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Introduction

1.1 Purpose

This document summarizes the recommended guidelines for bus stop placement and design in the Greater Dayton Regional Transit Authority (RTA) Service Area. The guidelines are intended to provide RTA and its stakeholders physical design specifications that are recommended to be integrated with local comprehensive plan policies, land use ordinances, pedestrian plans, and street design guidelines. These guidelines should be referred to when planning access improvements to transit facilities. Developers or builders who are interested in designing transit friendly projects may also make use of these design guidelines. The general public may find these guidelines useful in understanding the current practices for the placement of transit amenities.

These guidelines, developed by RTA take into consideration the operational needs, the requirements of the Americans with Disabilities Act (ADA), other federal and state accessibility mandates, and public safety. The purpose of these guidelines is to:

- Promote consistency in bus stop placement and design;
- Encourage developers to design clean and attractive bus stops that meet the operational requirements of our system;
- Encourage members of the community to use public transit through the provision of safe, comfortable, convenient, and consistent bus stops.

To the extent any of a portion of these guidelines is inconsistent with the ADA or any other federal, state, or local laws or regulations, the applicable law or regulation shall control. Developers, design professionals, engineers, contractors, and other persons who utilize these guidelines shall be responsible for complying with all applicable laws.

1.2 Bus Stop Policies and Procedures

It is RTA’s intent to establish consistent and systematic guidelines and procedures for the review of proposed amenity and amenity revisions. These guidelines and procedures specify the process for making decisions, developing transit plans and reviewing projects that may affect transit operations. These policies and procedures ensure that the amenities receive the proper assessment and technical review before amenities are moved or constructed.

1.3 Installing and Recording Bus Stop Additions and Deletions

Requests for new bus stop locations, other amenities or concerns regarding existing stops may originate from any number of sources including RTA staff, bus operators, the public, developers, and stakeholders. These requests may include issues such as requests to add, move, or remove bus stops or amenities; or may be operational and/or safety issues related to the stop location.

Pursuant of RTA Procedure – Installing and Recording Bus Stop Additions and Deletions (revised February 2017):

- Bus stop requests may be made directly to RTA or through an RTA stakeholder. All amenity requests will be reviewed by RTA Planning Department Staff. If the stakeholder receives the request, it will be forwarded to RTA staff for action. The Planning Department will evaluate the potential impacts on customers, residents, businesses in the surrounding area as well as RTA operations. A site visit by both RTA staff and stakeholder may be scheduled at the discretion of RTA to determine whether the request is feasible.
Bus Stops & Amenities

2.1 Bus Stop Placement

Bus stops should be placed in an adequate location with length to allow the coach to clear crosswalks and not obstruct traffic. An excerpt from the Transit Cooperative Research Program (TCRP) Report 19, Chapter 3 Street-side Factors denotes several types of placements and proper distances for each (see Exhibit 1). In the case of each of the three primary placements “No Parking Zones” should be established with a minimum required length as follows; far-side 90’, nearside 100’ and mid-block of 150’. It will be helpful to refer to “Exhibit 2” as a reference of advantages, disadvantages, and recommendation of conditions for bus stop placements.

Many of the current bus stops in the system have been placed near-side. Whenever possible it is preferred that bus stops be located on the far side of a street intersection to reduce the space required for the bus stop and to minimize conflicts between buses re-entering the traffic stream and vehicles making right turns onto cross streets. The Planning Department is responsible for identifying the proper placement (near, far side or mid) of any new bus stop. Any bus stop that is being replaced or relocated must also be brought to the attention of the Planning Department for proper placement.

