APPENDIX E

Transit-Supportive Design and Policy Handbook

OC TRANSIT VISION

Transit-Supportive Design and Policy Handbook

January 2018

OC Transit VISION

NELSON NYGAARD

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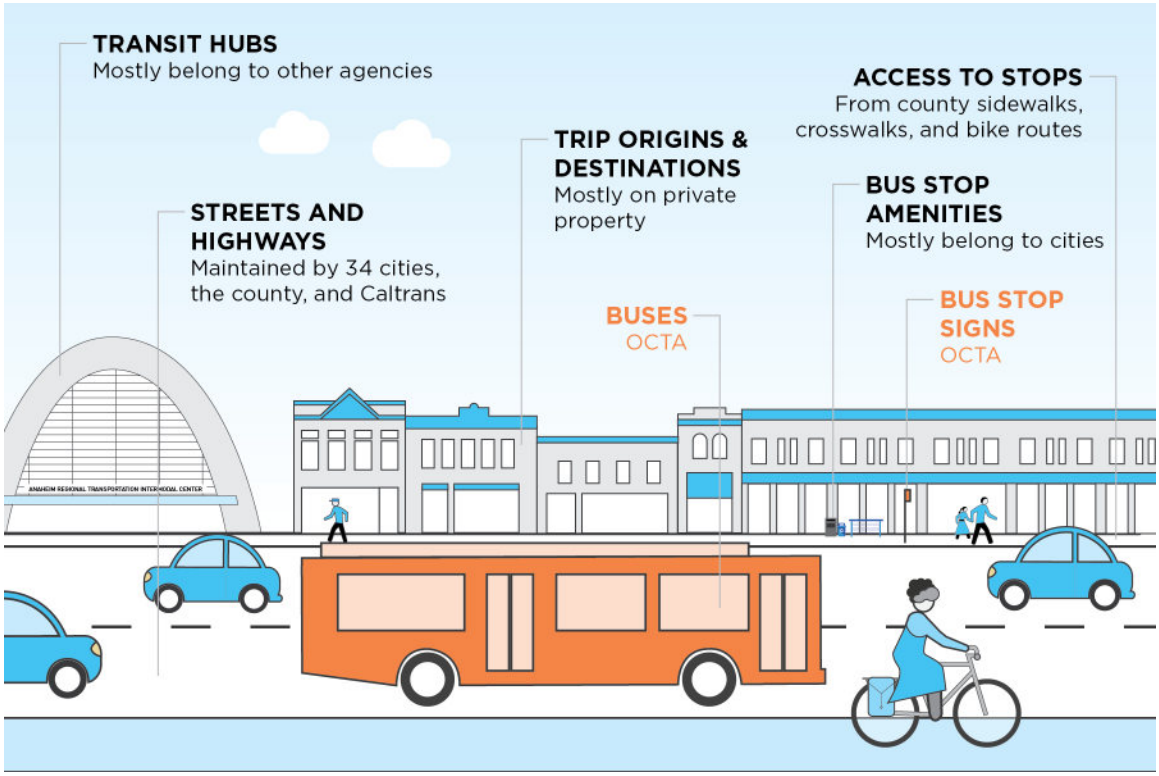
1 INTRODUCTION

1.1 WHY THIS HANDBOOK?

In Orange County, the Orange County Transportation Authority (OCTA) provides most public transit service. However, OCTA does not provide this service in a vacuum. Its buses and paratransit vehicles operate on streets and highways maintained by the county's 34 cities, the county itself, and the California Department of Transportation (Caltrans). OCTA bus stops are on city and county property, as are the sidewalks, crosswalks, and bike routes that provide access to them. Its routes connect to one another and to routes operated by other transit agencies at transit hubs that are mostly the property of other public agencies. And most of the origins and destinations of OCTA passengers—their homes, workplaces, and campuses and the shopping centers, hospitals, and theme parks they visit—are on private property.

Figure 1-1 What OCTA Owns and What Others Own



OCTA has control over its vehicles some transportation centers, bus stop poles, signs, and customer information, but most other elements belong to others.

Source: Nelson\Nygaard

For OCTA to be successful in its mission of providing high-quality transit service, it must partner with other public and private entities. This Transit-Supportive Design and Policy Handbook is intended to provide guidance to those representatives of public agencies as well as private parties who play a key role in helping OCTA to achieve this mission by contributing to the development of transit-supportive communities.

Old Towne in the City of Orange is a walkable, transit-supportive community.

Source: Ken Lund

Transit-supportive communities are not just good for transit—they are also good places to walk and ride a bike, to work and play, and to do business and enjoy a high quality of life. They are safe, healthy, inclusive, and sustainable communities. And they are resilient communities, designed to adapt to future changes. These reasons help to explain why local, regional, and state government agencies have adopted many transit-supportive policies and regulations in recent years. This handbook builds on current practice to provide practical support for communities seeking to put those ideas in place, and into action.

1.2 WHO IS IT FOR?

The audiences for the Transit-Supportive Design and Policy Handbook are diverse:

Public agency staff, including planners, public works officials, and others

Policymakers, including elected and appointed officials

Developers

Property and business owners

Architects, planners, and urban designers

Representatives of schools, medical centers, and other community institutions

Community groups and advocates for improved transportation options

General public interested in the subject of transit-supportive design and policy

1.3 WHAT IS IN IT?

This Transit-Supportive Design and Policy Handbook is in two parts:

- Guidance for the design of transit-supportive streets, transit stops, and other transportation facilities and programs
- Guidance for the design of transit-supportive buildings and neighborhoods, as well as land use policies and regulations

The guidance in this handbook is practical and easily accessible. However, it is far from the last word on the subject: readers should also consult OCTA's *Bus Stop Safety and Design Guidelines*, the Orange County Council of Governments' (OCCOG) *Complete Streets Initiative Design Handbook and Funding Toolkit*, and the National Association of City Transportation Officials (NACTO) *Transit Street Design Guide*.

Released in 2016, OCCOG's complete streets design guide is intended to help cities comply with State General Plan requirements.

Source: OCCOG

2 TRANSIT-SUPPORTIVE TRANSPORTATION SYSTEMS

2.1 INTRODUCTION

Transit is one of many modes in the Orange County transportation system, and the parts of this multimodal system must work together to support mobility to, in, and through the county. Among the most important elements of a successful transit system are the street environment in which transit operates and the types of connections that are available to help passengers access the system. Transit must operate in a high-quality and seamlessly-integrated environment to perform optimally.

This chapter covers the following topics:

- Transit service design and supportive street networks, as well as placement and design of bus stops;
- Street design features, including transit vehicle/operational requirements, complete street design, and transit-priority treatments; and
- Transportation system integration, including the concept of first/last mile access to transit, walking and biking access to transit, and connections to transit centers.

2.2 TRANSIT SERVICE DESIGN AND SUPPORTIVE STREET NETWORKS

To design streets and neighborhoods that support transit, it is helpful to understand a few basics of transit network and route design. These range from large scale (how to design street networks and locate buildings to enable efficient transit) to small scale (where to locate bus stops to efficiently accommodate both buses and passengers), but both are important and have implications for the design of Orange County communities.

2.2.1 Transit Service Design

While recent advances in technology have made “on-demand” or “micro” transit services such as OC Flex feasible, for the foreseeable future most transit service will continue to be provided along a fixed-route with published schedules. OCTA has taken the initiative to update its system, including through its OC 360 network restructuring, to ensure that its routes adhere to best practices in transit route and network design. These best practices are summarized on the following page.

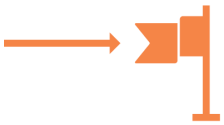
Figure 2-1 Best Practices in Transit Service Design

Be direct

Ideally, transit routes should avoid time-consuming turns and deviations and go in straight lines, making them both faster and easier to understand and remember.

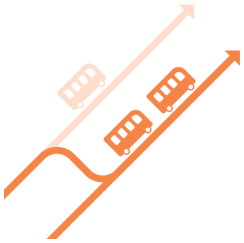
Serve a variety of destinations

The most efficient and cost-effective routes are useful to a variety of people at different times of day.



Terminate at strong anchors

When there are major demand generators at both ends of the route, buses or trains are rarely empty.

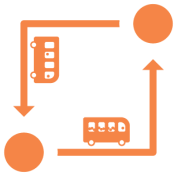


Avoid duplication

Rather than having routes operate on parallel streets less than a half -mile apart, have them overlap so that more frequent service can be provided in the combined segment.

Avoid routes that are too long

The longer the route, the more prone it is to delay; reliability may suffer.



Balance demand in each direction

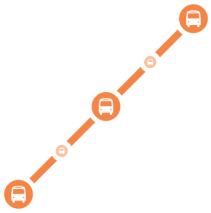
Routes are also more cost-effective when they carry roughly the same number of passengers each way rather than, for example, carrying a full load of commuters in one direction and running empty in the other.

Operate in rights-of-way that minimize delay

This could include transit-only lanes, streets with transit signal priority, or simply streets on which there are few conflicts with other modes.

Minimize transfer penalties

Transfers are sometimes necessary and even desirable from a network design perspective; however, they should be made as seamless as possible, both spatially and in terms of time waiting between services.

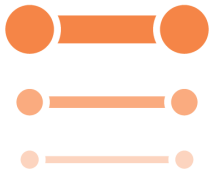


Balance speed and access when locating stops

Stops should be far enough apart to minimize delay but close enough to provide reasonable access for those with limited mobility. They should also be close to destinations, connecting routes and access points—such as crosswalks, bike lanes, and park-and-ride lots. Customers will walk further to better transit, and the stop spacing can be longer on these services.

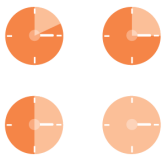
Provide a high-quality waiting environment

Stops should be comfortable, safe, dignified, and provide important information.



Match service levels to demand

While comfortable stops and stations are important, providing "walk-up" frequencies of 15 minutes or less enables people to avoid consulting a schedule and supports spontaneous trips. Very frequent service should be provided where demand supports the investment.



Make schedules easy to remember

Ideally, routes should operate on "clockface" headways, such as every 10, 15, or 30 minutes.

Several of these best practices in transit route and network design are directly applicable to the sorts of land use and development decisions communities must regularly make, in particular newer communities in developing areas. Streets that are generally straight, well connected to one another, and lined by homes, businesses, and a mix of other uses are more supportive of transit than indirect, disconnected streets with homes and businesses far apart. Bus stops should also be easily accessible to people on foot or using mobility devices.

