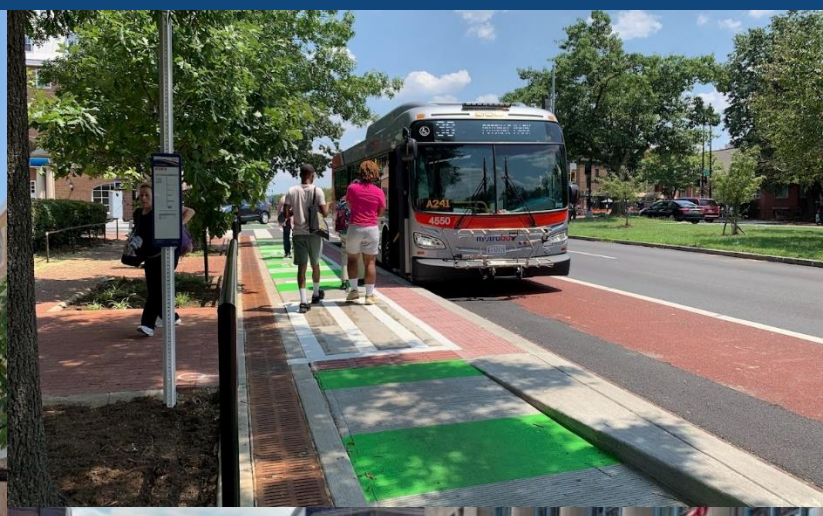
Guidelines for the Design and Placement of Bus Stops

November 2023



Washington Metropolitan Area Transit Authority

KFH GROUP

AECOM

Guidelines for the Design and Placement of Bus Stops

Final Report
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Prepared for:

Washington Metropolitan Area Transit Authority

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Acronyms

ADA	Americans with Disabilities Act
APS	Accessible Pedestrian Signals
BRT	Bus Rapid Transit
BPLN	Office of Bus Planning and Scheduling
CIEDS	Customer Information Electronic Display Screens
JDAC	Office of Joint Development and Adjacent Construction
MUTCD	Manual on Uniform Traffic Control Devices
NACTO	National Association of City Transportation Officials
PROWAG	Public Rights-of-Way Accessibility Guidelines
RTPI	Real Time Passenger Information
TCRP	Transit Cooperative Research Program
TSP	Transit Signal Priority
WMATA/Metro	Washington Metropolitan Area Transit Authority/Metro

Introduction

The bus stop design and placement guidelines provided in this document are an update to the Washington Metropolitan Area Transit Authority's (WMATA/Metro's) 2009 *Guidelines for Design and Placement of Transit Stops*. This updated document was developed following the completion of the *Supplemental Guidelines for the Design and Placement of Bus Stops* (2023) which developed updated and additional guidance for bus stop design and placement.

The design guidelines are intended to provide Metro and its jurisdictional partners with specific design criteria to be integrated into local planning policies, complete streets planning, bus stop improvement projects, and other local priorities. Developers or builders who are interested in developing transit friendly projects may also make use of these design guidelines.

The updated design guidelines are based on a review of current bus stop guidelines used by local jurisdictions in the Metrobus service area, a review of national best practices guidelines, and discussions with Metro staff and jurisdictional partners including representatives from the District of Columbia, Arlington County, Fairfax County, Montgomery County, Prince George's County, and the cities of Alexandria and Fairfax.

Guide Overview

The sections of this document are organized as follows:

How to Coordinate with Metro

As agencies and jurisdictions advance bus stops and amenities throughout the region, Metro is committed to participating in the implementation and maintenance of these facilities with the following expectations from localities:

Design

During early planning stages, coordinate with WMATA's Office of Bus Planning (BPLN) to evaluate local context, identify desired bus stop elements, and document design objectives.

ADA

WMATA understands that some bus stop sites precede the passage of the Americans with Disabilities Act of 1990 and may not be fully ADA-compliant. As agencies and jurisdictions renew or redevelop infrastructure, it is recommended that they coordinate with local accessibility officers or WMATA to ensure future compliance.

Installation

Submit conceptual or preliminary design plans for WMATA's approval prior to installation. Include provisions for electricity if a shelter is present or if dynamic information signage is planned.

Maintenance

WMATA will maintain amenities it owns at bus stops, such as bus stop flags, real-time passenger information (RTPI) and poles. Agencies, jurisdictions, or site owners are responsible for regular maintenance of the remaining bus stop assets to keep the bus stop fully functioning. They should also anticipate the replacement of bus stop infrastructure and amenities at the end of their use life to maintain a fully functioning bus stop.

WMATA Property

If proposed work is on or adjacent to WMATA-owned property or infrastructure, coordination is required with WMATA's Office of Joint Development and Adjacent Construction (JDAC).

1.0 Bus Stop Placement

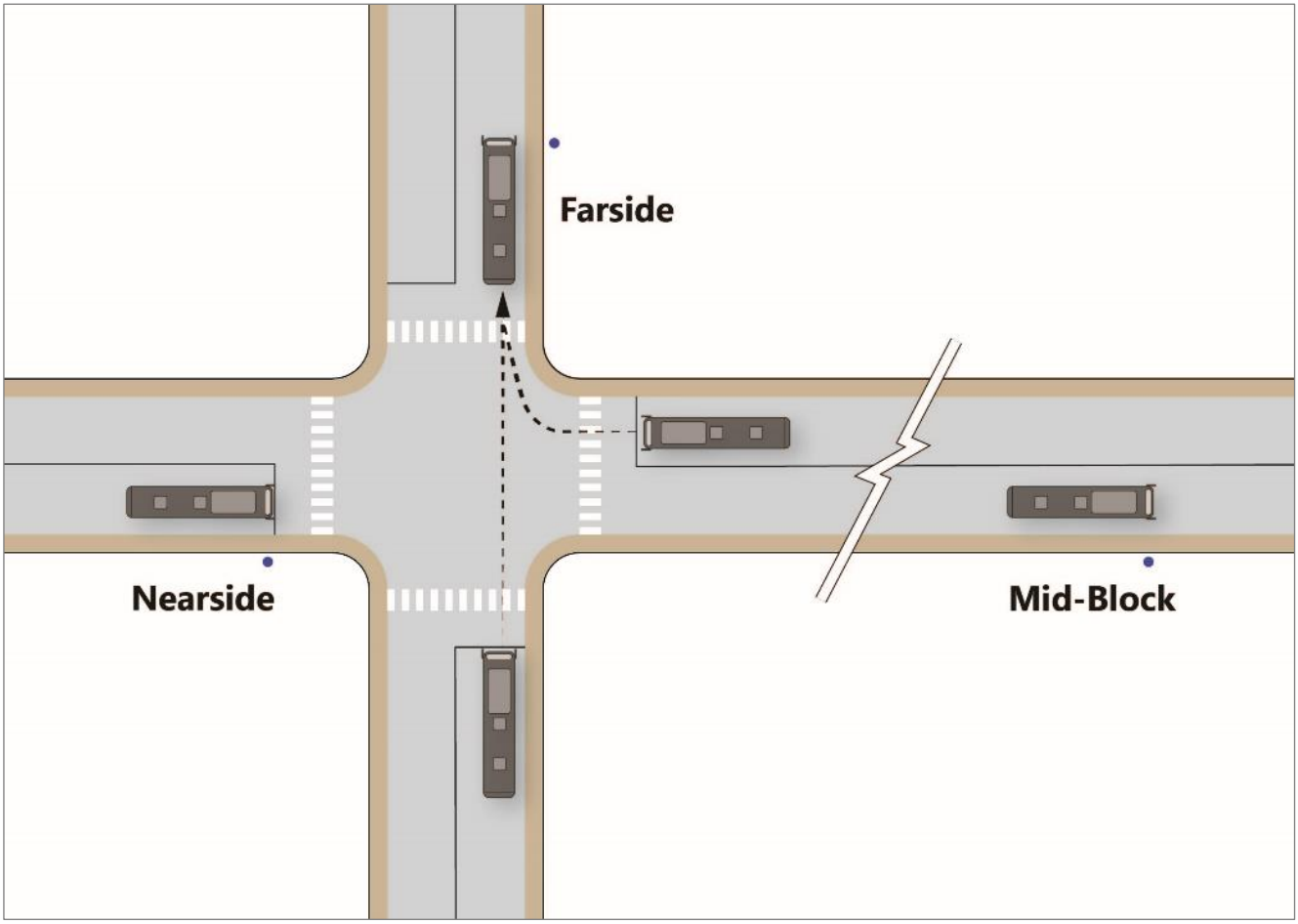
This section presents typical bus stop placement configurations and recommendations when considering placement options. The following configurations are provided as guidelines. Actual bus stop placement should take all location factors into account and be decided on a case-by-case basis.

Bus stop locations are generally defined in relation to the intersection (**Figure 1**). The types of bus stop locations as it relates to the intersection are:

- Near-side (upstream) of the intersection
- Far-side (downstream) of the intersection
- Mid-block (midway between intersections)

The relative advantages and disadvantages for each type of bus stop placement are presented in **Table 1**, in addition to the circumstances under which each location is recommended.

Figure 1: Bus Stop Placement



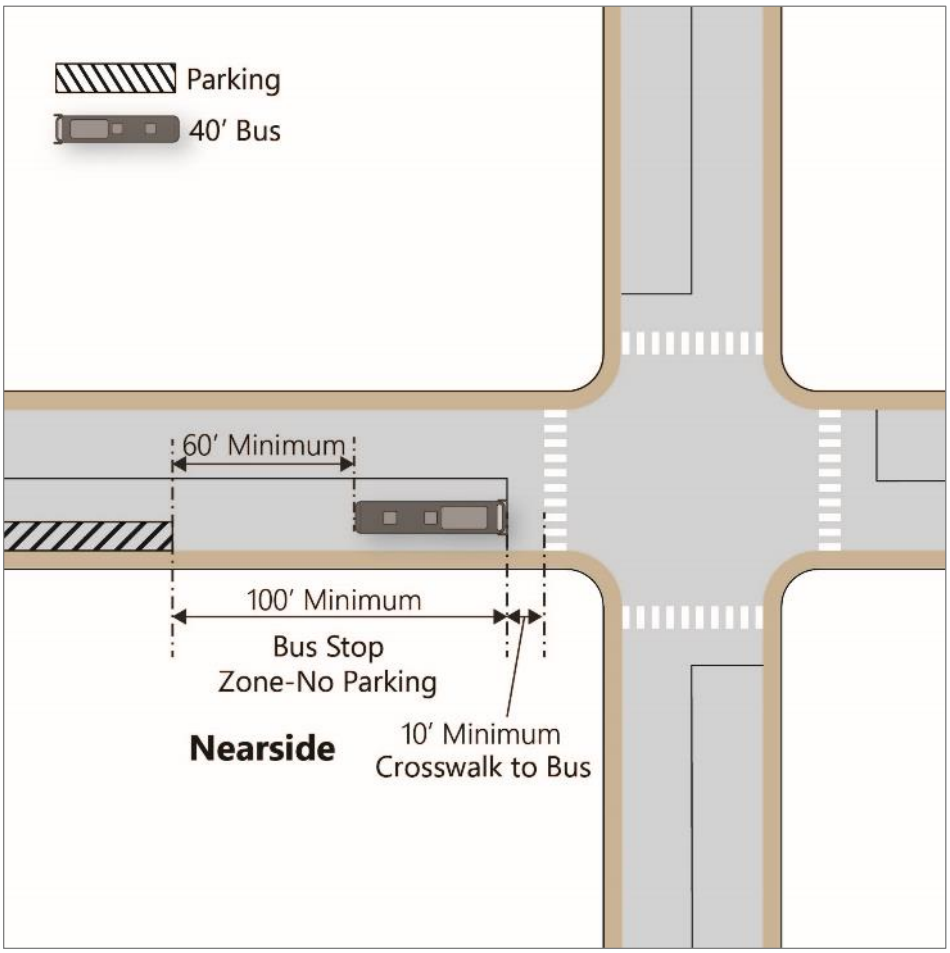
1.1 Near-Side Stops

Figure 2 provides an illustration of a typical near-side bus stop location. Stops located near-side of the intersection should be placed at least 5 feet from the crosswalk to prevent the bus from straddling the crosswalk while serving the stop. Near-side bus stop should be used if:

- Primary trip generator is downstream from the intersection.
- Existing pedestrian facilities are greater than on the far-side.
- Pedestrian movements are safer than on the far-side.
- Route requires a right turn at the intersection.

If curb-side parking is permitted before the stop, a minimum 100 feet no-parking zone must be provided to allow the bus to align with the curb. Near-side stops at intersections with dedicated right-hand turn lanes where right-on-red turning is permitted should be avoided.

Figure 2: Typical Near-Side Bus Stop Placement



Where Recommended:

- Primary trip generator is before the intersection.
- Existing pedestrian conditions are better than on the far-side.
- Pedestrian movements are safer than on the far-side.
- Vehicular traffic is heavier on the far-side.

Spacing Considerations:

- Add 20 feet to bus stop zones for a 60ft articulated bus.
- Increase bus stop zone by 50 feet for each additional 40ft bus or 70 feet for each additional 60ft articulated bus.

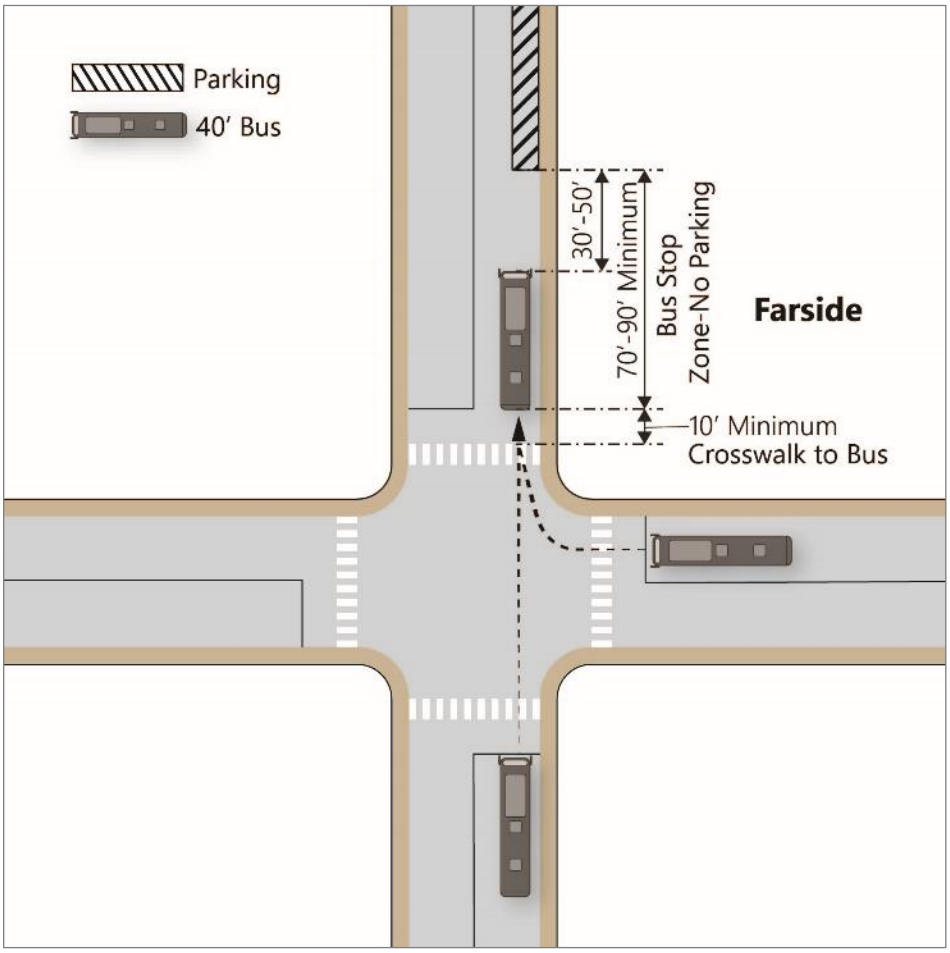
1.2 Far-Side Stops

Figure 3 provides an illustration of a typical far-side bus stop location. For a standard 40 feet bus, the stop should be located at least 50 feet from the intersection to ensure that the rear of the vehicle does not protrude into the intersection and/or straddles the crosswalk. Far-side bus stop should be used if:

- Primary trip generator is upstream from the intersection.
- Existing pedestrian facilities are greater and safer than on the near-side.
- High volume of right turns near-side of intersection.
- Stop is part of a Bus Rapid Transit (BRT) service.
- Pedestrian movements are safer than on the near-side.

If curb-side parking is permitted after the stop, a minimum 90 feet no-parking zone must be provided to allow the bus to safely merge back into traffic.

Figure 3: Typical Far-Side Bus Stop Placement



Where Recommended:

- Near-side stop is in a right turn lane.
- Primary trip generator is after the intersection.
- Route alignment requires left turn.
- High volume of turns.
- Complex intersection with multi-phase signals or dual turn lanes.
- Existing pedestrian conditions are better than on the near-side.
- Vehicular traffic is heavier on the near-side.

Spacing Considerations:

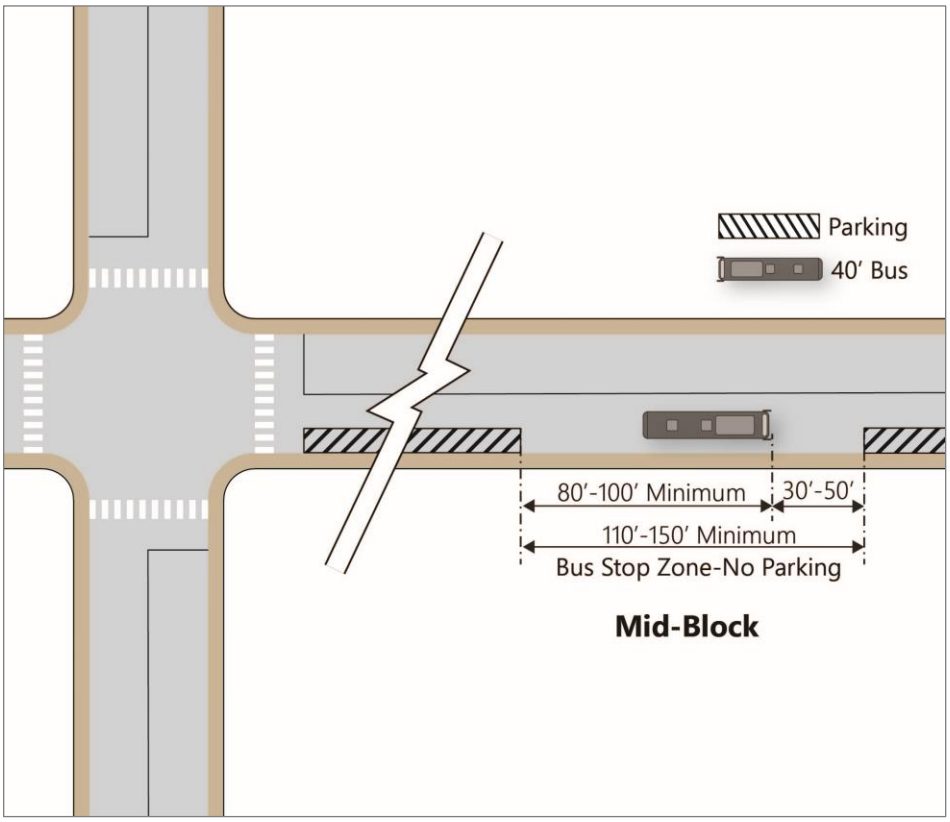
- Add 20 feet to bus stop zones for a 60ft articulated bus.
- Increase bus stop zone by 50 feet for each additional 40ft bus or 70 feet for each additional 60ft articulated bus.

1.3 Mid-Block Stops

Figure 4 provides an illustration of a typical mid-block bus stop. Mid-block stops are generally not preferred and should be avoided whenever possible. Mid-block stops are appropriate when:

- Major trip generators are located mid-block and cannot be served at the nearest intersection.
- If curb-side parking is permitted before or after the stop, a minimum of 110 feet no-parking zone must be provided to allow the bus to safely merge back into traffic (see **Figure 4**).

Figure 4: Typical Mid-Block Bus Stop Placement



Where Recommended:

- Primary trip generator is not near the intersection.
- Problematic traffic conditions at the intersection.

Spacing Considerations:

- Add 20 feet to bus stop zones for a 60ft articulated bus.
- Increase bus stop zone by 50 feet for each additional 40ft bus or 70 feet for each additional 60ft articulated bus.

Table 1: Bus Stop Locations

Location Related to Intersection	Advantages	Disadvantages	Where Recommended
Near-Side	• Minimizes interference when traffic is heavy on the far side of the intersection. • Allows passengers to access buses close to the crosswalk. • Results in the width of the intersection being available for the driver to pull away from the curb. • Eliminates double stopping. • Allows passengers to board and alight while the bus is stopped at a red light. • Provides driver with opportunity to look for oncoming traffic.	• Increases conflicts with right-turning vehicles. • May result in stopped buses obscuring curbside traffic control devices and crossing pedestrians. • May cause sight distance to be obscured for cross vehicles stopped to the right of the bus. • May block the through lane during peak period with queuing buses. • Increases sight distance problems for crossing pedestrians.	• Traffic is heavier on the far-side of the intersection. • When safer/greater pedestrian facilities are located on the near-side. • Passenger amenities must be outside of operator sightlines. • Compatible with queue jumps.
Far-Side	• Minimizes conflicts between right turning vehicles and buses. • Provides additional right turn capacity by making curb lane available for traffic. • Minimizes sight distance problems on approaches to intersection. • Encourages pedestrians to cross behind the bus. • Creates shorter deceleration distances for buses. • Results in bus drivers taking advantage of gaps in traffic flow created at traffic signals.	• May result in intersections being blocked during peak periods by parked buses. • May obscure sight distance for crossing vehicles. • May increase sight distance problems for pedestrians. • Can cause a bus to stop far-side after stopping for a red light. • May increase number of rear-end accidents since drivers do not expect buses to stop again after a red light. • Could result in traffic queued into intersection.	• High volume of right-turns near-side of the intersection. • When safer/greater pedestrian facilities are located on the far-side. • Stop should be far enough from the intersection to allow a turning bus to become parallel with the curb (recommend placing flag and pole at least 50 feet after the crosswalk). • Maximizes benefits of Transit Signal Priority (TSP). • Preferable when protected bike facilities (island bus stops/shared stops) are present.
Mid-Block	• Minimizes sight distance problems for vehicles and pedestrians. • May result in passenger waiting areas experiencing less pedestrian congestion.	• Requires additional distance for no-parking restrictions. • Encourages jaywalking. • Increase walking distance for patrons crossing intersections.	• Trip generator is located mid-block and cannot be served at the nearest intersection. • Not recommended for streets with high travel speeds and/or high traffic volumes.

1.4 Safety Considerations

Far-side, near-side, and mid-block locations all have inherent safety concerns. How and where pedestrians will be crossing the street should be factored in when deciding on the appropriate placement of a bus stop:

- **Far-side** locations can be efficient operationally by allowing the bus to clear the intersection before servicing the stop, it unloads passengers further from the intersection where it is safer to cross the street.

- **Near-side** locations allow passengers to be unloaded closer to the intersection, but can lead to a situation where pedestrians are crossing the street in front of the stopped bus making it difficult for pedestrians to see oncoming traffic, and for drivers to see crossing pedestrians.

- **Mid-block** stops are discouraged, as the stops are not in proximity to an intersection where there are likely to be traffic lights and pedestrian crossing amenities, such as crosswalks, curb ramps, or crossing signals.

