Denton County Transportation Authority

Service Performance and Design Standards

February 23, 2012

Table of Contents

INTRODUCTION

The Denton County Transportation Authority (DCTA) originally adopted service standards on September 21, 2006. DCTA revisited the agency's Service Plan in 2010-2011 and seized the opportunity to develop new Service Performance and Design Standards to aid staff and the Board of Directors in the development of DCTA services and allocation of resources.

PURPOSE

This document provides a framework for guiding decisions by which services are created, expanded and evaluated. By providing a defined set of performance standards, DCTA staff and the Board will have consistent direction on how to allocate, prioritize and deploy services. Once approved, DCTA services will be compared against the Service Standards to determine whether or not individual existing services perform at acceptable levels and to evaluate the potential of possible service changes. In order for services to be successful, they must be provided at levels that meet the basic needs of passengers. Therefore, minimum acceptable levels of service are included to ensure that the level of service provided is capable of achieving the goals of the Service Plan

ROUTE CLASSIFICATION SYSTEM

Transit services are most effective when they are tailored to the design and needs of the communities they serve. For planning purposes, the following definitions of service types will be used to identify both the types of services currently provided by DCTA and those that might be provided by DCTA in the future:

1. **Regional Commuter Rail Services:** This service is best characterized as a bidirectional passenger rail service with limited stops, fast travel times, and stations in major population centers or at major employment destinations.

2. **Regional Express Bus Services:** The A-train Midday Station Shuttle service is an example of DCTA's operation of premium commuter service, but regional express bus services may be appropriate in other locations in Denton County. This service type offers fast service during peak commute hours, focusing on linking cities or neighborhoods with high concentrations of workers traveling to a specific employment area or a major transit hub. Express bus services may take advantage of arterial and freeway HOV lanes, allowing them to provide a level of service that is comparable – or in some cases better than – automobile travel times.

3. **Regional Arterial Routes:** DCTA does not currently operate any services that would be categorized as regional arterial routes, but this type of service could be considered within Denton County in the future. Characteristics of regional arterial routes are as follows:

    - **All day service** – Regional arterial routes operate at least every 60 minutes during midday periods and 30 minutes during peak periods. The goal is to facilitate convenient transfers to/from feeder routes.

    - **Major transit center connections** – Regional arterial routes should have a terminus at a major transit center (e.g., A-train or DART station) or a major regional

activity center. Routes should be designed to make timed transfers to and from major connecting services.

- **Longer stop spacing** – Stops are limited to major residential developments, retail centers and park-and-ride facilities to speed travel times for longer distance riders.

The goal is for regional arterial routes to operate quickly and be relatively competitive with automobile travel times.

4. **Urban Area Trunk Routes:** Trunk routes are typically relatively straight and operate along main roads, constituting a primary form of local fixed route bus service. Typically, trunk routes should operate every 15 to 30 minutes on weekdays, with a relatively long service span.

5. **Community Circulators:** Other local fixed-route bus services, typically operating at 30- or 60-minute headways (but with the potential for greater frequencies), are termed community circulator routes. Most of DCTA's existing Connect routes would be classified as community circulators. Except around universities, these are designed to provide policy level coverage service to neighborhoods that do not have the population density or employment — or design characteristics — to support trunk routes. Services are designed to adapt to the unique characteristics of the neighborhoods or cities they serve. Whenever possible, clockface operations and timed transfer at transit centers should be accommodated in route designs. This suggests very careful attention to the length of the route to ensure there is a reasonable match between the schedule cycle time and the route length.

   Three types of community circulators are identified for Denton County.

   A. **Neighborhood Circulators:** These are traditional fixed route services. Because they do not compete effectively with private autos, neighborhood circulators should be established when higher levels of service cannot be effectively supported. They normally operate every 30 to 60 minutes and should operate on a clockface headway whenever possible.

   B. **Feeders:** Feeder buses are designed to "feed" trunk routes, commuter rail, and regional express bus services. Schedules are drawn to provide clockface headways. Feeder routes operate in urban and lower-density suburban neighborhoods and every effort should also be made to provide timed transfers with other routes at the transit centers served by feeders.

   C. **University Circulators:** These may look like traditional fixed routes, but have a specific market – student, faculty and staff ridership – and serve a location with significant parking constraints or costs. These routes normally operate at relatively good frequencies – every 5 to 30 minutes – and clockface headways are often not as critical.