(Exhibit 1 - Street-side Factors, Bus Stops nearside, far-side, and mid-block)
<table>
<thead>
<tr>
<th>Location Related to Intersection</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Where Recommended</th>
</tr>
</thead>
</table>
| Far-side                         | Minimizes conflicts between right turning vehicles and buses  
|                                  | Provides additional right turn capacity by making curb lane available for traffic  
|                                  | Minimizes sight distance problems on approaches to intersection  
|                                  | Encourages pedestrians to cross behind the bus  
|                                  | Creates shorter deceleration distances for buses  
|                                  | Results in bus drivers taking advantage of gaps in traffic flow created at traffic signals | May result in intersections being blocked during peak periods by parked buses  
|                                  | May obscure sight distance for crossing vehicles  
|                                  | May increase sight distance problems for pedestrians  
|                                  | Can cause a bus to stop far-side after stopping for a red light  
|                                  | May increase number of rear-end accidents since drivers do not expect buses to stop again after a red light | There is a high volume of turns  
|                                  | Route alignment requires left turn  
|                                  | Complex intersections with multi-phase signals or dual turn lanes  
|                                  | Traffic is heavier on the near-side  
|                                  | Existing pedestrian conditions are better on far-side  
|                                  | Traffic conditions and signals may cause delays if near-side  
|                                  | Intersections have transit signal priority treatments |  
| Near-side                        | Minimizes interference when traffic is heavy on the far side of the intersection  
|                                  | Allows passengers to access buses closest to the crosswalk  
|                                  | Results in the width of the intersection being available for the driver to pull away from the curb  
|                                  | Eliminates double stopping  
|                                  | Allows passengers to board and alight while the bus is stopped at a red light  
|                                  | Provides driver with opportunity to look for oncoming traffic | Increases conflicts with right-turning vehicles  
|                                  | May result in stopped buses obscuring curbside traffic control devices and crossing pedestrians  
|                                  | May cause sight distance to be obscured for cross vehicles stopped to the right of the bus  
|                                  | May block the through lane during peak period with queuing buses  
|                                  | Increases sight distance problems for crossing pedestrians | Traffic is heavier on the far-side  
|                                  | Existing pedestrian conditions are better than on the far-side  
|                                  | Pedestrian movements are safer on near-side  
|                                  | Bus route continues straight through the intersection |  
| Mid-block                        | Minimizes sight distance problems for vehicles and pedestrians  
|                                  | May result in passenger waiting areas experiencing less pedestrian congestion | Requires additional distance for no-parking restrictions  
|                                  | Encourages jaywalking  
|                                  | Increase walking distance for patrons crossing intersections | When the route alignment requires a right turn and curb radius is short  
|                                  | Problematic traffic conditions at the intersection  
|                                  | Passenger traffic generator is located mid-block  
|                                  | Compatible with corridor or district plan |  

(Exhibit 2 - Bus Stop Placement)

Source: WMATA Design and Placement of Transit Stops 2009
If a bus stop must be placed near a driveway, it is best to place it on the farside of the driveway where it will not impede with entering and exiting traffic. If blocking a driveway is unavoidable, special design considerations shall be given in order to prevent vehicles from attempting to squeeze by the bus in a situation with reduced sight distance. When there are two driveways to a parcel on the same street, it is better to block the upstream driveway forcing vehicles to turn behind the bus to access the driveway (see exhibit 3).

![Exhibit 3 – Driveway Adherence Guide](image)

\*Source: Orange County Transit Authority Bus Stop Safety and Design Guidelines March 24, 2004\*

### 2.2 Bus Stop Spacing

Spacing of a bus stop should be a minimum distance of 1/10 of a mile, but a preferred distance between bus stops is 2/10 of a mile or a separation of 2 city blocks (average 1056 feet). A separation of ¼ mile should be the standard in a suburban or rural area. The spacing of bus stops is in the intent of having 4-5 bus stops per route mile in local business service and 2-3 bus stops per route mile in much less dense areas of ridership.

Exceptions may be warranted when major collection points exist such as medical, disability, senior citizens / youth facilities or medium / large density residential complexes. Another factor may be bus stops located on both sides of a major intersection that has a distance too great for timely transition.

In addition, it is agreed with the City of Dayton that bus stops will not be placed in within a two-block radius of Wright Stop Plaza to promote the use of Wright Stop Plaza as a major collection point and minimize congestion of bus traffic within the main intersections of the central business district. To evaluate a new route and build ridership, placement of bus stops may initially depart from the above standards.
2.3 Bus Stop Design

The physical location of any bus stop, generally sized for a 40’ bus, will be primarily determined by the following standards: maximizing safety, operational efficiency, and minimizing impacts to adjacent property.