1.5 Special Consideration for Schools

Bus stop locations near schools (particularly primary schools) should be placed in an area where it can be visually monitored by school personnel and/or crossing guards to increase safety and security. Mid-block stops near schools are not recommended.

1.6 Other Bus Stop Placement Considerations

Bus stops should be clearly marked with signs or pavement markings to indicate that transit vehicles have exclusive use in the bus stop area. The best location will depend on vehicular and pedestrian patterns at the intersection, right-of-way availability, bus routing, roadway conditions, pedestrian facilities, and other conditions found at the site.

It is important to note that bus stops are typically located in pairs (one on each side of the street along two-way route segments) and is generally recommended that bus stop pairs be positioned close together along the route to ensure simplicity in planning the return-trip. However, the conditions on one side of the street may lend themselves to a different placement than the stop on the other side of the street, and in such a case, each side of the street needs to be individually considered.

Other considerations for bus stop placement include:

- Locate stops served by multiple routes to minimize or protect (by way of intersection signals) street crossings for passengers making transfers between routes.

- Avoid placement in proximity to driveways; where unavoidable:
  - Attempt to keep at least one exit and entrance driveway open for vehicles to access the site.
  - Locate stop where visibility for vehicles leaving the site is not obstructed, minimizing vehicle/bus conflicts (i.e., far side of the driveway).
  - Locate stop so passengers do not wait in the middle of the driveway or board/alight in the driveway.
  - It is preferable for the bus to block a driveway fully rather than partially.

- Place bus stops where they are easy to see by the bus operator, as well as other drivers and bicyclists. The stopped bus should also be easy to see from a distance by approaching traffic, to reduce the risk that the bus will be struck from behind when stopped in the roadway or pulling back into traffic from an off-street stop. For this reason, stops should not be placed:
  - Just over the crest of a hill
  - Just beyond a curve where traffic is curving right and the far-side of the curve is obscured by trees, buildings, etc.

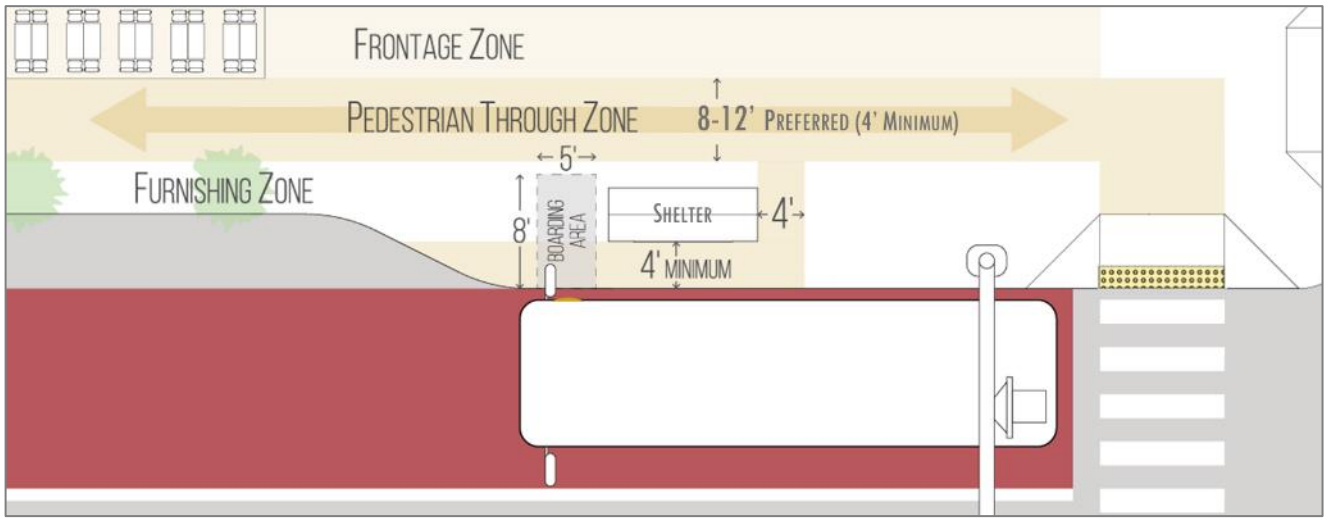
2.0 ADA Accessibility Elements

ADA compliance is required to the extent construction specifications are within a public entity's control (ADA Accessibility Standards Section 810 Transportation Facilities[1]). As outlined in this section, ADA guidelines for transportation facilities specifically mention the bus stop's boarding and alighting area, accessible connecting routes, and accessible bus shelters. The US Access Board's Public Rights-of-Way Accessibility Guidelines (PROWAG) also require the same features to be present at transit stops (Section R308 Transit Stops and Transit Shelters).

Beyond standards for transportation facilities, sidewalk and curb ramp standards are also applicable for accessible routes which connect to the transit stop, these are presented in the ADA Accessibility Standards Section 402 Accessible Routes. **Figure 5** illustrates ADA accessibility features at a bulb bus stop.

While existing non-compliant stops are grandfathered into the system, WMATA will not establish any new bus stops that are ADA non-compliant.

Figure 5: Bus Stop Accessibility Features



Source: NACTO Transit Street Design Guide

5 x 8 Feet Boarding and Alighting Area

- Provides a clear area 5 feet parallel and 8 feet perpendicular to the roadway.
- Provides firm, stable, and slip-resistant material surface.
- Slope (parallel to road) must be same as roadway to the extent practicable.
- Slope (perpendicular to road) must be less than 1:48 (2% max or less).

[1] https://www.access-board.gov/ada/chapter/ch08/#a810

Accessible Route

- Minimum 4 feet wide accessible route is required connecting the boarding and alighting area, shelter, sidewalk, and curb ramp at the next street crossing.
- Shelters, seating, trash bins, plantings, and utility boxes must be on an accessible path but not interfere with accessible clearances.
- Cross-slopes that do not exceed 2% must be provided along accessible paths and the landing area.
- Turning/transitional spaces must have a clear circular space that is at least 5 feet in diameter minimum. Alternatively, a T-Shaped space within a 5 feet square minimum with arms and base 3 feet wide minimum may be used. Each arm of the T-Shape shall be clear of obstructions 1 foot minimum in each direction and the base shall be clear of obstructions 2 feet minimum; the space shall be permitted to include knee and toe clearance complying with ADA Accessibility Standards Section 306 (Knee and Toe Clearance) only at the end of either the base or one arm.
- Wider 8 to 12 feet pedestrian through zone is recommended through the bus stop area.
- Where there is no level crossing and grade separation (e.g., island bus stop or intersection) an access ramp is needed; pedestrian access ramps must be at least 4 feet wide and may have a maximum slope of 1:12 (8.33%).

Accessible Bus Shelters

- Clear floor surface area of at least 30 by 48 inches must be located entirely within the shelter with a running and cross-slope not to exceed 1:48 (2% or less).
- Slope (parallel to road) must be same as roadway to the extent practical.
- Slope (perpendicular to road) must be less than 1:48 (2% or less).
- Connected via direct accessible route to boarding and alighting area, circuitous routes are not ADA compliant.
- Loading areas must be separate and clear from the shelter.
- Shelters located on boarding islands (separated from the sidewalk by a bike lane) should be located 5 to 10 feet from crosswalks to allow visibility between cyclists and passengers accessing the island.

In July 2013, WMATA's Board of Directors adopted an official definition of ADA compliant bus stops as the following:

- The pedestrian pad (boarding and alighting area) must have a firm, stable surface that is at least 5' by 8' located at the front door stopping locations.
- The pedestrian pad connects to the curb.
- The sidewalk connects to the pedestrian pad.
- The sidewalk has a pair of curb ramps (leading to the bus stop).

The existence of a bus stop pedestrian pad that has no connection to any sidewalk or a sidewalk that does not lead to at least one curb ramp at an adjacent intersection would be considered non-compliant under the WMATA Board's definition.

3.0 Universal Design Features

Universal design features are critical throughout the transportation network, making it possible for any street user to reach every transit stop comfortably and conveniently. Universal street design facilitates station access, system equity, and ease of movement for all users, especially people using wheelchairs or mobility devices, the elderly, people with visual impairments, people with children and strollers, and people carrying groceries or packages. Tactile, visual, and audible design elements should be utilized to guide people of all abilities through the street environment. Consistently using detectable surfaces, color contrast, and audible warnings assists all users, enhancing safety and accessibility.

Tactile Cues

- Detectable warning surfaces are required at any location where pedestrians enter a vehicular path, including bike lanes and intersection crossings (see **Figure 6**).
- Detectable warning surfaces are required along the edge of boarding platforms with a curb height of 8 inches or greater where screens or guards are not provided.
- Where passengers using wheelchairs are directed to specified doors, ensure the access doors are communicated throughout the boarding platform using signs, markings, and physical barriers – detectable warning surfaces shall be used to indicate door locations.

Figure 6: Detectable Warning Surfaces Placed at Bike Lane Pedestrian Crossings
Source: KFH Group

Color

- Color must be used consistently to delineate modal zones, edges, and conflict zones (see **Figure 7**).
- Bike lanes should be painted green throughout the bus stop area.
- Pedestrian crosswalks should be painted white.
- Where conflict zones are located, dashed color markings should be used.
- Detectable warning surfaces should be a color that visually contrasts with adjacent surfaces.
- Color repetition reinforces legibility and should be employed at conflict zones.

Figure 7: Colors Identify Intersections and Conflict Zones
Source: Google Street View Imagery

Audible Cues

- Signalized crossings should utilize accessible push buttons with audible cues to inform pedestrians of signal phases.
- Audible cues should include announcements or rapid percussive tones.
- If audible cues rely upon push-button activation, as shown in **Figure 8**, the button should be located near the curb ramp or near the detectable warning surface if the crossing is flush.
- Stops and stations with real-time arrival information should include audible announcements.

Figure 8: Accessible Push Button with Audible Cues at an Island Bus Stop
Source: KFH Group

Lighting

- Adequate lighting at bus stops allows bus operators to see waiting passengers at night.
- Pedestrian-scale lighting, including lamps less than 25 feet high, increases comfort and safety around stops (see **Figure 9**).
- Bus stops without sheltered lighting should be located within 30 feet of an overhead light source.
- Higher illumination around bus stops, relative to the surrounding environment, should be gradual rather than sudden to avoid the creation of virtual shadows.

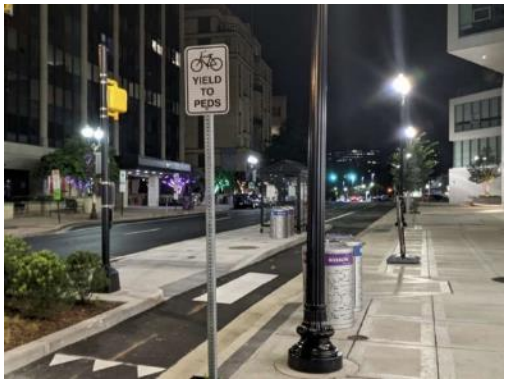


Figure 9: Pedestrian-Scale Lighting Improves Visibility and Safety
Source: ARLNow

Stormwater Drainage and Bioretention

- Bulb designs must account for stormwater drainage through trench drains or additional catch basins.
- Grates, covering trench drains, must be ADA compliant (see **Figure 10**).
- Bioretention areas can be integrated into bulb bus stops and other types to improve passenger comfort.
- Bioretention and other planted areas must be maintained to ensure accessible clearances and operator sight lines.
- Bioretention areas should be located at the end of the bus stop farthest from the intersection.

Figure 10: Bioretention Area with ADA Compliant Trench Drain Grates
Source: KFH Group

4.0 On Street Bus Stops

The following bus stop design guidelines focus on the safety and needs of bus operators, bus passengers, and all roadway users. Proper planning for bus facilities should be a major part of pedestrian and road design. Safety is the most important consideration. As such, pedestrian facilities must include a clear demarcation of pedestrian crossings and the provision of properly designed and accessible sidewalks. Universal design solutions should be utilized so that all people, with the widest range of abilities, can have equal access to transit.

Stop design, layout, and configuration are determined by a variety of elements. Some of those elements are rights-of-way, pedestrian infrastructure, site constraints, land use, vehicle speed and volume, parking, pedestrian volume, and local policies.

The design guidelines are organized into the following sections:

- **Description** – outlines the concept behind the design and provides a summary overview of the bus stop design.
- **Potential Benefits/Drawbacks** – describes potential benefits and/or drawbacks for service providers, passengers, pedestrians, and cyclists.
- **Usage Factors** – presents placement strategies and environmental factors where potential design benefits can be fully realized.
- **Design Factors** – outlines the specific design and placement considerations including lengths, widths, and site-specific factors.
- **Accessibility Factors** – all bus stops must meet ADA standards and promote universal design; this section provides specific accessibility considerations based on the bus stop design.

As shown in **Figure 11**, four types of on street bus stops are presented in the following section. These include Basic On Street, Bus Bay, Bulb, and Median Bus Stops. Each type of stop has potential benefits and drawbacks based on site constraints and street design. The design factors presented for each type of stop were established to improve safety for all street users.

Figure 11: Types of On Street Bus Stops

Basic On Street Bus Stop

- Preferred due to operating efficiency
- Require minimum design modifications
- Lowest cost option for establishing a stop
- Can be easily established and relocated
- Passengers board directly from the sidewalk

Bus Bay Bus Stop

- Allows buses to pick up and discharge passengers outside of the travel lanes
- Ideal for intersection queue jumps
- Creates space for the bus to dwell at timepoints and layovers

Bulb Bus Stop

- Shortens bus stop length and dwell time by eliminating distances for merging in and out of travel lanes
- Maximizes sidewalk space for passenger waiting areas and bus stop amenities

Median Bus Stop

- Supports implementation of transitways and center running transit services
- Provides pedestrian refuge islands and traffic calming measures
- Ideal for corridors with express services

4.1 Basic On-Street Bus Stop

Description

On-Street bus stops, as depicted in **Figure 12**, are the most frequently used curb-side bus stop facilities and are preferred for their operating efficiency. They provide easy access for bus operators and minimize delays to service. In addition, on-street stops require minimum design and can be easily established or relocated. On-street stops can be those where the bus stops in the travel lane, in a parking lane, or in the shoulder.

Figure 12: On-Street Bus Stop

Potential Benefits

- Lowest cost stop option requiring only signage, an ADA boarding area, and pedestrian connection.
- Requires minimum design and can be easily established or relocated.
- Promotes operating efficiency by providing easy access for bus operators and minimal delays to service.
- Passengers may board and alight directly from the sidewalk.

Potential Drawbacks

- May delay traffic when implemented in the travel lane on streets with one lane in each direction.
- On two lane, two-way streets, vehicles overtaking a stopped bus may create a hazard.
- Does not provide a dedicated passenger waiting area.

Usage Factors

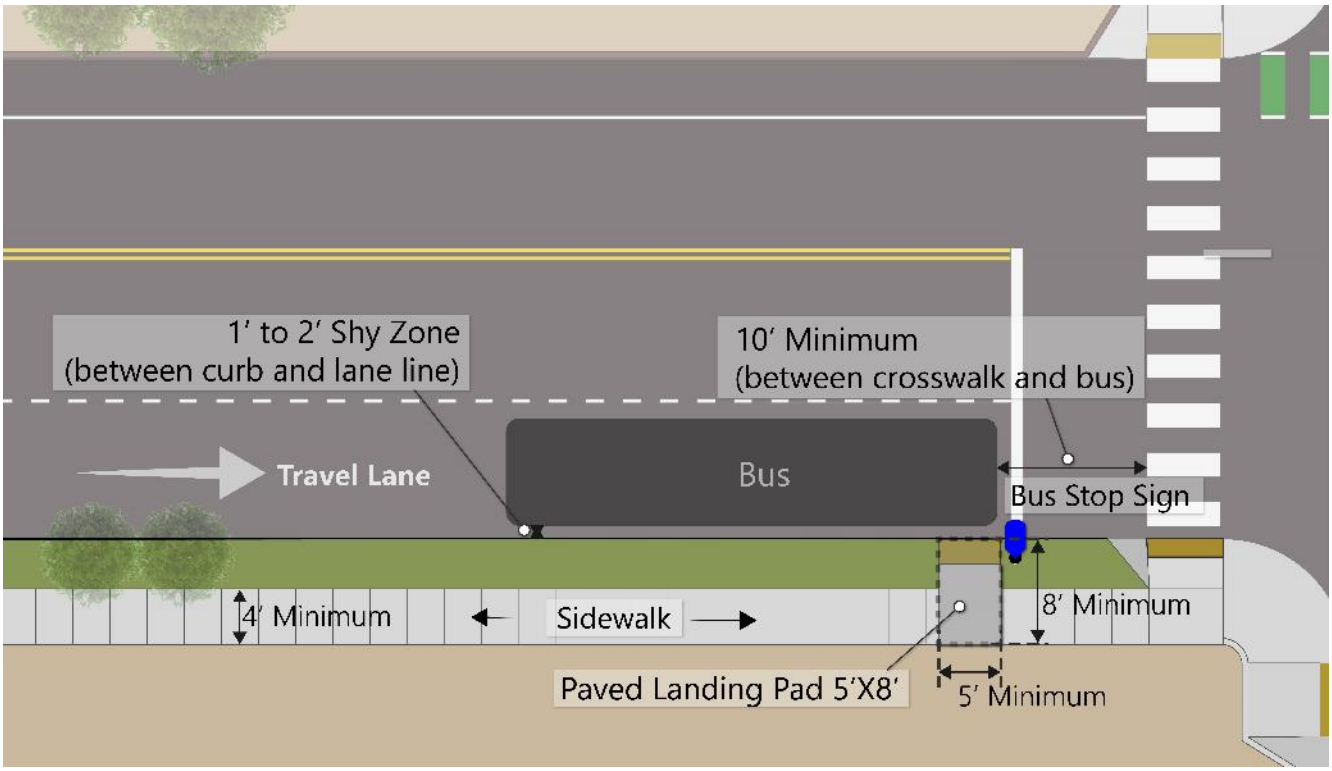
- Travel speed is less than 45 mph.
- Access can be provided for passengers with disabilities.
- Major trip generators nearby.
- Connections exist to pedestrian facilities.
- Street lighting exists.
- Adequate curb clearance is present to accommodate bus stop zone.
- Nearby major intersections are signalized.
- Passengers are not forced to wait, board or alight in a driveway.

Design Factors

In Travel Lane

If the stop can be served with the bus in the travel lane, it minimizes the potential for the bus to be delayed in waiting to re-enter the travel lane. However, in areas with high traffic volume, they can result in conflicts with other traffic. If traffic is moving at a relatively rapid pace (e.g., with a posted speed limit at 45 miles per hour), a stopped bus in the roadway can present a safety hazard. Also, on-street stops should be avoided at stops with high volumes of passenger activity at which the bus may be stopped for significant periods of time, since under these conditions the stopped bus would significantly disrupt traffic flow. **Figure 13** illustrates a typical on-street bus stop in the travel lane.

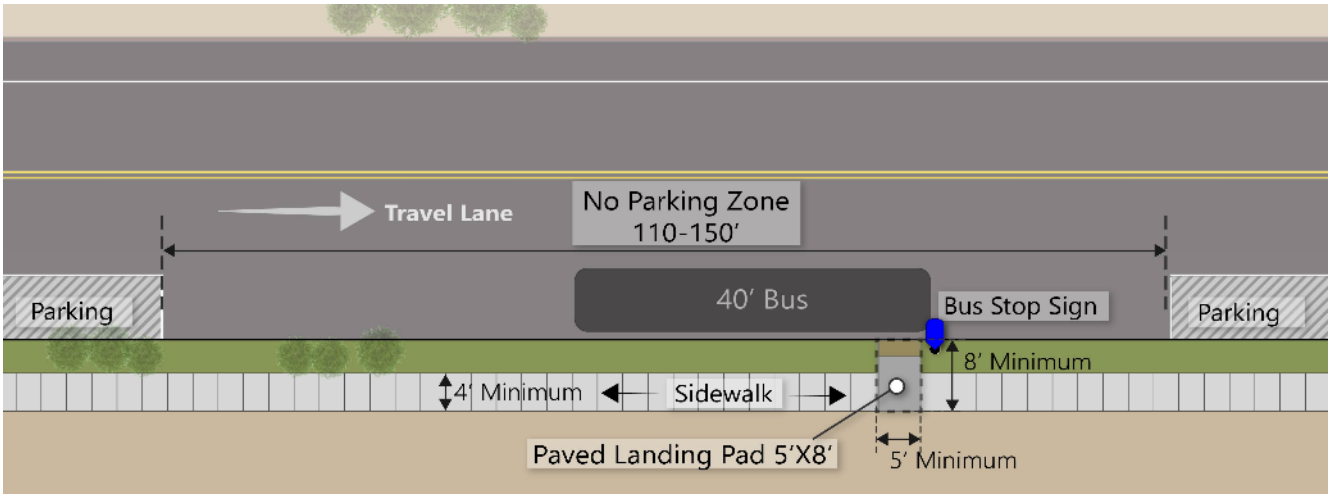
Figure 13: On-Street Stop In Travel Lane



In Parking Lane

This type of design is illustrated in **Figure 14**. The bus stopping area and acceleration/ deceleration area needs to be designated as “no parking” with enforcement to ensure parked cars do not block bus access to the curb and render the stop inaccessible to customers who use wheelchairs. As a result of the parking capacity that this type of bus stop removes, the jurisdiction may want to consider constructing a curb bulb as depicted in **Figure 20** for stops which otherwise could be made on-street.

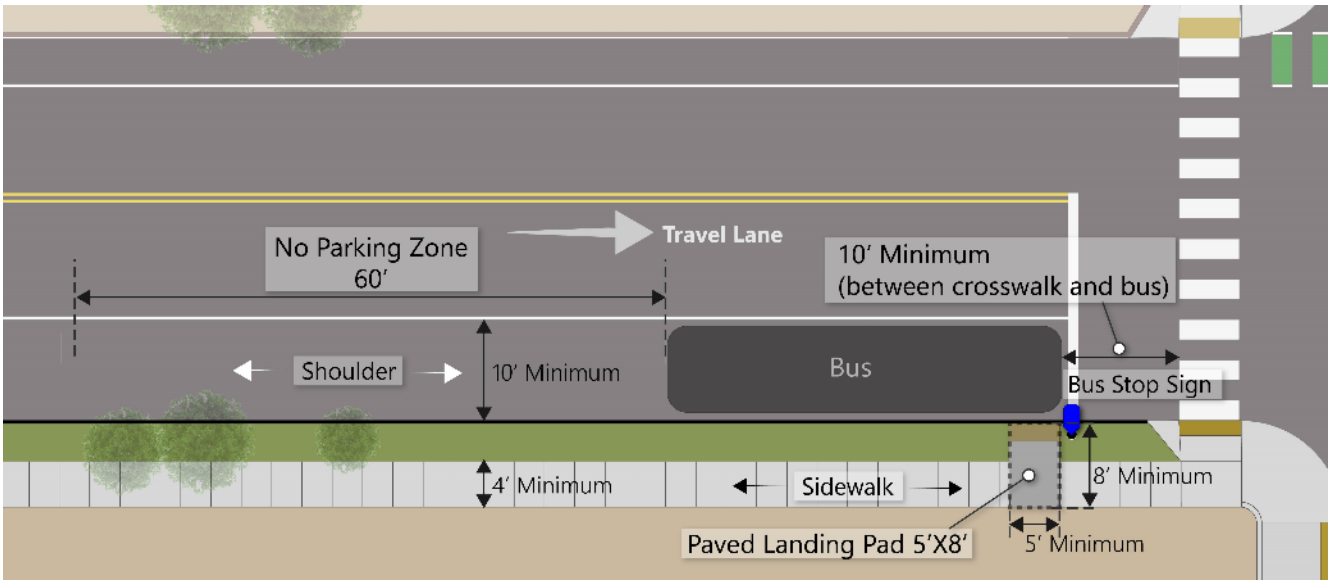
Figure 14: On-Street Stop In Parking Lane



On Shoulder

As with the parking lane, unless the entire shoulder is "no parking at any time," the bus stopping area and acceleration/deceleration area needs to be designated as "no parking" with enforcement, to ensure parked cars do not block bus access to the curb (thereby making the stop inaccessible to customers who use wheelchairs). Also, the pavement under the bus stopping area should be reinforced with a concrete pad. This type of design is illustrated in **Figure 15**.

