

BCDCOG

Transit and Bus Stop Design Guidelines



October 2021



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1 INTRODUCTION

Bus stops are the “front door” of transit systems. Their location, design, and maintenance influence how riders experience transit. This document provides bus stop guidance for the Berkeley-Charleston-Dorchester region.

About the Transit and Bus Stop Design Guidelines

This document—the **Transit and Bus Stop Design Guidelines**—is a tool to help the Berkeley-Charleston-Dorchester Council of Governments (BCDCOG), Charleston Area Regional Transportation Authority (CARTA), and TriCounty Link (TCL), and its regional partners deliver transportation choices that link people, jobs, and community conveniently, consistently, and safely. The intent of the Guidelines is to facilitate the proper siting, design, installation, and maintenance of either existing or proposed bus stops throughout the Tri-county Region. These guidelines were developed by BCDCOG for CARTA. As TCL service evolves into an urban area system, they can be applied.



CARTA stop on Rivers Avenue at Remount Road



Why It's Important

Well-designed bus stops enhance the transit experience, decrease perceived wait times for transit services, and can contribute to increased ridership. Conversely, poorly designed bus stops can decrease customer satisfaction, make transit less attractive to potential new customers, and potentially make waiting at stops unsafe for riders.

Who Should Use these Guidelines

The information in these Guidelines will be of use to anyone involved in the planning, design, construction, maintenance, and/or use of bus stops: community members, transit staff, planners at the municipal, county, and state level, and developers and private landowners. More information on these audience types is available in the **How to Use this Guide** section.



No Two Transit Stops Are Identical

Every bus stop has unique site characteristics, which can make designing a consistent bus stop challenging. The Transit and Bus Stop Design Guidelines outline best practices for bus stop design and present clear and practical recommendations for processes such as choosing bus stop locations, placing amenities at bus stops, and prioritizing stop upgrades. These Guidelines are applicable to bus stops used by CARTA and TriCountyLink.



Guidance and Standards

Much of the content in this document is not intended to be strict standards, but rather to provide **guidance** and inform design decisions within the site context. Flexibility is central to the development of these guidelines, especially given the fact that the region is subject to earthquakes, hurricanes, and flooding. Site contexts and these potential impacts must be considered when designing a bus stop.

However, information pertaining to the Americans with Disabilities Act (ADA) for making bus stops accessible are **standards** that should be followed.

This document incorporates the latest mandates and best practices as of September 2021.



About BCDCOG

BCDCOG is an association of, by and for local governments that helps Berkeley, Charleston and Dorchester county leaders plan for common needs, cooperate for mutual benefit and coordinate for sound regional development, including oversight for two public transit programs—CARTA and TriCounty Link (TCL).

CARTA Approved and Funded Amenities

CARTA’s over 860 stops vary in terms of their ridership, existing condition, and level of service. These guidelines include the process for CARTA to prioritize capital improvements at stops. Importantly, they also describe the approved amenities for CARTA stops that the agency could fund for stops. The amenities and the baseline capital costs for each that CARTA could cover are summarized below. These amenities are described in detail in Chapter 5 Bus Stop Amenities.



#	CARTA-Approved Amenity	Total Cost (see note)
1	Bus stop post and sign	\$150
2	ADA-compliant landing pad	\$4,825
3	Bike rack	\$168
4	Solar shelter lighting	\$1,550
5	Bench	\$906 - \$1,620
6	Trash can	\$105 - \$525
7	Shelter	\$12,495
8	Digital signage (not pictured)	\$8,515 - \$9,315

Notes:

Minimum amenities at all CARTA bus stops are a bus stop post, sign, and ADA compliant landing pad. If a municipality calls for additional amenities, CARTA would pay for the baseline cost of those amenities. Any additional costs due to upgraded or additional amenities, including variations in paint schemes, must be borne by the relevant municipality requesting that upgraded amenity. Developers would cover all costs of any new stop or stop improvements, including the installation.

The costs above for bus stop capital items do not include engineering or install fees. Those additional fees are below:

- Engineering fees ranging from \$10,000 to \$20,000 per shelter/bench
- Shelter installation at approximately \$6,500

- Bench installation at approximately \$1,500
- Digital signage installation at approximately \$750
- LED signage installation at approximately \$1,100

In this Chapter

The rest of this chapter includes three sections: (1) structure of the guidelines, (2) design principles, and (3) how to use this guide.

CARTA Is Here to Help

CARTA receives requests year-round and implements modifications to bus stops on an as-needed and approved basis.

To make a bus stop-related request for CARTA, email Transit Planning at belenv@bcdcoq.com or call BCDCOG at (843) 529-0400.

STRUCTURE OF THE GUIDELINES

The Guidelines include the following sections:

Chapter	What Questions It Answers
1 Introduction	<ul style="list-style-type: none"> What are design guidelines? Who are they for?
2 Bus Stop Placement	<ul style="list-style-type: none"> Where do bus stops go? What factors are important?
3 Bus Stop Configuration	<ul style="list-style-type: none"> How can bus stops be configured in different roadway environments?
4 Bus Stop Typologies	<ul style="list-style-type: none"> What are the different types of bus stops in the system? How do they differ in terms of their minimum, preferred, and optional amenities?
5 Bus Stop Amenities	<ul style="list-style-type: none"> What amenities can be found at bus stops? How should they be placed?
6 Bus Stop Modifications	<ul style="list-style-type: none"> What are the processes to request changes to a bus stop?
7 Operational Considerations	<ul style="list-style-type: none"> What else should be considered when designing a bus stop?
8 Implementation	<ul style="list-style-type: none"> How are bus stop investments prioritized? How much do bus stops cost? Who installs and maintains amenities?

DESIGN PRINCIPLES

A high-quality transit stop is one that is well connected to the neighborhood or community it serves, accommodates the needs of all transit passengers freely and comfortably, increases the safety of those boarding, alighting, waiting for, or riding the bus and permits efficient transit operations. Bus stop design should be guided by the following principles:



Locate Bus Stops in Convenient and Comfortable Locations

Bus stops should be located in places that are convenient to where people are traveling to and from, including concentrations of residences or jobs and major destinations such as social services or shopping destinations.



Locate Bus Stops in Safe Locations

Bus stops should be located where passengers feel comfortable, which is a location with enough people, activity, and/or lights to not feel isolated. In addition, the location of the stop itself should be well lit, and the stop should provide adequate space for waiting riders to sit or stand, away from other pedestrian flow and street traffic.



Make Bus Stops Visible and Easily Identifiable

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



Provide Amenities to Make the Wait Comfortable

Providing amenities, such as benches, lighting, bike facilities, trash cans, etc. at stops make waiting for the bus more comfortable. While it is not practical nor cost-effective to provide all amenities at all stops, more extensive amenities should be provided at high need locations.



Provide Information on Available Services

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



Integrate Bus Stops into Street Design Processes

When new developments are constructed, the stops should be designed as part of the overall project, rather than placed as an afterthought. Similarly, when roads and/or sidewalks are reconstructed, bus stops should be developed as part of the overall design.



Provide Good Pedestrian and Bicycle Access to Bus Stops

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

HOW TO USE THIS GUIDE

These Guidelines are designed for many different target audiences. BCDCOG partners with relevant parties for the design and placement of high-quality bus stops.

To help explain roles and responsibilities, this document organizes audiences into four categories: (1) community members, (2) BCDCOG staff, (3) agency at the city, county, and state level, and (4) developers and property owners.

Start Here: In Which Group Do You Belong?



COMMUNITY

Transit riders, residents, elected officials, employers



BCDCOG/CARTA STAFF

CARTA staff, TriCounty Link staff



OTHER AGENCY STAFF

Municipal, county, and state planners and engineers



DEVELOPERS

Developers and property owners



Community

For Information On:	Go To
Bus stop typologies and their minimum, preferred, and optional amenities	<ul style="list-style-type: none"> Chapter 4 Bus Stop Typologies
ADA Accessibility Overview	<ul style="list-style-type: none"> Chapter 5 Bus Stop Amenities Appendix D Bus Stop Accessibility and ADA Standards
Requesting Bus Stop Modifications	<ul style="list-style-type: none"> Chapter 6 Bus Stop Modifications
Amenity Installation and Maintenance Responsibilities	<ul style="list-style-type: none"> Chapter 8 Implementation
Temporary bus stop modifications during construction	<ul style="list-style-type: none"> Chapter 6 Bus Stop Modifications, page 6-9 ("Modifications During Construction")



BCDCOG/CARTA Staff

For Information On:	Go To
Bus Stop Spacing and Placement Guidelines:	<ul style="list-style-type: none"> Chapter 2 Bus Stop Spacing and Placement
Configurations for Different Roadway Contexts	<ul style="list-style-type: none"> Chapter 3 Bus Stop Configurations
Bus stop typologies and their minimum, preferred, and optional amenities	<ul style="list-style-type: none"> Chapter 4 Bus Stop Typologies
Guidance for the selection and placement of amenities for bus stops	<ul style="list-style-type: none"> Chapter 5 Bus Stop Amenities Appendix G
ADA Accessibility Overview	<ul style="list-style-type: none"> Chapter 5 Bus Stop Amenities Appendix D Bus Stop Accessibility and ADA Standards
Guidance for attaining encroachment permits, private property use agreements, and municipal review committees	<ul style="list-style-type: none"> Chapter 6 Bus Stop Modifications, pages 6-10
Operational considerations for operators and bus stop placement	<ul style="list-style-type: none"> Chapter 7 Operational Considerations
Prioritizing bus stop investments	<ul style="list-style-type: none"> Chapter 8 Implementation
Amenity Installation and Maintenance Responsibilities and Amenity Cost Estimates	<ul style="list-style-type: none"> Chapter 8 Implementation
Checklist for Bus Stop Inventory Field Visits	<ul style="list-style-type: none"> Appendix B
Amenity Standards and Specifications	<ul style="list-style-type: none"> Appendix E
Bus Stop Modifications Checklist	<ul style="list-style-type: none"> Appendix F
Bus Stop Database	<ul style="list-style-type: none"> Appendix H



Other Agency Staff

For Information On:	Go To
Bus stop typologies and their minimum, preferred, and optional amenities	<ul style="list-style-type: none"> Chapter 4 Bus Stop Typologies
Bus Stop Spacing and Placement Guidelines	<ul style="list-style-type: none"> Chapter 2 Bus Stop Spacing and Placement
Configurations for Different Roadway Contexts	<ul style="list-style-type: none"> Chapter 3 Bus Stop Configurations
Requesting Bus Stop Modifications	<ul style="list-style-type: none"> Chapter 6 Bus Stop Modifications
ADA Accessibility Overview	<ul style="list-style-type: none"> Chapter 5 Bus Stop Amenities Appendix D Bus Stop Accessibility and ADA Standards



Developers

For Information On:	Go To
Checklist to begin with	<ul style="list-style-type: none"> ▪ Appendix C Developer Checklist
Bus stop typologies and their minimum, preferred, and optional amenities:	<ul style="list-style-type: none"> ▪ Chapter 4 Bus Stop Typologies
Guidance for attaining encroachment permits, private property use agreements, and municipal review committees	<ul style="list-style-type: none"> ▪ Page 6-10 Encroachment Permits, Private Property Use Agreements, and Municipal Review Committees
Amenity Installation and Maintenance Responsibilities and Amenity Cost Estimates	<ul style="list-style-type: none"> ▪ Chapter 8 Implementation
Amenity Standards and Specifications	<ul style="list-style-type: none"> ▪ Appendix E
Temporary bus stop modifications during construction	<ul style="list-style-type: none"> ▪ Page 6-9 Modifications During Construction

2 BUS STOP SPACING AND PLACEMENT

This chapter explains where bus stops should go, from the corridor to the site: How far apart should they be from one-another? Where, relative to the intersection? And what other factors are important?

The information in this chapter helps plan optimal bus stop locations for fixed-route service. It also ensures that enough space is allocated for bus stops at an early design stage. This is particularly relevant for planning entire corridors or multiple stops surrounding new developments. However, it can also be used for a single bus stop.

This chapter includes the following two sections:

- **Bus Stop Spacing** discusses the recommended distance between bus stops, as well as considerations for stop pairing and high transfer activity stops.
- **Bus Stop Placement** discusses factors to be considered in selecting new bus stop locations along a route.

BUS STOP SPACING

Key Takeaways

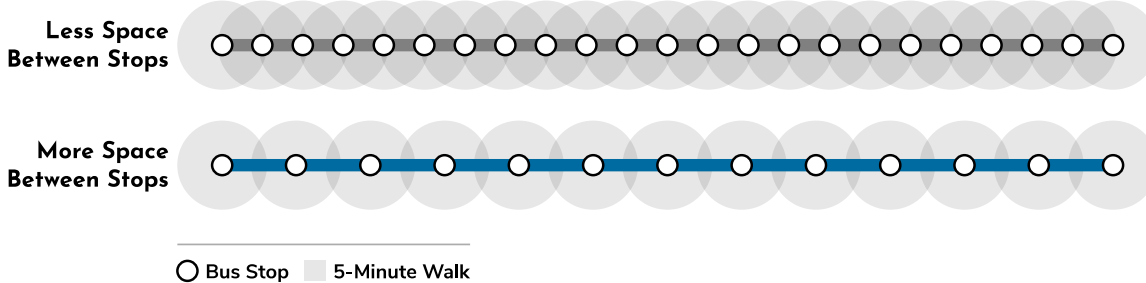
- Aim for stop spacing of 1,300 feet for local fixed routes.
- When possible, pair inbound and outbound bus stops, so that riders can get on and off the bus on opposite sides of the street, in same general area.
- In places with lots of transfers between routes, place bus stops as close to one another as possible, to make transfers easier for riders.



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The distance between stops significantly impacts travel times. More closely spaced stops provide customers with shorter walk times, but they also increase travel times and are the major reason that transit is slower than automobile travel. Each additional stop requires the bus to decelerate, come to a complete stop, load and unload riders, and then accelerate and re-merge into traffic. Most customers want transit service that balances convenience and speed, and the number and location of stops is a key component of determining that balance.

Figure 2-1 Too Closely Spaced Bus Stops Slow Service without Significantly Increasing Access to Transit



Spacing Guidelines

The ideal spacing of bus stops is based on the density of population and employment around a stop. In areas where there are more people living and working, bus stops should be closer together. The BCDCOG Spacing Guidelines below recommend an average stop spacing of 1,300 feet for local fixed routes. For express routes, stops are only placed at the route termini and, if applicable, a central point in downtown Charleston (e.g. the Visitors' Center).

Figure 2-2 presents guidelines for the space between stops and stops per mile for CARTA's fixed route bus service. Guidelines for maximum stops per mile and minimum spacing between stops are included for areas where walking conditions are poor or

there are other significant operating considerations limiting placement (see also Chapter 7 – Operational Considerations)

Figure 2-2 Recommended and Maximum Stop Spacing for Local Fixed Routes

Bus Stop Spacing Standard	Local Fixed Routes
Recommended Stops per Mile	4-6
Recommended Spacing between Stops	1,300 feet
Maximum Stops per Mile	8
Minimum Spacing between Stops	660 feet

These guidelines do not apply to express routes, whose stops are only placed at the route termini and, if applicable, a central point in downtown (e.g., the Visitors' Center).

In dense or sparse areas or corridors, a variation to the standard is warranted. CARTA staff use professional judgement for spacing, especially with placing at large attractors and trip generators. They work to adjust spacing to accommodate accessing key destinations, which might result in stop spacing that falls below the minimum guidelines.

Stop Pairing

Whenever possible, bus stop locations should be paired, so that customers board and alight on opposite sides of the same street in the same vicinity when making a round trip. This allows the transit service to be more intuitive and maximizes convenience for the greatest number of users.

Stops with High Transfer Activity

At locations where transfer activity between routes is heavy, bus stops for the intersecting routes should be located as close to each other as possible in order to shorten travel for passengers transferring between routes.

BUS STOP PLACEMENT

Key Takeaways

- When possible, make bus stops accessible by a sidewalk in good condition, between the bus stop and the nearest intersection.
- Bus stop placement should be responsive to major activity generators and should have a direct, accessible path to them.
- When possible, place bus stops on the far side of intersections.



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Staff**

In addition to spacing, existing conditions such as roadway type, sidewalk conditions and land use affect where new or moved bus stops are placed and how they are designed. Additional considerations that impact the safety, convenience, and accessibility of a stop, such as placement relative to street intersections must also be considered. The following is an overview of several factors that influence the placement of bus stops.

Environmental Context

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

Land Use and Activity Generators

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

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

Street Network

The functional class designation of a bus stop's roadway indicates the general characteristics of a roadway including its intended purpose and typical roadway speed. It can impact both design and operation of bus service and stops. For example, wider streets (often a higher functional class) may allow for curb extensions (also called bulb-

outs) at bus stops, which create more space for amenities and reduce the pedestrian crossing distance. However, wider streets also typically have higher speeds, which increase the sight distance needed for bus operators and make it harder for pedestrians to cross the roadway. As such, adjacent roadway speed and width should be considered when siting and designing a bus stop.

Driveways

Driveways and other curb cuts near bus stops can pose safety hazards for boarding and alighting passengers and transit vehicles. There are six principles that guide the siting of bus stops in relation to driveways,¹ enumerated as follows and illustrated in Figure 2-3 and Figure 2-4.

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

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

¹ These principles are adapted from MDOT MTA's Bus Stop Design Guide (2019).

Figure 2-3 Undesirable Driveway Arrangements

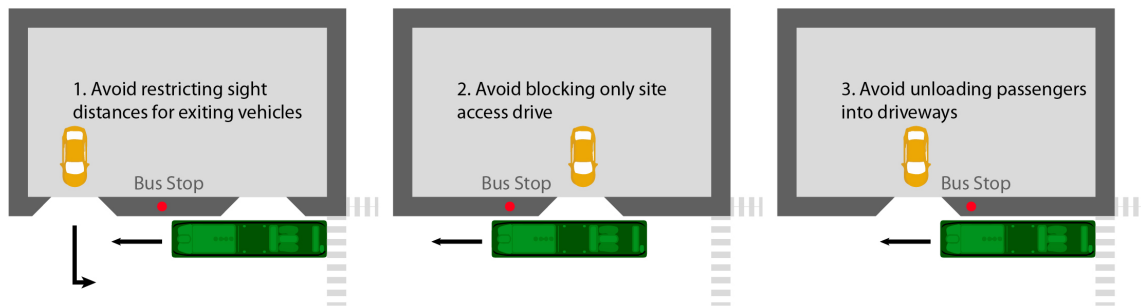
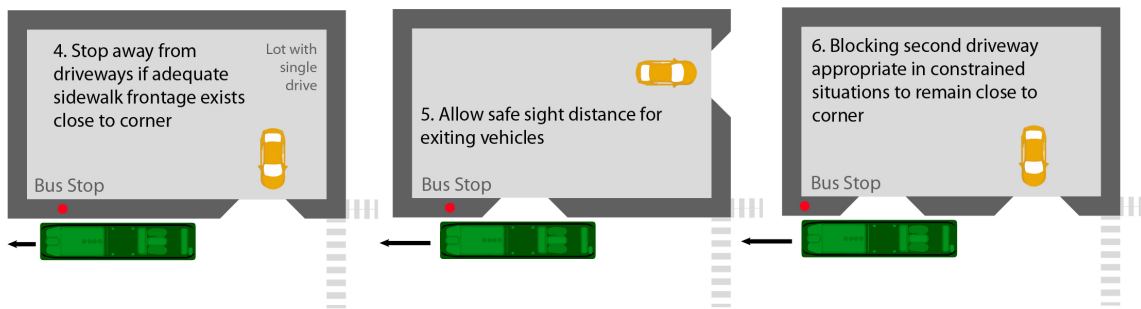


Figure 2-4 Acceptable Driveway Arrangements



Getting to and from the Bus Stop

Most people traveling to and from the bus stop are pedestrians or users of a wheeled mobility device, such as a wheelchair or bicycle. Therefore, the conditions of the sidewalk and connections with the surrounding area are important determinants of transit access and affect the prioritization of bus stop improvements.

At the least, a stop should be accessed by a sidewalk in good condition between the bus stop and the closest intersection. In addition, a safe, nearby street crossing with curb cuts for wheelchairs is required; almost all riders will need to make round trips using a pair of bus stops. For denser areas where it is likely that many people visit multiple destinations in a single bus trip, priority should be given to making sure that there is an accessible path throughout the area. For bus stops which serve mostly a single destination, the focus can be on a path between that destination and the bus stop.

Bicycling and transit can complement each other, and the reach of the transit service can be greatly extended by providing connections so that people can combine these two modes in a single trip. Particularly in more outlying locations where the transit network is less dense, people may be more likely to access the bus stop by bicycle. Generally, bicycle lanes and separated paths increase bicycle usage by making riders

safer and more comfortable. Wherever possible, bus stops should be placed close to this bicycle infrastructure, especially at places where a stop can facilitate bicycle connections to areas without transit service. In addition, some stops may warrant more bicycle parking. See Chapter 3 – Bus Stop Configuration for bus stop guidelines for designing bus stops that interact with on-street bicycle infrastructure.

Bus Stop Location Relative to Intersection

Bus stop position directly impacts the convenience and accessibility of the transit system. Determining the proper position of bus stops involves choosing between near-side, far-side and mid-block stops. While many other factors should be considered when choosing a bus stop position, including adjacent land use, space availability, and pedestrian access, the location of the stop relative to the intersection is an important consideration. If all other factors were similar, far-side stops would be preferable, since they encourage people to cross behind the bus and not in front. However, there are often complicating factors. The Bus Stop Configuration section (Chapter 3) of this document provides drawings for how bus stops should fit at each possible bus stop position.

Figure 2-5 Near-Side, Far-Side, and Mid-Block Bus Stops

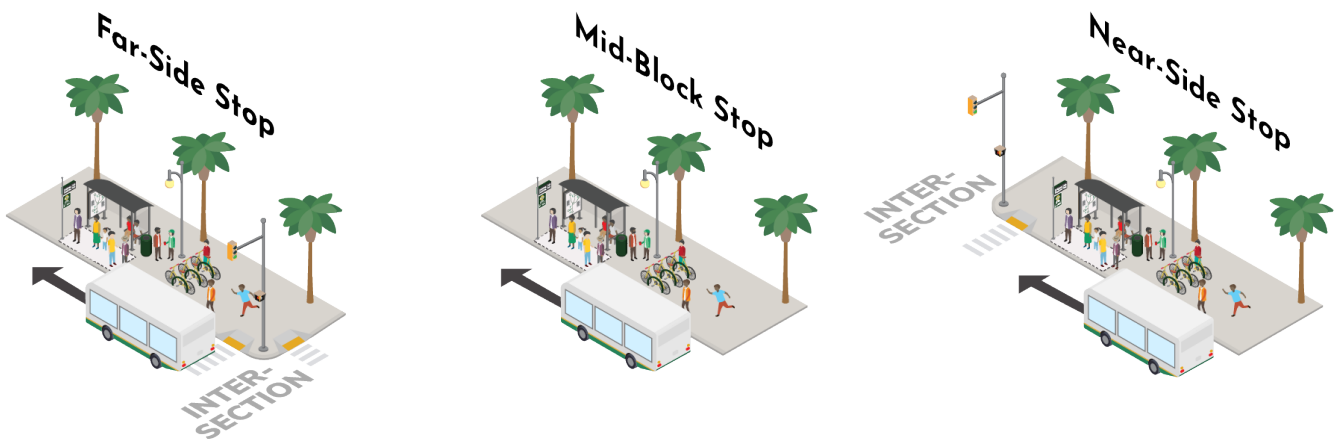


Figure 2-6 Near-Side Stop in Charleston

Near-Side

Near-side bus stops are located before an intersection, allowing passengers to load and unload while the vehicle is stopped at a red light or stop sign (see Figure 2-4). Near-side bus stops can minimize interference when traffic is heavy on the far-side of an intersection. At stop-controlled locations, near-side stops eliminate “double stopping,” as passengers can board the bus during the stop. Additionally, at near-side stops, gaps in traffic flow are created for buses re-entering traffic at the intersection and passengers access the bus closest to the crosswalk.



The stop configuration can generate conflicts with right turning vehicles. Delays associated with loading and unloading passengers may lead to unsafe driving practices, where right turning vehicles drive around the bus to make a right turn in front of the bus. Additionally, buses serving near-side stops may restrict sight distances for crossing pedestrians and vehicles.

Far-Side

Far-side bus stops are located after an intersection, allowing the bus to travel through the intersection before stopping to load and unload passengers. When the bus pulls away from the stop to reenter traffic at an intersection controlled by a traffic signal, the signal generates gaps in traffic allowing buses to reenter the traffic lane. Far-side stops also require shorter deceleration distances and encourage pedestrians to cross behind the bus. Far-side bus stops support the use of a broad array of active transit signal priority treatments and take up the least amount of curbside space. Additionally, far-side stops provide additional right turn capacity at the intersection by eliminating bus blockage in the curb lane on the approach to the intersection.

However, during peak travel periods, when traffic is heavy and bus queuing is possible, intersections may be blocked by buses waiting to access a far-side bus stop. Queued buses may restrict sight distances for crossing pedestrians and vehicles. Additionally, stopping far-side after stopping for a red light may interfere with bus operations as well as general traffic flow.

Figure 2-7 Far-Side Stop Located at Calhoun Street at Meeting Street

Mid-Block

Mid-block bus stops are located between intersections. Mid-block stops minimize sight distance problems for vehicles and pedestrians. Additionally, passenger waiting areas located mid-block often experience less pedestrian congestion. However, mid-block stops require both deceleration and acceleration areas, requiring additional distances for no parking restrictions or increased turnout construction costs. Mid-block stops also increase walking distances for patrons crossing at intersections, or result in patrons illegally crossing the street mid-block.