Maintaining adequate separation between driveways/intersections and bus stops, pull-outs and bulb-outs can increase the safety and efficiency of both the roadway and transit service.

Coordination of any new stop location or a request to relocate a bus stop needs to be addressed with RTA for an internal assessment of bus stop requests. Please contact the Planning Department at 937-425-8355, or via email planning@greaterdaytonrtta.org.

2.4 Amenities

An amenity as defined for RTA purposes is “any physical improvement made to a bus stop or transit facility that contributes to a rider’s comfort, access and/or safety while either waiting to board, boarding or alighting any RTA bus.” The RTA Board of Trustees acknowledged the importance of providing these passenger amenities and adopted a formal operating policy to implement the Passenger Amenity Program that became effective 1992. The program is reviewed a minimum of every two years. There are nine specific amenities included in the RTA Passenger Amenity Program document. These are: bus stop signage, concrete boarding pads, benches, shelters, trash receptacles, bus pads, schedule information, lighting, and Park-n-Ride facilities.

2.4 (a) Bus Stop Signage

Bus stop signs should be located a minimum of 2’ and generally no further than 4’ from the curb as to not protrude into traffic. This will allow a safety zone away from traffic designating where to stand and remain visible to an approaching bus operator. Acceptable mounting can be accomplished by application to a free-standing preferred square channel (minimum of u-channel) metal standard, existing utility pole, or on a shelter mounted bracket.

The sign is preferred to be visible from both sides to assist those with physical limitations having to encounter further difficulty of accessing printed information. The sign will have a minimum clearance of 7’, but have a preferred height less than 9’. This will allow an adequate view of design elements for route designations, real-time text instructions, and contact information. This height may also tend to deter vandalism. The bus stop sign should in no way detract from the visibility of any regulatory sign and should have prior approval when placed in conjunction with any regulatory sign. A bus stop sign should not be placed in conjunction with a regulatory sign (such as a stop or yield sign).

The standard signs with appropriate dimensions, branded in 2010 and modified in 2015, are set here in example. Each bus stop will have a Marquee style sign displaying the RTA logo, website address and general phone number. In addition to the Marquee sign there will be placed a route numeral sign (small or large) with a comprehensive list of all routes served by the bus stop, an individual bus stop identification number with “Real-time” information text instructions, and a message requesting patrons “Please No Smoking”. The small numeral signs will be used for listing 1 - 6 routes and the large numeral signs used for listing 7 – 12 routes.
2.4 (b) Passenger Boarding and Alighting Pad (landing pads)

A level and paved waiting areas with adequate space provide greater access to transit service for wheelchair users, the elderly, and other encumbered riders such as parents with strollers. Establishing a bus stop with just a post and sign does not automatically trigger the need for a Passenger Boarding and Alighting Pad unless other improvements such as shelters are constructed. However, to further increase access to transit services to all, it is recommended that the landing pads should be installed to the extent possible. Stops that cannot be rendered accessible obligates the transit provider to offer ADA complementary paratransit for customers who could otherwise use the accessible bus stop.

Per the Department of Transportation (DOT) 2006 ADA Standards for Transportation Facilities, where landing pads are provided they must be:

- Firm and stable. RTA has a preference of using concrete, but other durable materials may be accepted by the local jurisdiction and permissible with section 302 of the DOT ADA Standards
- Clear of obstructions, and be at least 96 inches (8 feet) perpendicular from the curb/roadway and at least 60 inches (5 feet) parallel to the roadway (see exhibit 4). A landing area of this size or larger is necessary for deployment of the transit vehicle’s ramp or lift and for a customer using a wheelchair to maneuver on and off the ramp or lift. It is permissible that where a shelter is provided the bus pad may extend into the clear floor space of the shelter. However, it is crucial that the landing pad is not blocked by any obstacles such as newspaper stands, trash receptacles, bike racks, or flower pots, etc.
- It shall provide connection to streets, sidewalks, or pedestrian paths by an accessible route. Any local requirements above ADA for accessible routes must also be met.
- Sloped (parallel to the roadway, i.e. running slope) the same as the roadway, to the maximum extent practicable. Perpendicular to the roadway (cross slope), the slope of the landing area shall not be steeper than 2.08 % (1” rise over 48” run).