Figure 15: On-Street Stop On Shoulder



4.2 Bus Bay Bus Stop

Description

This type of stop (**Figure 16**) is sometimes called a bus bay, turn-out, or berth. It is constructed as an inset into the curb, typically with tapered ends for acceleration and deceleration. This type of stopping area should be designated and enforced as “no parking” and be reinforced with a concrete pad. This type of structure requires enough right-of-way so that sidewalk capacity would not be adversely affected.

Figure 16: Bus Bay Bus Stop

Bus bays allow buses to pick up and discharge passengers outside of the travel lanes. As a result, this allows traffic to flow unobstructed while the bus is stopped. Additionally, bus bays increase safety for passengers by increasing the distance between them and traffic. It also lessens the chances of a vehicle rear ending a stopped bus. Figure xx illustrates a typical bus bay that will accommodate one 40 foot bus and the appropriate acceleration and deceleration lanes.

Potential Benefits

- Relative low-cost option for bus stops on streets with curbside parking.
- Prioritize through traffic, including through-moving transit/express services.
- Ideal for intersection queue jumps and queue bypasses.
- At signal-controlled locations, the bus may pull into a near-side stop, allowing traffic behind to pull forward to the stop line and proceed while the bus is dwelling.
- At time points or end-of-route layovers, pull-out stops create space for the bus to wait out of traffic flow.

Potential Drawbacks

- Potential to increase dwell time due to the bus merging in and out of traffic.
- Potential for sidewalk conflicts between through-moving pedestrians and alighting passengers when the bus is dwelling.
- Bus bays can be blocked by illegal loading or parking, transit vehicles may have insufficient space to transition, increasing the likelihood that passengers will be forced to board from street level and that the through-traffic lane will be blocked.
- Even when provided with entry and exit tapers, buses may not be able to pull close to curb, making boarding more difficult.

Usage Factors

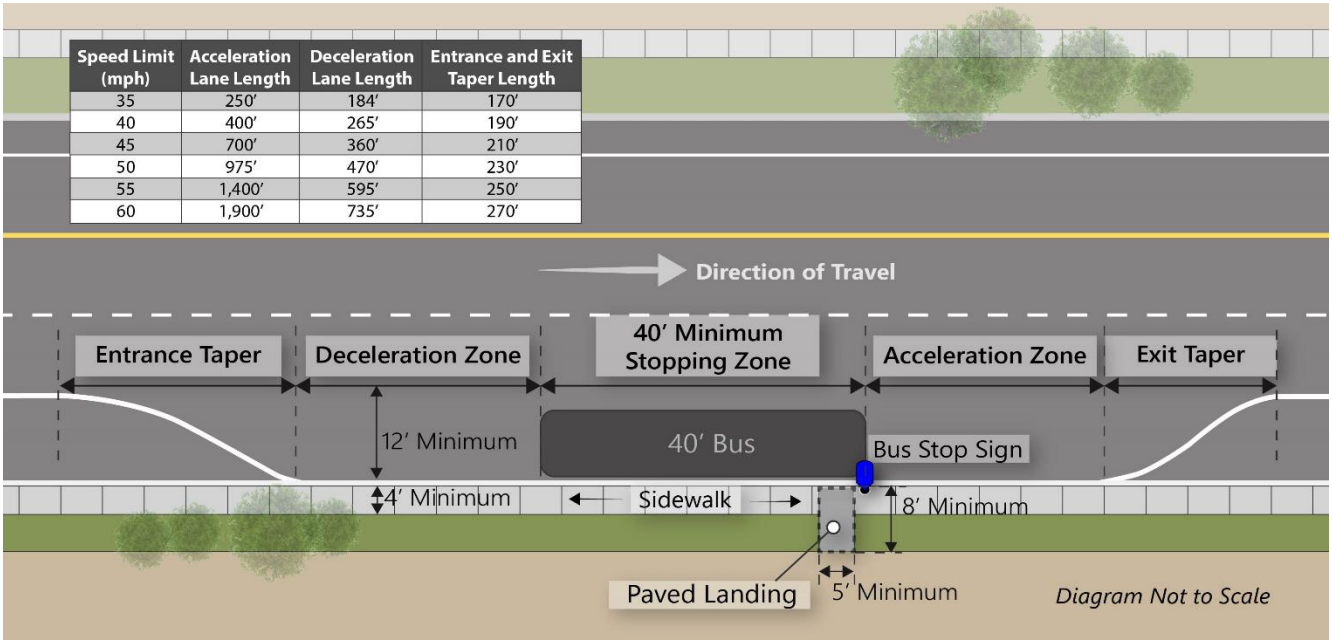
The following locations should be considered for bus bays:

- Traffic speeds exceeds 40 mph.
- Average peak-period dwell time exceeds 30 seconds per bus.
- Buses are expected to layover.
- History of vehicles colliding into back of bus.
- Multiple buses serve the stop at the same time.
- Where high transfer volume between intersecting routes is expected.
- Width must be wide enough to ensure buses do not extend into adjacent lanes.

Design Factors

Design factors for bus bay bus stops are illustrated in **Figure 17** and listed in **Table 2**.

Figure 17: Bus Bay Bus Stop



Note: Stopping area length is 50′ for each standard 40′ bus and 70′ for each 60′ articulated bus.

Table 2: Bus Bay Bus Stop Design Factors

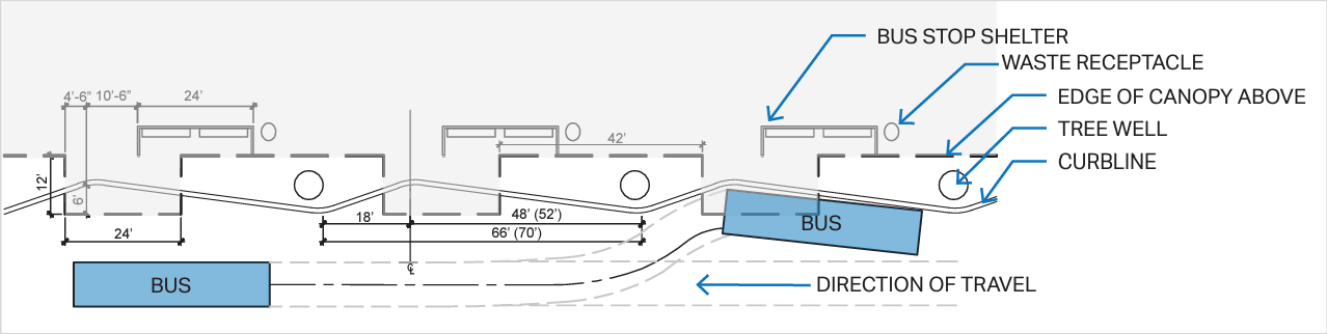
Element	Guideline
Length	40 to 50 feet stopping zone (40ft bus) 60 to 70 feet stopping zone (60ft articulated bus) Requires acceleration/deceleration zones and entrance/exit tapers (**Figure 17**)
Width	10 feet minimum in bus zone 8 feet minimum sidewalk (more preferred) to incorporate ADA boarding area.
Height	Standard curb height.
Clear Space	4 feet minimum between curb and passenger amenities/waiting area. 10 feet minimum distance between stopped bus and crosswalk. 1 to 2 foot "shy" zone between bulb curb and edge of travel lane.
Other Factors	If bike lane is present, use conflict zone markings to position bicyclists to the left of the bus zone.

Sawtooth Bus Bays

In off-street bus stopping areas, such as transfer centers, rail stations, and park and ride lots, sawtooth bus bays are recommended for their efficient use of constrained curb space. They are generally wider than parallel bays but require shorter curbside distances. Sawtooth bays can also work effectively along curved lanes and curbside facilities when conditions are appropriate.

Metro's *Station Area Planning Guide* provides greater detail on the design criteria for sawtooth bus bays (**Figure 18**). The guide notes that sawtooth bays are "mandatory where multiple bus bays are required and where there are a significant number of terminating routes and bus-to-bus transfers."

Figure 18: Sawtooth Bus Bay Diagram



Source: WMATA Station Area Planning Guide

Accessibility Factors

All bus stops must meet ADA compliance requirements as outlined in the ADA Accessibility and Universal Design section of this document. Specific accessibility factors and considerations for bus bay bus stops include:

- A 5 by 8-feet boarding and alighting area must be incorporated into the existing sidewalk.
- Shelters, seating, trash bins, and other passenger amenities must be accessible from but also outside of the accessible path of travel.
- Cross-slopes of no greater than 2% (unless infeasible due to roadway slope) should be provided in all directions on the boarding bulb.
- Consider near-side and far-side placement of bus bay bus stops to provide curb ramp and crosswalk connections.
- Mid-Block applications should include a dedicated on-street pedestrian crosswalk with curb ramp connections.

4.3 Bulb Bus Stop

Description

Bulb bus stops are designed to extend the sidewalk into a parking lane or roadway shoulder to align the bus stop with the travel lane thus creating an in-lane stop. This design improves transit vehicle speed and reliability by eliminating the need to merge in and out of traffic. This also minimizes the amount of curb space needed for the bus stop zone, thus creating space for other uses while simultaneously maximizing the boarding and alighting area. Bulb bus stops, shown in **Figure 19**, are also referred to as curb extensions, bulb-outs, and boarding bulbs.

Figure 19: Bulb Bus Stop

Potential Benefits

- Improves transit vehicle speeds, increasing operational efficiency and improving safety.
- Creates a dedicated waiting area without encroaching on the pedestrian through zone.
- Provides traffic calming benefits and reduces pedestrian street crossing distances.
- Can reduce bus and pavement wear and tear, reducing maintenance costs.
- Reduced delay for general purpose traffic as bus movements are more predictable[2]
- Bulbs can maximize the amount of curbside parking available on a street, as in-lane stops do not require merging zones.
- Buses can access boarding bulbs with minimal lateral movement leading to greater reassurance that stopping maneuvers are accessible to all.
- Shortens stop length, eliminating the transitional distances required to leave and merge back into traffic at pull-out stops.
- Less likely to be blocked by standing vehicles than a pull-out stop and this makes them more reliably accessible, since a bus that can't get to the curb cannot deploy its ramp.
- Requires the removal of less parking space than a bus stop that is in the parking lane.

Potential Drawbacks

- May delay traffic when implemented on streets with one lane in each direction.
- Where traffic buildup behind the bus is of concern, periodic pull-out stops might be necessary to allow vehicles to pass buses.
- Must account for stormwater drainage around the extended bulb.

Usage Factors

Bulb bus stops are applicable where in-lane bus stops are preferred. This bus stop type should not be used where bike facilities are provided on the right side of the roadway. Bulbs are adaptable to various street configurations and should be considered in the following conditions:

- Existing pull-out stops with a history of delays or collisions from buses re-entering traffic.
- Roadways with speed limits of 40 mph or lower.
- Full-time curbside parking is provided and critical to preserve.
- Parking zone regulations are frequently violated.
- Existing curb clearance is limited due to obstructions in the boarding zone.
- Traffic calming is desired.
- High pedestrian traffic areas with crowded/narrow sidewalks.
- High frequency (10 to 30 buses per hour)[3] stops that require larger boarding areas.
- Need for passenger amenities at sites too small to accommodate street furnishings.
- Recommended for locations with at least two travel lanes in the same direction – one travel lane can limit the use of the bulb, but this can achieve traffic calming in busy areas.

[2] TCRP Report 65: Evaluation of Bus Bulbs. Note: In San Francisco, bus bulbs increased both bus speeds and non-bus vehicle speeds.
[3] https://nacto.org/publication/transit-street-design-guide/introduction/service-context/transit-frequency-volume/

Design Factors

Design factors for bulb bus stops are illustrated in **Figure 20** and listed in **Table 3**.

Figure 20: Bulb Bus Stop Design Factors

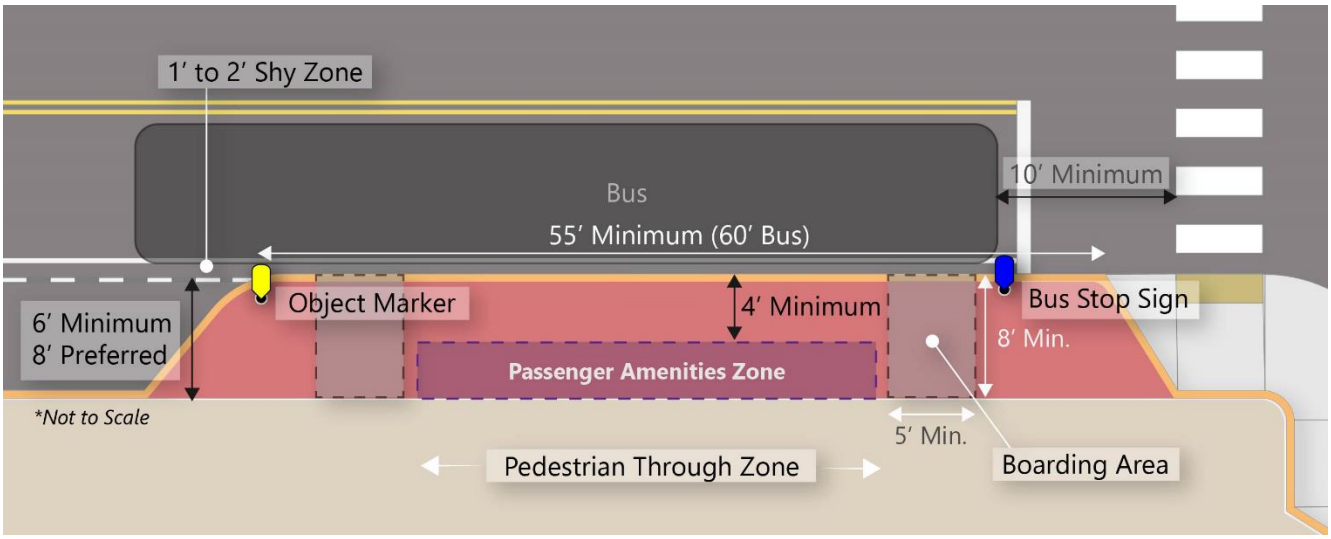


Table 3: Bulb Bus Stop Design Factors

Element	Guideline
Length	35 to 45 feet (40ft bus) 55 to 65 feet (60ft articulated bus) Expand for dwelling vehicles (see **Table 10**)
Width	6 feet minimum from existing curb. 8 feet or more preferred to incorporate boarding area.
Height	Standard curb height.
Clear Space	4 feet minimum between curb and passenger amenities/waiting area. 10 feet minimum distance between stopped bus and crosswalk. 1 to 2 foot "shy" zone between bulb curb and edge of travel lane.
Signage	Install reflective element or sign on the leading corner of the bulb; suggest: the Manual on Uniform Traffic Control Devices (MUTCD) KEEP LEFT (R4-8) or object markers (OM3). Far-side stops should include "Don't Block the Box" signage.
Other Factors	Design must account for stormwater drainage modifications. Could be constructed of temporary or permanent materials. Maintain sight lines by locating shelters at least 10 feet from crosswalks. Greater queuing space may be needed on streets with one lane per direction.

Accessibility Factors

All bus stops must meet ADA compliance requirements as outlined in the ADA Accessibility and Universal Design section of this document. Specific accessibility factors and considerations for bulb bus stops include:

- If the width of the bulb is less than 8 feet, the 5 by 8-feet boarding and alighting area must be incorporated into the existing sidewalk.
- Shelters, seating, trash bins, and other passenger amenities must be accessible from but also outside of the accessible path of travel.
- Cross-slopes of no greater than 2% (unless infeasible due to roadway slope) should be provided in all directions on the boarding bulb.
- Curb ramp and crosswalk connections should be incorporated into the boarding bulb at near-side and far-side bus stops.

Modular Platforms

Bulb bus stops can be constructed from temporary modular platforms or permanent materials like concrete. Modular platforms made of heavy-duty plastic (shown in **Figure 21**) can provide flexibility through modular designs and allow for relocation if necessary. All modular platforms must be constructed to meet ADA standards.

Figure 21: Modular Platform Used for Bus Stop

Source: WMATA (4th St. & N St. SW, Washington, DC)

Stormwater Drainage

Stormwater drainage can be a major issue for bulb bus stops and can result in significant costs when relocating catch basins. However, when properly designed, these issues can be mitigated with trench drains or catch basin additions. When major drainage modifications are required, covered trench drains with grates that are ADA compliant must be used (see **Figure 22**). An ADA compliant grate may be included in the 5 by 8 feet boarding area. Additional width should be provided to accommodate trench drains and potential green infrastructure features like bioswales or planters to improve stormwater recapture. Modular platforms do provide the benefit of a built-in trench along the roadway curb.

Figure 22: ADA Compliant Cover for Stormwater Trench Drain

Source: WMATA (H St. & 4th St. NW, Washington, DC)

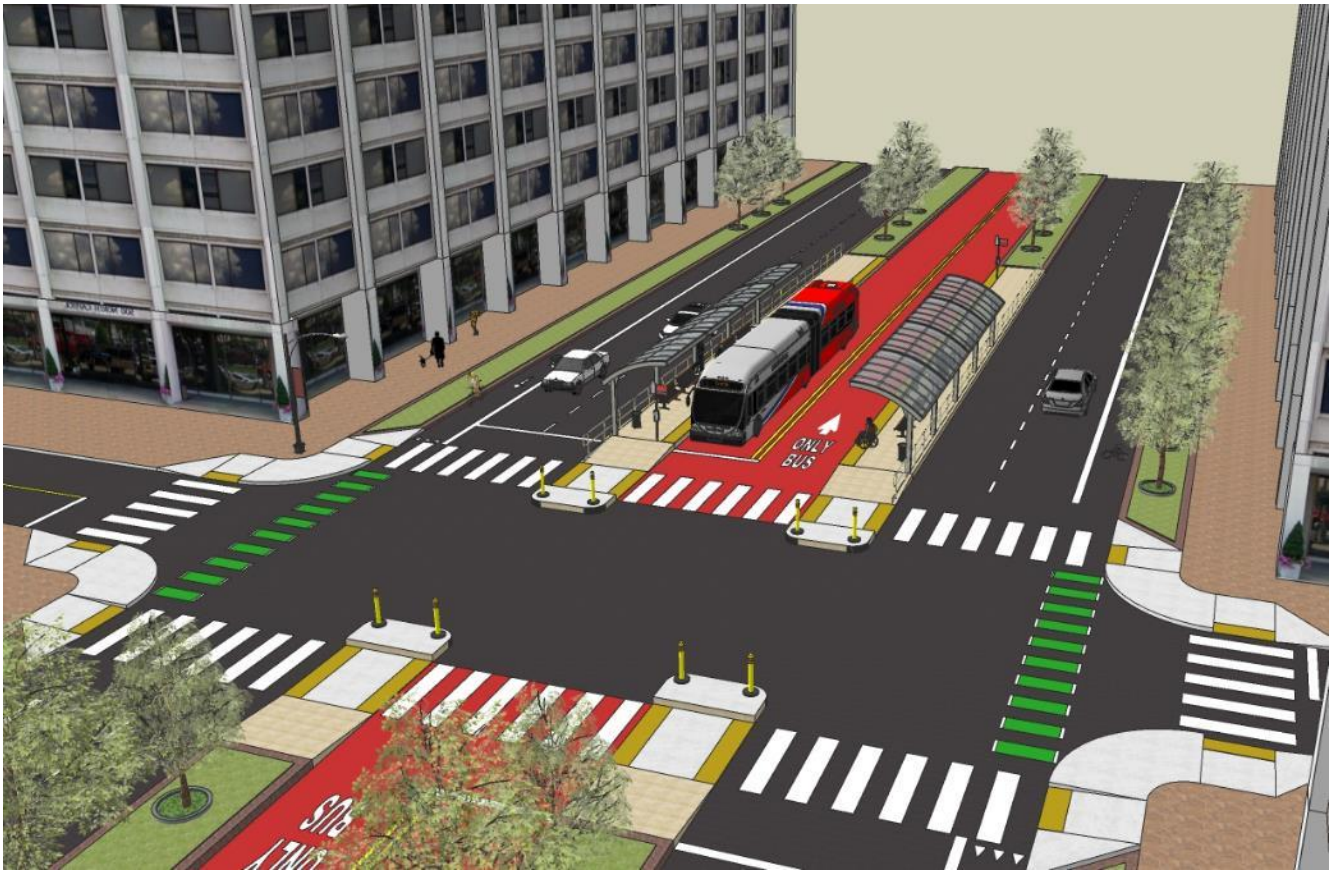
4.4 Median Bus Stop

Description

Median bus stops are used where transit vehicles operate in lanes that are not adjacent to the sidewalk and therefore require that passengers board and alight transit vehicles in a space that is separated from the sidewalk by a travel lane.

Median stops should be utilized where transit service runs along a wide median separating travel direction (see **Figure 23**). Passengers board and alight from the edge of the median with separate platforms for each direction. This stop design can also be provided on a median between a primary and secondary/service road. Design considerations should include left turn restrictions or light phasing, prioritizing pedestrian connections, level or near-level boarding platforms, and safety enhancements for pedestrian crossings.

Figure 23: Median Bus Stop



Potential Benefits

- Increase the visibility of transit service.
- Can serve as a pedestrian refuge and traffic calming measure.
- Allows for implementation of center running bus lanes.

Potential Drawbacks

- All pedestrians must cross travel lanes to reach the bus stop or sidewalk.
- Far-side stops with high-frequency service may serve multiple vehicles simultaneously which requires stations to be moved further from intersections.

Usage Factors

Median stops are applicable where center running transit services are provided. This bus stop type takes advantage of available median space to provide a dedicated passenger boarding area. This stop is typically used in Bus Rapid Transit (BRT) applications but is also found on medians separating primary and secondary roads (where transit service is provided on the primary road). Median stops should be considered in the following conditions:

- Locations where center running transit services are provided (e.g., BRT) or roadways that include service lanes.
- Where opportunities exist to take advantage of existing medians.
- Locations where in-lane bus stops are preferred.
- Corridors for longer express services where stops are typically placed further apart.
- Locations where buses need to make a left turn shortly after serving the stop.

Design Factors

Design factors for median bus stops are illustrated in **Figure 24** and listed in **Table 4**.