Mid-block stops should generally be used under special circumstances, such as where large destinations justify high-volume access or when the distance between adjacent intersections exceeds stop spacing recommendations.

Figure 2-8 Mid-Block Stop on Sam Rittenhouse Boulevard (Driveway shown behind stop is not an intersecting street)



3 BUS STOP CONFIGURATIONS

This chapter provides technical guidance on bus stop configurations in different operating environments.

The position of a bus stop relative to the travel lane affects how easily buses can reenter traffic flow and continue on their route.

It includes seven categories of configurations: (1) pull-out stops, (2) in-lane stops, (3) boarding bulb stops, (4) shared bus-bike lanes, (5) side boarding island stops, (6) shared cycle track stops, and (7) transfer centers.

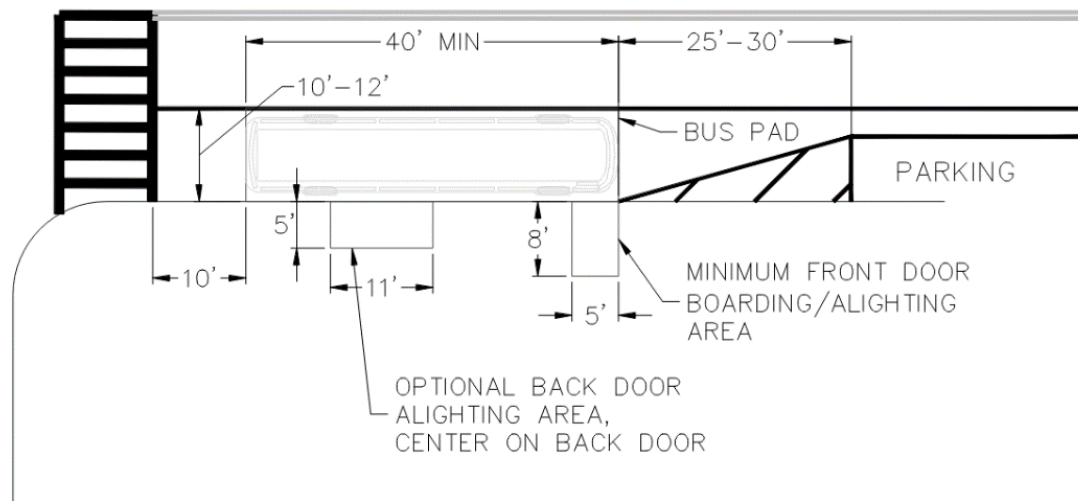
For pull-out, in-lane, and boarding bulb stops, placement specific guidance is also provided. As described in Chapter 2 – Bus Stop Spacing and Placement, bus stop position is the location of the bus stop relative to the intersection or within a block. Types of bus stop positions include far-side (just after an intersection), near-side (just prior to an intersection), mid-block (at least 200' away from any intersection).

The majority of CARTA buses are between 35' and 40'. As such, the dimensions shown below are designed for 40' buses. These dimensions are technical recommendations and their feasibility are subject to available right of way. Refer to Appendix D for more detail on ADA standards relevant to bus stop accessibility.

PULL-OUT STOPS

A pull-out bus stop is located in a curbside lane requiring the bus to merge out of and back into the travel lane in order to serve the stop. Pull-out stops are a low-cost option for bus stops on streets with curbside parking. Pull-out stops prioritize through-traffic, including through-moving transit and are most useful where flow is a priority or where in-lane stops would be problematic. Pull outs are designed to be long enough to accommodate 40' vehicles.

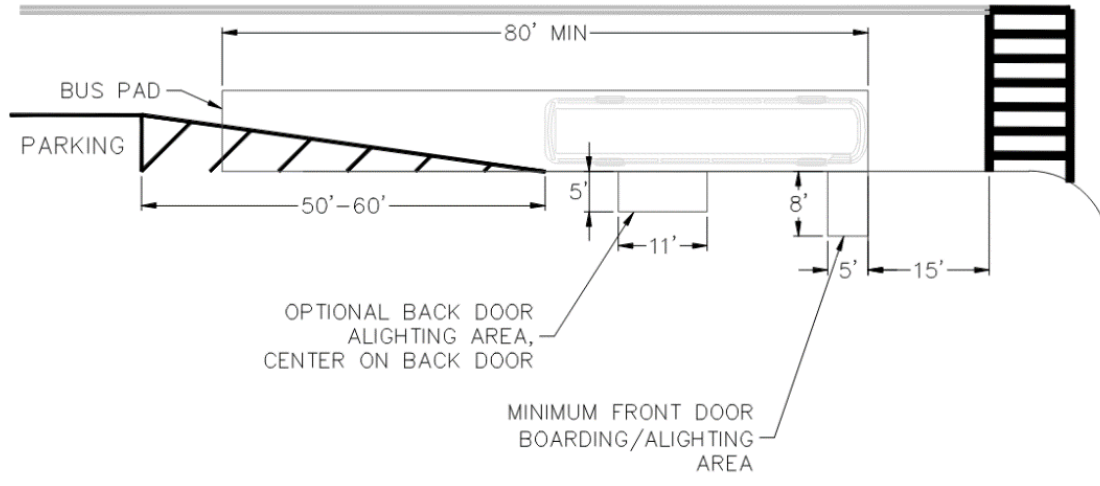
Far-Side Pull-out Stop



GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- Bus pads shall be a minimum of 8.5' wide.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.

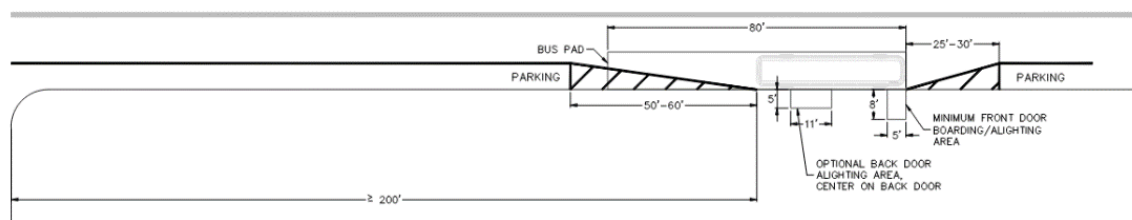
Near-Side Pull-Out Stop



GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- Bus pads shall be a minimum of 8.5' wide.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.

Mid-Block Pull-Out Stop



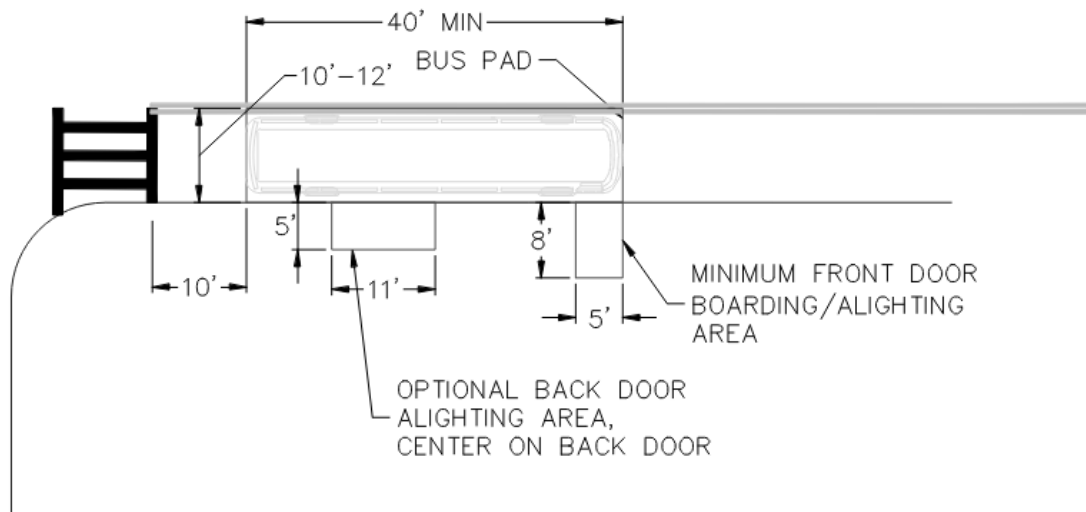
GENERAL GUIDELINES

- Bus pads shall be a minimum of 8.5' wide.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.

IN-LANE STOPS

In-lane bus stops are located in a travel lane, allowing the bus to serve the stop and continue the route without having to merge out and then back into the travel lane. In-lane stops are a low-cost option, requiring a minimum of a sign and ADA boarding area, while saving the bus time since it does not have to pull out into traffic. In-lane stops also result in a more compact bus stop zone as compared to pull-out stops, preserving parking and other curbside uses.

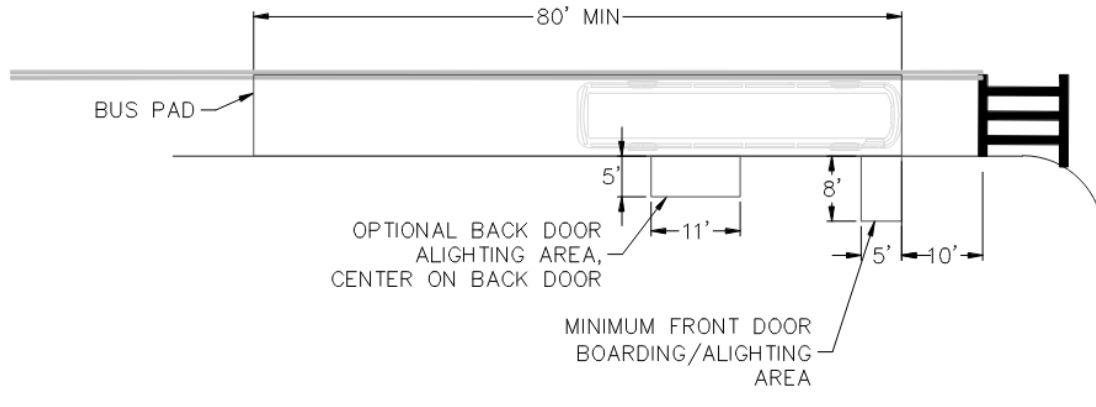
Far-Side In-Lane Stop



GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- Bus pads at in lane stops shall extend the full width of the lane.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.

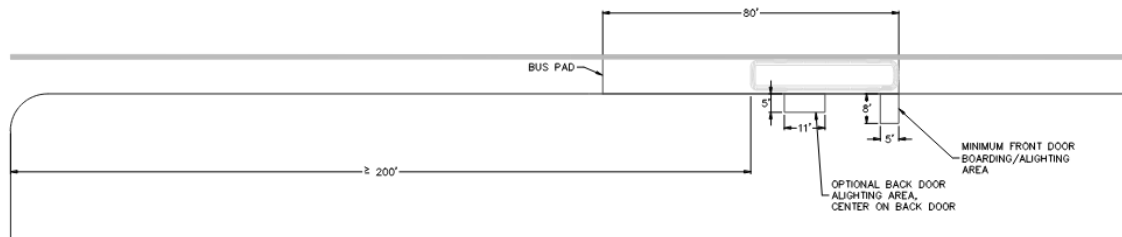
Near-Side In-Lane Stop



GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- Bus pads at in lane stops shall extend the full width of the lane.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.

Mid-Block In-Lane Stop



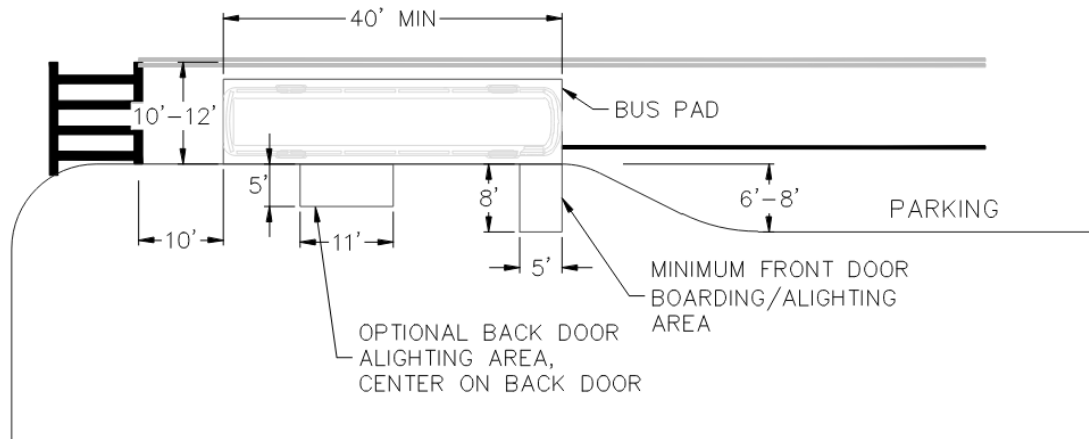
GENERAL GUIDELINES

- Bus pads at in lane stops shall extend the full width of the lane.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.

BOARDING BULB STOPS

Boarding bulb stops use curb extensions to align the transit stop with the parking lane, creating an in-lane stop. Boarding bulbs improve speed and reliability, provide more space for transit passenger amenities, and maintain clear pedestrian paths on the sidewalk. Curb extensions are most effective in dense urban environments with high pedestrian activity or areas where the sidewalk is too narrow to accommodate a bus stop. Boarding bulb stops also reduce the need to displace parking spaces since a bus serving a stop on a curb extension will stop in the traffic lane instead of traveling into the parking lane as they do at pull-out bus stops. Finally, boarding bulb stops work well in conjunction with crosswalks by reducing the crossing distance for pedestrians.

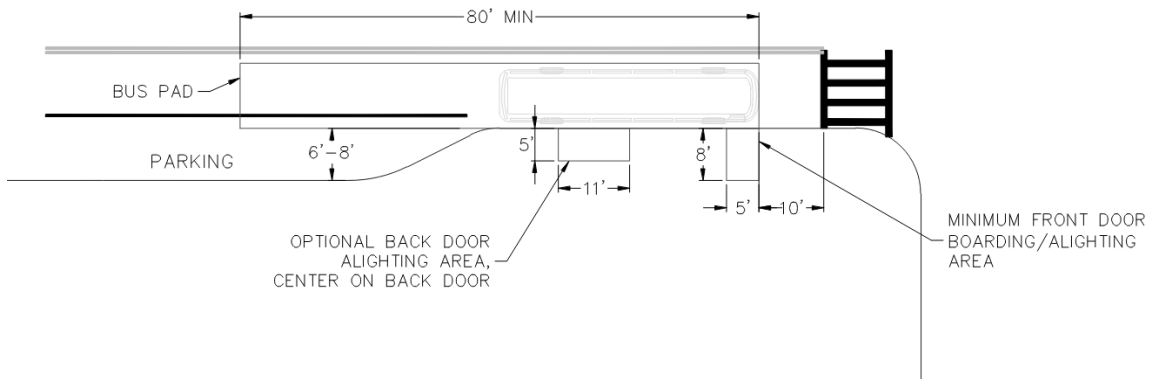
Far-Side Boarding Bulb Stop



GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- Bus pads at boarding bulb stops shall extend the full width of the lane.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.
- Bus bulbs shall be long enough to serve all doors of at least one design vehicle.
- Bus bulbs shall extend up to 2' from the edge of the travel lane. Bus bulbs typically extend out 6-8' from the curb.

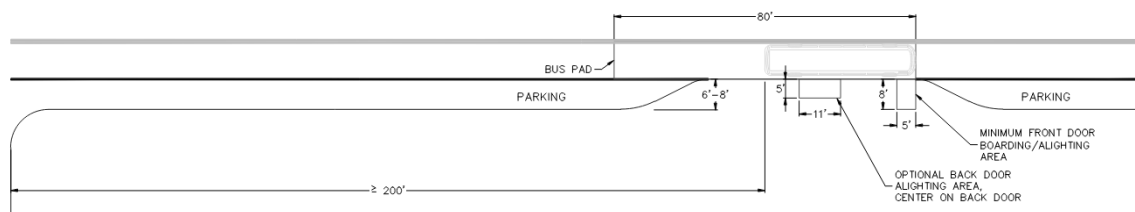
Near-Side Boarding Bulb Stop



GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- Bus pads at boarding bulb stops shall extend the full width of the lane.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.
- Bus bulbs shall be long enough to serve all doors of at least one design vehicle.
- Bus bulbs shall extend up to 2' from the edge of the travel lane. Bus bulbs typically extend out 6-8' from the curb.

Mid-Block Boarding Bulb Stop

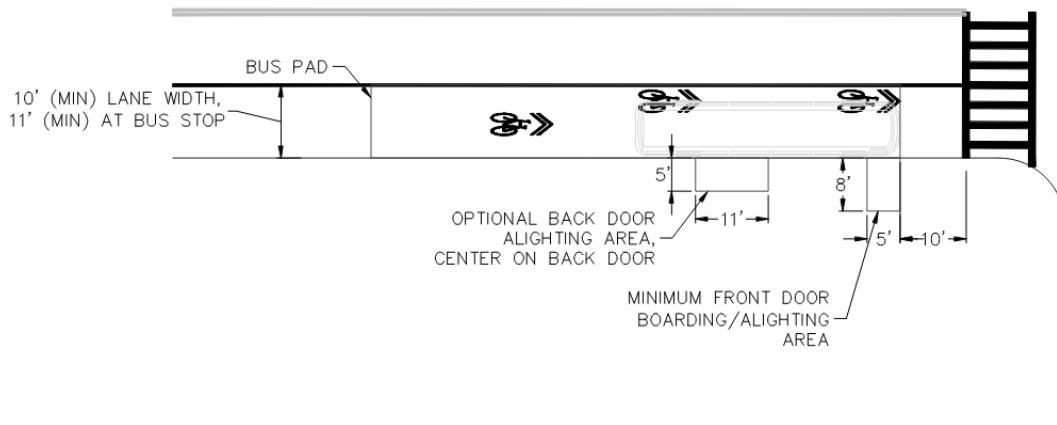


GENERAL GUIDELINES

- Bus pads at boarding bulb stops shall extend the full width of the lane.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.
- Bus bulbs shall be long enough to serve all doors of at least one design vehicle.
- Bus bulbs shall extend up to 2' from the edge of the travel lane. Bus bulbs typically extend out 6-8' from the curb.

SHARED BUS-BIKE LANES

Shared bus-bike lanes improve the speed, reliability, and efficiency of bus service and enhance safety for cyclists. Stops adjacent to a bus lane may have high passenger volumes, since typically bus lanes are used for corridors with heavy transit usage. Shared bus-bike lanes are applicable on curbside or offset bus lanes with no existing or planned dedicated bicycle facility.



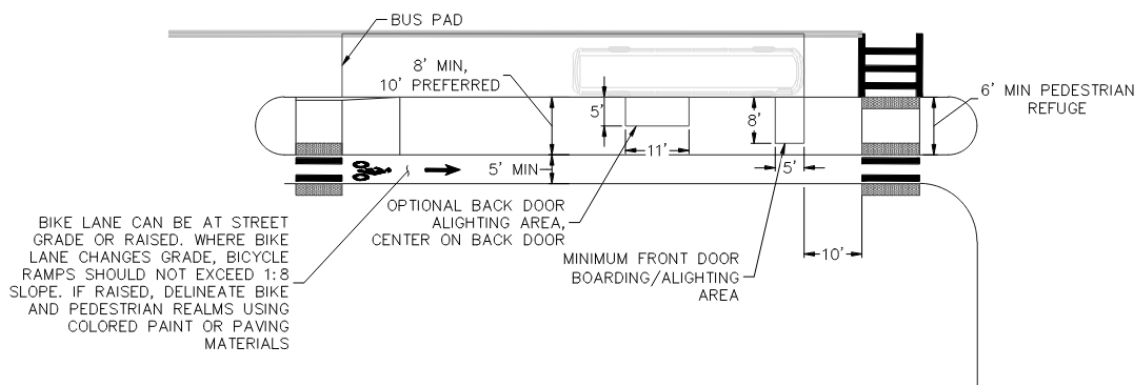
GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- In shared bus-bike lanes, bus pads shall extend the full width of the lane to provide a level surface to both buses and bikes.
- Bus pad lengths shall be 80' at near-side and mid-block stops and 40' at far-side stops.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.
- In shared bike-bus lanes, shared lane markings shall be placed in the center or left side of the lane. At bike/bus stops, shared lane markings shall be placed at the left side of the lane.

SIDE BOARDING ISLAND STOPS

Side boarding island stops, also referred to as floating stops, are designed to channelize a bike lane between the sidewalk and the bus stop boarding zone itself. Boarding islands eliminate the interaction between buses and bicycles at the curb, and allow the bus to stop in-lane while maintaining physical bike lane protection and providing separation to more users. Pedestrians crossing the bicycle lane should be channeled into clearly-marked crossings to reduce conflicts between bicycles and pedestrians.

While there are currently no examples of floating bus stops in the BCDCOG region, this type of bus stop facility is an emerging design.



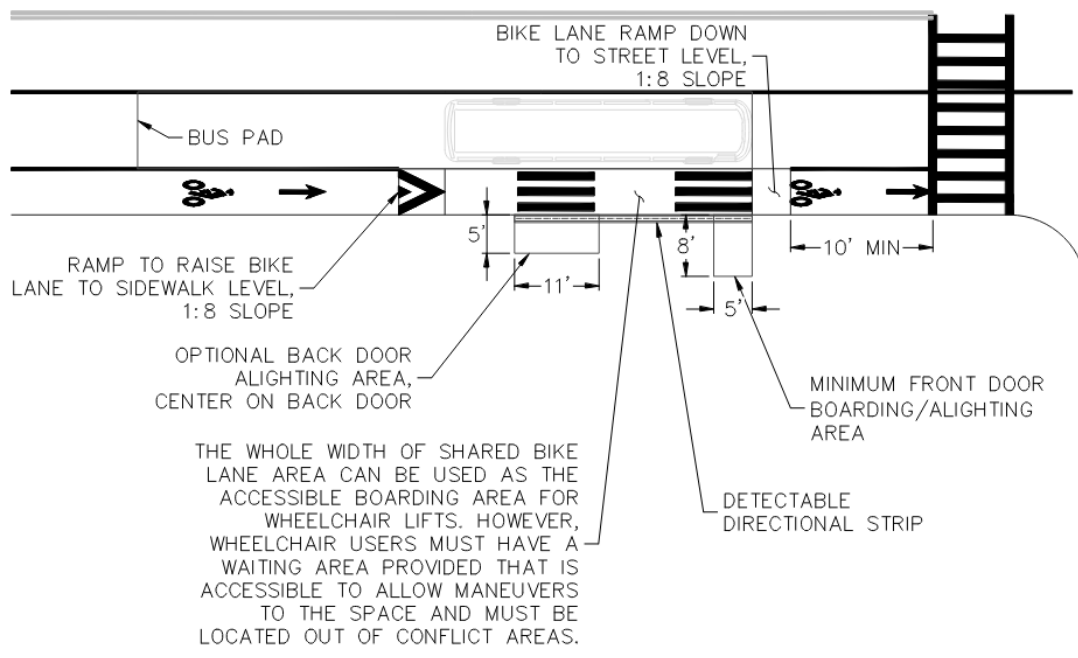
GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- Bus pads shall be a minimum of 8.5' wide.
- Bus pad lengths shall be 80' at near-side and mid-block stops and 40' at far-side stops.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.
- Bus island shall be long enough to serve all doors of at least one design vehicle.

SHARED CYCLE TRACK STOPS

Shared Cycle Track stops are used when limited right-of-way precludes boarding islands on streets with standard bicycle lanes. In this configuration, a bike lane or protected bike lane rises and runs along the boarding area, along the curb, rather than wrapping behind the boarding area. Bicyclists can ride through the boarding area when no transit vehicles are present, but must yield the space to boarding and alighting passengers when a bus stops.

While there are currently no examples of shared cycle track stops in the BCDCOG region, this type of bus stop facility is an emerging design.



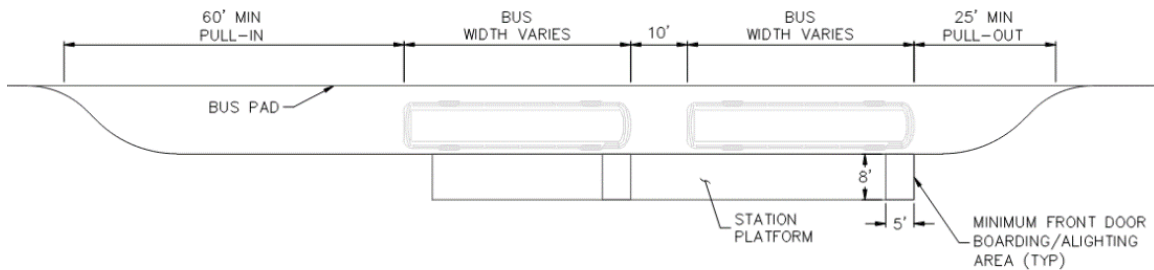
GENERAL GUIDELINES

- Maintain a minimum of 10' clear distance from crosswalk to bus dwelling location at all times.
- Bus pads shall be a minimum of 8.5' wide.
- Bus pad lengths shall be 80' at near-side and mid-block stops and 40' at far-side stops.
- Bus pads shall end before the crosswalk. If the bus pad must extend into the crosswalk, the bus pad shall extend across the full width of the crosswalk.
- Ensure bicyclists are in view of traffic at intersections.
- Maintain a 10' distance between the bike ramp exiting the boarding platform and crosswalk.

