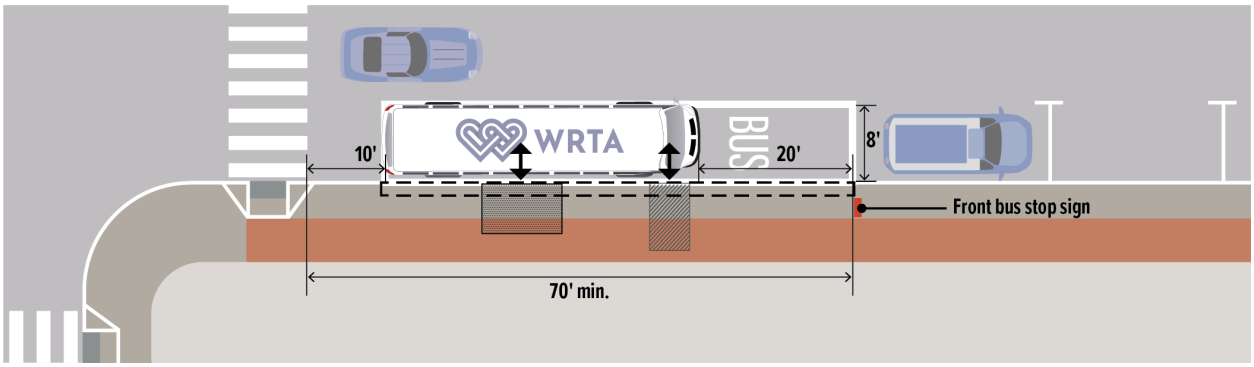


Figure 16: Far-Side Bus Stop After Left Turn

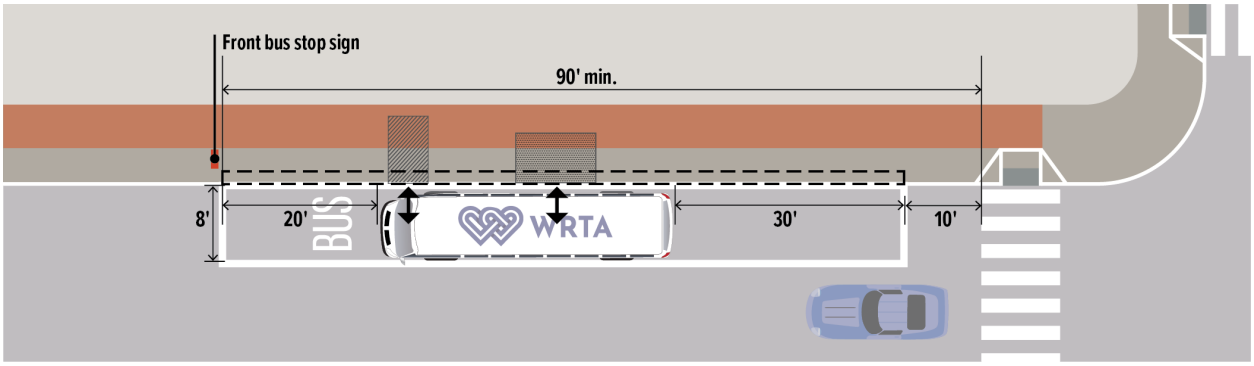
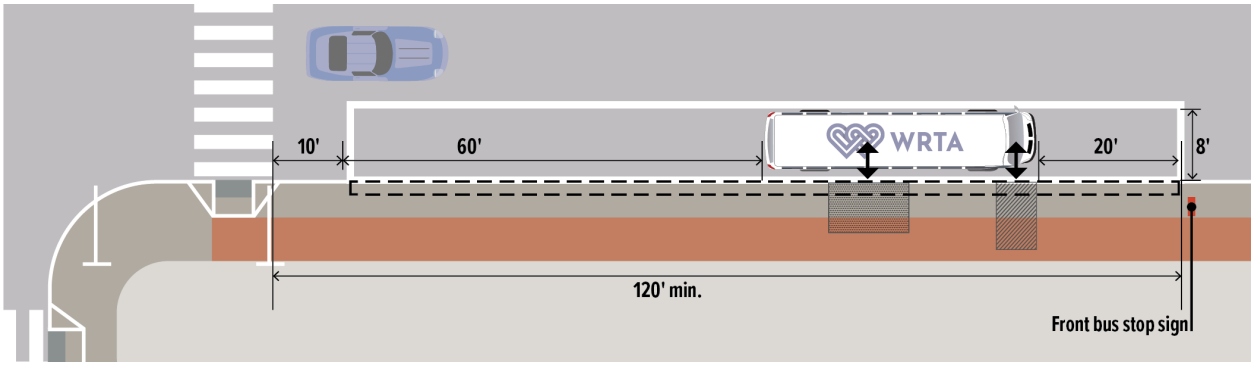


Figure 17: Far-Side Bus Stop After Right Turn



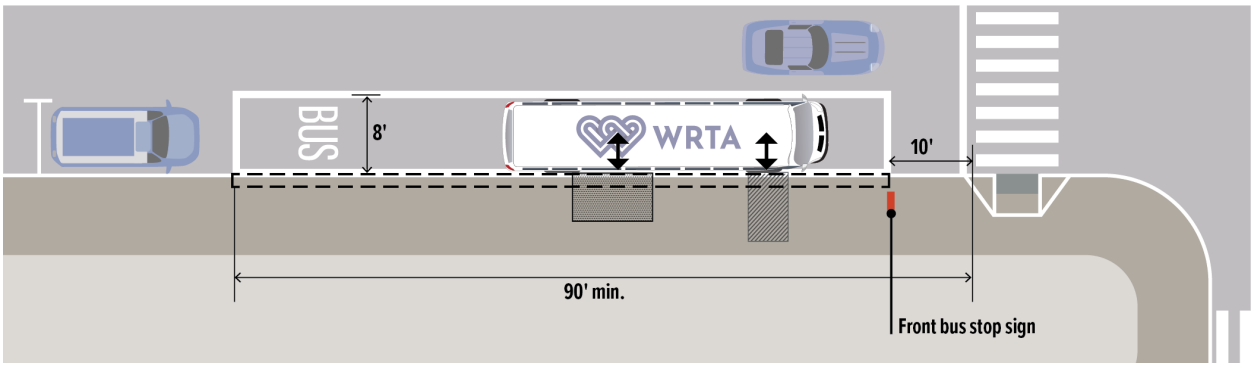
Near-Side Bus Stop (Parking Lane)

Near-side bus stops are not the preferred WRTA stop placement in most conditions but are still very common throughout the service area. Avoid nearside stops at high-volume and complex intersections and before bus turning movements. The guidance in Figure 18is based on a typical 8-foot parking lane. If the distance from the curb is not 8 feet, then the stop length will vary.

Layout Guidance

- The bus stop sign must be at least 10 feet away from the crosswalk.
- Consider pavement markings to keep the merge zone clear.
- Consider painted parking stalls to demarcate parking spaces.
- Consider loading zones or enforcement options if bus stop zones are chronically blocked.

Figure 18: Near-Side Bus Stop



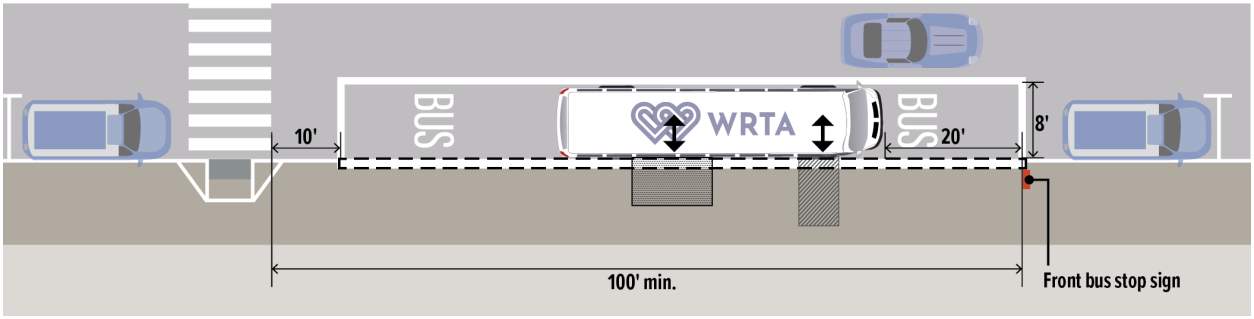
Mid-Block Bus Stop (Parking Lane)

Mid-block bus stops are typically only placed along long blocks or at major activity centers. The guidance in Figure 19 based on a typical 8-foot parking lane. If the distance from the curb is not 8 feet, then the stop length will vary. (Note: Most WRTA buses are wider than 8 feet and may hang over into travel lanes when pulled over at a curbside stop.)

Layout Guidance

- To improve safety and connectivity to destinations and reciprocal bus stops, mid-block stops should be co-located with mid-block crosswalks and enhanced crossing treatments like rapid flashing beacons.
- Avoid mid-block bus stops where riders may be tempted to illegally cross the street to reach the bus stop.
- Painted marked stalls and/or additional no parking signage is recommended to ensure entire bus stop zone is clear.

Figure 19: Mid-Block Bus Stop



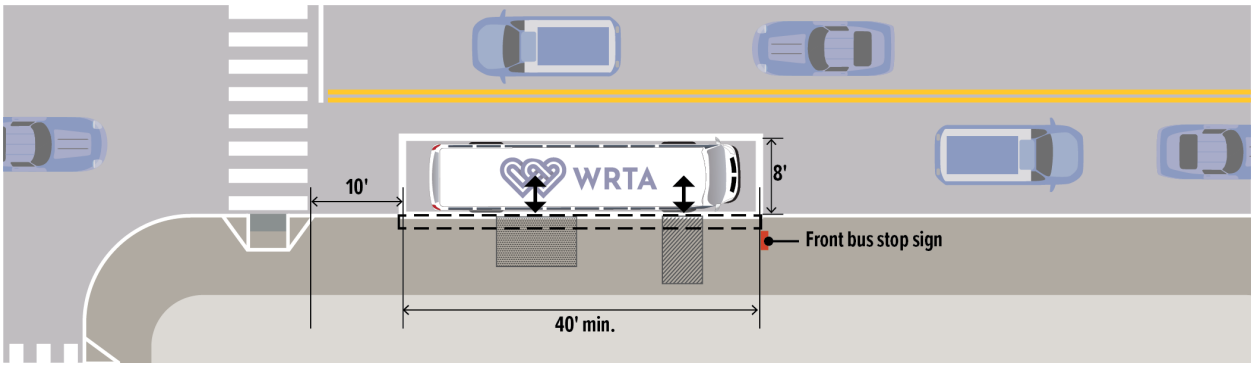
Travel Lane Bus Stop

Bus stops in the travel lane eliminate the need for buses to merge into traffic after stopping; as a result, the bus stop zone only needs to be as long as the bus vehicle itself, since there is no need for merge-out and merge-in zones.

