Designing for Transit

A Manual for Integrating Public Transportation and Land Development in the San Diego Metropolitan Area

February 2018

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San Diego Metropolitan Transit System

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Contents

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Introduction

1

The Americans with Disabilities Act (ADA) and supporting federal accessibility regulations must always be accommodated in the design of transit facilities. Modifications to accessibility regulations may supersede the guidance in this document. All applicable regulations should be reviewed prior to the design of any transit-related project.

ABOUT THIS MANUAL

This manual is designed to help planners, developers, architects, and engineers understand the physical requirements of public transportation. It also has important value to elected officials and city administrators as they formulate transit-supportive policies to achieve climate action goals

The manual consists of five sections. This introduction is the first section, providing background material on transit in the San Diego region and the need for its coordination with land development. The second section presents measures which can improve transit service and enhance safe access to transit on local streets through Complete Streets design strategies. The third section presents general guidelines on how to design development in a more transit-supportive way. It details how to make residential and commercial areas more conducive to walking and to the use of buses and light rail. It is followed by two sections giving specific design standards for public transportation facilities and vehicles, one section for bus transit and one for light rail transit.

This manual will be updated from time to time. Your ideas and contributions are welcomed. Please send them to the MTS Planning Department, 1255 Imperial Avenue, Suite 1000, San Diego, CA 92101-7490.

PUBLIC TRANSPORTATION IN SAN DIEGO

Public transportation is a vital piece of regional infrastructure. Hundreds of thousands of people across the San Diego region depend on it every day. This reliance on public transportation will only increase in the future as cities, universities, and other entities work to reduce automobile trips and the greenhouse gases autos produce. MTS operates nearly 100 fixed routes, three major Trolley lines, and on-demand responsive paratransit service to serve San Diego's urban core, many of the region's suburban communities, and even our rural mountain and desert communities.

Historical Background

Public transportation in San Diego has a long and colorful history. The first streetcars began operation in 1886, pulled by horses or mules, and later by steam and cable power. Under the leadership of the San Diego Electric Railway Company, these were soon replaced by electric streetcar lines, which expanded throughout the city. Long-distance runs into the countryside were served by heavier interurban electric railways. The first motor buses appeared during World War I on independently operated "stage lines" to outlying communities. The San Diego Electric Railway eventually bought out many of these lines and also began substituting buses for streetcars on its lightly used routes. Such substitutions became more numerous after World War II. It was cheaper for the company to initiate bus service than to renew the tracks and streetcars worn out from heavy wartime use. The last of the old streetcar lines closed down in 1949.

Meanwhile, in 1948, the company had been sold and reorganized as the San Diego Transit System. It faced many challenges. Strong competition from private automobiles was developing in the postwar years. In addition, the auto-oriented design of the newly developing suburbs was difficult to serve by transit. Steadily declining ridership eventually spelled financial disaster. To forestall massive service cuts, the system was purchased by the City of San Diego and began operating as San Diego Transit Corporation in 1967. Several suburban jurisdictions started public transit services, as well. These communities purchased their own buses, but turned day-to-day operations over to private companies.

The increasing number of transit providers in the region began to result in confusion. To help address this problem, the Metropolitan Transit Development Board (MTDB) was created by the State Legislature in 1975. It introduced standardization and coordination for all the operators in the metropolitan area. MTDB also began the development of a light rail transit system, to be operated by a subsidiary known as San Diego Trolley, Inc. Its first line opened in 1981. In 1985, the City of San Diego turned responsibility for San Diego Transit over to MTDB; this was followed four years later by the authority to regulate its taxis and jitneys.

In 2005, MTDB officially changed its name to the Metropolitan Transit System (MTS). Between 2001 and 2015, all independently operating municipally-owned transportation services throughout the service area became incorporated into MTS, to more efficiently utilize regional transit resources in a coordinated and seamless way.

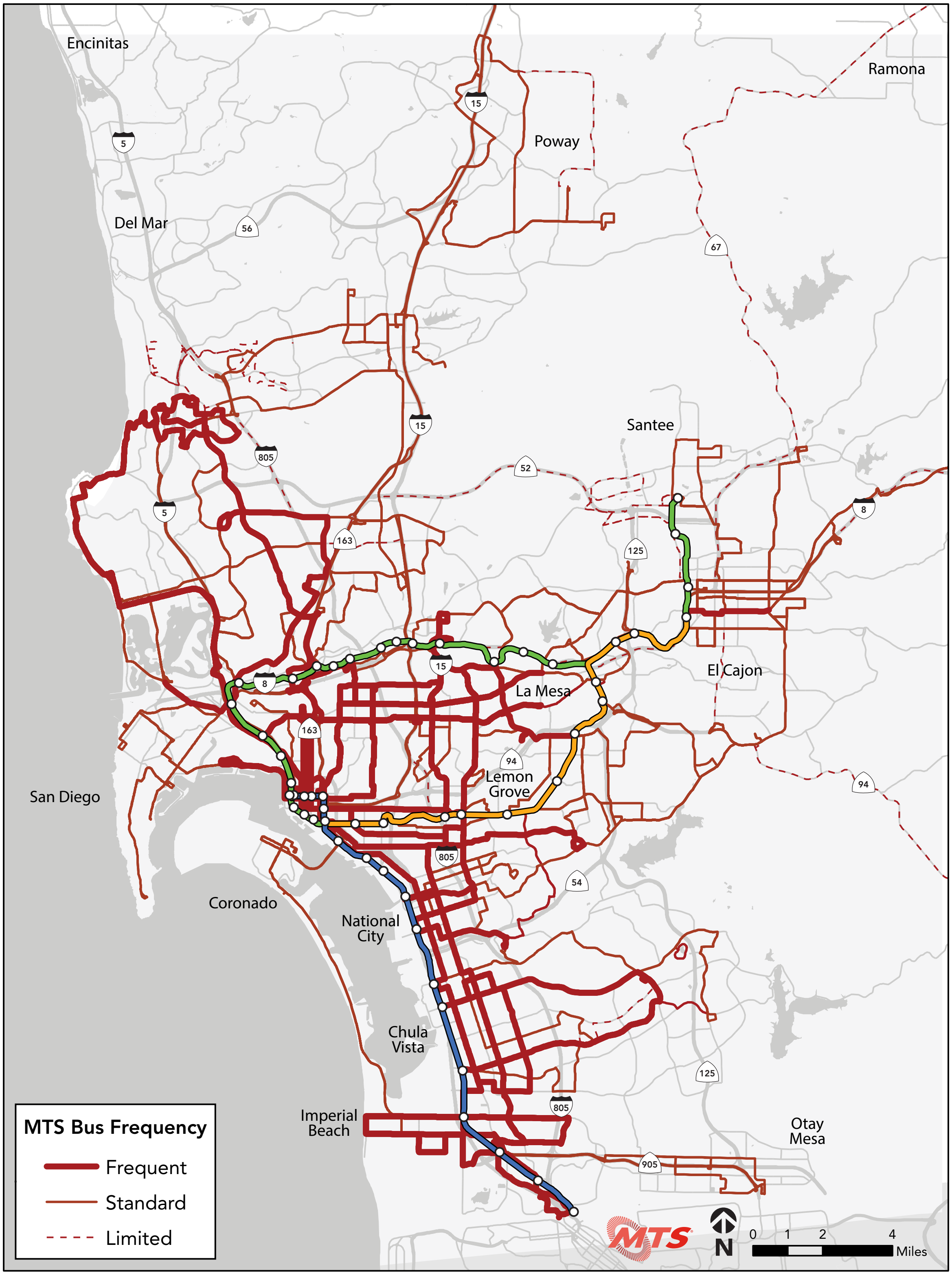
Current Organization

MTS has the responsibility for planning and operating bus, light rail, and paratransit services in the southwest portion of San Diego County. All MTS services share a common fare structure, route numbering scheme, and public information system. Thus, riders are assured of the benefits of a unified system. The San Diego Association of Governments (SANDAG), the Metropolitan Planning Organization (MPO) for San Diego County, is responsible for long-term transportation planning and engineering, regional transit fare setting, and construction of transit infrastructure.

MAKING THE LAND USE CONNECTION

In fulfilling MTS responsibility for improving public transportation, one fact has become very clear: **The environment in which transit operates is as important as the quality of service that is offered.** That is why this manual has been prepared. It is intended as an aid for those shaping our urban and suburban environments to create patterns of development that support transit use. It is also intended to complement similar design guidelines already developed by other local jurisdictions.

Figure 1-1 Metropolitan Transit System Map, 2017



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Making Transit Work Better for Your Community

2

TRANSIT PRIORITY MEASURES

Prioritizing transit in transportation infrastructure creates a more reliable and efficient service, which in turn makes the network more effective and can increase ridership. There are multiple methods for implementing transit priority measures within cities and communities.

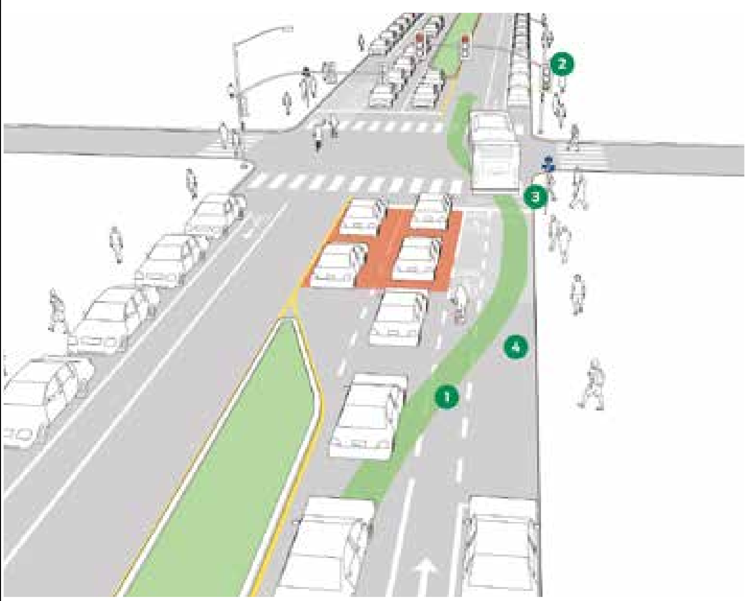
While some graphics originate from the National Association of City Transportation Officials (NACTO), dimensions and specific applications need to be verified by MTS.

Transit Priority Recommendations

- Queue Jumps
- Transit Signal Progression
- Active Transit Signal Priority
- Bus Bulbs

Queue Jumps

A queue jump provides buses with an exclusive lane and advanced signal priority to bypass vehicle queues at an intersection. It is viable at all stop configurations and with or without a bus station or stop. Positive results of this transit priority method include improved on-time performance and decreased route travel times, both of which improve overall service reliability. The technology and infrastructure necessary for this system includes a separate signal head to alert bus operators when to safely advance through the intersection and vehicle detector to sense when a transit vehicle is present. See the NACTO Transit Street Design Guide for more information and recommendations. For high frequency routes, transit only lanes may provide greater benefits to operations and service. **Figure 2-1** provides an overview of queue jumps.



1. Buses must have access to a lane and the ability to reach the front of the queue at the beginning of the signal cycle. Buses receive a head start with an advance green.
2. Separate signals must be used to indicate when transit proceeds and when general traffic proceeds. Transit signals can be either be a transit specific signal head or a louvered or visibility-limited green indication, making it visible only to the right-most lane.
3. Where stops are located near-side, right turns are prohibited from happening curbside. The bus pulls into the stop, completes boarding, and then pulls forward onto a loop detector to receive the advance green.
4. The length of a shared head start/right-turn pocket should be long enough to allow storage of right-turning vehicles and allow buses to reach the queue jump during each signal cycle.

Figure 2-1 Queue Jumps

Source: NACTO Transit Street Design Guide

Transit Signal Progression & Active Transit Signal Priority

Modifying the signal timing to give priority to transit can reduce transit trip durations; this treatment can be effective on both high frequency, dense corridors and at intersections with low volumes of cross traffic. It is important to first evaluate the intersection, corridor, and existing conditions of the area before modifying the signal timing. One method is through transit signal progression, or the strategy of sequentially timing signals such that a bus traveling between 12 and 20 mph would have consecutive green lights, or a "green wave." This allows for operational improvements without the construction of new infrastructure. Signal progression with TSP is shown in **Figure 2-2.**

Active Transit Signal Priority (TSP) is an additional signal improvement that can decrease transit route times by augmenting existing coordinated signal progression. This dynamic signal timing method uses technology within the transit vehicle and in the corridor to detect an approaching transit vehicles and adjust the signal timing to serve the oncoming transit service. This is often successful on signals that are more widely spaced or along dedicated transit lanes allowing the transit vehicles to reach the signal without encountering other delays. The NACTO Transit Street Design Guide provides more discussion on the technology options and the optimal locations for the use of transit signal progression and TSP.

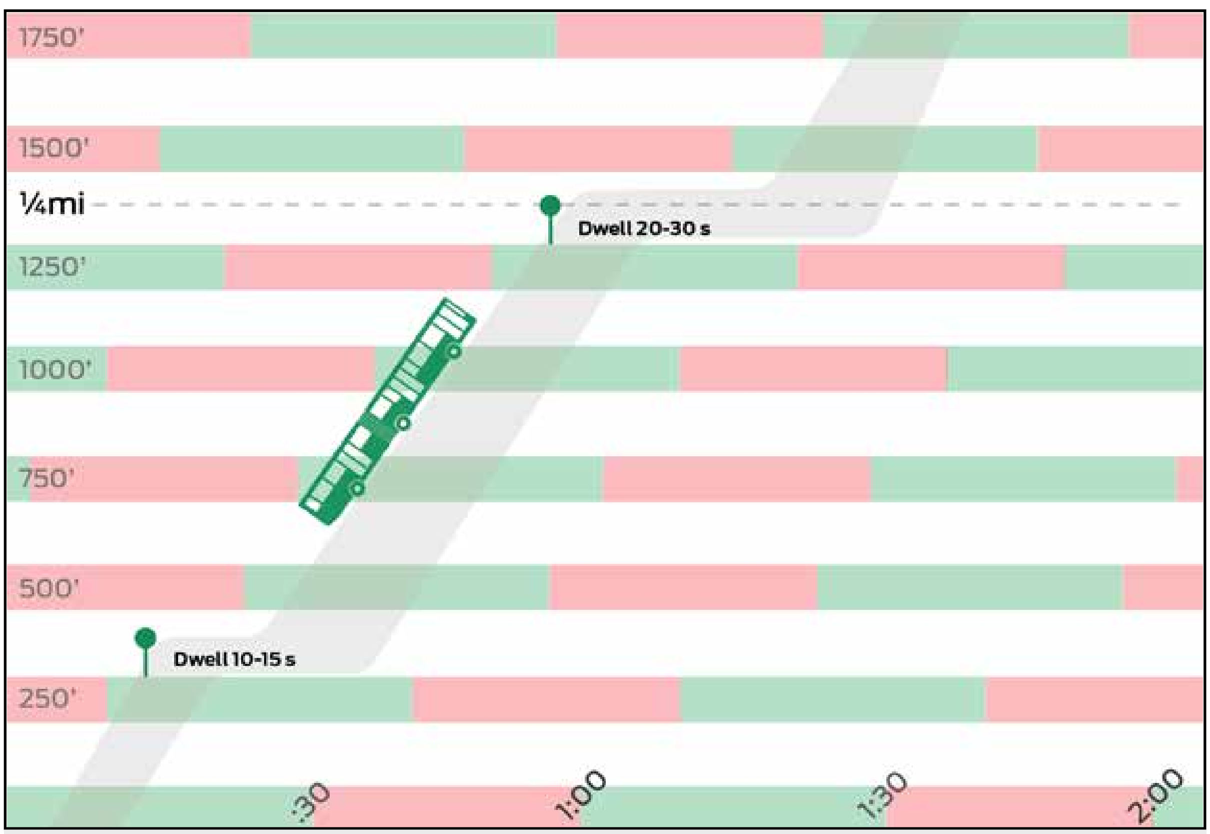
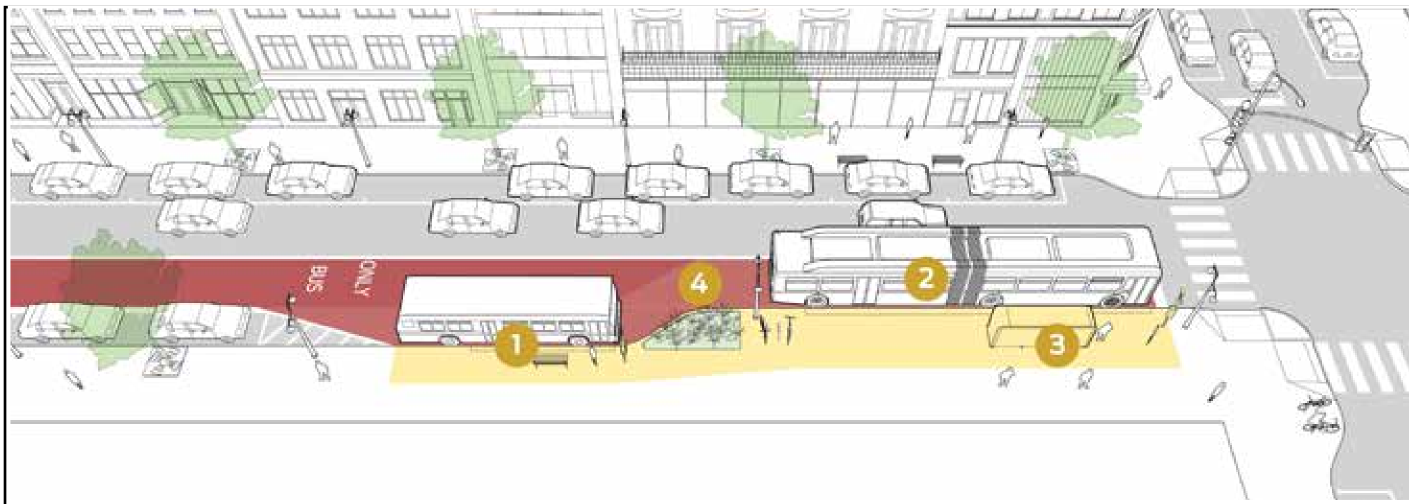


Figure 2-2 Transit Signal Progression
Source: NACTO Transit Street Design Guide

Bus Bulbs

A bus bulb is a physical street improvement that extends the bus station platform to the lane of travel. This is effective for Rapid routes but is not appropriate for local routes along Rapid corridors, or for streets with one lane per direction. Bulbs eliminate the need for transit vehicles to merge when serving stops, which improves travel times and reduces points of conflict between buses and other vehicles. Bus bulbs provide larger station areas for passengers and can provide additional waiting areas for high boarding volume stops, without blocking the sidewalk.

