REGIONAL MOBILITY HUB IMPLEMENTATION STRATEGY

Mobility Hub Features Catalog

SANDAG

IMPERIAL COUNTY TRANSPORTATION COMMISSION

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INTRODUCTION

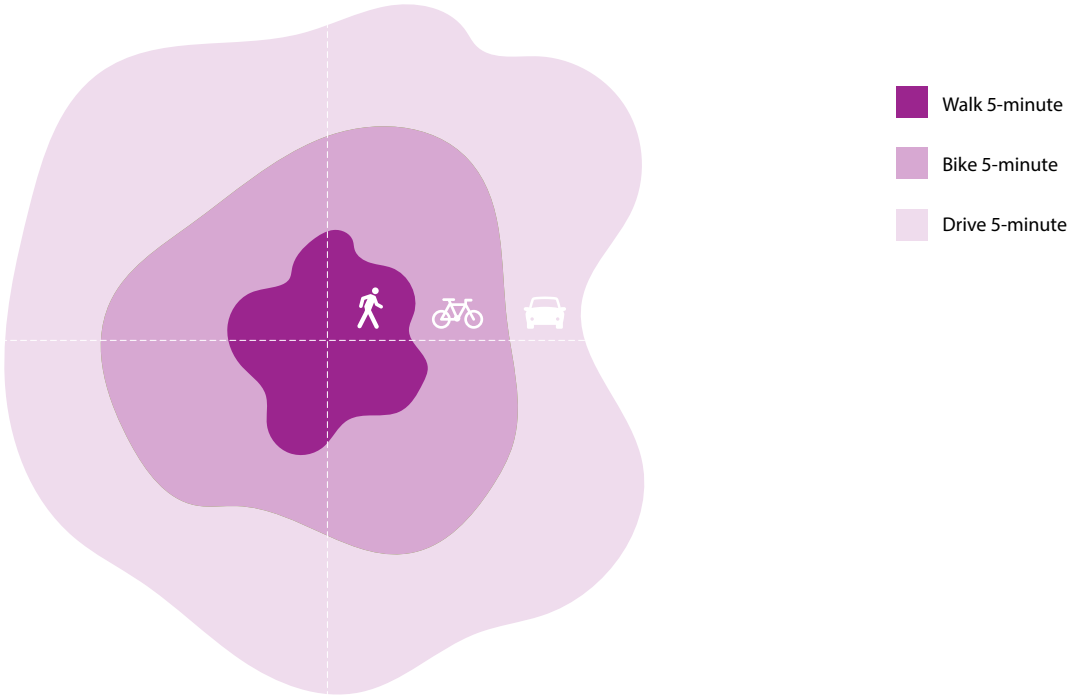
As the San Diego region and the Imperial Valley continue to grow, it will be vital to manage the increasing demands on our transportation system in ways that make it more efficient while also offering people viable alternatives to driving alone. Mobility hubs will be an important part of this effort. They are places of connectivity where different modes of travel — walking, biking, transit, and shared mobility options — come together in one place to help people make connections quickly and get to where they need to go.

This Mobility Hub Features Catalog is a resource for regional agencies, local jurisdictions, transit operators, and private service providers as they collaborate to design and implement mobility hubs around the region. It describes the kinds of services, amenities, and technologies that can work together to make it easier for people to connect to transit, while also providing them with more transportation options overall. These mobility hub features may include various transit station improvements such as enhanced waiting areas with landscaping and lighting, complimentary WiFi and real-time travel information; wider sidewalks, pedestrian lighting and trees for shade; bike paths, designated bike lanes, and bike parking options; dedicated bus lanes and supporting signal improvements; service facilities for shared cars, scooters, and electric vehicles; smart parking technology; and more. Each feature can be tailored to the unique needs of an individual community.

The mobility choices that people have in their communities are constantly evolving as their needs and preferences change. For example, some services described in the pages that follow could be fully automated within the next decade. This catalog isn't intended to describe all the possible features of a successful mobility hub. Rather, it considers the evolving collection of mobility services and technologies that will help shape how we move around our region in the future.

MOBILITY HUB ACCESS

Mobility hubs, at their core, are places where people can make seamless connections between public transit and other travel options. Each mobility hub can be designed specifically for the surrounding community it serves, ultimately making it easier for residents, employees, and visitors to use transit to travel from home to work and a wide variety of destinations in between. A mobility hub area includes not just the transit station itself but all those services and destinations that are accessible within a 5-min walk, bike, or drive to/from high-frequency transit.



The Regional Mobility Hub Implementation Strategy identifies the following types of services and amenities that may be found within the access zones. Some features may be concentrated within a short walk to transit, while others may serve people better who have to bike or use a motorized service to reach a transit stop:

TRANSIT AMENITIES

These are features located in the immediate transit station area to help riders plan their trips and make connections while offering them a safe and comfortable place to wait for their ride.

PEDESTRIAN AMENITIES

These features are located within a five-minute walk to transit and may include safe and convenient walkways and crossings.

BIKE AMENITIES

These features are located within a five-minute bike ride to transit and may include an efficient network of bikeways, secure options for parking a bike, and conveniently located options for bikeshare.

MOTORIZED SERVICES AMENITIES

These features are located within a five-minute drive to transit and may include on-demand, motorized shared services and infrastructure improvements that support their efficient operation.

SUPPORT SERVICES & AMENITIES

These features may exist within all mobility hub access zones and can include wayfinding, mobile retail services, and integrated trip planning and payment options.

CONTENTS

The Mobility Hub Features Catalog is organized by the five categories of services and amenities listed below. All mobility hub icons are interactive, allowing a reader to click through to that specific catalog entry. At any time, a reader may click the gray house icon featured at the bottom of each catalog entry page and return to this mobility hub icon table of contents. Each catalog entry includes a definition, implementation considerations, and an "Element in Action" section that describes how the feature has worked successfully in real-world situations. Look for the autonomous vehicle icon to learn how mobility hub features may be influenced by future mobility changes.

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TRANSIT AMENITIES

1 TRANSIT AMENITIES

ENHANCED TRANSIT WAITING AREAS

DEFINITION

Waiting areas provide a safe and comfortable place for passengers to wait for their transit or shared mobility ride. Area enhancements may include seating, landscaping, lighting, shade and rain cover, trash receptacles, complimentary WiFi, real-time transit arrival alerts, and daily schedule information. These amenities support the mobility hub concept by improving a passenger's overall transit riding experience, encouraging new riders to try transit, and increasing a passenger's sense of security.

IMPLEMENTATION CONSIDERATIONS

- Consider how people use transit stops in order to select which features get priority. For example, if people transfer between transit and other modes of travel at a location, an interactive kiosk and enhanced wayfinding may be higher priorities.
- Determine which enhancements will provide the most benefits. Improving aesthetics with landscaping or public art may be desirable. At the same time, functional enhancements such as fare payment kiosks, real-time arrival information, and interactive trip planning kiosks may give transit users a better experience overall.
- When designing amenities, make transit service efficiency a top priority. Any travel delays along routes can add up, frustrating passengers and costing transit agencies money.
- Consider other amenities that will make a waiting area more comfortable and convenient. These may include seating or lean bars, water fountains, trash and recycle bins, complimentary WiFi, USB charging ports, and shade structures and screens.
- If space allows, consider adding transit boarding islands, bulb-outs, and other physical improvements. These can ease connections between a transit stop and the adjacent mobility network, streamline transit service by allowing vehicles to make in-lane stops, preserve valuable space for pedestrian walkways, and add space for waiting transit customers.
- Provide shade at ticket machine kiosks so people can more easily read the screens.
- Consider providing special event kiosks to help people who are buying tickets on busy days when there are special events.
- Consider incorporating placemaking elements into transit stop design to integrate transit service into the surrounding community. Public art, listings of upcoming neighborhood events, and local business highlights can help personalize a transit waiting area. Other features such as swings, gardens, and interactive games also can make waiting more enjoyable.
- Local development regulations and the Americans with Disabilities Act (ADA) may guide the design of certain enhancements in a transit waiting area, including interactive kiosks, sidewalks, and seating.
- Maintaining transit waiting areas can require a significant amount of time and money. A custom designed shelter, for example, may require extra effort, funding, and even an inventory of custom replacement parts. A standard shelter may be more affordable.
- The Transit Street Design Guide from the National Association of City Transportation Officials (NACTO) provides additional transit waiting area design guidance.