(Exhibit 4 ADA Bus Boarding and Alighting Area requirements)

2.4 (c) Benches

A bench should be placed at any bus stop that has 20 or more boarding which has the required public space or established easement to achieve practical accessibility.

Specifications of the benches will be as follows; Dimensions: 72” L X 32” T X 27” D, Seating Surface will be ¼” X 1 ½” solid steel flat bar. These will be ornamental vertical straps in a straight-back style. Horizontal cross bars will be 2 3/8” O.D. steel pipe, and Bench Ends will be cast iron. The Finishing on all components will be an electro-statically top-coated Triglycidyl Isocyanurate (TGIC) polyester powder coat. Each shelter placed for public transit use shall have a bench component located within the shelter and may be of a different specification than the standard (pictured on page 9).
Benchs should be placed on a firm level surface (preference of concrete) and anchored at a minimum of two points to inhibit tipping during a patron’s use or unauthorized movement. A minimum setback from the curb of 32 inches to allow an acceptable access of the seat shall be maintained. The bench shall not be placed within the area of the Passenger Boarding and Alighting Pad.

2.4 (d) Shelters

Passenger shelters for RTA sites will be designed to engineering standards approved by RTA and the local jurisdiction. This includes shelters that are transparent for passenger visibility and safety, sight distance for approaching vehicles, protection from the elements, and reasonably vandal-resistant for easy maintenance. Additional passenger amenities or service features at these stops are subject to change.

RTA standard passenger shelter designs will include a bench component. Shelters are purchased directly by RTA for any designated public bus stop with adequate public space or accomplished within a private easement requiring a passenger shelter having the required 40 passenger boardings or agreed upon exception. These shelters are the property of RTA unless designated otherwise by prior agreement. An alternate shelter design will be considered based upon approval by the jurisdiction and RTA and constructed and maintained by the proposer or their designated party.

Only RTA approved shelters will be maintained by the RTA. Community Grant (projects partially or fully funded by other public or private entities) bus stop and shelters are covered by a separate agreement with a local jurisdiction or private entity. However, regardless of maintaining responsibilities, any immediate safety, vandalism or cleanliness issue must be addressed by RTA immediately and then report to the local jurisdiction or private entity as follow up. Shelter size will be appropriate to anticipated service and use. The size of the RTA shelter will be determined by RTA and the local jurisdiction.

RTA owns and maintains several different styles of shelters. They generally consist of enclosed units (partially enclosed and fully enclosed), old style cap-n-bench units (canopy with attached bench), and a newer style cap-n-bench (larger canopy with detached bench). The cap-n-bench styles by design lend themselves to allowing the passenger boarding and alighting pad to extend into them and allow accessibility to pedestrian pathways to the rear.
RTA Enclosed Shelters

RTA Caps with Benches
Pursuant to ADA requirements in section 810.3 bus stop shelters shall provide a minimum clear floor or ground space complying with 305 entirely within the shelter. Bus shelter shall be connected by an accessible route complying with 402 to a boarding and alighting area complying with 810.2 (See Exhibit 6)

(Exhibit 6 – ADA Section 810, Shelter Requirements)

2.4 (e) Trash Receptacles

Trash receptacles can help to control litter and maintain a bus stop’s cleanliness. Trash receptacles may be placed at any bus stop where service can be established by the jurisdiction, private entity, business or individual. Trash receptacles should be provided at bus stops with high levels of ridership or those that have a problem with litter due to proximity to fast food or convenient stores. A trash can will be required for any location that has 20 or more boardings average per day.

Trash receptacles at bus stop locations may be served by the jurisdiction or by private contractor or in conjunction of both should need require. Those bus stops that have a RTA shelter will be serviced by a minimum of a private contractor. Physical location of the trash receptacle should not interfere with the accessibility of the bus stop and its amenities or adjacent sidewalks. Trash receptacles at bus stops should resemble other publicly owned and maintained trash receptacles along the corridor.