Bus bulb stations create an inviting space for passengers and can provide additional space for seating, advanced wayfinding signs, and bike parking. Physical improvements to transit stops and stations improve not only the reliability of transit but also enhance the safety and experience of the passenger. The additional space created on either side of the bus bulb out can be transformed into bike and vehicle parking or additional streetscaping. The design elements of the bus bulb out are dependent on the vehicle and station boarding size. (See Figure 4-9 and Figure 4-10 for specifics on boarding dimensions).



1. Pull-out stop is located before the bulb stop and serves the local service. Each stop should include its own pole and sign, as well as legible rider and service information for passengers. Distinguishing between local and *Rapid* service stop locations is critical for trip planning.
2. *Rapid*/limited bus service is accommodated by the boarding bulb. Regardless of arrival order, *Rapid* buses are able to jump local buses in the queue and allow transfer between services. Curb radii at the back of the bulb must be great enough to accommodate the local bus's transition back into the travel lane.
3. Stop amenities (e.g. shelters, seating, wayfinding, and trash bins) can be placed on the bulb to preserve capacity and throughput of the sidewalk. For *Rapid* service, stop shelter and amenities should be more robustly designed, including expanded capacity, maps and real-time arrival information, and wayfinding.
4. Concrete bus pads are at a minimum "S" shaped and continuous through the stop, conforming to the shape of the curb.

Figure 2-3 Bus Bulbs

Source: NACTO Transit Street Design Guide

COMPLETE STREETS AND ACTIVE TRANSPORTATION

Access to Transit

Providing reliable service to passengers is an important piece for achieving the end goal of providing safe and efficient ways for transit users to reach their destinations. Allowing for passengers to arrive at their final location requires accessible stations, effective pedestrian, and bicycle networks. Complete Streets elements can help provide safe connections to transit, as seen in **Figure 2-4.**

Connected streets that have safe and direct access from transit stations to passenger destinations incentivizes commuters to use the service. Passengers are typically willing to walk between a quarter mile and a half of a mile from a transit station to their destination; this range varies based upon factors such as route frequency, neighborhood walkability, lighting, and security. Safe intersection and crosswalk design allows pedestrians to comfortably navigate the urban area. Examples of improvements to crosswalks include adding additional striping to the pavement, raised crosswalks when mid-block, extending the curb to reduce the crosswalk distance, and providing adequate pedestrian cross signal timing. However, not all pedestrian improvements are recommended along transit corridors, and may present impediments to successful transit service. It is important to consult with MTS Planning staff when consdiering street improvements along transit corridors.

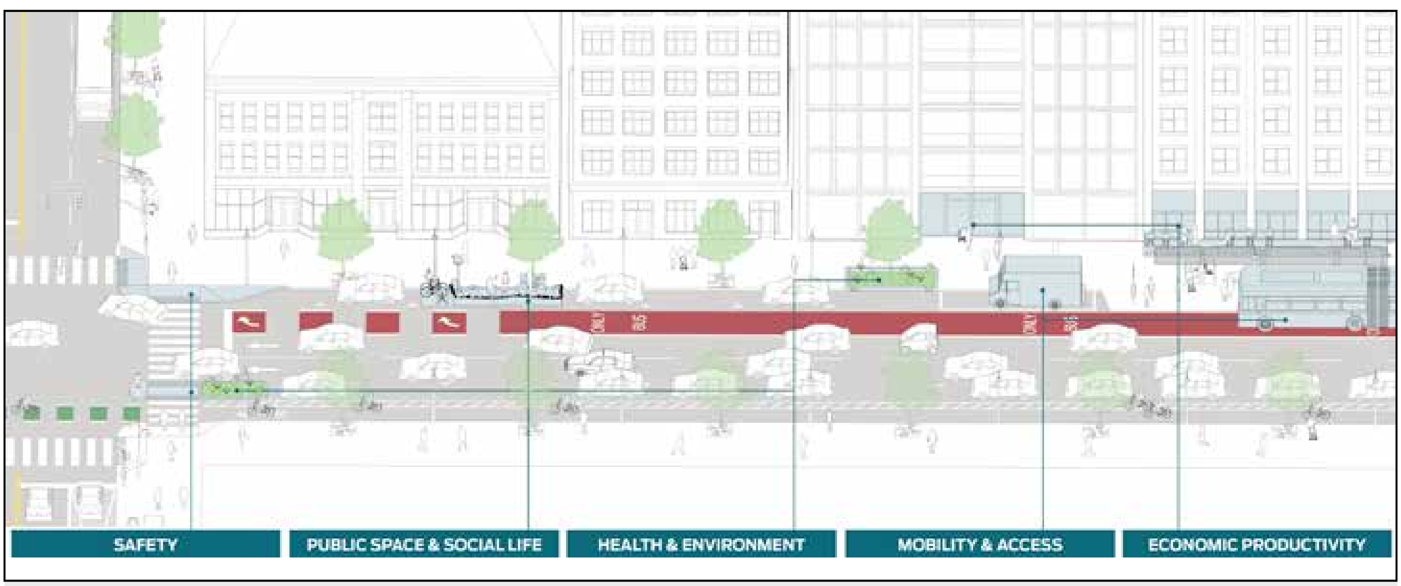


Figure 2-4 Complete Street Elements
Source: NACTO Transit Street Design Guide

Station Amenities

Station design is a key component in the transit user's experience; it allows the user to feel safe and gives them the necessary elements to navigate his or her way around the community and transit network. Elements that may be improved or added include:

- Lighting
- Shelters
- Seating
- Ticket Vending Machines
- Raised Transit Curbs

Well-lit stations and shelters allow users to feel comfortable using transit at all times of day. Shelters should be designed to shelter passengers from the elements while allowing passengers to remain aware of their surroundings and ensuring maximum visibility to transit operators.

Real-time wayfinding signs and prominent bus stop signs are essential elements for passengers, should be well lit, and provide relevant information on the transportation network and surrounding area. Some existing locations are infeasible for furniture due to site conditions or available space constraints, as safety and accessibility must be maintained. Therefore it is essential to work with MTS prior to development to ensure that a site can accommodate current or future station amenities.

Seating design should take into consideration passenger age, expected duration of wait times, and volume of boardings at the location. Transit curbs are raised curbs which reduce the elevation distance between the bus and the curb, allowing passengers an easier boarding and exiting experience and improving service by reducing boarding times at stops.

Figure 2-5 MTS RAPID Station
Source: MTS

Additional enhanced transit station elements include:

- Trashcans
- Bike parking
- Trees
- Landscaping

Assessing the needs and priorities of the station users, the land use surrounding the area, and the street configuration is critical in any transit station design. Incorporating native plants to the bus landscape improve the environment for the passengers, the natural ecosystem in the area, and the treatment of stormwater.

MTS provides benches and shelters in some jurisdictions - others prefer to utilize their own amenities. All MTS furniture is a consistent design for branding, maintenance, and procurement purposes. Developers or communities that want a custom design for bus stop amenities in their area may do so with the following conditions met:

1. MTS approves in advance to ensure accessibility and safety of its stops
2. Approval, agreement, and permit from the local jurisdiction, often requires a right-of-entry permit
3. All applicable codes are met
4. Provisions are made for cleaning, maintenance, repair, including 24-hour response in the event of damage

MTS must be provided contact information for the responsible responding parties.

Pedestrian Infrastructure

Sidewalk design influences pedestrians comfort, safety, and overall experience. Sidewalks should incorporate similar features as transit stations, including sufficient lighting, seating, additional space, trees and landscaping, and visibility to the rest of the street environment. By successfully implementing these elements to the streets surrounding a transit station, transit services can extend its network and can be used by more members of the community. Examples of pedestrian infrastructure are provided in **Figure 2-6** and **Figure 2-7.**

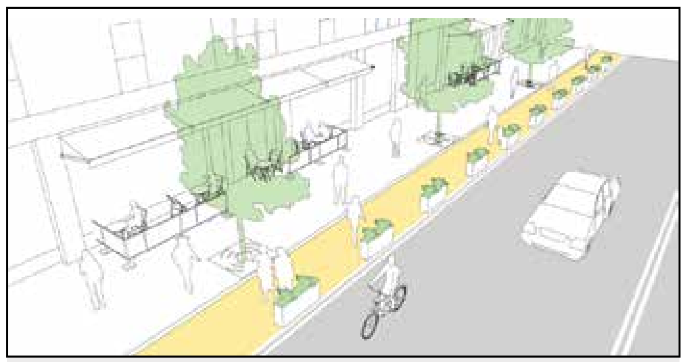


Figure 2-6 Sidewalk Widening
Source: NACTO Urban Street Design Guide

Figure 2-7 Parklet
Source: NACTO Urban Street Design Guide

Bicycle Infrastructure

Connecting passengers to transit with first and last mile solutions promotes the use of transit. Providing an area for short and long term bicycle parking increases the accessibility of the transit stop. It also improves stop congestion by encouraging people to park their bicycles in designated locations rather than on the infrastructure around the stop. Bikeshare systems are also effective for providing transit users another option to reach their destination. The placement of such parking facilities should not conflict with boarding areas, pedestrian walkways, and ADA paths.

Providing safe bicycle access increases the area the transit service can reach. While existing conditions may make it difficult to construct bicycle lanes and facilities, transforming adjacent streets into bicycle ways may be a viable alternative. MTS encourages the greatest separation possible between bus and bikes due to the very significant differences in size, weight, speed, and operating characteristics. Weaving between overtaking bikes and buses can create a dangerous environment for bikes and can cause delays to bus operations.

Traffic Calming

When designing for transit, it is important to be mindful of transit's place within the larger transportation context. Connecting passengers with safe first/last-mile transportation supports transit ridership. Safe streets for all can be accomplished through traffic calming measures.

One such tool is to provide narrower lanes, which can help reduce vehicle speeds. As seen on the following page, there is a linear correlation between the width of the lane and the speed vehicles travel. Note that for streets with bus service, at least one lane should remain 11'-12' wide.

In order to support bus operations, MTS recommends that traffic calming features which could slow bus operations, such as speed cushions, be focused on connecting side streets. On side streets, these elements can enhance the street environment and aid in bicycle and pedestrian connections to the transit corridor, without adversely impacting bus operations.

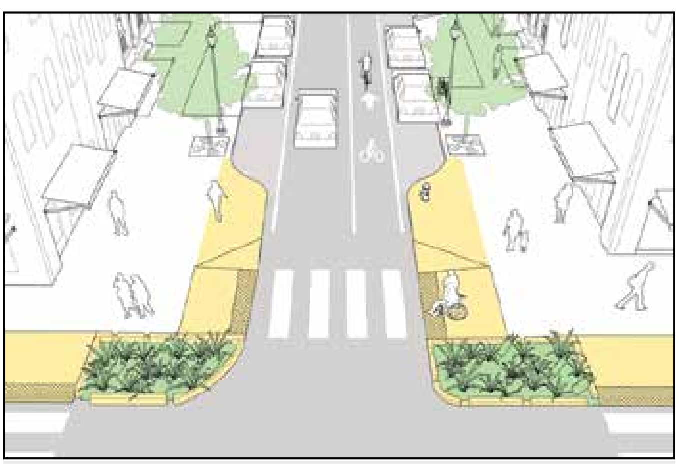


Figure 2-8 Curb Extension
Source: NACTO Urban Street Design Guide

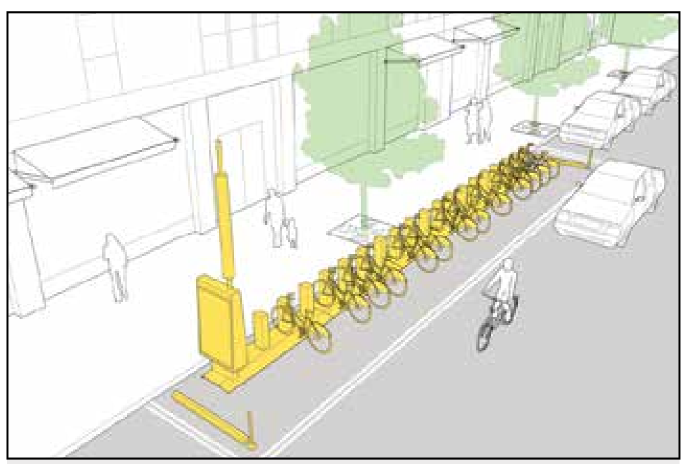


Figure 2-9 Bike Share Station
Source: NACTO Urban Street Design Guide

Elements such as curb extensions can be included along bus corridors; however, they are not recommended adjacent to curbside bus stops due to their impacts on operations at stops. When paired with in-lane bus stops, curb extensions can further compliment transit and potentially reduce the number of non-transit vehicles using the stop as a loading zone.

Traffic calming methods include:

- Curb extensions
- Speed tables
- Bus bulbs
- Speed cushions

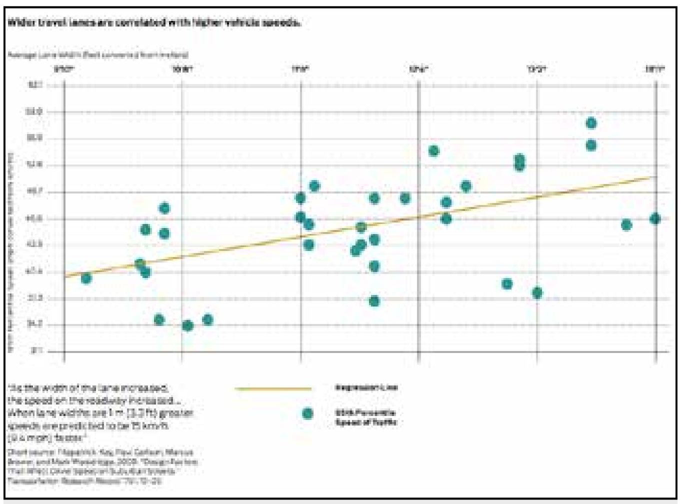


Figure 2-10 Lane width and speed correlation
Source: NACTO Urban Street Design Guide

Figure 2-11 Speed Table
Source: NACTO Urban Street Design Guide

Stormwater and Drainage Requirements Near Transit

When constructing a drainage inlet on streets with existing transit routes, ensure that the following are observed:

- Maintain a 5% gutter slope between gutter inlet and edge of pavement (See **Figure 4-4**)
- Maintain a curb height of 8" to 10"
- Include a bumper where the curb face is 90 degrees

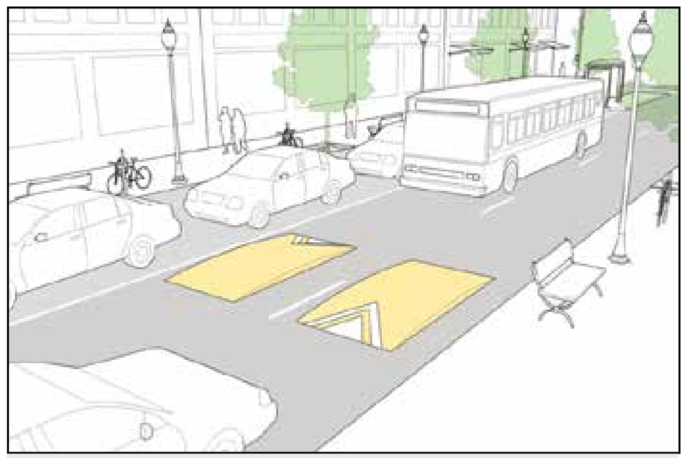


Figure 2-12 Speed Cushions
Source: NACTO Urban Street Design Guide

Figure 2-13 Curb extension impacting a bus stop
Source: MTS

COMMUNITY EVENTS, SPECIAL EVENTS, AND CONSTRUCTION COORDINATION

Community Events

Street space can be transformed from channels moving people into a space bringing communities together. Within greater San Diego, neighborhoods host farmers markets throughout the week and a variety of organizations host block parties, festivals and events such as CicloSDias and December Nights. Early coordination with MTS will allow for opportunities to plan alternative service for the event to ensure both optimal access to the event using transit as well as minimal impacts to other transit passengers.