Layout Guidance

- Travel lane bus stops can be far-side, near-side, or mid-block, and the 10-foot crosswalk clearance still applies when a stop is in a travel lane rather than a parking lane if a crosswalk is present.
- Where on-street parking terminates just before the intersection in order to facilitate an additional travel or turn lane, the length of that lane should meet or exceed the equivalent curb space needed for a near-side bus stop. The travel or turn lane may need to be extended, or a no parking area provided, to facilitate access to the stop.

Figure 20: Travel Lane Bus Stop (Far-side example)



Curb Extension/Bulb Out Bus Stop

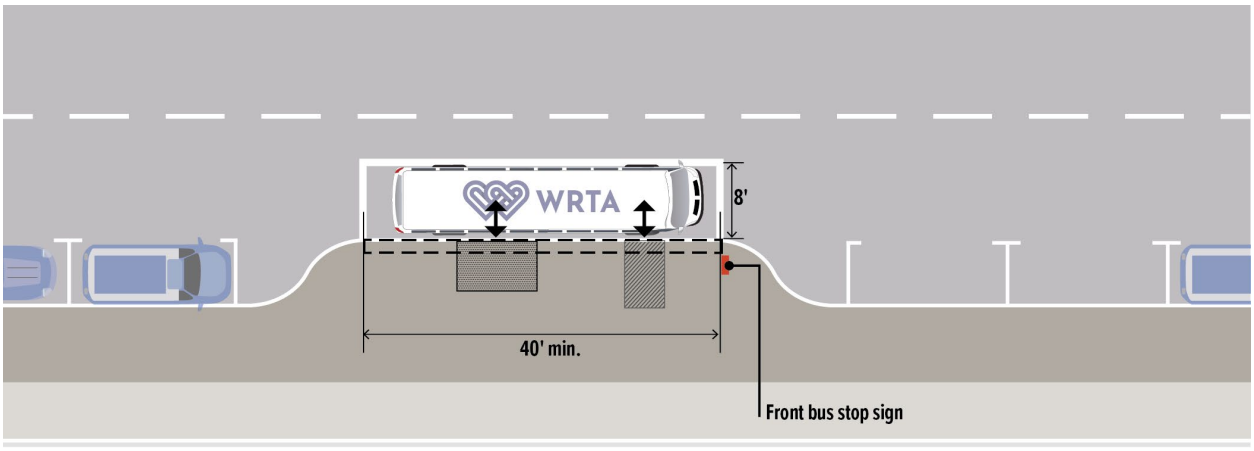
Curb extensions, or bus bulbs, extend the curb of a bus stop to be in line with the bus travel lane, rather than the parking lane, which allows buses to stop in-lane to serve riders. Like in-lane curbside stops, this treatment saves time, increases transit reliability, and reduces conflict between buses and other motorists because buses do not have to pull out of and back into the traffic lane when serving a bus stop. It can also provide more room for waiting passengers and amenities, particularly shelters, without encroaching on the original sidewalk area.

A curb extension in a parking lane preserves more parking spaces due to a shorter bus stop length: A typical 40-foot to 50-foot bus bulb replaces 2 to 3 standard parking spaces, retaining more parking spaces than a curbside bus stop, which occupies 3 to 6 spaces depending on placement.

Layout Guidance

- Curb extensions are generally 40 feet long, excluding the taper. They must be long enough for all doors to open onto the curb and for any appropriate setback from crosswalks; they could be as short as 30 feet, which enables both doors to open onto the sidewalk, but this results in the rear part of the bus overhanging and could obstruct parking access.
- Curb extensions should be designed to ensure that buses stop at least 10 feet clear of crosswalks.
- AASHTO recommends a 6-foot minimum curb extension in an 8-foot parking lane, leaving a 2-foot offset between the edge of curb edge and the travel lane. NACTO also recommends a 6-foot minimum, but states that the width should reflect the need for maneuvering and accommodation of stop amenities, and 8 to 10 feet is preferred. Narrower or partial curb extensions could be explored and will vary in length and parking impacts, depending on the depth of the curb extension.
- Consider traffic and queuing impacts with far-side bus bulbs, as traffic may back up behind the bus and into the intersection. Also consider traffic volumes and the number of travel lanes in relation to vehicles being able to pass stopped buses.
- Municipalities do not need to stripe the roadway because buses are stopping in-lane.
- This treatment does require moderate capital investments and potentially drainage modifications due to curb relocation.
- Near-side bus bulbs may require right-turn restrictions if there is a tight corner radius. The American Association of State Highway Transportation Officials (AASHTO) specifies a 20-foot to 30-foot curb radius to accommodate urban transit and intercity buses.
- Bus bulbs typically include the adjacent pedestrian curb ramp. This reduces the intersection crossing distance for pedestrians.

Figure 21: Curb Extension Bus Stop



Pull Out Bus Stop

A bus pull out allows buses to stop without impeding traffic flow by pulling into a bus stop zone and out of the main travel lane. They are most appropriate along higher speed suburban and rural roadways, or where there are extended dwell times, such as at a layover location or at commercial establishments such as a grocery store or mall when boardings can be slower with passengers carrying groceries or larger items. Passenger safety is improved by providing more distance between the bus stop zone and moving traffic.

Although there are clear benefits of buses pulling out of the travel lane, pull outs can also delay bus service, as buses may have to wait for a gap in traffic in order to re-enter the travel lane. Pull outs also reduce the sidewalk space at a stop, which can have a negative impact on the passenger waiting area and incorporation of amenities at stops. They are typically constructed when there is a wide right-of-way available, or the abutting property owner provides an easement for the construction of the sidewalk and/or pull out.

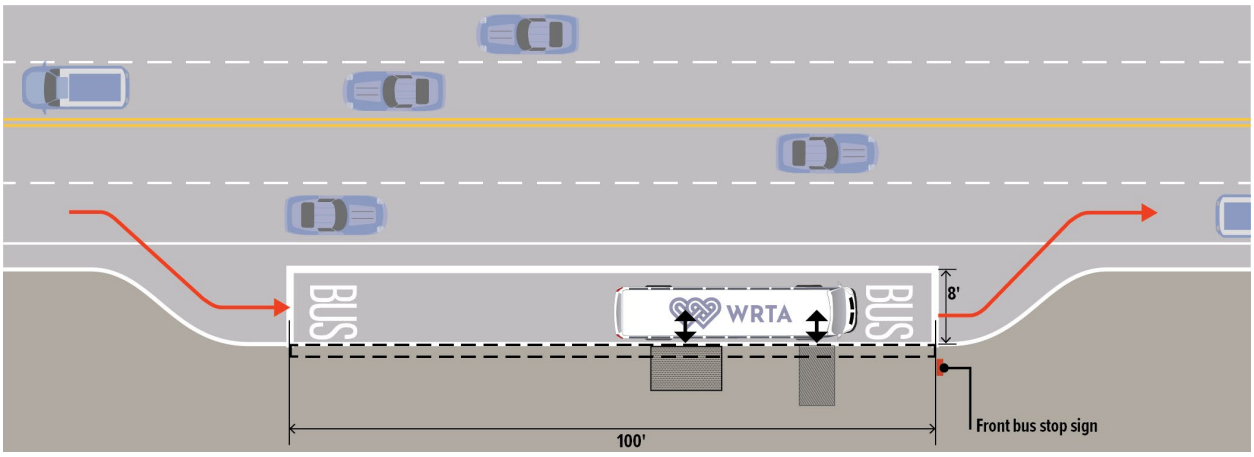
Appropriate Applications for Pull Out Bus Stops

- There is available sidewalk or other space, without adversely affecting pedestrian movement on the sidewalk.
- Travel speeds are high (greater than 40 miles per hour) and passenger safety is a concern.
- Vehicle/bus conflicts warrant separation of transit and passenger vehicles.
- Layover space for the end of the trip, or time point with extended dwell time (10 to 30 seconds per bus) is needed.
- The curb lane is used by moving traffic and traffic volumes in the curb lane are between 250 and 500 vehicles during the peak hour.
- Sight distance to the bus stop prevents traffic from safely stopping behind a stopped bus.

Layout Guidance

- The length of the pull out is determined by the tapers, entry and exit speed of the bus, frequency of gaps in traffic flow, as well as traffic speed and volumes. While some guidance is provided by AASHTO, pull outs should generally be 120 feet long with a taper of 5:1 on the approach and 3:1 on the egress, assuming a vehicle speed of 10 miles per hour or less.
- The width of the pull out should be 12 feet, though a 10-foot width is acceptable with traffic speeds less than 30 miles per hour.

Figure 22: Pull Out Bus Stop



3. Accessibility and Connectivity

Accessible bus stops improve mobility for all bus riders, including those with disabilities and additional mobility needs. Bus stops that are accessible remove potential barriers for riders when boarding, alighting, waiting, or accessing the surrounding sidewalk network.

Fundamental elements of bus stop accessibility include:

- Level landing area at the front door of the bus
- Clear path of travel to the sidewalk
- Clear zone at the rear door of the bus
- Connection to crosswalks and the pedestrian network

Bus stops must comply with the Americans with Disabilities Act (ADA) accessibility requirements which require a bus stop front door boarding area (also referred to as a landing area) and an accessible route between the landing area, the sidewalk, and bus stop amenities. In addition to these elements, WRTA bus stops should have a clear zone at the rear door, and pedestrian facilities connecting bus stops with the sidewalk network.

Vehicle Considerations: *The design of an accessible bus stop must accommodate the buses that serve them. WRTA's existing fleet is primarily comprised of 35' and 40' buses. WRTA's buses have wheelchair ramps at the front doors, bike racks to accommodate two bikes, front-end kneeling capabilities, and rear doors. WRTA paratransit service utilizes a different vehicle fleet; since they typically do not stop at fixed-route bus stops, they do not need to be considered in the design of fixed-route bus stops.*

Accessibility Guidance: Key Documents

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is one of America's most comprehensive pieces of civil rights legislation that prohibits discrimination and guarantees that people with disabilities have the same opportunities as everyone else. It is an "equal opportunity" law for people with disabilities. ADA Accessibility Guidelines (ADAAG) were the original guidelines developed by the US Access Board in 1991. The Department of Transportation implemented the ADA regulations by incorporating these guidelines verbatim in an Appendix to the Department of Transportation's Code of Federal Regulations 49, Part 37.