RTA owns and maintains several different styles of trash receptacles. The more common types are a 24-gallon concrete, 40-gallon concrete, 40-gallon black steel, and Big Belly Solar powered trash compactor. Each are fitted with a liner that receives the trash and can be easily removed to discard trash. Examples of the typical trash receptacles are pictured as follows:
The installation of each trash receptacle requires that the receptacle be anchored to the extent possible. In the application of concrete trash receptacles on concrete, construction adhesive can be used to avoid tipping and unauthorized movement. As bus stop improvements are made, cement receptacles should be replaced with steel or Big Belly solar compacting trash receptacles. As for the steel and Big Belly trash receptacles, they are to be mounted to a cement base by the appropriate bolts and brackets specified by the supplier.

In addition to these RTA owned trash cans, many jurisdictions have their own cans deployed at bus stop. The design of these cans is at the sole discretion of the jurisdiction. If these trash cans are located at a bus stop serviced by the RTA’s private contractor, they will be cleaned in coordination with those bus stops on the appropriate day of service.

Trash cans may also be placed at a bus stop that does not have service by the jurisdiction or by RTA private contractor if the service of the trash receptacle is established by an “Adopt-a-stop” agreement. The document will specify the location and require a minimum frequency of weekly service on a designated day of the week.

2.4 (f) Concrete Bus Pads

For heavily used bus stop areas a rigid pavement design is strongly recommended due to the loads and shear forces applied to pavement surfaces during bus starting and stopping movements.

The installation of concrete bus pads is discretionary of the local jurisdiction. The locations of recommended concrete pads will be influenced by bus frequency, speed and existing pavement conditions. Concrete bus pads should be installed to be the width of the curb lane and the length of the appropriate bus stop area, approximately 120 feet.

2.4 (g) Schedule Information

At high volume bus stops (i.e. Transit Hubs and the Job Center) or at bus stops where the local jurisdiction (such as Beavercreek, Ohio) has mandated that schedule information be placed, there will be an accommodation for the display of schedule information. Typically, there will be digital display boards depicting “Real-time” schedule information at the Transit Hubs along with a schedule rack with all bus schedules. Where applicable, printed schedule boards will be provided in shelters that have display cases such as those in Beavercreek and the Job Center. Each individual bus stop has “text” instructions to access “Real-time” information via phone, as well as contact information to access public transit time tables. Each bus stop has been GPS located to assure accuracy of information of approaching buses.

2.4 (h) Lighting

Adequate lighting at the bus stop allows bus drivers and approaching traffic to see waiting passenger at night. Lighting also provides added security for those waiting at the bus stop. Lighting can be provided by a nearby streetlight, ambient light from adjacent businesses, lighting equipment installed within a shelter, or by a stand-alone light pole. Bus stops without shelter lighting, should be located within 50 feet of an overhead light source. Bus stop light fixtures or shelter illumination should be between 1.5 and 2.0 foot-candles. Lighting should be to a low enough level to not create a spotlight effect that makes it difficult for passengers waiting on the inside of the shelter to see outside.
Physical location of the solar lighting should not interfere with the accessibility of the bus stop and its amenities or adjacent sidewalks. RTA supports two styles of Solar lighting throughout its system. These are the shelter mount style and stand-alone, pole-mount style pictured here. Each style must be mounted in such a way to be unobstructed by trees to receive adequate sunlight for charging. Regular periodic checks should be made to assure functionality of the light and to assure no obstructions of tree growth have hindered sunlight.

2.4 (i) Park-n-Ride Facilities

A Park-n-Ride facility is an area at or near a bus stop, where an individual may use a motor vehicle to arrive at that access point to board public transit and leave their vehicle for the duration of their trip. There are 33 Park-n-ride facilities that support the RTA system. The four major Transit Hubs are directly maintained by RTA Maintenance staff. The other 29 locations are areas in which private ownership exists and by agreement the facilities are used for RTA patrons. Each individual Park-n-ride location has its own unique agreement. The agreement should specify parking areas to be used and any maintenance stipulations if required.

An annual survey of the park-n-ride facilities should be made to gauge a level of use and by what counties the vehicles originate from. There is no minimum of use required as RTA does not directly maintain these facilities, but the survey may tend to highlight what counties could be promoted for additional use and increased ridership.