Figure 24: Median Bus Stop Design Factors

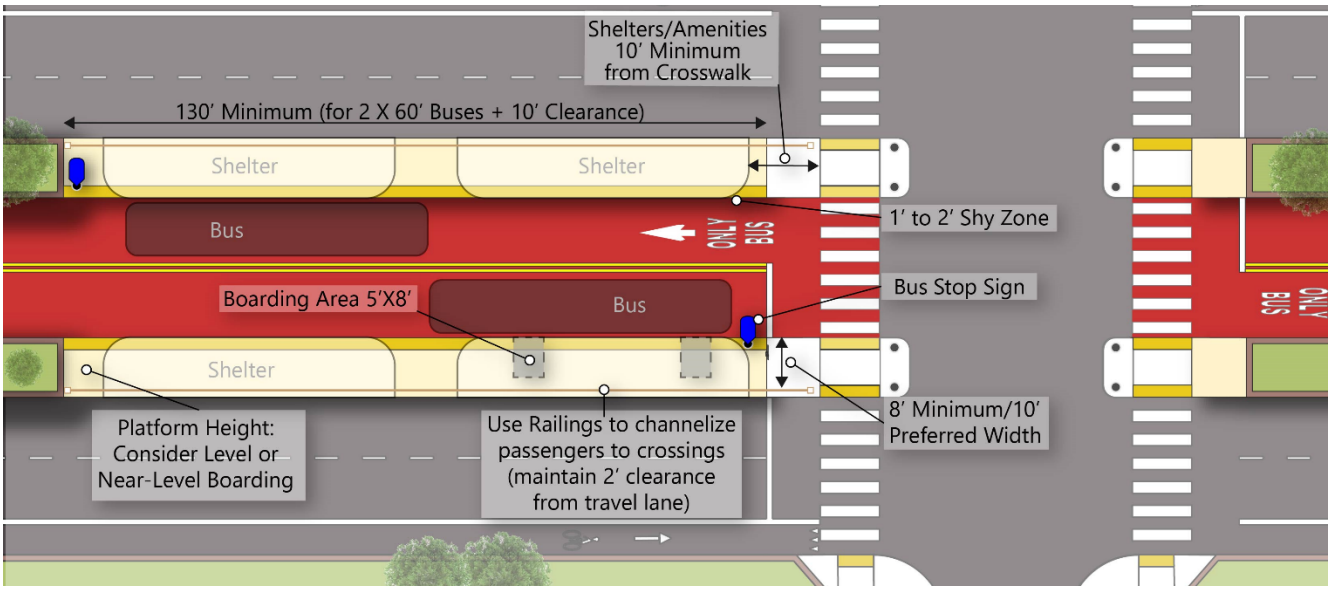


Table 4: Median Bus Stop Design Factors

Element	Guideline
Length	35 to 45 feet (40ft buses) 55 to 60 feet (60ft articulated) Recommended to increase length for at least two vehicles in dedicated transit lanes.
Width	8 feet minimum to incorporate boarding and alighting area. Preferred 10 feet minimum to include railing, leaning bars, etc.
Height	Consider level or near-level boarding.
Railings	Required on median boarding island along edge of travel lane. Provide a setback of at least 2ft from the edge of the travel lane. Channelizing railings should direct pedestrians to crossing locations.
Clear Space	4 feet minimum between passenger amenities and the edge of travel/bus lane. Locate shelters and other amenities at least 10 feet from crosswalks. 1 to 2 foot "shy" zone between the platform and edge of travel lane.
Intersection Access	Platform should be directly connected via accessible ramp to the crosswalk at a controlled intersection. Medians extended to the crosswalk or past the crosswalk must consider the bus turning radii at intersections where a bus enters or exists the median lanes.

Accessibility Factors

All bus stops must meet ADA compliance requirements as outlined in the ADA Accessibility and Universal Design section of this document. Specific accessibility factors and considerations for median bus stops include:

- When adjacent to intersections, the crosswalk should connect directly to the bus stop.
- Detectable warning surfaces must be placed on both sides of every pedestrian crossing.
- If the curb height is greater than 8 inches, detectable warning surfaces are required along the edge of the platform where passengers board and alight.
- Crosswalks must be installed where pedestrian routes intersect travel lanes.
- Shelters, seating, trash bins, and other passenger amenities must be accessible from but also outside of the platform's accessible path of travel.
- Cross-slopes of no greater than 2% (unless infeasible due to roadway slope) should be provided in all directions on the median bus stop platform.
- Channelizing railings or cane detectable guidance posts should clearly indicate the location of the pedestrian crossing.
- Raised pedestrian crossings should be used to encourage vehicles to yield to passengers.
- Accessible Pedestrian Signal (APS) pushbuttons should be included on the median refuge(s) to allow pedestrians with vision disabilities to receive the audible or vibrotactile indications to know when the WALK sign is illuminated.

Platform Height

Level or near-level boarding should be considered for this stop design. However, raised platforms should be a component of an enhanced service (BRT) or corridor improvements rather than a one-off design. The preferred alignment is a high platform that is level with the vehicle floor. Given the potential for raised platforms, there must be coordination between the height of the vehicle floor and the platform to minimize the vertical and horizontal gaps.

Platform height is a key consideration for median stops with BRT applications. Standard curb heights matching surrounding roadway curb heights are typically 6 to 7 inches. Raised BRT platforms are built higher than standard curbs between 9.5 and 12 inches. Level or near-level boarding requires platforms to match the vehicle floor height as closely as possible, typically 8 to 11 inches. Rub Rails should be included on raised platforms to prevent vehicle damage. Raised platforms require safety barriers and detectable warnings along the entire edge of the platform where passengers board and alight.

Pedestrian Crossing

It is preferred that the crosswalk at the intersection is connected directly to the median platform so that those using mobility aids/devices benefit from controlled direct access to the sidewalk. Space also must be provided for a pedestrian transition area and any additional infrastructure. Midblock stations must provide a designated crosswalk to enable passengers to access the station. Sight distances related to the intersection or adjacent driveways must also be considered when sitting stations.

5.0 Bus Stops & Shared Bicycle Facilities

As shown in **Figure 25**, four distinct bus stop designs are outlined in the following section. These designs are presented in order of WMATA's preference for implementation with Island Bus Stops being the preferred design and Mixed Bus/Bike Stops being the least preferred. The following designs aim to improve safety for all street users.

Figure 25: Types of Bus Stops Shared with Bicycle Facilities

Island Bus Stop

- Preferred bus stop design for bike facilities
- Locations with no/minimal site constraints
- Ideal for bi-directional bike lanes
- Safest design for passengers and cyclists

Narrow Island Bus Stop

- Site constraints prevent traditional island design
- Not ideal for bi-directional bike lanes
- Island must be wide enough for ramp deployment
- Safer design for passengers and cyclists

Shared Bus/Bike Stop

- Site constraints prevent island bus stops
- Bike lane must rise to sidewalk grade
- Prevents bus and bike mixing in the travel lane
- Ideal for low activity areas

Mixed Bus/Bike Stop

- Site constraints prevent island and shared bus stops
- Not a preferred solution, only permitted in areas with infrequent service (4 buses max. per hour)
- Does not prevent cars/trucks from parking and blocking the metrobus zone and bike lane

5.1 Island Bus Stop

Description

An Island Bus Stop is separated from the sidewalk by a channelized, raised, or intermediate level bike lane (see **Figure 26**). Similar in concept to the boarding bulb, island bus stops provide an in-lane stop while incorporating existing or planned bicycle facilities. Island Bus Stops are designed to channel bikes behind the bus stop and away from the roadway to eliminate potential mixing zones between cyclists and transit vehicles. This provides a dedicated boarding area for passengers between the bike lanes and the roadway (separated from the sidewalk). As an in-lane bus stop, this design eliminates the need for the transit vehicle to merge in and out of traffic while also minimizing the amount of curb space needed for the bus stop. Boarding island stops are also commonly referred to as boarding islands, bus islands, side boarding islands, floating bus islands, and floating bus stops.

Figure 26: Island Bus Stop

Potential Benefits

- Protects cyclists by preventing transit vehicles from crossing bike lanes at bus stops.
- Eliminates “leapfrogging” between buses and bikes in traffic lanes reducing the potential for conflicts.
- Provides dedicated passenger waiting area and maintains a clear path on the sidewalk.
- Expanded passenger waiting area provides opportunity for enhanced passenger amenities.
- Allows cyclists to continue traveling past the bus stop while buses dwell.
- Prevents vehicles from parking in the bus zone and bike lane.
- Encourages cyclists to ride in the bike lane rather than on the sidewalk, reducing the potential for conflicts with pedestrians or waiting transit patrons.
- Separation improves passenger, cyclist, and transit vehicle safety while increasing operational efficiency.

Potential Drawbacks

- Requires a relatively large amount of right-of-way, installation may require elimination of street-side parking or a travel lane.
- May require sidewalk modifications to provide adequate space for the island and bike lane.
- In-lane stops may delay traffic when implemented on streets with one lane in each direction.

Usage Factors

- Streets with moderate to high transit frequency where bike facilities exist or are planned.
- Bike facilities with moderate to high bike and scooter volumes.
- Locations where in-lane bus stops are preferred.
- Locations where there is a need to mitigate conflicts between transit vehicles, cyclists and parking.
- Where separation of pedestrians, cyclists, waiting passengers, transit vehicles and cars are desired.
- Appropriate where there is low frequency transit if there are concerns about parking violations.
- Far-side placement is preferred due to potential safety issues from right hooks across bike lanes.
- Where island bus stops can be accommodated within the existing right-of-way or street width.
- In locations where space is limited, narrow island bus stops should be considered.

Design Factors

Design factors for island bus stops are illustrated in **Figure 27** and listed in **Table 5**.

Figure 27: Island Bus Stop Design Factors

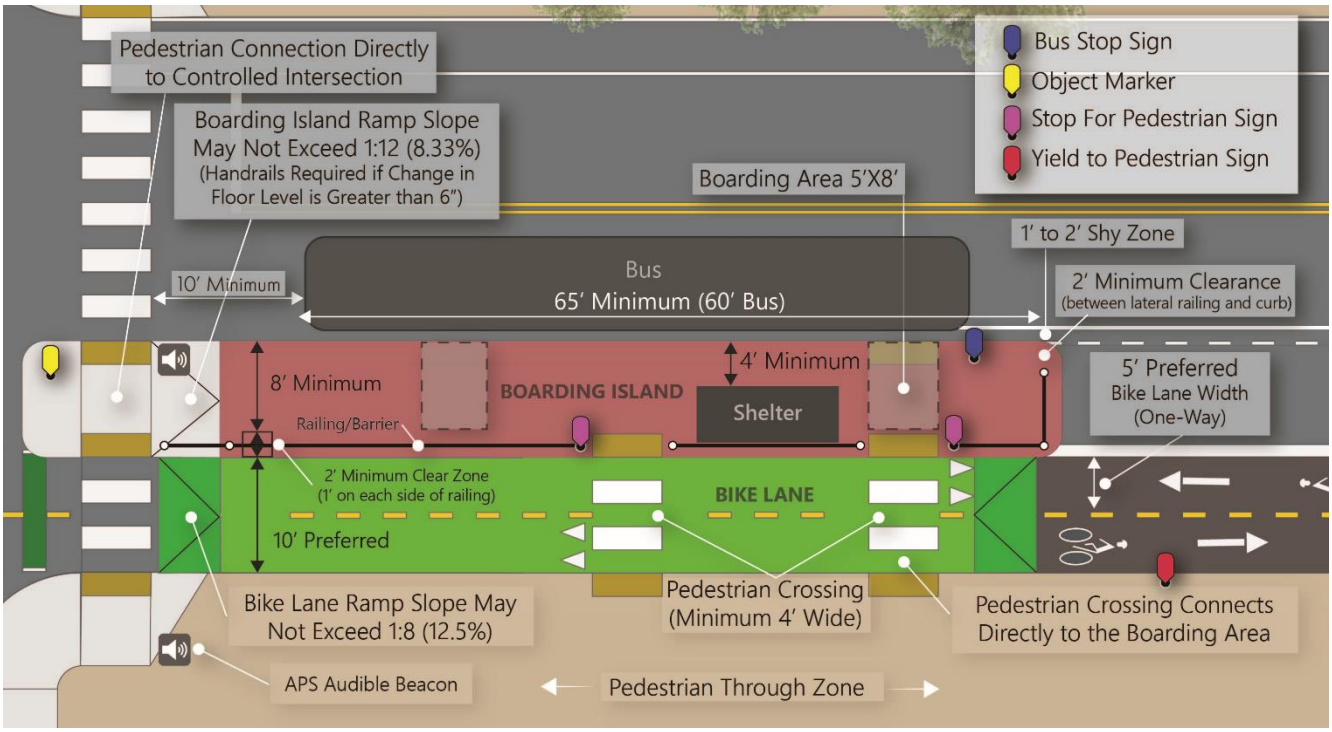


Table 5: Island Bus Stop Design Factors

Element	Island Bus Stop
Boarding Island	
Length	35 to 45 feet (40ft bus) 55 to 65 feet (60ft articulated) Expand for dwelling vehicles (see **Table 10**)
Width	8 feet minimum to incorporate ADA boarding and alighting area. Preferred 10 feet minimum to include railings, leaning bars, etc.
Height	Standard curb height recommended.
Railings	Railings/barriers are required on the boarding island edge of the bike lane. All railings/barriers must not infringe on the 5x8 foot ADA boarding and alighting area. Provide a clearance of at least 1 foot from bike lane to avoid catching handlebars. Transverse railings are recommended on both ends of the island to prevent pedestrians from walking beyond the boarding area (unless a ramp down to a median refuge is located at one end).

Table 5 (Continued): Island Bus Stop Design Factors

Element	Island Bus Stop
Clear Space	4 feet minimum between passenger amenities and the travel lane's curb edge. 1 to 2 foot "shy" zone between the curb and edge of travel lane. Locate shelters and other amenities at least 10 feet from crosswalks.
Signage	Reflective signage or another visible element must be installed on the leading corner of the island. Suggest: MUTCD KEEP LEFT (R4-8) or object marker (OM3). At pedestrian crossings to the island, [Bicycle] Yield to Peds (R9-6) or [Bike] [Stop] for [Ped] Within Crosswalk (modified R1-6A) are required.
Other Factors	Consider site specific stormwater drainage. Consider using modular platforms or permanent materials. Ensure sight lines are maintained, especially for lateral shifts in the bike lane.
Bike Lane	
Width	5 feet wide preferred for single direction and 10 feet wide preferred for two-way facility. Must use minimum preferred width where pedestrians cross bike lane. Visually narrowing the lanes using surface treatments is advised for speed calming.
Ramps	Bike lane should be elevated to sidewalk level for at-grade movement. Ramp slope for raised lanes and raised crosswalks should not exceed 1:8 (12.5%). Recommended that one crossing is provided to a signalized crosswalk at the end of the platform to provide a controlled crossing for patrons with vision disabilities.
Contrasting Color	High visibility bike lane pavement markings are required in the bus stop area. Lanes should be delineated using contrasting paint or paving materials.
Signage	Reflective bicycle traffic control signs are required (suggested R9-6 or R1-6A). Yield/stop for pedestrians' surface lane markings should be placed prior to the bus stop and at pedestrian crossings. Applications of raised crosswalks require markings for speed tables with crosswalks (MUTCD 3B-30).
Pedestrian Access	
Crossings	Two pedestrian crossings are recommended, one connecting directly to the ADA boarding and alighting area and another connecting to a controlled intersection. Crosswalks must be marked and yield or stop for pedestrian signs must be used. Channelizing railings on the island should direct pedestrians to crossing locations.
Intersection Access	Accessible ramp should be placed at the intersection end of the island connecting to the crosswalk if the stop is located at an intersection.
Signage	At pedestrian crossings to the island, [Bicycle] Yield to Peds (R9-6) or [Bike] [Stop] for [Ped] Within Crosswalk (modified R1-6A) are required. Multi-sensory guidance should be considered. A sign with braille, raised text, and audible messaging should be placed on the sidewalk at the crossing to help pedestrians with vision disabilities confirm they are at the bus stop's access point.
Tactile Guidance	Detectable warning surface must be installed along the edge of the roadway when the curb height is 8 inches or greater. On the sidewalk, a tactile guide strip should be considered to help pedestrians with vision disabilities locate the crossing leading to the bus island. The guide strip must be 24 inches wide when intended to be intercepted so that a pedestrian is unlikely to step over it without encountering it.

Boarding Island

It is recommended that the bus shelter and waiting area are co-located on the boarding island. Keeping the shelter on the sidewalk is not recommended as additional consideration must be given to how waiting passengers will move between the shelter and the platform while mitigating potential conflicts with cyclists when transit patrons are focused on the arriving bus.

Figure 28: Shelter Used as Barrier to Direct Passengers Towards Crossing
Source: KFH Group (14th St. & N St. NW, Wash., DC)

Bus shelters must be located at least 10 feet from crosswalks to allow visibility between cyclists and passengers accessing the island. Due to space constraints, shelters on an island bus stop will likely need to be narrower than standard. For far-side island bus stops, a standard shelter can be used if the advertisement panel (widest element) is positioned at the furthest point on the island where pedestrians won't need to cross. As shown in **Figure 28**, this assists in creating a barrier that directs passengers to the controlled intersection crossing.

At far-side and near-side stops, where roadway alignment allows, the boarding island should extend to the crosswalk forming a pedestrian refuge island to provide additional pedestrian space (see **Figure 29**). When a median refuge is provided connected to the bus island, an Accessible Pedestrian Signal (APS) pushbutton should be provided on the island to permit pedestrians with vision disabilities to get an audible or vibrotactile indication when the WALK signal is illuminated. Far-side stops should provide room for cars to queue behind a dwelling transit vehicle while signs and markings should communicate to drivers not to "Block the Box."

Figure 29: Boarding Island Bus Stop with Pedestrian Refuge Island in Crosswalk

Bike Lane

At the bus stop, it is preferred that bike lanes are at minimum 5 feet wide for a single-direction bike facility and 10 feet wide for a two-way bike facility. Bike lanes should be reduced to the minimum width at points where pedestrians cross the bike lane. Bike lane minimum widths could be reduced in locations with significant constraints; however, bike lanes should not be narrowed beyond minimum widths if there is grade separation or railings present between the bike lanes and the boarding island. Visually narrowing the bike lanes using surface treatments is recommended when speed reduction is desired. There are three typical bike lane configurations for island bus stops as shown below.

Channelized Bike Lane

- Remains at street grade, generally 6 to 7 inches lower than the sidewalk and bus platform (see **Figure 30**).
- Provides easily detectable edges between the bike lane and both the boarding platform and sidewalk.
- Best suited for island bus stops that connect to a refuge at an intersection with ramps; however, a raised crossing can be utilized as a secondary access point.
- Non-traversable treatments are required for separation between the bike lane and island bus stops.

Figure 30: Channelized Bike Lane
Source: KFH Group

Raised Bike Lane

- Rises from street level to sidewalk grade allowing at-grade pedestrian crossings (see **Figure 31**).
- Potential challenge for pedestrians with vision disabilities to detect the edge of the pedestrian zone and may inadvertently wander into the bike lane.
- A detectable edge treatment should be included separating the sidewalk from the bike lane; this can take several forms, including a non-traversable area like a grass strip, plantings, or railing.

Figure 31: Raised Bike Lane
Source: DDOT

Intermediate Grade Bike Lane

- Rises halfway between street level and sidewalk grade, providing a 3 inch curb (see **Figure 32**).
- Vertical curb provides a detectable edge for people with vision disabilities.
- Bike lane rises slightly at crossings and a very small ramp can be provided to allow for a level crossing.
- Non-traversable treatments are required for separation between the bike lane and island bus stops.

Figure 32: Intermediate Grade Bike Lane
Source: BeyondDC

High visibility bike lane markings should be considered just before the island bus stop to warn cyclists of pedestrian crossings. Yield markings or SLOW pavement markings (shown in **Figure 33**) are recommended. The entire bike lane should be painted green through the bus stop area from where the island starts to where the island ends. White crosswalk markings must be used at all crosswalks accessing the island. Applications of raised crosswalks require markings for speed tables with crosswalks (MUTCD 3B-30).

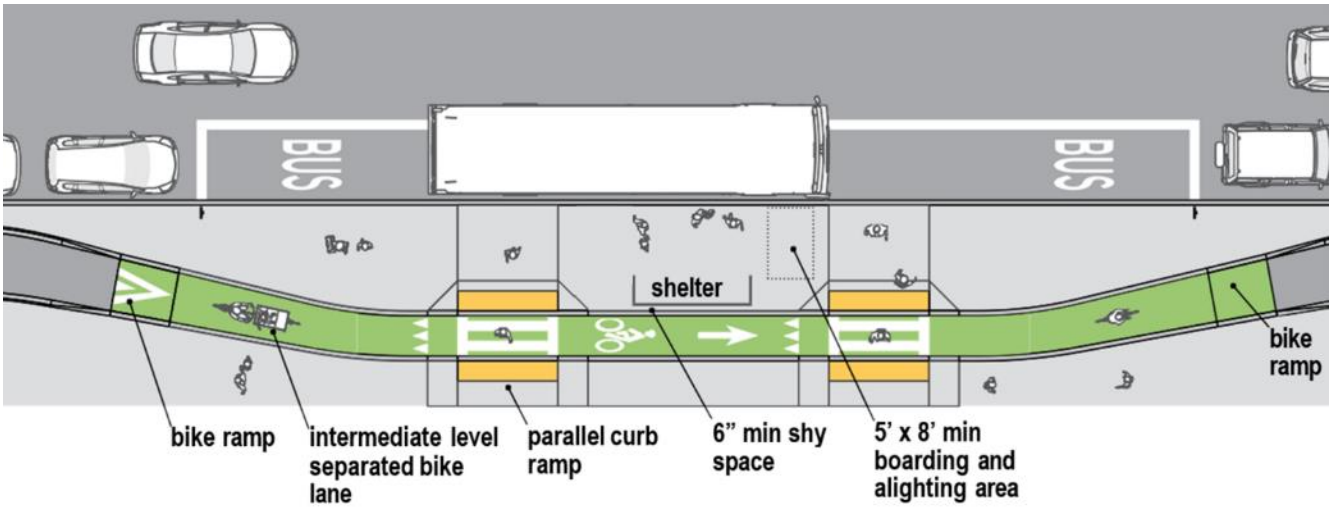
Figure 33: SLOW Bike Lane Pavement Warning at Island Bus Stop

Source: KFH Group (2nd Ave. & Colesville Rd., Silver Spring, MD)

Near-side island bus stops should incorporate traffic signal phasing to avoid vehicle and bicycle right-hook conflicts. Audible and/or visual warnings are recommended to alert cyclists of approaching buses. This could include flashing signals on the leading edge of the island or an audible announcement from the bus's exterior speakers. Further study will be required for the implementation of active warning systems which would likely be subject to MUTCD signal warrants.

Lateral deflection of the bike lane (shown in **Figure 34**) may be necessary to accommodate the 5 by 8 feet boarding and alighting area and other amenities within the boarding island. If shelters or other amenities are provided, ensure that sight lines are not limited.

Figure 34: Lateral Deflection of Bike Lane at Boarding Island



Source: Ohio Department of Transportation

Pedestrian Access

An accessible connection between the sidewalk and the boarding island is required. All crosswalks that connect the sidewalk to the boarding island must be marked and crosswalk yield markings should be included. Detectable warning surfaces must be placed on both sides of every designated crossing over the bike lane.

Figure 35: Median Refuge Island Tip
Source: NACTO

At least two pedestrian crossings are recommended for island bus stops. An accessible ramp should be placed at the intersection end of the island entering the crosswalk with an audible crosswalk system provided. If there is no crosswalk at the intersection, one should be installed, with a refuge island tip (see **Figure 35**) to provide a safe waiting area for pedestrians. Channelizing railings, planters, or other treatments should be used to help direct pedestrians, particularly those with vision disabilities to designated crossing locations.