The Department of Justice's revised regulations for Titles II and III of the Americans with Disabilities Act of 1990 (ADA) were published in the Federal Register on September 15, 2010. These regulations adopted revised, enforceable accessibility standards called the 2010 ADA Standards for Accessible Design ("2010 Standards"). On March 15, 2012, compliance with the 2010 Standards was required for new construction and alterations under Titles II and III. March 15, 2012 is also the compliance date for using the 2010 Standards for program accessibility and barrier removal. Section 810 references standards required for Transportation Facilities, including bus stops.

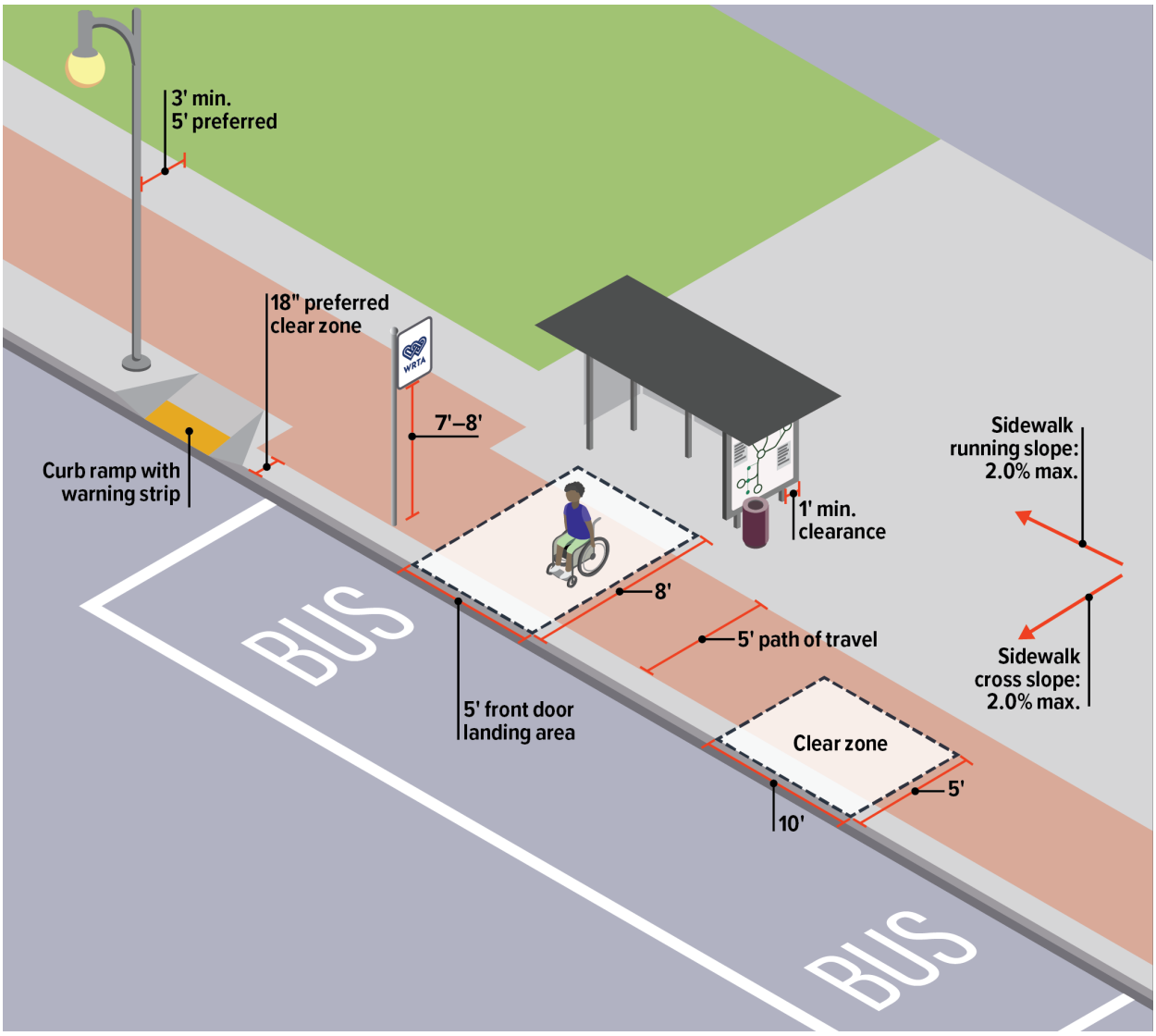
Public Right-of-Way Accessibility Guidelines (PROWAG)

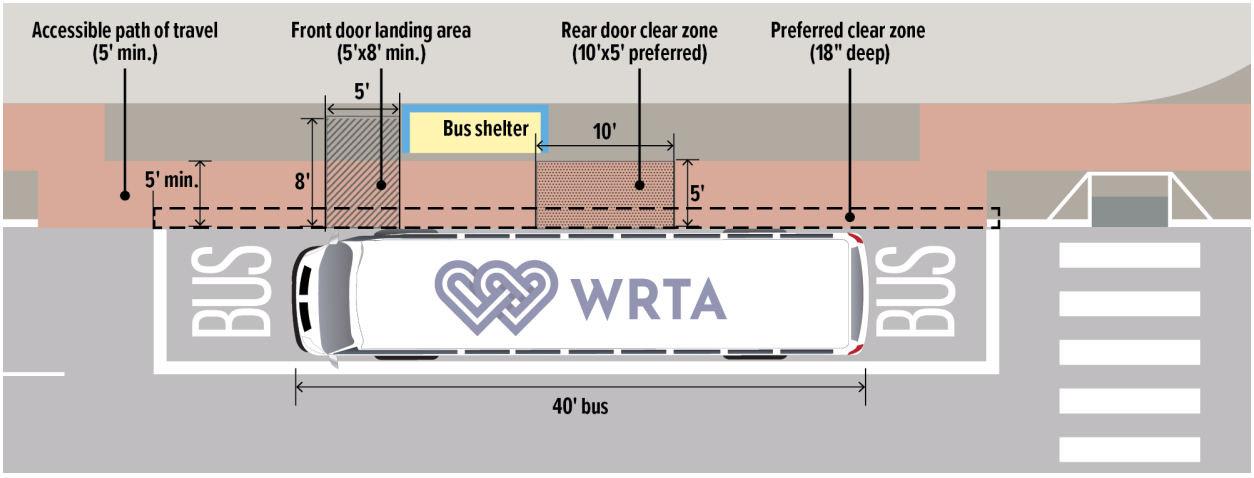
In 2011, the U.S. Access Board developed a set of Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (now PROWAG) to provide guidance on ADA design. PROWAG establishes design guidelines concerning access to public right-of-way spaces such sidewalks, streets, and crosswalks. The Department of Transportation (DOT) adopted PROWAG as an enhancement to existing ADA standards related to transit stops on December 18, 2024; effective January 17, 2025, these guidelines are now requirements for all new construction or altered transit stops, enforceable under Title II of the ADA.

State Accessibility Guidelines

State-level directives on accessibility apply to access to bus stops, but not the design of bus stops themselves. They include MassDOT Engineering Directive E-12-005: Walks and Wheelchair Ramps, which requires a minimum 4-foot sidewalk (5 feet is recommended), minimum 3-foot wide path of travel, and minimum 5-foot wide ramp at the curb line. These minimum sidewalk and path of travel widths align with those from the Massachusetts Architectural Access Board (MAAB).

Figure 23: ADA Compliance at a Bus Stop





Landing Area

Landing areas are the space where riders board and alight the bus at the front door of the bus. The front door landing area consists of an unobstructed zone continuous to the sidewalk and contiguous to the face of curb and street. At a minimum, landing areas are required to be 5 feet wide along the curb line and 8 feet deep across the sidewalk, according to ADA standards. Landing areas must be a firm, stable, and level surface that is smooth and continuous.

Front door landing area running slope, which is perpendicular to the roadway, cannot exceed 2.0% (and must be designed to 1.5%). Every effort should be made to ensure the front door landing area cross slope, which is parallel to the roadway, does not exceed 2.0% (and should be designed to 1.5%). In steep conditions, the cross slope must not exceed the slope of the roadway.

All WRTA buses have the functionality to lower or kneel at the front door, reducing the size of the step for riders to board or alight the bus, in addition to mechanical access ramps deployed by the operator for riders using wheeled mobility devices. The 8-foot depth provides the space required for deployment of the bus ramp and the requisite turning radius for someone using a wheeled mobility device.

The landing area should be concrete. The concrete mix and other surface treatments used should follow either local or MassDOT regulations, if applicable. Brick sidewalks or brick patterns integrated with concrete sidewalks are not desired due to leveling and maintenance concerns. If bricks are used, they should be wire-cut for a smoother finish. The landing area cannot encompass uneven or rough surfaces, such as a grass strip or tree pit, or contain dirt or gravel, or be located in a driveway.