TRANSFER CENTERS

Several of CARTA’s stops that experience high ridership as well as a high volume of transfers are designated as Transfer Centers. Transfer Centers are often installed along the systems most frequent transit routes and should have design footprints that accommodate multiple buses at a time.

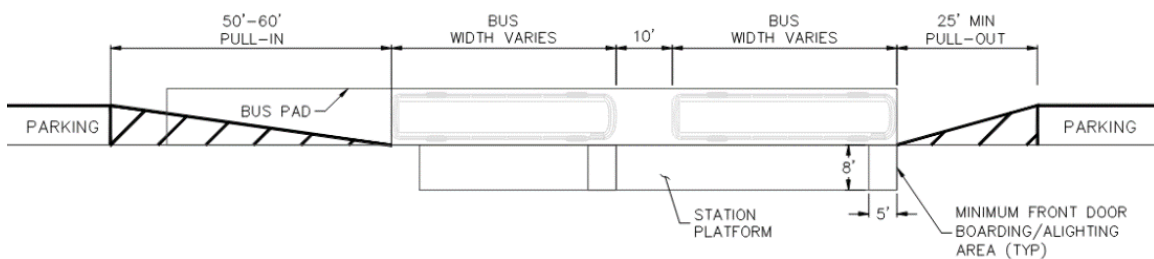
Pull-Out Transfer Center



GENERAL GUIDELINES

- All bus stops and transfer centers shall be long enough to accommodate the number and types of buses using it.
 - For each additional bus, add the length of bus plus 10’ of clearance between the consecutive buses.
- Accommodations such as emergency call boxes, area maps, real-time information displays, shelters, benches, lighting, bicycle racks, and trash receptacles are preferred at transfer centers.

In-Lane Transfer Center

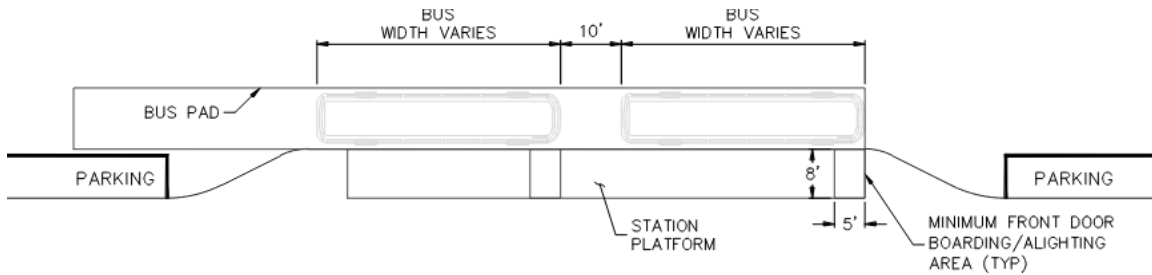


GENERAL GUIDELINES

- All bus stops and transfer centers shall be long enough to accommodate the number and types of buses using it.
 - For each additional bus, add the length of bus plus 10’ of clearance between the consecutive buses.

- In-lane transfer centers should not be used as dwelling centers at the end of route lines.
- Accommodations such as emergency call boxes, area maps, real-time information displays, shelters, benches, lighting, bicycle racks, and trash receptacles are preferred at transfer centers.

Bulb-Out Transfer Center



GENERAL GUIDELINES

- All bus stops and transfer centers shall be long enough to accommodate the number and types of buses using it.
 - For each additional bus, add the length of bus plus 10' of clearance between the consecutive buses.
- Bulb out transfer centers should not be used as dwelling centers at end of route lines.
- Accommodations such as emergency call boxes, area maps, real-time information displays, shelters, benches, lighting, bicycle racks, and trash receptacles are preferred at transfer centers.

4 BUS STOP TYPOLOGIES

This chapter groups all CARTA and TCL bus stops into six “types” according to their context and usage. These types reflect the diversity of bus stops in the region, from standard stops to major urban transit centers.

One of the unique factors of the BCD region is the diversity of communities—rural, suburban, urban, and historic—creating a range of transit operating environments for both CARTA and TCL.

Together, the six types below form a bus stop “typology”, which categorizes bus stops based on their operational characteristics, service levels, ridership, and surrounding land use contexts.

1. Transit Centers
2. Transfer Stops
3. Park & Rides
4. LCRT Stations
5. High Activity Stops
6. Standard Stops

These categories help determine which amenities are suitable at different stops. All stops will have required, preferred, and optional amenities based on their type:

Figure 4-1 provides a description of each bus stop type, examples for each, and how the types differ in terms of weekday ridership and frequency.

Figure 4-1 BCDCOG Typology Descriptions, Examples, and Characteristics

Stop Type	Description	Examples	CARTA Buses per Weekday
Transit Centers	Official CARTA transit centers	<ul style="list-style-type: none"> ▪ N. Charleston Super Stop/Shipwatch Sq. ▪ Downtown Transit Center (including Transit Mall, Mary St. @ Meeting St., Visitors Center) ▪ Citadel Mall 	<p>~100</p> <p>Buses every 6 min</p>
Transfer Stops	Stops with transfer activity but are not official transit centers	<ul style="list-style-type: none"> ▪ Calhoun St / Jonathan Lucas St (far side) ▪ Hungry Neck Blvd / Theater Dr (Mt. Pleasant Towne Centre) ▪ Calhoun St / St Philip St 	<p>60-90</p> <p>Buses every 10 min</p>
Park & Rides	Parking lots with connecting services to major activity centers	<ul style="list-style-type: none"> ▪ Citadel Mall P&R ▪ Melnick P&R ▪ Wando Crossing P&R ▪ Walmart-Market at Oakland ▪ James Island Walmart ▪ Dorchester Village Shopping Center 	<p>15-60</p> <p>Buses every 15-60 min</p>
LCRT Stations	Future Lowcountry Rapid Transit Stations	<ul style="list-style-type: none"> ▪ LCRT stations at Mall Drive, Hanahan Road, John Street, and others 	<p>Buses every 10 min</p>
High Activity Stops	Stops where ridership, transfer activity, and/or proximity to a major activity center merit higher investment	<ul style="list-style-type: none"> ▪ Medcom St/Trident Medical Center ▪ Waterfront Park ▪ King St/Mt Pleasant St (Joseph Floyd Manor) 	<p>30-50</p> <p>Buses every 30 min</p>
Standard Stops	The most typical stops often served by 1 route		<p><30</p> <p>Buses every 30-60 min</p>

TRANSIT CENTERS

Transit Centers are transit stops that experience very high ridership and a high number of transfers. They usually serve the system’s most frequent bus routes. Since these stops have the region’s highest level of ridership and service, they should provide a wide range of information and passenger amenities.



CARTA maintains 3 official transit centers: the North Charleston Super Stop, the Downtown Transit Center (including Transit Mall, Mary Street at Meeting Street, Visitors Center), and the Citadel Mall. The Shipwatch Square Center is planned to replace the North Charleston Super Stop.

Examples



Bus stop at Citadel Mall.



Mary Street Transit Center (Downtown Charleston).



North Charleston Super Stop.

Amenities

Required	Preferred	Optional
<ul style="list-style-type: none"> ▪ Landing Pad ▪ Bus Stop Sign ▪ Shelter ▪ Lighting ▪ Real Time Information ▪ Enhanced Passenger Information ▪ Trash Can ▪ Bench 	<ul style="list-style-type: none"> ▪ Bike Rack 	<ul style="list-style-type: none"> ▪ Electric Bus Charger ▪ Fare Machine ▪ Car Parking



▪ Safety and Security Elements

TRANSFER STOPS

Transfer Stops have higher ridership and levels of bus service than most CARTA stops. They are characterized by serving more than 1 bus route. Transfer stops should provide high levels of passenger amenities and information to help riders navigate the bus system. Transfer stops can have extended boarding areas to accommodate multiple buses at the same time.

Transfer stops such as Calhoun Street at Jonathan Lucas Street (far side) and Hungry Neck Boulevard at Theater Drive (Mount Pleasant Towne Center) have significant transfer activity but are not official transit centers.

Example



Bus stop at Calhoun St / Jonathan Lucas St.

Amenities



Required	Preferred	Optional
<ul style="list-style-type: none"> ▪ Landing Pad ▪ Bus Stop Sign ▪ Shelter ▪ Lighting ▪ Real Time Information ▪ Enhanced Passenger Information ▪ Trash Can ▪ Bench 	<ul style="list-style-type: none"> ▪ Bike Rack 	<ul style="list-style-type: none"> ▪ Fare Machine ▪ Safety and Security Elements

PARK & RIDES

Park & Ride stops are parking lots with connecting transit services that allow commuters heading to major activity centers to leave their vehicles and transfer to a bus for the remainder of their journey. CARTA and TriCounty Link operate 19 Park & Ride lots. Park & Ride stops have special amenity needs, such as the provision of parking and additional passenger information. The North Charleston Rivers Avenue Park & Ride is one example of the region’s Park & Ride stops.

Example



North Charleston Rivers Avenue Park & Ride (2150 Melnick Dr, North Charleston, SC 29406)

Amenities

Required	Preferred	Optional
<ul style="list-style-type: none"> ▪ Landing Pad ▪ Bus Stop Sign ▪ Shelter ▪ Lighting ▪ Real Time Information ▪ Enhanced Passenger Information ▪ Trash Can ▪ Bench ▪ Safety and Security Elements ▪ Bike Rack ▪ Car Parking 		<ul style="list-style-type: none"> ▪ Fare Machine ▪ Electric Bus Chargers

LCRT STATIONS

The Lowcountry Rapid Transit is a programmed Bus Rapid Transit line that will connect North Charleston and Charleston via US 78/US 52 (the Rivers Avenue corridor) from the Exchange Park Fairgrounds to the Charleston Peninsula/Medical District. LCRT stations will have special branding and many amenities. These station design guidelines are being developed as part of the separate LCRT study, and they will occupy their own bus stop type within the design guidelines. There are 20 LCRT stations planned for the corridor.



LCRT Station Architecture



LCRT Station Amenities

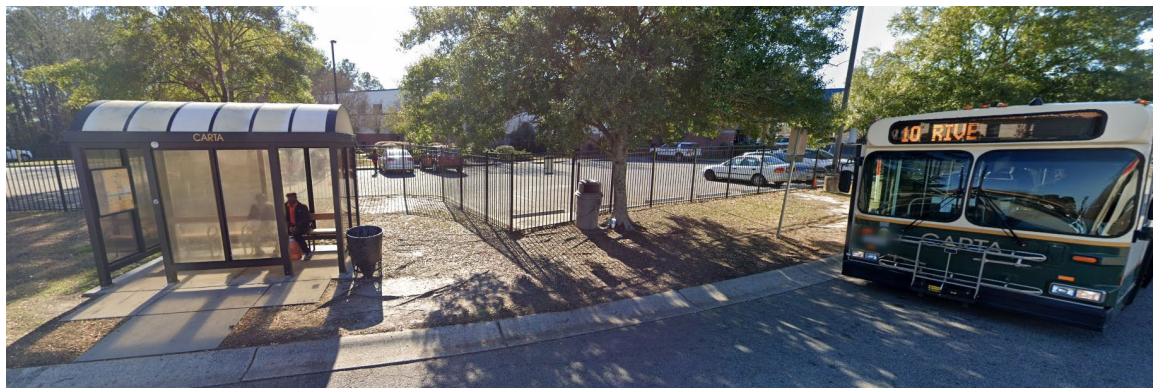
HIGH ACTIVITY STOPS

High activity stops have high existing or potential ridership due to proximity to major or transit-critical destinations. These include but are not limited to hospitals, transportation facilities, large residential developments, low-income housing, shopping centers, government buildings, colleges, and universities. Roughly 25 CARTA stops fall into the High Activity Stops type.

High activity stops have more minimum amenities due to their high ridership.



Example



Bus stop at Medcom St / Trident Medical Center.

Amenities

Required	Preferred	Optional
<ul style="list-style-type: none"> ▪ Landing Pad ▪ Bus Stop Sign ▪ Lighting ▪ Real Time Information ▪ Enhanced Passenger Information ▪ Trash Can ▪ Bench 	<ul style="list-style-type: none"> ▪ Shelter ▪ Bike Rack 	<ul style="list-style-type: none"> ▪ Fare Machine ▪ Safety and Security Elements

STANDARD STOPS

The vast majority of CARTA stops (about 750) fall into the Standard Stops type. These stops, typically served by only 1 route, experience relatively lower ridership and bus service. Because they range widely in terms of curb condition, ADA compliance, and room available for investment, these stops have minimum requirements that require only ADA compliance and a bus stop sign. These stops have a longer list of preferred amenities that are recommended to be included where space and funding allow.



Example



Standard Stops with a variety of curb conditions, room available for improvements and investment, as well as ADA compliance.



















Amenities

Required	Preferred	Optional
<ul style="list-style-type: none"> ▪ Landing Pad ▪ Bus Stop Sign 	<ul style="list-style-type: none"> ▪ Shelter ▪ Lighting ▪ Enhanced Passenger Information ▪ Trash Can ▪ Bench 	<ul style="list-style-type: none"> ▪ Real Time Information ▪ Bike Rack ▪ Safety and Security Elements ▪ Fare Machine

SUMMARY OF BUS STOP AMENITIES BY TYPOLOGY

Figure 4-2 shows the required, preferred, and optional amenities for all bus stop types. Good faith efforts should be made to meet these requirements. Beyond **required** amenities, every effort should be made to include **preferred** amenities at stops, but they may not be feasible because of physical constraints or other factors. **Optional** amenities are the remaining amenities that may feasibly be included at a bus stop.

Figure 4-2 BCDCOG Bus Stop Types and Minimum, Preferred, and Optional Amenities

Amenity	 Transit Centers	 Transfer Stops	 Park & Rides	LCRT Stations	 High Activity Stops	 Standard Stops
 ADA compliance	Required	Required	Required	*	Required	Required
 Bus stop sign	Required	Required	Required	*	Required	Required
 Lighting	Required	Required	Required	*	Required	Preferred
 Real-time information	Required	Required	Required	*	Preferred	Optional
 Enhanced passenger information	Required	Required	Required	*	Required	Preferred
 Trash can	Required	Required	Required	*	Required	Preferred
 Bench	Required	Required	Required	*	Required	Preferred
 Shelter	Required	Preferred	Required	*	Preferred	Preferred
 Bike rack	Preferred	Preferred	Required	*	Preferred	Optional
 Fare machine	Optional	Optional	Optional	*	Optional	Optional
 Electric bus charger	Optional		Optional	*		
 Safety and Security Elements	Required	Optional	Required	*	Optional	Optional
 Car Parking	Optional		Required	*		

*LCRT station amenities are being determined through a separate study.

5 BUS STOP AMENITIES

Bus stop amenities are the elements available at a given bus stop, such as bus stop signs, maps, shelters, and benches. This chapter provides guidance on the bus stop amenities referenced in Chapter 4 – Bus Stop Typologies.

Amenities covered in this chapter include:



Landing pads



Bus stop signs



Lighting



Real-time information



Enhanced passenger information



Trash cans



Benches and seating



Shelters and shade



Bike racks



Fare machines



Overhead chargers for electric buses



Safety and Security Elements

Each category of amenity includes: (1) a description, (2) where they're required, preferred, or optional, (3) guidance, (4) roles and responsibilities, and (5) relevant appendices. Photos and diagrams are available when relevant.

One central consideration for bus stop amenities is compliance with the Americans with Disabilities Act (ADA). For more information on **ADA compliance**, see the callout box on the next page.

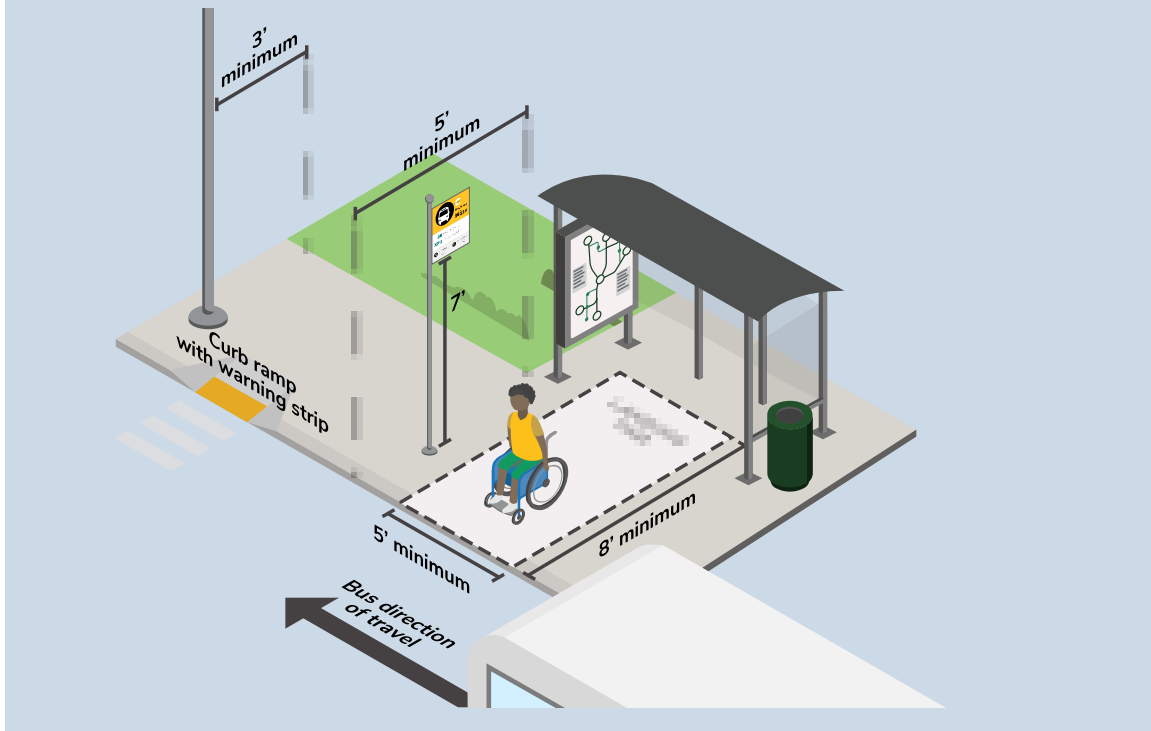
ADA Compliance

Access to bus stops is essential to the success of the transit network. Accessible boarding and alighting areas help to afford equal access to transit for all passengers, including those who use wheelchairs or other mobility devices. All bus stops being installed or upgraded must conform to the physical dimension requirements derived from the Americans with Disabilities Act of 1990 (ADA) and the Public Rights-of-Way Accessibility Guidelines (PROWAG), which are the primary federal guidelines for accessibility relating to transit facilities produced by the United States Access Board. Modifying existing stops to comply with ADA, though desirable from an accessibility perspective, is not required under ADA. Modification of existing stops can be difficult, especially if the stops are at sites with limited easement or not subject to CARTA’s control, such as shopping malls, on state rights-of-way, or suburban subdivisions.

A bus stop area is a designated location indicated by a bus stop sign where the bus will stop to let passengers board and alight. Bus stop signage, landing pads, passenger waiting areas, benches, and shelters are subject to ADA requirements to ensure access for all users. Flag stop areas/zones are not considered a designated area and thus not subject to the requirements outlined.

Bus stops with any of the amenities included in this chapter must have a 3-foot wide path through the stop for pedestrians to bypass the stop. Additionally, a 3-foot wide path must be provided to access any of the bus stop elements provided, including shelters, information, and any interactive elements such as push buttons. ADA Compliance was identified as one of the largest areas of opportunity for improving bus stops in the Charleston region.

Figure 5-1 ADA Compliance at a Bus Stop





LANDING PADS

The landing pad, also known as the accessible boarding area, is the place where riders get on and off the bus from the front door, directly adjacent to the bus stop sign. This is also the space where bus drivers deploy the ramp for riders using mobility devices, such as a wheelchair.

Landing Pads are a Top Priority

The landing pad is the BCDCOG’s top priority for compliance with ADA mandates. Other amenities listed in this chapter are important but should not displace investment in adequate landing pads.

Where They’re Required

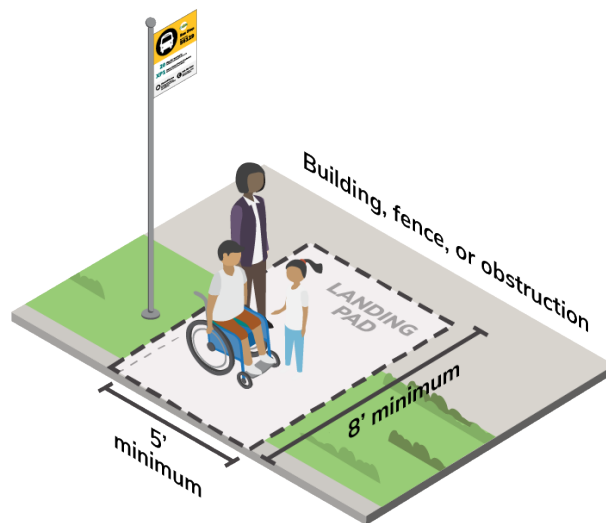
Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Required	Required	TBD	Required	Required

Guidance

According to ADA Standards issued by the U.S. Department of Transportation (DOT), all new or upgraded bus stops are **required** to have a front landing pad that:

- Provides a firm, stable surface
- Provides a clear length of 96 inches (8 ft.) minimum, measured perpendicular to the curb, and a clear width of 60 inches (5 ft.) minimum, measured parallel to the roadway
- Parallel to the roadway, has a slope that is the same as the roadway, to the maximum extent practicable
- Has a cross slope perpendicular to the roadway that does not exceed 1:48 (approx. 2%)




Figure 5-2 ADA-Accessible Boarding Area (Landing Pad)



A rear accessible boarding area should also be provided at high ridership bus stops to accommodate boardings and alightings occurring at the rear door of the vehicle. Since the position of the rear door may vary somewhat on various bus types, the rear door clear zone is recommended to be 10' wide (parallel to the roadway), and 4' deep (perpendicular to the roadway). Finally, landing pads and clear zones should not be obstructed by any physical features such as utility poles, sign poles, trees, newspaper machines, etc.

For CARTA, the standard depth for poured concrete or asphalt landing pads is 4".

Roles and Responsibilities

Role	Responsibilities and Considerations
 <p>BCDCOG/CARTA Staff</p>	<ul style="list-style-type: none"> Coordinate with dev/town planners to make sure all new/upgraded stops have landing pad and that they meet federal guidelines Does not own street and road right-of-way, except within certain Transit Centers Responsible for approving all landing pad designs Responsible for designing or constructing accessible landing pads and paths <i>[when appropriate]</i>
 <p>Other Agency Staff</p>	<ul style="list-style-type: none"> Responsible for designing or constructing accessible landing pads and paths <i>[when appropriate]</i> Coordinate with CARTA for their installation as outlined in Chapter 8 – Bus Stop Modifications
 <p>Developer</p>	<ul style="list-style-type: none"> Responsible for designing or constructing accessible landing pads and paths <i>[when appropriate]</i> Coordinate with CARTA for their installation as outlined in Chapter 8– Bus Stop Modifications

Relevant Appendices

- Appendix D – Bus Stop Accessibility and ADA Standards



BUS STOP SIGNS

Bus stop signs are the most basic element of a bus stop and are vital to the transit customer experience. As such, all bus stops served by CARTA must have consistently maintained bus stop signs, indicating where bus drivers will stop and where riders will board and alight the bus.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Required	Required	TBD	Required	Required

Guidance

This guidance covers: (1) elements and design, (2) placement, and (3) mounting.

Sign Elements and Design

Figure 5-3 shows a potential bus sign design for CARTA. It shows the information that should be visible on all CARTA bus stop signs: bus stop icon and text; route number(s), name(s), direction(s), terminus(es), and service type(s); contact information; transit provider logo and branding; and the bus stop ID code.

Figure 5-3 Bus Stop Sign Elements Mockup

High-visibility colors
Use colors that don't blend into foliage or common building materials in the background. Keep contrast high so that signs are easy to read in different lighting conditions.

Route information
For each route served by this stop, include the route number, name, direction, terminus, and service type if special (e.g., "express"). This tells riders where they will be headed.

Contact information
Include the provider phone number and website. For the phone number, include hours. For the website, point out that real-time information is available. Also, note the availability of real-time information via apps.

Logo and branding
Use transit provider logo, fonts, and colors, so riders don't mix up different types of stops.

Bus stop icon and text
"This is a bus stop!" Make this clear to all riders and potential riders at first glance, without prior knowledge of the provider. The bus icon conveys this information to people regardless of English proficiency.

Bus stop ID code
Include the bus stop ID code at each bus stop. This makes it easier for riders to confirm which stop they're at, and check times using an app.

Note: The above mockup is not intended to be an official sign redesign. It is shown only to convey the key elements that should be visible on all bus stop signs.

Sign Design and Accessibility (ADA)

Transit signs should have letter styles, design, and color choices that are unique to the transit system so that passengers can easily identify bus stops. Customer information on the signs, as discussed earlier, should be legible and clear for all users, including persons with disabilities. According to ADA requirements, letters and numbers should have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10 (Toolkit for the Assessment of Bus Stop Accessibility and Safety, TCRP Report 19, 1996). The characters and background of signs should be contrasting and should have a non-glare finish. When possible, double-sided signs should be used, so the sign is visible from both directions.