Accessibility Factors

All bus stops must meet ADA compliance requirements as outlined in the ADA Accessibility and Universal Design section of this document. Specific accessibility factors and considerations for island bus stops include:

- Boarding island must include at least one ADA compliant access point, with two preferred.
- Adjacent to intersections, one access point should connect directly to a median refuge island with a signalized crossing.
- An Accessible Pedestrian Signal Push button should be provided on the median refuge to permit pedestrians with vision disabilities to receive the audible and vibrotactile indication when the WALK signal is illuminated.
- Audible crosswalk system should be provided at the intersection or mid-block crossing.
- Crosswalk should connect directly to the boarding area on the boarding island from the sidewalk so that those using mobility aids/devices can have improved direct access.
- The crossing to the island should be raised or at-grade with the sidewalk and island to encourage cyclists to yield to passengers.
- Audible pedestrian signals should be considered to assist in locating the path between the boarding area and the sidewalk.
- Detectable warning surfaces must be placed on both sides of every bike lane crossing.
- Cane detectable guidance posts should be placed where the crosswalk connects directly to the boarding and alighting area. Audible and raised text signage should be considered on this pole.

5.2 Narrow Island Bus Stop

Description

Narrow boarding islands (also known as step-out islands) are a type of shared stop and can be constructed in constrained conditions where typical boarding islands are not feasible. A narrow boarding island raises the bike lane to sidewalk height while providing a narrow island (see **Figure 36**). The boarding and alighting area is within the bike lane with shelters and other amenities placed on the sidewalk. This design is typically used in locations with a moderate level of transit service, where space is constrained, and boarding islands are not feasible.

Figure 36: Narrow Island Bus Stop

Potential Benefits

- Provides similar benefits as island bus stops but in a smaller format for constrained areas.
- Protects cyclists by preventing buses from crossing bike lanes at bus stops.
- Eliminates “leapfrogging” between buses and bikes in traffic lanes reducing the potential for conflicts.
- Prevents and discourages vehicles from parking in the bike lane and bus stop zone.
- Encourages cyclists to ride in the bike lane rather than on the sidewalk, reducing the potential for conflicts with pedestrians or waiting transit patrons.
- Separation improves passenger, cyclist, and transit vehicle safety while increasing operational efficiency.

Potential Drawbacks

- While smaller than island bus stops, the design still requires a large amount of right-of-way which might require elimination of street-side parking or a travel lane and modifications to existing sidewalks.
- The passenger boarding area is partially within the bike lane.
- Passengers may wait in the bike lane to be more visible to the bus driver, considerations should be given to help transit riders understand where to safely wait.
- Lack of a dedicated passenger waiting area, all passenger amenities and an accessible waiting area must be placed along the sidewalk and away from the bike lane.
- Cyclists must stop while passengers board and alight the bus.
- Dwelling buses at the stop may cause confusion for cyclists, leading to potential conflicts.

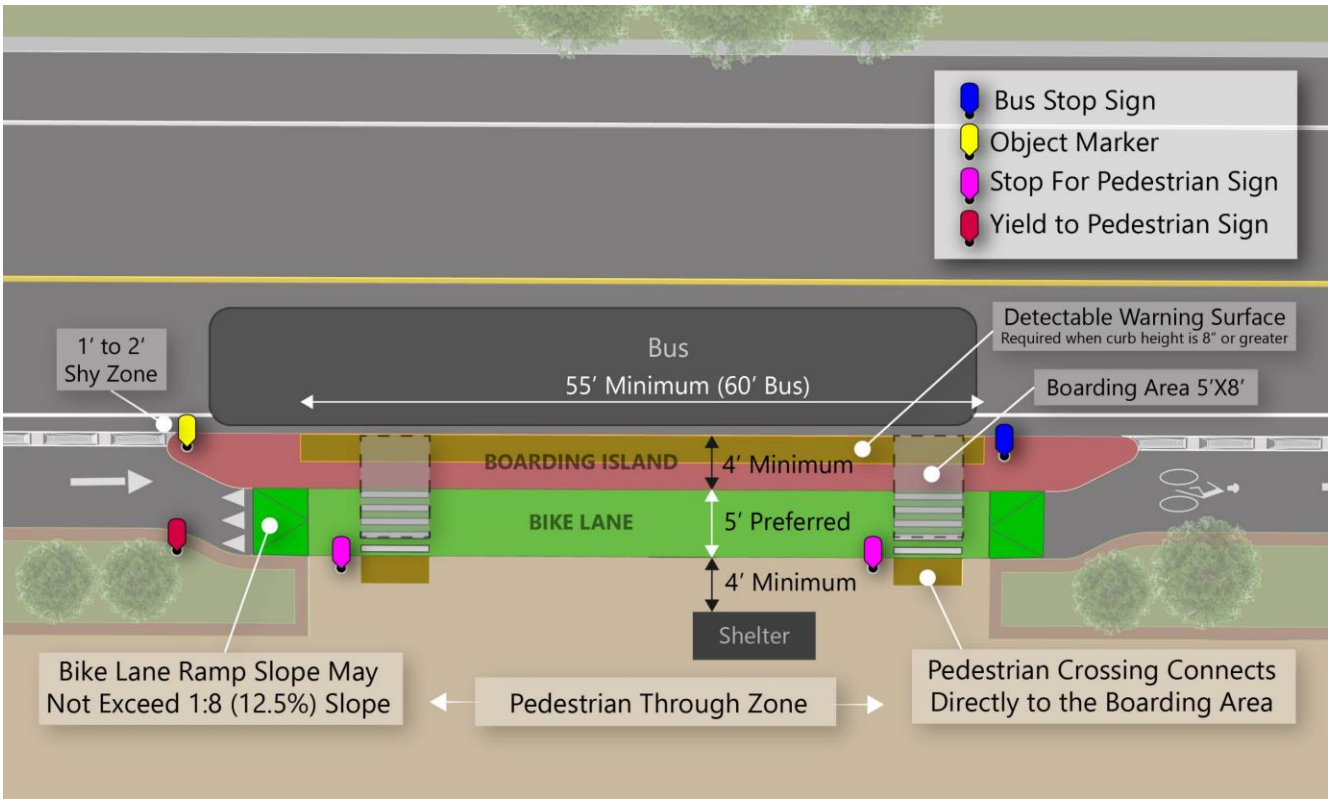
Usage Factors

- In locations where space is limited, and true island bus stops are not feasible, narrow island bus stops should be considered.
- Streets with moderate to high transit frequency where bike facilities exist or are planned.
- Bike facilities with moderate to high bike and scooter volumes.
- Not ideal for bi-directional bike lanes due to safety concerns for potential conflicts between passengers and cyclists.
- Narrow island area must be wide enough to allow ramp deployment outside of the bike lane due to the potential for conflict – a deployed ramp within the bike lane could be challenging to see for an approaching cyclist creating a safety hazard.
- Sidewalk area must be spacious enough for a dedicated waiting area to discourage transit patrons from waiting on the narrow island.
- Locations where there is a need to mitigate conflicts between transit vehicles and cyclists.
- Where separation of pedestrians, cyclists, passengers and transit vehicles are desired.
- Locations where in-lane bus stops are preferred.
- Where a narrow island bus stop can be accommodated within the existing right-of-way or street width.

Design Factors

Design factors for narrow island bus stops are illustrated in **Figure 37** and listed in **Table 6**.

Figure 37: Narrow Island Bus Stop Design Factors



Accessibility Factors

All bus stops must meet ADA compliance requirements as outlined in the ADA Accessibility and Universal Design section of this document. Specific accessibility factors and considerations for narrow island bus stops include:

- Bike lanes are a component of the ADA boarding and alighting area, as a result, the transition between the narrow island, bike lanes, and sidewalk must be level and flush.
- Delineating the sidewalk and bike lane is a critical need for pedestrians with vision disabilities, consider railings or barriers to direct patrons to boarding locations.
- Multi-sensory guidance should be considered to guide passengers with disabilities.
- An accessible passenger waiting area must be provided on the sidewalk.

Table 6: Narrow Island Bus Stop Design Factors

Element	Narrow Island Bus Stop
Boarding Island	
Length	35 to 45 feet (40ft bus) / 55 to 65 feet (60ft articulated) Expand for dwelling vehicles (see **Table 10**)
Width	8 feet minimum within boarding island and bike lane for boarding area. Provide 4 feet minimum boarding island width to allow for ramp deployment outside of bike lane to mitigate potential conflicts.
Height	Standard curb height.
Clear Space	1 to 2 foot "shy" zone between bulb curb and edge of travel lane. 4 feet clear area along the curb edge should be maintained. Locate shelters and other amenities at least 10 feet from crosswalks.
Signage	Reflective signage or another visible element should be installed on the leading corner of the island (Suggest: MUTCD KEEP LEFT (R4-8) or object marker (OM3). [Bicycle] Yield to Peds (R9-6) or [Bike] [Stop] for [Ped] Within Crosswalk (modified R1-6A) are required for pedestrian crossings.
Bike Lane	
Width	5 feet wide preferred for single direction facility. Not recommended for two-way bike facility due to safety concerns.
Ramps	Bike lane must be elevated to sidewalk level for controlled at-grade movement. Ramp slope for raised lanes and raised crosswalks should not exceed 1:8 (12.5%)
Contrasting Color	High visibility bike lane pavement markings are required. Lanes should be delineated using contrasting green paint or paving materials.
Signage	Reflective bicycle traffic control signs are required (suggest MUTCD R9-6 or R1-6A). Yield/stop for pedestrian's lane markings should be placed prior to the bus stop and at pedestrian crossings.
Pedestrian Access	
Crossings	Pedestrian crossings should directly connect the sidewalk to the bus's doors. Crosswalks must be marked and yield or stop markings should be used. Channelizing railings or treatments can direct pedestrians to crossing locations.
Signage	Reflective bicycle traffic control signs are required at pedestrian and bike lane crossings (suggested R1-6A). A sign with braille, raised text, or audible messaging should be placed on the sidewalk near the crossing to help pedestrians with vision disabilities confirm they are at the bus stop access point.
Tactile Guidance	Detectable warning surface must be installed along the edge of the roadway when the curb height is 8 inches or greater. On the sidewalk, a tactile guide strip should be considered to help pedestrians with vision disabilities locate the crossing leading to the bus boarding area. The guide strip must be 24 inches wide when intended to be intercepted so that a pedestrian is unlikely to step over it without encountering it.

5.3 Shared Bus/Bike Stop

Description

A shared bus stop incorporates the bike lane into the bus stop boarding area. The bike lane rises to curb/sidewalk height and runs along the bus stop boarding area (see **Figure 38**), allowing cyclists to ride through the boarding area when transit vehicles are not present and yielding to boarding/alighting passengers when a transit vehicle is present. Shared bus stops should be utilized if a boarding island configuration is not feasible due to sidewalk/roadway constraints. Shared bus stops are designed to eliminate potential mixing zones between cyclists and transit vehicles; however, this design can create a conflict point between passengers and cyclists.

Figure 38: Shared Bus/Bike Stop

Potential Benefits

- Provides an accessible boarding area for the bus stop within the bike lane.
- Protects cyclists by preventing buses from crossing bike lanes at bus stops.
- Eliminates “leapfrogging” between buses and bikes in traffic lanes reducing the potential for conflicts.
- Prevents vehicles from parking in the bike lane.
- Encourages cyclists to ride in the bike lane rather than on the sidewalk, reducing the potential for conflicts with pedestrians or waiting transit patrons.

Potential Drawbacks

- The passenger boarding area is within the bike lane, creating a potential conflict point between passengers and cyclists.
- Passengers may wait in the bike lane to be more visible to the bus driver, considerations should be given to help transit riders understand where to safely wait.
- All passenger amenities and an accessible waiting area must be placed along the sidewalk and away from the bike lane.
- Cyclists must stop while passengers board and alight the bus.
- Dwelling buses at the stop may cause confusion for cyclists, leading to potential conflicts.

Usage Factors

- Ideal for low-activity areas where constrained streets preclude boarding islands.
- Not recommended in high-activity areas due to the potential for conflict between passengers and cyclists.
- Location where the bike lane can be used as part of the ADA boarding and alighting area.
- The boarding platform must end at least 10 feet from the crosswalk to allow cyclists to queue ahead of the boarding platform.
- Near-side stops may create conflicts between through bike traffic and right-turning vehicles – if a far-side stop is not desirable or feasible, vehicular right turns across the bike lane should be prohibited or separated by signal phasing.
- Curbside activities that will conflict with bike movements and visibility (such as lay-bys or parking bays) must be prohibited at a minimum of 20 feet from either direction of the bike ramps to prevent conflicts between cyclists and vehicles.

Design Factors

Design factors for shared bus/bike stops are illustrated in **Figure 39** and listed in **Table 7**.

Figure 39: Shared Bus/Bike Stop Design Factors

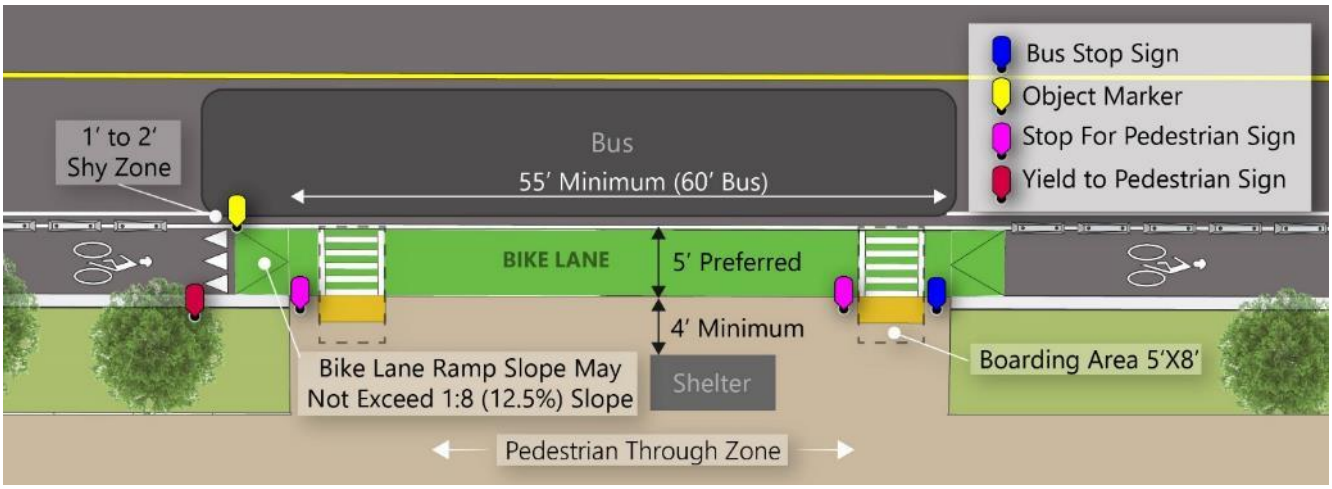


Table 7: Shared Bus Stop Design Factors

Element	Guideline
Length	35 to 45 feet (40ft buses) 55 to 60 feet (60ft articulated) Option to expand for dwelling vehicles (see **Table 10**)
Width	8 feet minimum within bike lane and sidewalk/platform for boarding area.
Height	Standard curb height. Bike lane must be raised to match curb height.
Clear Space	1 to 2 foot "shy" zone between bulb curb and edge of travel lane. Locate shelters and other amenities at least 10 feet from crosswalks.
Signage	Reflective signage or another visible element should be installed on the leading corner of the island (Suggest: MUTCD KEEP LEFT (R4-8) or object marker (OM3).
Bike Lane Width	5 feet wide preferred for single direction facility. Not recommended for two-way bike facility due to safety concerns.
Bike Ramps	Ramp slope for raised lanes and raised crosswalks should not exceed 1:8 (12.5%).
Contrasting Color	High visibility bike lane pavement markings are required, green paint should be used. Lanes should be delineated using contrasting paint or paving materials.
Bike Signage	Reflective bicycle traffic control signs are required (suggested R9-6A). Signage should be placed prior to the bus stop with additional signage advising heightened awareness in the bus stop zone. In the bike lane, markings should also be considered, including [YIELD] or [SLOW] markings and shark teeth yield markings. Passenger facing "Wait for Bus on Sidewalk" signage is recommended.

Accessibility Factors

ADA compliance requirements are especially important at shared bike/bus stops as the ADA boarding and alighting area must be incorporated into the raised bike lane. Safety measures taken to ensure that cyclists yield to boarding and alighting passengers are also a critical element of accessibility. Additional accessibility considerations should include:

- The protected passenger waiting area must be directly accessible to the boarding and alighting area by an accessible pathway.
- Any transitional elements between the passenger waiting area and the boarding and alighting area/bike lanes must be level and flush.
- Detectable warning surfaces must be placed at every pedestrian crossing over the bike lane. For a shared platform, this may need to be the entire length of the flush area. Consider railings or other physical barriers to direct passengers to crossing/boarding locations.
- If space allows, consider placing detectable warning surfaces placed along the edge the roadway. (see **Figure 40**).
- Consider comprehensive multi-sense information to guide visually disabled passengers.
- Audible signals should be considered to announce that a transit vehicle is arriving and assist in locating the path between the waiting area and the boarding area.
- The protected waiting area, outside of conflict zones, should be a minimum of 5 feet by 8 feet.

Figure 40: Shared Bus/Bike Stop with Detectable Warning Surfaces and Railing

Source: KFH Group (Pennsylvania Ave. & 6th St. SE, Washington, DC)

5.4 Mixing Bike/Bus Stop

Description

Only in instances where boarding islands and shared stops are not feasible due to location constraints and where service is infrequent (about four or less buses per hour), a transit stop could be created in the separated bike lane (see **Figure 41**). When buses are present, cyclists must merge left to pass and overtake the stopped transit vehicle. Bike lane mixing stops create a conflict point between cyclists and dwelling vehicles, a conflict that the supplemental bus stop guidelines aim to address. This type of stop is not a preferred solution for transit stops. However, if implemented, lane markings, contrasting colors, and signage must be considered to alert operators and cyclists of the transit vehicle's movements.

Figure 41: Mixing Bike/Bus Stop

Potential Benefits

- Roadway markings improve visibility and safety as buses merge through bike lanes (**Figure 42**).
- Encourages cyclists to wait in the bike lane rather than overtake the bus or ride on the sidewalk, reducing the potential for conflicts with vehicles and pedestrians or waiting passengers.

Potential Drawbacks

- Requires bus operators and cyclists to overtake one another, potentially multiple times (leapfrogging), increasing conflict risks.
- If bicycle volumes are heavy, buses may be delayed as operators wait for a safe gap in bike traffic.
- May result in vehicles parking or standing in the bus stop zone causing safety and accessibility issues. This may be ameliorated by providing sufficient loading zones nearby but can probably not be eliminated.

Usage Factors

- Not a preferred design solution, only permitted in locations with infrequent service (no more than 4 buses per hour).
- Not recommended for low-stress or “all ages and abilities” bike routes.
- Suitable for low-speed and low-activity residential streets with bicycle facilities where site constraints do not allow for islands or shared bus/bike stops.

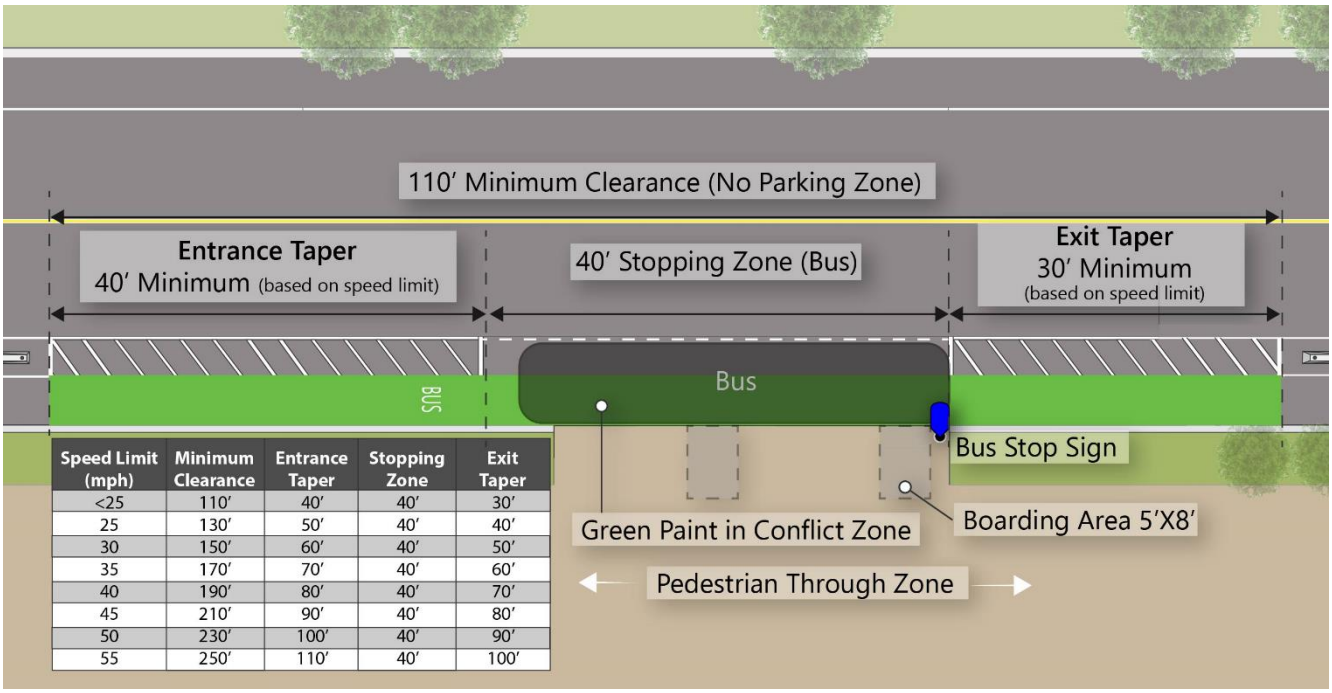
Figure 42: Mixing Bike/Bus Stop with Bike Lane and Roadway Markings

Source: KFH Group (Old Georgetown Rd. & Spruce Tree Ave., Montgomery County, MD)

Design Factors

Design factors for mixing bus/bike stops are illustrated in **Figure 43** and listed in **Table 8**.

Figure 43: Mixing Bike/Bus Stop Design Factors



Speed Limit (mph)	Minimum Clearance	Entrance Taper	Stopping Zone	Exit Taper
<25	110′	40′	40′	30′
25	130′	50′	40′	40′
30	150′	60′	40′	50′
35	170′	70′	40′	60′
40	190′	80′	40′	70′
45	210′	90′	40′	80′
50	230′	100′	40′	90′
55	250′	110′	40′	100′

Table 8: Mixing Bike/Bus Stop Design Factors

Element	Guideline
Length	40 feet (40ft buses) bus zone. 60 feet (60ft articulated) bus zone. 40 feet minimum entrance taper for merging (expand for high-speed roadways). 30 feet minimum exit taper for merging (expand for high-speed roadways).
Width	10 feet minimum bus zone.
Bike Lane Width	5 feet wide preferred for single direction facility. Not recommended for two-way bike facility due to safety concerns.
Contrasting Color	High visibility bike lane pavement markings are required in the bus stop area, green paint should be used or contrasting paving materials.
Bike Signage	Reflective bicycle traffic control signs advising heightened awareness in the bus stop zone should be considered. In the bike lane, pavement markings should also be considered, including [YIELD] or [BUS] markings.

Accessibility Factors

All bus stops must meet ADA compliance requirements as outlined in the ADA Accessibility and Universal Design section of this document. Mixing Bike/Bus Stops are designed to incorporate traditional on-street bus stop elements where the ADA boarding area is incorporated into the existing sidewalk. Buses must have adequate space to be fully aligned with the curb, allowing for safe access for all types of passengers. Additionally, the bus stop should be located so that the front door of the stopped bus aligns with the ADA boarding area.

When this design is used in conjunction with a separated bike lane, the bikeway separation must end prior to the bus stop to permit the bus to access the curb. This may result in other drivers parking or standing at the bus stop, and this can preclude the bus from being able to serve the stop. This may be ameliorated by providing sufficient loading zones nearby but can probably not be eliminated.