3 Maintenance

3.1 Emergency Maintenance Issues

When an Emergency Maintenance Issue arises requiring maintenance of any amenity, the general protocol will be as follows:

As immediate as possible, report to the scene of the incident, as thoroughly as possible document the existing conditions including photos (strongly recommended), remove any safety issue for the prevention of injury to RTA patrons and citizens in general (i.e. sharp objects, tripping hazards, obstruction to paths of travel including roadways and sidewalks, etc.). Notify the Customer and Business Development Department, Planning Department. The Planning Department representative will notify the jurisdiction of the maintenance issue. The jurisdictional leader and the Planning Department representative will then determine the best course of action to be taken to repair, replace or remove the amenity. A work request ticket will be entered in the RTA system for tracking purposes by the Planning Department Representative.
3.2 Non-emergency Maintenance Issues

When a non-emergency issue arises requiring maintenance of any amenity, the general protocol will be as follows:

Notify the Customer and Business Development Department, Planning Department representative. The Planning Department representative will notify the jurisdiction of the maintenance issue. A work request ticket will be entered in the RTA system for tracking purposes by the Planning Department representative. The work request will be provided to the external entity or Infrastructure group for scheduling of the required maintenance. For internal maintenance items, a reasonable level of inventory must be maintained to address potential maintenance issues (i.e. sign, standards, temporary bus signs, trash receptacles, benches, shelters, solar lighting – batteries or whole units, etc.).

For all pre-planned amenity work, such as service or mid-pick changes, work orders must be sent at a minimum two (2) weeks in advance of when the work is to be completed. It is most important that the RTA staff be on guard to provide preventive maintenance of our vast transit system and report non-emergency issues in a timely manner. By continuing to seek out areas of concern, we can deliver premier service for our patrons and the communities that we serve. RTA has an Amenities Survey Report that should be used as a checklist in defining any deficiencies of a current or proposed bus stop.

Non-emergency issues notifications can come from many other sources such as; RTA patrons, jurisdictional leaders or concerned citizens. It is key for good stakeholder relations to provide valuable two-way communication with the reporting party to identify that the report was received, that a course of action and timeline has been established and that the issue was rectified. This can be accomplished efficiently with timely delivery of repairs, report of their completion by the Infrastructure group, and constant outreach from the Planning Department to the reporting party.

3.3 Planned Maintenance by an External Entity

Jurisdictions, private contractors, developers from time to time have need to disrupt operations of a bus route, a bus stop, or pathways leading into the transit system. A road construction report is being compiled to show those effects on the RTA transit system. Advance knowledge of these disruptions in operation will allow RTA to plan for how the customer will be best served. This service will entail any notice of reroute, bus stop closures, schedule delays, or in some cases elimination of service. In all cases, the Planning Department will remain in constant contact with the jurisdiction, contractors and / or developers.

Proper documentation of target start and completion dates, update phases of work, areas effected, and changes in modes of service will be the focus of the construction report. This information should be readily available to the Communications, Operations, and Maintenance Departments. The Communications Department should alert passengers of any disruption of service. The Maintenance Department can be better prepared with required fleet. The Operations department can inform operators of routes and bus stops that are effected.

During discussions of road construction or other developments, RTA should address the need for bus pull-offs for roadways with speeds of 35 mph or greater. This type of bus bay design, described in the Transit Cooperative Research Program Report 19, is well suited for higher-speed, higher-volume roadways where long entrance and exit tapers should be provided so that the bus can achieve both deceleration and acceleration outside of the through-traffic lane. These bus bays are designed to provide minimal interruption to through-traffic on a busy road, and the dimensions vary with the speed limit of the roadway. While bus bays often decrease potential bus/vehicle conflicts, they can also pose great difficulty for bus operators when attempting to re-enter the traffic stream. Minimal design specification should be followed (see Exhibit 9, page 15).
3.4 Unplanned Maintenance by an External Entity

When unplanned disruptions occur immediate notification should be given to the Operations Department (937-425-8628) to allow for expedient adjustment of service. The Operations department should then immediately inform the Maintenance and the Planning Department so that appropriate courses of action can be taken to assign fleet needs and to alert customers of temporary changes to service.