6. **On-Call Demand Response:** These general public demand response services are provided in areas where traditional fixed-route services are not appropriate due to lack of transit supportive land uses and population densities. Connect RSVP is an example of this type of service.

MINIMUM SERVICE SPAN AND FREQUENCY

Span of Service

The time between the first and last trip operated on a route defines the span of service. In addition, service span specifies the minimum period of time service will operate at any point in the system. This gives customers confidence that direct and connecting service will be provided during the span hours. The table below details the span of service that should be provided by type of service.

Desired Minimum Service Span			
Route Type	**Weekday**	**Saturday**	**Sunday**
Commuter Rail	5am - 9pm	10am - 11pm	N/A
Regional Express Bus	5am - 7pm	N/A	N/A
Regional Arterial Bus	5am - 9pm	N/A	N/A
Urban Area Trunk Routes	5am - 9pm	9am - 6pm	N/A
Community Circulators	5am - 9pm	9am - 6pm	N/A
On-Call	6am - 9am, 3pm - 7pm	N/A	N/A

Frequency

Service frequency has a major influence on transit ridership. Frequent service is costly to provide but is valued by regular and occasional customers. It is also regarded as an attractive characteristic by potential customers. The table below details the minimum service frequency that should be provided by type of service.

Desired Minimum Service Frequency				
	Weekday			
Route Type	**Peak**	**Midday**	**Saturday**	**Sunday**
Commuter Rail	25	105	105	N/A
Regional Express Bus	20	60	N/A	N/A
Regional Arterial Bus	30	60	60	N/A
Urban Area Trunk Routes	30	30	60	N/A
Community Circulators	30	30	60	N/A

SERVICE PERFORMANCE STANDARDS

DCTA will monitor key system-wide performance statistics, using pre-established targets in order to measure organizational success. System service standards cover a wide range of subjects including ridership, safety, reliability, and customer satisfaction. While the table below includes standards specific to route types, these metrics will be aggregated by mode for reporting purposes.

Service Quality and Reliability Benchmarks

Quality/ Reliability Measures	System Service Standards
Boarding Passengers per Revenue Hour	1. Regional Commuter Rail Services – 35 passengers/hour 2. Regional Express Bus Services – 20 passengers/hour 3. Regional Arterial Routes – 15 passengers/hour 4. Urban Area Trunk Routes – 25 passengers/hour 5. Community Circulators a. Neighborhood/Feeder – 10 passengers/hour b. University – 25 passengers/hour 6. On-Call – 2.5 passengers/hour
Passengers per Mile	1. Regional Commuter Rail Services– 1.25 passengers/mile 2. Regional Express Bus Services – 1.0 passengers/mile 3. Regional Arterial Routes – 1.0 passengers/mile 4. Urban Area Trunk Routes – 2.2 passengers/mile 5. Community Circulators a. Neighborhood/Feeder – 0.7 passengers/mile b. University – 2.2 passengers/mile
Farebox Recovery	1. Regional Commuter Rail Services – 20% 2. Regional Express Bus Services – 25% 3. Regional Arterial Routes –15% 4. Urban Area Trunk Routes – 20% 5. Community Circulators a. Neighborhood/Feeder – 13% b. University – 90% 6. On-Call – 10%
On Time Performance	90% on-time performance for all services
Passenger Complaints/ Boardings	The number of complaints shall not exceed 0.01% of the total boardings. The benchmark is 7.5 complaints/100,000 boardings.
Accidents /Bus Miles Operated	Fewer than 2 accidents/100,000 revenue miles
Maintenance	The benchmark is 1 road call/7,000 revenue miles.
	At least 85% of all regular fleet vehicles should be available for operations at all times
	The ratio of spare vehicles to regular fleet vehicles should be less than at 20%
	95% of vehicle inspections shall be completed on time
Bus Trips Cancelled	No bus trips shall be cancelled. The benchmark is zero tolerance.