6.0 Bus Stop Hierarchy

For many transit agencies and jurisdictions, resources for providing and improving passenger facilities are limited requiring them to prioritize what and where improvements will be made. **Table 9** below provides a hierarchy of bus stop types that provides a guide on the provision of passenger amenities for the different bus stop types. There are three classes of bus stops: Basic Stop, Enhanced Bus Service, and Transit Center stops.

- **Basic Stop:** primary stops that serve as access points to the Metrobus system.
- **Enhanced:** stops that receive MetroExtra limited stop service and/or BRT service.
- **Transit Center:** stops that serve multiple routes and have over 500 boardings per day.

The number of boardings per day, across all routes serving the stop, including transfers, is recommended as the primary criterion for determining whether an amenity should be installed. This will ensure that resources are used at locations where they will benefit the greatest numbers of users.

Secondary considerations may include:

- **Number of routes serving the stop and its role as a transfer point.** For example, a stop served by multiple routes, at which more than one vehicle at a time will be serving the stop, will need unobstructed boarding areas for each vehicle.
- **Special populations served by the stop.** For example, a stop located near an organization which serves older people or people with disabilities would be a good a candidate for a bench, since the presence of seating at the stop may make a difference as to whether an individual who has difficulty walking can use fixed-route service (instead of MetroAccess).
- **Joint Partnerships.** A stop where an adjacent property owner or other organization is willing to finance and/or maintain a shelter or other types of amenities may be a good candidate for this type of amenity even if total boardings fall short of minimum thresholds. This includes advertising shelters, which the shelter vendor may wish to place at strategic locations for visibility of the advertisement in the community as part of their contract with the local jurisdiction.

Table 9: Bus Stop Hierarchy

Element	Basic Stop	Enhanced Service Bus Stop	Transit Center
Bus Stop Sign	Yes	Yes	Yes
ADA 5'x8' Landing Pad	Yes	Yes	Yes
Sidewalk	Yes	Yes	Yes
Lighting	Evening Service	Yes	Yes
Seating	Trip Generator Based[4]	Yes	Yes
Expanded Boarding & Alighting Area (Rear-door Access)	No[5]	Yes	Yes
Bus Bay (Pull Off)	No	Site Specific	Yes
Shelter(s)	1 (50+ boardings/day)	1	2 +
Trash Receptacle	Site Specific	Yes	Yes
Information Case	Yes	Yes	Yes
System Map	Contingent on Shelter	Yes	Yes
Real Time Passenger Information (LED + Audio)	Optional[6]	Yes	Yes

[4] Passenger seating should be provided at basic bus stops adjacent to community centers, hospitals, human service agencies, schools, senior living, and other key trip generators.
[5] Metro is planning to begin allowing passengers to enter from all bus doors in late 2023, expanded boarding and alighting areas should be considered for all bus stops.
[6] Refer to the Real Time Passenger Information Systems section for more details on installation considerations.

6.1 Basic Stop

Basic stops are the most common category of bus stop. They typically consist of a bus stop sign, an ADA boarding area, and sidewalk connection. Basic stops do not include expanded passenger waiting areas or enhanced passenger amenities. However, all bus stops with 50 or more average daily boardings should include a shelter and RTPI. All basic stops should include the following elements and passenger amenities:

- Accurate and up-to-date bus stop sign.
- At minimum a clear, unobstructed, paved boarding area that is 8 feet wide (perpendicular to the curb) by 5 feet deep (parallel to the curb) and compliant with the ADA.
- Expanded boarding and alighting areas should be considered.
- Connected by a paved sidewalk that is at least 4 feet wide.
- Adequate lighting either from street lights, lights from adjacent business, or shelter lighting (particularly stops that are served in the evenings).
- Trash receptacle (particularly at locations nearby restaurants and convenient stores).
- Shelter if there are 50 or more boardings per day (including transfers).
- Information case with detailed schedule information on services.

6.2 Enhanced Bus Service Stops

Enhanced bus service stops are designated as limited-stop/skip stop service and/or BRT bus stops. Express services have a limited number of bus stops along selected corridors in order to provide a higher level of service. This category differentiates limited-stop service stops (MetroExtra) and BRT bus stops due to the varying service characteristics.

Limited-Stop Service Stops

Express and limited-stop services, such as MetroExtra, should have the following passenger amenities regardless of daily ridership:

- Accurate and up-to-date bus stop sign.
- At minimum a clear, unobstructed, paved boarding area that is 8 feet wide (perpendicular to the curb) by 5 feet deep (parallel to the curb) and compliant with ADA; enhanced bus service stops must have additional waiting space and clear space for all door boarding.
- Connected to the pedestrian network by a paved sidewalk that is at least 4 feet wide.
- Adequate lighting (from streetlights, lights from adjacent business, or shelter lighting).
- Shelter with bench (for 300 or more boardings per day provide additional shelter(s))
- Information case with detailed schedule information on services and a system map.
- Real-time passenger information (see RTPI section).

Bus Rapid Transit (BRT) Stops

BRT bus stops/stations should be designed with enhanced connectivity and passenger amenities, similar to rail stations. BRT bus stops should have the following passenger amenities regardless of daily ridership:

- Branded/special bus stop signage and unique shelter designs (see **Figure 44**).
- High-capacity platforms that incorporate ADA boarding areas, all door boarding, and passenger waiting areas.
- Level or near-level vehicle boarding capabilities.
- Accessible connections to the pedestrian network and shared use paths.
- Enhanced passenger amenities (e.g., shelters, seating, system map, bike racks, etc.)
- Real-time passenger information (see RTPI section).

Figure 44: Crystal City Potomac Yard Transitway BRT Bus Stop

Source: Google Street View Imagery (33rd St. & Crystal Dr., Arlington, VA)

6.3 Transit Center

Transit center bus stops are located at Metro Station bus loops, dedicated off-street transfer stations, and other stops that serve multiple routes with over 500 boardings per day. Specific designs and accommodations for transit center stops can be found in the WMATA Station Site and Access Planning Manual. Transit centers should have an array of passenger amenities.

7.0 Bus Stop Elements and Amenities

7.1 Bus Stop Signs

A bus stop sign should be securely mounted on its own post, at an angle perpendicular to the street. For bus stops that are served by Metro and other transit agencies, the Metrobus flag shall be placed at the top of the bus stop post above the other transit agency flag as shown in **Figure 45**. Every bus stop must be marked with a bus stop sign indicating to bus operators and customers the location of the bus stop.

Figure 45: Sign Placement for Shared Stops
Source: KFH Group

Signs indicate to passengers and operators where buses stop, as well as publicize the availability of the service. Placement of bus stop signs should take into consideration customer convenience, safety, and stop visibility. Bus stop signs must conform to ADA requirements for height, width, and visibility. Information on the bus stop sign should at a minimum include operator name, contact phone number, and route numbers or names.

The sign must be easily visible to the approaching bus driver and be clear of the side mirrors of buses, 2 to 4 feet from the face of the curb. The bus stop sign should neither block nor be blocked by other street signs. The header sign is the point at which the front of the bus should be aligned when the bus is servicing passengers and thus should be placed approximately one foot beyond the far side of the front door landing area.

The bottom edge of the sign should be positioned at a height of at least 80 inches above the ground, as specified under ADA. Measuring from the base of the sign, Metro header signs are typically positioned 98 inches above the ground. Bus stop signs may also be mounted on bus shelters. Signs mounted on bus stop shelters should also have a space of 80 to 98 inches from the base of the sign to the ground.

To meet ADA requirements for minimum information related accessibility, the following standards must be met for visual signage:

- Non-glare finish for both characters and background.
- Characters contrasted with background with either light characters on a dark background or dark characters on a light background – note that signs are more legible for persons with low vision when characters contrast as much as possible with their background.
- Characters that are conventional in form (i.e., not italic, oblique, script, highly decorative, or of other unusual forms).
- Fonts with character proportions where the width of the uppercase letter “O” is 55% minimum and 110% maximum of the height of the uppercase letter “I”.
- The minimum character height (based on the uppercase letter “I”) required depends on the height of the sign and how close a transit customer can get to the sign (horizontal viewing distance):
  - Where the height from the ground to the baseline of the character is 70 inches to 120 inches (5 to 10 feet), and the horizontal viewing distance is no greater than 15 feet, the characters must be at least 2 inches tall.
  - Where the height from the ground to the baseline of the character is greater than 120 inches (10 feet), and the horizontal viewing distance is no greater than 21 feet, the characters must be at least 3 inches tall.
  - If obstructions around the sign pole result in a greater viewing distance, the minimum character height increases by 1/8 inch per additional foot of viewing distance.
- Stroke thickness of the uppercase letter “I” that is 10% to 30% of the height of the character.
- Character spacing (measured between the two closest points of adjacent characters) between individual characters that is 10% to 35% of character height.
- Line spacing (measured between the baselines of separate lines of characters within a message) that is 135% to 170% maximum of the character height.

While tactile signage (braille or raised lettering) is not a requirement for bus stops, if such signage is installed, it is subject to ADA Accessibility Standards.

7.2 Bus Stop Sign Post

It is preferred that all bus stop locations have their own dedicated bus stop posts. Using street sign posts, light posts, and other non-bus stop posts should be avoided whenever possible. Bus stop posts should be rust resistant, painted white and distinguishable from other posts in the same area to benefit customers with visual impairments.

In addition to designing bus stop posts to be more distinguishable from other posts, consideration should be given to other solutions such as a tactile sign with the word Metro or Bus Stop (**Figure 46**). Tactile signs should be installed between 40 inches to 54 inches on-center above the ground.

Figure 46: Example of Tactile Sign Mounted on Bus Stop
Source: KFH Group

Bus stop sign posts should be installed at the far side of the landing area (**Figure 47**). Consistent placement of the sign pole provides the bus driver with a landmark at which to align the front end of the vehicle to make deployment of the lift or ramp possible. It also provides the customers with an indication of where they will be boarding the bus.

Figure 47: Bus Stop Sign Post Aligned with Front of Vehicle

Source: KFH Group (Wayne Ave. & Dixon Ave., Montgomery County, MD)

7.3 Information Displays

Service information should be provided at all bus stops that serve as transfer points between routes. Shelters should be designed with panels that will accommodate customer information such as system maps, neighborhood maps, and/or schedule and route information.

Customer information at high activity stops without bus shelters can be provided through an information case or display that is attached to the bus stop post (**Figure 48**). The type of information case may vary by jurisdiction, but paved access (minimum of 36 inches wide) should be provided to the information displayed in the case.

Bus schedules, timetables, and maps that are posted at the bus stop (the information contained within these cases) are not subject to ADA requirements. However, post-mounted objects such as information cases must meet relevant ADA requirements to ensure that they do not create a potential hazard for pedestrians. Information cases mounted on posts may overhang circulation areas by up to 4 inches maximum when located 27 to 80 inches above the ground.

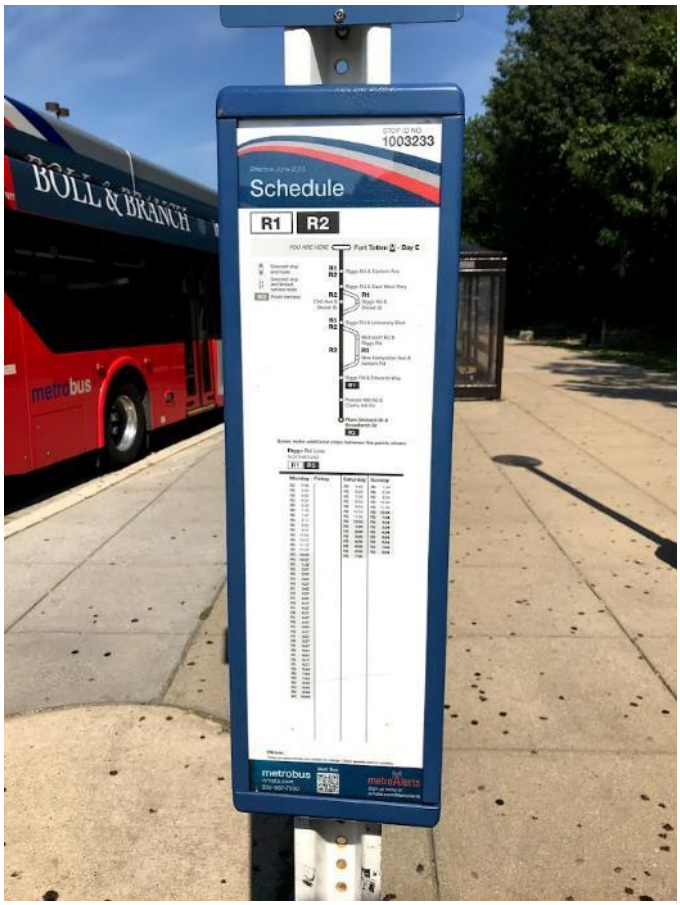


Figure 48: Post Mounted Information Case
Source: KFH Group (Fort Totten Metro Station Bus Bays)

While there are no relevant ADA guidelines on appropriate heights for information cases, there are suggested viewing heights for items in museums such as exhibits and labels. In the Design for Accessibility: A Cultural Administrator's Handbook, and Smithsonian Guidelines for Accessible Exhibition Design, wall labels should be at a height that is comfortable for both those seated and standing. Wall labels mounted between 48 inches and 67 inches are in a comfortable viewing location for both those seated and standing.

Real-time bus information should be considered at key stops to provide customers with up-to-date bus arrivals through digital electronic displays such as e-paper signs or other electronic displays. Real-time displays are preferred and should be used to upgrade and replace traditional static information cases in a gradual fashion.

7.4 Lighting

Adequate lighting at bus stop facilities allows bus drivers and approaching traffic to see waiting passengers at night. Lighting also provides added security for those waiting at the stop, in addition to illuminating route and schedule information for patrons. Bus stop locations that are served in the evenings should have adequate lighting. Lighting can be provided by a nearby streetlight, ambient light from the adjacent business, lighting installed within the shelter, or a stand-alone light pole. Transit stops without sheltered lighting should be located within 30 feet of an overhead light source. Bus stop light fixtures or shelter illumination should be between 2.0 to 5.0 footcandles. However, shelter lighting should be on the lower range as to not create a spotlight affect where it is difficult for passengers waiting inside the shelter to see outside.

7.5 ADA Landing Pads/Passenger Waiting Area

A leveled and paved waiting area with adequate space provides a safe, secure, non-slippery surface for passengers waiting at the stop. This will provide greater access to transit services to wheelchair users, the elderly, and other encumbered riders such as parents with strollers. Another benefit to providing an adequate waiting area is that passengers waiting for the bus will be setback further from the curb and the flow of traffic.

According to the ADA Standards for Transportation Facilities, landing pads (for passengers boarding and alighting) should be:

- Firm and stable.
- Clear of obstructions and being at least 96 inches (8 feet) from the curb/roadway and at least 60 inches (5 feet) parallel to roadway. A landing area of this size or larger is necessary for deployment of the vehicle's ramp and lift and for a customer using a wheelchair to maneuver on and off the lift.
- Connected to streets, sidewalks, or pedestrian paths by an accessible route.
- Sloped (parallel to the roadway) as the same as the roadway, to the maximum extent practicable. Perpendicular to the roadway, the slope of the landing area shall not be steeper than 1:48.

Ideally for urban areas and high volume stops, and where there is adequate right-of-way, landing pads should be a continuous 8-feet-wide paved pad along the entire length of the bus stop. **Figures 49 and 50** provide examples of ADA landing pads. It is also preferred that the landing pad/waiting area be connected to an accessible sidewalk but separated from the general pedestrian flow. This will allow for safe boarding and alighting from both the front and rear doors of the bus.

All new bus stops must be located in accessible locations. Stops which are inaccessible obligate the transit provider to offer ADA complementary paratransit for customers who could otherwise use the accessible stop.

Figure 49: Landing Pad with Sidewalk Set Back from Curb

Source: KFH Group (Calverton Blvd. & Galway Dr., Prince George's County, MD)

Figure 50: Landing Pad with Sidewalk Adjacent to Curb

Source: KFH Group (Old Georgetown Rd. & Wyngate Dr., Montgomery County, MD)

7.6 Expanded Boarding and Alighting Area

Bus platform dimensions should ultimately be determined by rider capacity, pedestrian accessibility, and operator needs. Where all door boarding is desired, expanded passenger platforms should be provided. Expanded platforms are also applicable where in-lane bus stops (**Figure 51**), curb extensions, or boarding islands are provided.

Platform Length

The platform length (parallel to the flow of vehicles) should be determined by the expected number of transit vehicles concurrently serving or dwelling at the bus stop.

- The minimum platform length must be no less than the length needed to serve all doors of the longest transit vehicle that will serve the stop (see **Table 10**).
- The total platform length should exceed the length of all transit vehicles expected to serve and or dwell at the stop concurrently.
- An additional 5 to 10 feet of distance should be accounted for between each additional transit vehicle expected to be dwelling.

Figure 51: Preferred Landing Pad for Front/Rear Boarding and Alighting

Source: KFH Group (Ethan Allen Ave. & New Hampshire Ave., Takoma Park, MD)

For example, the platform length of a near-side bus stop that is served by one 40-foot bus would need to be a minimum of 35 feet in length. If the same bus stop is simultaneously served by two 40-foot buses, it would require a minimum of 80 to 90 feet in platform length. Recommended minimum platform lengths for in-lane stops are provided in **Table 10**.

Table 10: In-Lane Stop Minimum Platform Length by Transit Vehicle Type (feet)

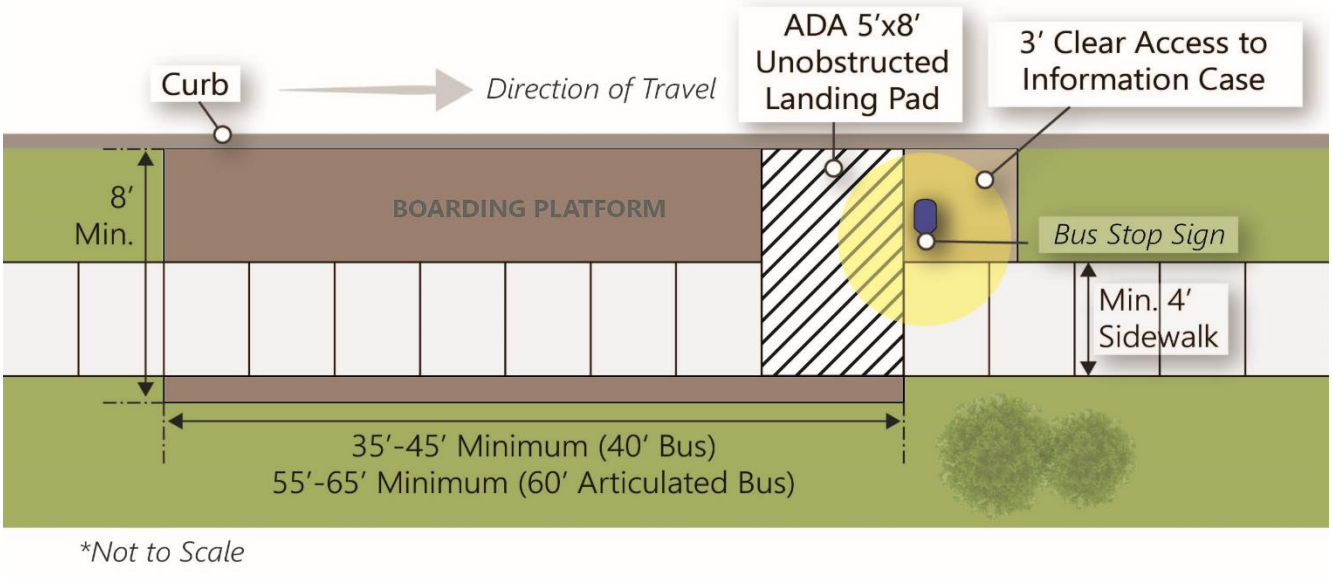
Stop Position	40ft Bus	60ft Bus	2 x 40ft Buses	2 x 60ft Buses
Near-Side	35	55	80	115
Far-Side*	45	65	90	130
Mid-Block	35	55	80	115

**Includes 10 feet of additional clearance behind the transit vehicle to prevent queuing vehicles from blocking the intersection*

Platform Width

The platform width is the distance perpendicular to the flow of vehicles. ADA guidelines require the platform width to be a minimum of 8 feet (**Figure 52**). Curb extensions, for bulb bus stops, may utilize the existing pedestrian through zone to achieve the 8 feet minimum width. Boarding islands, separated from the sidewalk, must be a minimum of 8 feet wide and should include additional width for railings or other barriers.

Figure 52: Front and Rear Boarding Platform



Curb Height

Curb height is the vertical distance of the boarding area/platform above the roadway surface. Standard curb height, matching surrounding roadway curb heights, is recommended for landing pads and boarding platforms.

Level or near-level boarding (matching the vehicle floor height) should be a component of an enhanced service or corridor improvement rather than a stand-alone design (**Figure 53**). If the curb height is greater than 8 inches, detectable warning surfaces are required along the edge of the platform where passengers board and alight.

Figure 53: Curb Height Rise for Near-Level Boarding
Source: AECOM (Crystal City Potomac Yard Transitway, Arlington, VA)

Dedicated Passenger Waiting Area

All bus stops must have a dedicated passenger waiting area provided within a safe and accessible location (**Figure 54**). Curb extensions or boarding islands provide the opportunity to locate a dedicated passenger waiting area outside of the pedestrian through zone. Extended areas should be considered for bus stops with large passenger volumes. Passenger waiting areas should maintain a Queuing Area Level of Service D (3 to 7 ft^2 per passenger) or better.[7]

Figure 54: Dedicated Passenger Waiting Area Outside of the Pedestrian Through Zone

Source: KFH Group (11th & G St. NW, Washington, DC)

[7] TCRP Report 165: Transit Capacity and Quality of Service Manual

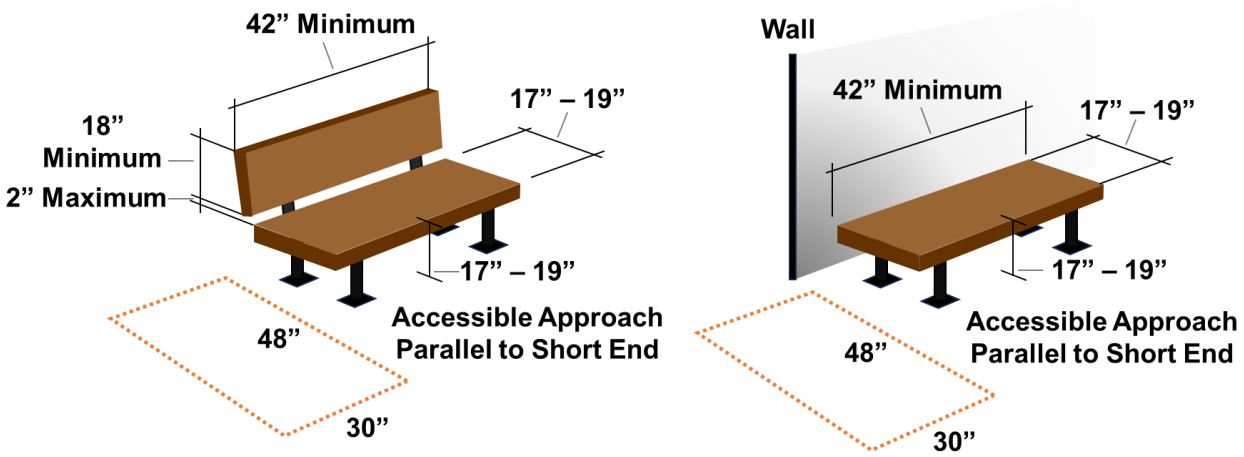
7.7 Freestanding Bench

Benches are recommended for bus stop locations that are near sites that attract riders who may have difficulty walking and standing, particularly, stops where headways are longer than 15 minutes.