ELEMENT IN ACTION

Ventura Bus Home – Ventura, CA

Photo courtesy of Dennis Oppenheim

The City of Ventura Public Art Program, in collaboration with the Public Works Department, commissioned a "bus home" architectural installation – the first artist-designed public facility in Ventura. It depicts the metamorphosis of a bus transforming into a home, while also serving as a functional bus transfer stop at the Pacific View Mall. The waiting area provides seating, trash bins, and shade. As a public art installation, the bus stop provides visual entertainment for transit riders, pedestrians, and other travelers.

1 TRANSIT AMENITIES

ELEMENT IN ACTION (continued)

Spring Street Bus Stop – Los Angeles, CA

The Spring Street bus station across the street from Los Angeles City Hall is a "smart shelter" equipped with LED lighting, USB charging ports, complimentary WiFi, real-time arrival information, and a push-to-talk button for the visually impaired. This station is one example of the city's innovative public-private partnership (P3) with Outfront Media and JCDecaux North America to enrich the urban transit experience and revitalize public spaces. Advertising media panels generate revenue for the P3 program, and a portion is shared with the city annually.



Photos courtesy of JC Decaux

Caribou Coffee Bus Shelters – Minneapolis, MN

Photo courtesy of Colle McVoy

Three downtown Minneapolis bus shelters were transformed into life-size toaster ovens to keep transit riders warm during cold Minnesota winters and market the Caribou Coffee chain. The shelters are situated near Caribou coffeehouses in high traffic areas close to downtown. Overhead heat lamps radiate heat and glow red, adding to the toaster oven design.

Osmose Station - Paris, France

The Osmose experimental bus station on Boulevard Diderot has made waiting for a transit ride enjoyable. People can access real-time bus arrival information, explore the area with an interactive touch-screen map, locate local businesses and services, charge a device, connect to WiFi, purchase tickets to events, rent a bike, buy a cup of coffee, and even borrow a book for their bus ride from a self-serving lending library.

Photos courtesy of Aurel Design Urbain and Régie Autonome des Transports Parisiens (RATP)

1 TRANSIT AMENITIES

PASSENGER LOADING ZONES

DEFINITION

Passenger loading zones are places where passengers can be dropped off or picked up, conveniently and safely. They are typically marked as designated curb spaces that can be used by a wide variety of shared mobility services – shuttles, taxis, carpools, vanpools, and on-demand rideshare services.

IMPLEMENTATION CONSIDERATIONS

- Carefully consider where to situate loading zones throughout the mobility hub area, not just at the transit station.
- Make sure loading zone signs clearly communicate what's allowed and not allowed, and place those signs where they're easily visible.
- Determine whether painting a curb and/or installing signs are sufficient to designate passenger loading zones. If not, consider using dynamic signs to better capture people's attention and inform them.
- If local jurisdictions do not allow idling, consider installing signs to inform drivers and devoting resources to enforcing those rules.
- Consider Americans with Disabilities Act (ADA) requirements when designing loading zones.
- Carefully estimate how many vehicles will use passenger loading zones at various times of day, how long drivers will stop, and how this activity will impact traffic.
- Work with service providers to balance the needs of drivers using passenger loading zones and transit vehicles using operational and commercial loading and unloading zones with the needs of transit stop loading and unloading zones.
- During off-peak hours, consider using passenger loading zones for commercial loading, freight delivery, and other purposes besides dropping off and picking up people. Allowing these other uses can ensure that passenger loading zones are put to use around the clock.
- Loading zones designated for taxis and shuttles have existed for decades. But the growing popularity of on-demand ridesharing services is requiring local jurisdictions to develop new policies that accommodate these services without slowing the flow of traffic and safe passenger loading and unloading. These policies should consider the needs of a diverse group of users. For example, "kiss & ride" vehicles may only need the space for a minute or two while taxis may occupy the space for several hours.
- Work with on-demand rideshare services to develop in-app prompts, so drivers and riders know where to find dedicated passenger loading zones.
- Trip planning applications soon will integrate transit options with rideshare and shuttle services. Track this progress and consider any implications for designing passenger loading zones.

The need for convenient passenger loading spaces will increase as more people use shared autonomous vehicles. Meanwhile, less space for parking may be needed as more people use autonomous shuttles and ridehailing services to connect to transit.

ELEMENT IN ACTION

Crawley, West Sussex, England

Taxi passenger loading zones are conveniently located at the Crawley Towne Centre in West Sussex. Riders may also connect to a nearby railway station and two dozen bus routes, which makes this location a multimodal hub for commuters and others.

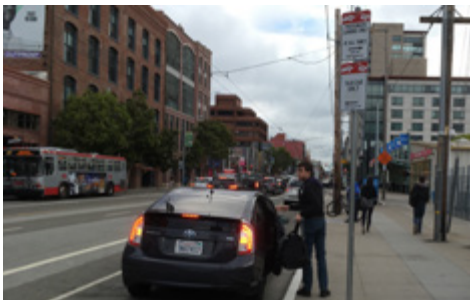

Photo courtesy of Livable City and Tom Radulovich

4th and King Caltrain Station, San Francisco

The 4th and King Caltrain Station is one of San Francisco's busiest hubs for transit, taxis, rideshare services, and employer shuttles. Designated passenger loading zones for rideshare services were installed using clear signs, curb treatments, and in-app prompts that alert riders and drivers to proceed to designated areas.

1 TRANSIT AMENITIES

REAL-TIME TRAVEL INFORMATION

DEFINITION

Real-time travel information helps passengers make informed travel choices based on the availability of nearby mobility options. People can plan their time more effectively, wait less for transit options, and ultimately become happier with alternatives to driving alone. Real-time travel information also may work in combination with other transit station improvements, improving the overall transit experience.

IMPLEMENTATION CONSIDERATIONS

- Developers of real-time travel information should consider what transit customers want to make their trips more efficient.
- In addition to real-time vehicle location data, real-time information may include current traffic conditions, transit real-time operations, historical traffic conditions, and historical transit operations data.
- Designing real-time passenger information should be coordinated with relevant transit agencies, or those agencies should design it directly.
- Signs should adhere to universal design standards. Signs may include an audio option for visually impaired people. Traditionally, this option was limited to wide-area passenger annunciators, which were limited in the length and frequency of announcements. Smartphone apps and beacon technology now enable more targeted and detailed audio information to be delivered.
- A common way to provide real-time information is through variable message signs that indicate transit arrival times at a stop or station.
- Current information also can be displayed on LED screens situated at high-volume transit stations. These screens provide live updates on transit arrival times, and on the availability of nearby shared mobility services such as carshare, bikeshare, and on-demand rideshare. Information offered could include the time until the next transit service arrives, the distance to the nearest carshare vehicle or bikeshare station, and the availability of rideshare services.
- Displays are updated in real-time to account for traffic, weather, and other delays.
- Beacon technology can be installed in a transit station to guide riders to mobility services and other amenities. This tool transmits transit information wirelessly to users with Bluetooth-enabled smartphones. Services may range from turn-by-turn wayfinding instructions to real-time transit service updates at stations and stops. These beacons even could provide messages in various languages, provide directions to wheelchair accessible facilities within the station area, and assist patrons with cognitive disabilities.
- To establish system connectivity, redundancy, and reliability, integrating real-time information with a regional data hub such as the Transportation Management Center San Diego County is recommended.
- Real-time information on transit and shared mobility services that is transmitted to smartphones either as texts or through apps can supplement physical displays mounted at transit stations.
- Consider policies related to the local sign code. Americans with Disabilities Act (ADA) requirements dictate specific fonts and colors for signs.
- Consider Title VI regulations impacting information provided in English.
- Federal and state grants can fund the installation of real-time technologies.