ROUTE-LEVEL PERFORMANCE MEASURES AND STANDARDS

Productivity standards will be used to evaluate ridership, route efficiency, and reliability. The table below summarizes the fixed route operating standards. Four measures are proposed to measure the success characteristics of individual routes:

- **Passengers per Revenue Hour.** Calculated by dividing the number of passengers by revenue hours for a particular route. The metric provides a snapshot of overall performance and route efficiency.
- **Service to Total Hours Ratio.** With a goal to reduce vehicle-deadheading to/from a bus route or layover, it is important to understand service hours (or revenue hours) as a proportion of total service hours. Ratios for routes that are higher than those of other routes may point to operating issues such as schedules that cannot be cost-effectively broken into vehicle assignments or routes with distant or inefficient terminus points.
- **On Time Performance.** The reliability of route operations is also critical. Measuring an individual route's schedule adherence provides information regarding whether a customer can count on a bus being there as scheduled.
- **Cost per Passenger**. Cost per passenger is calculated by determining the cost of operating a route and dividing by the number of passengers. This ratio reflects the benefits of a given service (measured in customers) against the public cost of operating the service.

Route-Level Operating Standards

	Regional Commuter Rail Services	Regional Express Bus Services	Regional Arterial Routes	Urban Area Trunk Routes	Community Circulators	On-Call
Passengers per Hour	30	15	15	15	Neighborhood/Feeder: 8 University: 15	2.5
Service to Total Hours Ratio	1.0	1.3	1.3	1.15	1.15	1.15
On-Time Performance	90%	90%	90%	90%	90%	95%
Cost Per Passenger	$20	$10	$4	$5	$5	$30

POTENTIAL CORRECTIVE ACTIONS

Poor-performing services failing to meet productivity standards may be considered for a series of potential corrective actions, including schedule adjustments, route modifications, modified marketing strategies or elimination.

Schedule adjustments including frequency and service span reductions can improve productivity and cost effectiveness with minimal negative impacts.

Route modifications can help improve productivity and cost effectiveness in many cases. Ridership should be closely examined at the stop level to identify unproductive segments or service gaps. Route extensions or minor realignments may improve access to destinations. Route consolidations or short-turns may reduce duplicative or excess service.

Service elimination may be considered if ridership is consistently underperforming with minimal likelihood for sufficient future growth. All alternative means of maintaining service should be considered before proposing elimination. Elimination does not preclude restoration of service at a later time; however, proven ridership demand must exist before such a step is considered.

Service alternatives may be considered in low-density areas with moderate ridership potential. On-Call service may carry a small passenger market more cost-effectively than traditional fixed-route bus service.

SERVICE DESIGN STANDARDS

Service design standards are critical planning tools that are used to guide the expansion of service to new areas and potential markets.

Typically, transit agencies need to consider a full range of interrelated social, political and economic factors when they make major service decisions. While ridership is critically important, issues of equity and broader community impacts cannot be ignored. Several general design principles should guide the planning and operation of DCTA's fixed route transit services:

1. **Directness**. Routes should be as straight as the street pattern allows. These direct paths make for the most direct, likely the fastest, possible trip, and therefore tend to be useful to the more people than circuitous routes. Even if a trip requires changing buses, it is likely to be more direct and faster than a trip using circuitous service. One other factor is simply the human factor. Humans prefer to maintain orientation. Routes that follow circuitous pathways easily lose riders orientation implying to their subconscious that they are "lost in woods." Not only is this uncomfortable, but it reinforces the conception that the trip is taking longer than it actually should be.

2. **Frequency**. The elapsed time between consecutive buses on a route is one of the most important determinants of ridership. More frequent service attracts more passengers assuming a market is present. A very infrequent route requires customers to plan trips around the bus schedule. A very frequent route allows riders to travel whenever they want, without a schedule, allowing transit to approach the convenience that a road offers to a motorist: it is there exactly when customers want and need it.

   Provision of service that operates every 15 minutes is an important psychological breakpoint. At frequencies of 15 minutes or better, many riders will not need to use the schedule, because they know that they can just wait for the bus and it will be along "soon." While frequency is expensive, it is also crucial to high ridership.