Figure 24: ADA-Accessible Landing Area

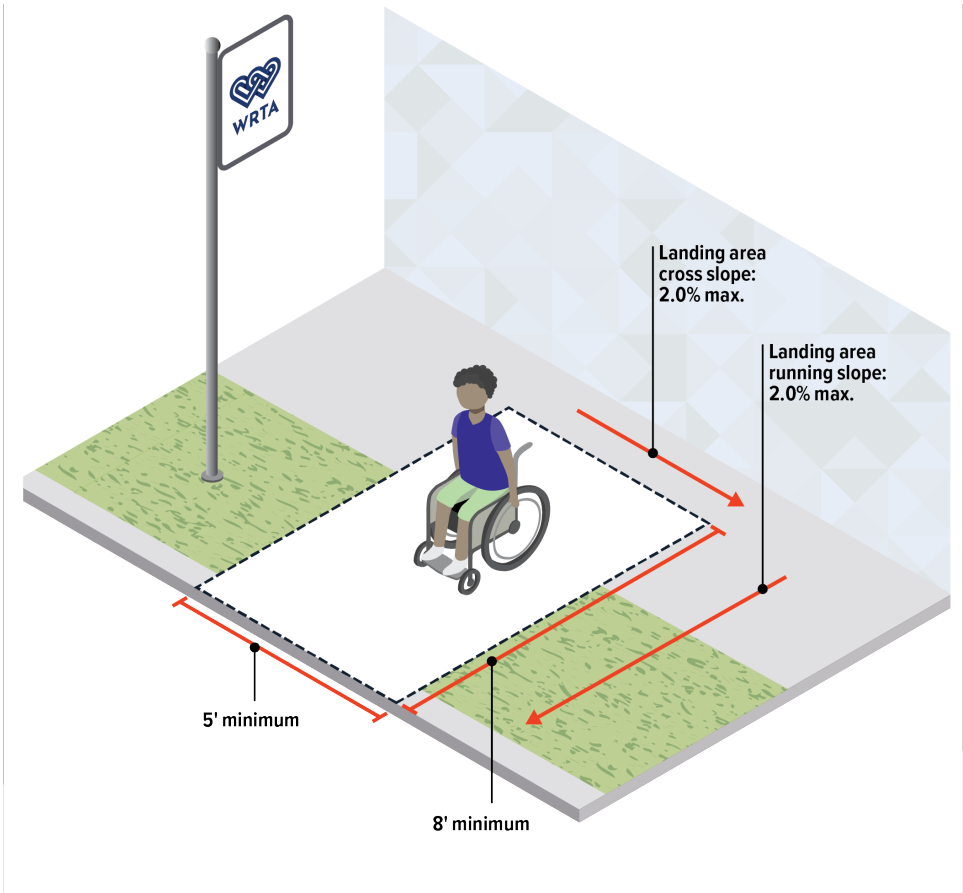


Figure 25: WRTA Guidelines for Bus Stop Landing Areas

Dimensions	5′ x 8′
Perpendicular Clearance to Road	8′ min depth, from back of curb to back of sidewalk
Parallel Clearance to Road	5′ min width, parallel to curb
Cross Slope *(parallel to road)*	1.5% preferred; 2.0% max
Running Slope *(perpendicular to road)*	1.5% preferred; 2.0% max
Curb Reveal	5″ to 7″ inches; 6″ preferred

Rear Door Clear Zone

The rear door clear zone is the space located where the back doors of the bus open onto the sidewalk. Although not required by ADA, clear zones for the rear door of the bus are critical for rear door customer activity to occur safely. This rear door clear zone should have a 10-foot width along the curb line and a 5-foot depth across the sidewalk. The clear zone should be free of driveways,

curb ramps, and obstructions such as utility poles, hydrants, and other street furniture. Similar to the landing area, the rear door clear zone should be a level, paved, and unobstructed surface connected to a sidewalk with a path of travel of 5 feet or more.

Figure 26: WRTA Guidelines for Bus Stop Rear Door Clear Zone

Dimensions	10′ x 5′
Perpendicular Clearance to Road	5′ min depth, measured from face of curb
Parallel Clearance to Road	10′ min width, parallel to curb

Path of Travel

There must be a clear, unobstructed, accessible path of travel through the stop area connecting the front door landing area, the sidewalk, and bus stop amenities.

- A 5-foot path of travel must be accessible through the stop. This space allows riders and pedestrians to pass each other comfortably and minimizes conflict at bus stops. The 5-foot width is measured from the back of the curb and does not include the width of any curb.
- The path must be firm, stable, smooth, level, and slip-resistant pathway (concrete, asphalt, granite, or wire cut brick).
- In most cases, the landing area and bus stop zone are already part of the sidewalk. If there is not a continuous sidewalk, then planners and engineers must make efforts to clear obstructions and provide a firm, stable, smooth, level 5-foot clear path of travel between the sidewalk and the front door landing area/bus stop zone.
- The sidewalk cross slope, which is perpendicular to the roadway, cannot exceed 2.0% and should be designed to 1.5%. The sidewalk running slope, which is parallel to the roadway, cannot exceed the slope of the roadway. Every effort should be made to achieve a sidewalk running slope of 2.0%. The lead entity and roadway owner should coordinate with WRTA if the slope of the roadway is greater than 2.0%.
- The path must be clear of obstructions. If elements such as newspaper boxes, tree grates, utility poles, and trash cans obstruct the path of travel, then the stop is not fully accessible. In addition, environmental elements such as encroaching grass, bushes, tree roots, and snow can also make the sidewalk inaccessible.
- As outlined by the Federal Highway Administration, a public agency must maintain accessible walkways, with only temporary accessibility interruptions. This maintenance obligation includes snow removal.

[Note: A 3-foot path can be provided in circumstances with extremely limited right-of-way (ROW) and for the shortest distance possible, with a maximum distance of 200 feet, at which point a 5-foot-by-5-foot passing zone must be provided. A path of travel as narrow as 2-foot, 8-inches (32-inch) is permitted only in extenuating circumstances, such as at unavoidable brief pinch points like at a utility

pole. In cases where a Massachusetts Department of Transportation (MassDOT) or Massachusetts Architectural Access Board (MAAB) directive requires a 4-foot or 5-foot sidewalk (see State Accessibility Guidelines below), the 3-foot ADA minimum is negated.]

Figure 27: WRTA Guidelines for Bus Stop Accessible Path of Travel

Width	5′ min (exclusive of the width of curb)
Cross Slope *(perpendicular to road)*	1.5% preferred; 2.0% max
Running Slope *(parallel to road)*	2.0% preferred; not to exceed the running slope of the parallel roadway

Siting of Bus Stop Amenities

Bus shelters and other bus stop amenities must be connected to the landing area by an accessible path of travel that is at least 5 feet wide and clear of obstructions.

The siting of bus shelters or other bus stop amenities must not obstruct the 5-foot accessible path of travel within and through the bus stop. Although not desirable, the width may be reduced at pinch points (for example, at a utility pole) to 3 feet, as long as the other clearances are met.

Bus stop signs must also be sited with vertical clearance in mind, with a minimum of 7 feet and a maximum of 8 feet from the ground to the bottom of the bus stop sign.

Further guidance on the siting of signage and amenities is provided in Chapter 5: Bus Stop Amenities.

Sidewalk Network

Ideally, the sidewalk at a bus stop connects to the surrounding sidewalk network, providing convenient access for passengers to and from their starting points and destinations. It is important to place priority on creating sidewalks adjacent to bus stops to ensure fundamental safety and comfort for passengers.

Bus stop boarding and alighting areas must be connected to streets, sidewalks, or pedestrian paths by an accessible route. Sidewalks that provide adequate access must be connected to the bus stop and connected to a sidewalk network. Bus stops should not be isolated or located on an island, on unpaved areas, or where there is a solid platform or pad but no connecting sidewalk.

Intersection or Crossing

The accessible path of travel from the bus stop front door landing area must connect to and across the nearest street crossing to allow for a connection between inbound and outbound service where

there is stop pair. If bus stops are at the intersection (near-side or far-side), accessible crosswalks are required on the side streets.

Accessible street crossings include crosswalk markings and curb ramps at both ends of the crosswalk. These crossing components must comply with State and Federal accessibility regulations.

At signalized pedestrian crossings, municipalities or the roadway owner must provide accessible pedestrian signals (APS). APS include push buttons at activated signals, within reach of a level area of the curb ramp. The APS must create an audible sound both when engaged and when the walk signal is activated.

4. Roadway Context

Essential and supporting elements of bus stops occur both on the sidewalk and on the street. When designing a bus stop, considerations must be made for indicating the bus stop zone on the street, how the bus stop interacts with on-road bicycle facilities, and the potential for bus transit priority measures. This chapter highlights some of these design elements for roadway owners and WRTA's agency partners.

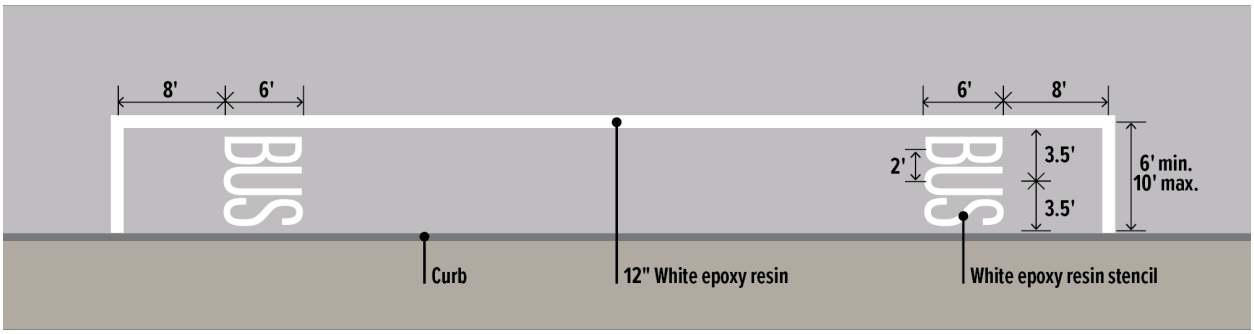
Bus Stop Striping

Bus stop striping and bus boxes enhance the visibility of bus stops for bus operators, drivers, and riders. Roadway owners can consider bus stop striping to reinforce the bus stop zone in on-street parking areas. Vehicles that block bus stops slow down service, and also present accessibility issues by hindering the ability of bus operators to pull into the stop and deploy the wheelchair ramp.

Bus stop box striping should match outer edge of existing striping. In locations where there is no existing striping, outer edge of bus stop striping should be 8 feet from face of curb unless otherwise noted. Bus stop striping should include the word "BUS" at the top and bottom of the bus stop zone. The word "BUS" must be oriented in the direction of travel. The bus stop zone should be encased in a 12-inch thick line delineating the bus stop zone. Adoption of the bus stop striping detail, shown in Figure 28, will result in consistency at bus stops in WRTA's service area. While WRTA may not apply the markings itself, it can guide municipalities, developers, and other entities who may stripe bus stops to follow these standards.

Thermoplastic striping is preferable to paint for better durability, although paint is an acceptable alternative. WRTA expects that roadway owners – typically municipalities and MassDOT – will maintain bus stop striping throughout the course of their existing road maintenance responsibilities. Deviation from the recommended striping thickness may occur to match the standards of the respective roadway owners.

Figure 28: Bus Stop Striping



Concrete Bus Pads

Where possible, cement concrete bus pads are a preferred substitute for conventional asphalt paving, which is prone to distortion by constant bus turn movements at the stop. Bus pads are more durable and recommended at frequently served bus stops or where rutting has occurred. Bus pads must be at least 8.5 feet to 12 feet wide to accommodate both wheels of a bus and allow for bus operator driving variability.[2]

Bus pads must stretch the length of the bus stop, encompassing the entire bus stop zone on the roadway. The bus pad must be long enough to cover the length of the bus and the deceleration and acceleration zones, where roadway wear and tear is most likely to occur.