Special Events Coordination

As local jurisdictions permit and/or host a variety of events, transit services can effectively mitigate traffic delays and other results of larger volumes of people.

Construction Coordination

As our region continues to develop through new construction and improvements to the existing infrastructure, it is important to maintain transit operations. Early communication and preventive measures can reduce interruptions in service. Maintaining constant communication with MTS throughout the entire span of the project benefits both the citizens and visitors to the city. Since construction work can cause closures and detours of routes, it is essential that the transit network remain reliable and efficient.

Coordination is particularly important in regards to rail, as vehicles cannot detour like buses. Additionally, rail operations are governed by Federal Transit Administration (FTA) and California Public Utilities Commission (CPUC) regulations. Information on the process to obtain a Right of Entry Permit can be found on the MTS website. Consult MTS for information regarding terms of construction scheduling, flaggers, meetings, safety, and permitting.

For bus stop closures, appropriate notifications procedures are required. **A minimum of two weeks notice is required at the bus stop, and coordination with the Bus Operations department must be done in advance of the closure.**

BICYCLE AND TRANSIT STREETS

Providing cyclists with space on urban streets to share with transit and other vehicles is beneficial for the transportation network overall. It allows transit users to use a bicycle to get to and from the station or stop, or as an alternative way to commute rather than using a personal vehicle.

While many of the strategies to implement share or separated bicycle infrastructure are suitable for environments with a high volume of transit service routes, shared bus and bicycle lanes can be uncomfortable for cyclists and cause delays in the transit service, and are therefore not recommended by MTS.

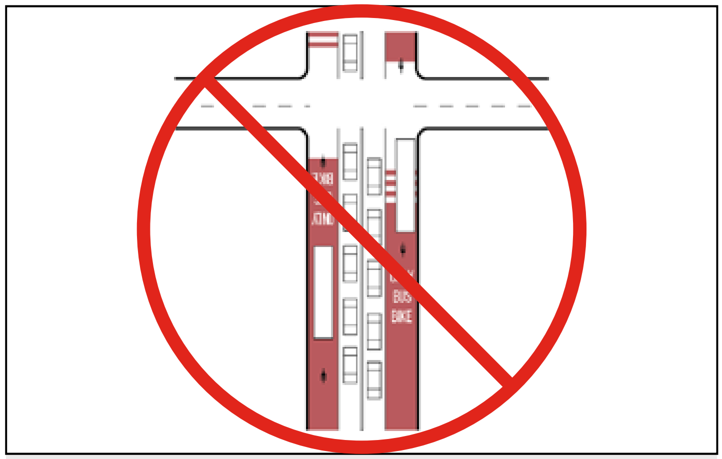
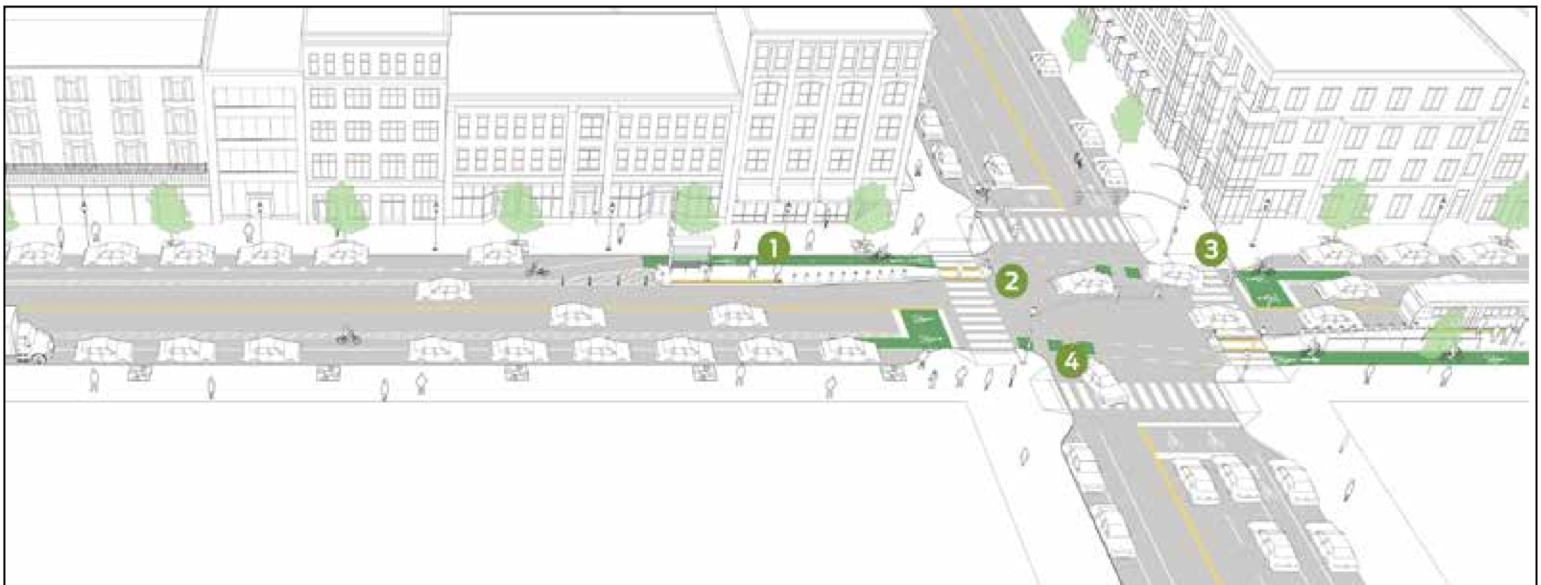


Figure 2-15 Shared Transit and Bike Lanes are Not Recommended
Source: NACTO Transit Street Design Guide



1. On streets with buffered bike lanes, most stops can be converted to in-lane stops. Buses are no longer required to pull to the curb and re-enter traffic, a major advantage on a street with one lane per direction. Prior to implementation of in-lane stops, sharrows or dotted line treatments can be used to allow bus stops in bike lanes. Consult FHWA guidance for more information.
2. Design boarding islands with pedestrian refuges, shortening crossing distances and enabling shorter signal cycles. Small deflector islands protect pedestrians and tighten turn radii (for additional guidance, see Side-Boarding Islands).
3. Transit and bicycle signal delay can both be reduced with low-speed signal progressions, short cycles, and/or active signal priority to improve transit speeds and reduce corridor-wide travel times.
4. Position bicyclists using intersection crossing markings, and apply green color as the bike lane passes the boarding island. Bicyclists can be positioned in front of motor vehicles at intersections using bike boxes, or left turns can be made using two-stage turn queue boxes. On Trolley routes, use two-stage turn queue boxes to encourage bicyclists to cross tracks at a safe angle. Refer to Bicycle Rail Crossings and the Urban Bikeway Design Guide for additional guidance.

Figure 2-14 Transit Street with Bike Lanes
Source: NACTO Transit Street Design Guide

FUTURE TRANSIT SIGNAL PRIORITY CORRIDORS

The San Diego Association of Governments' (SANDAG) Intelligent Transportation Systems (ITS) program created a Draft Improving Bus Operations and Traffic (IBOT) Final Report in November of 2016. The committee identified nine corridors within the MTS area for potential Transportation Signal Priority (TSP) improvements in the future.

TABLE 2-1 TRANSIT SIGNAL PRIORITY CORRIDORS

CORRIDOR #	AGENCY	MAJOR STREETS	PRIMARY BUS ROUTE(S)	JURISDICTION
1	MTS	University Ave. between 1st Ave. and La Mesa Blvd.	1, 7, 10, 11, 83, 120	San Diego, La Mesa
2	NCTD	Mission Ave. between Oceanside Transit Center and San Luis Rey Transit Center (via Douglas Dr. & N. River Rd.)	303, 313	Oceanside
3	MTS	Genesee Ave. between SR-163 and Nobel Dr.	25, 41, 50, 105	San Diego
4	MTS	Highland Ave. between 3rd St. and Main St. (via 3rd Ave.)	929	National City, Chula Vista
5	MTS	Between El Cajon Transit Center and E. Main St. (via Main, Johnson, Broadway)	848, 864, 871, 872, 874, 875, 888, 892	El Cajon
6	MTS	H St. between Woodlawn Ave. and Southwestern College (via Otay Lakes Rd.)	709	Chula Vista
7	MTS	54th St./Euclid Ave. between Logan Ave. and Monroe Ave.	3, 4, 13, 916, 917, 955	San Diego
8	MTS	Taylor St./Linda Vista Rd. between Old Town Transit Center and Armstrong St.	44, 88, 105	San Diego
9	MTS	Fairmount Ave. between Home Ave. and I-8	11,13	San Diego
10	MTS	College Ave. between SDSU and Lemon Grove Ave. (via Broadway)	215, 836, 936	San Diego, Lemon Grove

Source: SANDAG Improving Bus Operations and Traffic (IBOT) Final Report

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Ten Ways to Design More Transit-Oriented Communities

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PRINCIPLES

There are many ways in which new development design can support increased use of public transportation. Most strategies involve little cost or effort if they are incorporated early in the planning of a project. It is usually cheaper and easier to design something in advance than it is to try to fit it in later. While the guidelines are oriented primarily to new development, many of them are applicable to redevelopment, as well.

Success in using such guidelines requires a change in how the issue of transportation planning is approached. Instead of relying upon a single-minded effort to accommodate automobiles, both public planners and private developers must consider reopening the urban area to travel by all modes.

Plans should reflect the needs of pedestrians, transit riders, and bicyclists. Although much “lip service” has been paid to other modes of travel, the very design of newer communities has discouraged their use. The guidelines that follow offer suggestions on how to foster more diversity in transportation as our region grows.

In addition to helping attain regional goals of congestion management and pollution control, transit-oriented communities can be more desirable places to live. This is because they allow their residents a diversity of travel options, thereby reducing the dependence on any one way of getting around. As regional regulations on the automobile become more stringent, the value of communities that foster walking and the use of transit will rise. Thus, market forces will eventually reinforce those design standards which result in more versatile communities.

Ten principles for developing more transit-oriented communities are presented on the following pages. They are:

1. Create a pedestrian-friendly environment.
2. Make pedestrian facilities a priority.
3. Design building sites to serve many users.
4. Encourage a mixture of land uses.
5. Provide appropriate densities.
6. Interconnect the street system.
7. Narrow the neighborhood street.
8. Be cautious of major streets.
9. Integrate transit into the community.
10. Consider transit linkage in advance.

1. CREATE A PEDESTRIAN FRIENDLY ENVIRONMENT

The simplest way of increasing the use of public transportation is to establish communities where walking is more attractive. Walking is the most common way that people reach bus and light rail stops. In a recent countywide survey, two-thirds of all transit riders reported that they walked to the stop. The factors that encourage people to walk are often subtle, but they all focus upon the creation of a pleasant environment for the pedestrian.

An important underlying principle is the formation of an outdoor "space." Most people don't feel comfortable walking in a wide open area with busy traffic passing closely by.

Pedestrians are, instead, drawn to streets with a feeling of intimacy and enclosure. This feeling can be created by locating buildings close to the sidewalk, by lining the street with trees, and by buffering the sidewalk with parked cars.

Pedestrians enjoy small details, such as displays in shop windows.

This is in sharp contrast to the landscape that caters to motorists, consisting of large signs, frequent driveways, and little detail at eye level. Such landscapes discourage walking and the use of public transportation.

2. MAKE PEDESTRIAN FACILITIES A PRIORITY

One obvious way of creating a pedestrian environment is to ensure that there are adequate sidewalks, pathways and crosswalks. In some post-war residential subdivisions, sidewalks were omitted completely! Fortunately, we have come to realize the importance of these facilities, but greater forethought is needed in their design and placement.

Sidewalks in residential areas should be of sufficient width for two people to walk abreast comfortably and must be fully ADA compliant for wheelchair accessibility. In commercial areas, sidewalks should be even wider. The minimum standards listed in local design ordinances are often just that-minimum. More generous designs (such as six feet wide in residential areas and ten feet wide at bus stops) make pedestrians feel they are valued.

Pedestrians need shortcuts when blocks are long and street patterns are circuitous. These are vital in many areas to get people from their homes to nearby bus stops. Paths are needed at the end of culs-de-sac and at other strategic points in the street system.

Pedestrian pathways located behind buildings are fine supplements to sidewalks, but they should not be used as substitutes for them. It is important that pedestrians be part of the activity that occurs in the street environment and not separated from it. Sidewalks along public streets can enhance safety, as well, by making pedestrians visible to more people.

Pedestrians should be allowed to cross at all corners of an intersection. Crossing prohibitions should be necessitated only by safety factors, such as reduced sight distance. The increase in turn lane capacity afforded by these prohibitions must be balanced against the delay and inconvenience they cause to people on foot.

Figure 3-1 Protected Pedestrian Median Refuge

Source: MTS

3. DESIGN BUILDING SITES TO SERVE MANY USERS

The design and orientation of buildings contribute to transit use—or discourage it—in ways which are not always obvious. Most suburban buildings are oriented to one clientele: people arriving by automobile. Access by other modes of transportation is too often ignored. Buildings should be designed and sited in ways which cater to transit riders, pedestrians and cyclists, as well as those arriving by car.

When a major store or office building is set too far back from the street, walking distance to sidewalks and bus stops is increased. This drawback is even worse if transit users must wade through a sea of parked cars to reach the building entrance.

Even landscaped setbacks, while attractive to passing motorists, can create an environment which is not functional for transit. Walking distances are too long, and there is little shade or protection from the elements.

Shopping and employment areas should be designed closer to the street, with at least one entrance oriented to pedestrians and transit users. The parking lots of office and industrial buildings can be placed behind the buildings, away from the street.

In suburban office and industrial parks, buildings should be clustered at intersections, close to the street line. This orientation makes them convenient to existing or potential bus stops. It also encourages people to walk between different buildings to conduct business or get lunch.

Local jurisdictions, through their permitting process, can incentivize transit use by restricting parking supply. This can be achieved through reducing parking minimums, instituting parking maximums, and encouraging shared parking between land uses.

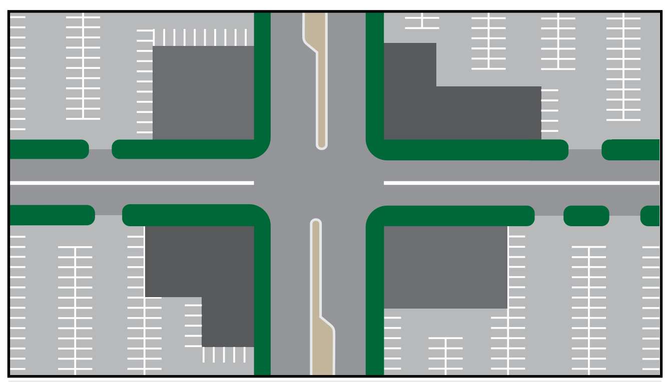


Figure 3-2 Strategic placement of office buildings increases accessibility for transit users

4. ENCOURAGE A MIXTURE OF LAND USES

A basic element often overlooked in creating a pedestrian environment is the need to mix different types of land use. Mixed uses create opportunities to substitute walking for driving. Diverse uses along a street also create activity and a sense of security for those waiting for a bus.

Current zoning regulations generally require strict separation of residential, shopping, and employment uses into large, homogeneous areas. In these kinds of developments, the distances between home, work, and shops are too great, and there are often no direct pathways connecting them. Walking is just too difficult.

In contrast, mixed uses are a common attribute of our older neighborhoods. When different types of land uses are located in close proximity, it is possible to walk instead of having to drive. Moreover, the pedestrian environments which they create encourage people to walk to bus and trolley stops by providing interesting pathways and places to stop along the way.

Different types of uses can be incorporated in the same building to conserve the use of land and further diminish the need for driving. For example, apartments can be located above small shops. As a bonus, the lower development costs of these kinds of units can be passed on to consumers as lower rents.

5. PROVIDE APPROPRIATE DENSITIES

High density is a factor that is often associated with high transit ridership. This does not mean that only high-rise apartments and office buildings should be constructed near transit stops. However, for transit to be cost-effective, certain thresholds of development should be encouraged.