3. **Consistency**. A consistent pattern to the schedule is strongly recommended. While frequency may vary during the day according to demand, it should not vary with apparent randomness from one trip to the next. Whenever possible, routes should also have frequencies that divide evenly into an hour, such as every 10, 15, 30, or 60 minutes. These frequencies have two advantages:

- Customers can remember the schedule easily, because the same pattern of times is repeated each hour. If a route runs every 30 minutes, the customer can remember that the bus comes at: 10 and: 40 past each hour. By contrast, if the bus runs every 35 minutes, few customers can remember the schedule, and are, therefore, forced to consult a timetable – or seek assistance from customer service – in order to catch any trip that they don't use routinely. Irregularity will often convince customers that they have missed a bus, or that the bus is "always late."
- Using frequencies such as 15, 30, or 60 minutes offer greater ease in scheduling timed connections between routes that occur consistently in each hour. This is especially important for less frequent feeder routes because they rely on connections for much of their ridership. Timed connections permit passengers on these feeders to complete their trips much more quickly.

4. **Simplicity**. Straight routes are also easily associated with one or two major arterials. The naming, presentation, and planning of such routes should encourage the idea that the route is an integral part of the street. Simplification is a key value in creating networks that people can navigate easily to make many kinds of trips.
5. **Walk Distances.** Although opinions differ about how far one should be asked to walk to a transit stop, the industry experience overwhelmingly indicates that the vast majority of riders will walk up to ¼ mile. Each transit route should be seen, then, as serving a band ½ mile wide (up to ¼ mile to each side of the route), except where the road network prevents reasonably direct pedestrian access.
6. **Minimum Bus Stop Design.** All bus stops should be clearly marked with proper signage including the designated route number(s). Benches should be considered for individual stops where the average daily boardings exceed 15 passengers. Priority should be given to bus stops serving senior apartments, activity centers, and group residences designed for persons with disabilities.
7. **Recovery Time.** All route schedules should include a minimum of 10% recovery time to ensure on-time performance. When headway-based scheduling is being applied, good practice is to ensure recovery time of one headway at each end of the route to ensure the ability to operate buses at the design frequency. It should be noted this design parameter is intended to ensure schedule reliability, not necessarily to provide rest periods for operators. Best practices in transit scheduling recognize that transit operators can be afforded rest periods without adding to the number of buses necessary to maintain schedule reliability: buses continue to move and operators rest.

DESIGN STANDARDS FOR FIXED ROUTE SERVICES

This section identifies the specific service design standards that have been identified for each service category. The following table details the specific design and operating standards applicable to each fixed route classification.

Fixed Route Design Standards

	Regional Commuter Rail Services	Regional Express Bus Services	Regional Arterial Routes	Urban Area Trunk Routes	Community Circulators
Location Characteristics *Dwelling Units per Acre* *Employees per Acre*	Along major corridors	Along major corridors	>4 >1	>10 >7.5	Neighborhood/Feeder >5 University >10 Neighborhood/Feeder >3 University >10
Frequency of Service *Weekday Commute Periods* *Midday & Weekend Periods* *Night Services*	15-30 min 30-60 min 30-60 min	30 min 60 min 60 min	30 min 60 min 60 min	10-20 min 10-60 min 30-60 min	As appropriate - typically no more than every 60 min.
Travel Time Ratio to Autos*	1.1	1.3	1.3	1.75	3.0
Stop Spacing *Urban Areas* *Suburban Areas* *Rural Areas*	 +5 miles +5 miles +5 miles	 ½ mile +5 miles +5 miles	 ½ mile ½ - 2 miles 2 -5 miles	 ¼ mile ¼ - ½ mile	 ¼ mile ¼ mile As needed
Scheduling Practices	Meet Demand Clockface Timed Transfer	Meet Demand Clockface Timed Transfer	Meet Demand Clockface Timed Transfer	Meet Demand Clockface Timed Transfer	Meet Demand Clockface Timed Transfer
Target Route Speed – Average speed that the route should achieve	>30 mph	>25 mph	>20 mph	>10 mph	>12 mph
Guideline Amenities Along Route	Shelters at all stops	Shelters at all stops	Shelters where needed	Shelters where needed	At major transfer points and high boarding locations only

*The travel time ratio to autos is compares the travel time for a bus to travel from one end of the route to the other end with the time the same trip can be accomplished during afternoon commute periods when traveling by auto.

COMMUNITY DESIGN STANDARDS IN SUPPORT OF SERVICE DESIGN STANDARDS

Recommended policies address issues of land use, circulation, and urban design. The coordination of these three aspects of form and function are essential in order to support increased transit ridership and preserve the livability of Denton County.