Sign Placement

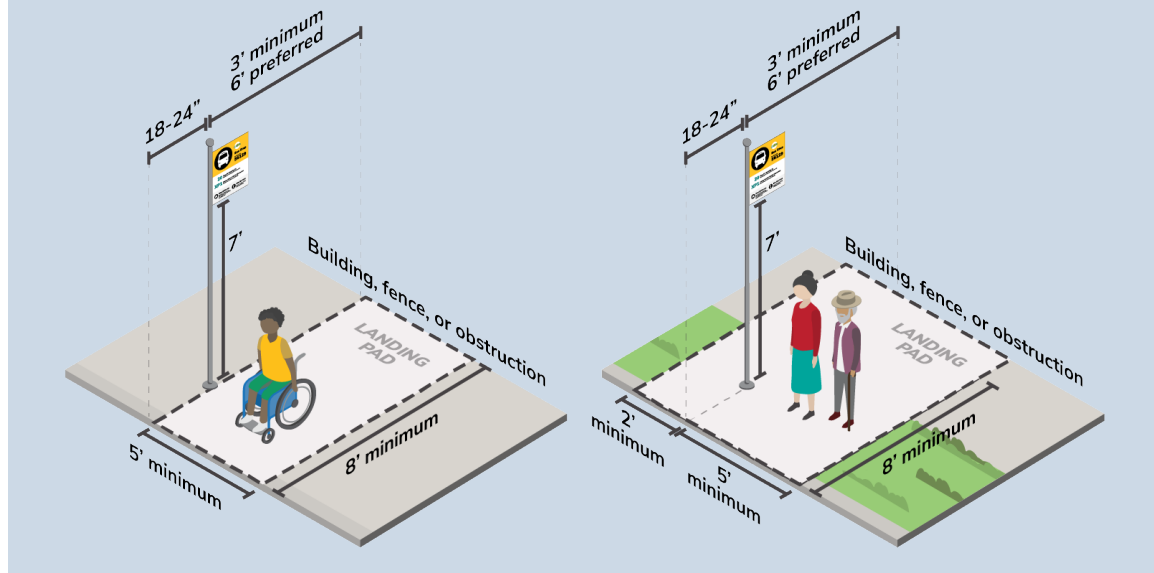
Bus stop signs should be placed where customers board at the front door of the bus, adjacent to the landing pad.

Sign Placement: Inside or Outside the Landing Pad

Figure 5-4 shows minimum dimensions for the placement of a sign with respect to the landing pad of the stop.

If the sign is placed outside the landing pad concrete, then the landing pad must be the standard 5' width, perpendicular to the street (left side of Figure 5-4). However, if the sign is placed *inside* the landing pad concrete, then the minimum landing pad width must be 2' wider (right side of Figure 5-4).




Figure 5-4 Bus Stop Sign Placement



Sign Mounting

Whenever possible, bus stop signs should be mounted on their own post or other approved standard post, such as a square post perforated by holes down its length, to make it easier to recognize for riders with visual disabilities to identify the bus stop. Bus stop sign poles can be installed in pavement or turf grass. BCDCOG recommends that bus stop sign posts be buried below grade a minimum of 2 feet, but signs can be surface mounted as needed.

Roles and Responsibilities

Role	Responsibilities and Considerations
 <p>BCDCOG/CARTA Staff</p>	<ul style="list-style-type: none"> Provide, install, and maintain a bus stop sign at every bus stop
 <p>Other Agency Staff</p>	<ul style="list-style-type: none"> Coordinate with CARTA for pole placement and installation in the public right-of-way, as outlined in Chapter 6 – Bus Stop Modifications
 <p>Developer</p>	<ul style="list-style-type: none"> Coordinate with CARTA for pole placement and installation in the private right-of-way, as outlined in Chapter 6 – Bus Stop Modifications

Relevant Appendices

- Appendix D – Bus Stop Accessibility and ADA Standards



LIGHTING

Adequate lighting is important for passenger comfort and security, as well as to improve the visibility of waiting passengers to approaching bus drivers and other oncoming traffic.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Required	Required	TBD	Required	Preferred

Guidance

Almost all bus stops are served after dark or during inclement weather and should ideally be located to take advantage of existing street lighting or other outside facility lighting. If that is not possible, lighting should be installed at the stop, either via mounted lights or within shelters.

When possible, efforts should be made to reduce the presence of shadows and dark enclosures in and around the bus stop




Once bus stop lighting is installed, it is important to ensure that all bus stop lights work. Members of the public may report damaged lighting and unsafe waiting conditions to CARTA.

Figure 5-5 Examples of Bus Stop Lighting (Charleston, SC and North Charleston, SC)



Solar lights and shelter lights installed at CARTA stops.

Roles and Responsibilities

Role	Responsibilities and Considerations
 <p>BCDCOG/CARTA Staff</p>	<ul style="list-style-type: none"> ▪ Fund, install, and maintain integrated bus shelter lighting and sign-mounted solar power lights at bus stops
 <p>Other Agency Staff</p>	<ul style="list-style-type: none"> ▪ Install and maintain overhead street lamps at bus stops ▪ Coordinate with CARTA for placement and installation, as outlined in Chapter 6– Bus Stop Modifications
 <p>Developer</p>	<ul style="list-style-type: none"> ▪ Install and maintain adjacent lighting at bus stops ▪ Coordinate with CARTA for placement and installation, as outlined in Chapter 6 – Bus Stop Modifications

Relevant Appendices

- Appendix E –Solar Lighting Specifications



REAL-TIME INFORMATION

Real-time information (RTI) shows riders when a bus will reach a given stop, based on the actual vehicle’s location. RTI enables riders to spend less time waiting for the bus and anticipate arrival times more accurately—even when a bus is delayed. Furthermore, when the underlying RTI data is open source, third-party developers can integrate it into websites and smartphone apps.

RTI can be available at bus stops in the form of digital signage (Figure 5-6). This is especially useful for riders who do not own a smartphone. However, riders who can access RTI through a smartphone app will nonetheless find it easier to check available options on a larger screen.

Real-Time Information Displays are Currently Being Expanded

Real-time information displays are not currently installed at any CARTA stops, but the agency is in the process of deploying the boards at select high-ridership locations.



Figure 5-6 Real-Time Arrival Information Board mounted to CARTA Bus Stop



Where They’re Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Required	Preferred	TBD	Required	Optional

Roles and Responsibilities

Role	Responsibilities and Considerations
 <p>BCDCOG/CARTA Staff</p>	<ul style="list-style-type: none"> ▪ Fund, install, and maintain real-time information displays at bus stops
 <p>Other Agency Staff</p>	<ul style="list-style-type: none"> ▪ Municipal planners approve shelters [where appropriate. See Page 6-10 (on Encroachment Permits, Private Property Use Agreements, and Municipal Review Committees for additional information on municipal review committees.)]

Relevant Appendices

- Appendix D –Digital Sign Specifications



ENHANCED PASSENGER INFORMATION

Enhanced passenger information at stops includes schedules, system and route maps, and local area maps. These are important because:

- Schedule information at bus stops helps reduce some of the uncertainty associated with taking the bus.
- Transit system maps can assist passengers in determining the best routing for their trip—including identifying transfer locations. System maps can also act as low-cost advertising and help potential customers understand how they can use transit services.
- Local area maps provide neighborhood context for transit riders unfamiliar with a given location and can alert regular users to previously overlooked destinations and transfer opportunities.

Community Input: More Passenger Information at Key Stops

Community input has revealed a preference for more system information, particularly at stops near major activity centers.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Required	Required	TBD	Required	Preferred

Guidance

This section provides guidance on: (1) schedule information, (2) system and route maps, and (3) local area maps and information.

Schedule Information

CARTA should provide relevant route schedules at select bus stops. In the case of schedule changes, CARTA will place rider notices at the affected bus stops. Schedule information may be posted in bus shelters at transfer locations and at stops where it is likely that new, visiting, or occasional passengers are likely to interact with the transit network.

System and Route Maps

Most high ridership stops, especially stops that are major transfer locations, should have some form of a transit system map. CARTA will provide system-wide or route-specific maps at selected bus stops depending on the services available at a given stop. Maps should be prioritized at stops with high volumes of transfers and where new, visiting, or occasional passengers are likely to interact with the transit network.



Figure 5-7 Transit System Maps Installed at Bus Stops (Charleston, SC)



Local Area Maps and Information

Local area maps often highlight nearby transportation services, such as train stations, and other bus stops. Local area maps may also highlight tourist destinations, government offices, or information centers. Local governments may post area maps and information in bus shelters at transfer locations and at stops where it is likely that new, visiting, or occasional passengers are likely to interact with the transit network. Maps should be prioritized at stops with high volumes of transfers and where new, visiting, or occasional passengers are likely to interact with the transit network.

Roles and Responsibilities

Role	Responsibilities and Considerations
 <p>BCDCOG/CARTA Staff</p>	<ul style="list-style-type: none"> ▪ Fund, install, and maintain printed bus schedules and system and route maps at bus stops
	<ul style="list-style-type: none"> ▪ Fund, install, and maintain print local area maps and information at bus stops ▪ Coordinate with CARTA for placement and installation, as outlined in Chapter 6– Bus Stop Modifications



Other Agency Staff

TRASH CANS

Trash receptacles provide a convenience for waiting riders and help to reduce the amount of trash left on buses and on the street.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Required	Required	TBD	Required	Preferred

Guidance


Trash cans should be within easy reach of the bus stop waiting area but must not block accessible paths, landing pads, bus door opening zones, shelters, or posted information. Trash cans should be secured to the ground to prevent accidental tipping or unauthorized movement. Trash cans on the ground typically require a 2' by 2' footprint.

Trash receptacle design should be consistent with the design of the other bus stop amenities. There are multiple types of trash cans in use across bus stops in the region. CARTA installs two types of receptacles: landscape trash receptacles, which are attached to signposts, and shelter trash receptacles. The Town of Mount Pleasant and the City of Charleston use streetscape trash cans to service bus stops.

Figure 5-8 Trash Can at a CARTA Bus Stop



Roles and Responsibilities

Role	Responsibilities and Considerations
 BCDCOG/CARTA Staff	<ul style="list-style-type: none"> ▪ Fund and install CARTA Standard Trash Receptacles at bus stops ▪ Maintain CARTA-installed trash receptacles at appropriate intervals to ensure bus stops remain comfortable for those waiting for the bus



Other Agency Staff

- May fund and install municipal or custom trash receptacles at bus stops
- Maintain municipal or custom trash receptacles at appropriate intervals to ensure bus stops remain comfortable for those waiting for the bus
- Coordinate with CARTA for placement and installation, as outlined in Chapter 6 – Bus Stop Modifications

Relevant Appendices

- Appendix E – Trash Receptacle Specifications



BENCHES AND SEATING

Providing seating at bus stops significantly enhances the experience of waiting for a bus. Benches are the most typical type of seating, but alternatives such as low walls, leaning rails or bollards can also be used. Seating also presents an opportunity to integrate art or advertising into bus stop design.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Required	Required	TBD	Required	Preferred

Guidance

All benches and leaning rails installed by CARTA or local governments must meet ADA requirements. Benches must not block accessible paths and landing pads, bus door opening zones, shelters or posted information.

Benches should provide a level of comfort appropriate for the typical wait and constructed of materials that will not be excessively hot in direct sunlight. Seating exposed to the elements can sometimes be placed under trees or near buildings to provide shade. Seating should be secured to a poured foundation and incorporated within shelters when possible. **The standard depth for poured concrete or asphalt foundations beneath benches is 4”.**

CARTA encourages local governments and private entities to install benches at bus stops to increase passenger comfort, especially at stops with long wait times and at stops frequented by older adults, people with disabilities, and children.

Figure 5-9 CARTA-Approved Bus Stop Benches in the Charleston region





Figure 5-10 CARTA-Approved Leaning Rail Design(Source: BASCO)



CONTOUR (LR-CO)

Roles and Responsibilities

Role	Responsibilities and Considerations
 BCDCOG/CARTA Staff	<ul style="list-style-type: none"> ▪ Fund and install only CARTA Standard Benches attached to bus shelters ▪ Maintain all bus stop seating
 Other Agency Staff	<ul style="list-style-type: none"> ▪ May fund and install municipal or custom seating at bus stops ▪ Coordinate with CARTA for placement and installation of bus stop seating, as outlined in Chapter 6 – Bus Stop Modifications

Relevant Appendices

- Appendix E – Bench Specifications and Leaning Rail Specifications



SHELTERS AND SHADE

Bus shelters protect transit riders from the elements, provide seating for waiting passengers, and help to identify stop locations. Aside from buses, they are one of the most visible elements of a transit system. As such, attractive and well-designed shelters can help enhance public perceptions of transit and function as advertisements for available services. Similar to benches, shelters also present an opportunity to integrate art or advertising into bus stop design.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Preferred	Required	TBD	Preferred	Preferred

Guidance

Shelters

A number of different shelters are currently in use in the BCDCOG region, including the CARTA standard shelter and standard shelters unique to municipalities. Shelter specifications are not consistent across the system due to various municipal and historic district regulations. Appendix E – Shelter Specifications describes the specific requirements and specifications related to shelters in the historic district of Charleston and all relevant municipalities.

Figure 5-11 Standard CARTA Shelter



CARTA pays for the baseline costs of its approved shelter described in Appendix E – Shelter Specifications. All costs above the baseline costs of the approved shelter design must be borne by the entity requesting or requiring the shelter.

Additionally, all shelter guidelines discussed in Appendix E exist in addition to ADA guidelines. Shelters must not block accessible paths and landing pads, bus door opening zones, shelters or posted information. All shelters must meet Federal ADA requirements. A clear path to access the shelter, minimum 3' wide, must be available to provide access for pedestrian and people using mobility devices.

All proposed shelter locations must be evaluated by CARTA to ensure installation feasibility and accessibility, for each shelter type requires different minimum site envelopes. All shelters must be constructed to be durable and easy to maintain. Shelters must be built on and secured to a reinforced concrete foundation; CARTA requires that the poured foundation for its standard shelter be 8” deep reinforced concrete. Poured foundations for historic shelters must be 12” deep reinforced concrete. Poured foundations for custom shelters must be 4” deep with an 18” edge around the perimeter, and they must also include a “turn down” edge and 4 12” x 30” depth footers of reinforced concrete. Bus shelters should provide a clear line of sight to approaching buses and ensure that waiting passengers are visible to bus operators and other street users.

Shade

Amenities that offer shade from the sun but not shelter include building overhangs, awnings, and trees. Addition shade options include cantilever shade structures like “shade sails” which provide shade over areas that require unobstructed spaces. CARTA does not currently fund, install or maintain shade structures other than the CARTA standard shelter. Local governments or private entities interested in providing alternative shade structures must coordinate with CARTA staff to evaluate implementation and feasibility.





Figure 5-12 Shade Sails at Avondale Park & Ride (Avondale, Arizona)



Figure 5-13 Building Overhang used for Shade at North Charleston Super Stop)



Roles and Responsibilities

Role	Responsibilities and Considerations
 <p>Community</p>	<ul style="list-style-type: none"> ▪ Members of the public may report damaged shelters to CARTA. ▪ Residents, businesses, property owners, and civic groups may take an active role in keeping shelters clean through the Adopt-A-Stop Program. ▪ Members of the public may request a shelter at a stop.
 <p>BCDCOG/CARTA Staff</p>	<ul style="list-style-type: none"> ▪ Fund and install CARTA standard shelters at locations chosen using the Shelter Scoring Criteria described in Chapter 8 – Implementation. ▪ If shelter is being installed by a local government, a developer or in private right-of-way, coordinate with the relevant parties for installation as outlined in Chapter 6 – Bus Stop Modifications ▪ Maintain all shelters within the bus stop network
 <p>Other Agency Staff</p>	<ul style="list-style-type: none"> ▪ Fund and install upgrade shelters ▪ Coordinate with CARTA for their installation as outlined in Chapter 6 – Bus Stop Modifications
 <p>Developer</p>	<ul style="list-style-type: none"> ▪ Fund and install CARTA approved and upgraded shelters ▪ Coordinate with CARTA for their installation as outlined in Chapter 6 – Bus Stop Modifications

Relevant Appendices

- Appendix E –Shelter Specifications



BICYCLE RACKS

Bicycle racks help to provide an additional way for passengers to access bus service. At most bus stops in the BCDCOG region, outdoor unsheltered bike racks are an appropriate solution for short-term bike parking. Short-term bike parking serves those who leave their bicycles for relatively short periods of time, typically for shopping or errands, eating or recreation. Unsheltered bicycle racks provide a high level of convenience by being readily visible and moderate level of security.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Preferred	Preferred	Required	TBD	Preferred	Optional

Guidance

Unsheltered bike racks are a common and affordable way to provide short-term parking. While there is a large range of bike storage solutions, “inverted-u” racks with a square tube are CARTA’s approved design for outdoor, unsheltered bike racks at bus stations. “Inverted-u” designs make for easy bike parking by giving bikes full support and multiple locking points for a u-style bike lock, in accordance with the guidelines of the Association of Pedestrian and Bicycle Professionals.

Figure 5-14 Square Tube Bicycle Racks at Bus Stop (North Charleston, SC)






Specifications related to the CARTA approved bicycle rack are available in Appendix E. Bicycle racks at bus stops may be installed and maintained by CARTA, local governments or private entities. SCDOT does not install or maintain bike racks at transit stops. Both CARTA and the City of Charleston use square tube “inverted-u” racks as their standard bike rack.

Bicycle racks should be within easy reach of the bus stop waiting area but must not block accessible paths and landing pads, bus door opening zones, shelters or posted information. They should be sited in areas with adequate lighting to discourage theft.

Bicycle racks should be affixed to a paved surface. For CARTA, **the standard depth for poured concrete or asphalt bicycle rack foundations is 4”**. If multiple bicycle racks are installed, they must be placed at least 3 feet apart to allow convenient access. Where multiple rows of racks are installed to form a “bicycle parking lot,” there should be 4 feet between each row, measured from tire to tire.

Roles and Responsibilities

Role	Responsibilities and Considerations
 BCDCOG/CARTA Staff	<ul style="list-style-type: none"> ▪ Fund and install CARTA standard bike racks at high need locations ▪ If a bike rack is being installed by a local government, a developer, or by CARTA in private right-of-way, coordinate with the relevant parties for installation as outlined in Chapter 6 – Bus Stop Modifications ▪ Maintain CARTA-installed racks within the bus stop network
 Other Agency Staff	<ul style="list-style-type: none"> ▪ Fund and install municipal bike racks ▪ Coordinate with CARTA for their installation as outlined in Chapter 6 – Bus Stop Modifications
 Developer	<ul style="list-style-type: none"> ▪ Fund and install bike racks ▪ Coordinate with CARTA for their installation as outlined in Chapter 6 – Bus Stop Modifications

Relevant Appendices

- Appendix E – Standard Bike Rack Specifications



FARE MACHINES

Fare machines, also known as ticket vending machines (TVMs) are secure electronic kiosks that allow passengers to purchase single fares and passes. The installation of fare payment/purchase equipment at bus stops can improve customer convenience and service reliability by reducing on-board cash transactions and bus stop dwell times.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Optional	Optional	Optional	TBD	Optional	Optional

Guidance

There are currently no fare machines at transit stops within the BCDCOG region. To be effective, fare payment equipment should be located in close proximity to the bus boarding areas and instructional signage must be provided. Fare machines must not block accessible paths and landing pads, bus door opening zones, shelters, or posted information.


Fare machines must incorporate braille or other tactile labels for buttons and keys and audible instructions for how to use the machine. Operable parts of fare machines must be placed at a height between 34 and 48 inches to accommodate passengers using mobility devices.

Off-board fare payment vending machines typically require a 10' by 10' footprint for two machines and should be semi-enclosed for protection from the elements. Additionally, fare payment equipment requires both power and communication connections as well as video surveillance. It is increasingly feasible to have these machines be solar-powered with wireless communications.

Figure 5-15 Off-Board Payment Equipment (New York, NY)



Roles and Responsibilities

Role	Responsibilities and Considerations
 <p>BCDCOG/CARTA Staff</p>	<ul style="list-style-type: none"> ▪ Fund, install, and maintain fare machines at select transit stops ▪ Coordinate with utility providers for electric and internet connections ▪ Coordinate with public or private partners for equipment installation as outlined in Chapter 6 – Bus Stop Modifications



ELECTRIC BUS CHARGERS

As many transit fleets convert to electric vehicles, agencies increasingly have the need to install on-street chargers to charge electric buses during layover periods. After receiving several discretionary grants and matching funds from BCDCOG, CARTA has a CIP in place to replace its fixed route transit bus fleet with battery electric buses and will have 28 in service by the end of 2022. CARTA is developing an Electric Bus Master Plan to identify charging infrastructure needs and placement. CARTA's Shipwatch Square transit center in North Charleston is planned to have overhead bus chargers.

The overhead chargers require an adjacent power cabinet that transforms the power, as well as the charge pole, a roughly 17' high structure that brings the power to the electrical port in the roof of the vehicle.

Overhead chargers are suitable in layover locations where agencies store vehicles in between runs (this includes transit centers and Park & Rides), and they typically require a 5' by 5' area on the sidewalk for the power cabinet and a 3' by 3' area on the sidewalk for mounting the charge pole.

Figure 5-16 Example Overhead Charger Built by ABB



The power cabinet is in the background to the left of the vehicle.



SAFETY AND SECURITY ELEMENTS

In addition to lighting, elements video surveillance can contribute to making bus stops feel more safe and secure.

Where They're Required

Transit Center	Transfer Stop	Park & Ride	LCRT Station	High Activity Stop	Standard Stop
Required	Optional	Required	TBD	Optional	Optional

Guidance

A key consideration for implementing video surveillance at stops is the supporting infrastructure, which would require at least a power source. Consideration also should be given to connectivity to monitoring systems. Alternatively, the use of CCTV by businesses proximate to bus stops or shelters should be considered.

The use of communication systems at bus stops may enhance security. If cell phones are prevalent in a system, then a security program advising whom to call to report suspicious activity or actual criminal events could benefit passengers. Additionally, improving stops design to avoid blind spots and improve visibility can also help make waiting for the bus feel safer.

6 BUS STOP MODIFICATIONS

This chapter explains how bus stop modifications take place. It focuses on when modifications typically occur, and what the process is.

CARTA attempts to locate bus stops where they will be most convenient, accessible, and safe. Nonetheless, sometimes changes are necessary.

Bus stop modifications may originate through a CARTA analysis of local conditions using the guidelines in this section, or by request from elected officials, community organizations, transit riders, or property owners.

Changing a bus stop can be a complex process that involves access, safety, and operational efficiency. It also requires analysis and coordination among stakeholders. Ultimately, factors related to access, safety, and security for people who use the street may take priority and override the concerns of property owners when determining transit stop locations.

The modifications listed in this chapter include: (1) modifying amenities at an existing bus stop, (2) adding bus stops, (3) relocating bus stops, (4) removing bus stops, and (5) modifications during construction. This chapter also covers different types of encroachment permits involved in bus stop modifications.

CARTA Is Here to Help

CARTA receives requests year-round and implements modifications to bus stops on an as-needed and approved basis.

To make a bus stop-related request for CARTA, email Transit Planning at belenv@bcdcog.com or call BCDCOG at (843) 529-0400.





MODIFYING AMENITIES AT AN EXISTING BUS STOP

ADD, REMOVE, MOVE, OR OTHERWISE CHANGE AMENITIES—SUCH AS SEATING, LIGHTING, OR A SHELTER—AT A BUS STOP THAT ALREADY EXISTS.

When Might this Happen?

- A member of the public or a property developer requests a modification to amenities at an existing bus stop. Any member of the public can make such a request.
- CARTA determines through a planning effort that modifying amenities at existing bus stops is desired.
- SCDOT or a local municipality or county requests a modification to amenities at an existing bus stop based on state or local planning efforts, or as part of a roadway project.

What’s the Process?

Step	 Community	 BCDCOG/ CARTA Staff	 Other Agency Staff	 Developers
Send a request for modifications to amenities at an existing bus stop (or stops). The request can come from a community member, property developer, municipality, county, SCDOT, or CARTA.	✓	✓	✓	✓
Use the Bus Stop Amenities Scoring process (see Chapter 8) to determine whether it is appropriate to make the requested modifications.		✓		
If the modification request is approved, CARTA staff will manage implementation.		✓		

ADDING BUS STOPS





ADD A NEW BUS STOP TO AN EXISTING BUS ROUTE.

Today, CARTA bus stops are generally spaced at appropriate distances to balance access and efficiency. While it is neither feasible nor efficient for every origin and destination point in the transit network to have a bus stop directly in front of it, there are instances where CARTA might consider adding a new stop to a bus route.

When Might this Happen?

- A member of the public or a property developer requests a modification to amenities at an existing bus stop. Any member of the public can make such a request.
- CARTA determines through a planning effort that modifying amenities at existing bus stops is desired.
- SCDOT or a local municipality or county requests a modification to amenities at an existing bus stop based on state or local planning efforts, or as part of a roadway project.

What’s the Process?

Step	 Community	 BCDCOG/ CARTA Staff	 Other Agency Staff	 Developers
Send a request for bus stop addition. The request can come from a community member, property developer, municipality, county, SCDOT, or CARTA.	✓	✓	✓	✓
Evaluate a potential new location for an existing stop based on access, safety, and operational efficiency factors (see below call out box and Chapter 2 – Bus Stop Placement)		✓		
If the addition request is approved, CARTA staff will manage implementation.		✓		

All new stops must improve the transit network as a whole by strategically improving access to bus routes while maintaining operational efficiencies that enable passengers to reach their destinations quickly and reliably.

New Bus Stops: What Does CARTA Take into Account?

CARTA considers the following factors related to access, safety, and operational efficiency, when evaluating proposed new bus stop locations.