The table below summarizes the thresholds which are recommended as rules-of-thumb for transit-oriented development. While these thresholds may be superseded by other site-related circumstances, such as topography, they are useful guidelines. A gradient of densities should exist within the walking radius of a transit stop, with the highest intensity of use located nearest the transit facility. In some instances, density is indicated in the table by the type of urban environment within which it is located. Three such environments have been distinguished: (1) “urban centers” (such as Downtown San Diego or Mission Valley) are characterized by a concentration of high-intensity buildings with mixed uses in close proximity; (2) “urban areas” (such as Pacific Beach or Mid-City) consist of moderately dense clusters of single- and multi-family houses and related commercial districts; and (3) “suburban areas” (such as Carmel Valley, Eastlake, or Point Loma) are low- to-moderate-density areas in which single-family homes predominate.

COMMERCIAL: RETAIL

Type of use is more important than density in this category. Neighborhood retail (such as dry cleaners or cafes) and services (like daycare centers) can support transit facilities by providing riders with conveniences close to stops. Large regional retail facilities (such as shopping malls) can become transit focal points in themselves, when sited close to the transit facility.

Community retail (large discount stores and supermarkets) tend to be auto-oriented and are generally not good neighbors for transit stations and bus stops unless designed to orient pedestrian and development activity toward the street.

INDUSTRIAL

Manufacturing and warehousing/distribution facilities, if isolated from other land uses, are usually not compatible with transit. Many are space-intensive, rather than labor-intensive, creating areas with few employees and long walking distances. Those plants employing a high concentration of employees may be served by transit if they are located near existing services or can contract with a transit provider for shuttle service to the nearest transit center.

TABLE 3-1 RECOMMENDED TRANSIT-ORIENTED LAND USE DENSITY

	Within 1/2-mile of LRT Stations or Bus Transit Centers	Within 1/4-mile of Bus Stops
Residential		
Urban Centers	45 units/acre* average density 30 units/acre minimum density	30 units/acre* average density 18 units/acre minimum density
Urban Areas	25 units/acre average density 18 units/acre minimum density	12 units/acre average density 7 units/acre minimum density
Suburban Areas	18 units/acre average density 12 units/acre minimum density	7 units/acre* average density 5 units/acre minimum density
Commercial: Office		
Urban Centers	1.00 FAR minimum**	0.50 FAR minimum
Urban and Suburban Areas	1.00 FAR minimum	0.35 FAR minimum

*Figures shown are net residential densities; gross densities are about 20% lower (e.g., 45 units/acre net= 36 units/acre gross).

**These are minimum FARs (floor area ratios); higher FARs are encouraged, but the maximums should be those specified in community or general plans.

6. INTERCONNECT THE STREET SYSTEM

The layout of streets in a neighborhood or commercial district can be the single greatest limiting factor on the provision of good transit service. Once in place, street layouts are changed only with great difficulty and expense. For this reason, all proposals for new streets should be reviewed with MTS early enough for potential problems to be identified and modifications made.

Recent practice has emphasized discontinuous streets, such as loops and culs-de-sac, in order to discourage through traffic. Unfortunately, such streets also make it impossible for buses to pass through these areas. Transit service is relegated to peripheral streets which are not convenient to most residents in the development.

Moreover, discontinuous street patterns make it difficult for pedestrians to walk to bus stops, even though they may be close in terms of linear distance.

An interconnected street pattern can solve these problems by allowing buses to penetrate neighborhoods. Interconnected streets also give pedestrians many alternative walking paths and help shorten walking distances. When streets are connected in this way, auto drivers have many routes to follow, as well. This disperses traffic and reduces the volume of cars on any one street in the network.

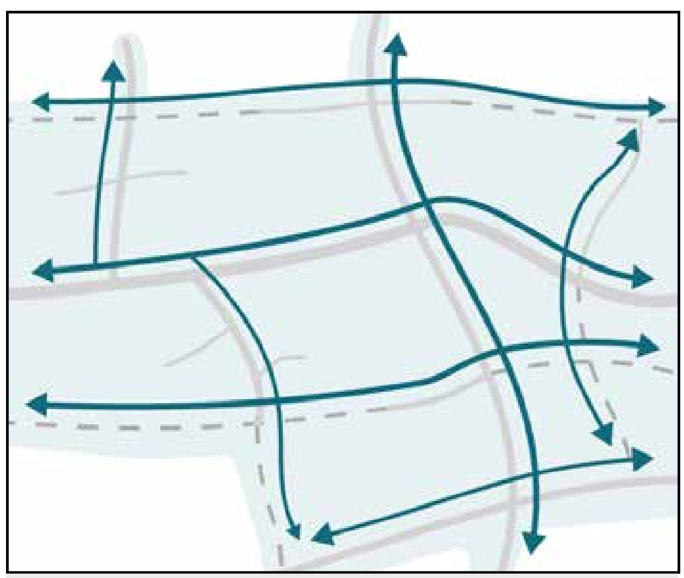


Figure 3-1 Connected networks improve access to transit
Source: NACTO Transit Street Design Guide

7. NARROW THE NEIGHBORHOOD STREET

Local and collector streets are intended to carry relatively low volumes of traffic through neighborhoods and serve abutting property. Many, however, are too wide. They act as barriers which divide communities and discourage walking and the use of transit.

Neighborhood streets that are too wide increase the distance that must be crossed by pedestrians. They also encourage traffic speeds that may be higher than desired, and they increase the costs of construction and maintenance.

Street standards need to be revised in many communities to allow for more flexibility. Local streets can be very narrow to emphasize the slower speeds and more intimate nature of these areas. These streets are good for walking but may not be suitable for bus service. Therefore, such considerations should be reviewed with MTS in advance to ensure that other streets in the area can accommodate buses.

Wide curb radii, used to allow traffic to turn at higher speeds, are not appropriate for local and collector streets. Such radii increase the distance pedestrians must cross at intersections.

To permit large vehicles such as buses and fire apparatus to turn, parking should be allowed on the street. A lane of on-street parking effectively increases the available turning radius. On low volume streets, encroachment of a turning vehicle into an oncoming lane may be an acceptable way of dealing with small radius curbs.

8. BE CAUTIOUS OF MAJOR STREETS

Major streets and arterials accommodate—and encourage—high levels of traffic. They also pose special problems for transit. Major streets were historically the focus of public transportation and were designed accordingly. Unfortunately, many of them are now configured in ways which create a hostile environment for both pedestrians and transit users. While major streets can be useful to expedite the flow of express buses, they are generally not well suited to local bus traffic.

Major streets and arterials are being designed more like expressways. They are wide, with infrequent intersections, and many lack abutting land uses. These kinds of roads cater only to high-speed traffic. They are difficult places for buses to stop and for pedestrians to cross. To encourage transit use, safe street crossings must be allowed at frequent intervals. Pedestrians must also be buffered from traffic by parking or landscaping.

In order to take advantage of local topography, many major streets have been developed along canyon floors. The nearest development is often located on the hilltops, inaccessible to transit service on the road below. As a result, residents must drive their cars for almost every trip they make. To deal with this problem, alternative through streets should be incorporated into new development. These through streets would serve the hilltops and allow transit to penetrate the neighborhoods.

Rather than developing major streets at all, consideration should be made to substituting collectors. These have the transit-oriented attributes of abutting land uses, buffered sidewalks and narrower roadways. Needed traffic capacity can be achieved by spacing such collectors more closely together.

9. INTEGRATE TRANSIT INTO THE COMMUNITY

Quite often, transit service is relegated to the periphery of a development as a practical necessity. A bolder approach is to bring transit service-bus or rail-right to the heart of a community, integrated into its fabric. Instead of being considered a nuisance to be avoided, public transportation is thus treated as an asset to be embraced.

In many instances, the value of transit to a development is ignored. Transit facilities are frequently located at the edge of activity centers to avoid “adverse impacts.” In the process, transit is less visible and less convenient. Any chance of capitalizing on this public investment is lost.

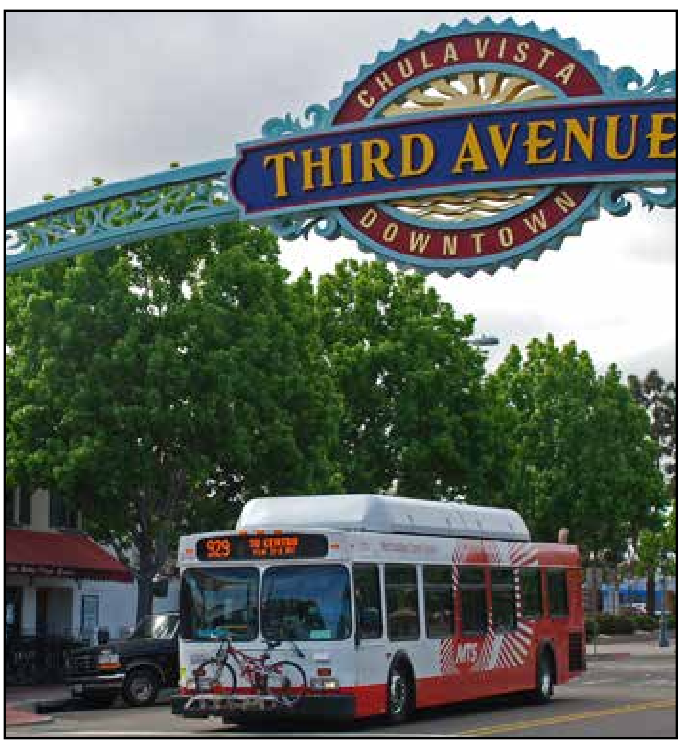
With a little creativity, transit stops can serve as the focal point of a community. They can be combined with convenience stores, daycare centers, restaurants, and other neighborhood amenities. Combining such uses reinforces the focal point, making it a real part of the community. Stops should also accommodate passenger drop-off/pick-up via designated curb loading space, particularly for connections with transportation network companies (TNCs) such as Uber and Lyft.

This strategy shortens walking distances and allows transit riders to combine many chores into one trip (such as picking up dry cleaning on the way home from work). In this way, transit can be as convenient as the automobile, making it a more attractive option. Integration of transit requires consideration in advance. For this reason, this strategy should be discussed with MTS very early in the planning stage of new development.

10. CONSIDER TRANSIT LINKAGE IN ADVANCE

"Linkage" is the term often used to describe the physical and psychological ways in which transit can be tied in with new development. Much of this section of the manual has dealt with linkage in one form or another. There are several other guidelines that can be considered to strengthen linkage in a new or redeveloping community.

The pathways likely to be used by pedestrians to reach nearby transit stops should be anticipated. If there are no transit stops at present, consultation should be made with MTS staff to determine the most likely locations where service might be added in the future. Sidewalks and crosswalks can then be laid out accordingly.



Don't forget about mobility needs of the disabled. Curbs and stairways can be formidable barriers to those in wheelchairs or for whom walking is difficult. The Americans with Disabilities Act (ADA) provides specifications to help overcome such barriers to mobility.

The pathways leading to light rail stations and transit centers warrant special attention. Pavement textures, trees and street furniture should be specified to create an easily followed route which encourages use by pedestrians and cyclists.

Walls are an impediment to foot traffic, and they create a bleak and isolated environment for waiting passengers. They are often employed along busy arterial streets to reduce noise. Existing walls should be breached, where possible, to allow for pedestrian connections to the neighborhoods behind them.

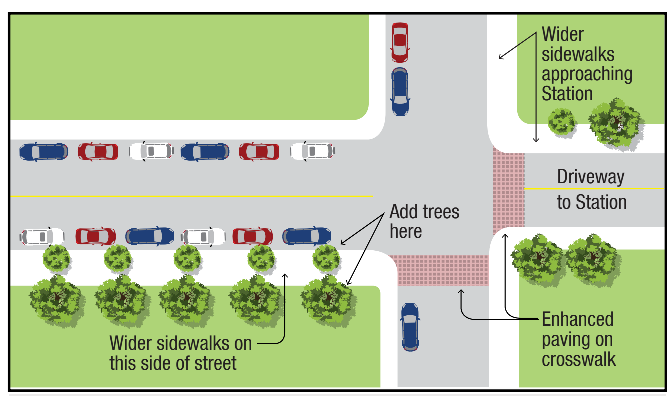


Figure 3-3 Simple improvements enhance the urban environment

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Design Standards for Bus Transit

4

DESIGN STANDARDS FOR BUS TRANSIT

Designing for bus transit means creating suitable facilities in which buses can operate and passengers can wait. In most cases, these facilities are the streets and sidewalks controlled by the jurisdictions in which they are located. These streets and sidewalks utilize a wide range of standards. The pages that follow explain the ranges needed to allow bus transit to function properly.

Those in the private sector proposing new development should be familiar with these standards to assure that their projects will accommodate buses. Likewise, public agency staff must understand bus transit needs in order to properly review the development proposals submitted to them. Agency staff can also utilize these standards when designing street and sidewalk improvements in older neighborhoods.

The design of our communities should recognize possibilities that may exist several years in the future. Thus, even when a proposed project is not served by buses at the present time, designing for buses is still desirable. This will allow future extensions of service to be accommodated economically.

There may be instances where following the design standards in this section (such as using large turning radii for buses) seems to conflict with the urban design principals of the previous section of the manual (such as encouraging small curb radii at intersections). Such conflicts can often be reconciled by consultation with MTS staff. Many of the “standards” provided here are simple guidelines that can be flexibly interpreted in certain situations. This reinforces a statement made earlier in this manual: It is important for those contemplating new development to contact MTS as early as possible in the planning process. MTS can also offer developers insights on longer term plans for nearby transit services so that these can be incorporated into the project.

Figure 4-1a Bus Vehicle Dimensions

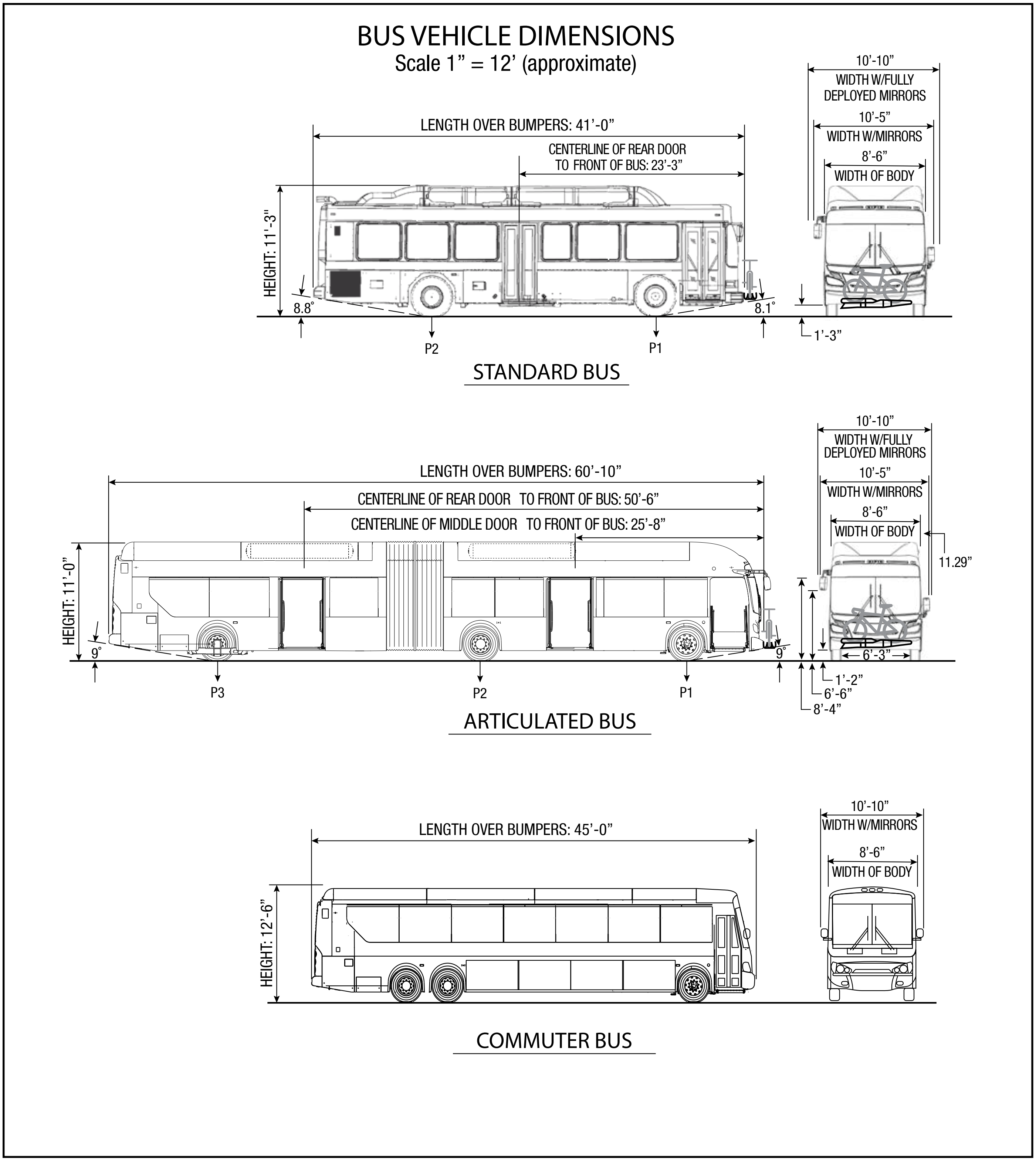
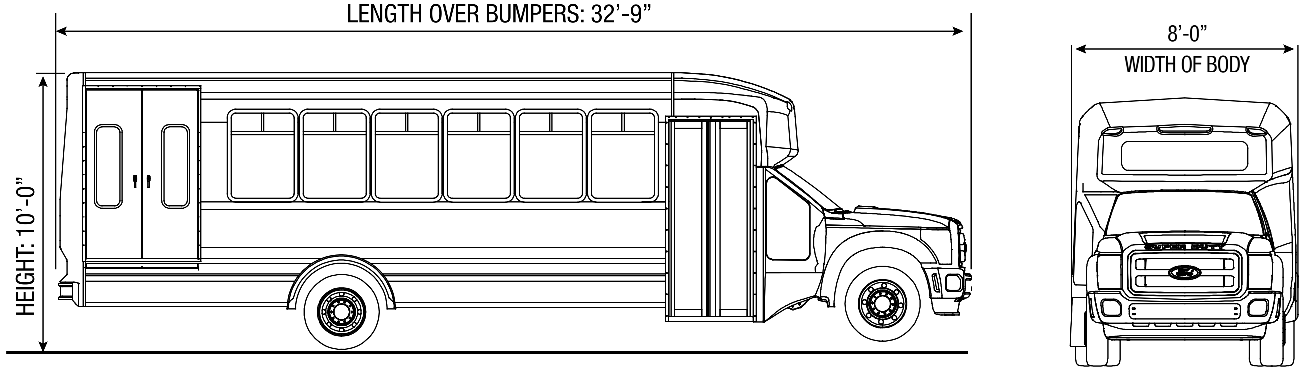