SAMPLE REAL-TIME TRAVEL INFORMATION IMPROVEMENTS

Real-Time Transit Arrival Information

Real-time transit arrival information lets riders know exactly when a bus, train, or Trolley will arrive at a given stop. In San Diego, *Rapid* and local bus patrons can text a transit stop ID (located at the bottom of each bus stop sign) to "GOMTS" and immediately receive a text message with the latest arrival information. Physical displays with real-time arrival information, meanwhile, can keep any rider up to date – whether or not they have a smartphone. These physical displays also can integrate wayfinding tools. Overall, real-time information makes riders more satisfied customers, and more willing to use public transit again instead of driving alone.

1 TRANSIT AMENITIES

SAMPLE REAL-TIME TRAVEL INFORMATION IMPROVEMENTS (continued)

Real-Time Travel Information Displays

Photo courtesy of TransitScreen

A comprehensive display of transportation services informs travelers of their options in real time. A simple display using standard LED technology with one or two colors is typical. Some displays are durable for outdoor environments; however, LCD technology housed in protective casings are becoming more common. TransitScreen is an example of a real-time display that offers transit arrival times and information on shared mobility service options. These displays can be placed in residential areas or in places where people work, in addition to transit stations. A power source, internet access, and a large display (40 inches to 70 inches) are typically required.

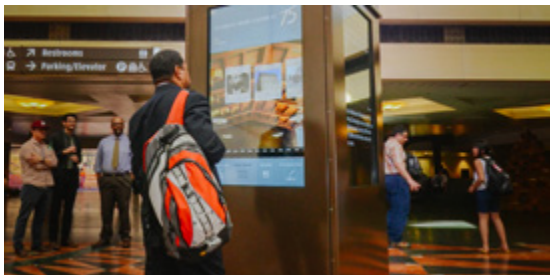

Photo courtesy of Metro

Interactive, touchscreen kiosks may be located at key destinations or in high pedestrian traffic areas, including transit stations. Users can access transit schedules and maps, plan a trip based on real-time arrival information, learn about the availability of shared mobility services, and obtain information about nearby destinations, including local history.

Real-Time Travel Apps

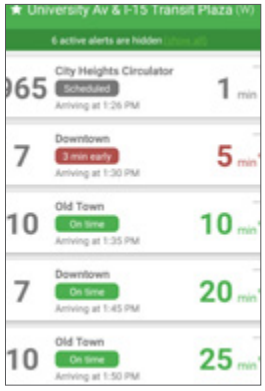

Photo courtesy of OneBusAway

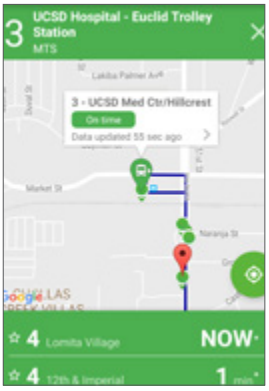

Photo courtesy of OneBusAway

Real-time applications such as OneBusAway provide transit arrival information to anyone with a smartphone. These applications can use a person's current location, preferred transit stop, or specific route and combine that data with real-time information from transit agencies.

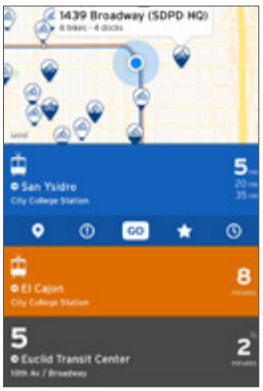

Photo courtesy of Transit

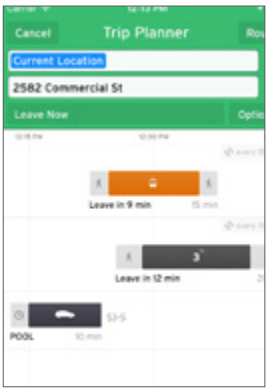

Photo courtesy of Transit

Other tools such as the Transit app integrate real-time transit arrival information with information on alternative mobility options such as bikeshare and Uber. Both of these applications help riders make informed decisions about their trips and save time.

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2

PEDESTRIAN AMENITIES

2 PEDESTRIAN AMENITIES

WALKWAYS

DEFINITION

Pedestrians walking to and from public transit and other mobility services want a safe, attractive walking environment. Wide walkways, landscaping, pedestrian scale lighting, enhanced paving, pedestrian cut-throughs, and other urban design enhancements all can serve to make walking safe and attractive.

IMPLEMENTATION CONSIDERATIONS

- The National Association of City Transportation Officials (NACTO) recommends a minimum sidewalk cross-section of five feet to accommodate two people walking side by side. This sidewalk width does not include other space reserved for seating, lighting, and sidewalk cafes.
- Municipal development codes and Americans with Disabilities Act (ADA) regulations can influence the design of pedestrian paths.
- Maintenance responsibilities, operating costs for lights and other expenses, and liability considerations should be addressed as part of the design.
- Design shortcut paths with special paving, lighting, furnishings (such as seating), and shade so they are inviting to people of varying ages and abilities.
- Design shortcut paths to accommodate people who ride bikes, as well as others who engage in active transportation and need a sufficiently wide and smooth pathway.
- If a walkway is situated in the middle of a block, design shortcut paths where feasible that lead to a mid-block crossing for easier access across streets.
- Make sure that pathways are maintained well, lit well, and situated in "people-friendly" places that are well-traveled, highly visible, and oriented for pedestrians.
- Maintain existing cut-throughs and add safety enhancements.
- Use signs at entrances and decision points to guide people who are heading to transit stops and other mobility services. Coordinate the design and placement of new signs with existing sign features.
- The NACTO Urban Street Design Guide provides additional walkway design guidance, including descriptions of all sidewalk zones.

SAMPLE WALKWAY IMPROVEMENTS

Sidewalk Widening

Photo courtesy of NACTO

Widening sidewalks creates a pedestrian-friendly environment, particularly in commercial or transit station areas. Safety and comfort are enhanced, and sidewalks also may provide opportunities for more economic activity such as sidewalk cafes with outdoor restaurant seating. Utility boxes, lighting, street trees, and other infrastructure should not block the flow of pedestrians. NACTO recommends that the portion of the sidewalk dedicated to pedestrians, also referred to as the "pedestrian through zone," be up to 12 feet wide in downtown or commercial areas.

Improved Landscaping

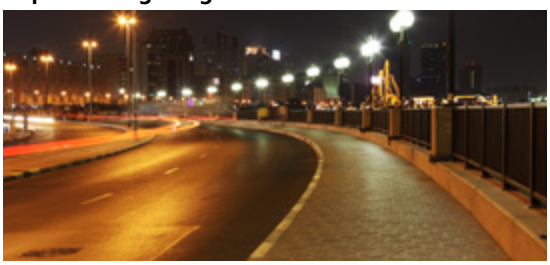
Photo courtesy of NACTO

Walkway landscaping offers pedestrians shade as they wait for a ride. Street trees and shrubs also may help separate pedestrians from fast moving traffic and filter the air. Trees, shrubs, and other plants may have unique space requirements, and tree grates may be needed to protect landscaping situated in heavily trafficked walkways. Native landscaping is recommended.

2 PEDESTRIAN AMENITIES

SAMPLE WALKWAY IMPROVEMENTS (continued)

Improved Lighting



Lighting in transit areas and along walkways improves safety and helps people find their way at night. Ideally, lighting should illuminate spaces with people in mind. Lights should be placed about every 30 feet along a walkway. Lights should not be obscured within tree canopies. Motion-activated lights in areas where light isn't needed continuously can save energy.

Pedestrian Bridge Enhancements

Bridges and overpasses offer pedestrians a safe and direct path above highways or other busy arterials. Overpasses also may provide pedestrian connections when on-street walkways aren't available. Minimal overpass widths should be eight feet, but the width should be increased to 14 feet if bike riders are also accommodated, according to the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities. Clear wayfinding signs near entrances and exits to overpasses also may be incorporated.

Pedestrian Underpass Enhancements

Pedestrian underpasses allow people to safely cross beneath a freeway, railway, or other busy corridor. Underpass entrances and exits should be visible to all pedestrians. Lighting should illuminate the underpass at all hours. Other enhancements may include public art, landscaping, special paving, bollards, and space accommodations for bike riders. Minimal underpass widths should be between 14 and 16 feet, but they should be increased if the underpass is more than 60 feet long, according to the AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Enhanced Paving

Photo courtesy of NACTO

Improvements to the surface of sidewalks make it easier to walk to and from transit as well as other destinations within the five-minute walk zone. Different paving treatments, including textures and color patterns, may identify areas for different types of active transportation for enhanced safety. Make sure the walking surface is smooth, slip resistant, and without bumps. Permeable pavement materials allow storm water to pass through to the soil below rather than overwhelm a city's sewer system.