Benches should be designed to coordinate with shelters along the same corridor, with an appearance appropriate to the neighborhood and fabricated of durable materials resistant to vandalism and weather conditions. The bench should be installed adjacent to (but not impeding) the landing area and connected to a pedestrian pathway. Benches installed within shelters should not obstruct the minimum accessible clear space within the shelter. The ADA specifies the following dimensions for bench accessibility as shown in **Figure 55**.

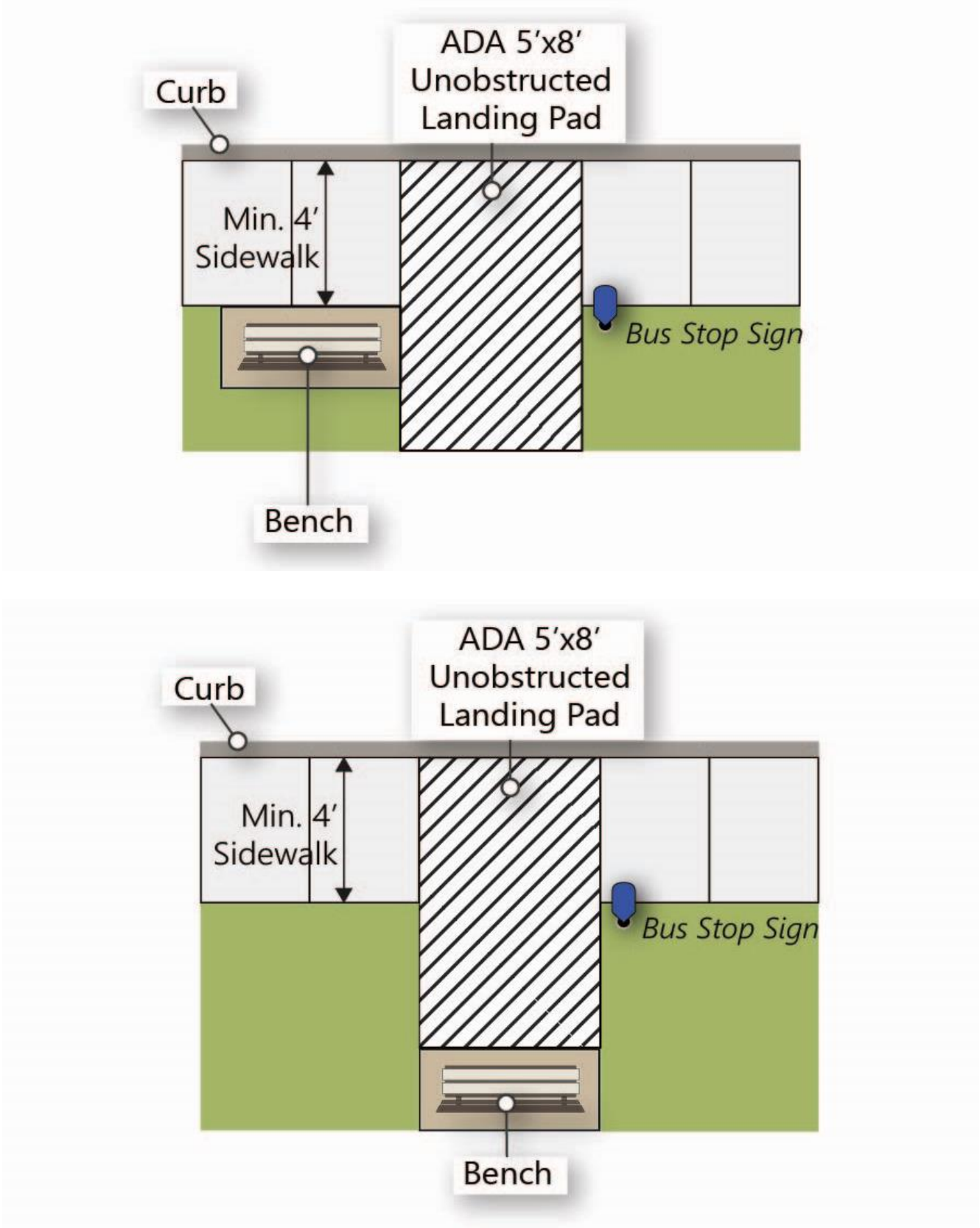
- Seat dimensions: between 17 to 19 inches in depth and a minimum of 42 inches in length.
- Seat height: 17 to 19 inches above the ground required. (ADA Standard)
- Back support: a minimum of 18 inches high in height, positioned a maximum of 2 inches above seat.
- Structural strength: able to withstand a vertical or horizontal pressure of 250 pounds or more.
- Bench materials: durable and resistant to vandalism and weather conditions; if installed externally use a slip resistant surface which allows for proper drainage. Design should discourage sleeping on bench.
- Accessible clear area: adjacent to the bench provide a minimum of 30x48 inches of firm, stable, and clear ground space for a wheelchair to maneuver and occupy. (ADA Standard)
- Placement: Maintain at least 4 feet between the bench and the back-face of the curb (**Figure 56**). Do not install bench on the 5x8 foot wheelchair landing pad; obstruct sidewalk or access to customer information.

Figure 55: Preferred Bench Dimensions



Accessible Approach **Accessible Approach Against a Wall**

Figure 56: Possible Bench Locations



7.8 Shelters

Shelters are recommended for all stops at which 50 or more passengers board per day, enhanced service stops, and transit centers. Based on the type of facility or location served (i.e., senior communities, universities, hospitals, major trip generators, and major transit points between routes) exceptions should be made. Currently, each jurisdiction is responsible for installing and maintaining its own shelters. The following will provide some general design factors as well as accessibility requirements for bus stops with shelters. Figure 3-13 provide examples of shelters in the region.

General Design Factors

Shelters should be oriented so that they are placed facing the travel lane and the location should minimize the walking distances between the shelter and the loading area for passengers. To provide adequate boarding and alighting space for persons in a wheelchair, efforts should be made to place shelters at the nearside of the landing pad. Additional general guidelines to follow in placing shelters are:

- Transparent sides for greater visibility; if glass panels are used, they should be shatter proof and be marked with reflectors, logos, or other techniques to indicate their presence (panels should also be resistant to fading and clouding).
- Use durable materials resistant to vandalism and weather conditions.
- Place name of stop/stop location on shelter.
- Include interior seating (design to discourage opportunities for sleeping).
- Incorporate lighting in shelter, with a power supply separate from a feed for real-time information (if applicable).
- Do not place shelters on wheelchair landing pad.
- Do not obstruct sidewalk.
- Ensure unobstructed adequate access to entrance of shelter.
- Ensure shelter opening is at least 36 inches wide (ADA Accessibility Standards specify a minimum of 30 inches) to allow wheelchair access – open face shelter is preferred.
- Provide a usable clear floor or ground space that is at least 36 inches wide by at least 48 inches deep, entirely within the shelter.
- Ensure adequate maneuvering space outside of the shelter opening and connection by an accessible route to the landing pad area.
- There should be no obstructions or steps between the landing pad and the shelter.
- Provide provision for bus shelter maps, maps should be double sided if placed against glass or an opaque frame should be provided.
- At transit centers, the shelter should be labeled with its letter or number designation as well as bus route numbers. If this information is placed on the glass, it should be double sided or have an opaque backing.

The minimum dimensions for the maneuvering space outside of the shelter depend on the placement of the opening and the direction of approach from the sidewalk. If the approach to the shelter opening is perpendicular (i.e., the customer is facing the opening while

approaching), the minimum clear space from the opening is 48 inches. If the customer approaches the opening from the side, the minimum clear space from the opening is 42 inches.

Other Considerations

In addition to meeting the minimum dimensions and clearances necessary to be accessible to people who use wheelchairs, shelters should take in account the following:

- Appearance appropriate for the neighborhood.
- Advertising placement should not obstruct the view of approaching traffic and buses (if applicable).
- Larger (or have multiple installations) shelters at stops with high ridership (i.e., at least 300 boardings per day).
- Clean and maintained on a regular basis.

Seating should be incorporated within the shelter whenever possible (see **Figure 57**), and the layout of the bench within the shelter must still provide for the minimum clear space connected to an access route. The configuration of the interior space must provide for an accessible path of travel to the shelter opening. In addition to incorporating seating within the shelter, route maps and schedules should also be included. The route maps and schedules should be easily readable by wheelchair users and those with visual impairments. The shelter shall have adequate illumination and provide greater visibility for bus operators while providing passenger security in the evenings.

Figure 57: ADA Compliant Bus Shelter

Source: WMATA (7th St. & Independence Ave. SW, Washington, DC)

7.9 Trash Receptacles

Trash receptacles at bus stops should resemble other publicly owned and maintained trash cans along the corridor. Consideration should be given to maintenance and trash pick-up whenever trash receptacles are provided. Trash receptacles should be installed where they do not create an obstruction or interfere with the accessibility of the bus stop or the adjacent sidewalk. Trash receptacles shall not be placed on the wheelchair landing pad. They must not obstruct pathways between the sidewalk, shelter access (when applicable), the landing area, or posted information. Municipally owned trash receptacles must not be placed/mounted on the WMATA bus stop pole; they may be attached to a bus shelter or other pole. Trash receptacles should be secured to the pavement to prevent accidental tipping or unauthorized movement.

7.10 Vendor Boxes

Vendor boxes (also referred to as newspaper boxes) can provide passengers with reading materials while they wait for a bus. Owners of these vendor boxes generally place their boxes at locations with a high level of pedestrian activity. As with any street furniture, vendor boxes must comply with ADA requirements. Vendor boxes cannot reduce the clear spaces required by the ADA, and therefore, they cannot be located on the 5x8 foot landing pad, or obstruct access to the stop, the shelter or customer information. The vendor boxes shown in **Figure 58** infringe upon the 5x8 foot landing pad. In addition, vendor boxes cannot be secured to any bus stop feature such as the bus stop post, trash receptacle, shelter, or bench. Vendor boxes in violation of these guidelines must be removed or relocated.

Figure 58: Vendor Boxes and Trash Receptacle

Source: KFH Group (14th St. & N St. NW, Washington, DC)

8.0 Real Time Passenger Information Systems (RTPI)

Real time passenger information systems (RTPI) provide customers with accurate bus arrival times as they arrive and wait at the bus stop. Real time signage eliminates uncertainty for customers and builds confidence in service reliability which has the potential to increase bus patronage.

Signage should display the operator's name, route number, destination, and minutes to bus arrival (see **Figure 59**). Real-time signage requires a 120-volt continuous power supply. Stops with shelters are ideal candidates for real-time information signage; however, there are options available at stops without a shelter.

Figure 59: Real-Time Passenger Information Signage
Source: WMATA

Audible systems, connected to real-time arrival information, must be installed to aid individuals with visual impairments. Commonly referred to as talking signs, these systems are activated via push button (**Figure 60**).

8.1 Customer Information Electronic Display Signs (CIEDS)

CIEDS provide bus patrons with real-time bus arrival information, route information, MetroAlerts, detours, ad-hoc messages, and audio announcements. This system also allows other public transit agencies to provide real-time information at shared bus stops and transit centers.

Figure 60: Audible System for Arrivals
Source: KFH Group

CIEDS come in four different types of configurations:

- **Type A1 Sign** (Single Sided LED) – (see Figure 56) displays real-time data and other transit related messages on a single-sided high brightness amber LED sign. The sign's size is 46 x 11 x 6.5 inches. These signs require 120VAC electrical input, 1.1 Amps, and a communication interface with cellular data (TCP/IP). This sign will be installed at bus shelters with heights of no more than 10 feet.

- **Type A2 Sign** (Double Sided LED) – has the same configuration as Type A1 Signs, the only difference being that information is shown on both sides and the sign has more thickness. Type A2 signs will be installed at bus shelters with heights between 12 feet and 16 feet.

- **Type C Sign** – has either E-paper or LCD sign that is typically placed at the exit of Metrorail Stations where bus loops are in operation (see **Figure 61**). The LCD sign is available in 32 or 42 inch nominal diagonal sizes. Depending on the orientation and configuration, the display may be attached to a pole, post, or wall at the exit of the station. The sign will also include an assistive listening device, allowing visually impaired commuters to access pertinent information through a button press.

- **E-Paper Sign** – (see **Figure 62**) solar power sign that allows for real-time displays at bus stops where power is not available. The E-Paper sign provides real-time information on a high-resolution display that can be mounted to a signpost. Multi-page displays can be updated remotely with real-time information, rider alerts, and more.

Figure 61: Type C (LCD) Sign
Source: WMATA

Figure 62: E-Paper Sign
Source: WMATA

8.2 RTPI Guidelines

WMATA recognizes that the availability of different types of real-time signs and evolving technologies requires continuous modifications of the technology used as well as the thresholds applied for guiding the decision-making process. Using different technologies for the provision of RTPI would bring its own challenges. Data interface, interoperability and remote updating capabilities are among the many challenges that could be faced with the operation of different technologies. Agencies interested in exploring RTPI should consult with WMATA's Office of Bus Planning.

When it comes to deploying real time information at bus stops, resource limitations wouldn't allow a full-scale installation of the available amenities at every bus stop. As a result, agencies must choose and select the type of amenities we provide at bus stops based on a set of defined criteria. Providing and improving passenger bus stop amenities requires a continuous review and revision of the bus stop hierarchy criteria in order to prioritize investment decisions. WMATA's current guidelines on RTPI are shown in **Table 11**.

Table 11: Real Time Information Display Installation Guidelines

Technology Type	Basic Bus Stop	Enhanced Service Bus Stop	Transit Center
District of Columbia			
1. Customer Information Electronic Display Sign (CIEDS)	Boarding >100/day with shelter and power	Boarding >100/day with shelter and power	Yes
2. E-Paper Sign	Boarding >50/day with/without shelter and without power	Boarding >50/day with shelter and without power	No
Maryland and Virginia			
1. Customer Information Electronic Display Sign (CIEDS)	Boarding >50/day with shelter and power	Boarding >100/day with shelter and power	Yes
2. E-Paper Sign	Boarding >50/day with/without shelter and without power	Boarding >50/day with shelter and without power	No

Source: WMATA Bus Stop Real Time Passenger Information – Revised Guideline and Future Need, August 2020

9.0 Bus Stop Prototypes

The following provides bus stop prototypes that show different combinations of the elements described earlier in this section based on the most common types of bus stop design. Specific combinations will depend on the site, the facility function, the transit agency's operational plans, land availability, and available budget. The prototypes focus on various bus stop designs, and the recommended placements of bus stop elements and amenities. Basic bus stops provide access to transit in a variety of locations. Such locations can be along arterial roadways, collector streets, or local roads and may be adjacent to a variety of land uses. More expansive types of facilities such as intermodal centers and transit centers typically involve the hiring of an architect and/or structural engineer and represent a significant capital outlay and therefore are not reproduced in these prototypes.

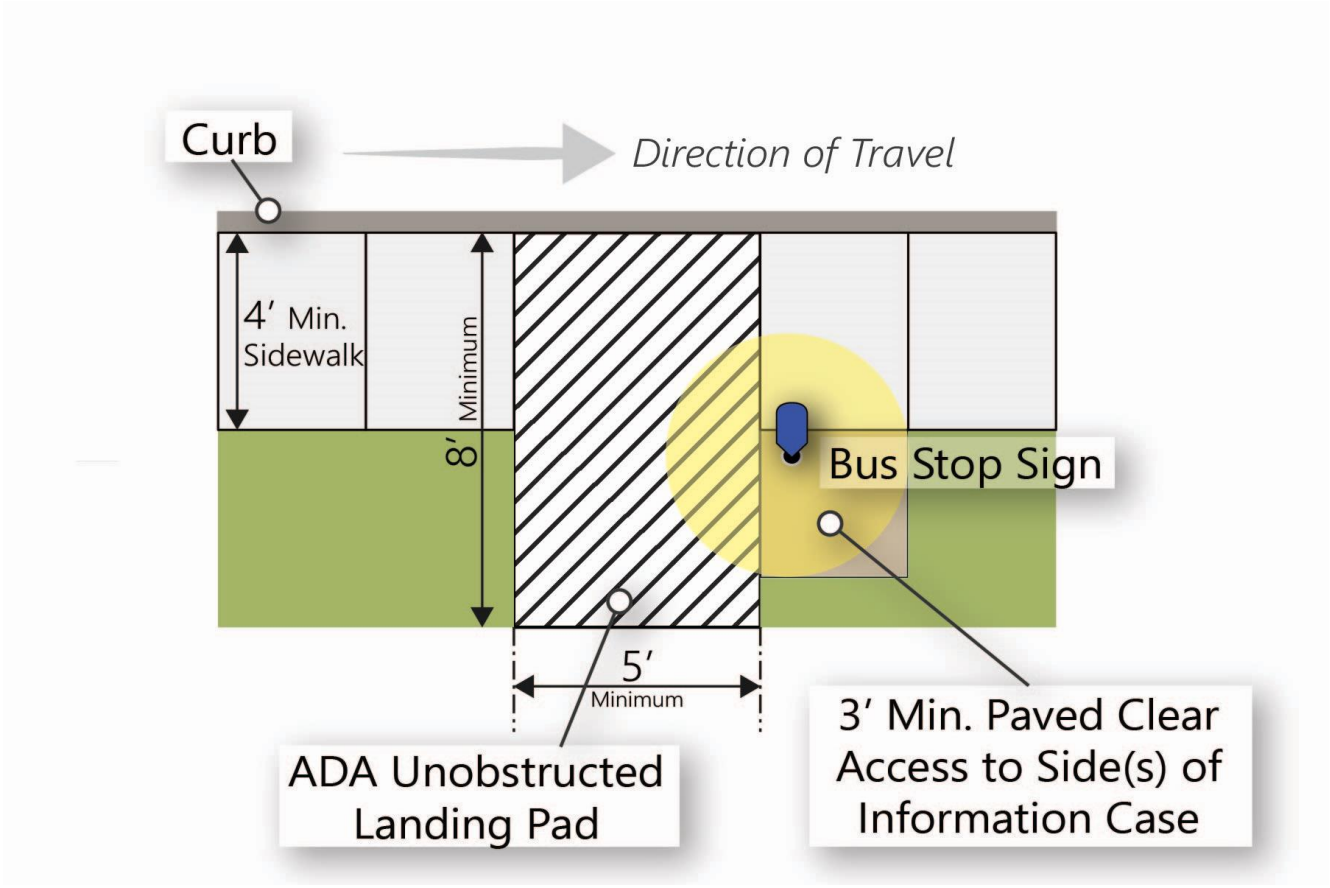
9.1 Basic Non-Sheltered Bus Stop

The following prototypes are for basic bus stops with no passenger shelters and minimal passenger amenities.

Sidewalk Adjacent to Curb

Figure 63 provides a diagram of a basic bus stop with limited passenger amenities in which a 4 feet wide sidewalk is adjacent to the street-curb. The stop can be either a far-side, near-side, or mid-block stop. In this prototype, a paved pad extends 4 feet deep and 5 feet wide from the back of the sidewalk creating a 5 x 8 feet ADA landing pad. The bus stop post is placed off the sidewalk and ADA landing pad so it does not impede the flow of pedestrians or the deployment of a wheelchair ramp/lift. A clear unobstructed paved access is provided to each side of the information case that is displaying bus information.

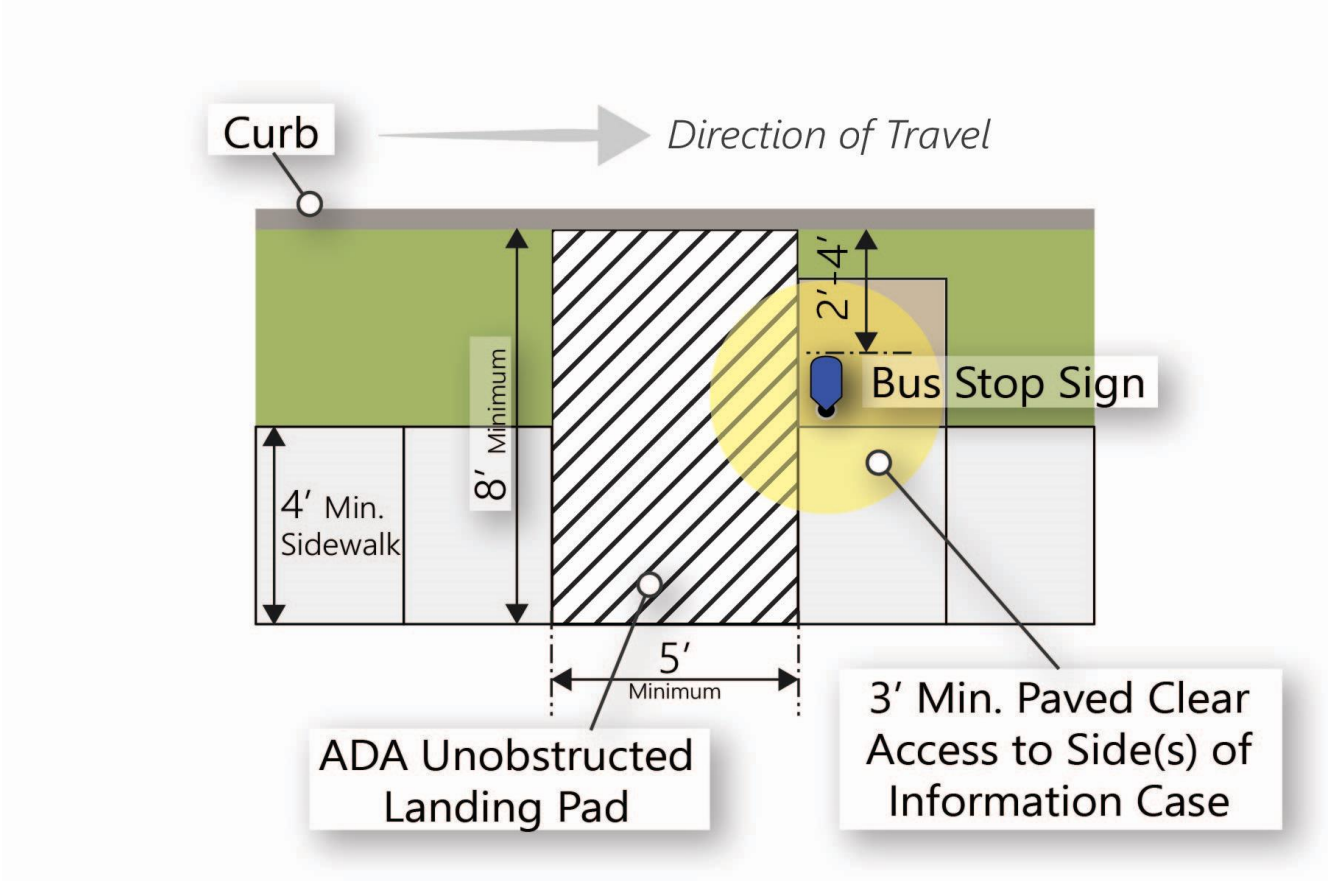
Figure 63: Basic Stop with Sidewalk adjacent to Curb



Sidewalk Setback from the Curb

Figure 64 provides a diagram of a primary bus stop in which there is a 4 feet wide grass buffer between the 4 feet wide sidewalk and the street-curb. The stop can either be a far-side, near-side, or mid-block stop. In this prototype, a 4 feet deep by 5 feet wide paved pad is installed to connect the curb to the sidewalk thus creating a 5 x 8 feet ADA landing pad. The bus stop sign is located between 2 to 4 feet from the back of the curb to avoid being struck by side mirrors of buses. The bus stop post is placed off the sidewalk and ADA landing pad so it does not impede the flow of pedestrians or the deployment of a wheelchair ramp/lift. A clear unobstructed paved access is provided to each side of the information case that is displaying bus information.