Figure 4-1b Bus Vehicle Dimensions



CUTAWAY BUS

WEIGHT (LOADED)	STANDARD BUS	ARTICULATED BUS	COMMUTER BUS
TOTAL WEIGHT	41,600 POUNDS	66,790 POUNDS	53,000 POUNDS
AXLE LOADING AT P1	14,600	14,600	17,000
AXLE LOADING AT P2	26,000	14,600	13,000
AXLE LOADING AT P3	-----	26,000	23,000

GRADE LIMITATIONS

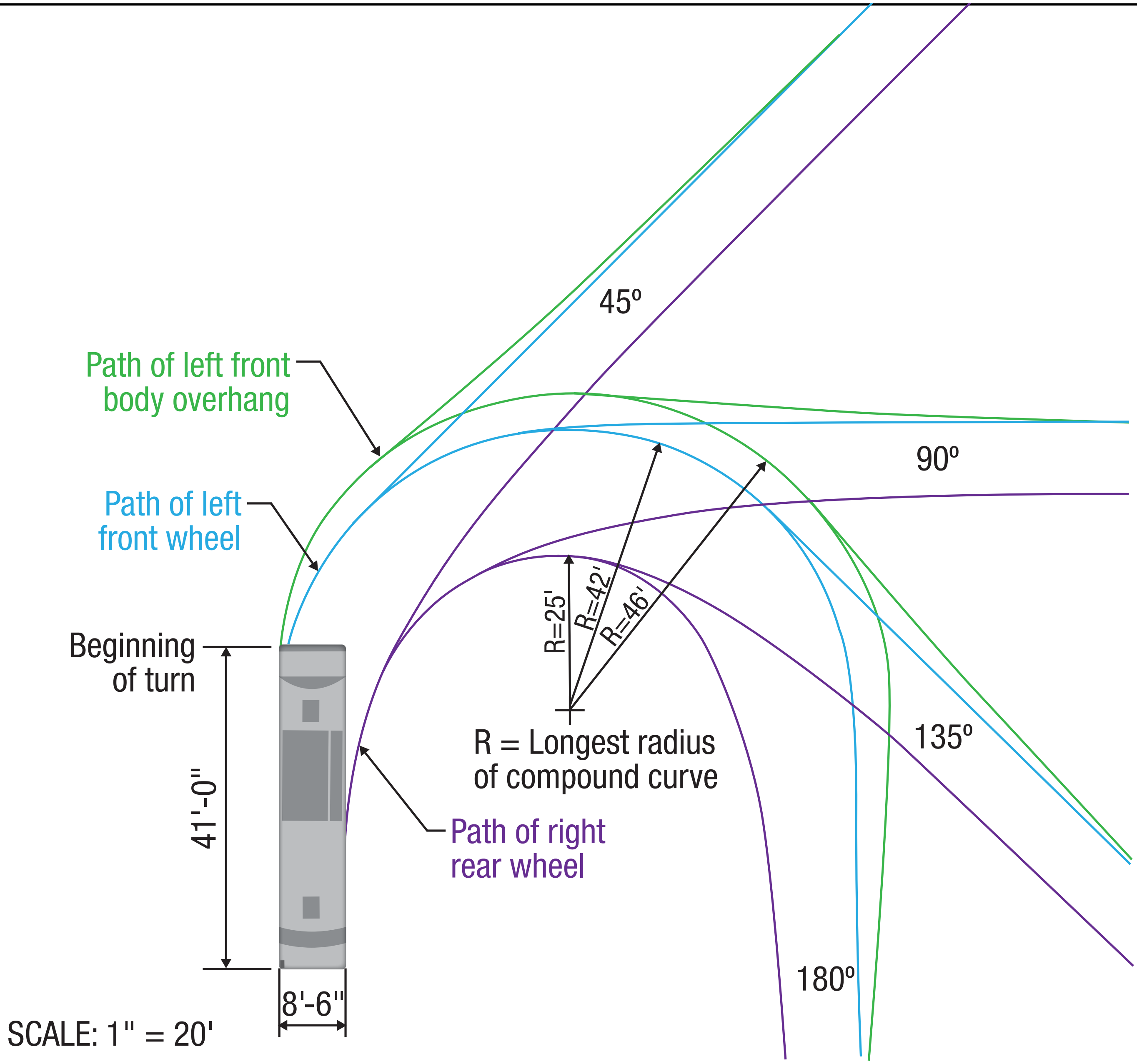
	STANDARD BUS	ARTICULATED BUS
UPHILL:	6%	6%
DOWNHILL:	12%	12%

TURNING RADIUS

50-FOOT MINIMUM OUTSIDE RADIUS (WITH OVERHANG), 55-FOOT DESIRABLE

27-FOOT MINIMUM INSIDE RADIUS, 30-FOOT DESIRABLE

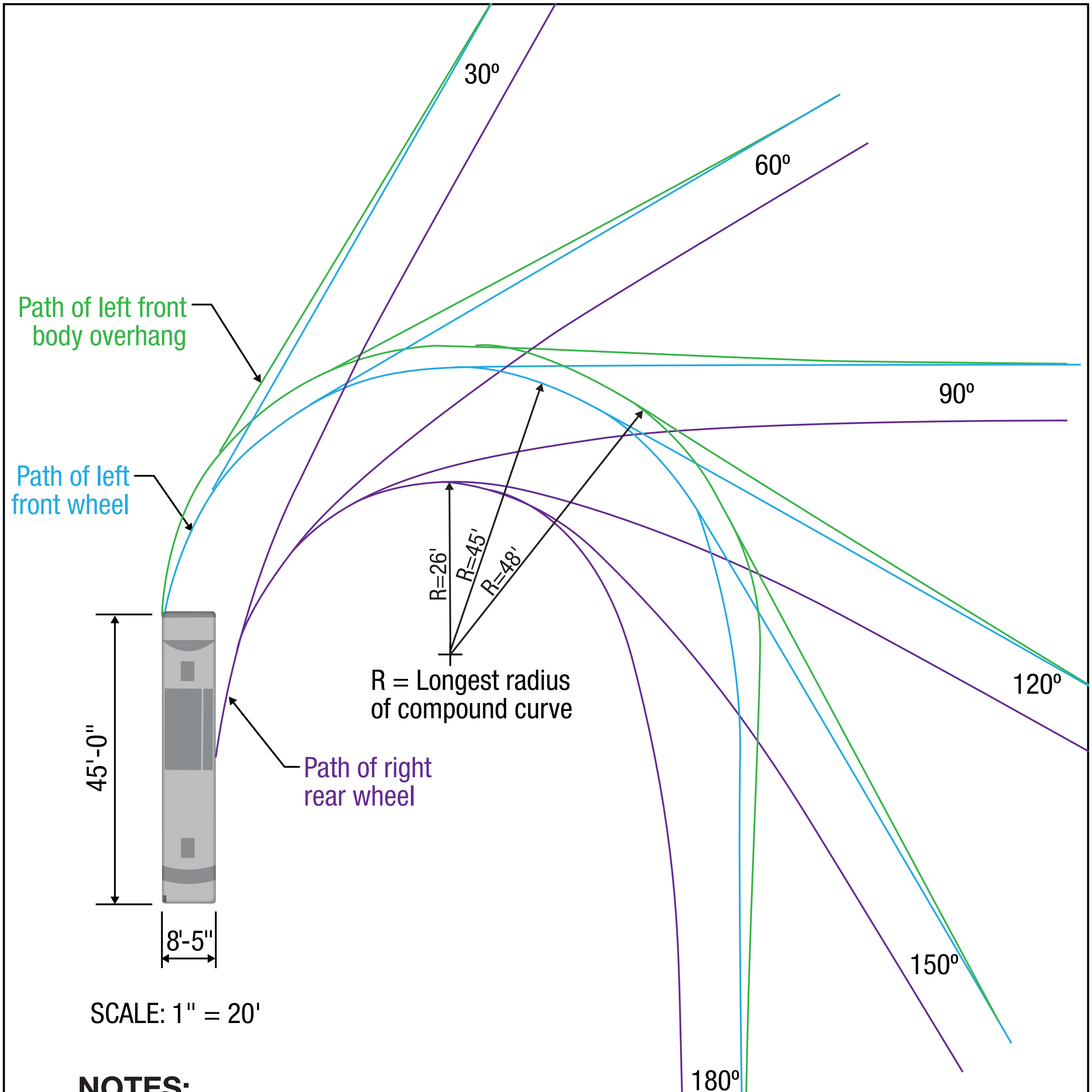
Figure 4-2a Bus Turning Template, 40’ Standard Bus



NOTES:

1. The above diagram should be considered minimum for a standard bus. Radii of 50’ (outside) and 25’ (inside) are recommended for pavement edges or obstructions.
2. Articulated buses can be accommodated within the above envelope.

Figure 4-2b Bus Turning Template, 45’ Commuter Bus



NOTES:

1. The above diagram should be considered minimum for a commuter express bus. Radii of 55’ (outside) and 25’ (inside) are recommended for pavement edges or obstructions.
2. Articulated buses can be accommodated within the above envelope.

Figure 4-3 Vertical and Horizontal Clearances for Buses

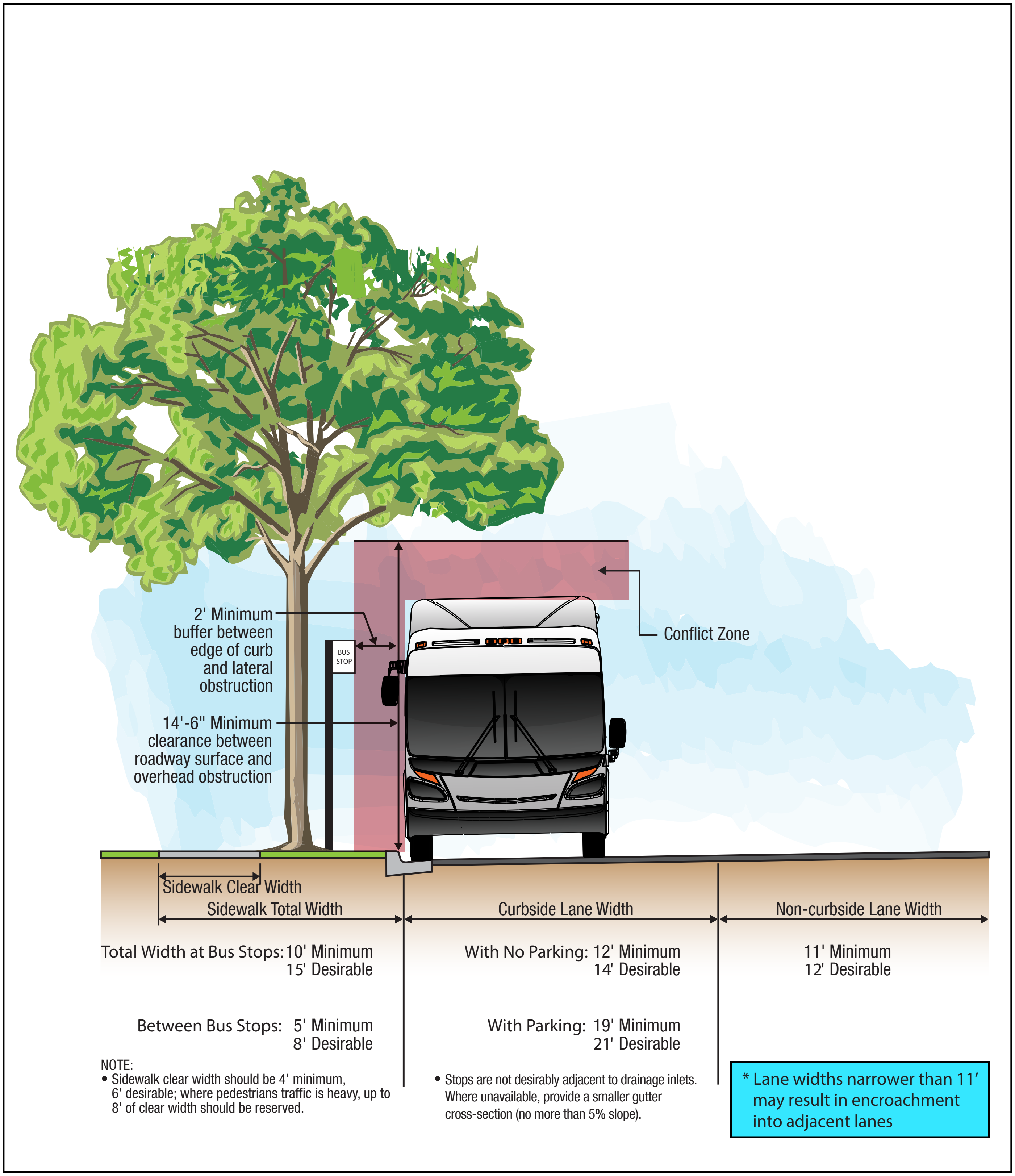
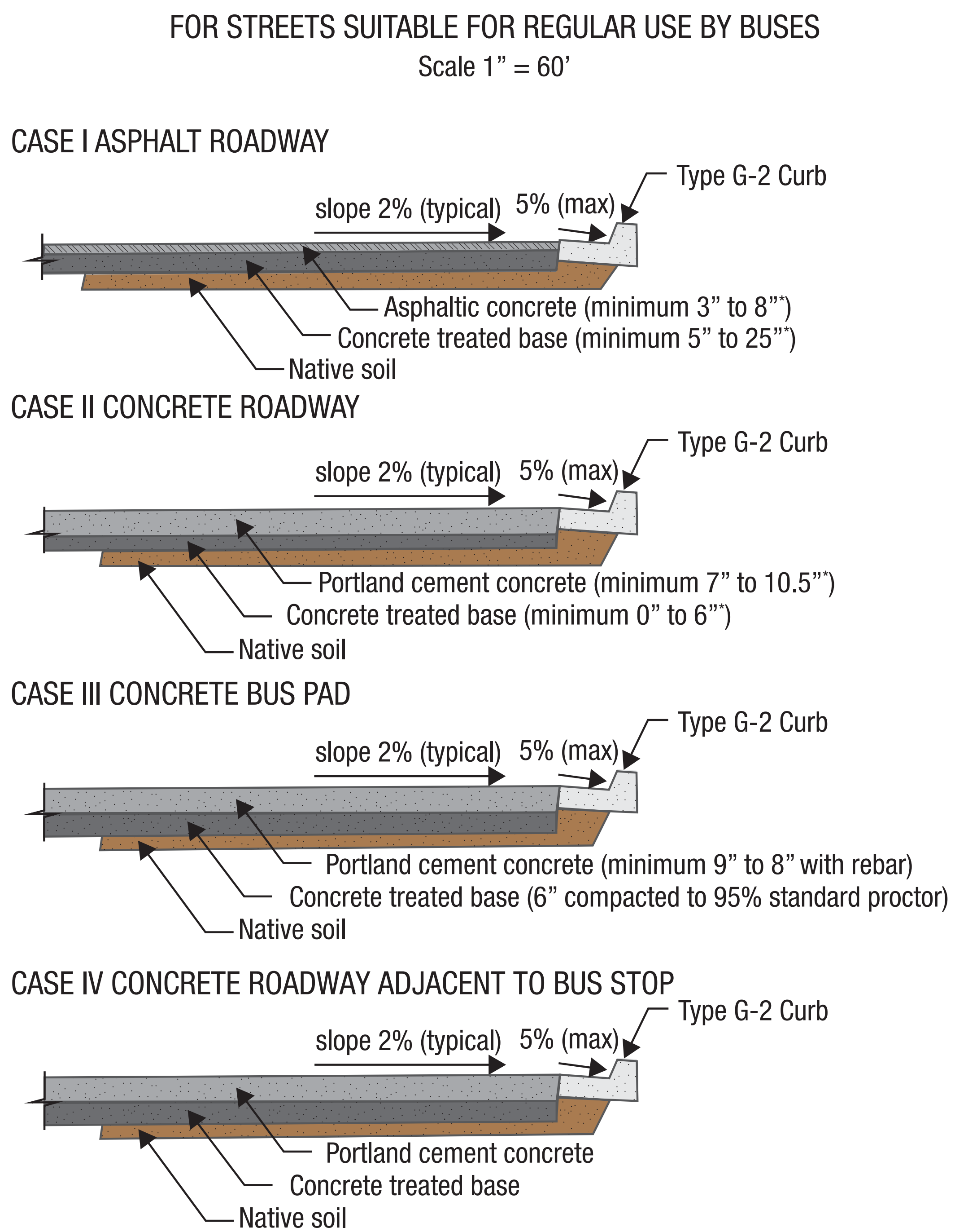