2.2.2 Supportive Street Networks

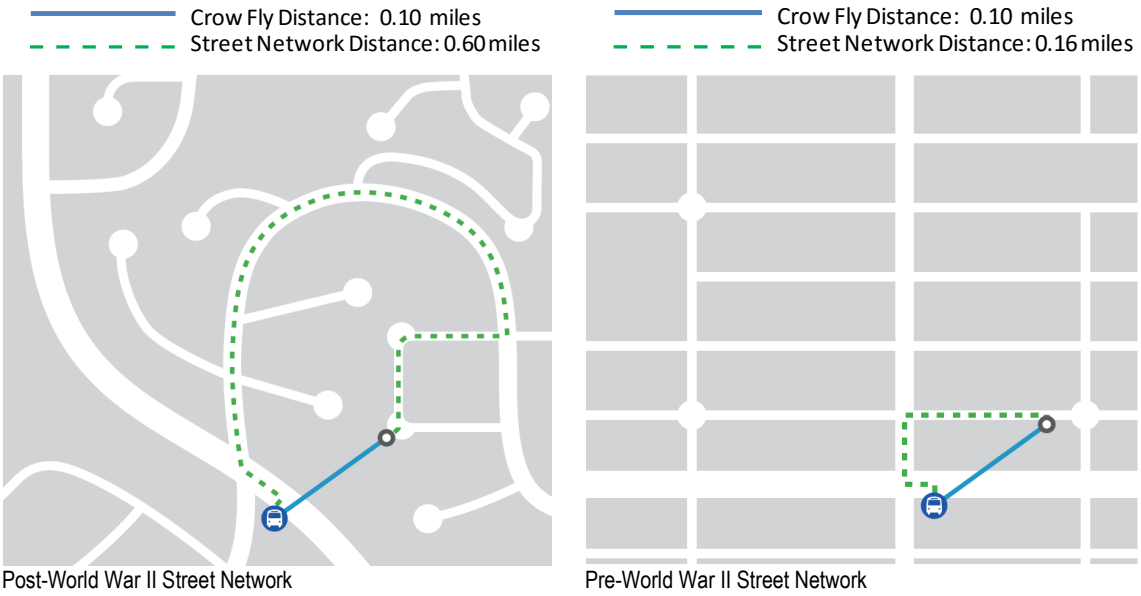
Most Orange County neighborhoods designed after World War II have been designed around cars, with wide and winding streets that don't always connect to one another, funneling drivers along twisting, turning paths from cul-de-sacs and other "local" streets to mid-sized "connector" and major "arterial" streets.[1] Street networks in older downtown areas, meanwhile, were retrofitted using one-way streets that are designed to move cars quickly through an area, but which require bus routes to operate on different streets in different directions.

Lately, however, some new neighborhoods have been designed based on traditional, well-connected street networks, and some one-way streets have been converted back to two-way traffic. By offering not just more direct routes but more route options, such street networks can work well for pedestrians and cyclists, motorists, and transit riders.

The figures below shows the street networks in a typical post-WWII subdivision and a pre-WWII neighborhood. As the graphic illustrates, walking distances are much shorter in the latter—this is important, as (with a few exceptions, such as commuter express routes stopping at park-and-rides) the overwhelming majority of transit riders walk to and from stops. The straight streets in the pre-war neighborhood design also offer more direct paths for transit routes, promoting faster travel times, and make travel by many modes easier.

[1] Local, collector, and arterial are categories of streets defined under the Federal Highway Administration's "functional classification" system used by most cities. The functional classification system defines streets based on their role in the roadway network, but not in terms of how they accommodate non-auto modes or relate to adjacent land uses. (https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/section03.cfm)

Figure 2-2 Street Networks and Travel Distance



Source: TransLink Transit Oriented Communities (2011)

Many older neighborhoods in Orange County (typically in the north/central part of the county) more closely resemble pre-WWII street design than post-WWII, and it is in these neighborhoods that OC Bus ridership is highest. Transit access in neighborhoods that were designed in the post-war style is more challenging. However, these areas can be retrofitted with pedestrian- and bike-only "cut through" paths to avoid making people travel well out of direction to reach bus stops, or bus stops can be relocated to reduce walking distances.

Older (top) and newer (bottom) Orange County neighborhoods have different types of street networks that are more or less supportive of transit, respectively.

Source: OCTA

2.2.3 Transit Stop Location

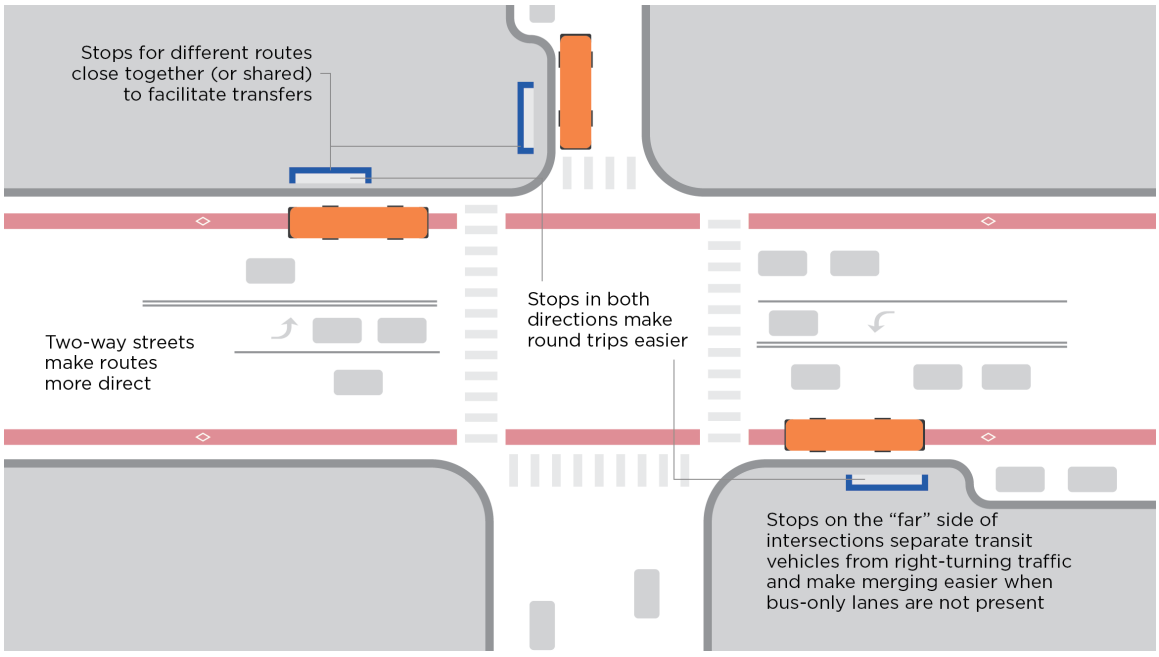
It may seem obvious, but transit stops should be in places people can easily walk to—unfortunately, many are not. As noted earlier, most transit riders walk to and from stops; to be useful, stops must be located a short walk from origins and destinations and accessible via direct pathways. This means placing stops at intersections, near crosswalks. Stops should also be along sidewalks that are continuous, without gaps, and wide enough for pedestrians to comfortably walk alongside or pass one another. New stops must be Americans with Disabilities Act (ADA)-accessible and older stops should be retrofitted to meet ADA standards for senior and disabled customers.

At intersections where transit routes converge, stops for the various routes should be located as close as possible to one another to facilitate transfers. Not only will fewer connections be missed, but conditions will be safer, as transferring passengers will be less tempted to cross against traffic to catch a bus.

To support round-trip travel, every transit stop should be accompanied by a stop in the other direction; these stops should be clearly visible from one another for ease of navigation. As was noted in the previous section, two-way streets are better for transit than one-way streets, both because they support more direct routes but also because they enable clear sightlines between pairs of stops.

Finally, stops should be located on the "far" sides of intersections. There are pros and cons to this—as some prefer stops on the "near" (approach side)—and they are discussed at length in the OCCOG *Complete Streets Handbook*. In general, stops on the far side are generally more supportive of transit operations, as they separate transit vehicles from right-turning traffic, make it easier for them to merge back into traffic, and allow pedestrians to cross the street behind the transit vehicle rather than in front of it.

Figure 2-3 Elements of Transit Stop Location



Source: Nelson\Nygaard

2.2.4 Transit Stop Design

Good design of transit stops is important for two reasons. First, and most obviously, much of the actual experience of using transit takes place at stops, not aboard vehicles, so passenger comfort and amenities (including passenger information) are essential. Second, well-designed transit stops don't just accommodate transit vehicles—they help them operate more efficiently, reducing the time it takes to load and unload passengers (dwell time) as well as the time it takes to get into and out of a stop.

2.2.4.1 On-Street Stops

On busy streets, many communities locate bus stops at "turnouts" where buses can pull out of traffic to load and unload passengers. This is not ideal, as bus operators must then wait to merge back into traffic. Generally, if there are multiple lanes of traffic, buses should be allowed to stop in the outside lane. If streets are quiet enough, buses can be allowed to temporarily block traffic; exceptions include streets with very high traffic speeds, as well as locations where buses must sit to lay over, to change drivers, or to load and unload. On streets with curbside parking, stops can be located on sidewalk extensions.

Bus turnout in Orange County.

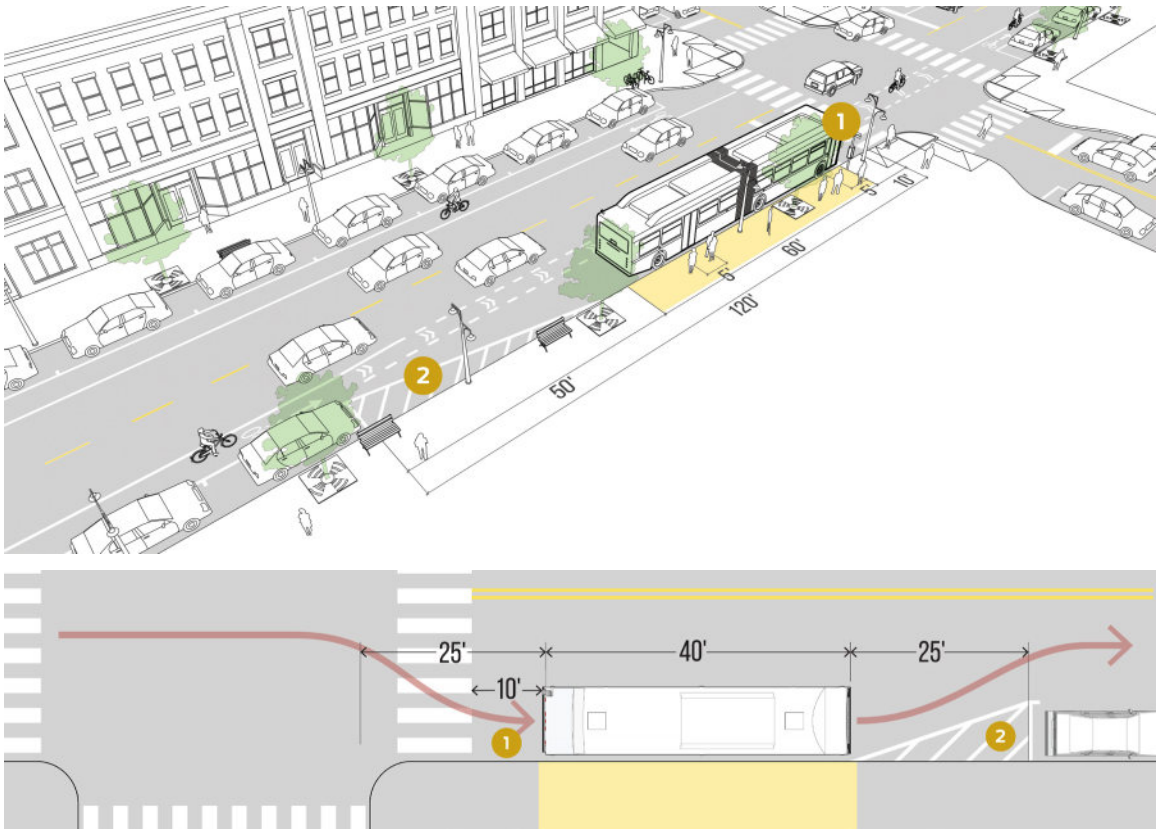
Source: OCTA

"Bulb-out" or sidewalk extension bus stops in Seattle, Washington, and Portland, Oregon.