If adjacent to a bike lane, the bus pad should extend to the inner or outer edge of the bike lane to prevent the creation of a longitudinal seam within the bike lane.

Material

Bus pads can be made of concrete or a modified hot asphalt mix (HMA). While concrete bus pads have a higher capital cost than HMA or striping, they have minimal maintenance costs. In addition, concrete bus pads prevent the rutting of asphalt pavement that often occurs at bus stops due to the repeated movement of heavy buses.

HMA, which is also known as Airport Mix, is an increasingly popular alternative material to concrete used to define the bus stop zone. It has different specifications than concrete bus pads and is a thicker layer than traditional asphalt used to pave roads. HMA is typically more cost effective to install than concrete and has a quicker curing time. Maintenance of HMA is also generally cheaper than concrete bus pads and it is easier to repair when disturbed by utility work. In addition, HMA provides better traction during wet or winter weather than concrete. However, HMA may require additional maintenance than concrete over the life of the material, but at lower cost.

WRTA should work with design engineers and roadway owners (municipalities) to determine which material is preferable for them to install and maintain.

[2] National Association of City Transportation Officials. Transit Street Design Guide, 2016.

Bicycle Accommodations

As municipalities and MassDOT continue to add bicycle infrastructure on roadways across the Commonwealth, it is important that bus stops are designed to support dedicated road space for bicyclists. Worcester and other WRTA communities have bicycle lanes on roadways with WRTA service. As opportunities arise to improve these bus stops in the future, and as bicycle facilities in the WRTA service area expand, it is important to consider how bicycle facilities can most safely be integrated with bus stops.

Bike lanes at bus stops can generally be configured in three ways:

- **Bike Lane Adjacent to Bus Stop:** Bike lanes adjacent to a bus stop are common where the bus stop is not in the travel lane. In these instances, it is recommended that the edge lines of the bike lane are dashed where a bus encroaches on the bike lane, entering or leaving a bus stop.

  Figure 29: Bike Lane Adjacent to Bus Stop (Fall River, MA)

- **Through a Bus Stop:** Buses may stop in a bike lane at bus stops that do not stop fully outside the travel lane. In these instances, the bike lane should have a dashed lane line in the bus stop zone to make bus drivers and bicyclists aware of the dual use of this segment of the bike lane.

Figure 30: Bike Lane Through a Bus Stop (Wakefield, RI)

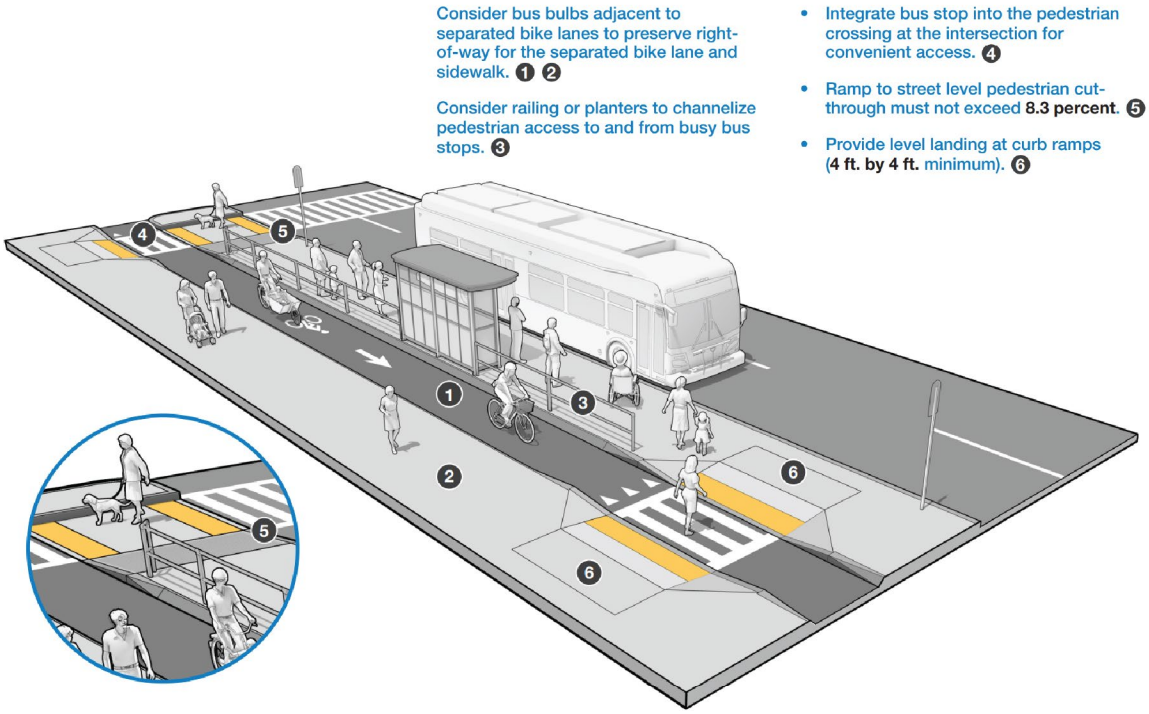


- **Behind a Bus Stop (Floating Bus Stop):** Placing bike lanes behind a bus stop separates the bus stop from the sidewalk network, creating a "floating bus stop" or "bus island." These are particularly useful on roads with high bus ridership and high volumes of people cycling or roads with protected bike lanes.

  Floating bus stops are increasingly common and prevent conflicts between buses serving a bus stop and bicyclists in the bike lane. However, floating bus stops require a crosswalk across the bike lane to establish the conflict zone between riders and bicyclists. As with a crosswalk across a traditional travel lane, bicyclists must yield to people walking. The bike lane can be at the same grade as the sidewalk and floating bus stop or at street level, or midway between the sidewalk and street. Chapter 5 of MassDOT's Separated Bike Lane Planning & Design Guide contains additional information on floating bus stops.

Figure 31: Bike Lane Behind a Bus Stop (Floating Bus Stop) (Boston, MA)





Source of graphic: MassDOT Separated Bike Lane Planning & Design Guide, Chapter 5

Bus Priority Measures

Although bus priority measures are not directly related to bus stop design, the location of stops, as discussed in the previous chapter, can enable the addition of bus priority measures. This section is intended to provide high-level guidance on bus priority treatments to WRTA and municipalities in the region. Detailed guidance on bus priority treatments can be found in the NACTO Transit Street Design Guide.

Bus Lanes

Bus lanes are travel lanes dedicated to bus use that improve speed and reliability and allow buses to avoid conflicts with other vehicles and traffic on the roadway.

Bus lanes are commonly designated with red paint and delineated with a wide solid white line next to the travel lane, with a "BUS ONLY" stencil. They can be placed next to a sidewalk/curb or be offset from a sidewalk/curb next to a parking lane. Curbside bus lanes will have in-lane bus stops. Parking off-set bus lanes can be paired with a curb extension or floating bus stop to create an in-lane bus stop and maximize the benefits of the bus lane.

Bus lanes can be operational full or part-time (e.g., during peak hours) and may be exclusive to buses or shared with bicycles, delivery trucks, or traditional taxis. Part-time bus lanes can revert to parking, sometimes in conjunction with a bike lane, during off-peak hours

Queue Jumps

Bus queue jump (or by-pass) lanes are short bus lanes, sometimes shared with right turns and bicycles, located on an intersection approach. Queue jumps allow buses to by-pass a queue of waiting vehicles by using the parallel curbside travel lane to "jump the queue." These lanes typically coincide with far-side bus stops and can be combined with transit signal priority.

Transit Signal Priority

Transit Signal Priority (TSP) provides buses approaching an intersection with an extended or early green light so there is minimal or no wait time for buses at the intersection. It can provide an advanced signal phase for buses, only if it is used in conjunction with a bus lane or bus queue jump lane.

5. Bus Stop Amenities

Bus stop amenities are the elements available at a given bus stop, such as bus stop signs, maps, shelters, and benches. Amenities at bus stops provide safe and comfortable stops for riders, improve the rider waiting experience, and help increase the visibility of bus stops.

Each amenity is discussed in further detail below. As discussed in Chapter 3, amenity placements must abide by ADA clearance and path of travel requirements. For guidance on prioritizing the installation of bus stop amenities at different types of bus stops, refer to Chapter 6: Bus Stop Typology and Standards.

Bus Stop Signs

Every bus stop should have a sign at the front of the bus stop that is easily identifiable by customers and bus drivers and provides information to facilitate use of the transit service.

Bus stop signs serve multiple functions. For riders, the sign markets the bus service to the public to promote use by new or occasional riders. The front signs include route number(s) and end point destination(s) that affirm to riders that they are at the correct stop for the direction they are headed. Signs should complement printed or digital information and be designed to assist riders with limited vision.

For the bus operator, the front sign identifies where riders are waiting to board the bus and the front door landing area. To other road users, signs indicate the front and rear of the bus stop zone and the designated no parking area.

Content and Design

WRTA introduced redesigned bus stop signage as part of its larger rebranding initiative. Bus stops have a primary bus stop sign that includes the agency's name and logo, the numbers, destinations, and directions (where necessary) of the routes serving the stop, and the agency's website and phone number. Bus stops also include a placard installed on the bus stop pole to help riders access real-time arrival information for the stop, including the stop's ID number, a phone number to text for updates, and QR codes for riders to download the Transit app.