Street Furniture

Photo courtesy of NACTO

Photo courtesy of NACTO

Street furniture makes traveling by foot more comfortable and enjoyable. Benches, trash bins, lighting, wayfinding signs, and other amenities such as charging stations and bike racks all are examples of street furniture. NACTO recommends that street furniture elements be placed in the space between the curb and the pedestrian through zone in order to help maintain a clear path of sidewalk travel. Some street furniture elements may be sited in regular intervals to promote a sense of continuity. Additionally, the conversion of a curbside parking space into public spaces such as a parklet and pedestrian plaza may feature street furniture

2 PEDESTRIAN AMENITIES

CROSSINGS

DEFINITION

Pedestrian crossings help keep people safe. The most effective ones keep walking distances to a minimum, make pedestrians and others more visible to drivers, and include signals to stop traffic so people can cross the street easily and safely. Existing crossings may be enhanced to provide a safer environment for people, or improvements may be incorporated into newly designed facilities. Many transit riders are pedestrians at some point during their trip, so enhancing crossings can improve safety for transit customers while also making transit vehicle operations more efficient.

IMPLEMENTATION CONSIDERATIONS

- Decisions about designing and building crossings are based on several factors, including how land is used, the volume and speed of traffic, the history of vehicle crashes in the area, the current and anticipated demand for crossings, and the degree to which pedestrians follow traffic rules.
- In places where traffic is high and moving fast, crossings with signals may be warranted. Crossings without signals may be sufficient where it's less busy or crossing distances are shorter.
- Provide crossings around and next to freeway overpasses and underpasses, so that pedestrians can navigate these areas more easily and more safely.
- Where it's possible, provide people with crossings that are situated behind a transit vehicle stop. This allows the transit vehicle to pull away without having to wait for crossing pedestrians.
- There is no absolute rule for how frequently crossings should be provided. Several factors determine this, including the length of blocks, the width of streets, the position of entrances to buildings, and where traffic signals are situated, according to the National Association of City Transportation Officials (NACTO) Urban Street Design Guide. In most cases, it's sufficient to provide crossings every 120 feet to 200 feet.
- The Americans with Disabilities Act (ADA) requires curb ramps to help all users, including the elderly as well as people pushing carts or strollers.
- The NACTO Urban Street Design Guide offers additional guidance on designing pedestrian crossings.

Autonomous vehicle technology must readily detect pedestrians, whether or not there is a designated crossing.

SAMPLE CROSSING IMPROVEMENTS

Signal Timing Treatments

Traffic signals can be designed to improve pedestrian safety at intersections. Pedestrians can be given lead time so they can enter an intersection before vehicles; as a result, they'll be more visible to drivers. Meanwhile, shorter signal cycles can reduce the amount of time that pedestrians wait to cross; this can reduce delays and discourage people from crossing against the light. Traffic signals that prevent vehicles from turning right on red also may help prevent conflicts between drivers and pedestrians at crowded intersections. Traffic signals furthermore can be aligned with transit headways; this can help prioritize crossing for pedestrians.

Curb Extensions / Bulb-Outs

Photo courtesy of NACTO

Curb extensions, or bulb-outs, extend a sidewalk into the street at the corners of intersections. Bulb-outs reduce crossing distances, increase pedestrian visibility, clearly identify parking lanes for vehicles, and can help slow traffic. They also can be enhanced with landscaping, seating, and other so-called "street furnishings." Bulb-out widths should be as large as possible, while also accommodating space needed for adjacent vehicle lanes and bikeways. Curb extensions in general narrow the roadway and slow traffic, so the local fire department, a public utility, or another agency may provide comments on how these improvements could impact their ability to operate effectively. For bulb-outs at transit stations or stops, design landing pads and pedestrian access areas for people in wheelchairs and using walkers.

2 PEDESTRIAN AMENITIES

SAMPLE CROSSING IMPROVEMENTS (continued)

Mid-Block Crossings

Mid-block crossings provide convenient and safe places where people can cross the street in the middle of a long block. Crossings should use clear markings and signs that alert drivers to yield for pedestrians. Rectangular rapid flash beacons (RRFB), in-road flashers, and pedestrian hybrid beacons activated by a pedestrian push button are other ways to alert drivers to people using a mid-block crossing.

Refuge Islands

Median refuge islands offer people safe places to wait as they cross busy multi-lane streets with traffic traveling in both directions. These islands may include curbs, bollards, or other features to protect people who are waiting. NACTO recommends that pedestrian safety islands have a minimum width of six feet, although a width of eight to ten feet is preferred. However, a narrower raised median is better than no median at all.

Pedestrian Hybrid Beacon

Photo courtesy of Mike Cynecki

These improvements, also known as High-Intensity Activated crossWalK (HAWK) beacons, are typically situated at minor intersections and mid-block crossings so that vehicles stop only when pedestrians need to cross the street. A 2010 study by the Federal Highway Administration (FHWA) found that after a HAWK signal was installed, pedestrian crashes were reduced by 69 percent (Report No. FHWA-HRT-10-042).

Rectangular Rapid Flash Beacons

Photo courtesy of NACTO

Rectangular Rapid Flash Beacons (RRFBs) feature amber LED lights that are activated by pushing a button or through technology that automatically detects a pedestrian's presence. RRFBs may provide a lower cost alternative to traditional traffic signals and pedestrian hybrid beacons. The irregular LED flash pattern is similar to emergency flashers on police vehicles, capturing the attention of drivers more readily than conventional traffic signals.

2 PEDESTRIAN AMENITIES

SAMPLE CROSSING IMPROVEMENTS (continued)

Raised Crossing

Elevating a crossing to the level of connecting sidewalks can encourage motorists to yield to pedestrians while also making the crossing ADA accessible. Where traffic speeds and conditions allow, raise crossings so they are flush with the connecting sidewalk and use special paving material to differentiate them from the roadway. Raised crossings may not be appropriate on streets with bus routes, because they can slow and impede the flow of bus traffic.

Pedestrian Scramble

A pedestrian scramble consists of striped pedestrian crossings across both intersecting streets, as well as diagonally from each street corner. Vehicle traffic is stopped in all directions so pedestrians can cross all at once. Existing intersection infrastructure and signal timing is used. Scrambles work well in busy urban areas where there are a lot of pedestrians. Install informational signs that inform pedestrians how to safely navigate intersections with scramble crossings.

Pedestrian Detection

Integrating technology at crossings to detect pedestrians can provide transportation agencies with data on the number of people that use a given crossings, and when during the day they're used the most. This can help agencies prioritize walkway and crossings improvements to increase safety and convenience. Wireless technology that detects pedestrians is also being integrated into vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communication systems.

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3

BIKE AMENITIES

3 BIKE AMENITIES

BIKEWAYS

DEFINITION

Bikeways can encourage cycling to, from, and within a mobility hub, offering bike riders easier access to transit and other nearby destinations (e.g., work, shopping, recreation). They provide a safe and comfortable riding experience for people of all ages and abilities, and alert drivers to the presence of bike riders on or near the roadway. Bikeways make cycling a priority on certain routes, and an important part of the local and regional travel network.