Sources: Bill Bryant and Nelson\Nygaard

Where buses are required to pull out of traffic and stop along the curb, stops should be long enough for buses to efficiently and safely maneuver into and out of them, pulling all the way out of traffic and to the curb in the process (see Section 2.3, Street Design for more). Stops should never be separated from the curb by parked cars forcing passengers to walk through the vehicles to reach the curb—this is dangerous and prevents access for people using mobility devices. The curb at bus stops should be kept free of all obstructions.

Figure 2-3 Required Dimensions for Near- and Far-Side Bus Stops

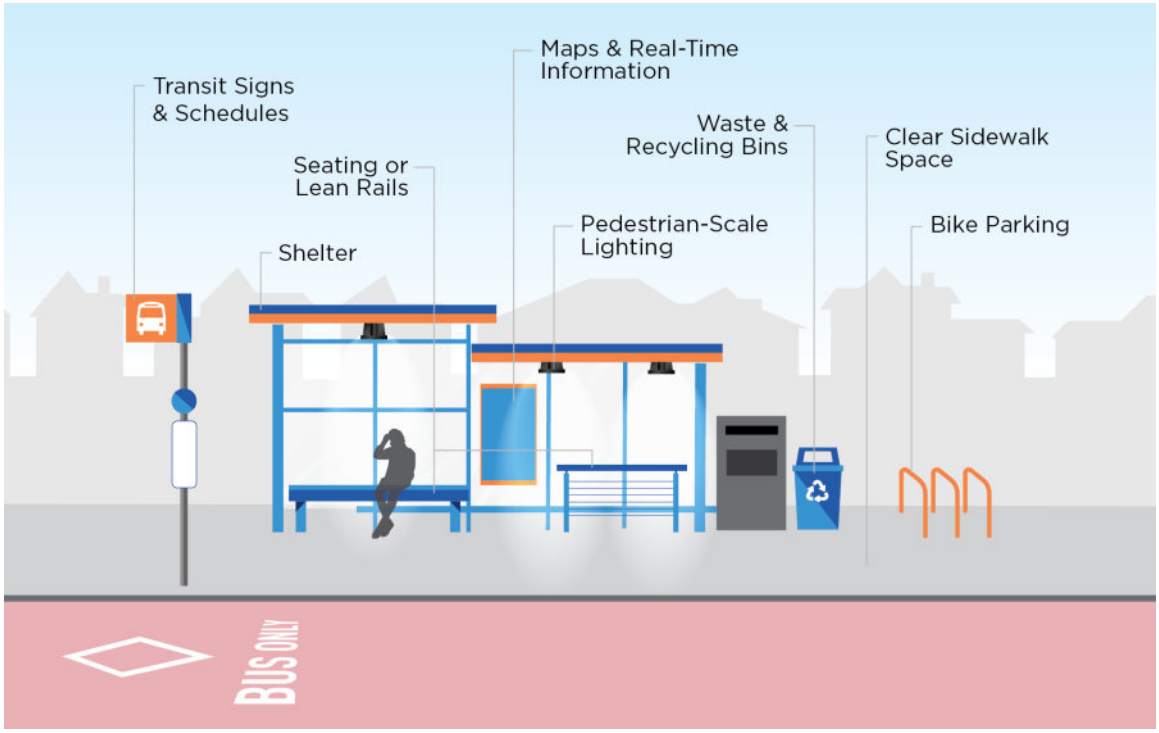


Typical bus stops requiring buses to pull out of and back into traffic must be long enough for buses to safely make this maneuver. Stops are also recommended to be at least 10 feet away from crosswalks.

Source: NACTO Transit Street Design Guide

As far as stops themselves, they should be comfortable, safe, and clean, with seating, shelters at busier stops, pedestrian-scale lighting, and trash cans. They should also provide necessary information—not just signs, but schedules, maps, and (at busier stops) displays showing updated wait times. Finally, they should provide enough space for wheelchair, scooter, walker, stroller, and bike access; passenger loading and unloading; room to wait; and room for pedestrians to pass by without being impeded by the stop or waiting passengers. Above all, they should offer existing and potential transit riders the same sense of dignity that drivers and others are afforded.

Figure 2-4 Amenities at High-Quality Bus Stops



Source: Nelson\Nygaard

2.2.4.2 Transit Centers

Transit centers—train stations, express bus park-and-rides, and other types of off-street facilities that enable transfers between routes—have different design requirements depending on their function, but a few universal rules of design should be applied.

As with pedestrian access to on-street stops, distances between stops (and train platforms) should be minimized for transferring passengers, as well as for transit vehicles trying to get into, around, and out of the transit center. Where possible, transit centers and their stops should be close to the street and should avoid circuitous access and circulation pathways. In some cases, putting some stops on the street next to the transit center may help to reduce overall travel time for passengers. Finally, wayfinding and directional signage can be used to help people find their way to and from transit stops.

Transit centers should also be designed around intermodal connectivity and access needs, based on an access hierarchy prioritizing different modes. This is further explained in Section 2.4, Transportation System Integration.

Bus stops at transit centers, like this one in Mountain View in the San Francisco Bay Area, should be both close to the street and close to any other connecting transit, such as rail platforms.

Source: Nelson\Nygaard

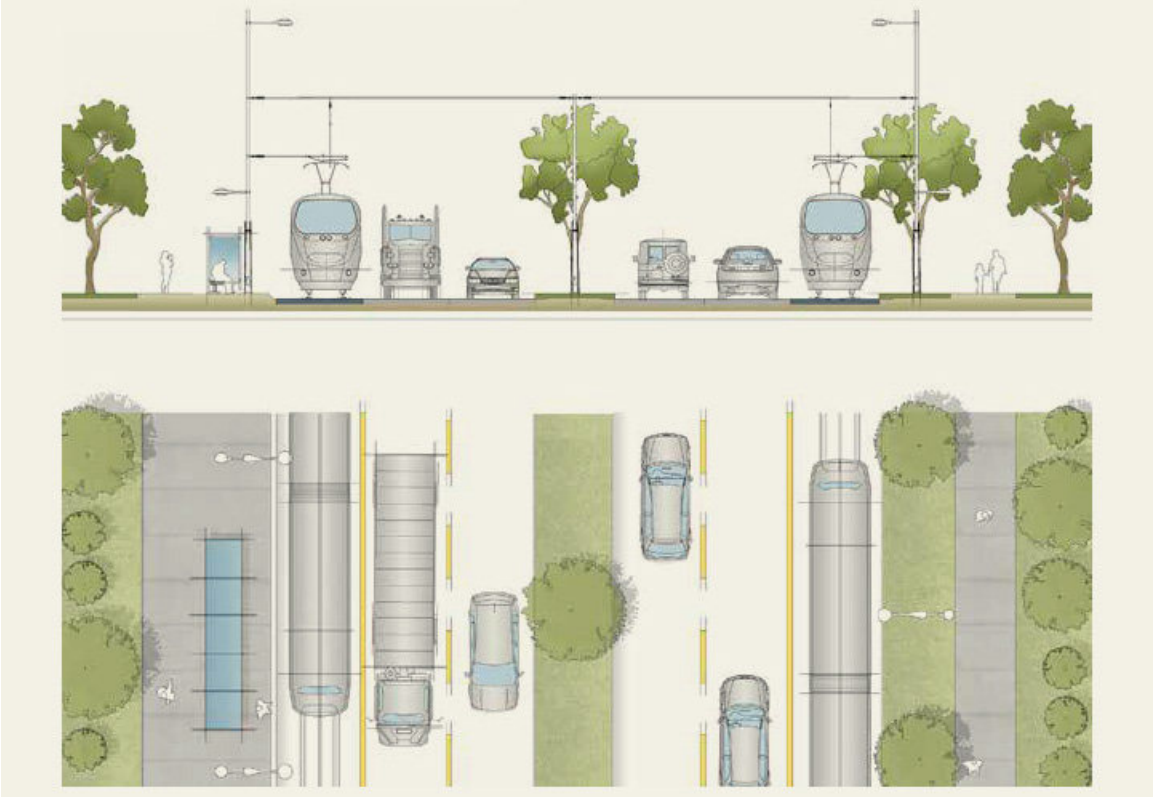
2.3 STREET DESIGN

Most transit in Orange County operates on city streets, and the design of those streets is essential to providing effective transit service. Historically, this has meant simply accommodating bus movements—while this remains important, the current best practice is to design "complete streets" for all people. Complete streets improve access to transit and also support priority for transit vehicles on busy routes.

2.3.1 Complete Streets

Complete streets are streets that safely accommodate all people, whether they are driving, waking, biking, riding transit, or operating a freight vehicle. OCCOG's *Complete Streets Initiative Design Handbook and Funding Toolkit* provides detailed guidance on the design of complete streets in Orange County, including design principles related to rights-of-way for transit, transit stops, and "first/last mile" multimodal access to stops.

Figure 2-5 Example of a Complete Street



Complete streets accommodate all modes, including transit.

Source: OCCOG Complete Streets Initiative Design Handbook and Funding Toolkit

In general, complete streets are also transit-supportive streets. Even where they don't provide priority treatments for transit (see next section), they provide additional space for transit stops, improve pedestrian and bicycle access to transit, and bolster transit-supportive land uses such as pedestrian- and transit-oriented "main street" retail. Designers of complete streets should be careful to ensure that transit vehicle movements can be accommodated efficiently; for example, if reductions in capacity impact transit travel times, those impacts should be offset by other improvements for transit such as those described in the next section.