ACCESS

- Transit need, defined by demographics, socioeconomics, and other criteria;
- Access to (and at) the proposed stop in compliance with the Americans with Disabilities Act (ADA), including the boarding and alighting area, sidewalks, curb ramps, and pedestrian crossings;
- Equity, as defined and measured by Title VI of the Civil Rights Act of 1964;
- Amenities, including the feasibility of installing seating or a shelter;
- Block lengths, street connectivity, presence of controlled pedestrian crossings, and topography around the proposed stop;
- Curb space uses (i.e. loading, parking) and available curb space for buses to dwell.

SAFETY

- Lighting, visibility, and protection from vehicle traffic for waiting passengers;
- Presence of controlled pedestrian crossings;
- Ease of bus movement in and out of the proposed stop;
- Volumes and movements of traffic other than transit.

OPERATIONAL EFFICIENCY

- Routes that would serve the proposed stop, including their service type (Fixed, Commuter, DASH, Neighborhood Circulator) and their frequency of service;
- Land uses surrounding the proposed stop and their suitability for transit service;
- Spacing between adjacent stops and compliance with the Bus Stop Spacing Guidelines (See Chapter 2 - Bus Stop Placement)
- Travel time and dwell time effects on bus operations and passengers' trips;
- Potential ridership, primarily in the form of passengers who currently do not have adequate access to the transit network.

RELOCATING BUS STOPS





MOVE THE LOCATION OF AN EXISTING BUS STOP.

Most CARTA stops are located within the public right-of-way on public property. CARTA strives to provide safe, efficient, reliable transportation to as many people as possible. The relocation of a bus stop is a complex and costly process that involves a variety of safety and operational considerations, requiring input and cooperation from internal and external stakeholders. Relocating a bus stop is a decision that should not be made lightly.

When Might this Happen?

- CARTA determines that there is a major safety concern at an existing bus stop that is best resolved through relocation (based on the factors listed under “Safety” on the previous page.)
- CARTA determines through a planning effort that there is an opportunity to improve the safety, accessibility, or operational efficiency of a bus stop or route by relocating an existing bus stop.
- SCDOT or a local municipality or county requests the relocation of an existing bus stop based on state or local planning efforts, or as part of a roadway project.
- A property developer requests the relocation of an existing bus stop to provide more convenient access to residents, visitors or employees.

What’s the Process?

Step	 Community	 BCDCOG/ CARTA Staff	 Other Agency Staff	 Developers
Send a request for relocating an existing bus stop (or stops). The request can come from a community member, property developer, municipality, county, SCDOT, or CARTA.	✓	✓	✓	✓
Evaluate a potential new location for an existing stop based on access, safety, and operational efficiency factors.		✓		
If relocation request is approved, CARTA will coordinate.		✓		

REMOVING BUS STOPS

REMOVE A SINGLE BUS STOP OR SEVERAL BUS STOPS ON A STREET SEGMENT OR ROUTE.

When Might this Happen?

- CARTA determines through a planning effort that one or several bus stops should be removed or consolidated to increase the operational efficiency of a bus route.
- CARTA permanently discontinues a bus service.

What’s the Process?






Step	 Community	 BCDCOG/ CARTA Staff	 Other Agency Staff	 Developers
Analyze the stop or stops for safety, accessibility, transfer points, trip generators, ridership, and spacing guidelines (see Chapter 2- Bus Stop Placement)		✓		
Post a rider notice to notify transit users and the surrounding community of the proposed stop removal 15 days before stop is removed. See figure on next page for an example rider notice.		✓		
Remove bus stop.		✓		

Figure 6-1 Example Rider Notice at Modified Bus Stop




ATTENTION CARTA CUSTOMERS

BUS STOP RELOCATION-EFFECTIVE 02/05/21

#840 St. Andrews Blvd/Sycamore Ave.

Bus Stop #840 will be moved several feet down across Sycamore Ave.
View map below for details.



Visit RideCARTA.COM FOR MORE INFO OR PLEASE CALL CUSTOMER SERVICE -- 724-7420 MENU OPTION 1

Stop Removal or Relocation: What Does CARTA Take into Account?

CARTA considers the following factors related to access, safety, location, ridership and trip generation when evaluating removing or relocating bus stops:

SAFETY/ACCESSIBILITY

It is vitally important that passengers only access the bus network where it is safe to do so. Because street infrastructure is the responsibility of the state, county, and/or local jurisdictions' departments of transportation, CARTA can make only minor accessibility improvements at bus stops. Bus stops without a safe waiting area, sidewalks, crosswalks, or lighting may be relocated to safer and more accessible locations.

For example, a stop on St. Andrews Boulevard at Sycamore Avenue was shifted from near-side to far-side to be located adjacent to a crosswalk that allows riders to more safely cross St. Andrews Boulevard (Figure 6-2 shows the stop before it was relocated. The crosswalk is visible in the left of the image).

Figure 6-2 Stop at St Andrews Blvd / Sycamore Ave Before Relocating for Safety and Access Reasons



TRANSFER POINTS

For the transit network to operate efficiently and effectively, passengers must be able to connect between services. Bus stops should be maintained at locations where passengers can connect to Tri-County Link and other transit providers. Bus stops may be retained at transfer points even if they do not meet spacing guidelines.

RIDERSHIP

Because CARTA has limited resources it is sometimes necessary to discontinue service to bus stops that are used by only a small number of passengers. Stops with less than five boardings and alightings per day may be considered for removal if it is not needed to meet the Bus Stop Spacing Guidelines in Chapter 2.

A bus stop with more than 100 boardings and alightings per day is a useful stop that should be retained. However, even stops that have more than 100 passengers a day may be removed when they are close to another stop, adjacent to a stop that functions as a transfer point, or adjacent to a stop with greater capacity for waiting passengers or amenities such as a bus shelter.

TRIP GENERATORS AND SPECIAL CONSIDERATIONS

Many origins and destinations in the transit network are very important to serve as directly as possible. Before removing a stop, consideration is given to nearby schools and universities, healthcare facilities, services and dense housing for people with disabilities and older adults, large employers, community centers, and other major points of interest. Bus stops near some trip generators may be retained even if they do not meet spacing guidelines.

MODIFICATIONS DURING CONSTRUCTION

Construction and maintenance near bus stops, whether related to public infrastructure or private development, is inevitable. It is vital that state and local government agencies and private developers coordinate with CARTA to ensure that passengers can safely access the transit network during periods of construction or maintenance.

Requirements for construction and maintenance near bus stops:

- In accordance with SCDOT Complete Streets regulations, work zone traffic control plans must address all modes of travel that are currently accommodated within the limits of the construction project. This may require appropriate design features to adequately maintain existing accommodations during construction.¹
- Traffic control devices, including variable message signs, must not interfere with accessible paths to bus stops. If a traffic control device must block access to a bus stop, then an accessible temporary bus stop must be established during construction.
- Where an alternative route to an existing bus stop cannot be provided, work zone traffic control plans² must include a temporary bus stop. Temporary bus stops must be accessible to passengers with disabilities, with accessible boarding and alighting and waiting areas, and signage and notice must be provided to passengers.
 - A temporary bus stop should be signed by posting a temporary bus stop sign provided by CARTA
 - Local government agencies and private developers may mount a temporary bus stop sign on a temporary support they provide during construction.

Guidelines for construction and maintenance near bus stops:

- CARTA should be involved in the planning of traffic control during construction. CARTA seeks to minimize delay for passengers when creating detours, but street closures are not within its jurisdiction.
- Pedestrian routes during construction should be located on the same side of the street as the construction activity to reduce pedestrian crossings.

¹ Source: SCDOT <http://info2.scdot.org/SCDOTPress/PublishingImages/DD%2028%20Complete%20Streets.pdf>

² Detailed here: https://www.scdot.org/inside/pdfs/WZTCM/Work_Zone_Traffic_Control_Manual.pdf

ENCROACHMENT PERMITS, PRIVATE PROPERTY USE AGREEMENTS, AND MUNICIPAL REVIEW COMMITTEES

If a bus stop is approved to be moved or added according to the above guidelines, CARTA may have to obtain an encroachment permit, private property use agreement, and/or approval by municipal review. A bus stop modification may be subject to one or more of the following requirements. CARTA is available to assist with directing any relevant parties to the correct and relevant permitting websites described below:

Private Property Use Agreement

If a change will impact private property—e.g., a bus stop landing pad and shelter will encroach onto the land of a privately owned commercial site—CARTA will seek an Agreement with the property owner to either own or lease the land that the bus stop will occupy. CARTA, the property owner, the engineering firm CARTA hires to design and build the bus stop, and the municipality where the change is taking place will work together to obtain a permit to make the change.

If a change will impact public property, CARTA must obtain permits from the affected agency or municipality. All possible agencies and municipalities are listed below:

SCDOT Encroachment Permit

As of 2021, approximately three-quarters of CARTA bus stops are located on state roads. In the event that a stop is added or moved on a SCDOT road, and the stop involves a major capital improvement, CARTA must obtain an Encroachment Permit from SCDOT. The Encroachment Permit form and drawings are submitted for review to SCDOT, which reviews the submission for safety concerns, site visibility issues and traffic controls. Following rounds of review and changes, SCDOT will issue an Encroachment Permit. Guidelines and checklists for obtaining an Encroachment Permit from SCDOT are available online at <https://www.scdot.org/business/permits.aspx>. SCDOT maintains a “Street Finder” to help determine if a road is under municipal or SCDOT jurisdiction: <https://ris.scdot.org/RoadwayInformationStreetFinder.aspx>.

County of Charleston Encroachment Permit

Most CARTA bus stops are located in Charleston County. Where bus stops are sited to encroach on Charleston County public property, an encroachment permit is needed. Following rounds of reviews and changes to an application for an encroachment permit, the Charleston County Department of Public Works will issue an encroachment permit.

Application and instructions for an encroachment permit in Charleston County are available online: <https://www.charlestoncounty.org/departments/public-works/index.php>

City of Charleston Design Review Committee

As of 2021, approximately 375 of CARTA's stops are located in the City of Charleston (see Figure 6-3 and Figure). The Design Review Committee (DRC) is special to the City of Charleston. DRC has approved the new and historical shelter design used at CARTA bus stops (see Appendix E – Shelter Specifications) and is tasked with approving any major elements of a bus stop improvement located south of Line Street (the historic district) within the City of Charleston. Following rounds of review and changes, DRC will issue a final approval. DRC processes and procedures are available online: <https://www.charleston-sc.gov/DocumentCenter/View/1336/DRC-process-and-application-form?bidId=>.

Town of Mt. Pleasant Design Review Team

As of 2021, approximately 85 of CARTA's stops are located in Mt. Pleasant (see Figure 6-3 and Figure). Mt. Pleasant's Design Review Team (DRT) is charged with reviewing CARTA's bus stop site plans. DRT is tasked with approving any site plans for modified bus stops. Following rounds of review and changes, DRT will issue a final approval. DRT processes and procedures are available online: <http://www.tompssc.com/1170/Development-Review-Team>.

Town of James Island Encroachment Permit

An application is required when any type of work is proposed within a Town of James Island right-of-way or easement. The Town of James Island Encroachment Permit application is available online: <https://www.jamesislandsc.us/Data/Sites/1/media/public-works-forms/encroachment-permit-application.pdf>

City of North Charleston Permit

As of 2021, approximately 345 of CARTA's stops are located in North Charleston (see Figure 6-3 and Figure 6-4). If a site plan is along a North Charleston street, CARTA must work with the City to obtain an encroachment permit. Following rounds of review and changes to CARTA's site plan, the City will issue an Encroachment Permit. City of North Charleston encroachment permit processes and procedures are available online: <https://www.northcharleston.org/business/construction-and-development/permits/encroachment-permit/>.

Figure 6-3 Bus Stops by Municipality

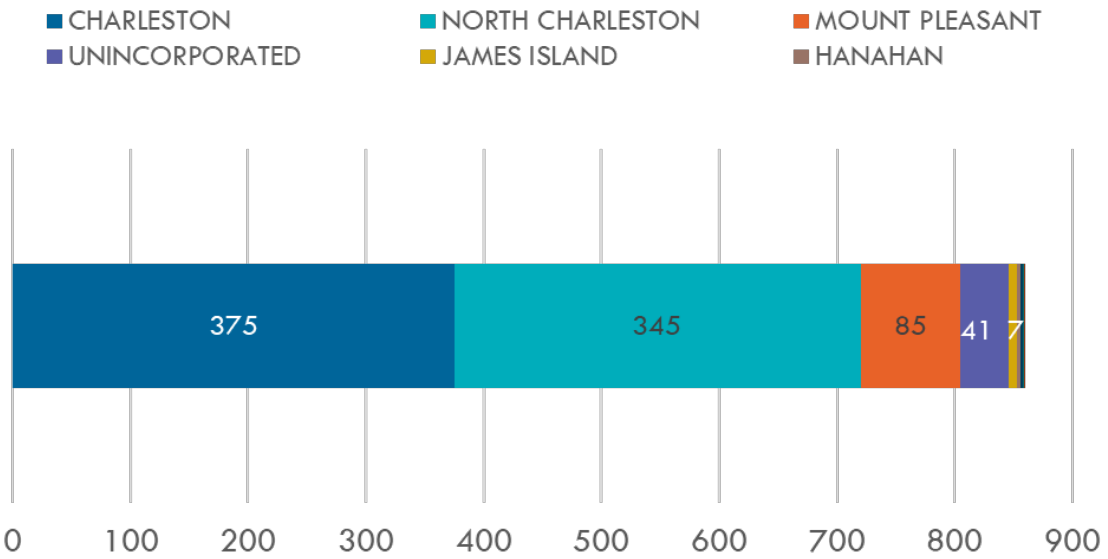
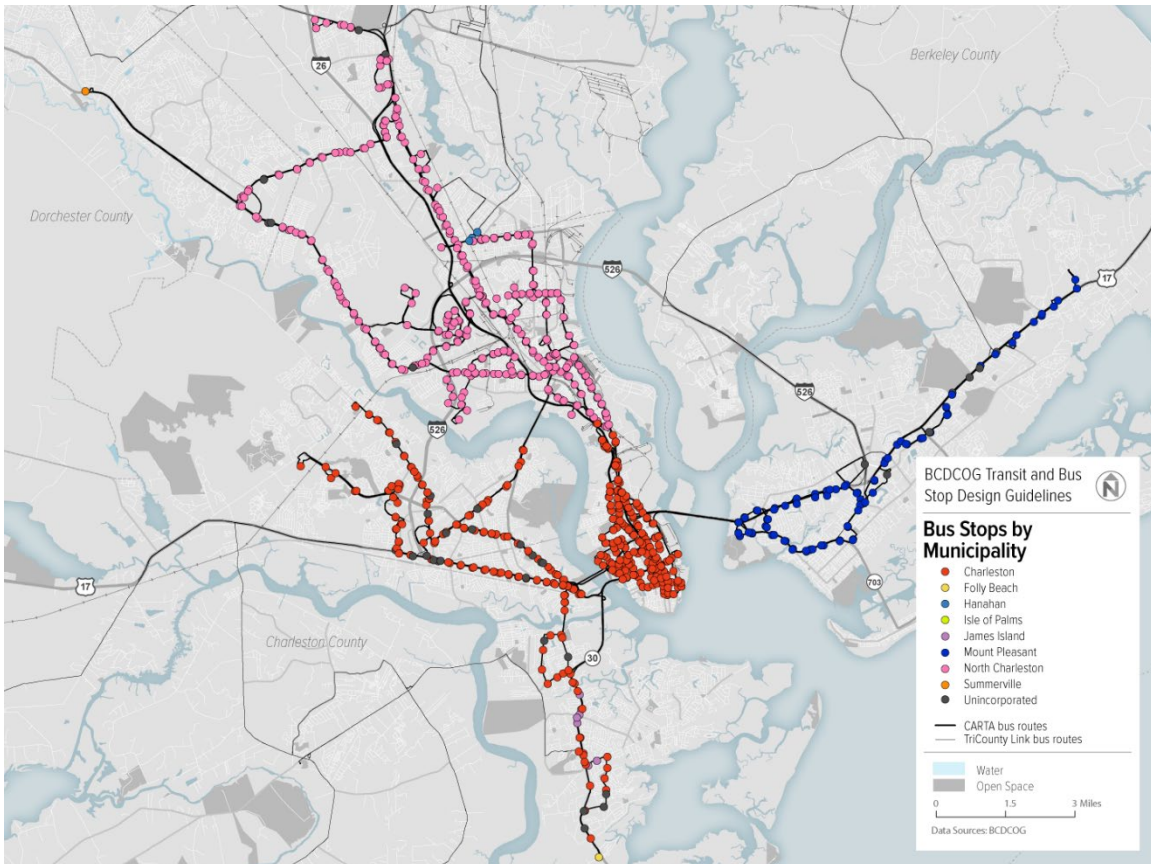


Figure 6-4 Map of Bus Stops by Municipality



7 OPERATIONAL CONSIDERATIONS

This section covers relevant technical and engineering considerations associated with transit operations: (1) vehicle dimensions, (2) turn radii, (3) visibility, (4) lane widths, and (5) coordination with other curb uses.

VEHICLE DIMENSIONS

Any space that will be served by a CARTA bus should consider the height, width, and length of vehicles to ensure safe accommodation. CARTA currently operates a fleet of standard transit buses in two sizes: 35 feet and 40 feet. CARTA has programmed 60' buses to come online in the future, and they will fit within the operational limitations described here. Most buses operated in CARTA's service area are 35' in length. Most buses are equipped with bicycle racks, front wheelchair ramps and a front-end kneeling feature that reduces step height for mobility-impaired patrons. CARTA owns and operates Tel-A-Ride, the regional paratransit service. At several bus stop locations, the curb space is shared by both standard transit buses and paratransit vehicles.

The most common lifts used on buses are conventional wheelchair lifts. Since the wheelchair lift may be at the front or rear door, bus stop designs need to allow for either possibility. The length of the ramp typically extends 2 to 3 feet from the edge of the bus for a standard height curb.

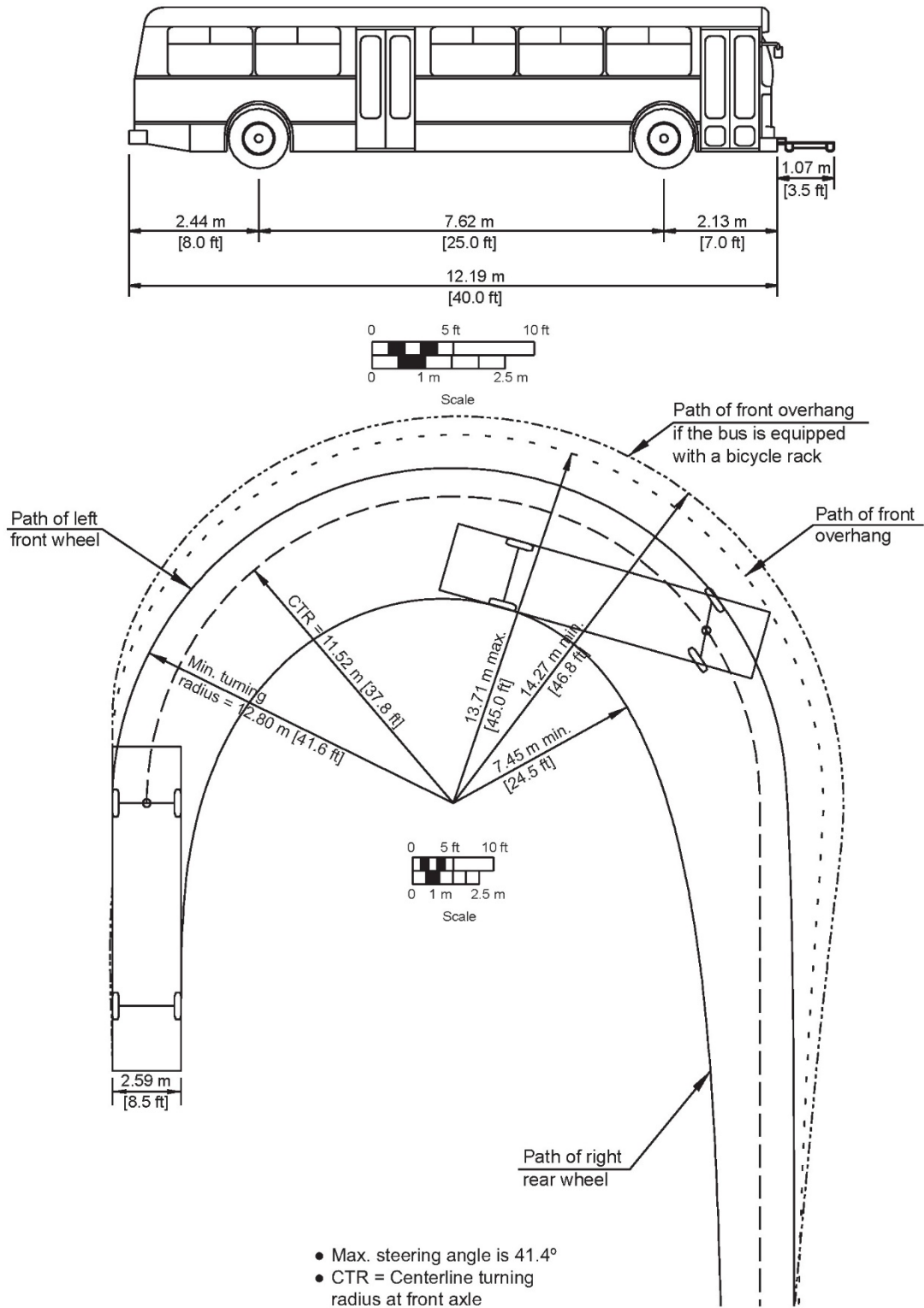
TURN RADII

Because transit vehicles make wide turns, properly designing or modifying the geometry of an intersection through corner radii, stop lines, and on-street parking helps minimize conflicts among buses, cars, bicycles, and pedestrians. Minimizing turning speeds is also critical to the safety of pedestrians, who are the most vulnerable street users.

Standards for turning radius can vary depending on the effective radius of each bus and other factors such as whether a bicycle lane or parking lane is available or if traffic volumes are so low as to allow transit vehicles to make full use of either or both of the departure or receiving lanes. Design considerations for designing turning radii include:

- Turning speeds should be limited to 15 miles per hour or less, with turn radii as small as is feasible.
- Since 30'-, 35'-, and 40' buses are used throughout the region, all future transit designs shall accommodate the AASHTO standard 40' city bus to accommodate fleet flexibility and future needs.
- Curb radii on dense urban grid streets where buses operate should be designed with a target radius of 20-30 feet.
- Parking may need to be restricted close to a street corner to achieve the required effective turn radii.
- A stop line on a receiving street may need to be relocated back from an intersection to achieve the required effective turn radii.
- Other modifications to striping at intersections may be made to achieve the required effective turn radii, including shifting through lanes.
- At intersections where buses turn, bus stops for the turning bus route should be located only on the far side of the intersection.

Figure 7-1 Standard 40-Foot Bus Dimensions and Curb Radii Dimensions (AASHTO, 2011)

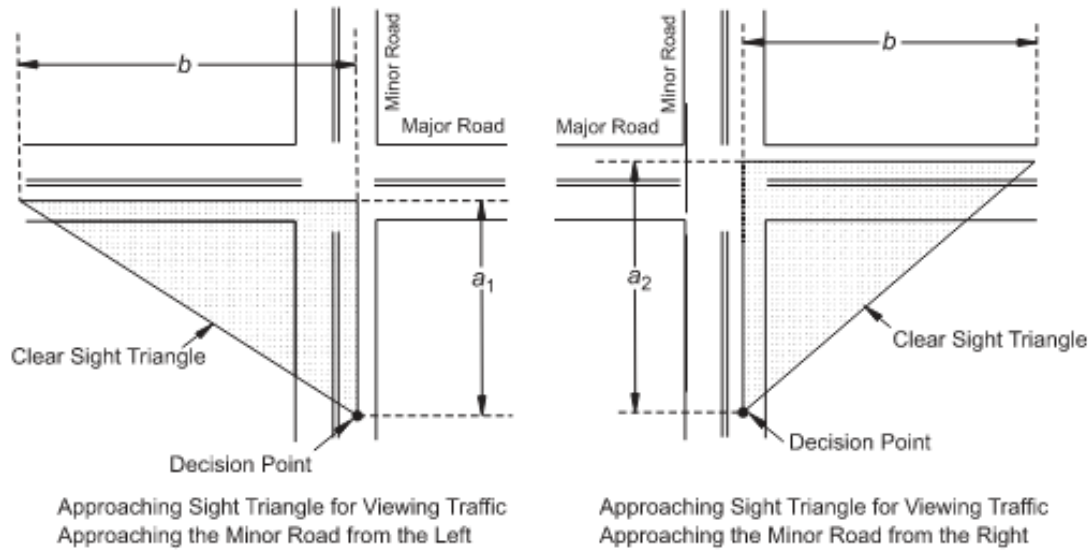


VISIBILITY

Bus operators need to see far enough ahead to assess developing situations and take actions appropriate for the conditions. This includes being able to see bus stops and waiting passengers adjacent to a roadway, approaching vehicles, crossing cyclists, and pedestrians. Short sight distances due to topography or curves can prevent traffic from stopping safely behind a stopped bus. Sight distance calculations for road design should follow the AASHTO requirements outlined in the *Geometric Design Guide for Transit Facilities on Highways and Streets*, or specific local jurisdiction requirements. Design considerations for appropriate sight distances include:

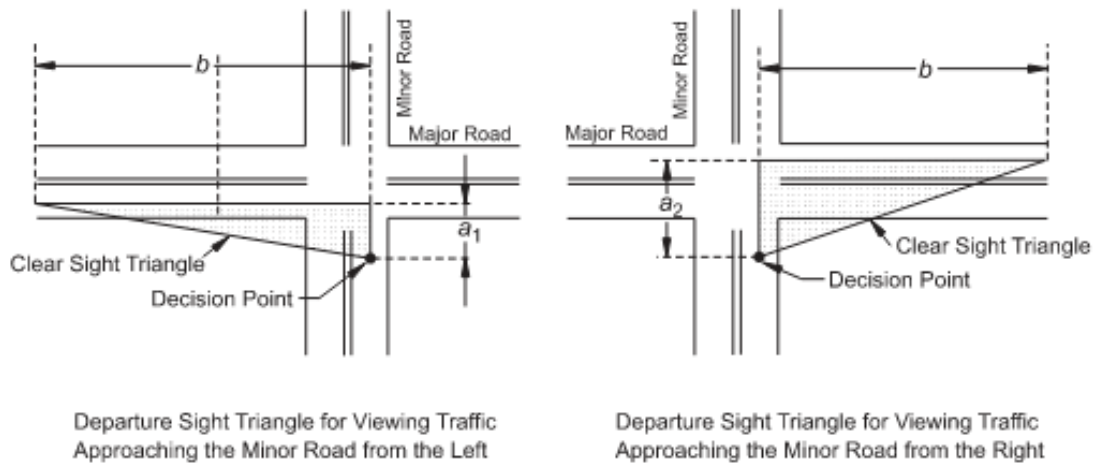
- When developing transit facilities, bus shelters and other sight-obscuring amenities such as trees should be located outside of the sight distance triangle of intersections and driveways. Professional judgment should be used to ensure that the shelters minimize visual obstructions between the approaching operator's view and the shelter location.
- Bus stops must not be placed over the crest of a hill or around a blind curve, nor located near a corner, curve, gully, traffic island, or intersection if the stop blocks sight lines for pedestrians and vehicle drivers.