Figure 32: WRTA Bus Stop Signage (Diagram with Dimensions and Installed)



Figure 33: WRTA Bus Stop Sign (Template Diagram and Installed)





Figure 34: WRTA Bus Stop Real-Time Placard (Template Diagram and Installed)

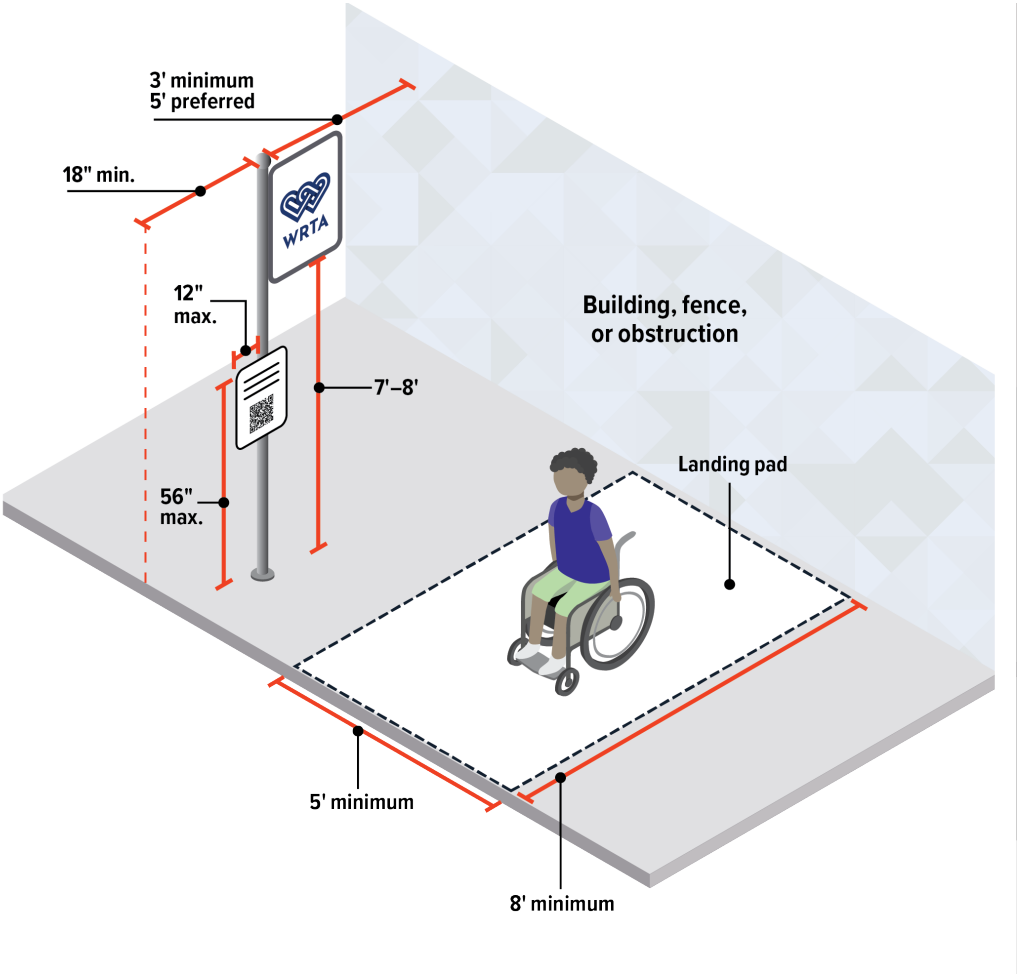




Placement

- Bus stop signs should be placed where customers board at the front door of the bus at the beginning of the bus stop zone, adjacent to the landing pad.
- Bus stop signs should ideally be mounted on their own post. Historically bus stop signs have also been mounted on light poles, utility poles, signal poles, etc. However, if there are existing signs on these poles, the vertical clearance required may not be met, and so an additional signpost may ultimately be required. Signs should not be installed on bus shelters, where they are less visible from the roadway, and encroach on the pedestrian path of travel.
- The WRTA and its local partners must install signposts 18 inches from the face of the curb to avoid potential collisions with bus mirrors and other vehicles.
- Sign placement cannot obstruct the 5-foot accessible path of travel. In locations with narrow sidewalks or other constraints, the sign can be placed at the back of sidewalk to maintain an accessible path of travel. To confirm sign placement in space-constrained conditions, planners and engineers should contact WRTA.
- Set back signs at least 3 feet from any intersection or driveway to avoid potential vehicle collisions. If there are large commercial vehicles active in the driveway, additional clearance may be required.
- The bus stop sign should be positioned perpendicular to the curb with the line of traffic flow, in order to be visible to approaching buses and other traffic, as well as to pedestrians on the sidewalk.
- Bus stop signs should not be placed so low to the ground that pedestrians may hit their head, nor too high that the sign becomes illegible. According to MUTCD, signs should have a minimum 7 feet vertical clearance above the ground. To maintain visibility, the bottom of the sign should not be installed higher than 8 feet above the ground. Additionally, overhanging branches and other vegetation should be trimmed back to allow for sign visibility.

Figure 35: Bus Stop Sign Placement & Dimensions



Benches

Benches are a relatively low-cost bus stop amenity that can provide riders with some level of comfort, especially on bus routes that do not run very frequently, and at bus stops that have lower ridership, where a more substantial investment in a bus shelter may not be viable. Free-standing benches are relatively simple to install and more easily accommodated on narrower, constrained sidewalks, and where a shelter might not be feasible. While benches are a relatively simple amenity to install, benches may require some upkeep including maintenance and cleaning.

Benches that are part of a shelter are considered separately from free-standing benches discussed here.

Design

- Public Right-of-Way Accessibility Guidelines (PROWAG) requires that benches provide back support and armrests to help people to sit down and stand up. Standard benches should be

at least 43 inches long (to accommodate 2 persons) and 20-24 inches wide and have a seat height of 17-19 inches.

- Use shot-blasted, galvanized materials to prevent degradation.
- Standardizing the style of benches distributed throughout the WRTA service area provides continuity and consistency, and improves the overall visual aesthetic of bus stops.

Placement

- Orient benches toward the street so riders can see an approaching bus.
- Benches should have an unobstructed view of an oncoming bus.
- Accessible paths of travel to and through the bus stop must be maintained.
- All benches should have a 6-foot minimum clearance in front of the bench: A 5-foot wide path of travel must be maintained through the bus stop to maintain compliance with ADA guidelines with an additional 1-foot of space required for knee and toe clearance.
- The back of sidewalk is the ideal position for a bench; however, benches should not be less than 6 feet from the back of curb when facing the road.
- Benches placed at the back of sidewalk are less likely to be buried in snowbanks, compared to benches positioned closer to the curb.
- If the bench is located along the back of sidewalk, maintain a minimum 6-inch clear area for maintenance and snow removal between the back of the bench and any adjacent buildings, walls, or fences.
- Avoid placing benches in front of system maps or wayfinding guides.
- Avoid blocking building entrances.
- Mount the bench in at least 4-inch-deep concrete.

Shelters

Bus shelters shield riders from harsh weather conditions and environmental factors such as sun, glare, and wind, while also serving as a recognizable marker for bus stops. They offer a comfortable waiting area for passengers and are among the most prominent amenities at bus stops. In addition, they may also provide lighting, maps, or other customer information. Aside from buses, they are one of the most visible elements of a transit system.

Bus shelters are considered a premium bus stop amenity and require the greatest level of investment and ongoing upkeep for WRTA, property owners, and municipalities. Maintenance tasks may include regular trash collection, cleaning, and the replacement of panels or other shelter components.

Installation of a bus shelter may trigger accessibility improvements, such as bus stop lengthening, an accessible front door landing area, and widening the path of travel.

Design

Shelter designs should be simple, functional, easy to maintain, and hinder vandalism. All shelters should adhere to the following design principles, in addition to meeting ADA requirements, such as providing a 30" by 48" minimum clear floor area and a 48" minimum approach to the floor area to accommodate riders using mobility devices.

- Shelters should have an open side fronting the street, and the side of the shelter facing approaching buses should be open or made of a transparent material. The rear of the shelter should be transparent.
- Shelter panels should limit or lack tinting, allowing people inside the shelter to easily see out, and for people outside the shelter to easily see inside.
- Customers should be able to easily see an approaching bus, and bus drivers should be able to easily see customers inside.
- There should be two or more points of entry or one large entry point.
- Shelters should have internal lighting or be in well-lit areas.
- To prevent the collection of debris, facilitate cleaning, and increase security, shelter walls should not extend all the way to the ground.
- Materials should be resistant to graffiti, breaking, and shattering.
- Shelters can vary in both size and panel configuration to fit different contexts. Different types of shelters fit different sidewalk widths and allow for a clear path of travel. For example, a narrow shelter (narrow depth with a back panel and narrow or no side panels) can be used in locations with narrow sidewalks where providing an accessible shelter would otherwise not be possible.

Placement

The placement of shelters must maintain safety and good visibility of approaching buses, be free of streetscape and landscape elements in the line of sight, and ideally be outside of designated landing areas and accessible path of travel (5-foot clear path).

- Shelter placement cannot obstruct the continuous 5-foot path of travel, which is commonly in front but can also be behind the shelter. The WRTA and its local partners are required to maintain an accessible path of travel between the shelter, front door landing area, adjacent sidewalk, nearest curb ramp, and accessible crosswalk is required
  - For constrained sidewalks, consider a narrow style shelter that has less impact on the path of travel.
- Locate shelter within the bus stop zone, as close as is practical to the front door boarding area to limit time delay from riders leaving the shelter to board.
  - The WRTA prefers shelter locations between the front door boarding area and rear door clear zone with the shelters oriented towards the street.
- Maintain accessible boarding and alighting areas at all doors.

- Locate where there is adequate street or stop-level lighting. At shelters, consider hard-wired or solar lighting options.
- Where possible, place the shelter more than 10 feet from a curb cut for an intersection or driveway and avoid placing directly in front of building access points, windows, and storefronts used for commercial purposes.
- Avoid obstructing building entrances and pathways.
- Avoid locations with obstructions that block the bus operator's view of riders waiting at the bus stop.
- Advertising panels must not block visibility between an approaching bus and waiting riders.
- If the shelter is located along the back of sidewalk, maintain a minimum 1-foot clear area for maintenance and snow removal between the back of the shelter and any adjacent buildings, walls, or fences.
- The sidewalk cross slope must be 2.0% or less on the shelter foundation to facilitate drainage.