Land Use

The land use criteria are intended to measure the ability of land use policies to support the goals of this Long Range Transit Plan.

- **Land uses should be mixed both horizontally and vertically**. Vertical mixed use, with ground floor retail in developed areas and activity centers as identified through land use plans, can increase the vitality of the street and provide people with the choice of walking to desired services. Only a few communities in the county have the potential for this type of vertical integration, but development near A-train and future rail lines should emphasize vertical mixed uses. More important for the rest of Denton County, mixing uses horizontally can prevent desolate, single-use areas, and encourages increased pedestrian activity; scale of use and distance between uses are important to successful horizontal mixed-use development.
- **Support and enhance major activity centers**. Activity centers have a strong impact on transportation patterns as the major destinations in the city. They are generally characterized by their regionally important commercial, employment, and service uses. To make these places more transit-supportive they should be enhanced by land use decisions that locate new housing and complementary neighborhood-scale retail and employment uses to diversify the mix, creating an environment that maximizes transportation choice.
- **Land use intensities should be at levels that will encourage use of transit and support pedestrian and bicycle activity**. A general threshold for transit-supportive residential uses is 10 to 15 units per net acre for high-frequency bus transit. This density can be lower, however, if the urban environment supports pedestrian access to transit (a discussion of transit density requirements is included in Appendix H). Commercial and employment/education uses with high employment densities (e.g., UNT) support more transit use than do those with lower employment densities (e.g., industrial or warehousing). Extensive areas of retail tend to be auto-dominated if not scaled appropriately and mixed with other uses, such as Vista Ridge Mall in Lewisville or Rayzor Ranch in Denton. Non-residential uses with a Floor Area Ratio (FAR) of 0.5 provide a baseline that can support transit ridership. While there is little empirical research available to link employment density with transit ridership, the general “rule of thumb” is to maximize the intensity of development given market conditions and to make certain that the transit network provides high-quality service to areas with concentrations of employment uses and retail services.
- **Parking requirements (and parking provision) should be compatible with compact, pedestrian and transit-supportive design and development**. Requirements should account for mixed uses, transit access, and the linking of trips that reduce reliance on automobiles and total parking demand.

Circulation and Connectivity

Transit and transportation systems need to provide a balance of hierarchy and integration between and amongst modes. The circulation system facilitates access and safety for all travel modes, with particular attention to pedestrian and bicycle access, as these modes support transit ridership.

- **The transportation and circulation framework should define compact districts and corridors** that are characterized by high connectivity of streets to not

overly concentrate traffic on major streets and to provide more direct routes for pedestrians, good access to transit, and streets that are designed for pedestrians and bicycles, as well as vehicles. Of the various cities in the county, the street network in Denton is the best for transit operations because of the better connectivity of arterials.

- **New residential developments** should include streets that provide connectivity. Cul de sacs and walls around communities, which have been the norm in newer developing cities like Frisco, The Colony and Northlake are especially challenging for providing effective public transit.
- **Transit improvement projects should be targeted at areas with transit-supportive land uses** (existing and planned), in and around key destinations and projects that can increase pedestrian activity.

Urban Design

High quality urban design, including street and building design, can support increased transit use and pedestrian and bicycle activity. An important evaluation criterion is the extent to which the plans provide guidelines or standards to achieve the desired urban design character in a particular community.

- **Streets should be designed to support use by multiple modes**, including transit, bicycles, and pedestrians, through proper scaling and provision of lighting, landscaping, and amenities. Amenities must be designed to provide comfortable walking environments.
- **Buildings should be human scaled**, with a positive relationship to the street (including entries and windows facing onto public streets, and appropriate articulation, signage, etc.).
- **The impact of parking on the public realm should be minimized** by siting parking lots behind buildings or screening elements (walls or landscaping). Buildings should be close to the road so parking can be located on the side or in the rear.

PARATRANSIT PERFORMANCE REPORTING

Purpose of Paratransit Performance Measures

Performance measures as applied to paratransit services will incorporate many of the traditional measures of revenue hours/miles per vehicle/passenger. However, some agencies are broadening the way performance is measured, particularly because of the different nature of paratransit versus fixed-route services. Ride statistics such as total number of rides, number of rides denied, average miles per passenger trip and average ride time are being applied to gauge the impact of paratransit services in terms of improving transportation access. Paratransit providers are also beginning to measure their performance in terms of vehicle capacity, instead of the number of vehicles in their fleet, to reflect the mixed fleet used to deliver paratransit services.