Figure 7-2 Sight Distance Triangles for Intersections and Driveways



Approach Sight Triangles (Uncontrolled or Yield-Controlled)

– A –



Departure Sight Triangles (Stop-Controlled)

– B –

Source: AASHTO A Policy on Geometric Design of Highways and Streets, Figure 9-15 Intersection Sight Triangles (2011). Variables:

- a_1 : Distance from the major road along the minor road
- a_2 : Distance of a_1 plus the width of the lanes departing from the intersection on the major road. This should also include the width of any median present on the major road unless the median is wide enough to permit a vehicle to stop before entering or crossing the roadway beyond the median
- b : Length of the leg of the sight triangle.

Note: The appropriate measurement of distances a_1 and a_2 for departure sight triangles depends on the placement of any marked stop line that may be present.

LANE WIDTHS

Bus travel lanes should be designed to ensure the safety of both the passenger on-board and the surrounding vehicles, bicycles and pedestrians. Street transit operations are best accommodated on streets with travel lanes that are a minimum of 10 feet, or 11 feet for center running travel lanes, but operations can still be possible on narrow streets such as those found throughout downtown Charleston. Narrower lanes can impede maneuverability, result in more difficult turning movements for buses and/or a need for buses to encroach into the adjacent lane to complete a turn (known as lane splitting).

COORDINATION WITH OTHER CURB USES

Parking and Loading Zones

In many locations, on-street parking and/or loading zones may surround the bus stop and compete for available curb space. Since many bus stops need to be lengthened in order to meet modern accessibility standards, the impact to on-street parking can be somewhat offset by increasing the space between bus stops to the recommended 1000 feet. Alternatively, a curb extension (also known as a bulb-out) may also be developed in order to leave more on-street parking in place.

Driveways

Driveways and other curb cuts near bus stops can pose safety hazards for boarding and alighting passengers and transit vehicles. There are six principles that guide the siting of bus stops in relation to driveways, as described below:

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

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

8 IMPLEMENTATION

This chapter explains how to prioritize bus stop investments and provides an overview of cost estimates, and oversight and maintenance responsibilities.

The information in the preceding chapters provides guidance to ensure that bus stops will be designed for safety, comfort, and accessibility. It is equally important to have a program for ongoing improvement and maintenance of bus stops, so that these high-quality designs can be implemented. This chapter discusses these topics.

PRIORITIZING INVESTMENTS

While many bus stop improvements will occur because of roadway or development projects, some funding should be devoted to bus stop enhancements. For these projects, criteria to evaluate and prioritize investments is needed. This section includes a scoring rubric for prioritizing bus stops for capital investment.

Bus Stop Capital Improvement Scoring Rubric

When considering a bus stop modification request, CARTA uses the following Basic Bus Stop Upgrade scoring rubric to determine whether further investment, usually in the form of additional amenities or relocation, is appropriate. CARTA will prioritize the highest scoring bus stops for capital investment.

Consideration should be given to implementing improvements at the same time for both halves of a bus stop pair, since most people need to make round trips. Exceptions to this rule might be made if one of the stops is already in relatively good condition (with only minor deficiencies) while the other is in poor condition.

Criteria	Responsibility
Passenger Activity – Sum of weekday boardings and alightings	<ul style="list-style-type: none"> ▪ 40 points if sum is greater than 50 ▪ 30 points if sum is between 25-50
Existing Conditions	<ul style="list-style-type: none"> ▪ 20 points if rated as 1 (Very Poor) ▪ 15 points if rated as 2 (Poor) ▪ 10 points if rated as 3 (Fair)
Zero-vehicle households and Environmental Justice Area	<ul style="list-style-type: none"> ▪ 10 points if zero-vehicle household population in the surrounding census block group is greater than CARTA service area average ▪ 10 points if stop is located in an Environmental Justice Area ▪ 20 points if both
Significant Transfer Point	<ul style="list-style-type: none"> ▪ 10 points
Near Medical Facility, Significant Civic Building or Educational Institution (1/4 mile)	<ul style="list-style-type: none"> ▪ 10 points
Part of corridor or neighborhood initiative to strengthen identity	<ul style="list-style-type: none"> ▪ 10 points

CARTA-APPROVED AND -FUNDED AMENITIES

CARTA’s over 860 stops vary in terms of their ridership, existing condition, and level of service. These guidelines include the process for CARTA to prioritize capital improvements at stops. Importantly, they also describe the approved amenities for CARTA stops that the agency could fund for stops. The amenities and the baseline capital costs for each that CARTA could cover are summarized below. These amenities are described in detail in Chapter 5 Bus Stop Amenities.

CARTA Approved and Funded Amenities



#	CARTA- Approved Amenity	Total Cost (see note)
1	Bus stop post and sign	\$150
2	ADA-compliant landing pad	\$4,825
3	Bike rack	\$168
4	Solar shelter lighting	\$1,550
5	Bench	\$906 - \$1,620
6	Trash can	\$105 - \$525
7	Shelter	\$12,495
8	Digital signage (not pictured)	\$8,515 - \$9,315

Notes:

Minimum amenities at all CARTA bus stops are a bus stop post, sign, and ADA compliant landing pad. If a municipality calls for additional amenities, CARTA would pay for the baseline cost of those amenities. Any additional costs due to upgraded or additional amenities, including variations in paint schemes, must be borne by the relevant municipality requesting that upgraded amenity. Developers would cover all costs of any new stop or stop improvements, including the installation.

The costs above for bus stop capital items do not include engineering or install fees. Those additional fees are below:







- Engineering fees ranging from \$10,000 to \$20,000 per shelter/bench
- Shelter installation at approximately \$6,500
- Bench installation at approximately \$1,500
- Digital signage installation at approximately \$750












LED signage installation at approximately \$1,100

Developers and local planners interested in coordinating with CARTA for bus stop improvements should refer to Chapter 6 – Bus Stop Modifications.

AMENITY INSTALLATION AND MAINTENANCE

The installation of amenities at bus stops and their ongoing physical maintenance often involves both public and private partners. The table below shows the distribution of installation and maintenance responsibilities among the parties most commonly involved in bus stop installation and upgrades: (1) CARTA, and (2) the property owner who may be SCDOT, a municipality, or private land owner.

 Amenity	 CARTA	 Other Agency Staff or Property Owner	Notes
	Installation Coordination	Maintenance	
	Installation Maintenance	Coordination	CARTA funds, installs, and maintains its bus stop signs.
	Installation Maintenance	Installation Maintenance	CARTA funds, installs, and maintains integrated bus shelter lighting and sign-mounted solar power lights. Overhead streetlamps and other forms of lighting can be installed at bus stops by local roadway authorities and adjacent property owners in coordination with CARTA.

	 CARTA	 Other Agency Staff or Property Owner	Notes
	Installation Maintenance	Coordination	CARTA funds, installs, and maintains its real-time information signs
	Installation Maintenance	Coordination	CARTA funds, installs, and maintains passenger information at its stops.
	Installation Maintenance	Installation Maintenance	At most stops, CARTA is responsible for installing and maintaining trash cans, but in certain cases, trash receptacles at bus stops are emptied by the municipality or business district in which they are sited.
	Installation Maintenance	Installation	Benches at bus stops may be funded and installed by CARTA, local jurisdictions, or private entities. CARTA funds and installs only standard benches attached to bus shelters, making seating at bus stops that do not have shelters the responsibility of local jurisdictions and private entities. CARTA is committed to maintaining all bus stop benches.
	Installation Maintenance	Installation	CARTA funds, installs, and maintains most shelters, except for shelters built by a developer.
	Installation Maintenance	Installation Maintenance	The funding, installation, and maintenance of bike racks are determined on a case by case basis.
	Installation Maintenance	Coordination	CARTA funds, installs, and maintains fare machines at its bus stops.
	Installation Maintenance	Coordination	CARTA funds, installs, and maintains electric bus chargers at its bus stops.
 Safety & Security	Installation Maintenance	Installation Maintenance	At most stops, CARTA is responsible for installing and maintaining safety and security elements like cameras and emergency call boxes, but in certain cases, they may be installed and

Amenity	 CARTA	 Other Agency Staff or Property Owner	Notes
			maintained by the municipality or business district in which they are sited.

CARTA Is Here to Help

CARTA receives requests year-round and implements modifications to bus stops on an as-needed and approved basis.

For bus stop amenity, procurement, and construction-related questions, email Transit Planning at belenv@bcdco.com or call BCDCOG at (843) 529-0400.

APPENDICES

Appendix	Contents
Appendix A	Glossary of Terms
Appendix B	Checklist for Bus Stop Inventory Field Visits
Appendix C	Developer Checklist
Appendix D	Bus Stop Accessibility and ADA Standards
Appendix E	Amenity Standards and Specifications Solar Lighting Specifications Digital Sign Specifications Trash Receptacle Specifications Bench Specifications Shelter Specifications Bike Rack Specifications Leaning Rail Specifications
Appendix F	BCDCOG Staff Checklist
Appendix G	Bus Stop Amenities Installation Guide
Appendix H	Bus Stop Inventory

APPENDIX A: GLOSSARY OF TERMS

Accessible boarding area (ADA pad or landing pad): The place where passengers get on and off the bus at the front door, directly adjacent to the bus stop sign. This is also where the bus operators deploy the ramp for passengers using mobility devices. The area is a firm and stable surface, and shall provide a clear length of 96 in. (8 ft.), measured perpendicular to the curb or vehicle roadway edge, and a clear width of 60 in. (5 ft.) minimum, measured parallel to the vehicle roadway, as stated in 810 Transportation Facilities chapter of the 2010 ADA Standards for Accessible Design.

ADA compliance: Characteristics of transit equipment, service and boarding areas that comply with the Americans with Disabilities Act (ADA) of 1990 and subsequent amendments. ADA legislation that mandates equal access to all public transportation services, regardless of mobility status. The ADA requires that fixed-route transit be accessible and that paratransit service be provided in the same geographic areas on the same days and hours as the fixed route service.

Alight: To get off or out of a transportation vehicle.

Board: To get on or into a transportation vehicle.

Bumpout/curb extension: A curb bumpout is a strategy to improve safety for all road users, by extending the curb at a corner and narrowing the roadway width at intersections.

Bus Rapid Transit (BRT): Bus Rapid Transit offers rail-like transit on an upgraded, rubber-tired bus service. BRT is characterized by attention to major transit corridors, simple but frequent service, preferential traffic light controls and reduced number of stops.

Bus stop: A location marked with site specific signs, indicating where buses will stop.

Dwell zone: The dwell zone is the space, in the street, needed for a transit vehicle to stop at the curb, or edge of roadway, and perform dwell functions: rider boarding and alighting, fare collection, etc.

Far side: Bus stop located after the intersection (in the direction of travel).

Fixed route bus service: Transit provided along dependable and defined routes with published schedules and stops at designated locations.

Floating bus stop: A floating bus stop design channelizes the bike lane behind the clear zone of the bus stop, to maintain separate spaces for people biking and people boarding, alighting, and waiting for transit.

Headway: The frequency interval between the passing of successive buses moving along the same route in the same direction, usually expressed in minutes. Also known as Frequency.

In-lane stop: Bus stop located in a travel lane, allowing the bus to serve the stop and continue the route without having to merge out and then back into the travel lane.

Mid-block: Bus stop located at least 200 feet from nearest intersection.

Near side: Bus stop located before the intersection (in the direction of travel).

Pedestrian Access Route (PAR): A continuous, and clear path with width of 4.0 ft minimum, exclusive of the width of the curb, as stated Chapter R3 Technical Requirements of the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way 2011 (PROWAG). The PAR connects the bus stop to destinations.

Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way 2011 (PROWAG): Recommended guidelines for designing and constructing facilities within the public rights of way, most recently released in 2011, as a best practice for accessibility issues in the public right of way not covered by the Department of Justice's currently adopted standards.

Pull-out stop: Bus stop located in a curbside lane (usually a parking lane or pull-out bay, signed as a bus stop), requiring the bus to merge out of and back into the travel lane in order to serve the stop.

Travel lane: A lane devoted exclusively to vehicular traffic.

Trip generator: A land use or discrete activity that by nature of its operations tends to create a significant amount of travel.

United States Access Board 2010 ADA Standards for Accessible Design: The US Access Board is a federal agency that promotes equality and inclusion of people with disabilities by creating accessibility guidelines and standards for the built environment, transit vehicles, telecommunications equipment, medical diagnostic equipment, and information technology. The most recent federal standard is the 2010 ADA Standards for Accessible Design, which sets the minimum requirements – both scoping and technical for newly designed and constructed or altered State and local government facilities, public accommodations, and commercial facilities to be readily accessible to and usable by individuals with disabilities.

APPENDIX B: CHECKLIST FOR BUS STOP INVENTORY AND MAINTENANCE FIELD VISITS

In addition to being useful for updating and maintaining this guide, bus stop data is important to facilitate planning throughout the region. The information that is currently known about CARTA bus stops is attached at Appendix G: CARTA Bus Stop Database. CARTA staff will continue to maintain this information with regular field visits and bus stop inventory updates. Additional up-to-date information for each stop should also be collected for CARTA’s bus stop inventory, and this checklist includes a list of all bus stop attributes to collect. This checklist will also be used by CARTA maintenance during regular field visits to inspect bus stops.

General Information	
Created on:	Updated on:
Stop ID #	
Stop Name	
Routes Served	
Bus direction	<input type="checkbox"/> Inbound <input type="checkbox"/> Outbound <input type="checkbox"/> Terminal
Location relative to intersection	<input type="checkbox"/> Near-side <input type="checkbox"/> Midblock <input type="checkbox"/> Loop <input type="checkbox"/> Far-side <input type="checkbox"/> Off-street (e.g. in a parking lot or transit center)
Amenities available:	<input type="checkbox"/> Sidewalk <input type="checkbox"/> Crosswalk <input type="checkbox"/> Bus stop sign <input type="checkbox"/> Mounted on post (with square mount) <input type="checkbox"/> Mounted on post (with u-channel) <input type="checkbox"/> Mounted on existing pole (e.g. electric pole) <input type="checkbox"/> Lighting <input type="checkbox"/> Street light <input type="checkbox"/> CARTA solar pole-mounted <input type="checkbox"/> Pole mounted (not solar) <input type="checkbox"/> Building light <input type="checkbox"/> CARTA solar shelter light <input type="checkbox"/> Seating <input type="checkbox"/> CARTA approved seating <input type="checkbox"/> Commercial advertising bench <input type="checkbox"/> Non-standard bench <input type="checkbox"/> Lean bar <input type="checkbox"/> Other: _____ <input type="checkbox"/> Trash receptacle <input type="checkbox"/> Mounted trash can (10 gal) <input type="checkbox"/> Trash can on ground (28+ gal) <input type="checkbox"/> Other <input type="checkbox"/> Shelter <input type="checkbox"/> Bike rack <input type="checkbox"/> Real time information <input type="checkbox"/> Existing overhead shade (from a tree, building awning, building overhang, etc.)

Landing Zone and Sidewalk Information	
Is there an accessible 5' wide by 8' deep landing zone in front of the bus stop sign?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If not, landing area width and depth	Width: _____ Depth: _____
Does the landing zone comply with the other following ADA standards? 1. A cross slope no greater than 2% (1/50). 2. Any connections to a street, sidewalk, path etc. are at least 3' wide.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Do elements obstruct the landing area (e.g. barrels, news boxes, bench, bike racks, etc)	<input type="checkbox"/> Yes <input type="checkbox"/> No
What is the material of the landing area?	<input type="checkbox"/> Hard paving material (concrete, stone, asphalt) <input type="checkbox"/> Soil <input type="checkbox"/> Grass <input type="checkbox"/> Other
What is the material of the sidewalk?	<input type="checkbox"/> Concrete <input type="checkbox"/> Asphalt <input type="checkbox"/> Stone <input type="checkbox"/> Other: _____
Are there physical barriers that constrict the width of the sidewalk? If yes, take and include a photo.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are there any problems with the sidewalk or landing area surface? If yes, take and include a photo.	<input type="checkbox"/> Yes <input type="checkbox"/> No
Rank the sidewalk condition (1-5)	_____
If stop is not accessible, is it feasible to shift the stop to an alternate location nearby?	
Is there a level and clear boarding area at each back door of the bus?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Seating Information	
What is the seat height of the bench	Width: _____ Depth: _____

<p>Does the bench comply with the following ADA standards?</p> <ol style="list-style-type: none"> 1. Seat dimensions: 20 inches minimum to 24 inches maximum in depth and 42 inches minimum in length. 2. Seat height: 17 inches minimum to 19 inches maximum above the floor or ground. 3. Back support: 42 inches minimum in length and that extends from a point 2 inches maximum above the seat to a point 18 inches minimum above the seat. 4. Structure supporting vertical or horizontal forces of 250 pounds applied at any point on the seat, fastener, mounting device, or supporting structure. 5. Exposed benches: slip resistant and designed to shed water. 6. If installed inside the shelter it must be installed in such a manner to allow a wheelchair passenger to still use the shelter (30"). 7. Do not install bench on ADA landing pad 8. Minimum of 2' between the bench and back face of curb. 9. Minimum of 3' circulation space on either side of the bench for access. 	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p>
<p>Rank the bench condition (1-5)</p>	<p>_____</p>
<p>Which way does the bench face?</p>	<p><input type="checkbox"/> Parallel to curb <input type="checkbox"/> Perpendicular to curb <input type="checkbox"/> Angled to curb</p>
Shelter Information	
<p>What type of shelter is it?</p>	<p><input type="checkbox"/> CARTA standard shelter <input type="checkbox"/> Historic district shelter <input type="checkbox"/> Domed top shelter <input type="checkbox"/> Gable roof shelter <input type="checkbox"/> Other: _____</p>
<p>Shelter dimensions</p>	<p>Width: _____ Depth: _____ Height: _____</p>
<p>Distance from front of shelter (windscreen or post) to curb</p>	<p>_____</p>

Distance from back of shelter (windscreen or post) to back of sidewalk or building/fence/wall	_____
Is the shelter in the middle of the sidewalk and obstructing the general pedestrian path of travel?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there a 32" deep x 48" wide accessible space fully within and under the shelter roof?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Does the shelter comply with the following ADA standards?	
1. Clear path of 3' minimum in front or behind shelter for sidewalk.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
2. Entrance must be 2'8" wide at minimum.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Minimum clear floor area of 30 inches wide by four feet deep.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Not placed on the ADA landing pad.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
5. Minimum height of 6'8".	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
6. If it abuts a building, there must be 12" between the shelter and building at minimum.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
7. Connected to route to the landing pad.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Does the shelter have a bench?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Who owns the shelter?	_____
Information Features	
Is there a bus stop sign?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Bus stop sign is posted how high above the ground/surface (in inches)?	Height: _____
Does it include the correct Stop ID?	<input type="checkbox"/> Yes <input type="checkbox"/> No
List the route numbers indicated on the bus stop sign	_____ _____ _____
Are existing signs and/or posts damaged, worn or not secured?	<input type="checkbox"/> Yes. Explain: _____ <input type="checkbox"/> No
What is the sign face orientation to the curb?	<input type="checkbox"/> Parallel to curb <input type="checkbox"/> Perpendicular to curb <input type="checkbox"/> Angled to curb

What is the distance from the pole/post/other to the street edge/curb (in inches)?	_____
Does the bus stop sign mounting/placement conform with the following ADA Standards?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
1. If it is mounted on a wall or telephone pole and between 27" and 80" off the ground, it cannot protrude into the pathway by more than 4". Below 27" can protrude any amount.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
2. If it is mounted on its own pole between 27" and 80" from the ground, it can overhang by up to 12".	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. If the bottom of the sign is mounted less than 80" from the ground, a barrier must be provided to warn the visually impaired.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a route map posted?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there a schedule posted?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there an area map posted?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is parking allowed in the bus stop (i.e. is the bus stop mistakenly painted to members of the public to parallel park in it or use the curb for pick up/drop off)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Miscellaneous Information	
Is bus stop near an at-grade railroad crossing?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Ranking System

Regarding rating conditions at each stop, a suggested scoring system is shown below:

- Score of 5 = Stop is already fully accessible and in excellent condition
- Score of 4 = Good condition, functionally accessible, deficiencies are minor
- Score of 3 = Fair condition, some significant issues for safety and/or accessibility
- Score of 2 = Poor condition, not accessible, very significant problems
- Score of 1 = Very poor condition, difficult for anyone to use stop

APPENDIX C: DEVELOPER CHECKLIST

When CARTA receives a request for bus stop addition or relocation, it evaluates the proposed bus stop location using the access, safety, and operational efficiency factors outlined in Chapter 6 – Bus Stop Modifications. This checklist is designed to guide property developers through the bus stop addition or relocation process. Projects covered in this checklist include, but are not limited to, new developments, renovations, road projects, and streetscape projects.

First things first: defining the need

Property developers interested in upgrading transit service to a development must contact CARTA during the project planning phase to explore whether it is operationally feasible to provide new or relocated transit stops on or adjacent to the proposed development. If feasible, CARTA will determine what type of bus stop and what level of amenities should be provided.

To make a bus stop-related request for CARTA, email Transit Planning at belenv@bcdco.com or call BCDCOG at (843) 529-0400.

Developer Checklist:

Transit Circulation and Stop Placement	
	Design all roadways and driveways that will accommodate buses to have lane widths between 10-12 ft. (See Chapter 7 -- Operational Considerations)
	For all intersections and driveways that will accommodate buses, design corners for a 50 ft. (15.2m) outside and 30 ft. (9.1m) inside turning radius. (See Chapter 7 -- Operational Considerations)
	For all roadways, driveways, and stop areas that will accommodate buses, design pavement cross-sections to withstand the wear-and-tear that will be generated by heavier vehicles (ideally including concrete pads at bus stop areas) (See Chapter 3 – Bus Stop Configurations)
	Locate proposed bus stop in a safe, visible, and well-lit location in reasonable proximity to primary destinations (See Chapter 2 – Bus Stop Placement)
	If the proposed bus stop will be located in the public right of way, secure right-of-way and appropriate encroachment permits. (See Chapter 6 – Bus Stop Modifications)
Bus Stop Design and Accessibility	
	Allocate sufficient length along the curb lane to accommodate the proposed bus stop configuration. (See Chapter 3 – Bus Stop Configurations)
	Allocate sufficient right of way behind the curb to meet ADA requirements and accommodate all required amenities for the proposed bus stop type, at a minimum. (See Chapter 3 – Bus Stop Configurations)

	Coordinate with CARTA for bus stop design and amenity placement consistent with the Transit and Bus Stop Design Guidelines.
	Coordinate an amenity installation and maintenance agreement with CARTA and any other involved local parties.
	Coordinate with local public works agencies for utility services and pavement markings, if necessary.
	Provide adequate pedestrian walkways to transit stops. Ensure proposed bus stops are connected to the development and any primary destinations with an ADA-compliant pedestrian access path free of obstacles. (See Chapter 5 – Bus Stop Amenities and Appendix D – Bus Stop Accessibility Guidelines).

APPENDIX D: BUS STOP ACCESSIBILITY AND ADA STANDARDS

The following standards are based on the Americans with Disabilities Act of 1990 and the subsequent ADA Accessibility Guidelines for Buildings and Facilities (ADAAG). These minimums will help determine if a stop can be placed or what modifications must be made to the proposed location to meet the minimum guidelines. The ADA Standards presented are the minimum requirements to comply with the law and are not necessarily best practices.

Background and Applicability of ADA Standards

The Americans with Disabilities Act of 1990 (ADA) is broad legislation intended to make American society more accessible to people with disabilities. It consists of five sections or titles. Titles II and III (public services and public accommodations) affect bus stop planning, design, and construction.