IMPLEMENTATION CONSIDERATIONS

- Consider existing bicycle plans for local and regional jurisdictions There may exist policies to guide development around facilities like mobility hubs. For cities that have Bike Master Plans, ensure that those plans prioritize bike infrastructure that connects to transit and major destinations.
- Several improvements can enhance the local environment for people who ride bikes. Bikeways can be designated with colored pavement and special markings, as well as simple signs that identify routes. Bike cut-throughs, rolling lanes, and shared transit bike lanes can also help bike riders.
- Biking is a popular way to travel to and from transit stops, but bike lanes to the right of vehicle traffic lanes often can conflict with buses that need to stop to let passengers board or exit. During the design process, extensive thought should be given to the most appropriate bike facility along existing or future transit corridors. This will help ensure that bike riders remain as safe as possible, and that buses or right-turning vehicles do not impact the flow of bike traffic.
- Plans to reduce the width of traffic lanes to accommodate people who ride bikes should be coordinated with transit and emergency responders. A typical lane for transit buses is roughly 8.5 feet wide, with some additional space needed for rear view mirrors that extend beyond the body of a bus. Transit, fire, and police operations should be considered when there are plans to reduce the width of vehicle traffic lanes in order to fit in a bike lane or to reduce traffic speeds
- Technology can help make biking more attractive.
  - For example, bike signals can be incorporated into existing traffic signals to allow cyclists some lead time to cross an intersection.
  - Signals for vehicle traffic and bikes also can be situated near each other so both are visible to drivers and bike riders at the same time.
  - Bike sensors, meanwhile, can trigger signals that alert drivers to the presence of one or more bike riders.
  - Bike counters can tally how many people are using a bikeway, enabling planners and local leaders to make more informed decisions about future bike improvements.
- The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide provides additional guidance on bikeways.

Similar to pedestrian detection, autonomous vehicles must detect all users of the road including cyclists, ensuring that roadways are safe for cyclists and those traveling in an automated vehicle.

SAMPLE BIKEWAY FACILITIES AND AMENITIES

Class I Bike Path

Bike paths are physically separated from vehicle traffic by curbs, bollards, or landscaping. Also known as shared-use paths, bike paths accommodate bike, pedestrian, and other non-motorized forms travel. Bike paths can be constructed in roadway right-of-way through road diets, which refers to the removal of a traffic lane to accommodate another transportation mode such as biking, or through the removal of on-street parking. They also can be constructed in independent right-of-way. Bike paths provide critical mobility connections where roadways are absent or not conducive to biking.

Class II Bike Lane

Bike lanes are defined by pavement markings and signs that designate a portion of a roadway for exclusive or preferential bike travel. Bike lanes typically are defined by a thin line of paint or a wider painted buffer to give bike riders extra protection on the road. They also can be enhanced with innovative signs, intersection treatments, and bike loop detectors – all of which aim to improve safety and connectivity.

3 BIKE AMENITIES

SAMPLE BIKEWAY FACILITIES AND AMENITIES (continued)

Class III Bike Route

Bike routes are located on shared roadways that accommodate vehicles and bikes in the same travel lane. They are designated by signs or painted markings (e.g., sharrows). Bike routes can provide continuity to other bikeways, or designate preferred routes through high-demand corridors.

Class IV Cycle Tracks

Photo courtesy of NACTO

Cycle tracks, exclusively for bike use, offer one-way bike travel in each direction and are situated adjacent to vehicular travel lanes. They exist in the roadway right-of-way, but they are separated from vehicle lanes by physical barriers or buffers.

Median Refuge

Photo courtesy of NACTO

A median refuge island provides bike riders with a protected space to wait while crossing the street. On a two-way street, median refuge islands allow people on bikes to pause after crossing one direction of traffic and wait safely until it's clear to cross the other direction of traffic. These islands are helpful where there are few acceptable places to cross a two-way street.

Bike Signals

Bike signals give bike riders the ability to safely move through busy intersections. Dedicated bike signals also help avoid right-turn conflicts with moving vehicles. Bike signals can be timed to accommodate typical biking speeds.

SAMPLE BIKEWAY FACILITIES AND AMENITIES (continued)

Bike Boxes

Photo courtesy of City of National City

Bike boxes are green-colored spaces painted on the pavement that appear in front of a vehicle stop bar and behind a pedestrian crossing. These spaces allow bike riders to ride in front of queued vehicles, making them more visible as they enter an intersection first.

Bike Channels

A bicycle escalator in Tokyo (Tamachi Station) © 2014 Stephen-L-Johnson available under CC BY 2.0

Bike channels provide a convenient way for bike riders to walk their bikes up or down a stairway. This amenity may be found at large, multi-level transit stations or at any point within a mobility hub bike access shed where they're needed.

Bike Footrest

Bike footrests allow bike riders to keep their balance as they're resting or waiting for the light to change at an intersection. A handrail also may be provided for added convenience and comfort.

Bike and Pedestrian Counters

Photo courtesy of SFMTA via NACTO

Bike and pedestrian counters may include underground sensors and a display that shows the number of bike riders and pedestrians traveling through the area. The information helps planners and other officials better understand general trends in biking and walking over time and space, and therefore plan for future improvements. Counters also help the general public become more aware of the popularity of walking and biking in their neighborhoods.

3 BIKE AMENITIES

BIKE PARKING

DEFINITION

Offering people places to park and lock up their bikes goes a long way toward encouraging biking as a transportation choice for short trips. That's especially true for people biking to and from transit stops. Mobility hubs can offer bike riders a variety of bike parking options, and secure and convenient bike parking facilities provide transit riders with an alternative to bringing their bikes onto transit. Parking options that are highly visible, convenient, and secure make mobility hubs an attractive destination for people who choose biking over driving alone.

IMPLEMENTATION CONSIDERATIONS

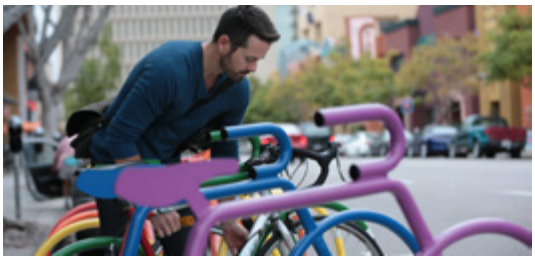
- Consider customer demand, space availability, and operational costs when locating bike storage or lockers near transit.
- Transit customers may leave their bikes near stops or stations for significant periods of time, so many would prefer more secure bike storage, if it's available.
- Consider setback and access requirements during the design of bike parking facilities.
- Pricing policies should be responsive to the market and provide options for low-income customers.
- Consider the overall needs for the operation, staffing, maintenance, and security of bike parking facilities.
- Consider whether or not there is a need or desire within a mobility hub to incorporate charging facilities for electric bikes.
- Real-time information on available bike parking should be integrated into a universal transportation account, with which users can find, access, and pay for a variety of mobility services.
- The Association of Pedestrian and Bicycle Professionals (APBP) resource, Essentials of Bike Parking provides additional guidance on bike parking principles.

BIKE PARKING IMPROVEMENTS

Bike Racks

Bike racks are stationary fixtures where cyclists can lock up their bikes for short periods of time. They can be situated at transit stations or on sidewalks close to building entrances. Each jurisdiction may have standards for bike rack type and placement, but the National Association of City Transportation Officials (NACTO) recommends placing bike racks at least three feet apart for convenient access. Also, short-term bike parking options should be situated within 50 feet of a transit stop or station entrance. Additional guidance on bike rack placement near transit is provided by the NACTO Transit Street Design Guide.

Bike Corrals



Bike corrals refer to a group of bike racks placed on a street directly in front of a business or other high-traffic destination. They provide parking spaces for several bikes while taking up no more space than a single vehicle. They are best suited for areas with narrow sidewalks, and also places that are typically busy with bike riders. Bike corrals situated near street corners are more visible to cyclists and vehicle traffic, and they help separate pedestrians from moving traffic.

Bike Lockers

Bike lockers are individual storage units for securing bikes for longer periods of time near transit stations or large residential and employment areas. While they provide protection from weather and pedestrian traffic, they do take up more space than conventional bike racks. Bike locker technology has been moving from mechanical options that require a key or padlock to access assigned locker spaces to electronic lockers accessible by a key card. Electronic bike lockers within the San Diego region are battery operated and charged by solar power.

BIKE PARKING IMPROVEMENTS (continued)

Secure Group Bike Parking

Secure group bike parking facilities accommodate a larger number of bikes, compared with bike racks and lockers. These facilities also may provide amenities such as bike repair tools, tire pumps, and electric bike charging stations. Enclosures may be free-standing structures or separated spaces within buildings or vehicle parking structures.