Paratransit performance measures allow DCTA staff to:

- Track compliance with certain requirements of the ADA, including on-time performance, trip denials, and access to the reservation system;

- Assess system performance based on established criteria, and compare that to past measures of performance and target goals.
- Document outcomes and trends related to system efficiency and communicate these to the DCTA Board, NCTCOG, and member cities.

Demand Response Performance Measures and Standards

The following performance measures will be used to assess system productivity and ADA compliance. While there is general agreement on what to measure, there are few industry-accepted standards or target values (except those related the showing adequate capacity to avoid a pattern of trip denials).

- **Cost per revenue hour**. Annual operating costs divided by annual vehicle service hours. This measure highlights an agency's cost effectiveness, normalizing operating costs (primarily labor and fuel) to the number of hours the service is provided.
- **Cost per trip**. Annual operating costs divided by the number of trips provided. For ADA paratransit services, it is common to include rider companions and attendants in the number of trips (i.e. total boardings). This measure allocates operating costs on a per passenger basis which is often useful when analyzing growth trends or when comparing modes.
- **Cost per revenue mile**. Annual operating costs divided by annual vehicle service miles. This measure highlights cost effectiveness, normalized to service miles provided.
- **Trips per hour**. Annual boardings (again including attendants and companions) divided by annual vehicle service hours. This is a key performance indicator highlighting the number of passengers carried for a unit of service delivered. For Access, it reflects the level of shared rides and amount of slack time in a run.
- **Revenue miles per trip**. Annual vehicle service miles divided by the number of annual boardings. This measure can show variations or trends in trip length which is useful when examining factors contributing to the efficiency of a demand-response system (longer trips are harder to schedule with shared rides and create more deadhead time where the vehicle is operating without a passenger onboard).
- **Percent of trips on time**. Percent of all trips where the passenger is picked up within the allotted appointment time window. This measure is a key performance indicator, especially from the customer's perspective, indicating the reliability of the service.
- **No-show/late cancellation rate.** Defined as the percent of scheduled trips where the passenger is a no-show or failed to provide adequate notice that they cannot complete their trip. This measure shows how much unproductive vehicle and driver time is expended making unnecessary trips and not being available to transport other passengers.
- **Advance cancellation rate.** The percent of scheduled trips that were cancelled more than two hours prior to the scheduled pick up time. This measure shows the degree to which the scheduling system has to respond to customer changes, also negatively impacting an agency's ability to efficiently schedule vehicle utilization.
- **Missed-trip rate:** Scheduled trips that were not completed within an hour of the scheduled time because the Access vehicle failed to arrive at the scheduled pickup time. The measure is a key indicator of on-time performance and service efficiency.

- **Average passenger trip length:** The total number of passenger miles divided by the number of passenger trips. This measures the relative amount of longer trips which can result in longer deadhead times and/or fewer shared rides – resulting in lower productivity rates.
- **Average passenger travel time.** This indicator reflects the amount of time a passenger has to ride in the vehicle to complete his/her trip but is not typically monitored in the industry. The sampling of individual trips allows Access to make sure a customer does not spend an excessive amount of time in a vehicle (especially compared to the equivalent trip time for a fixed-route trip).
- **Complaint rate:** The number of complaints per 1,000 passenger trips. This measure shows trends in customer satisfaction levels. While the complaint rate shows the level of negative feedback from customers, a commendation rate shows the level of positive feedback.
- **Farebox recovery ratio:** The percentage of Access operating costs recovered by passenger fares. This is a measure of service efficiency.

Access Performance Measures and Standards

Access Performance Measure	Access Performance Standard
Cost per service hour	$75
Cost per passenger	$30
Cost per service mile	$5.50
Passengers per hour	2.5
Percent of trips on-time	90%
No-shows	No Shows=<1.5%
Missed Trips	<0.5%
Advance cancellation rate	15%
Complaint rate (per 100,000 trips)	15
ADA Trip denials	None
Farebox recovery ratio	10%

PASSENGER AMENITIES

The following are guidelines for passenger amenities for fixed route bus services. The primary focus of the placement of any amenity is for the safety of the passenger and the transit operator. Regarding the bus stops, it is DCTA's intent to pattern practices after the well - established and proven Transit Cooperative Research Program, Report 19, Guidelines for the Location and Design of Bus Stops prepared by the Texas Transportation Institute and can be found online at http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf).