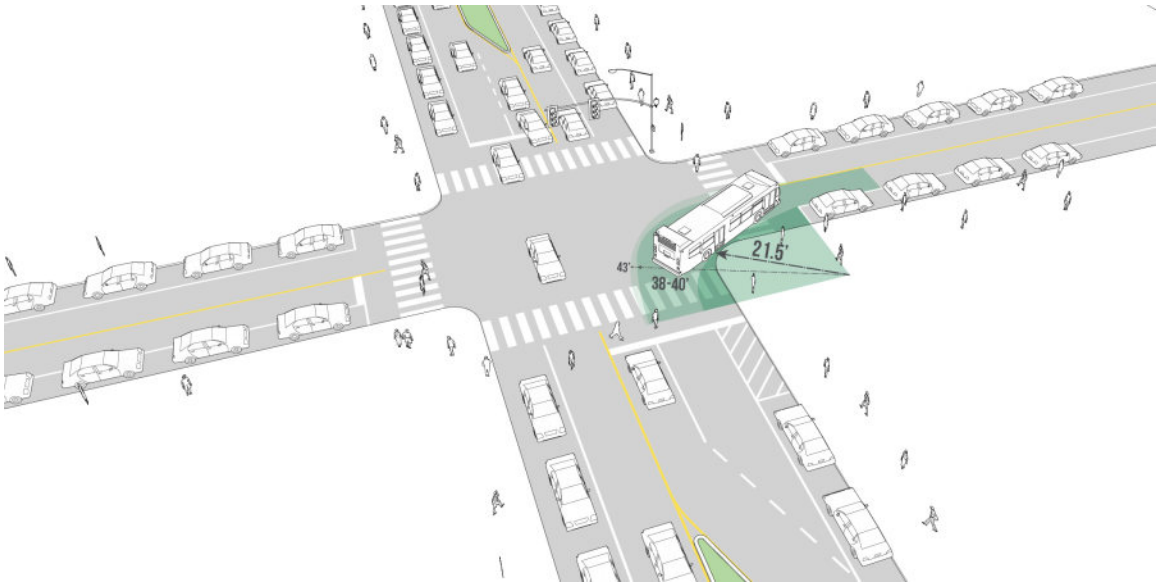
2.3.2 Vehicle/Operational Requirements

OCTA's *Bus Stop Safety and Design Guidelines* provide detailed specifications on street design and engineering requirements for transit vehicles, including dimensions. In general, lanes in which transit vehicles operate should be 11 feet wide (lanes may be slightly narrower where buses are not passing one another, on one-way streets, or on streets with multiple travel lanes in each direction).

At intersections where transit vehicles make right turns, the corner turning radii should be large enough to accommodate them while still remaining "tight" enough to support slow speeds and safe pedestrian crossings. If there are multiple travel lanes in each direction, radii may be tightened and vehicles can turn into a non-curb lane (or, if there is curbside parking, it can be removed near the intersection).

Finally, stops that require a transit vehicle to pull out of a travel lane should include sufficient space for acceleration and deceleration, maneuvering, and merging. Ideally, stops should be close to twice as long as the largest vehicles that will use them.

Figure 2-6 Turning Radius of a Transit Vehicle



A bus can turn safely and efficiently at corners with relatively small, pedestrian-friendly radiuses if curbside parking is removed near the intersection or if there is a second travel lane that the bus can use to make the turn.

Source: NACTO Transit Street Design Guide

2.3.3 Transit-Priority Treatments

2.3.3.1 Types of Transit-Priority Treatments

Transit-priority treatments reduce delay for transit vehicles and passengers. The transit-priority toolbox ranges from the simple—sufficient space for passengers to load and unload so that a vehicle's waiting time at stops is reduced—to more extensive interventions such as exclusive lanes for transit vehicles.

Transit-priority treatments generally fall into two categories: strategies to reduce delay at stops, and strategies to reduce delay between stops. Most measures to reduce delay at stops, such as use of low-floor vehicles eliminating stairs at doorways, are the responsibility of transit operators. But cities are largely responsible for streets and traffic signals that reduce delay between stops.

Three relatively simple measures that cities can implement to significantly reduce transit travel times are the following:

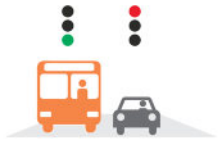
Figure 2-7 Three Types of Transit-Priority Treatments

Signal timing adjustments

Signal timing adjustments, synchronization, and adaptive signal systems optimize traffic flow on a street.

Transit signal priority (TSP)

Transit signal priority (TSP) systems extends green lights up to 10 seconds for approaching transit vehicles, allowing them to avoid red lights (or, in some cases, to turn red lights green a few seconds early).



Queue jumps

"Queue jump" bypass lanes on intersection approaches (also known as short transit-only lanes or shared right-turn lanes) accompanied by brief transit-only signal phases allow transit vehicles to bypass lines of cars stopped at red lights, thereby avoiding bottlenecks.

2.3.3.2 Transit-Only Lanes

A fourth type of transit-only treatment is transit-only lanes, which may be side-running or center-running and exclusive or semi-exclusive. Transit-only lanes can be somewhat more challenging to implement than the three measures described above. Semi-exclusive "business access and transit" or BAT lanes can be used by transit vehicles as well as motorists turning right or maneuvering into or out of curbside parking spaces. Transit lanes can also be full-time or part-time, for example during peak-periods only (such lanes are often used for parking at off-peak hours). Transit lanes are most effective when they are physically separated from traffic, but lanes that are not can be made more effective by coloring them (most often red) or using other visual cues such as signs. Where transit service is relatively frequent, transit-only lanes can increase the "person-capacity" of the street, as a lane reserved for transit vehicles with hundreds or dozens of passengers can carry more people than one used by vehicles with one or two passengers.

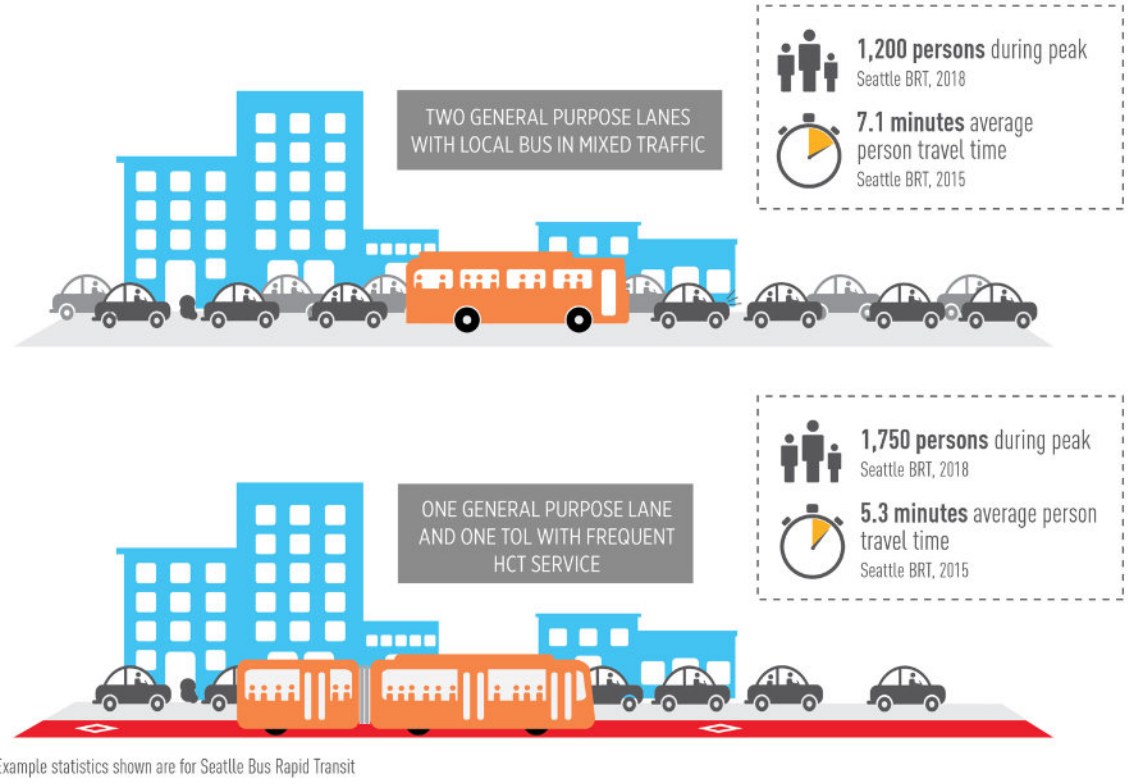
Figure 2-8 Transit-Only Lanes

Side-running transit lanes

Center-running transit lanes

Exclusive transit rights-of-way

Figure 2-9 Roadway Capacity With and Without Transit-Only Lane (TOL) and High Capacity Transit (HCT)



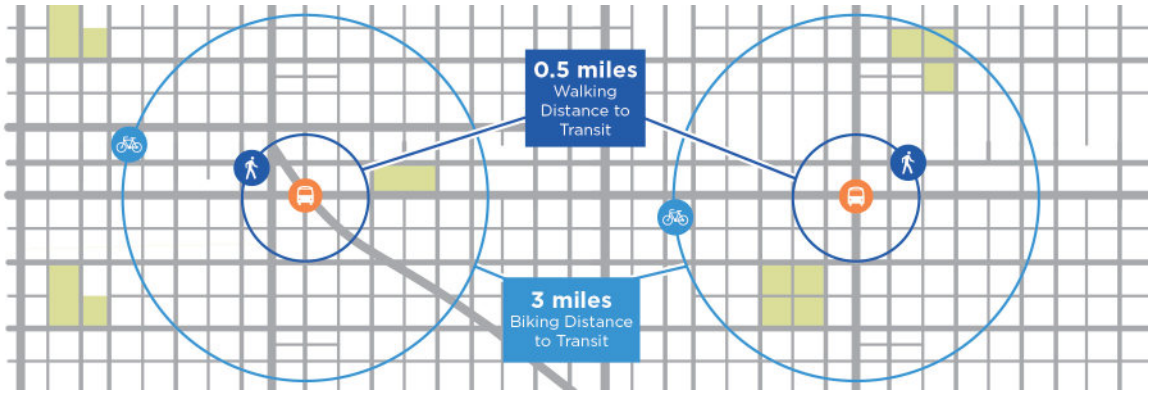
Example statistics shown are for Seattle Bus Rapid Transit

Source: Nelson\Nygaard

2.4 TRANSPORTATION SYSTEM INTEGRATION

Ideally, transit routes should pick people up a short walk from their trip origins and drop them off near their destinations. But for a variety of reasons, transit stops cannot always be immediately adjacent to origins or destinations. They may be a half-mile, a mile, or even several miles away. In these cases, transit passengers rely on what are called "first/last mile" connections to origins and destinations. These include connecting transit routes, as well as connections with other modes.