Figure 64: Basic Stop with Sidewalk Setback from Curb

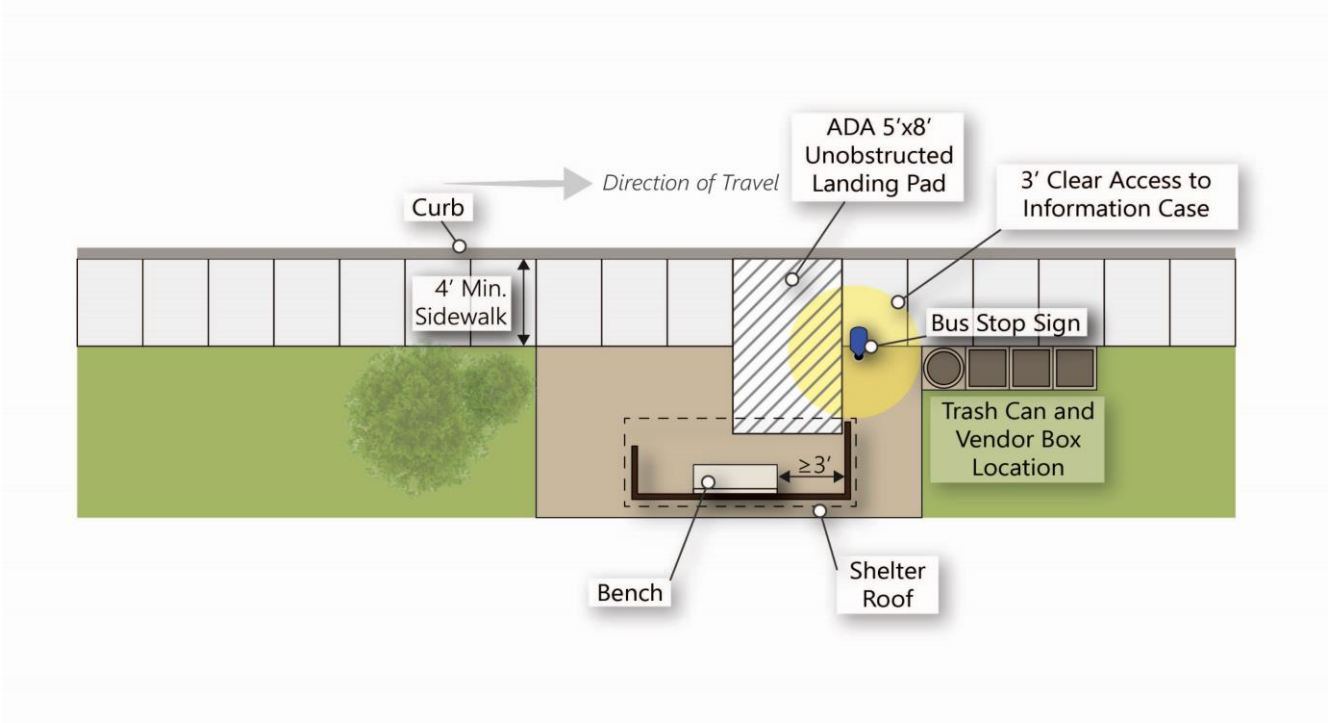


9.2 Basic Sheltered Bus Stop

Sidewalk Adjacent to Curb

Figure 65 provides a diagram of a sheltered bus stop in which the 4 feet wide sidewalk is adjacent to the street-curb. The stop can be either a far-side, near-side, or mid-block stop. In this prototype, the shelter is located on the backside of the sidewalk with easy access from the sidewalk into the shelter. The 5 x 8 feet ADA landing pad is located in front of the shelter and overlaps with the sidewalk. The bus stop sign is located between 2 to 4 feet from the back of the curb to avoid being struck by the buses' side mirror. The bus stop post is placed off the sidewalk and ADA landing pad so it does not impede the flow of pedestrians or the deployment of a wheelchair lift. A clear unobstructed paved access is provided to each side of the information case that is displaying bus information. Near-side the shelter is a 4feet wide paved pathway for access to customer information on the side panel. The trash receptacle and vendor boxes are located adjacent to the sidewalk but away from any access points.

Figure 65: Sheltered Stop with Sidewalk adjacent to Curb

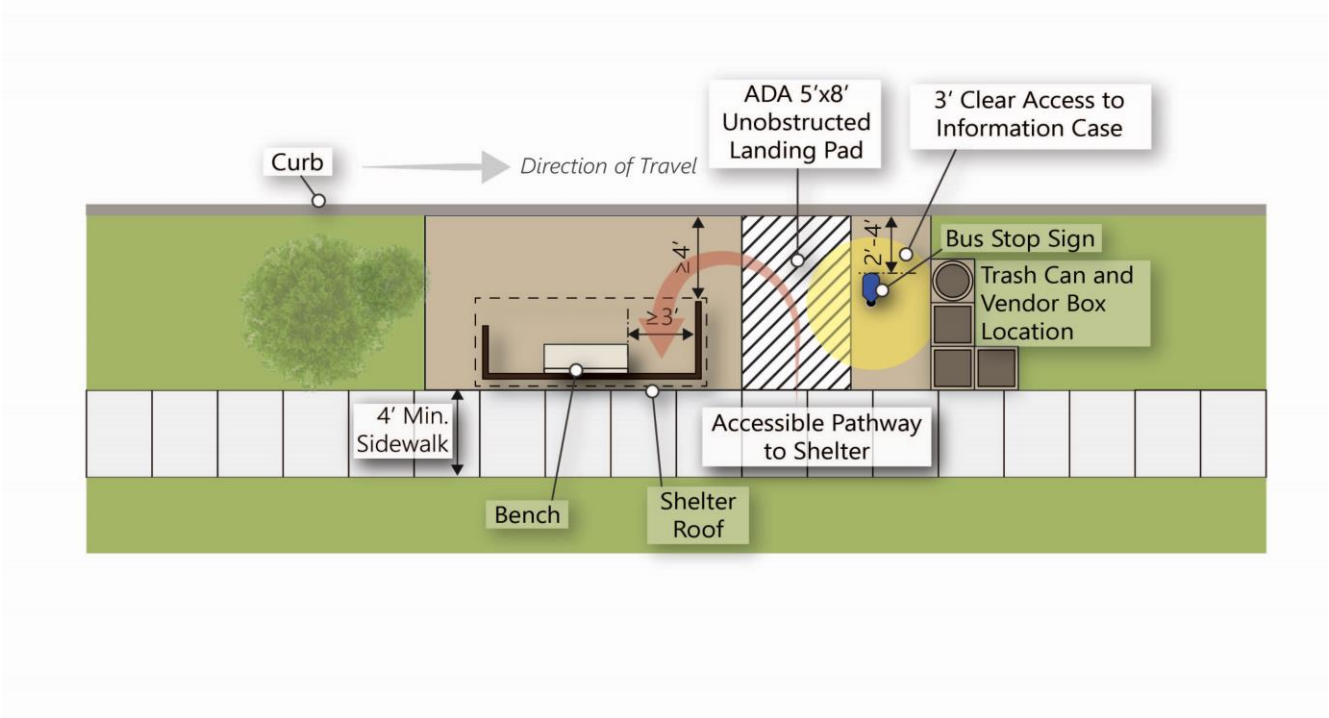


Sidewalk Setback from the Curb

Figures 66 and **67** illustrate two types of sheltered bus stop design with the sidewalk setback from the street-curb.

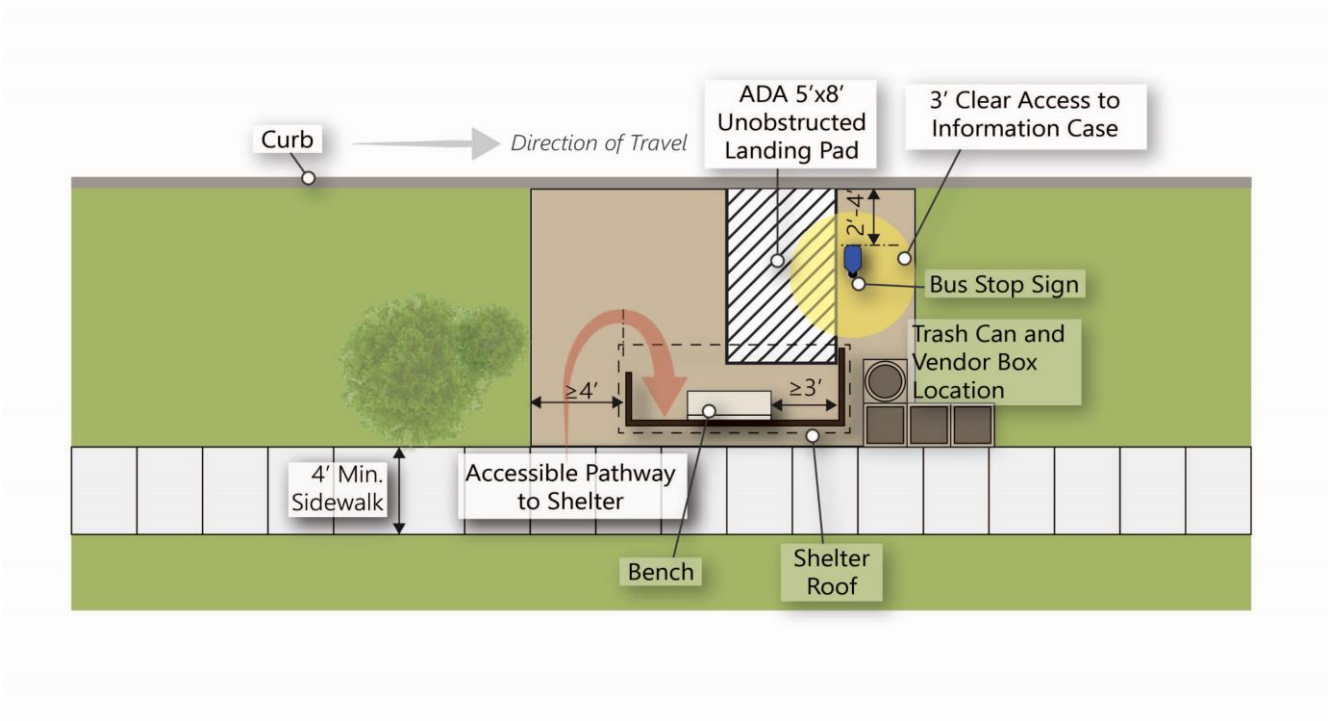
ADA Landing Pad Far-side of Shelter. In Figure 49, the 5 x 8 feet ADA landing pad is located far-side of the shelter. Locating the ADA landing pad far-side versus near-side of the stop will allow the bus to fully pull into the bus stop zone and the wheelchair lift (which is typically located on the front door of standard 40 feet transit bus) to align with the ADA landing pad. For bus stop locations with a high level of activity, this design will provide more space for wheelchair maneuverability and riders to safely wait for the bus. Access to the shelter is provided on either side of the shelter. The near-side shelter access provides an accessible pathway to customer information on the side panel. The shelter roof overhang is a minimum of 4 feet from the back of the curb to avoid being struck by transit or commercial bus side mirrors. The trash receptacle and vendor boxes are located away from any access points but are still accessible by pedestrians and transit patrons.

Figure 66: ADA Landing Pad Far-side of Shelter



ADA Landing Pad In Front of Shelter. In **Figure 67**, the 5 x 8 feet ADA landing pad is located in front of the shelter. Locating the ADA landing pad in front of the shelter will require greater clearance setback from the curb. This will provide more space between waiting patrons and the flow of traffic. Access to the shelter is provided on the near-side of the shelter. This pathway also allows customers to access bus information installed on the side panels of the shelter. The trash receptacle and vendor boxes are located away from any access points but are still accessible by pedestrians and transit patrons.

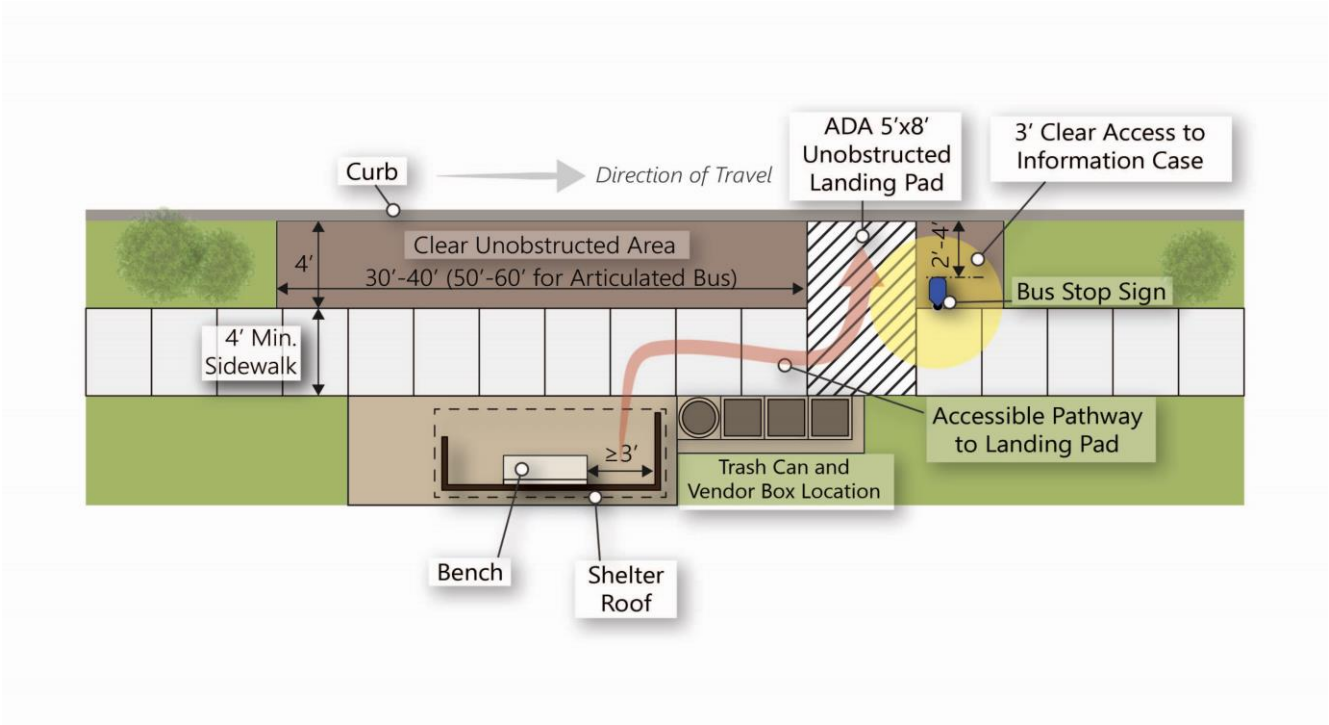
Figure 67: ADA Landing Pad in Front of Shelter



9.3 Enhanced Service Bus Stop

Figure 68 provides a bus stop prototype that is served by an enhanced type of bus service (i.e., limited stop service) or experiences a higher level of boardings and alightings and pedestrian flow. This prototype consists of a 30 – 40 feet (50 – 60 feet for an articulated bus) paved area adjacent to the curb and sidewalk. This expanded area is intended to provide more space for pedestrian and patron movement and better accommodation for rear door alighting. The expanded paved area should be clear of all possible obstructions (i.e., trash cans, vendor boxes, planter boxes, streetlights, etc.).

Figure 68: Enhanced Service Bus Stop



10.0 Art in Transit

Metro's Art in Transit Program incorporates visual and performing arts into the Metrorail and Metrobus system to enhance the experience of customers, the communities, and the Capital region at large.

The Art in Transit Program works with visual and performing artists, other arts professionals, architects, engineers, community organizations, and jurisdictional art councils to develop projects and performances that reflect the spirit and vitality of communities served by Metro.

The program supports temporary art installations, such as the temporary bus shelters shown in **Figure 69** at the Fort Totten Metro Station. As well as more permanent art installations including *Penguin Rush Hour* (**Figure 70)** at the Silver Spring Metro Station.

Figure 69: Art Installation on a Temporary Bus Shelter at the Fort Totten Metro Station Bus Loop
Source: WMATA, Art in Transit

Figure 70: Penguin Rush Hour Mural at the Silver Spring Metro Station
Source: KFH Group

The Art in Transit Program:

- Utilizes the WMATA transit environment as a place where customers and the public can enjoy the arts as a regular part of their daily lives.
- Contributes to the dynamic cultural and artistic scene of the Capital region and recognizes, values, and celebrates the communities it serves.
- Encourages public-private partnerships to support art projects that may not be achieved independently.
- Mitigates the impact of construction on surrounding communities by incorporating visual artwork into the preparation and building phases of new transit projects.
- Increases enthusiasm for and support of WMATA and its interest in serving the public.

WMATA has partnered Approval and installation of all visual arts and performances on WMATA property must be coordinated through WMATA's Office of Architecture, in accordance with the rules and regulations[8] governing the Art in Transit Program.

[8] https://www.wmata.com/initiatives/art-in-transit/upload/Property_Use_Regulations.pdf

11.0 Bus Stop Spacing and Rebalancing

11.1 Bus Stop Spacing

The distance between bus stops is of key concern to Metro. More closely spaced stops provide customers with more convenient service as they are likely to experience a shorter walk to the nearest bus stop. However, closely-spaced stops are also likely to result in a longer ride for customers if demand for boarding and alighting is dispersed across many stops due to the bus decelerating, coming to a complete stop and then accelerating to merge into traffic.

The spacing of bus stops is an optimizing issue that attempts to balance the needs of passengers and operators. The objective of passengers is typically to minimize their travel time or distance, whereas for agencies the focus is on revenues, operational costs, service reliability, and passenger satisfaction. Ultimately, bus stops should be spaced closely enough that passengers can walk to them easily, but far enough apart to optimize bus running times.

If time savings are significant (for example, an overall time savings of at least five minutes per trip), the transit system may be able to reduce the number of buses needed to meet headway guidelines. The downside to having a greater distance between bus stops is that some customers will be required to walk further to the nearest stop and may find this inconvenience enough of a deterrent to choosing transit, or even a hardship that prevents them from being able to ride (because of a mobility limitation).

Metrobus bus stop spacing guidelines:

Local Bus Service

- 4-5 bus stops per mile (approximately 1,000 to 1,300 feet between stops)

Enhanced Service/Limited Stop Service

- 2-3 bus stops per mile (approximately 1,800 to 2,600 feet between stops)

Commuter/Express Stop Service

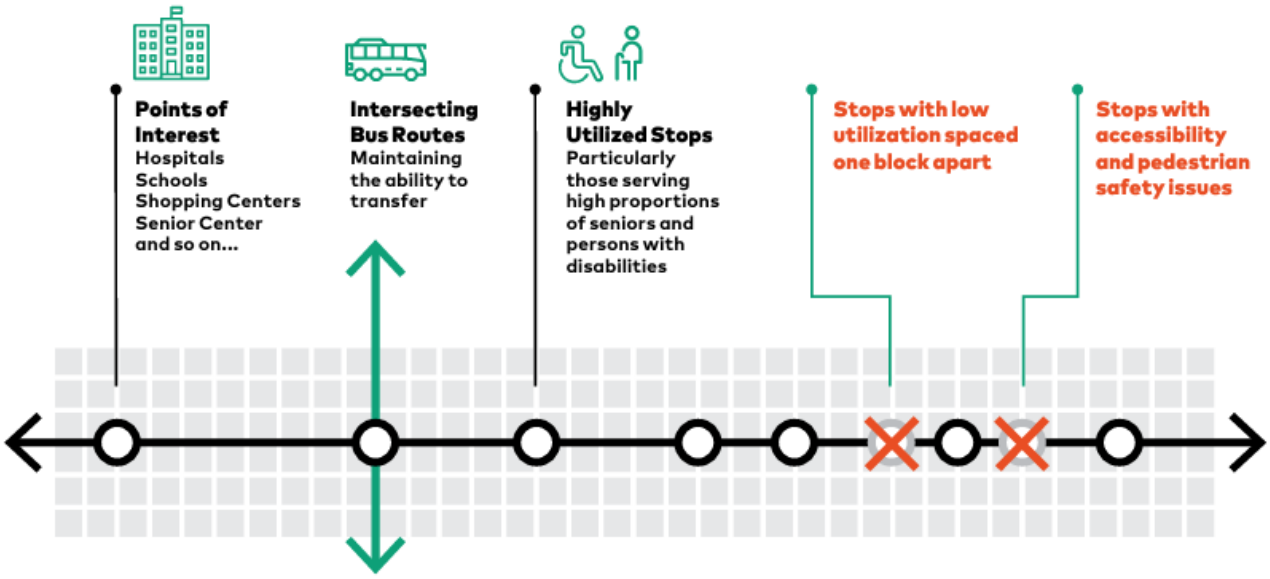
- Vary depending on major employment destinations and high boarding locations.

It is important to note that these are general guidelines, and closer spacing may be desirable where a concentration of people with mobility disabilities or elderly people live or travel, service is being marketed to tourists, or for key destinations or intersection conditions.

11.2 Bus Stop Rebalancing Steps

Bus stop rebalancing is a complex process that requires input from a wide variety of stakeholders. Transit agency staff must work in concert to identify bus stops for removal, conduct internal and external outreach, make the case to the public for faster trips, and communicate changes to riders and operators. Based on guidance from the Transit Center's Bus Stop Balancing report, three critical rebalancing steps are outlined below.

Figure 71: The Basics of Bus Stop Rebalancing



Source: Transit Center, Bus Stop Balancing

As noted in **Figure 71**, bus stop rebalancing campaigns should focus on three specific types of bus stops:

- Bus stops spaced one block apart.
- Bus stops with low utilization (based on average daily boardings and alightings).
- Bus stops with accessibility and/or pedestrian safety issues.

Step 1: Preparations

- **Secure staff commitments** from key agency departments including planning, operations, and communications.

- **Survey riders** to gain local perspective and start building the case for stop rebalancing.

- **Conduct a bus stop inventory** and ADA assessment along candidate corridors or routes.
- **Engage with bus operators** early in the process – they know more about the bus stops on their route than anyone.
- **Develop ambitious plans** for rebalancing, the outreach process will include compromises and most likely some degree of scaling back the original proposal.
- **Alert leaders and advocates** early in the process to educate them on the benefits of bus stop rebalancing before their constituents approach them.

Step 2: Implementation and Communication

- **Develop clear criteria** to select bus stops for removal.
- **Assemble a focus group** of riders in the impacted area to test agency communication, signage, etc.
- **Develop a communications plan** to provide specific locations (e.g., website, public meetings, etc.) where riders and the community can provide input and feedback.
- **Be up front with riders** to ensure they fully understand the benefits of a faster trip and trade off of a longer walk to the bus stop.
- **Alert all riders along the route**, including those that utilize stops that are preserved, to build a constituency that understands the benefits and tradeoffs of rebalancing.
- **Commit to an overarching rebalancing plan** for systematic improvements to ensure impacted riders do not feel singled out if their bus stop is one of a small number being removed.

Step 3: Follow Up

- **Promote improvements** in travel time and ridership attributable to bus stop rebalancing to build support for future rebalancing campaigns.
- **Monitor and reevaluate** bus stop spacing on a regular basis as population and jobs shift over time.

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