DCTA will strive to work with local jurisdictions to construct accessible sidewalks in areas where sidewalks are non-existent or difficult to navigate. Special care will be taken to ensure ADA access is available at DCTA stop locations whenever possible.

Bus Stop Placement

Stops should be located in the vicinity of demonstrated or potential ridership generators and where the stop can be safely placed. Safety issues always take precedence over issues of convenience.

Stops should be no closer than 700 feet to ensure the flow of traffic and adherence to the schedule. Actual stop spacing should be determined by usage and attractors. Stops should be located in areas where passengers can alight and board without physical or natural obstacles (e.g. light poles, storm water run-off), doors may be easily opened and closed and where a wheelchair lift can be easily and safely operated.

All stops should be placed in public right-of-way and have minimal impact on existing signs, stop locations and driveway locations. Care should be taken to ensure that the signs are easily visible by not only passengers but by bus operators.

When a permanent stop is out-of-service due to construction, a temporary stop may be placed at the next safest and convenient location. The same criteria for placing a permanent stop should be considered when placing a temporary stop. Generally, a temporary stop is used for six months or less. Extenuating circumstances may allow for this time period to be extended.

Signalized Intersections

In general, stops at signalized intersections should be placed nearside as to allow alighting and boarding without disrupting the flow of traffic. The exception to this is where there is an exclusive right turn lane which would prevent placing a stop nearside to the intersection. If this is the case, the stop should be located at the farside of the intersection, which allows for the bus to completely clear the intersection. Where the bus makes left turns, the stop should be far-side, giving enough room for the bus to clear the intersection and automobiles to clear the bus.

Unsignalized Intersections

Far-side stops are preferred at unsignalized intersections for safety reasons. Far-side stops should be located no closer than approximately 80 feet from the intersection to allow for both the bus and automobiles to clear the intersection.

Mid-block stops may be necessary near unsignalized intersections. If this is the case, stops should be placed with consideration for allowing sight distance for both traffic and pedestrians. If possible, mid-block stops should be placed in conjunction with pedestrian cross-walks, although this may not always be the case.

Bus Stop Amenities

Bus stop amenities add to customer comfort, convenience and safety. As a rule, bus stops within the DCTA system should have 15 daily passengers boarding to maintain a bus bench and 25 daily passengers for a bus shelter. Both a shelter and bench should be equipped with a trash receptacle, which will be secured to prevent it from being tipped or blown over. Amenities will be placed in areas where lighting provides visibility for bus operators and safety for passengers. Consideration will be taken for the surrounding environment to ensure passenger safety and comfort. All bus stop amenities should be placed on public right-of-way and be approved by the appropriate city department. Placement on private property will be considered on a case-by-case basis and with written permission of the property owner.

Benches

Benches may be installed where sidewalk width allows and no physical constraints exist. The bench should be located where it does not impact or obstruct ADA access and should be on a level surface. It should be placed as close to the bus stop sign as possible and in a location where passengers are visible to the operator.

Shelters

Shelters may be placed in locations with 25 or more daily boardings or at transfer points. Shelters should be sited on level ground, with adequate drainage and light. Safety for passengers should be considered when placing a shelter. If a shelter is requested by a private party, then private party will be asked to participate in the cost of the shelter, if the shelter does not meet stated criteria. Shelter placement is also dependent upon the agreement of affected property owners and compliance with local government ordinance, building codes and ADA requirements.

Relocation & Removal of Bus Stops and Passenger Amenities

DCTA strives to be a responsible neighbor and will be responsive to bus stop adjustments where passenger safety, comfort and convenience are not compromised. When a request is made to remove or relocate a bus stop or passenger amenity, DCTA will strive to cooperate with the requesting party and/or owners of businesses and residences to ensure minimal inconvenience for all. DCTA will not remove or relocate bus stops or passenger amenities when the request appears to be motivated by bias on the basis of ethnicity, income level or social status of passengers utilizing the bus stop.