Figure 36: Shelter Placement and Accessible Clearance at a Bus Stop

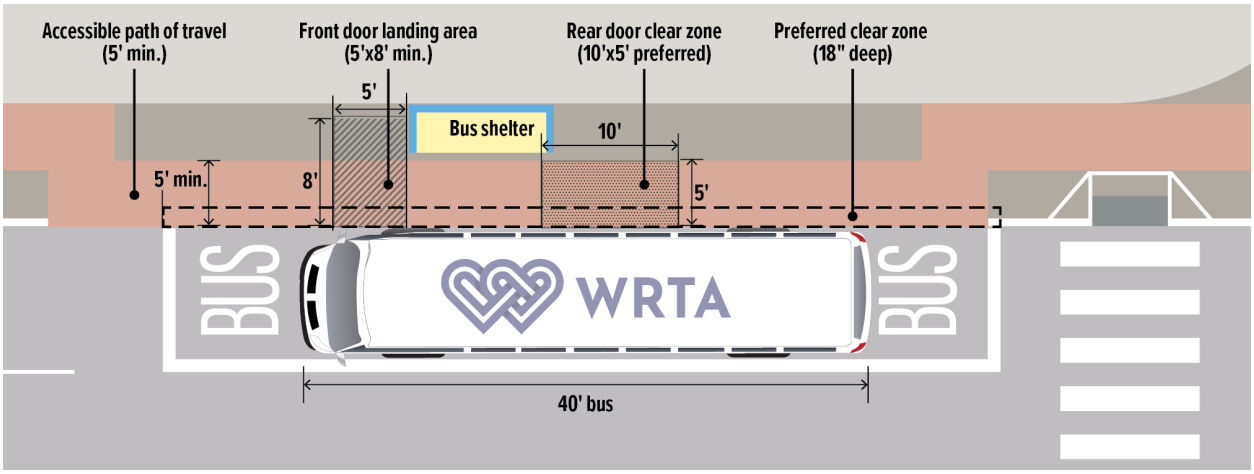


Figure 37: Shelter Siting Guidelines

Guideline	Distance	Notes and Considerations
Distance from back of curb, shelter facing roadway	6′	Preferred distance to face of shelter, facing roadway. Can be reduced if side panel is removed. 2′ acceptable for shelters with no front windscreen and no side panel on one side.
Distance from back of curb, shelter facing away from roadway	18″	Preferred distance to back of shelter, facing towards back of sidewalk (away from roadway).
Distance from back of curb	2′	Preferred distance to shelter roof/overhang, to avoid collisions with bus side mirrors.

Guideline	Distance	Notes and Considerations
Distance from building entrance	10′	Shelter cannot be located in front of building access points, storefronts, or building windows used for display.
Distance from building face/tall boundary treatment on typical/narrow sidewalks - 12′ or less	2′	Preferred distance to back of shelter; with shorter, smaller or more transparent/accessible obstructions such as a planter or fence, 6″ is acceptable, as long as the shelter foundation and footings do not encroach on the abutting property and there is access for maintenance.
Distance from building face/tall boundary treatment on wide sidewalks - 13′ or more	6′	Preferred distance to back of shelter; allowing the pedestrian path of travel through the stop to flow behind the shelter, while riders congregate in the front of the shelter, at the face of sidewalk.
Sight distance	12′	From beginning or end of curb return of an intersection or large commercial access driveway to avoid obstructing sight distance.
Distance from crosswalk	15′	-
Distance from streetscape elements	3′ – 12′	3′ = Distance from streetscape elements 5′ = Preferred distance from tree trunk 4′ = Preferred distance from other street furniture and vertical sidewalk elements (benches, poles, etc.) 12′ = Preferred distance from fire hydrant
Accessibility clearance – Vertical	80″ minimum	Vertical clearance
Accessibility clearance – Horizontal	5′ (4′ minimum)	Horizontal clearance – pedestrian path of travel in front of or behind shelter. This may be reduced to 3′ at a pinch point.

Shelter Siting Guidelines reflect Americans with Disabilities Act (ADA) federal requirements and PROWAG (Public Right-of-Way Accessibility Guidelines) guidance

Rider Information

In addition to the critical information provided on the bus stop sign, rider information materials at stops can be helpful for first-time or infrequent riders, help identify the bus stop, and communicate general system information.

- **System maps** provide routing information for an entire bus trip and can be used to identify transfer locations. In addition, system maps can act as advertising for the bus system by showing people all the destinations they can access by bus.
- **Schedules** help customers know when buses should arrive. Schedule information is particularly important on lower frequency bus routes so customers can try to avoid waiting for an unreasonable amount of time at a bus stop. Updating physical schedule information at

bus stops is resource intensive, as it may need to be updated several times per year to reflect seasonal service changes. It is also difficult to time information updates so that bus stops do not have newer schedule information before it takes effect, or too late after it takes effect. For these reasons, schedule information is recommended to be shared digitally, either through a smartphone app or real-time information screens or signs (see "Real-Time Information" below).

At some WRTA bus stops, an additional sign is posted to advertise real-time information. This additional sign, typically posted about halfway up the pole between the ground and the bus stop sign, displays the bus stop's ID number and a QR code that riders can scan to link to real-time arrival information for that bus stop.

Lighting

Adequate lighting supports customer comfort, safety, and security. It also enables bus operators and other drivers to see waiting riders. Ideally, bus stops are co-located near overhead streetlights that illuminate the stop at night. Shadows from adjacent structures may warrant additional lighting. Nearby crosswalks and curb ramps that serve the bus stop should also be illuminated.

Lighting should be at the bus stop through use of pedestrian-scale streetlights. If a shelter is present, the WRTA recommends both interior and area lighting. Supplemental lighting from nearby businesses improves visibility but does not substitute area lighting.

Placement and maintenance of lighting is typically the responsibility of the municipality, except for lighting inside a shelter that is maintained through WRTA's shelter contract. WRTA works to prioritize the siting of bus stops at locations where existing lighting sources can provide access for WRTA passengers. Providing lighting directly at bus stops is challenging due to the requirement to meter electrical service for a low power draw. WRTA may consider solar lighting at locations where conditions permit, which would be determined on a site-by-site basis.

Bicycle Parking

Bicycle racks help to provide an additional way for passengers to access bus service. Designated bike parking discourages people from locking bicycles in areas that interfere with a rider's path of travel or other pedestrians. It also provides an option for riders if the rack on the front of the bus is already at capacity.

WRTA does not include bicycle racks in the development of bus stops directly, but will partner with organizations interested in providing this amenity at locations that allow for the safe and unimpeded usage of the primary function as a bus stop.

Design

Municipalities and other WRTA partners should provide "post and ring" or "inverted U"-style racks at bus stops. For additional bike parking design guidance, users of this guide may consult the

Association of Pedestrian and Bicycle Professionals (APBP) guide, “Essentials of Bike Parking: Selecting and Installing Bike Parking that Works” (2015).

Placement

- The installing entity should place bike racks away from curbs, outside of the accessible path of travel, and should account for the size of parked bikes. Bike racks must be positioned so that no matter how a bicycle is locked to it, it will not obstruct the path of travel and landing areas. Do not assume bike owners will remove wheels or make other adjustments to reduce their footprint.
- Locate bike parking away from the front door landing area to reduce friction with people getting on and off the bus.
- Locate at a convenient location proximate to the bus stop and within sight of passengers (within 50 feet of the bus stop).
- Ensure easy and unobstructed access to bike racks.
- Orient single bicycle racks to be parallel to the curb to maximize the path of travel.
- Place bike racks in well-lit areas that are not blocked by a bus shelter, landscaping, or other site elements.
- Consider the path to enter and leave the bus stop from adjacent bike lanes, bike trails, or roadways.

Real-Time Information

Real-time information provides up-to-date information on bus arrival time, which is based on the actual location of the bus along the route. Access to real-time arrival information enhances the rider experience by enabling more accurate trip planning, more comfortable connections, and shorter wait times when riders can plan their travel accordingly. It can help riders better anticipate their travel time, as well as decrease the perceived time spent waiting, since the uncertainty of how far away the bus is or whether there are any delays can make waiting for a bus feel longer than it actually is.

Real-time information displays at bus stops make bus arrival information immediately available to passengers waiting at a stop. They improve the waiting experience for all riders at a stop but are particularly useful for riders without mobile devices to be able to access real-time arrival information.

Real-time information can be shown on digital screens or signs at bus stops, ranging from simple LED or "e-ink" (electronic ink) displays to larger LCD screens with multiple colors and more detailed information, and may be most appropriate to prioritize at high-ridership stops or stops with high transfer volumes.

WRTA makes its real-time bus arrival information publicly available through open data, which allows partners like adjacent property owners to display real-time arrival information on any screen connected to the internet. Open data resources can be found at: https://gtfs.wrta.cadavl.com/WRTA/GTFS/.

Figure 38: Examples of Real-Time Information at Bus Stops (Left: E-Ink in Chelsea, MA. Right: Real-Time Display in Urbana, IL.)



6. Bus Stop Types and Standards

While each WRTA bus stop is unique, they generally fall into one of four categories based on ridership, operating environment, and nearby destinations. These bus stop types identify the appropriate minimum, preferred, and optional amenities for all of the agency's existing and future bus stops.

WRTA serves a variety of communities and environments, including urban, suburban, and rural. This provides a range of operating environments that influence the levels of service provided, ridership volumes, and travel patterns. Bus stop types categorize bus stops according to operational, service, and utilization characteristics, and identify the appropriate amenities to be offered by each type. These types are meant to encompass the range of bus stops that exist in WRTA's system, from the most basic bus stops with very low ridership to stops that experience the highest levels of ridership and activity. The minimum, preferred, and optional amenities for all of the agency's existing and future bus stops are outlined for each type of bus stop.

No matter how many customers use a bus stop on a given day, each bus stop requires certain key design elements to be safe, accessible, reliable, and comfortable for customers. These bus stop types aim to provide WRTA with clear and practical guidelines for providing amenities at bus stops. By formalizing the amenity identification and installation process, WRTA can set clear goals for bus stop quality and provide justification for how and when bus stop upgrades occur.

Bus Stop Types

WRTA's bus stops generally fall into one of four categories based on ridership, operating environment, and surrounding land uses:

1. Standard Bus Stop
2. Mid-Activity Bus Stop
3. High-Activity Bus Stop
4. Off-Street/Private Property Bus Stop

These categories, or types, specify the minimum, preferred, and optional amenities for all of the agency's existing and future bus stops. Each bus stop type and its selection criteria are described in the table below.

Figure 39: WRTA Bus Stop Types and Criteria

	Standard	Mid-Activity	High-Activity	Off-Street / Private Property
Description	Most typical bus stop, generally supporting lower daily ridership and less frequent bus service, typically served by only one route.	Bus stops with moderate ridership, or lower-ridership stops with transfer activity, long wait times, or concentrations of potential riders with mobility needs.	Bus stops where high ridership, transfer activity, and/or proximity to a major activity center merit increased amenities.	Bus stops located on private property where WRTA has limited control (e.g., shopping centers, campuses).
Criteria	▪ <20 average weekday boarding	▪ 20-49 average weekday boardings ▪ Stops that are close to healthcare centers, housing serving older adults, or other areas with high concentrations of riders with mobility needs ▪ Stops with high transfer activity ▪ Stops with long wait times	▪ 50 or more average weekday boardings ▪ Stops that are close to healthcare centers, housing serving older adults, or other areas with high concentrations of riders with mobility needs ▪ Stops with high transfer activity	▪ Located on private property; WRTA will need to work with property owners and developers to determine feasible and appropriate amenities.