Figure 2-10 Walking and Biking Distance to Transit Stops



Research has found that most transit users will walk up to a quarter- or half-mile to stops, and that most cyclists will ride three to five miles. Improvements to pedestrian and bicycle infrastructure within "walksheds" and "bikesheds" can improve access to transit.

Source: Nelson\Nygaard

2.4.1 Pedestrian and Bicycle Access

Transit stops should be located to support direct pedestrian connections. Those pathways should be as comfortable and safe as possible, using complete streets design practices. This also means that marked crossings of streets should be both relatively frequent and close together—ideally, no more than 600 feet apart, although they may be farther apart in suburban areas with lower pedestrian volumes—and as short as possible.

Crossings can be shortened by aligning them at right angles to sidewalks, by reducing the number of travel lanes, and by providing "bulb-out" sidewalk extensions and pedestrian refuges in medians. Crossing times at signals should be timed at 3 or 2.5 feet per second (particularly in areas with large numbers of older adults or children), and actuated signals that require a pedestrian to push a button to get the walk sign can be converted to fixed signal timing to provide a walk phase with every signal cycle. (In locations with very high pedestrian volumes, "scramble" or all-way crossings can be installed to further separate vehicle movements from people walking.)

Motorist awareness of pedestrians in crosswalks can be enhanced using high-visibility crosswalk treatments ("continental," "ladder," or "zebra" striping) and other measures to enhance safety, including pedestrian-actuated signals at unsignalized locations (for example "HAWK" or High-Intensity Activated Crosswalk beacons or rapid-flashing beacons).

To support access for all, curb ramps compliant with the Americans with Disabilities Act (ADA) should be provided at all intersections; these should be both aligned with crosswalks and connected to sidewalks. Grade-separated crossings, including pedestrian bridges, should be avoided whenever possible, as these make pathways less direct and can be difficult for people of all ages to navigate.

A pedestrian curb extension or bulb-out in Santa Ana.

Source: Nelson\Nygaard

Bicycle routes to transit stops, meanwhile, should follow the same geometric principles: direct paths, with frequent, short, and high-visibility crossings of streets. Ideally, busy transit stops should be connected to designated bicycle routes featuring high-quality bicycle facilities such as off-street paths, separated (protected) or buffered on-street lanes, or "bicycle boulevard" or "greenway" treatments on lower-volume streets. Where transit and bicycle routes are on the same street, conflict points should be minimized—bicycles and transit vehicles tend to travel at similar speeds and "leapfrog" one another, resulting in conflicts whenever they pass—by providing dedicated space for both modes.

This Santa Ana bike lane is buffered from traffic and colorized to increase visibility and awareness of cyclists.

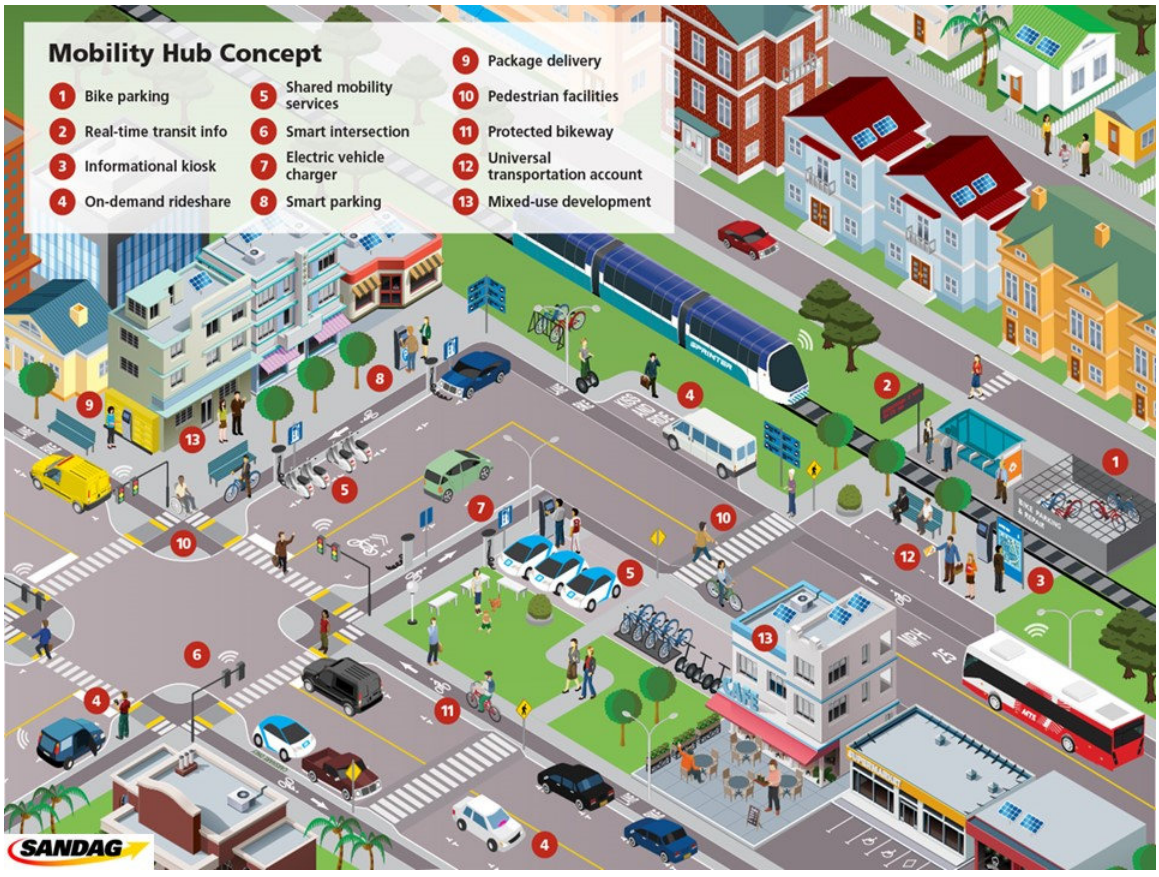
Source: Nelson\Nygaard

2.4.2 Mobility Hubs

Mobility hubs are places where multiple modes of transportation come together, providing seamless connections to the transit system and between modes. The emerging best practice is to provide fully featured "mobility hubs" at transit centers including elements such as "bike stations" with secure bike parking, repair, and rental facilities (and extensive rider amenities, such as showers); bikeshare docks (if a local system exists); carshare vehicles; a staffed or unstaffed traveler information kiosk with integrated information on all modes serving the transit center; retail spaces such as a café; public restrooms; and placemaking features such as plazas, art, and landscaping.

Together with other access elements including stops for connecting transit, park-and-ride lots, and pedestrian and bicycle routes through the site, mobility hubs can ensure that transit riders have access to a wide range of options for first/last mile connectivity, greatly increasing the range and utility of transit routes serving the transit center.

Figure 2-11 Elements of a Mobility Hub



Source: SANDAG

2.4.3 Transit Centers Access Hierarchy

Off-street transit centers—including rail stations, park-and-rides, and bus transfer facilities—have distinct access requirements. Like on-street stops, access paths to transit centers should be made as

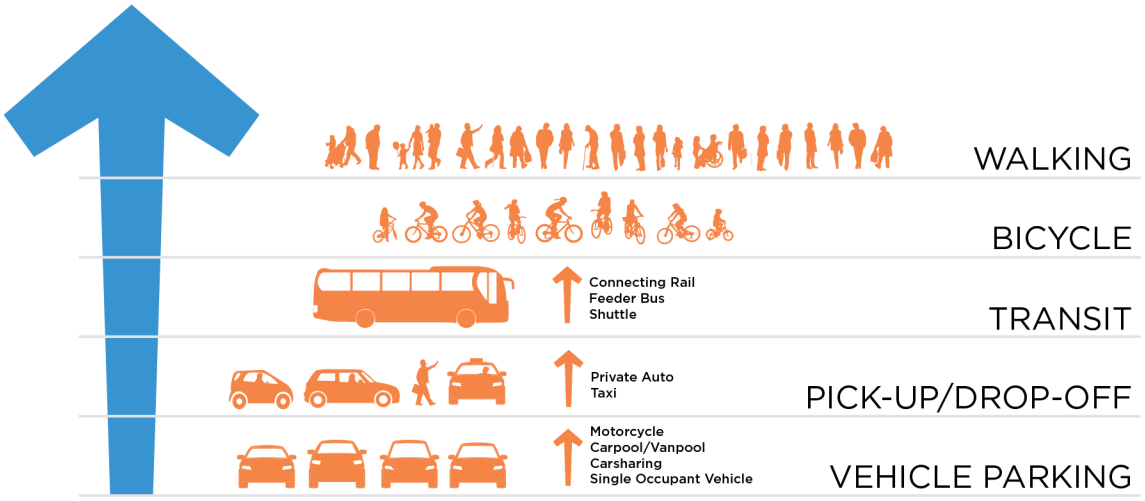
direct as possible, meaning that transit centers should be located along busy routes and should be close to the street, so that people and buses can get in and out of the transit center easily.

Choices must also be made in the allocation of space at transit centers, and access and circulation pathways within them must be designed to minimize conflicts. One way of making these decisions is to define an "access hierarchy" that prioritizes allocation of space for different modes based on factors including conflict reduction, access needs, and broader policy imperatives such as incentivizing low-carbon modes.

A typical access hierarchy prioritizes pedestrians over people using other modes, meaning that pedestrian paths through transit facilities should be kept as direct, comfortable, and safe (conflict-free) as possible. Other forms of active transportation, specifically bicycles, are also typically prioritized—this means that paths should be safe and that bicycle parking and other amenities such as rental facilities should be provided in close proximity to the actual transit stops.

Stops for connecting or feeder transit routes and designated pick-up/drop-off areas for private autos ("kiss-and-ride"), taxis, and transportation network companies including Uber and Lyft should be provided in locations convenient to both drivers and transit riders. Finally, park-and-ride lots or garages for autos can be located somewhat farther away from transit stops, both to reduce conflicts between vehicles, pedestrians, and cyclists and because drivers can be expected to walk some distance if conflict-free pedestrian paths are provided. Within parking lots, space for high-occupancy vehicles (such as OC Vanpool), low-emission vehicles, carshare vehicles, and motorcycles should be prioritized.