Sabre Springs/Peñasquitos Transit Station (San Diego, CA)

Plaza Saltillo Station (Austin, TX)

Bike Hut (Santa Ana, CA)

Photo courtesy of BikeConnect

Bikestation (Long Beach, CA)

Photo courtesy of Bikestation

Bike & Ride (Malmö, Sweden)

Radstation Malmö Central © 2016 adfc.sachsen available under CC BY-SA 2.0

Bike Valet

Photo courtesy of El Cajon Boulevard Business Improvement Association

A bike valet service provides a safe and convenient bike parking option near frequent, high-ridership transit services. When this service is offered, a group bike parking facility is staffed during specified time periods to offer cyclists a seamless bike-to-transit experience. A bike valet service may be suitable in densely populated communities where bike demand is high and/or where secure group bike parking options near transit are limited. Transit riders who have trouble bringing their bikes onto transit vehicles because of space constraints may also benefit from a bike valet service. In addition, the service may be valuable during special events that draw large crowds.

Other Amenities Provided Near Bike Parking Facilities

Bike Repair Stand

Electric Bike Charging Station

Cycling Supply Vending Machine

Trek Stop: Cycling Convenience © 2008 Hugger Industries available under CC BY-NC-SA 2.0

Bike Washing Station

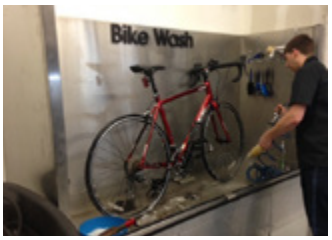


Photo courtesy of OneTen Cycles

3 BIKE AMENITIES

BIKESHARE

DEFINITION

Bikeshare aims to provide convenient, affordable, on-demand access to bikes for short-term use in urban areas while enhancing access to transit. Bikeshare stations typically are situated near transit stops and major residential and commercial destinations. Bikeshare programs can help reduce traffic congestion, air pollution, and the demand for vehicle parking. Bikeshare also may be attractive to people who'd rather not own a bike because of the risk of theft and vandalism, a lack of parking or storage, and maintenance costs.

SAMPLE BIKESHARE MODELS

The following are types of bikeshare systems that serve the varying needs and demands of users:

- **Station-based bikeshare** features automated kiosks that electronically secure and release bikes during each rental. Kiosks may be installed on- or off-street within a neighborhood or large facility or campus. Each kiosk has its own space and power requirements. Examples of station-based bikeshare systems include: Capital Bikeshare (Washington, D.C.), Citi Bike (New York City), DecoBike (San Diego), and Divvy (Chicago). The NACTO Bike Share Station Siting Guide provides additional guidance on siting bikeshare kiosks.
- **Dockless bikeshare** services allow each GPS-enabled bike with integrated locks to be accessed using a smartphone app. Bikes typically may be parked anywhere within a pre-determined service area (or geo-fence). A hybrid system comprised of stations and dockless parking options also may be provided. Incentives could be offered to encourage users to park bikes at stations or at specific locations within a service area. Bluegogo, LimeBike, Ofo, and Spin are examples of fully dockless bikeshare systems.
- **Employee bikeshare programs** offer a shared pool of bikes for employee business and/or personal use. Varying levels of management, maintenance, and security may be implemented, but more informal programs rely on the integrity of individuals to use and care for the bikes in an appropriate way. Similar forms of internal bikeshare also may be implemented in large residential communities and hotels/resorts.
- **Peer-to-peer bikeshare** facilitates bike rentals between individuals through a website or smartphone app. This model may depend on face-to-face customer interaction and may not be ideal for implementation by a public agency. However, jurisdictions and private entities looking to encourage biking may consider providing a common space with surveillance for peer-to-peer bikeshare transactions to increase safety. Spinlister is a peer-to-peer platform for users to borrow bikes as well as surfboards and snowboards.

IMPLEMENTATION CONSIDERATIONS

- Various bikeshare implementation models exist, and there could be several parties or companies involved. One may produce the bikes, another may operate the program, and a city or private entity may own the bikeshare system.
- All systems strike a balance between serving occasional/recreational/tourist markets versus more frequent commute trips. With varying systems come varied outcomes regarding cost and potential revenue. Bikeshare program objectives need to be clearly defined upfront to ensure that the option implemented closely aligns with those objectives.
- Bikeshare ridership increases exponentially with increases in station density, according to a National Association of City Transportation Officials (NACTO) analysis of U.S. bikeshare system data. Stations separated by walkable distances (e.g., every 1,000 feet) is fundamental for providing an equitable bikeshare program that features convenient, on-demand mobility.
- Bikeshare stations should be situated at transit stops or within one block of the stops, and they should be made highly visible with signs. Integrating bikeshare stations with transit greatly extends the mobility network by offering people a way to reach destinations that are not directly served by scheduled transit.
- Bikeshare operators typically move bikes between kiosks or within the service area to balance demand and supply. Mobility hub kiosks always should have an ample supply of bikes, especially during peak travel times.
- Situating bikeshare options near existing or planned bikeways will further enhance the program's success.
- Consider integrating adaptive bikes to accommodate people with disabilities and seniors.
- Consider potential funding options for a bikeshare system, including federal and local grants, government subsidies, corporate sponsorships, private investment, etc. Advertising revenues or other sponsorships can help pay for launching a bikeshare service and funding its ongoing operations.
- Implementation in low-income areas could require subsidized/discounted rates, as well as alternative payment options such as payment without smartphones or credit cards.
- Consider offering a joint transit-bikeshare pass or coordinating with a regional transportation fare payment program. Integration with the region's universal transportation account is an option, if one is available. Barriers to implementation include data and fare-payment integration, pricing structures, challenges to compatible infrastructure, and the complexity in allocating profits.

3 BIKE AMENITIES

ELEMENT IN ACTION

DecoBike – San Diego, CA

Photo courtesy of DecoBike San Diego

DecoBike launched in 2015 in partnership with the City of San Diego with a goal of offering 1,800 bikes at 180 stations Downtown, Uptown, and in some beach communities. Stations are solar-powered, automated and operate 24 hours a day, seven days a week. They are modular in design and can be easily expanded or reduced to align with demand. Each station features a map indicating its location. The location of stations also can be viewed via the DecoBike website and mobile app. Infrequent users or tourists pay only for the time they use DecoBike, while regular users can purchase an annual membership (a credit or debit card is needed).

Divvy Bikes – Chicago, IL

Divvy is a bikeshare program owned by the Chicago Department of Transportation and operated by Motivate. About 5,800 bikes at 580 stations are available 24/7. The Divvy for Everyone program offers assistance to people who otherwise wouldn't have the financial resources to participate. Qualifying residents can make a one-time $5 payment for an annual membership. No credit card is required, and cash payments can be made at participating 7-Eleven and Family Dollar stores.

Spin – Seattle, WA

Photo courtesy of Spin

Spin is a dockless bikeshare system that allows users to scan a QR code with a mobile app to unlock a bike for use. Trips cost $1 up to 30 minutes, and $1 every 30 minutes thereafter. Spin bikes can be parked anywhere, just as one would park their personal bike. Spin's approach is to work closely with city governments to implement this model, while minimizing safety and other potential transportation impacts of a kiosk-free bikeshare program. Spin is now active in Seattle, and in March 2017 it piloted dockless bikeshare in Austin, Texas during South by Southwest®.

Adaptive Bicycling Pilot Project – Portland, OR

The Portland Bureau of Transportation (PBOT) is working to add an adaptive bicycling service to the city's local bikeshare program, in order to make it more accessible to disabled people. Biketown launched in the summer of 2016, but some critics argued that the bikeshare system did not equitably accommodate all users. PBOT plans to make adaptive bikes available through existing bike rental shops located near popular bikeways. The expanded bikeshare program will aim to provide both hand bikes and three wheeled bikes.

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4

MOTORIZED SERVICES & AMENITIES

Photo courtesy of car2go

4 MOTORIZED SERVICES AMENITIES

DEDICATED TRANSIT LANES

DEFINITION

Dedicated transit lanes typically are provided for major routes offering frequent service or where congestion may significantly impact service reliability. These lanes may be physically separated from traffic with curbs or paint to discourage drivers from entering them. Prioritizing transit service with dedicated transit lanes can help make transit more convenient for people than driving alone.