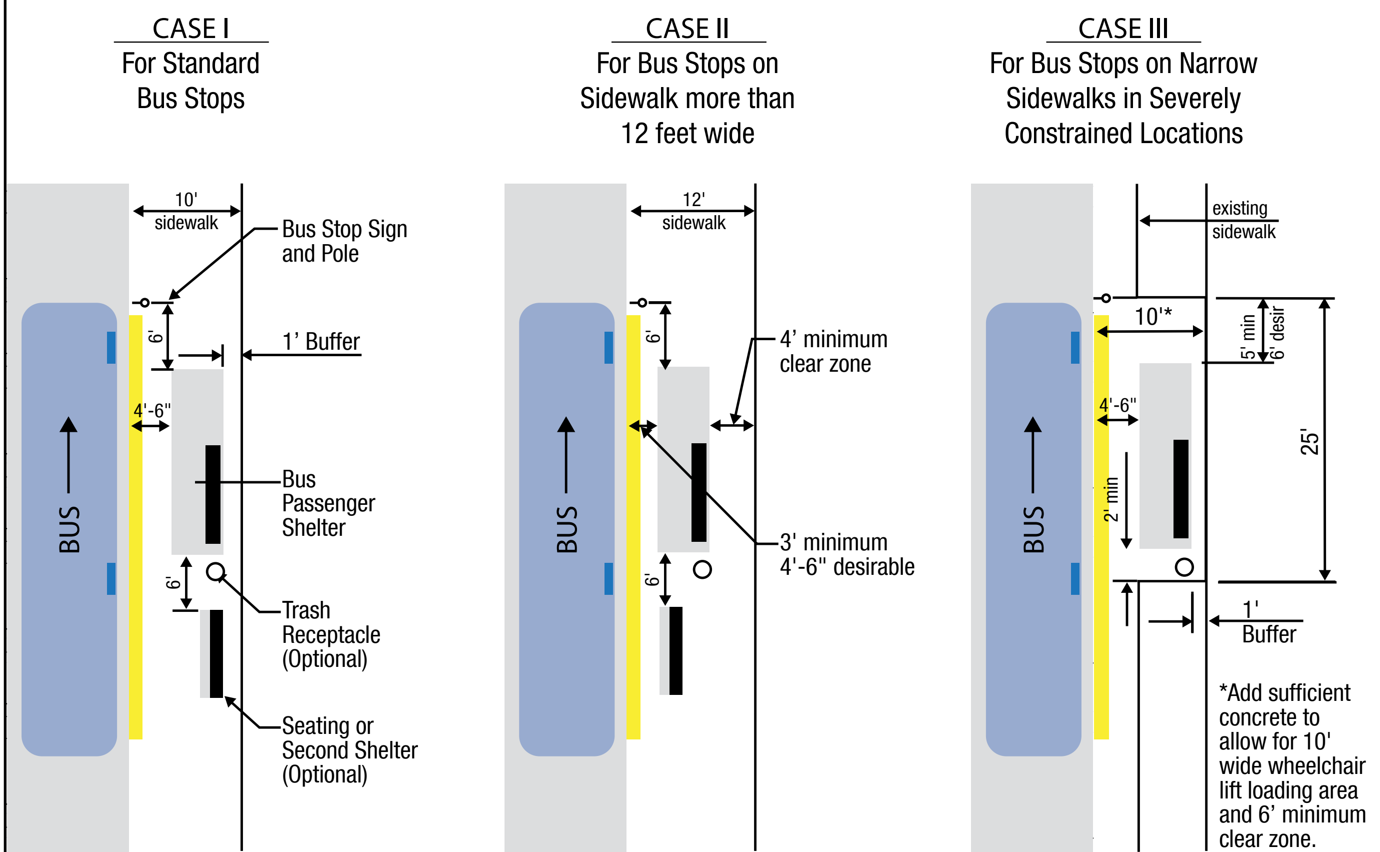
Figure 4-4 Pavement Composition Recommendations



NOTES:

1. Pavement section is a specification of the local jurisdiction responsible for the roadway. The diagrams above are for general discussion only. Local jurisdiction or owner will confirm that the section can handle stopping, dynamic and fixed point loading.
2. Thickness of layers depends upon average daily traffic volume and resistance value of native soil. For exact specifications, see San Diego area Regional Standard Drawings, Pavement Design Standards, Schedule J for roadways categorized as collector or higher.
3. For all pavement and concrete pad improvements, please coordinate with MTS on final placement.

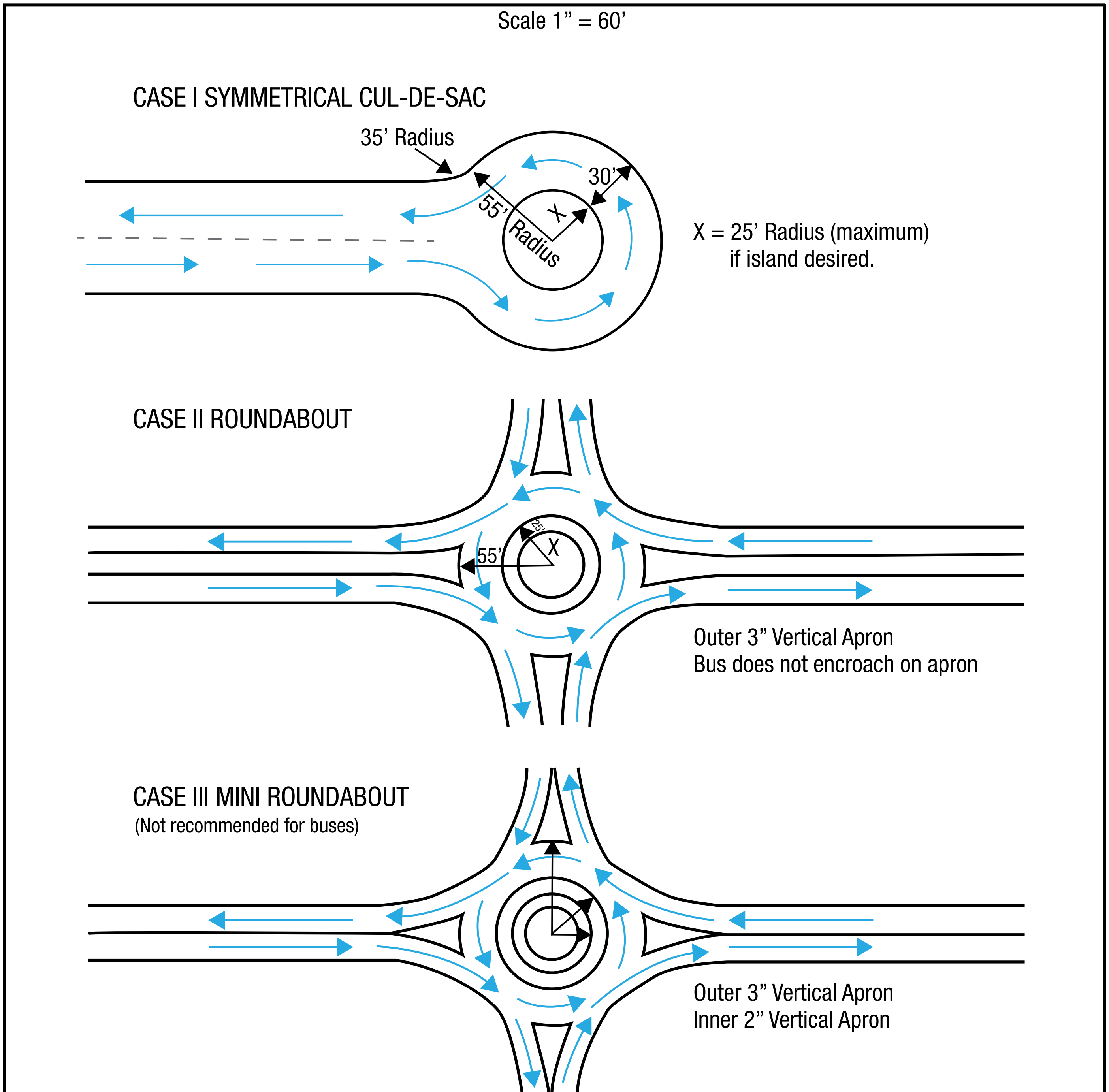
Figure 4-5 Bus Passenger Shelter Placement



NOTE:
Landscape (e.g. trees) and furnishings (e.g. branches) can be integrated into the stop area in line with shelter and outside of clear paths and accessible landing areas, providing shade and a more comfortable waiting environment.

Source: NACTO Transit Street Design Guide

Figure 4-6 Bus Turnarounds



NOTE:
Inner curb radius is smaller and outer curb radius is larger than what is shown on Fig. 4-2. This is to avoid fixed object collisions. Striping at 27’ and 50’ radii can guide bus operators.