Figure 2-12 Potential Access Hierarchy for Orange County Transit Centers



Source: Nelson\Nygaard

2.5 CONCLUSION

Cities and other public agencies have an important role to play in ensuring that the full transportation system is supportive of transit: that streets are designed to support transit operations as well as multimodal access to transit, enabling people to easily get to and from transit. Doing so will require thinking holistically and at different scales, from the very large to the small—from the overall transportation system in Orange County and Southern California to the individual transit trips that people take, including other modes in addition to transit.

3 TRANSIT-SUPPORTIVE LAND USE POLICIES

3.1 INTRODUCTION

One of the most important roles that cities and other public agencies play in supporting transit is their role as land-use policy makers. Policies that codify a desire for transit-supportive land uses and incentivize developers to play a role in achieving that vision are a proactive way that cities can help to increase transit use. On the other end of the spectrum are policies and programs that disincentivize development and behaviors that detract from transit ridership, such as providing free, abundant parking in areas well served by transit. The right combination of "carrots" and "sticks" can help to support transit ridership in Orange County.

This chapter covers the following topics:

- Transit-supportive land use—urban design and architecture—including guidance on location, density, mixing of uses, and built form/walkability, as well as state and regional policies related to transit-oriented development; and
- Transit-supportive policies in the important areas of parking and transportation demand management (TDM).

3.2 TRANSIT-SUPPORTIVE LAND USE

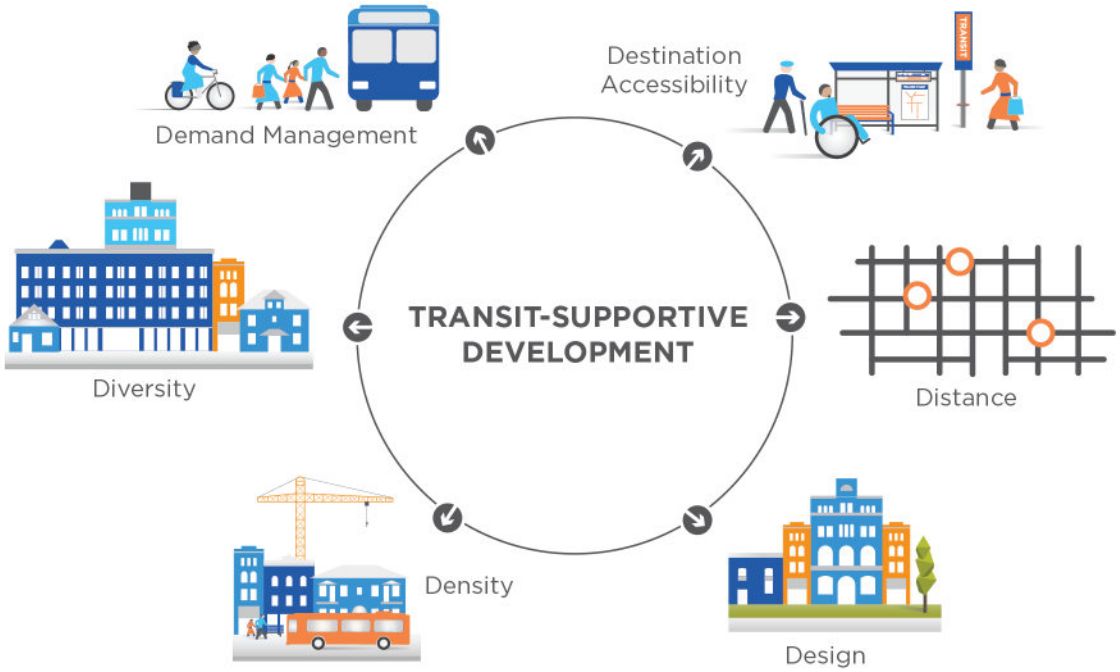
3.2.1 "The Six D's"

When considering the relationship between transit, buildings, and neighborhoods, it is useful to think in terms of what planners call the 6 Ds: Destinations, Distance, Density, Diversity, Design, and Demand Management. Each of these is essential to the design of built environments in which transit can succeed.

- **Destinations:** Land uses should be grouped together to form busy destinations, and destinations should be in locations that are easily accessible to transit, and not remote, isolated sites.
- **Distance:** Origins and destinations should be relatively close together and connected by direct paths.
- **Density:** Putting more residents and workers or students—more potential transit riders—close to transit increases the number of transit riders.
- **Diversity:** A mixture of different land uses in close proximity enables walkable environments, which are also transit-supportive environments.

- **Design:** Architecture built around pedestrians is architecture that also supports transit. Adding interest to the streetscape is key to creating pedestrian- and transit-friendly places.
- **Demand Management:** Strategies to reduce reliance on driving, like those described later in this chapter, can be as important to successful transit as physical factors such as the first 5 Ds.

Figure 3-1 The 6 Ds of Transit-Supportive Land Use



Source: Nelson\Nygaard

3.2.1.1 Location

Among the "6 Ds," the first two—Destinations and Distance—are aspects of location. "Location, location, location," goes an old saying; "location is everything," goes another. When it comes to transit and land use, location may not be everything…but it is a very important thing.

It's a simple matter of geometry: if places are going to be easy to get to, they can't be far away. For transit, this means that destinations should ideally be located in linear corridors, relatively close together. There should be a series of destinations—one after another—and they shouldn't require buses or trains to travel well out of direction to serve them or to go long distances between destinations. Street networks should also allow for direct pedestrian paths (see Section 2.2.2, Supportive Street Networks).

It is especially important that major destinations such as schools and hospitals be located on or near busy streets, and not in outlying areas.

Children's Hospital of Orange County in the City of Orange is located along Main Street, a busy street with many destinations, and is served by two of OCTA's busiest bus lines, Route 53 and 53X.

Source: Children's Hospital of Orange County

3.2.1.2 Density

Contrary to "traditional" transit thinking, very high densities are not required for transit to be successful; where the other factors described here exist, moderately dense areas can support frequent bus service. Transit can thrive in areas with three-, two-, or even one-story buildings.

It is a simple mathematical fact, however, that the more people there are close to transit—the more residents, workers, students there are—the more potential transit riders there are close to transit. So more ground coverage, with less space between buildings (including parking lots), is a good thing. So is greater height, to the extent that the community is supportive.

Apartments Near Fullerton Transportation Center

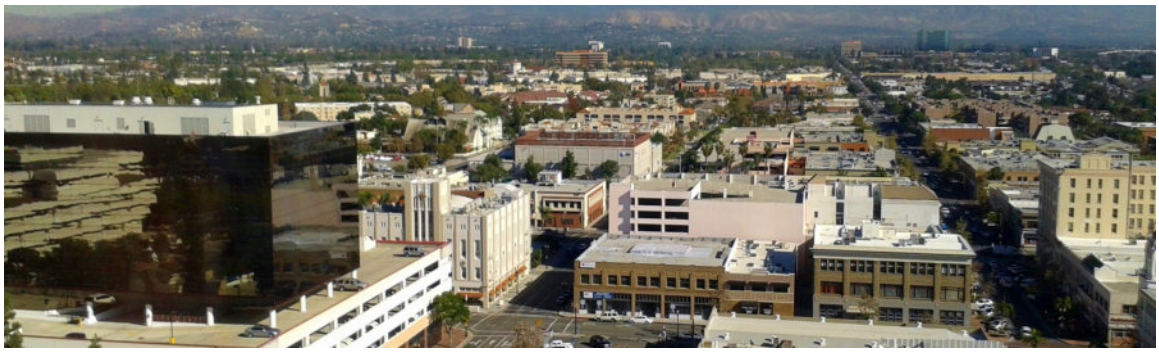
Source: Driver Urban

Higher densities are particularly important near transit centers (including rail stations) or near points where busy transit routes intersect (see "High Quality Transit Areas" below. Finally, low-density areas also tend to be less walkable areas, and walkable areas are transit supportive areas (see "Built Form/Walkability" below).

3.2.1.3 Mixture of Uses

A diversity of land uses in close proximity—homes, workplaces, shopping, schools, hospitals, senior centers, parks, and other destinations—is supportive of transit partly because it allows shorter trips between origins and destinations. Because it must stop to pick up and drop off passengers, transit is generally better at serving short trips than long trips. Mixed uses are also supportive because they create demand for transit at different times of day, and not just during limited periods such as rush hours. Mixed-use districts are also typically walkable areas.

One important fact about mixed-use zoning that is important to understand is that a degree of density is necessary to ensure that "complete neighborhoods" can be built. Notably, there must be enough residents within a short distance to support different kinds of retail uses, including grocery stores.



Central Santa Ana contains a diversity of land uses in close proximity.

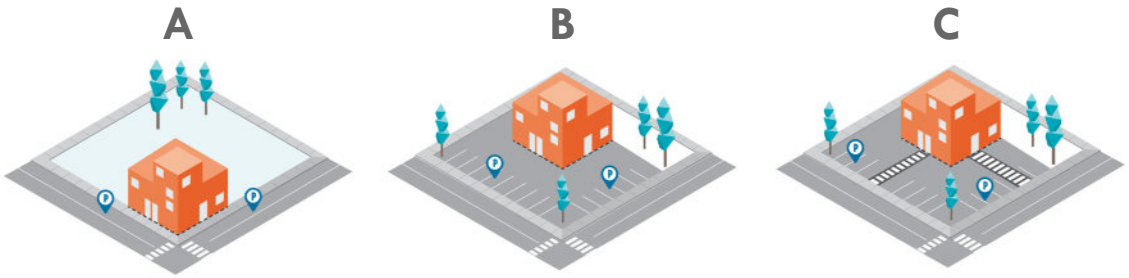
Source: City of Santa Ana

3.2.1.4 Built Form/Walkability

In designing a transit-supportive neighborhood, the most important thing to keep in mind is that it should be a walkable neighborhood. This means many things, including shorter distances between origins and destinations (see Sections 3.2.1 and 3.2.3). Pedestrians are also attracted to areas with other pedestrians, so density is important (see Section 3.2.2), as are spaces where pedestrians can gather to relax or interact, such as public plazas.

But design of buildings and properties is also critical to supporting walkable neighborhoods (and transit). Pedestrian-oriented buildings are not "drive in, drive out" buildings. They are built out to the sidewalk and not set back behind parking lots or significant landscaping that act as a pedestrian barrier between the building and the sidewalk, and between the building and bus stops. They have active frontages, such as retail, rather than blank walls or garage entrances facing the main street. They are, above all, welcoming to people walking up or passing by on foot.

Figure 3-2 Pedestrian Orientation of Buildings and Parking



Pedestrian Oriented: A building built out to the sidewalk

Not Pedestrian Oriented: A building behind a parking lot

Somewhat Pedestrian Oriented: A building behind a parking lot that has been retrofitted to include an accessible path

Why are transit-oriented buildings important to transit? In part, it is because most people walk to and from most types of transit. But it is also because pedestrian-oriented buildings are integral to denser, mixed-use neighborhoods with origins and destinations close together—while big, dense buildings can be auto-oriented, it is rare to find large numbers of pedestrian-oriented buildings in an area that is auto-oriented.