Standard Bus Stops

The vast majority of WRTA bus stops are categorized as Standard bus stops. These stops experience relatively lower ridership, and many are served by only one bus route.

Because they range widely in terms of curb condition, ADA compliance, and room available for investment, these bus stops have minimum requirements that require only ADA compliance and a bus stop sign. Preferred amenities should be included where space, funding, and other factors allow.

Figure 40: Standard Bus Stop Example with Minimum Elements



Mid-Activity Bus Stops

Mid-Activity bus stops have higher ridership volumes than Standard bus stops, typically serving a moderate level of boarding activity. Bus stops can also be considered Mid-Activity if they have lower ridership volumes but are located near concentrations of potential riders with high mobility needs, such as medical facilities or housing that serves older adults, and merit additional amenities to better serve riders waiting at these stops.

Figure 41: Mid-Activity Bus Stop Example with Minimum Elements



High-Activity Bus Stops

High-Activity bus stops have the system's highest existing transit activity and continued potential for growth. They are often located at major destinations, along busy corridors, or locations with significant transfer activity, and may be served by multiple routes or frequent bus service. Major destinations include but are not limited to hospitals, residential developments, and shopping centers. High-Activity bus stops may also have moderate ridership but be located close to concentrations of potential riders with high mobility needs, such as medical facilities or housing that serves older adults. This type of stop receives more amenities due to their high ridership and the importance of these stop locations.

Figure 42: High-Activity Bus Stop Example with Minimum Elements



Off-Street/Private Property Bus Stops

Off-Street/Private Property Bus Stops are located on private property, outside of the public ROW. Ridership and number of routes served varies widely. These bus stops often directly serve major retail, employment, and education destinations: supermarkets, big box stores, and campuses are common locations for Off-Street bus stops. Because this bus stop type is not under the direct control of a municipality or public agency, minimum requirements only include ADA compliance and a bus stop sign, even at bus stops with very high ridership. Preferred and optional amenities must be negotiated with the property owner. Higher ridership off-street bus stops would preferably have similar amenities to Mid-Activity or High-Activity Activity Bus Stops, while lower ridership bus stops of this type would align more closely with Standard Bus Stops.

Figure 43: WRTA off-street bus stops located on private property at Auburn Mall





Amenities by Bus Stop Type

Figure 44 below shows the minimum, preferred, and optional amenities for each of WRTA's four bus stop typologies:

- Minimum (✓) amenities are amenities required at each bus stop.
- Preferred amenities are amenities that are recommended for inclusion at bus stops but are not required because physical constraints or other factors may affect the inclusion of those features.
- Optional amenities are the remaining amenities that may feasibly be included at a bus stop.

This table provides guidance for the acceptable amenities at each stop type, but they should only be considered if all amenities adhere to WRTA's accessibility requirements. In addition to required amenities, an effort should be made to include preferred amenities unless there are physical or accessibility constraints. Optional amenities are remaining amenities that can be added at the discretion of WRTA and other stakeholders.

Figure 44: Bus Stop Amenities by Stop Type

Bus Stop Amenity	Standard	Mid-Activity	High-Activity	Off-Street / Private Property
Bus Stop Sign	✓	✓	✓	✓
Real-time QR Code	✓	✓	✓	✓
Bench	Optional	✓	✓	Preferred
Lighting	Preferred	✓	✓	Preferred
Shelter		Optional	✓	Optional
System Map, Other Rider Information		Optional	✓	
Real-Time Information		Optional	Preferred	Optional
Bicycle Parking, by other parties	Optional	Optional	Optional	Optional

7. Implementation

With finite resources, WRTA should prioritize bus stop improvements and amenities to maximize improvements for the largest number of WRTA riders. Since WRTA does not typically own the land at bus stops, it relies on other parties to construct or approve the construction of new and improved bus stops.

Prioritizing Bus Stop Improvements

Making basic bus stop improvements and installing amenities will primarily occur through two mechanisms: as part of larger roadway or development projects and through standalone bus stop improvements. Standalone bus stop improvements require an objective method to prioritize the installation of amenities since WRTA has finite financial resources that cannot accommodate all improvement requests at once.

Prioritization Criteria

Key criteria for prioritizing stand-alone bus stop improvements include the following:

- Ridership: Prioritizing stops with high ridership volumes allows a significant share of riders to benefit from improvements.
- Zero-Vehicle Households: Prioritizing improvements at stops located near high concentrations of zero-vehicle households focuses improvements that serve riders or potential riders who may rely on transit the most.
- Sidewalk/Accessibility Conditions: This consideration prioritizes investments at stops that require improvements in order to be considered accessible.

Using these criteria, the scoring rubric below can be used to identify bus stops that are the highest priority for improvement. Bus stops to consider for improvements are those that fall short of the amenity requirements for their Stop Type, as well as those that need accessibility improvements (i.e., construction or improvement of accessible pedestrian landing area or continuous sidewalk).

Figure 45: Scoring Criteria for Prioritizing Bus Stop Improvements

Criteria	Score
Number of average daily boardings	Up to 20 *Stops with more than 20 daily boardings will receive the maximum of 20 points*
Zero-Vehicle Households	10 if stop serves an area with a share of zero-vehicle households above the service area average
Presence of pedestrian landing area	10
Presence of continuous sidewalk	10
Maximum Total	**50**

In addition, WRTA should incorporate the following considerations into identifying and prioritizing opportunities for bus stop improvements:

- Geography or Corridor Continuity: Improving stops that are clustered together along a corridor or in a concentrated area maximizes the effectiveness of stop optimization across several related stops while making efficient use of construction timing and resources. This approach is also more logical for riders, and demonstrates how changes to a larger set of stops can yield benefits to the overall corridor, including enhanced bus stop facilities and improved operations and service.
- Level of Effort: Stops with adjustments that do not require substantive capital investment to be modified can be prioritized in coordination with other factors to advance project outcomes more quickly.

Bus Stop Pairs

It is recommended that bus stop improvements be made concurrently for the two bus stops that comprise a bus stop pair, since bus customers typically travel round trip from the same location. In addition, improving both bus stops in a bus stop pair results in a more efficient use of agency resources than improving bus stops individually, since many aspects of the design and construction services can be done as one project. Exceptions can be made if one bus stop is already in good condition.

Leverage Roadway and Development Project Opportunities

WRTA can work with municipal and State partners to identify additional opportunities to implement bus stop improvements as part of roadway projects, planned developments, and other efforts. Bus stop improvements or construction should be incorporated into planned roadway projects and new developments to accelerate bus stop improvements in a cost-effective way while removing the need for future additional construction work at that location.

Bus Stop Location Modifications

WRTA will consider adding new stops on an as-requested basis. WRTA will consult this guide in considering requests for new stops.

WRTA maintains a bus stop database, which includes passenger ridership. On an annual basis, WRTA will update this database and review all bus stop ridership activity to consider stops for potential removal or upgrade.

WRTA will coordinate with municipal partners to identify opportunities to improve bus stop amenities, bus stop accessibility, and path of travel to bus stops, including:

- WRTA-review of development plans for new developments occurring along transit routes
- Identification of municipal public works projects occurring within the vicinity of bus stops
- Pursuit of funding opportunities for corridor-based bus stop investment

Responsibilities of Partner Entities

Amenity Installation and Maintenance

The maintenance and installation of bus stop amenities are often the responsibility of multiple entities, including WRTA, municipalities, MassDOT, and private landowners. Figure 46 details the most common responsibilities for bus amenity installation and upgrades.

Figure 46: Bus Stop Element & Amenity Responsibilities

Bus Stop Element or Amenity	WRTA	Municipality / MassDOT / Developer
Landing Pad	Install Coordinate	Install Maintain
Bus Stop Sign	Install	Coordinate
Street Lighting	N/A	Install Maintain
Trash Receptacles	N/A	Install Empty Maintain
Benches/Seating	Install Maintain	Install Maintain (custom)
Shelters	Install Maintain	Approve Install Maintain (custom)

Bus Stop Element or Amenity	WRTA	Municipality / MassDOT / Developer
Bike Parking	Install Maintain	Install Maintain

Municipal Responsibilities

Planning

WRTA can encourage municipalities to conduct audits of bus stops under its jurisdiction to determine major concerns or accessibility issues. Municipalities may partner with WRTA in these audits. These audits can facilitate the efficient inclusion of bus stop improvements in roadway projects when these projects reach the design phase.

Construction

WRTA expects that municipalities will upgrade bus stops to be ADA compliant when sidewalks are reconstructed, and will install bus pads using concrete or hot asphalt mix, or stripe bus stop zones, when roadways are being repaved. Municipalities are strongly encouraged to collaborate with WRTA during the scoping and early design phases of projects impacting bus stops.

For bus stop improvement projects being led by WRTA, the agency will need to coordinate with municipalities or MassDOT for plan review and obtain necessary approvals and permits.

Operations

To promote efficient operation of the WRTA bus system, WRTA expects that municipalities will fulfill the following actions:

- Strictly enforce parking regulations at bus stops.
- Maintain amenities that they install, including emptying trash receptacles and maintaining custom shelters.
- Maintain and refresh bus stop striping as part of roadway projects along bus routes.
- Clear snow from the bus stop zone to enable customer access to bus stops. Some of this responsibility may be transferred to abutters by municipal ordinance.

State Responsibilities

Construction

WRTA expects that MassDOT will upgrade bus stops to be ADA compliant when sidewalks are reconstructed and stripe bus stop zones when roadways are being repaved. MassDOT District 3 is strongly encouraged to collaborate with WRTA during the scoping and early design phases of

projects impacting bus stops. For bus stop improvement projects being led by WRTA, MassDOT District 3 will need to review and approve plans and issue permits.

Operations

MassDOT is expected to maintain and refresh bus stop striping as part of roadway projects along bus routes.

Developer Responsibilities

Construction

At the direction of municipalities, developers can be required to construct bus stops and provide amenities consistent with the nature of the development and anticipated ridership at the bus stop. Developers are strongly encouraged to collaborate with WRTA on the consideration of amenities to install and to consult with WRTA for bus and bus rider roadway design best practices, and may be required to evaluate bus schedule impacts if off-street bus stops are proposed.

Operations

WRTA expects that developers maintain amenities, including regularly emptying trash receptacles and maintaining shelters that they install. In addition, developers are responsible for shoveling snow at bus stops on their property to provide a clear path of travel and ensure access.