Figure 4-7 Intersection Design for Bus Turns

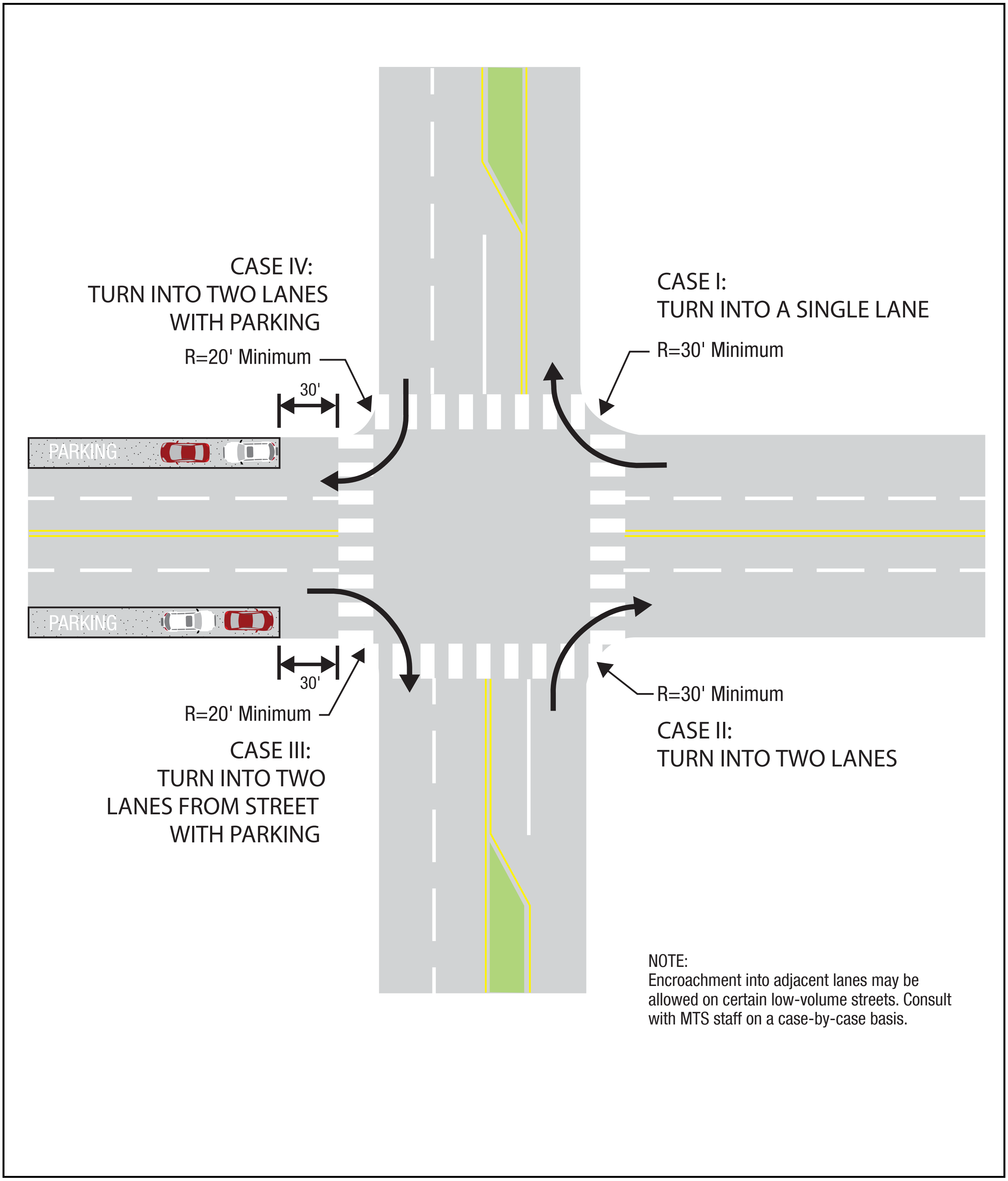


Figure 4-8 Intersection Design for Bus Turns at Pedestrian Bulbs

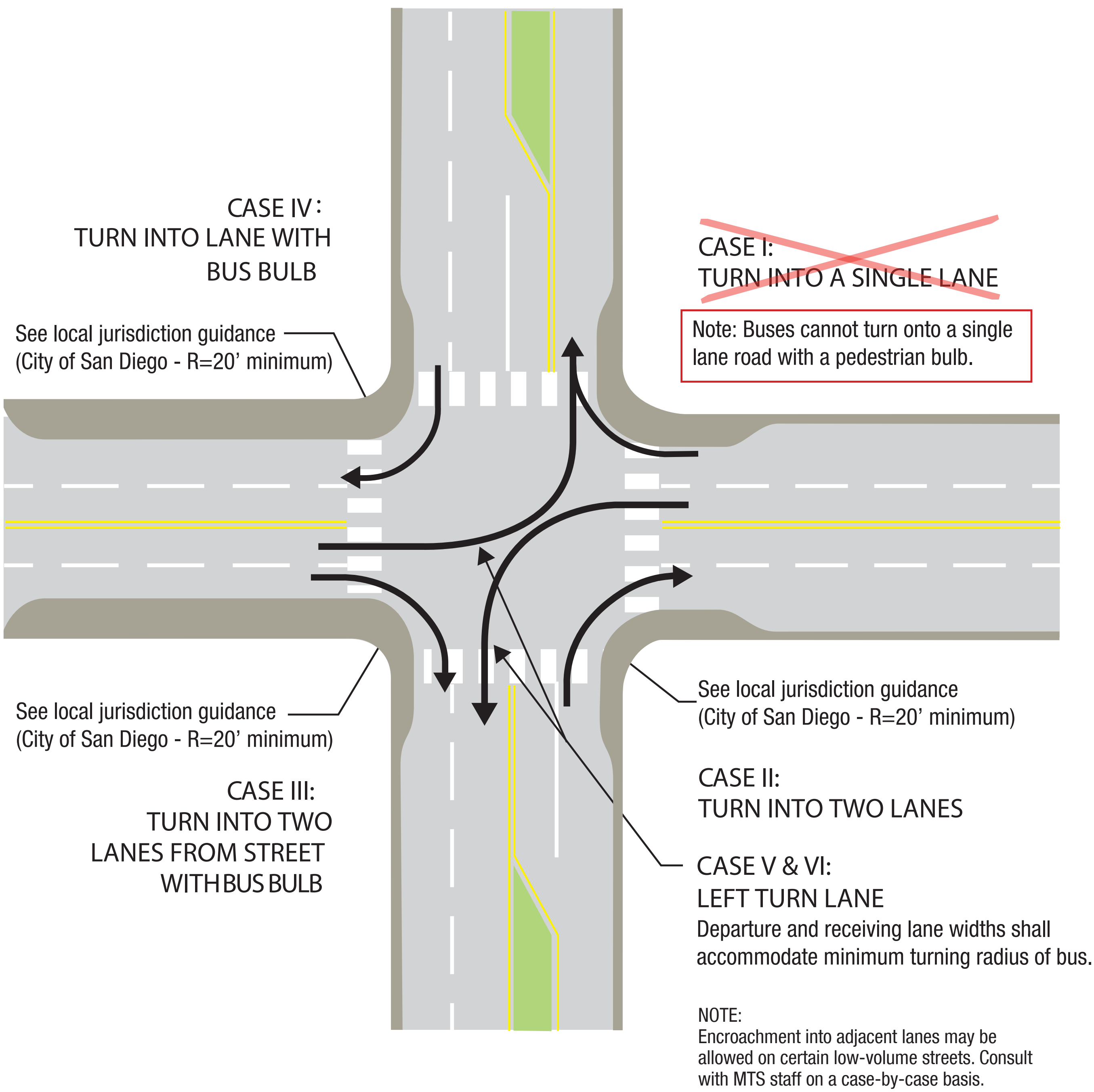
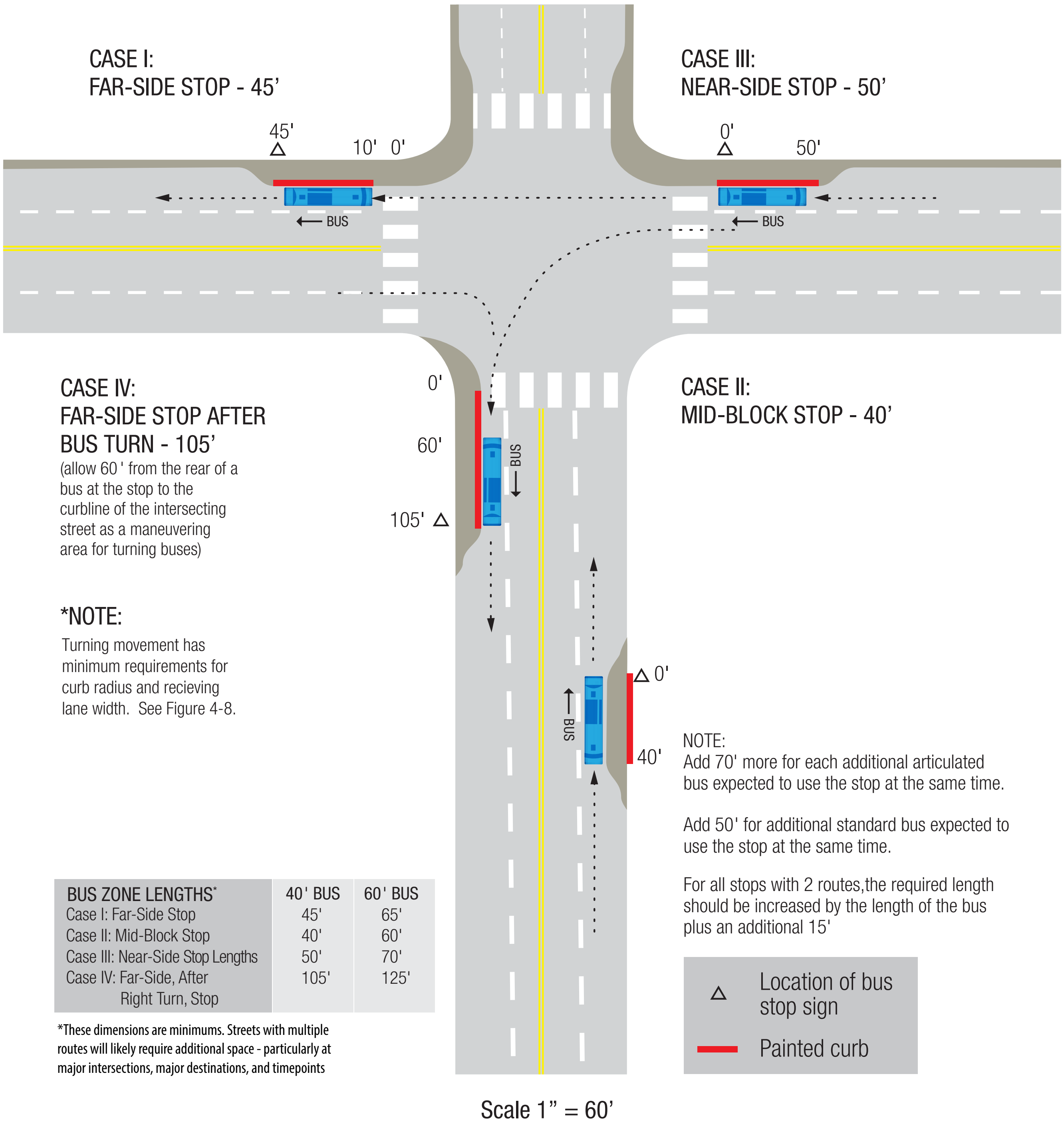


Figure 4-9 Bus Stop Dimensions with In-Lane Stops



BUS ZONE LENGTHS*	40' BUS	60' BUS
Case I: Far-Side Stop	45'	65'
Case II: Mid-Block Stop	40'	60'
Case III: Near-Side Stop Lengths	50'	70'
Case IV: Far-Side, After Right Turn, Stop	105'	125'

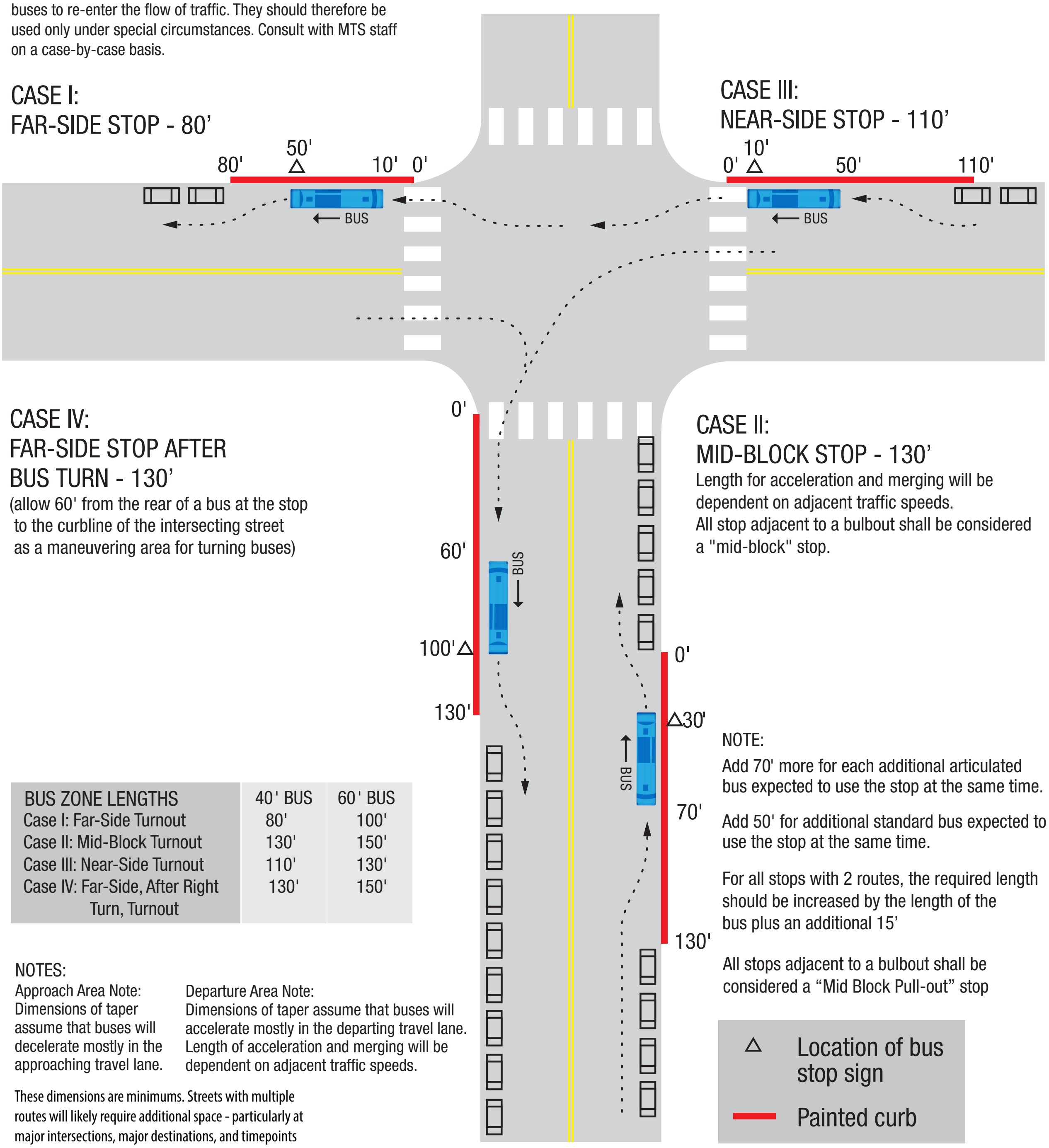
*These dimensions are minimums. Streets with multiple routes will likely require additional space - particularly at major intersections, major destinations, and timepoints

Figure 4-10 Bus Pull-Out Stops and Dimensions

GENERAL NOTE:
Bus turnouts are widened sections of roadway designed for buses to pull out of the traffic stream. While advantageous to general traffic, turnouts make it difficult for buses to re-enter the flow of traffic. They should therefore be used only under special circumstances. Consult with MTS staff on a case-by-case basis.

CASE I:
FAR-SIDE STOP - 80’

CASE III:
NEAR-SIDE STOP - 110’



CASE IV:
FAR-SIDE STOP AFTER
BUS TURN - 130’
(allow 60' from the rear of a bus at the stop to the curbline of the intersecting street as a maneuvering area for turning buses)

CASE II:
MID-BLOCK STOP - 130’
Length for acceleration and merging will be dependent on adjacent traffic speeds.
All stop adjacent to a bulbout shall be considered a "mid-block" stop.

BUS ZONE LENGTHS	40' BUS	60' BUS
Case I: Far-Side Turnout	80'	100'
Case II: Mid-Block Turnout	130'	150'
Case III: Near-Side Turnout	110'	130'
Case IV: Far-Side, After Right Turn, Turnout	130'	150'

NOTE:
Add 70' more for each additional articulated bus expected to use the stop at the same time.

Add 50' for additional standard bus expected to use the stop at the same time.

For all stops with 2 routes, the required length should be increased by the length of the bus plus an additional 15’

All stops adjacent to a bulbout shall be considered a “Mid Block Pull-out” stop

NOTES:
Approach Area Note: Dimensions of taper assume that buses will decelerate mostly in the approaching travel lane.

Departure Area Note: Dimensions of taper assume that buses will accelerate mostly in the departing travel lane. Length of acceleration and merging will be dependent on adjacent traffic speeds.

These dimensions are minimums. Streets with multiple routes will likely require additional space - particularly at major intersections, major destinations, and timepoints

△ Location of bus stop sign
Painted curb

Scale 1 " = 60'

Figure 4-11 Off-Street Bus Station

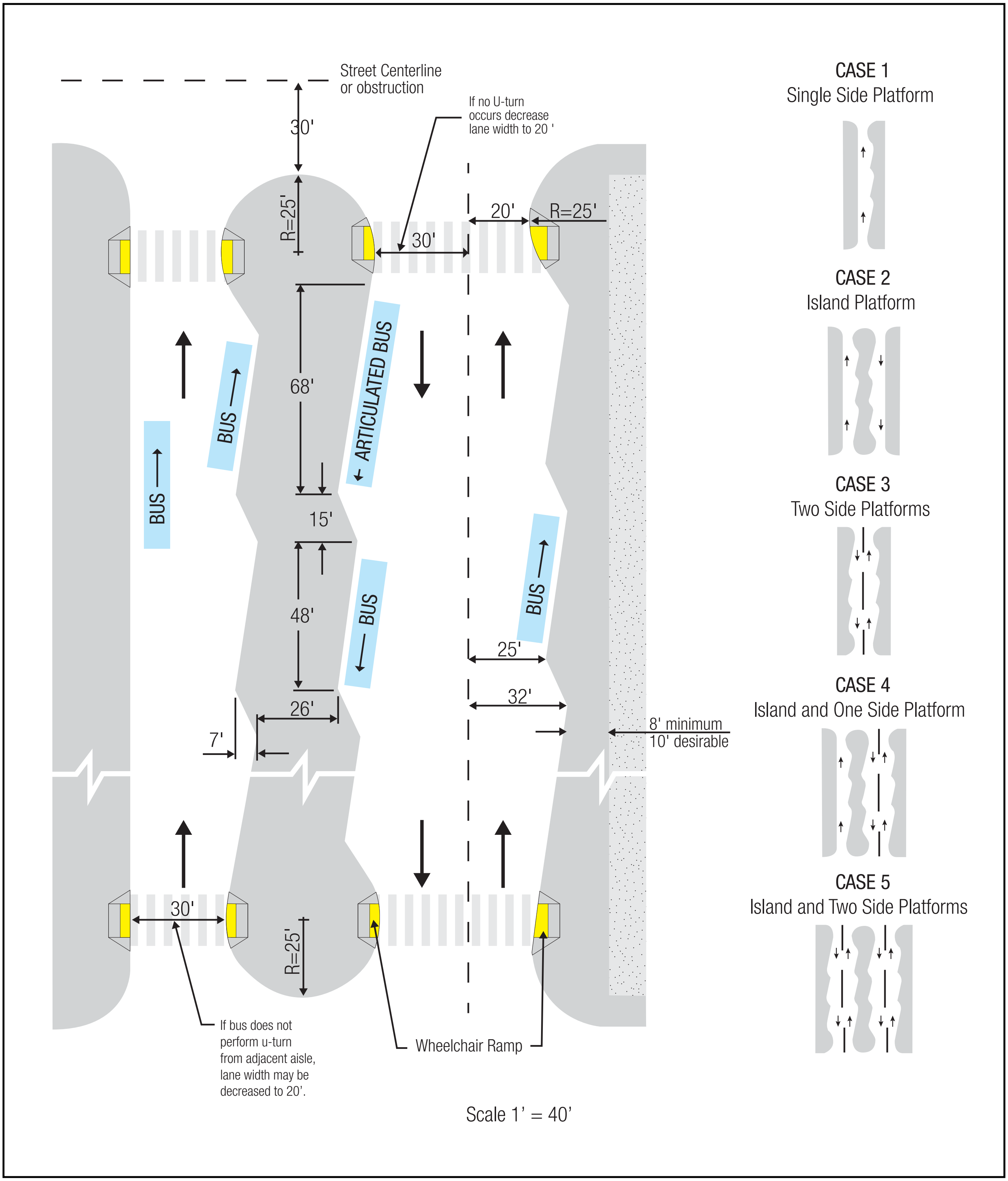


Figure 4-12 Bus Passenger Shelters (Non-Advertising)

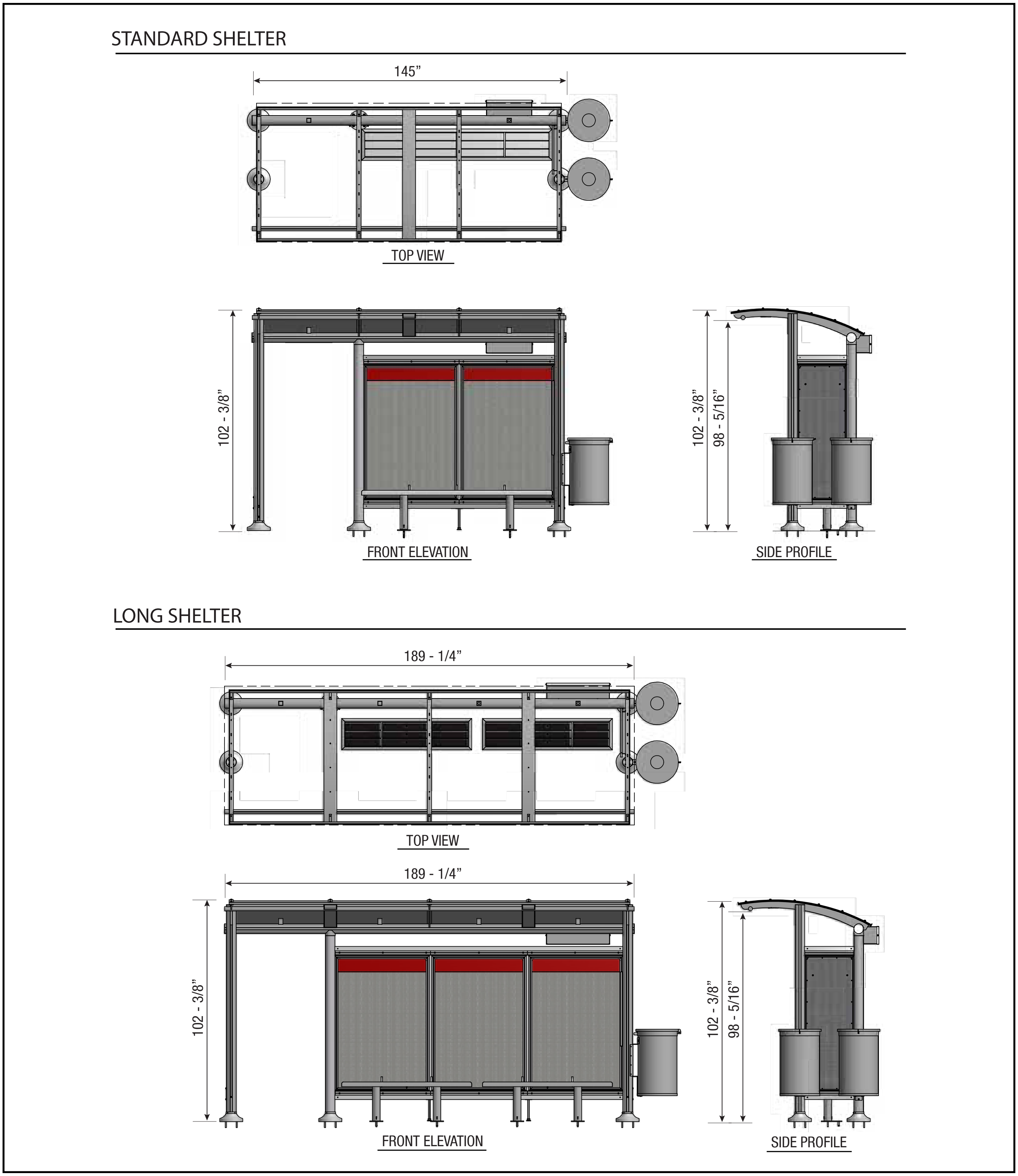


Figure 4-13 Bus Passenger Shelters (Advertising)