This building in Newport Beach is welcoming to pedestrians.

Source: Ken Lund

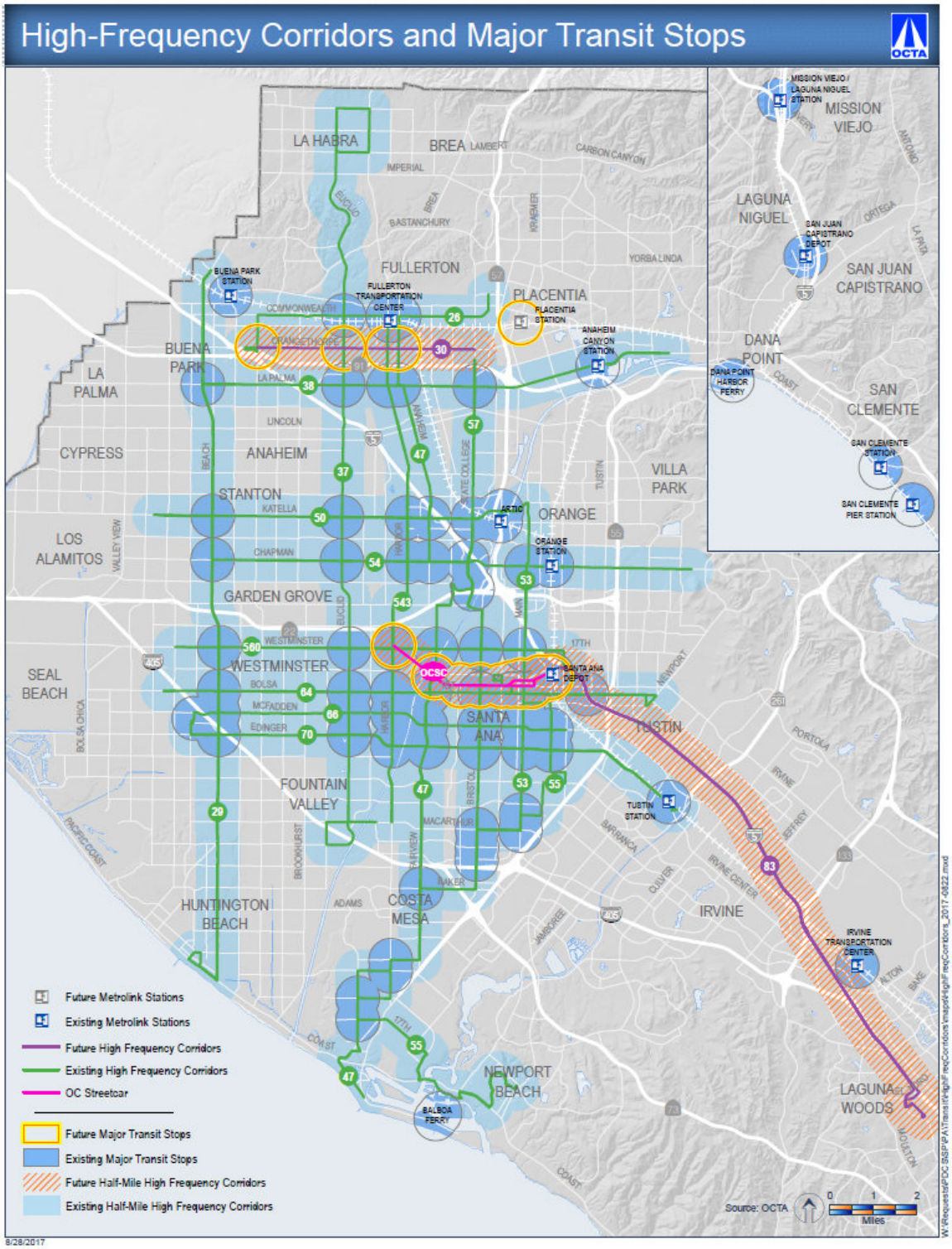
3.2.2 Transit-Oriented Development

Transit-oriented development, or TOD, offers many advantages to cities. Buildings and neighborhoods designed using the "6 Ds" described in the previous section contribute to a range of commonly held community objectives beyond support for transit, including improvements to health and safety, reduced air and noise pollution, and lower costs to taxpayers from use of existing infrastructure such as streets and utility lines. Transit-accessible locations are good places to concentrate higher-density residential and commercial development, as traffic and other impacts are reduced by proximity to transit, and they make good sites for affordable housing, as lower-income residents benefit from access to transit.

In recent years, a series of policies have been adopted at the state and regional levels promoting transit-oriented development. These have ranged from grants and low-interest loans for transit-oriented development to measures to reduce greenhouse gas (GHG) or carbon emissions and promote TOD through changes to environmental review processes.

One of the highest-profile of these is Senate Bill 375 (SB 375), which streamlines California Environmental Quality Act (CEQA) requirements for residential and mixed-use developments that are within a half-mile of a transit corridor or stop with 15-minute or more frequent peak service and meet other requirements, including density of at least 20 dwelling units per acre. In the Southern California Association of Governments (SCAG) region, these locations are called "High Quality Transit Areas," and they can be found throughout northern Orange County and near Metrolink stations in the south, as shown in Figure 3-2.

Figure 3-3 OCTA High-Frequency Corridors and Major Transit Stops



Current High-Quality Transit Areas in Orange County.

Source: OCTA

Another, more recent effort by the state to promote TOD through changes to CEQA processes was SB 743, which will soon require transportation impacts to be analyzed using vehicle miles traveled (VMT) rather than vehicular level of service. This change will benefit developments in walkable, transit-oriented locations generating fewer impacts, and will encourage use of transportation demand management strategies (see following section) rather than roadway improvements as mitigation measures.

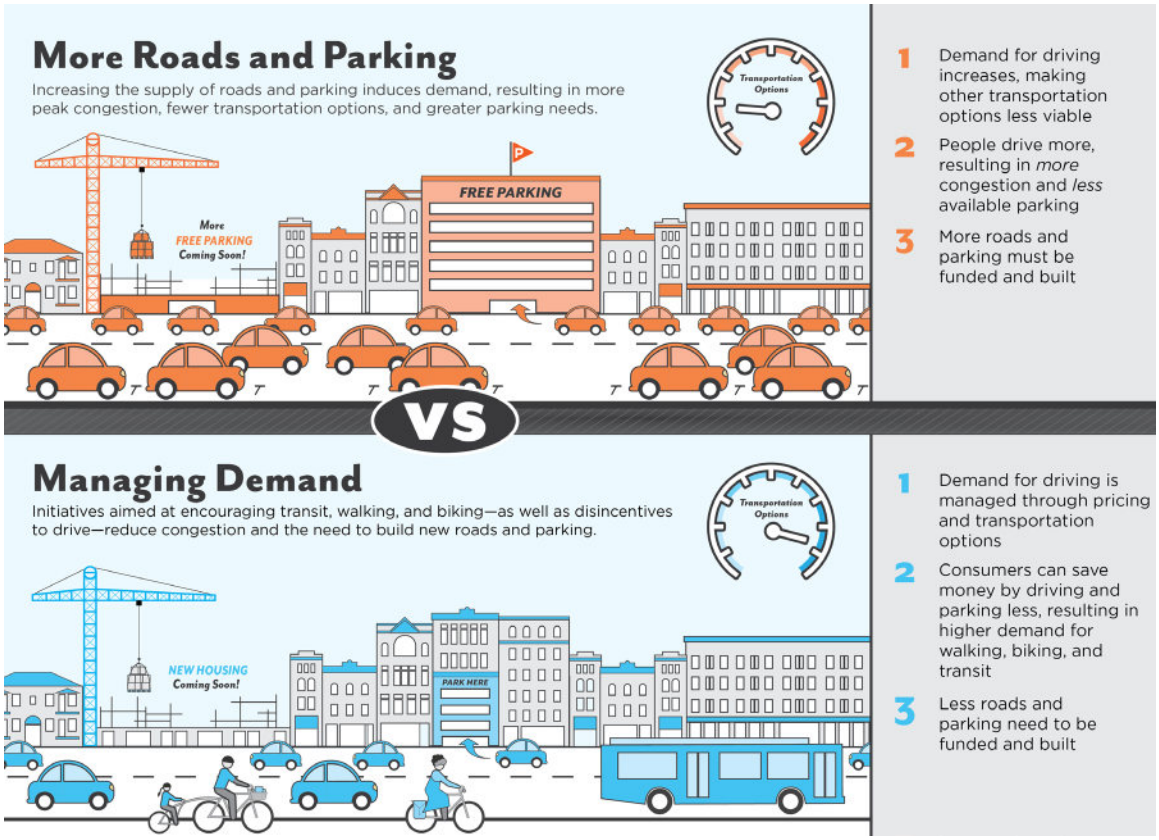
OCTA Design Review Services

Cities and developers can request transit information and receive transit-supportive recommendations for their upcoming projects and plans from OCTA. At no cost, OCTA transit staff will provide information such as nearby bus stop ridership, bus route frequencies, and planned changes to bus service. OCTA will also provide input on site layout and access to transit to help generate or improve ridership at new developments. For more information contact the OCTA Planning Division.

3.3 TRANSIT-SUPPORTIVE POLICIES

Cities, developers, and other public and private entities can support transit by adopting policies and establishing programs to encourage transit use, walking, biking, and ridesharing and to discourage unnecessary solo driving for short trips. Collectively, these policies are referred to as "demand management"—transportation demand management (TDM) or parking demand management (PDM) measures and strategies. A demand management-based approach is one that discourages single-occupant vehicle (SOV) trips by reducing the need for them or making it easier to take trips in other ways. It is also an approach that more efficiently and proactively manages limited parking and road supply rather than simply adding supply, which can be very expensive to both build and maintain, and can "induce" or increase demand by temporarily providing more space for cars, until it fills up.

Figure 3-4 Impacts of More Roads and Parking vs. Managing Demand



Source: Nelson\Nygaard

3.3.1 Parking Management

Smart parking policy focuses on availability of parking, rather than supply. This is because the point of a parking space isn't to merely exist. To be useful, parking must be available for use, and not already occupied by others.

There are many policies that cities and developers can use to ensure that public and private parking, on- and off-street, is available when needed. The conventional approach is simply to spend money on more supply (or to require others to spend money). But in addition to its high cost, there are opportunity costs to this approach: space used for parking can't be used for other things, including homes, businesses, and parks. Because developments are limited in size, requiring too much parking in new development both reduces space for other uses and increases costs to developers, homebuyers, and tenants.