Although the definition of disability under the ADA is broad, bus stop placement and design most directly affect persons with mobility and visual impairments. Making new stops conform to ADA physical dimension requirements is relatively easy. Modifying existing stops to comply with ADA, though desirable from an accessibility perspective, is not required under ADA. Modification of existing stops is more difficult, especially if the stops are at sites with limited easement or not subject to the transit agency's control, such as shopping malls, on state rights-of-way, or suburban subdivisions. Either way, the "equal access" provisions of the ADA require that the route for persons with limited mobility or vision be as accessible as the route used by those without disabilities. A person with disabilities should not have to travel further, or use a roundabout route, to get to a designated area.

ADA Bus Stop Design Principles

ADA bus stop design principles govern bus stop signs, landings, benches, and shelters. Currently, BCDCOG bus stop design principles do not exceed ADA standards in any way. In addition, SCDOT guidelines emphasize that all bus stops on state roads must meet the accessibility criteria in the ADA. The following pages describe ADA bus stop design principles, organized by bus stop element.

SIGNAGE

Bus stops marked with signs indicate to passengers where the bus will stop and publicize the availability of transit service to the general public.

1. Letters and numbers to be a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10.
2. Characters and numbers should be sized according to the viewing distance from which they are to be read. The minimum height is measured using an uppercase X.
3. Accompany pictograms with the equivalent verbal description placed directly below, with a border dimension of 6 inches (152 millimeters) minimum in height.
4. Characters and background of signs in a non-glare finish, with characters and symbols contrasting from their background.
5. If it is mounted on a wall or telephone pole and between 27" and 80" off the ground, it cannot protrude into the pathway by more than 4". Below 27" can protrude any amount.
6. If it is mounted on its own pole between 27" and 80" from the ground, it can overhang by up to 12".
7. If the bottom of the sign is mounted less than 80" from the ground, a barrier must be provided to warn the visually impaired.

LANDING PAD AND PASSENGER WAITING AREA

A bus stop area is a designated location where the bus will stop to let on and off passengers. It is indicated by a bus stop sign. *Flag stop areas/zones are not considered a designated area and thus not subject to the requirements outlined.*

1. A firm stable surface including concrete, asphalt, brick, stone, tile and wood. Loose material such as gravel or stone dust do not meet the requirements unless properly treated with binders, consolidants, compaction or grid forms. Grass is not considered a firm stable surface.
2. ADA landing pad – an area that is clear of obstructions and measures eight feet (perpendicular to the curb) by five feet (parallel to the curb, connected to a pedestrian path or accessible walkway, and a firm stable surface). The landing pad can include part of the sidewalk.
3. A cross slope no greater than 2% (1/50).
4. Accessible connections to a street, sidewalk, path etc. if any exist. Must be at least 3' wide.

BENCHES

1. Seat dimensions: 20 inches minimum to 24 inches maximum in depth and 42 inches minimum in length.
2. Seat height: 17 inches minimum to 19 inches maximum above the floor or ground.
3. Back support: 42 inches minimum in length and that extends from a point 2 inches maximum above the seat to a point 18 inches minimum above the seat.
4. Structure supporting vertical or horizontal forces of 250 pounds applied at any point on the seat, fastener, mounting device, or supporting structure.
5. Exposed benches: slip resistant and designed to shed water.
6. If installed inside the shelter it must be installed in such as manner to allow a wheelchair passenger to still use the shelter (30").
7. Do not install bench on ADA landing pad
8. Minimum of 2' between the bench and back face of curb.
9. Minimum of 3' circulation space on either side of the bench for access.



Example Bench at CARTA Bus Stop

SHELTER

Shelters provide protection from the elements while waiting for the bus and the decision to install a shelter is typically based upon passenger volumes.

1. Clear path of 3' minimum in front or behind shelter for sidewalk.
2. Entrance must be 2'8" wide at minimum.
3. Minimum clear floor area of 30 inches wide by four feet deep.
4. Not placed on the ADA landing pad.
5. Minimum height of 6'8".
6. If it abuts a building, there must be 12" between the shelter and building at minimum.
7. Connected to route to the landing pad.
8. Accessible connections to a street, sidewalk, path etc.

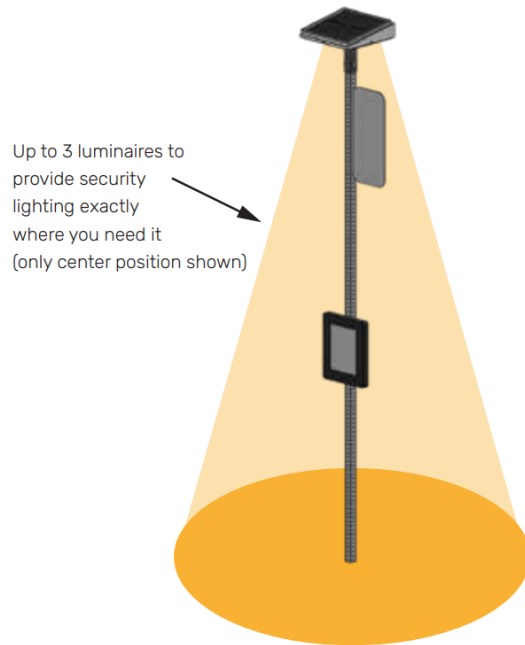
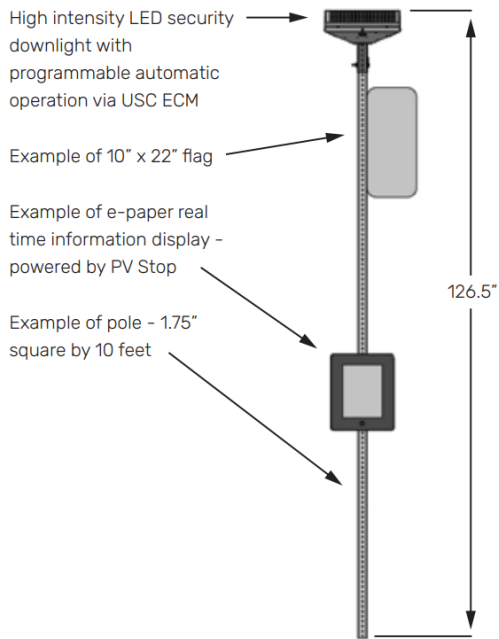
APPENDIX E: AMENITY STANDARDS AND SPECIFICATIONS

Appendix E contains the specifications for all CARTA amenities, as described in Chapter 5: Bus Stop Amenities. Amenities at bus stops may differ, but the following amenities are those formally approved by CARTA for use at their bus stops.

Solar Lighting Specifications

CARTA has approved solar lights for two discrete uses. The first is a sign mounted solar light, and the second is a solar light package approved for shelters. The specifications for each are below:

PV-STOP+ TRANSIT SOLAR-POWERED LED LIGHTING SYSTEM



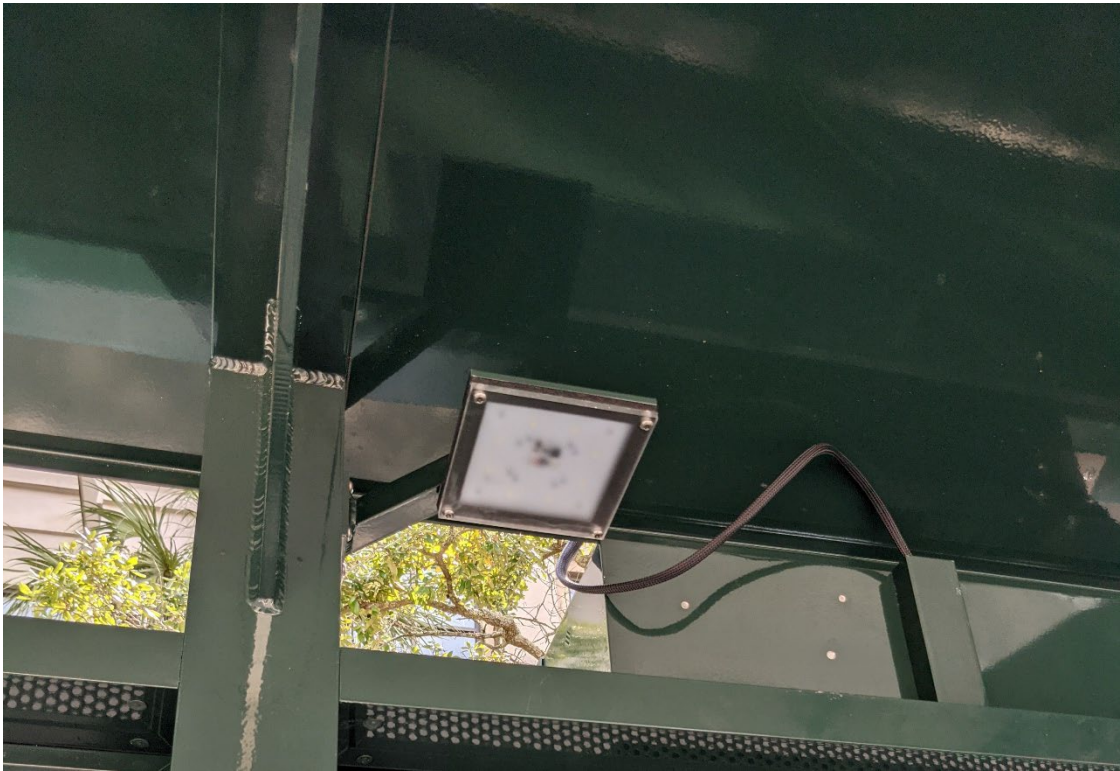


Solar Lighting in Use at CARTA Bus Stop.

BRASCO SOLAR LIGHTING PACKAGE

Includes:

1. 175 watt flexible solar panel
2. 4.3 watt LED light
3. 73 AMP hour batteries



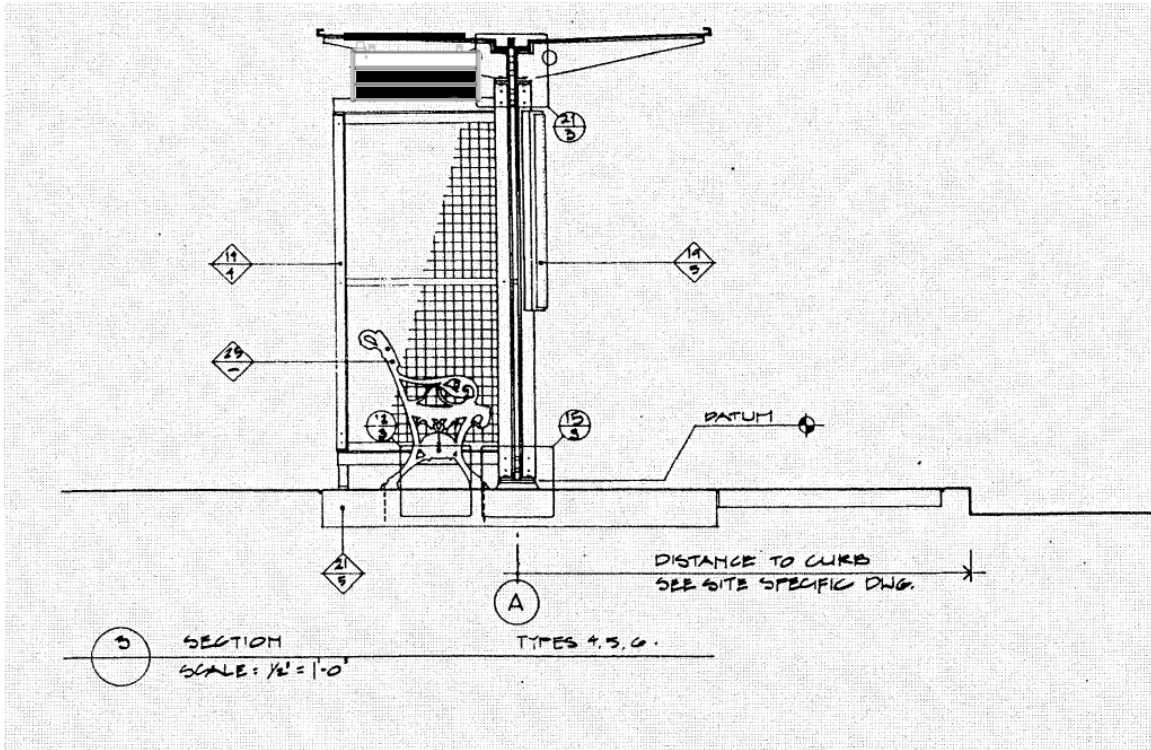
Shelter light installed at a CARTA shelter

SPECIFICATIONS	
Model No.	SU-6
Dimensions	5" x 5"
Power Consumption	4.3 W
Fixture	Aluminum Weldment with Frosted Acrylic Lens
Input Voltage	12 Volts DC
Operating Temperature	-40 - 74°C
Finish	Standard Powder Coat or Anti-Graffiti Powder Coat
Power Supply	A/C, Solar Powered
Hardware	Tamper Resistant
Mounting	Header or Column Mounted
Operating Hours	50,000

BRASCO Solar Light Specifications

Digital Sign Specifications

CARTA has an approved digital sign approved for use at its bus stops. The sign is built by Sunrise Systems and comes in single- or double-sided models.



Sunrise Systems Single Side Digital Sign shown in use at a Charleston bus shelter.



Digital sign mounted to a CARTA bus sign.

Trash Receptacle Specifications

Trash receptacles vary throughout the region based on the municipality. CARTA has two pre-approved trash receptacles for their own stops: The “Landscape” trash receptacle and the “Eclipse 32.” Specifications for these stops and other popular trash receptacle models by municipality are below.

CARTA uses the “Landscape” trash receptacles and attaches them to sign posts.



Eclipse-10-20

Landscape 10-20

Small steel waste receptacles for column mounting with optional lids and optional mounting bracket. Includes center message band.

10 Gallon Landscape Trash Receptacle

20 Gallon Landscape Trash Receptacle

- Retainer bands hold bags in place
- Bottom drainage holes included
- Mounting holes for poles or walls Included
- Add decals to center band for message
- Weather and UV-resistant powder coat
- Available in black, coffee brown, or hunter green

The “Eclipse 32” is typically installed with Brasco Sunline shelters.



Eclipse-32

Eclipse 32

18” Diameter, 38” H. Large freestanding aluminum waste receptacle with optional lid and optional liner.

32 Gallon Eclipse Trash Receptacle

- Pedestal base with drainage holes included
- Weather and UV-resistant powder coat
- Available in standard powder coat painted finish RAL colors

Mt. Pleasant and the City of Charleston typically use the “Streetscape” trashcans.



Streetscape

Streetscape

26” Diameter, 33” H. Large freestanding steel waste receptacle with optional lid, optional liner and optional center message band.

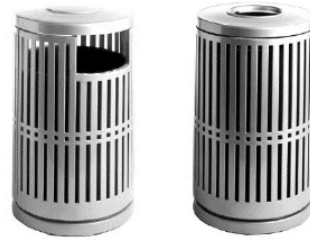
35 Gallon Streetscape Trash Receptacle

- Optional “Recycle Blue” finish
- Pre-drilled mounting holes for concrete
- Weather and UV-resistant powder coat
- Available in black, coffee brown, or hunter green

Additionally, Mt. Pleasant often uses the Chase Park model trash bin at stops.

RECYCLING-LITTER BIN

Model	Chase Park, dual use
Manufacturer	Landscape Forms
Openings	Standard side (1), 5 inch diameter hole (1)
Size	36 gallon, 24 inch diameter, divided liner
Signs	(2) standard design, 10-recyclable, 13 waste only
Color	Black, Powdercoat



Bench Specifications

CARTA has an approved bench design for its new shelters. In addition, historical benches are used in Charleston’s historic district, and Mt. Pleasant has its own preferred bench design. Seating should be secured to a poured foundation and incorporated within shelters when possible. **The standard depth for poured concrete or asphalt foundations beneath benches is 4”.**

CARTA’s approved bench is the BRASCO 6’ Curveline bench. The specifications for this bench and a photo of it installed at a BRASCO shelter are shown below.

The historical bench used in the Charleston historic district is built by J&M Foundry in Summerville (Address - 1594 State Rd, Summerville, SC 29483; Phone Number- (843) 761-2990). Below is a picture of the benches installed at a historic district bus stop.



Additionally, the Town of Mt. Pleasant often installs the “Austin” model bench shown below.

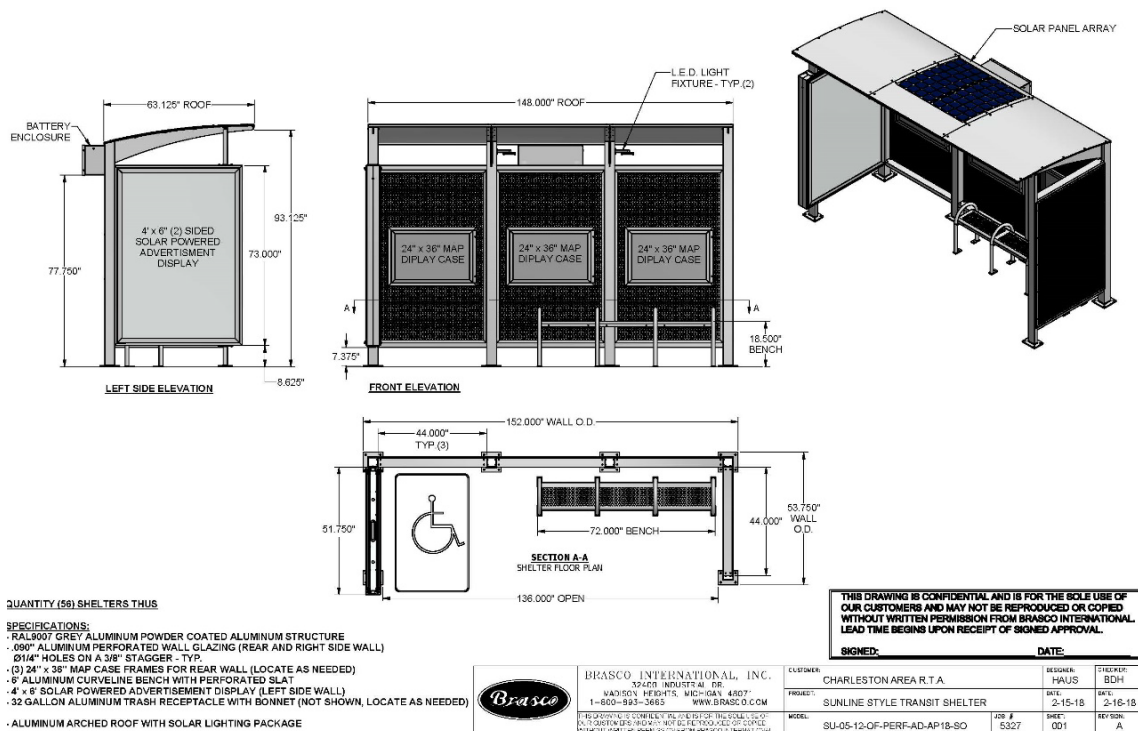
Model	Austin
Manufacturer	Landscape Forms
Style	Backed
Wood	Ipe, no finish
Mounting	Cantilever Surface Mount
Arm Option	No arms
Color	Titanium Powdercoat



Shelter Specifications

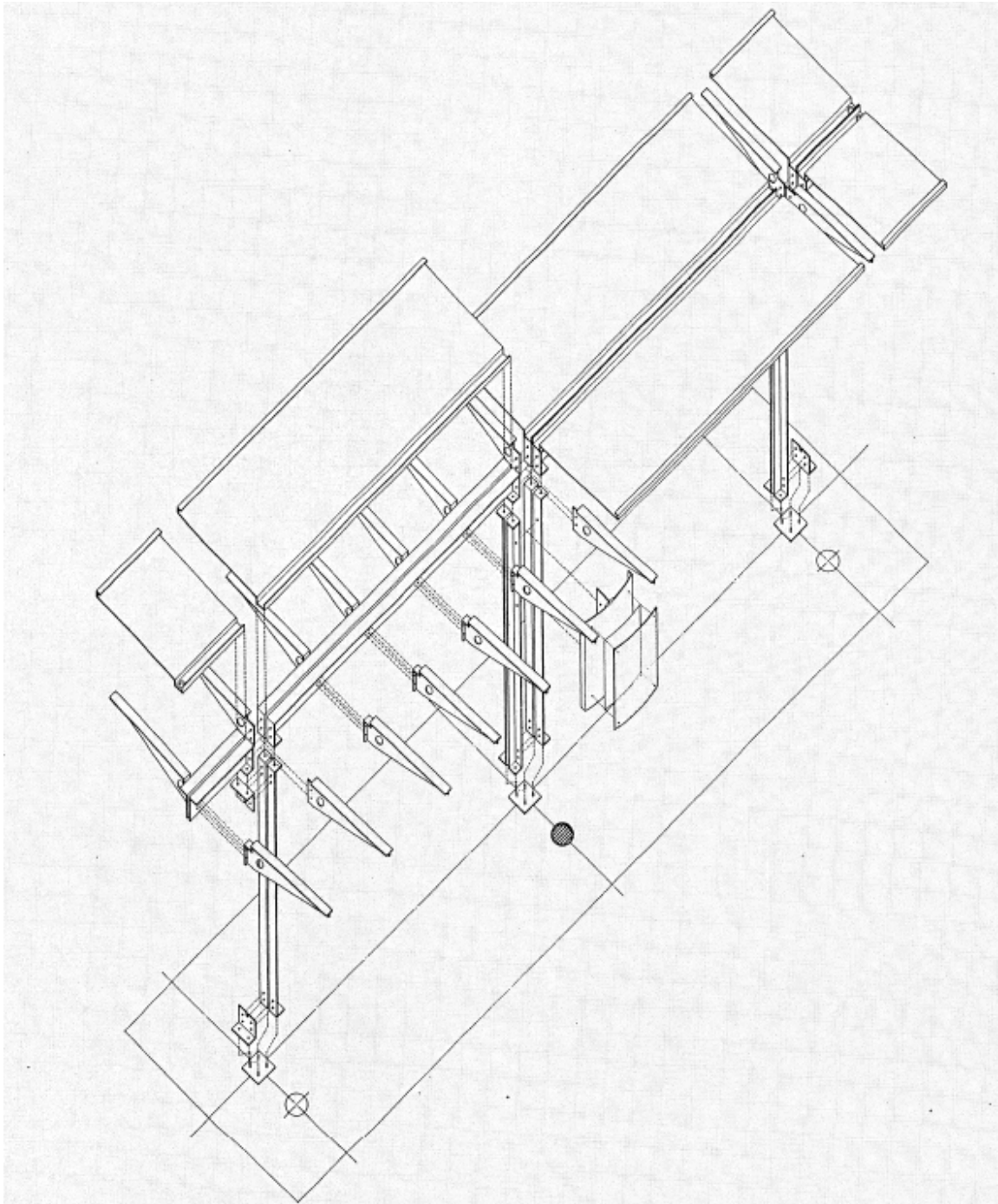
CARTA's standard shelter is manufactured by BRSCO. The shelter is ADA compliant and made of aluminum. Shelters must be built on and secured to a reinforced concrete foundation; CARTA requires that the poured foundation for its standard shelter be 8" deep reinforced concrete. Bus shelters should provide a clear line of sight to approaching buses and ensure that waiting passengers are visible to bus operators and other street users.

Its specifications and two example photos are below. The shelter comes in gray and green.



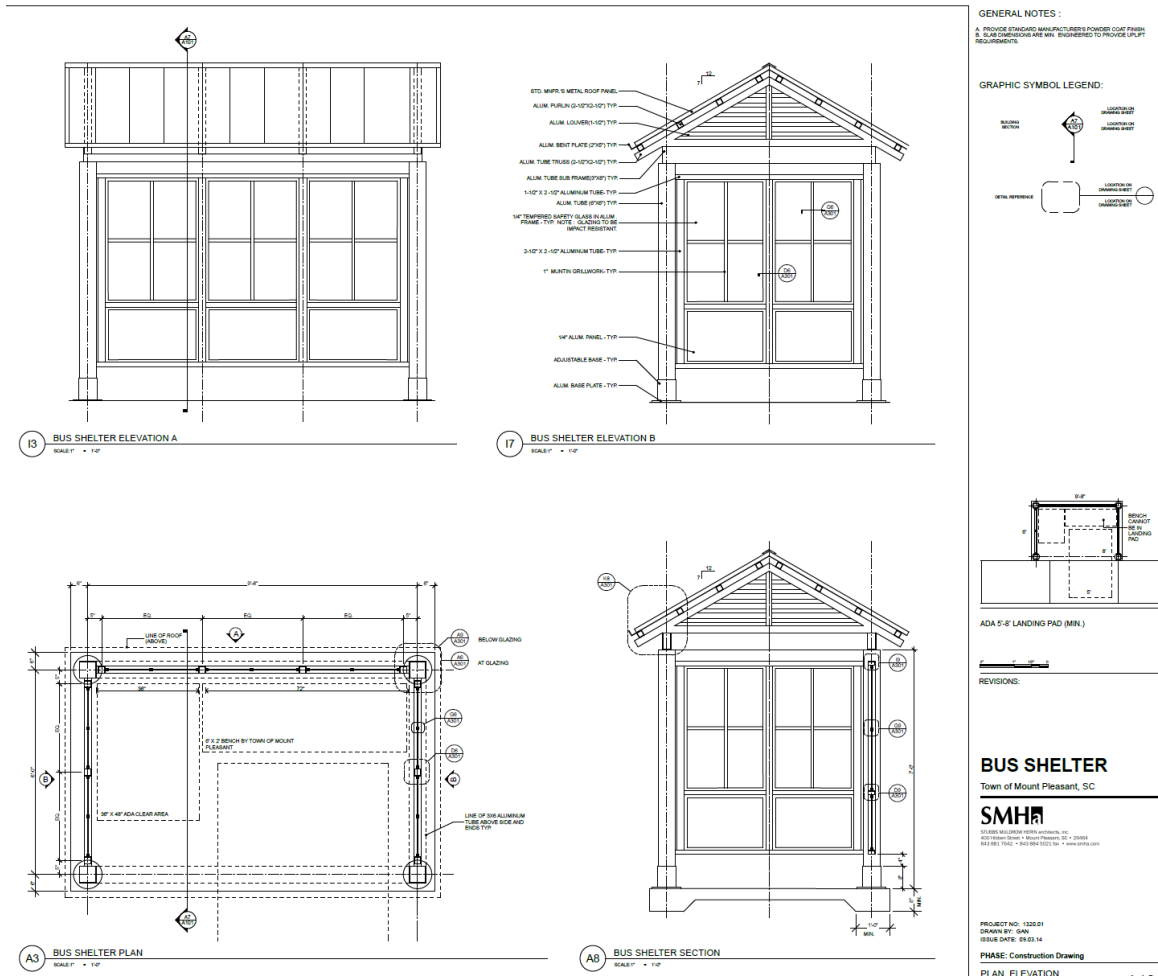


The City of Charleston has approved and adopted two shelter designs. The first is the Standard CARTA Stop. The second is the Historical Shelter Design, which is the preferred shelter design for all shelters installed south of Line Street. The Historical Shelter features a unique roof structure. Dimensions and additional photos the historical shelter designs are below. Poured foundations for historic shelters must be 12" deep reinforced concrete.