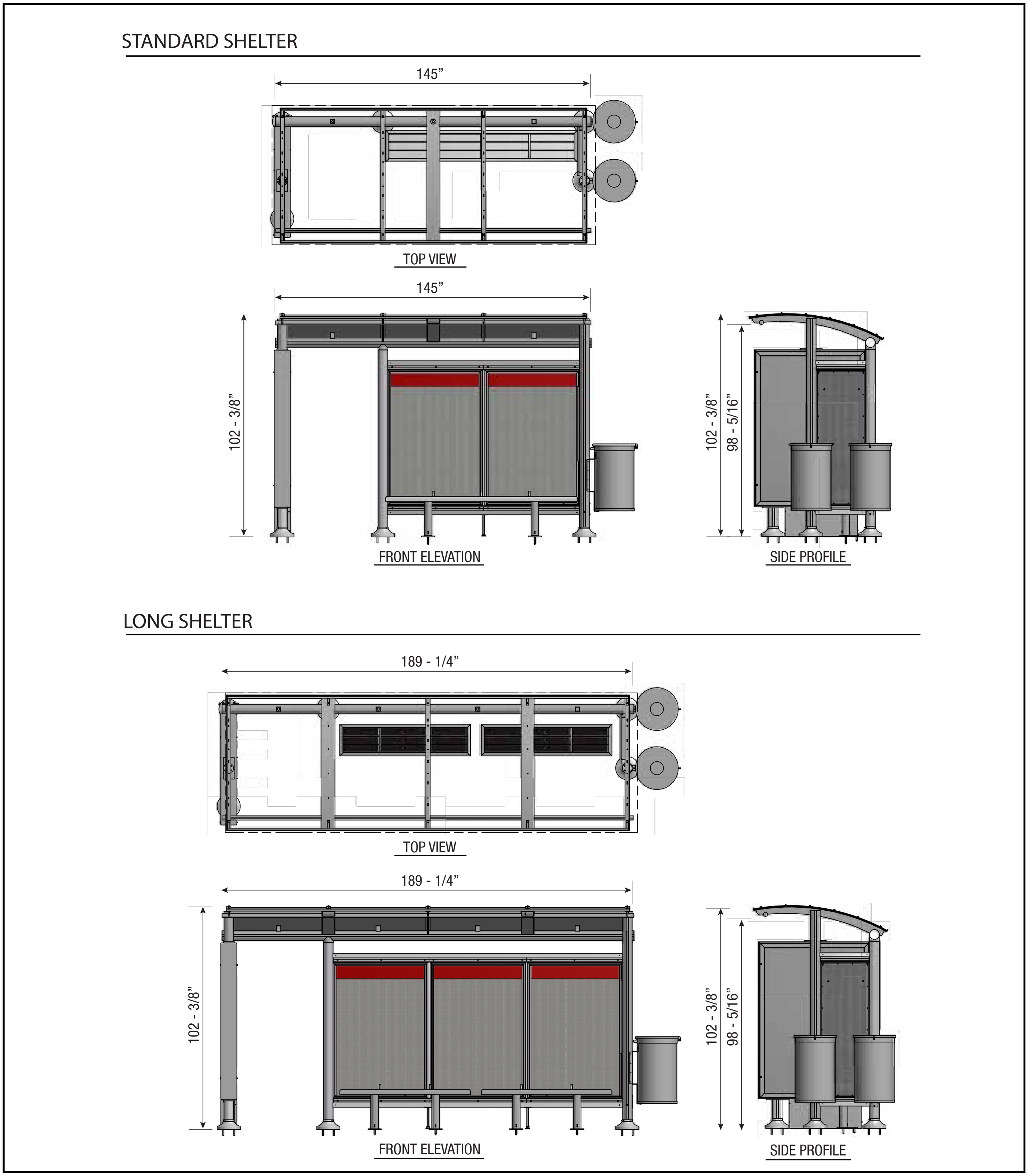


TABLE 4-1 SUMMARY OF DESIRED BUS STOP FEATURES

	Daily Passenger Boardings				
Feature	**<50**	**50-100**	**101-200**	**201-500**	**>500**
Sign and Pole	S	S	S	S	O
Built-in Sign	-	-	-	O	S
Expanded Sidewalk	O	O	S	S	S
Accessible	S	S	S	S	S
Seating	O	S	S	S	S
Passenger Shelter	O	O	S	S	S
Route Designations	S	S	S	S	S
Schedule Display	O	O	O	S	S
Route Map	O	O	O	S	S
System Map	-	-	O	O	S
Trash/Recycling Receptacle	O	O	O	S	S
Real Time Digital Display	-	-	O	O	O
Bus Pads (Street)*	*	*	*	*	S
Red Curbs	S	S	S	S	S

S = Standard feature

O = Optional feature

**** = Required for stops with four or more buses per hour. Bus pads (street) are a specification of the jurisdiction that controls the right-of-way.***

- = Not applicable

NOTE: Some features may be provided by others. Actual deployment of features depends upon individual site conditions and constraints.

Development Around Light Rail Transit

5

DEVELOP AROUND LIGHT RAIL TRANSIT

The goal of TOD is to maximize land use and density and to increase ridership and provide the greatest benefit with MTS resources. LRT is a relatively flexible form of rail transit in that it can adapt to many different situations. It can operate in city streets, on exclusive rights-of-way, and even in tunnels or on aerial structures. Stations may be simple or elaborate, depending upon their location and function. Trains can vary in length from one to four cars. SANDAG is the agency responsible for the long-term planning, development, and construction of light rail projects. These projects are considered and evaluated in the SANDAG Regional Transportation Plan. Those interested in future light rail system development should contact SANDAG for more information on the RTP and upcoming transit projects.

As light rail projects are completed by SANDAG, they are turned over to MTS for service operations and maintenance. MTS' most common planning issues for its light rail are:

- Land development, typically Transit Oriented Developments (TODs) at or near San Diego Trolley stations. Developers interested in pursuing opportunities should contact MTS' Manager of Real Estate Assets at (619) 231-1466.
- Construction near or adjacent to MTS' light rail right-of-way. MTS rail operating environment includes high voltage infrastructure and active light- and heavy-rail operations. Work done on or near MTS property or operating right-of-way may require permits, flagging, and coordination with service operations. Contractors with projects near MTS rail right-of-way should contact MTS Right-of-Way Engineer as early as possible at (619) 231-1466.

TRANSIT-ORIENTED LAND DEVELOPMENT POLICIES

The second section of this manual discussed design and land use considerations that support transit. Included were specific actions to promote a balanced transportation system consisting of automobiles, public transit, bicycles, and walking. This section of the manual discusses how local governments can implement these guidelines from broad general plan policies to specific development review procedures.

This section begins with an overview of the relationship between a city's urban form and its transportation system. It points out the need for a balanced transportation system and discusses the impact of the land use pattern on transportation choices. This section goes on to provide examples of policies and objectives that should be included in a strong transit policy.

Overview

The most critical element in the creation of transit-oriented communities is urban form. Transit is intended to serve a large number of people making similar trips. The optimal urban form for transit is, therefore, one of well-defined linkages between a dense urban core and subordinate activity centers.

The antithesis of this model, and the least desirable from a transit perspective, is the post-World War II development pattern of urban sprawl. Sprawl is typified by low densities, a strict segregation of land uses and numerous minor activity centers.

Low-density city development cannot be effectively served by transit because of its disparate trip making characteristics. Without a central focus, trips are distributed in all directions, rather than along well defined corridors. Urban sprawl and its trip patterns can only be supported by an automobile-centered transportation system. As discussed earlier in this manual, neighborhoods that are designed for the automobile are ill-equipped to accommodate any other mode of transportation.

The successful reintegration of public transportation into the urban fabric of our cities requires a strong transit policy that provides the framework for future development. This policy must recognize the compelling role of public transportation in the economic and social development of our urban centers. Such an affirmation is necessary to move towards a balanced transportation system and away from our nearly sole reliance on the automobile for our mobility needs.

In one sense, it will not be easy to redirect the public commitment from an automobile-dictated infrastructure to that of transit. The subsidies that have provided the underpinning for the automobile to develop into the dominant mode of transportation are firmly entrenched in our public attitudes and policies. Times are changing, however, and this institutional bias to the automobile may be changing, as well.

The cost for subsidizing the automobile is measured not only in dollars, but also in environmental and social costs. For example, policies that continue to promote the use of the automobile undermine strategies to improve air quality, conserve energy, reduce congestion, and transform city streets into public places. This contradiction will have to be addressed by local governments if progress is to be made in any of these areas.

What Local Government Can Do

A strong transit policy may take many forms but will focus on transit and walking as fundamental components of land use decisions. The commitment to transit should be comprehensively woven into the land development process. From the general plan to the final development permit, land use decisions and the expenditure of public funds should be predicated on this realization: that the sustained economic development of our cities requires a new development pattern that can be supported by a balanced transportation system. Transit policies for a local or regional government can be structured around the following five objectives:

Transit Preference

Transit should be the preferred mode of transportation to meet urban mobility demands. Increased street capacity for general traffic should be limited to specific circumstances.

Land Use Determinant

Growth should be directed to transit corridors. Access can be conveniently provided by public transit if sufficient density thresholds are achieved. Directing growth to transit facilities will ensure the most cost-effective use of transit and the most direct form of access for nearby uses. Such focused growth will also promote efficient use of other urban facilities and services.

Automobile Disincentives

Employer-provided, long-term parking is a direct subsidy for automobile use. Parking management is an effective way to reduce the incentive for people to drive to work. Parking costs should be borne as part of the cost of driving, included with gasoline, insurance, and car repairs. Monies spent on providing parking spaces should be redirected to providing transit passes.

Designing For Pedestrians

Walking is a critical part of a transit trip. Improving the pedestrian environment will make people feel comfortable walking from place to place. Buildings should give first consideration to pedestrian access. Streets should be designed to feel human-scale and inviting to pedestrians, and can support this by including elements such as benches and shade trees.

Providing for Public/Private Partnerships in Transit

The private sector should be included in helping to finance transit directly. Through the project review process, and based on the general and community plans, transit dedications or facilities should be included as normal infrastructure improvements.

Based upon these five objectives, the following discussion will illustrate specific actions needed to move toward an urban form supported by a balanced transportation system. This urban form generates trips of all modes: walking, bicycling, transit and automobile.

General Plan

The general plan is the guiding policy document for urban planning, providing the framework for future development. In order to effect the fundamental changes necessary to support a balanced transportation system, the general plan must clearly articulate a commitment to a multimodal transportation system. Policies promoting a balanced transportation system should be included in the land use element, as well as in the circulation element of the general plan.

A clear statement on the desirable form of the urban environment will provide the underpinning for land use and circulation policies. There should be an overarching goal to create an urban form supported by a balanced transportation system.

The following policy statements reflect this goal and are offered as examples of transit-supportive General Plan language:

- Integrate land use and circulation plans to create an urban environment that supports a multimodal transportation system.
- Use the transportation system to guide future development. Direct development to areas with a confluence of transportation facilities; limit development in areas accessible by only a single transportation mode.
- Recognize that transportation facilities are the primary organizing element of the built environment, and carefully balance the intensity of development with the capacity of the circulation system. (Note: in this regard, public transportation can be used as a tool to increase densities in areas where traffic capacity alone would ordinarily limit intense development.)

Circulation Element

Within the circulation element of the general plan, more specific objectives and policies related to a multimodal transportation system should be provided. These proposals should reinforce the harmonious integration of land use and transportation. Policy direction related to all modes of transportation- including transit, pedestrian and bicycle circulation, vehicular circulation, and parking-should be provided. These policies should assert the compelling role of public transit in the economic, physical and social development of the city.

In downtown and other densely developed areas, it may be appropriate to designate transit as the preferred mode of access, as San Francisco did in 1973. The imperative for this policy was the recognition that downtown was constrained by an automobile-oriented transportation system that was inadequate to support the desired level of downtown development. San Francisco turned to a balanced circulation system, with public transit as its cornerstone, primarily as an economic development strategy. A similar strategy was taken by Portland, Oregon around the same time, including the establishment of a cap on downtown parking spaces.

In densely developed areas, such as well-defined downtowns with limited expansion capabilities, similar strategies may be beneficial to promote the economic vitality of the area. The significant infrastructure costs that would be incurred to support public streets and private off-street parking could be reinvested in other productive ways.

For downtown development, the foremost objective should be to develop transit as the primary mode of travel to and from downtown. This objective should be supported with action policies to increase transit service and to give public transit priority over automobiles. Four such policies are suggested:

1. Do not increase the existing automobile capacity of the streets and freeways into downtown.
2. Control the growth of long-term (i.e., commuter) parking spaces within downtown and along its fringes.
3. Establish exclusive transit lanes on freeways and city streets where significant transit service exists. (These transit lanes may need to extend a considerable distance outside downtown in order to relieve congested sections of radial roadways serving downtown-bound commuters.)
4. Improve the speed of transit travel and service by giving priority to transit vehicles where conflicts with auto traffic occur.

The circulation element should also provide criteria for determining the most appropriate mode of transportation. Automobiles should be identified as the most appropriate for trips between low intensity land uses. Automobile trips are also justified where, relative to the number of transit riders served, it would be prohibitively expensive to provide public transit.

Specific Plans, Master Plans, and Corridor Plans

More detailed than general plans are specific plans, master plans and corridor plans. These documents influence urban form with varying degrees of specificity. They are typically the critical intermediary between city-wide policies and the implementing zoning ordinance. These documents implement general plan policies on a project- or area-specific basis.

It is critical that development proposals be evaluated for contextual consistency with broad urban form goals before the proposal undergoes the more myopic site review process. This broad perspective is necessary if area and specific plans are to be interconnected and complementary to the surrounding community and to the region at-large.

This is a particularly appropriate level of planning at which to create a transit- and pedestrian-based environment. It is at this stage that specific transit facilities needed to serve the plan area can be identified. Concomitant with this determination should be the financing plan for these transit improvements. Transit should take equal financing priority with other necessary community infrastructure needs, such as water and sewer facilities.

Private sector contributions to support the transit facilities should be explicitly stated. Included would be the provision of transit right-of-way, construction costs, and ongoing operating and maintenance requirements. Private sector funding sources include impact fees, benefit assessment districts, linkage fees, development agreements, and air quality and traffic congestion mitigation fees.

Implementing Ordinances

Development regulations that ensure transit- and pedestrian-sensitive site designs should be included in zoning ordinances. This could include adding language to existing zones, including planned districts and overlay zones, or creating new transit area zones, districts or overlays. San Francisco has incorporated transit-appropriate development regulations within its downtown district ordinance, while Portland, Oregon has transit-overlay zones.

Transit criteria might include minimum front yard setbacks, reduced off-street parking requirements, pedestrian linkages to adjacent properties, and a prescription of ground floor land uses that depend on interaction with the street.

CONCLUSION

As stated at the outset of this section, urban form is the primary determinate of whether transit is a desirable alternative to the automobile. For this reason, the planning process must include the comprehensive consideration of transit, from policy through to implementation. This inclusion will help ensure that transit and walking become viable alternative modes of transportation. As this occurs, we will see real progress in reducing the social, economic and environmental impacts of the automobile on our metropolitan area.

MTS CONTACTS

Please contact MTS with any questions or concerns you may have regarding the content in this document. The front desk phone number is: (619) 231-1466

REFERENCES

The following documents were helpful in compiling this manual and may provide further information on integrating transit and land use.

Local References

- Metropolitan Transit Development Board, San Diego CA. *Designing for Transit*. 1993
- San Diego Association of Governments. *Draft Improving Bus Operations and Traffic Final Report.* 2016.

National References

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