SAMPLE DEDICATED TRANSIT LANE TREATMENTS

Multiple design approaches can be used for dedicated transit lanes, based on available space and needs, according to the National Association of City Transportation Officials (NACTO) Transit Street Design Guide:

Offset transit lane

Photo courtesy of NACTO Transit Street Design Guide

Also known as "floating" or "parking-adjacent" lanes, these direct transit vehicles to the right-most moving lane. They may be offset from the curb by street parking, curb extensions, or raised cycle tracks.

Peak-only bus lane

Photo courtesy of NACTO Transit Street Design Guide

These operate during peak travel periods. Mixed traffic or other curbside uses are permitted during non-peak periods. These lanes also help transit stay on schedule when traffic congestion is high.

Curbside transit lane

Photo courtesy of NACTO Transit Street Design Guide

The lane adjacent to the curb can be dedicated for transit vehicles, especially on through-corridors where parking isn't provided or not well used.

Center transit lane

Photo courtesy of NACTO Transit Street Design Guide

Traditionally found on streetcar or light rail routes, these can be added as part of a rapid bus line or any bus route with suitable stations. Other features such as left turn restrictions, leading transit intervals, and all-door boarding allow center transit lanes to reduce the sources of transit delays.

Shared bus-bike lanes

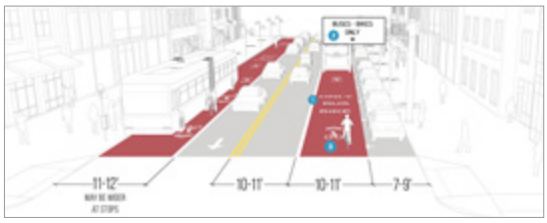


Photo courtesy of NACTO Transit Street Design Guide

These accommodate buses and cyclists traveling at lower speeds. Buses are discouraged from passing, and cyclists may pass buses only at stops. Shared bus-bike lanes may be suitable where there's not enough room for high-volume bus routes and separated bikeways.

Contraflow transit lane

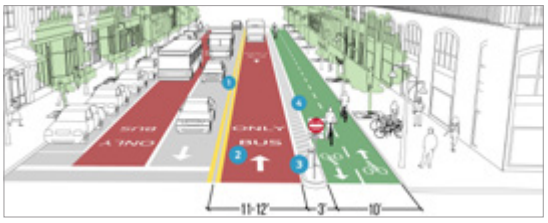


Photo courtesy of NACTO Transit Street Design Guide

This can be thought of as a conventional two-way street, but one in which non-transit vehicles are prohibited from traveling in the contraflow direction. These lanes may be used on streets where general traffic is limited to travel in one direction, but transit operations would benefit from routes heading in both directions.

4 MOTORIZED SERVICES AMENITIES

IMPLEMENTATION CONSIDERATIONS

- Consider any local precedence for transit-only lanes. If none exists, then a concerted effort may be needed to educate the general public about the new traffic rules and make sure they're enforced as the community adjusts to the new road design.
- Determine whether the lanes should allow only transit traffic, or if automobiles should be allowed to use the lanes to access businesses. Also determine whether or not bikes should be permitted to access the lanes.
- Consider the hours of operation for dedicated transit lanes. If they're needed primarily during peak periods, then the lanes could be opened to general traffic during off-peak hours.
- How transit stations are designed and accessed will determine how dedicated transit lanes are planned. If lanes are operating in an outside or inside lane, evaluate the most effective design for passenger access and safety.
- Signs should be specific and clearly communicate what's allowed – transit only, transit and right turns only, transit only between certain hours, etc. Clearly communicate what fines drivers will face if they violate rules governing dedicated transit lanes.
- Conduct a transit operational analysis and traffic review to determine the needs, costs, and benefits of adding dedicated transit lanes.
- The National Association of City Transportation Officials (NACTO) Transit Street Design Guide provides additional guidance on dedicated transit lanes.

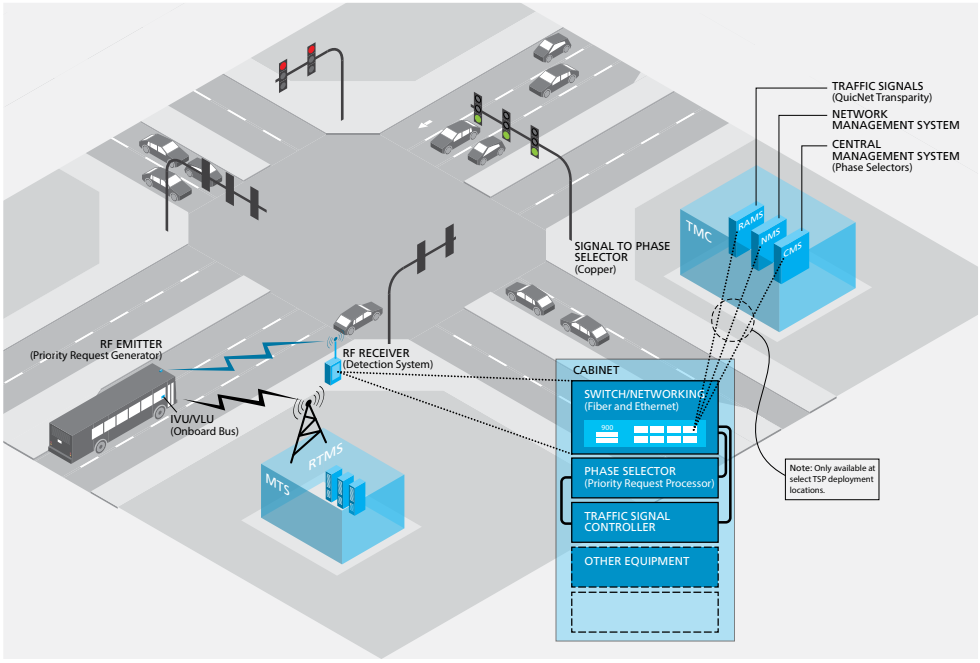
Autonomous rapid transit vehicles could request other autonomous vehicles shift out of a short-term dedicated transit lane, to provide increased service during high traffic times.

SUPPORTING TRANSIT LANE IMPROVEMENTS

Transit signal priority (TSP) helps improve transit reliability and efficiency within a mobility hub area by providing transit vehicles with more green light time. An emitter on a bus sends a signal to a receiver as the bus approaches an intersection. If the TSP request is granted, the bus will receive an early green signal or additional green time. TSP can operate independently at the signal level, connect with multiple signals in a corridor, or be integrated in a regional traffic management control system.

TSP CONSIDERATIONS

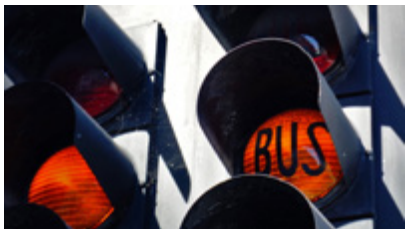
- Jurisdictions may require a transit vehicle to meet certain requirements before granting signal priority. For example, a bus may be required to be running late by a certain number of minutes and/or have at least ten passengers on board to be granted signal priority. There also may be restrictions on the frequency of TSP events allowed. Transit agencies and municipal transportation planners and engineers need to agree on these policy decisions.
- Transit and emergency vehicles have been connected to signals for decades. However, private automobiles now have the capability to be connected. Consider how emergency, transit, and private vehicles should be interconnected, and how they relate to one another at intersections.
- Consider options, features, and interoperability of onboard transit vehicle equipment for the TSP solution to be effective.



4 MOTORIZED SERVICES AMENITIES

SUPPORTING TRANSIT LANE IMPROVEMENTS (continued)

Overhead signs Overhead signs can alert drivers and other travelers to important information about dedicated transit lanes. Flashing beacons also can be used to draw attention to signs during specific travel periods.



Transit-only signals can be designed as transit-specific signal heads or be visible only to the vehicles traveling in the dedicated transit lane. They may be integrated as part of the design of dedicated transit lanes to indicate when transit vehicles operating in mixed-traffic lanes have exclusive phases, or to provide transit vehicles with a head start at an intersection.

Photo courtesy of NACTO Transit Street Design Guide

Queue jumpers refer to short stretches of dedicated transit lanes that are combined with TSP to enable buses to bypass a waiting queue of automobile traffic. Buses must have clear access to the dedicated lane, and the ability to reach the front of the traffic queue at the beginning of the signal cycle. A bus-only signal may be used to indicate when a transit vehicle can proceed before general traffic. Queue jumpers also can improve bus performance and service reliability.