The Town of Mount Pleasant has adopted a standard BRASCO bus shelter for all shelters within the municipality. The Mount Pleasant shelter features a gable roof design. Similar to the City of Charleston’s shelter designs, Mt. Pleasant’s has been adopted by the city so that the town’s Design Review Team is generally only asked to approve shelter locations. Shelter specifications for Mt. Pleasant’s design are below. Poured foundations for custom shelters like that approved by the Town of Mount Pleasant must be 4” deep with an 18” edge around the perimeter, and they must also include a “turn down” edge and 4 12” x 30” depth footers of reinforced concrete.

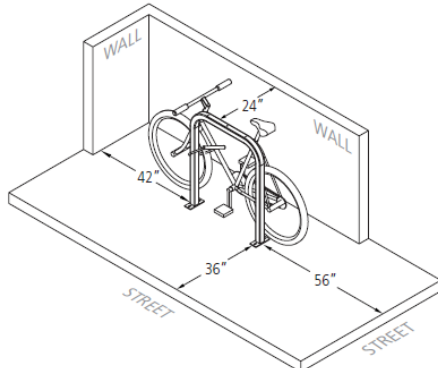
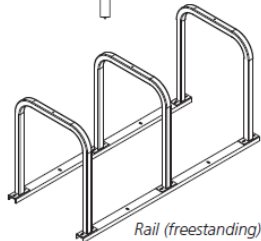
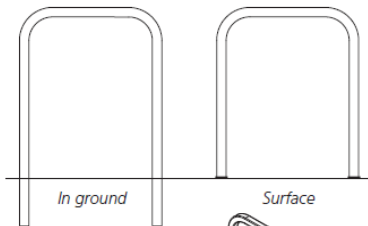
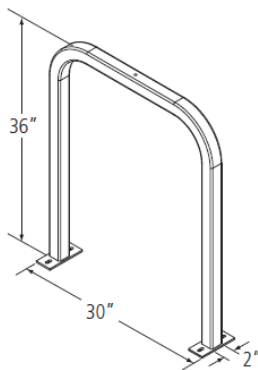


The Town of James Island uses the CARTA standard shelter but painted blue. Shelters must be built on and secured to a reinforced concrete foundation; CARTA requires that the poured foundation for its standard shelter be 8" deep reinforced concrete.



Bike Rack Specifications

CARTA’s preferred bike rack design is the Dero Downtown Rack | Square Tube Secure Bike Rack. In areas outside of the Historic District, this bike rack is gray. Within the historic district, this rack is black. Specifications and an example of the gray rack in action are below. Bicycle racks should be affixed to a paved surface. For CARTA, **the standard depth for poured concrete or asphalt bicycle rack foundations is 4”**. If multiple bicycle racks are installed, they must be placed at least 3 feet apart to allow convenient access. Where multiple rows of racks are installed to form a “bicycle parking lot,” there should be 4 feet between each row, measured from tire to tire.



Product Dero Downtown Rack
As manufactured by Dero Bike Racks

Capacity 2 Bikes

Materials 2" x 2" x 3/16" square tube - mild steel
2" x 2" x 11g square tube - stainless steel

Finishes An after fabrication hot dipped galvanized finish is our standard option. 250 TGIC powder coat colors, thermoplastic coating, PVC dip, and stainless steel finishes are also available as alternate options.

Our powder coat finish assures a high level of adhesion and durability by following these steps:
1. Sandblast
2. Epoxy primer electrostatically applied
3. Final thick TGIC polyester powder coat

Installation Methods **In ground mount** is embedded into concrete base. Specify in ground mount for this option.
Foot Mount has two 2.5"x6"x.25" feet with two anchors per foot. Specify foot mount for this option.
Rail Mounted Downtown Racks are bolted to two parallel rails which can be left freestanding or anchored to the ground. Rails are heavy duty 3"x1.4"x3/16" thick galvanized mounting rails. Specify rail mount for this option.

Space Use and Setbacks **Wall Setbacks:**
For racks set parallel to a wall:
Minimum: 24"
Recommended: 36"

For racks set perpendicular to a wall:
Minimum: 28"
Recommended: 42"

Distance Between Racks:
Minimum: 24"
Recommended: 36"

Street Setbacks:
Minimum: 24"
Recommended: 36"



Outdoor, unsheltered racks are the most common and cheapest to provide for short-term parking in the Charleston region. Bike parking can also be provided in indoor, guarded storage areas or lockers, which are highly secure. Or, they can be provided in sheltered storage area. It is uncommon for a municipality or agency to have a specific policy on the number of bike parking spaces that must be provided at a given public location like a transit stop.

The Town of Mt. Pleasant often installs “Ring” model bike racks, made of stainless steel, but these are not CARTA-standard.



Leaning Rail Specifications

Leaning rails are uncommon today in CARTA's system but are planned to be expanded to more stops. CARTA's preferred leaning rack design is BRASCO's Contour leaning rail design, pictured below.



CONTOUR (LR-CO)

A modern rail that can be surface-mounted or affixed to a shelter or wall. Constructed from 4" round aluminum extrusion and is available in 4', 6' and 8' lengths and a 32" height. Powder coated to the color of your choice.

APPENDIX F: BUS STOP MODIFICATIONS CHECKLIST

The following checklist will be used by CARTA upon receiving a bus stop modification request:

Evaluating Bus Stop Requests	
	Receive bus stop modification request via CARTA-led planning effort or by email/phone call to CARTA (directions to make requests to CARTA are described on Page 6-1).
	Determine typology category of affected bus stop (described in Chapter 4 Bus Stop Typologies)
	<p>Proceed to relevant checklist based on modification request type:</p> <ul style="list-style-type: none"> ▪ For requests to modify amenities at an existing bus stop, continue to Evaluating Modification Requests. ▪ For requests to add a new bus stop to an existing bus route, continue to Evaluating Addition and Relocation Requests. ▪ For requests to permanently move the location of an existing bus stop, continue to Evaluating Addition and Relocation Requests. ▪ For requests to remove a bus stop, continue to Evaluating Removal Requests. ▪ For temporary bus stop changes, continue to Temporary Bus Stop Changes.
Evaluating Modification Requests	
	<p>Does affected stop meet bus stop spacing guidelines (described on Page 2-3)?</p> <ul style="list-style-type: none"> ▪ If yes (bus stop is within recommended spacing of adjacent stops), proceed below. ▪ If no (bus stop if removed would maintain good bus stop spacing), continue to Evaluating Removal Requests
	<p>Score bus stop using Bus Stop Amenities Scoring Rubric (Page 8-1)</p> <ul style="list-style-type: none"> ▪ If bus stop scores higher than other prioritized and funded bus stops, proceed to Implementing Bus Stop Changes. ▪ If bus stop scores lower than other prioritized and funded bus stops, note request in inventory and notify requestor that other bus stops have received priority
Evaluating Addition and Relocation Requests	
	<p>Evaluate potential new bus stop location based on Access, Safety, and Operational Efficiency guidelines (described on Page 6-4). Does bus stop location meet these guidelines?</p> <ul style="list-style-type: none"> ▪ If yes, proceed to next step. ▪ If no, deny request.

	<p>Does new bus stop location meet bus stop spacing guidelines (described on Page 2-3)?</p> <ul style="list-style-type: none"> ▪ If yes (bus stop will be within recommended spacing of adjacent stops), proceed to Implementing Bus Stop Changes. ▪ If no (bus stop if added would result in poor bus stop spacing), is a bus stop still needed in the proposed location due to safety issues (e.g. existing bus stops do not allow for safe access to a destination)? <ul style="list-style-type: none"> – If yes, proceed to Implementing Bus Stop Changes – If no, deny request.
Evaluating Removal Requests	
	<p>If approved, will remaining bus stops meet bus stop spacing guidelines (described on Page 2-3)?</p> <ul style="list-style-type: none"> ▪ If yes (bus stop will be within recommended spacing of adjacent stops), proceed to next step. ▪ If no (bus stop if removed would result in poor bus stop spacing), deny request.
	<p>Evaluate the proposed stop based on its existing access, role as a transfer point, proximity to major destinations, existing ridership (see guidelines on page 6-7. Would the removal of this stop significantly and negatively affect access, transit operations, or stop spacing as described by these guidelines?</p> <ul style="list-style-type: none"> ▪ If yes, is bus stop removal request due to the existing stop being unsafe? <ul style="list-style-type: none"> – If yes, proceed to Evaluating Addition and Relocation Requests. – If no, deny request. ▪ If no, proceed to next step.
	<p>Post a rider notice to notify transit users and the surrounding community of the proposed stop removal 15 days before stop is removed. See Figure 6-1 (Example Rider Notice at Modified Stop). Proceed to next step.</p>
	<p>Notify and coordinate with facilities staff and transit operator on removal plans and remove stop.</p>
Temporary Bus Stop Changes	
	<p>Identify primary point of contact with entity responsible for construction, DOT, property owner, and official of any involved municipalities.</p>
	<p>Review work zone traffic control plans to ensure that transit is accommodated within the limits of the construction project as described on Page 6-9.</p>
	<p>Post a rider notice to notify transit users and the surrounding community of the temporary bus stop change 15 days before stop is changed or as soon as possible. See Figure 6-1 (Example Rider Notice at Modified Stop).</p>
Implementing Bus Stop Changes	
	<p>If appropriate, bring the requester of the bus stop change as a partner in this process.</p>
	<p>Ensure that funding is available and committed to this project.</p>

	<p>Determine high-level design and bus stop amenities based on the following:</p> <ul style="list-style-type: none"> ▪ Includes all minimum amenities of relevant bus stop typology (described in Chapter 4 Bus Stop Typologies) ▪ Includes any preferred or optional amenities that CARTA and partner(s) agree upon ▪ Uses the approved amenities of the area where the bus stop is located (described in Appendix E), ▪ Consistency with any corridor or street plans ▪ ADA compliant (described in Appendix D) ▪ Includes foundation under all amenities using material at standard depth specifications (as described in Chapter 5 Bus Stop Amenities. For example, all landing pads must be 4" deep of poured asphalt or concrete, and all benches must be secured to a foundation of at least 4" of depth)
	<p>If needed due to amenities planned to be installed, enter into a cost sharing agreement and maintenance agreement:</p> <ul style="list-style-type: none"> ▪ Cost sharing agreement: As described on Page 8-2, at non-developer stops, CARTA will only pay for the amenities and baseline costs of its approved amenity package. Any costs above those base costs are known as a "betterment." CARTA is not responsible for betterment costs; these costs are borne by the entity requiring the betterment. Developers are responsible for all costs at their stops. ▪ Maintenance agreement: In some cases, a developer, property owner, town, or business improvement district may take on maintenance of a particular bus stop and/or its amenities. If this will be the case, CARTA will enter into a maintenance agreement with the relevant entity.
	<p>Determine location of bus stop and any relevant additional permits/approvals needed (described in detail on Page 6-10)</p> <ul style="list-style-type: none"> ▪ Will bus stop impact private property? If yes, seek a lease or ownership agreement with owner of the land that the bus stop will occupy and bring property owner on as a partner. ▪ Will bus stop impact public property? SCDOT maintains a "Street Finder" to help determine if a road is under municipal or SCDOT jurisdiction: https://ris.scdot.org/RoadwayInformationStreetFinder.aspx. If yes, determine jurisdiction and apply for an encroachment permit from the relevant entity: <ul style="list-style-type: none"> – SCDOT: https://www.scdot.org/business/permits.aspx – County of Charleston: https://www.charlestoncounty.org/departments/public-works/index.php – City of Charleston and City of Charleston Historic District: https://www.charleston-sc.gov/DocumentCenter/View/1336/DRC-process-and-application-form?bidId=. – Town of Mt. Pleasant: http://www.tompssc.com/1170/Development-Review-Team. – City of North Charleston: https://www.northcharleston.org/business/construction-and-development/permits/encroachment-permit/. ▪ Work together with partners and relevant entities to finalize needed permits and approvals.
	<p>Engage a private engineering firm to conduct surveys and draw up a set of bus stop plans that are in line with the identified requirements.</p>

	Coordinate with local public works agencies for utility services and pavement markings, if necessary.
	Inform marketing in case customers and/or media should be notified of bus stop change.
	Following construction, inspect bus stop using Bus Stop Installation Inspection Checklist (next page)
	Update bus stop inventory
	<p>Notify the following CARTA departments or entities of modification completion:</p> <ul style="list-style-type: none"> ▪ Marketing ▪ Finance ▪ Maintenance ▪ Transdev

Bus Stop Installation Inspection Checklist

TO: Project File

FROM:

SUBJECT: Bus shelter installation Inspection checklist

DATE:

Bus Stop Name:	ID Number:	Inspection Date:
Project Description:		
Inspection Performed By:		
Is the spatial location consistent with the design plans:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Bus stop sign installed:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Sign Orientation/Position Acceptable:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Correct Route Information/ID Number:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Sign/Post In Good Condition:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Concrete Pad poured to specification:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Concrete Expansion Joints Installed:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Any Concrete Cracking:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Curb Tie-in per Design Plans:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Sidewalk Tie-in per Design Plans:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Bench Installed:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
All side panels present and fastened:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Garbage installed:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Secured:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Map Holders Installed (3):	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Date Marketing Department Notified to Install map inserts:		
Date Finance Department Notified to Update Stop Database and GTFS:		
Drainage Sloped Away from Structure:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Sediment and Erosion Control devices:	Yes <input type="checkbox"/>	No <input type="checkbox"/>

Dimensions meet ADA Guidelines:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
<ul style="list-style-type: none"> ▪ Landing area at least 5 feet wide and 8 feet deep ▪ Wheelchair fits completely under the shelter (min. space of a common mobility device is 30 in. by 48 in.) 		
Sod Installation	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Accepted:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Comments:		
Corrective Action Requested:		

An inspection checklist, when used properly, is an assurance that a particular piece of equipment has been inspected. As each item on the checklist is ticked off, the person doing the inspection is verifying that each component of the equipment is in correct working order.

A grantee of the Federal Transit Administration (FTA) must ensure continuous management of grant projects. Capital projects, such as construction projects, rolling stock procurements, and technology projects, must have a mechanism for technical oversight of the projects.

The purpose of document is to describe the procedures and reporting requirements that the Federal Transit Administration (FTA) expects from the project manager (PM) with regard to the Sponsor’s management, organization, and capability to effectively and efficiently plan, develop, manage, and complete a Federally-assisted capital project.

When projects are implemented, the PM is ultimately responsible for, and must ensure technical oversight of, the project. Monitoring mechanisms may include:

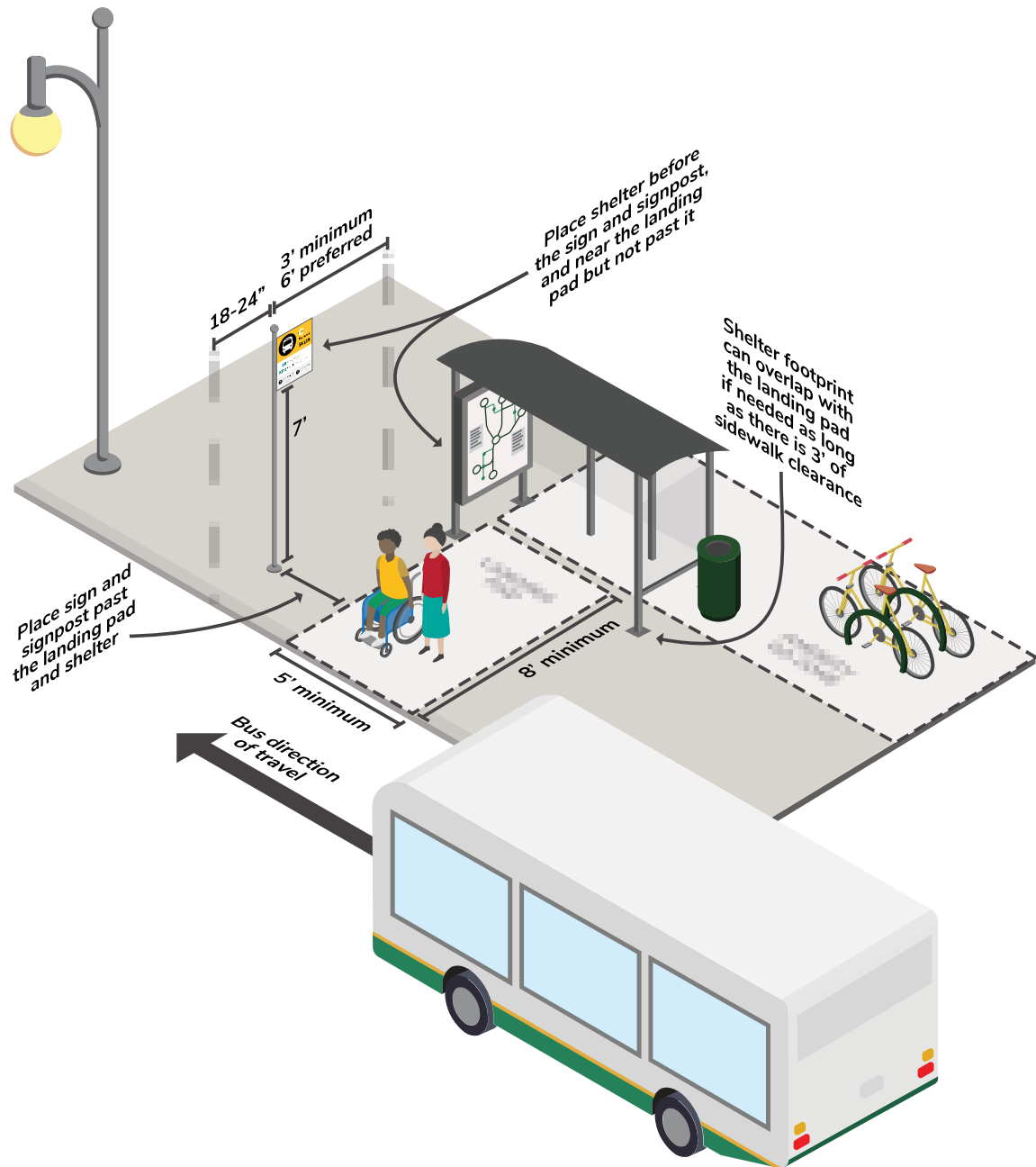
- Contracting with a consultant to provide project management oversight
- Reviewing requests for proposals and construction contracts
- Reviewing plans and drawings
- Conducting periodic site inspections
- Requiring/Completing progress reports
- Attending project review meetings
- Withholding payment of a portion of the grant until final inspection and acceptance of the facility by the PM

Contractors and/or subrecipients are required to prepare a variety of reports on a quarterly basis. These include a project narrative, invoices, project performance measures (number of passenger trips provided, vehicle miles traveled, unit installed, project status etc. as appropriate based on the project).

Signature: _____

APPENDIX G: BUS STOP AMENITIES INSTALLATION GUIDE

The following guide is designed for use by CARTA maintenance staff to ensure optimal and ADA-compliant placement of the most vital bus stop elements, including the bus stop post, sign, landing pad, shelter, bench, bike rack, and trash can.



APPENDIX H: CARTA BUS STOP DATABASE

CARTA Bus Stop Database as of September 2021.

826	764330 St Andrews Blvd / Sycamore Ave	Sidewalk	Far	Y	N	Y	N	N	N	Solar on bus stop sign post	Y
827	764326 St Andrews Blvd / Avondale Ave	Sidewalk; Bike Lane		Y	N	N			N	Street	N
828	764301 Hwy 61 / Oakdale Pl	Sidewalk; Bike Lane		Y	N	N			N	Street	N
829	764274 St. Andrews Blvd / Riverdale Dr	Sidewalk; Bike Lane		Y	N	N			N	Street	N
830	764265 Hwy 61 / Parish Rd	Bike Lane; Sidewalk		Y	N	N			N	None	N
831	764244 Hwy 61 / West Harrison Rd	Sidewalk		Y	N	N			N	None	N
832	819988 Fielding Connector / Ripley Point Dr		Near	N	N	N	N	N	N	Solar on bus stop sign post	Y
833	819979 Fielding Connector / Ripley Point Dr.		Near	N	N	N	N	N	N	None	Y
834	764241 St. Andrews Blvd / Savannah Hwy	Crosswalk; Sidewalk		Y	N	Y			N	None	N
835	2448617 Chuck Dawley Blvd / S Shadow Dr	Sidewalk		Y	N	N	N	N	N	None	Unknown
836	764259 St Andrews Blvd / Sheldon Rd	Sidewalk; Bike Lane	Mid	Y	N	N	N	N	N	Street	N
837	794837 St Andrews Blvd / Colony Dr	Sidewalk; Bike Lane		Y	N	N			N	Street	N
838	794839 St Andrews Blvd / Oakdale Pl	Bike Lane; Sidewalk		Y	N	N			N	Street	N
839	764311 St Andrews Blvd / Penn Ave	Sidewalk; Bike Lane		Y	N	N			N	Street	N
840	794841 St Andrews Blvd / Sycamore Ave	Sidewalk	Far	Y	N	Y	N	N	N	Street	N
841	819980 St. Andrews Blvd / 5th Ave @ Taco Bell			Y	N				N	None	N
842	819981 Ashley River Rd / Carriage Ln	Sidewalk	Mid	Y	N	N	N	N	N	None	N
843	794849 Ashley River Rd / Playground Rd	Sidewalk		Y	N	N			N	None	N
844	794850 Ashley River Rd / Heathwood Drive	Sidewalk	Mid	Y	N	N	N	N	N	Solar on bus stop sign post	N
845	794851 Ashley River Rd / Ashley Hall Rd	Sidewalk		Y	N	N			N	None	N
846	764403 Ashley River Rd / Westover Dr	Bench; Sidewalk	Mid	Y	Y- Donated	N	N	N	N	Solar on bus stop sign post	N
847	794854 Ashley River Rd / Waggoo Rd	Commercial Bench; Sidewalk		Y	Y- Commercial	N			N	Street	N
848	794858 Orleans Rd / Carverwood Ln									Street	N
849	794860 Orleans Rd / Carrie St	Sidewalk		Y	N	N			N	Street	N
850	794863 Tobias Gadsden Blvd / Paul Cantrell Blvd	Sidewalk		Y	N	N			N	None	N
851	794866 Ashley River Rd / Ashley Hall Plantation Rd				N				N	None	N
852	764499 Ashley River Rd / Magwood Dr	Sidewalk		Y	N	N			N	None	N
853	819982 Ashley River Rd / Dogwood Rd	Bench		N	Y	N			N	None	N
854	819983 Ashley River Rd / Pierpont Ave								N	None	N
855	819984 Ashley River Rd / Old Parsonage Rd	Bench; Sidewalk	Near	Y	Y	N		N	N	None	N
856	819985 Ashley River Rd / Glendale Dr								N	None	N
857	847937 Ashley River Rd / Tobias Gadsden Blvd	Sidewalk		Y	N	N			N	None	N
858	764246 Calhoun St / Courtenay Dr	Bench; Sidewalk	Far	Y	Y	N	Y	N	N	Street	N
859	2320920 Tobias Gadsden Blvd / Ashley River Rd		Near	N	N	Y	N	N	N	None	N
860	848053 Sam Rittenberg Blvd / Orleans Rd	Sidewalk		Y	N	N			N	None	N
861	848054 Ashley River Rd / Richmond St								N	None	N
862	848055 Ashley River Rd / Planters Trace Apartments				Y				N	None	N
863	848056 Ashley River Rd / Sledge Ln	Bench; Sidewalk		Y	Y	N			N	None	N
864	839430 Festival Centre Park & Ride				N				N	Street	Y
865	2319801 Stuart Engals Blvd / Wando Crossing Shopping Center		Mid	N	N	N	N	N	N	Solar on bus stop sign post	Y
866	2320182 Ashley Phosphate Rd / Pepperdam Ave	Sidewalk		Y	N	N			N	Street	N
867	2320919 Stuart Engals Blvd / Bowman Rd				N				N	Street	N
868	2543546 Greenridge Rd / Rivers Ave		Mid	N	N	N			N	Street	Y
869	2619312 Ocean Blvd / 14th Ave	Sidewalk, Bench	Mid	Y	Y- Donated	Y	Y	N	N	Street	Y