Generally, more parking means more traffic congestion and collisions, as it results in more cars on the road. Additionally, when existing parking is not proactively managed, lack of availability can lead to motorists "circling" or driving around looking for a space, further increasing traffic on the way.

Following are a few strategies that can be used to proactively manage parking supply and ensure availability:

- **Market-Based Pricing:** "Free" parking isn't really free; its costs are just hidden and passed along in other ways, ranging from the cost of groceries at your neighborhood supermarket to prices for condominiums. Putting a price on public parking encourages some people to seek out alternatives (such as parking farther away or taking transit) and helps ensure that parking is available for others. Paid parking can also eliminate the need for time limits to regulate turnover in commercial areas, removing a source of annoyance and anxiety. The price is set correctly when about 15% of parking, or about one space out of seven, is available at most times.
- **Parking Benefit Districts**: Revenue from paid parking reinvested in the area where it is generated can be used to fund a range of transportation improvements and other neighborhood amenities, such as streetscape enhancements.

Source: Nelson\Nygaard

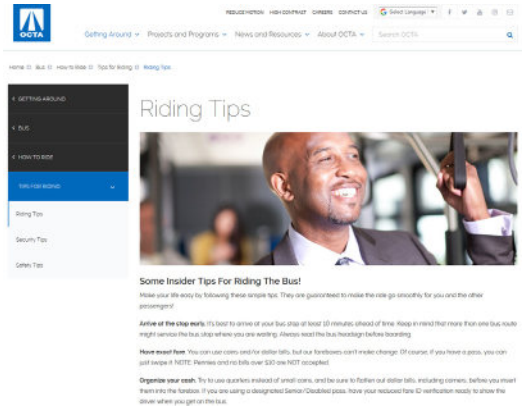
- **Reduced Parking Minimums:** Reducing or even eliminating zoning code-mandated minimum parking requirements in new development (or for changes of use in existing developments) can reduce the cost of new housing or commercial space and increase the financial viability of some developments and new businesses. Reducing or eliminating minimums also lets developers better respond to actual market demand for parking.
- **Shared Parking:** The conventional approach of requiring each new development or business to provide its own parking eliminates flexibility and inevitably results in inefficiencies, as at any given moment many spaces will be empty. Parking spaces in apartment buildings sit empty during the day when residents are at work; commercial spaces are empty at night when businesses are closed. Acknowledging that demand for parking peaks for different types of uses at different times, some zoning codes allow for shared parking arrangements. Select cities also have "in-lieu" or parking district programs in which developments and businesses can pay a fee toward construction or use of shared public lots or garages and have part or all of their minimum parking requirements waived.
- **Park-Once Districts:** The best practice in shared parking in commercial areas is to create one or more public lots or garages in which visitors may park once and then walk to several different businesses. Many shopping centers and malls operate this way, but the idea can also be applied to other types of businesses in commercial corridors or downtown areas.

Santa Monica is one of many Southern California cities with a "park once" system in its downtown of centralized lots or garages.
Source: La Citta Vita

- **Unbundling:** "Unbundling" is the practice of leasing or selling parking spaces separately from apartments, condominiums, and commercial space. It offers renters and buyers flexibility, reducing costs for those

who don't need parking, and can provide developers with added flexibility to lease or sell parking to people who live or work off-site. Everyone benefits from more efficient use and provision of parking.

- **Parking Cash-Out:** Employers can reduce their parking costs and go some distance toward satisfying trip-reduction requirements (see Section 3.3.2) by paying employees to take alternate modes to work rather than taking up a parking space on-site. In Orange County, companies with more than 50 employees that pay for their parking are required to provide Parking Cash-Out.



Source: OCTA

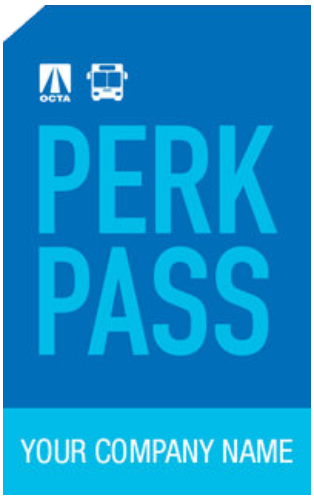
The mix of parking demand management strategies that is right for Orange County requires further study but likely incorporates many of the approaches described above. OCTA can work with its member jurisdictions to determine the right strategies to implement, focusing first on areas with the potential for high capacity transit and significant increases in transit ridership.

3.3.2 Transportation Demand Management

TDM strategies reduce demand for solo driving. In California, cities generally require employers above a certain size to implement specific TDM measures; some municipalities have similar requirements for large multifamily residential developments. The emerging best practice is to require all major trip generators to adopt single occupant vehicle (SOV) trip-reduction strategies but provide a flexible "menu" of options that each employer or developer can select from to design the approach that works best for them and their jurisdiction.

Following are a few strategies that can be used to reduce SOV trips (and potentially increase transit ridership):

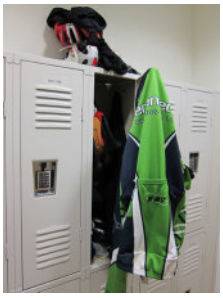
- **Transit Passes:** Discounted bulk passes for large groups of students or employees partly or fully subsidized by an institution or employer can greatly reduce the cost of and increase rates of transit use. OCTA offers both student passes for participating colleges and universities as well as annual "perk passes" for interested employers. More information on the latter can be found at http://www.octa.net/Bus/Fares-and-Passes/Perk-Pass/.
- **Pre-Tax Deductions:** Employers can reduce the cost of transit use for employees by participating in federally authorized pre-tax deduction or "commuter benefit" programs that allow employees to set aside a portion of their salaries to purchase transit fares.
- **Transit Information:** One very inexpensive strategy colleges, universities, employers, and others can do to encourage transit ridership is to "demystify" transit and



OCTA Bulk Pass
Source: OCTA

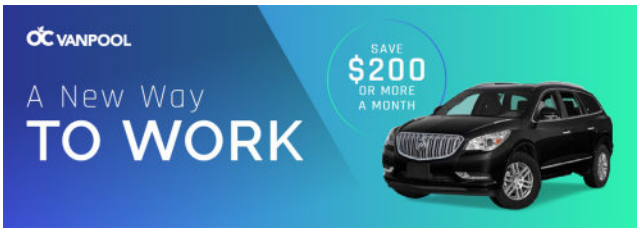
reduce barriers to use by providing maps, schedules, rider guides, and other information. All of these can be found on the OCTA website at http://www.octa.net.

- **Infrastructure Improvements:** Just as they have historically sometimes been required to fund roadway improvements, developers can be asked to pay for improvements to transit stops, sidewalks, and bike routes serving their sites.
- **Bicycle Amenities:** Accommodations for cyclists range from simple racks to secured parking in storage rooms and on-site showers and changing rooms.
- **Reserved Carpool/Vanpool Parking:** Another simple thing employers can do to discourage solo driving is to encourage ridesharing by reserving prime parking spaces for high-occupancy vehicles.



Lockers for cyclists
Source: Nelson\Nygaard

- **Ridesharing Programs:** Employers can help match their employees with other employees interested in carpooling to work together. In some cases, employers even help arrange vanpools. OCTA offers its own vanpool subsidy program; more information can be found at http://www.octa.net/Vanpool/Overview/.



OC Vanpool ridesharing program
Source: OCTA

- **Guaranteed Ride Home:** In guaranteed ride home programs, employees are offered a limited number of free taxi rides for use when they have to leave work unexpectedly or work late. This allows them to take transit or carpool to work without worrying about finding their way home if plans change. In Orange County, employers who actively participate in the OCVanpool, Perk Pass, or Metrolink Corporate Programs are eligible to participate in a free Guaranteed Ride Home Program provided by OCTA. (https://www.octa.net/Getting-Around/Rideshare/Employers/Guaranteed-Ride-Home-Program/)
- **Reserved Carshare Parking:** One TDM measure that is especially popular and effective in a residential context is reserved parking for carshare or short-term rental vehicles. This measure only applies where there are existing carshare programs such as Zipcar. Where they do exist, setting aside even one or two spaces for carshare vehicles can encourage families to transition from a two-car to a one-car household or encourage families or individuals to try a car-free lifestyle.

Reserved carshare parking
Source: Nelson\Nygaard

- **On-Site Amenities:** Large employers can reduce rates of auto use by offering on-site services for employees such as cafeterias, gyms, and daycare facilities. Eliminating the need to bring a car to work to go out for lunch or run errands before or after work can, in turn, eliminate the need to drive a car to work in the first place.

- **Flexible Schedules and Telecommuting:** Employers can reduce rush-hour traffic simply by allowing employees to leave and arrive earlier or later or work from home on a part-time basis.
- **TDM Coordinators/TMAs.** Large employers can hire staff to manage trip-reduction programs or become part of a Transportation Management Association made up of multiple businesses. In Orange County, existing TMAs in the Irvine Spectrum and City of Anaheim provide these services to employers.

GreenTRIP

GreenTRIP is a program offered by the California-based nonprofit TransForm to help cities and developers design developments with effective SOV trip-reduction strategies. GreenTRIP Connect is a website (http://www.transformca.org/greentrip/connect) that allows developers to test different strategies and, based on the specific project location, receive feedback based on research into the likely effectiveness of that strategy.

3.4 CONCLUSION

In addition to ensuring that streets and other elements of the transportation system are supportive of effective transit, cities, developers, and others can ensure that policies related to transportation and land use decision-making processes are supportive of transit. This, too, requires holistic thinking about the place of transit in the larger context of our transportation networks as well as our built environments, the places we make. It also requires an understanding of psychology and of the role of incentives and disincentives in the choices we make as individuals.

4 USING THIS HANDBOOK

Ultimately, successful transit requires partnerships—most importantly between transit agencies and cities, but also with other government agencies and private entities of all types. Essentially, everyone with an interest in effective transit service has a role to play, from city staff designing streets and writing zoning codes to community groups organizing for well-lit sidewalks or other neighborhood amenities that could benefit transit riders.

This handbook was designed to serve as a brief introduction to many of the ways cities and individuals can provide support for transit. While it provides practical guidance, it is not (and is not intended to be) comprehensive. Those wishing to learn more about the subjects covered here should turn to one or more of the guidebooks described in the introduction to this handbook.

Most importantly, those wishing to help improve transit in Orange County and in their communities should take action by incorporating transit into design and policy where possible. While OCTA management and staff work hard to provide effective transit for Orange County, OCTA is just one organization in a county of 34 cities with more than three million people. In the end, it will require support for transit-supportive design and policies across the many Orange County stakeholders for OCTA to achieve the most productive transit system.