ELEMENT IN ACTION

Mid-City Centerline *Rapid* Transit – San Diego, CA

Scheduled to open in 2018, this project will provide the San Diego region's first freeway-level transit stations along State Route 15 at University Avenue and El Cajon Boulevard. Transit-only lanes will operate within the existing median from I-805 to I-8. This investment aims to improve the on-time performance of existing *Rapid* service, while supporting an integrated network of *Rapid* and local bus routes linking Downtown and Mid-City to job centers to the north.

Wilshire Bus Rapid Transit – Los Angeles, CA

Peak hour bus lanes were designated on Wilshire Boulevard to help reduce transit commute times on the busy thoroughfare. The improvement created 7.7 miles of dedicated lanes between South Park View Street and Centinela Avenue and 9.9 miles of street, signal, and sign improvements along the corridor. The facility prohibits vehicles from driving or parking in the dedicated lanes from 7 to 9 a.m. and from 4 to 7 p.m. Monday through Friday. Vehicles may enter the bus lanes only near intersections to make right turns. Cyclists are permitted to use the curbside bus lanes.

sbX Rapid Transit – San Bernardino, CA

The Omnitrans sbX Green Line is the Inland Empire's first rapid bus service. The 15.7-mile line runs on a busy corridor between San Bernardino and Loma Linda, includes 5.4 miles of dedicated lanes, and stops at schools, job centers, and other points of interest. Buses have traffic signal priority, reducing commute times. The line aims to cut traffic on freeways, improve air quality, and increase bus ridership. More than half a million people rode the bus line during its first year, and ridership continues to grow, according to Omnitrans.

Photo courtesy of Rick Sforza, The Sun/SCNG

4 MOTORIZED SERVICES AMENITIES

RIDEABLES

DEFINITION

A rideable is a portable device with wheels that makes people more mobile. Non-motorized skateboards and scooters have existed for decades, but a new generation of small, electric travel options are available for people of all ages. Motorized rideables typically use an electric power source and feature a floorboard for the rider to stand on. Scooters, electric skateboards, hoverboards, and self-balancing boards with one or two wheels are all examples of rideables.

SAMPLE RIDEABLE DEVICES

IMPLEMENTATION CONSIDERATIONS

- Rideables can encourage people to connect to a transit stop that otherwise might be too far to reach by walking.
- Widened sidewalks may allow walkers and people using rideables to share the space.
- Rideables can help reduce auto traffic and emissions in busy travel corridors.
- Charging outlets can be situated near transit waiting areas to offer people who are using electric-powered rideables a convenient power source.
- Many rideables are portable and easy to carry aboard transit, but some may need to be left behind and stored securely.
- Wayfinding and/or dynamic signs can inform people about where and how rideables are permitted.
- Some rideables may be synced with smartphones to allow locking and unlocking.
- Some rideables feature LED lighting for enhanced visibility.
- California legislation (Assembly Bill 604, Olsen) defines electrically motorized boards and how they can be used:
    - An electrically motorized board is any wheeled device that has a floorboard that is not greater than 60 inches deep and 18 inches wide, is designed to transport only one person, and does not exceed 20 miles per hour.
    - A motorized skateboard is not considered an electrically motorized board.
    - Riders must be 16 years or older.
    - Electrically motorized boards are not allowed to operate on roadways with speed limits that exceed 35 miles per hour, unless they operate entirely within a designated Class II or Class IV bikeway.
    - Electrically motorized boards can use bikeways, but riders must travel at a reasonable speed, wear a fastened bicycle helmet, and yield to pedestrians.
    - Local governments are authorized to adopt rules and regulations by ordinance or resolution to prohibit or restrict people from riding or propelling electrically motorized boards on highways, sidewalks, or roadways.
    - Other agencies such as transit development boards or universities also may adopt ordinances, rules, or regulations to restrict the use of bicycles, motorized bicycles, skateboards, electrically motorized boards, and roller skates on any property they control.

Autonomous vehicles will be equipped to detect people using rideables within a mobility hub area, as well as others walking and riding bikes.

4 MOTORIZED SERVICES AMENITIES

ELECTRIC BIKE & SCOOTERSHARE

DEFINITION

A shared fleet of electric bikes (e-bikes) or motorized scooters can make it easier for people to travel to work or other destinations when topography is challenging or parking is scarce. While there are different business models, the service may operate much like bikeshare: electric bikes or scooters are docked at a station, and they can be released after check-in and payment at a kiosk. Members are typically charged by the hour, day, or month if they use the service regularly. Given the typical speeds of electric bikes and scooters, they are well suited for short trips of 2-3 miles – too far for many to walk.

IMPLEMENTATION CONSIDERATIONS

- Revise municipal regulations to designate on-street parking locations for e-bikes or scooters, if applicable, including areas previously restricted by residential parking permit programs.
- Determine whether e-bikes should be restricted to parking at bikeshare kiosks or at other designated locations. Determine if e-bikes may use bike racks or other publicly accessible bike parking options.
- Determine if scooters can park in existing on-street motorcycle spaces, designated off-street parking lots, and other specific locations used by other vehicles. Determine where scooters are permitted to park during trip stopovers (e.g., on-street in between two parked cars, areas of a curb that are too small for a car)
- Situate electric bike and scooter charging stations, as well as dedicated parking facilities, near transit stations and other major destinations.
- Review existing policies to determine if helmets are required. Work with local agencies and e-bike or scootershare vendors to ensure that people are following helmet requirements.
- Consider integrating e-bike or pedal-assist bikes into a non-motorized bikeshare program. For example, nearly half of Baltimore Bike Share's bikes have an electric pedal-assist feature known as Pedelec that gives riders an extra "boost" when they're heading uphill. No gears or buttons are required. Pedelec bikes are identified by a white lightning bolt on the back fender.
- The battery range of e-bikes depends on a number of factors including the size of the battery, how much effort riders put into pedaling, the topography, wind resistance, road surface conditions, and the rider's weight.
- Integrate the e-bike and scootershare into real-time travel information apps or a universal transportation account so that users can find, access, and pay for the services as they need them.

ELEMENT IN ACTION

Scoot - San Francisco, CA

Photo courtesy of Untitled © 2013 Marcin Wichary available under CC BY 2.0

Scoot offers a fleet of 500 shared electric scooters that can go up to 30 mph and travel an average range of 20-25 miles on a single charge. Scoot also offers mini cars called quads, which can go up to 25 mph and travel up to 40 miles. Scoots may be rented for as little as one hour and up to 48 hours, making it a flexible travel option for many people. Each Scoot comes with two sizes of helmets stowed in the back. Scoot also features a mobile app for reservations and a cashless payment feature.

Cityscoot - Paris, France

Photo courtesy of Cityscoot

More than 1,000 Cityscoot scooters are available to rent in Paris between 7 a.m. and 12 a.m. everyday. No membership is required, and Cityscoot handles all charging needs. The booking system is fully integrated; no keys, cards, or recharge terminals are used. A 4-digit PIN provided by the Cityscoot app unlocks each scooter for use. The rental base rate is 28 cents (Euro) per minute, but Cityscoot offers packages of 25 Euros for 100 minutes or 100 Euros for 500 minutes. An approved helmet with a single-use hygiene cap is provided beneath the seat, but riders may use their own helmet.

4 MOTORIZED SERVICES AMENITIES

CARSHARE

DEFINITION

Carshare services offer access to vehicles 24 hours a day, seven days a week. These cars can be found within a specified service area, at transit stations, and other locations, and people can find them by using a smartphone app. Users are typically charged according to how long they use the cars or how far they drive. Fees cover car insurance, parking, emergency roadside service, and other car-related expenses. Carsharing offers people a convenient way to make connections beyond the first and last mile of a public transit stop. It also offers an alternative to owning a vehicle.

SAMPLE CARSHARE MODELS

- **Round-trip carshare** services, such as Maven and Zipcar, require users to return a vehicle to the same designated location.
- **Free-floating carshare** services such as car2go, ReachNow, WaiveCar allow users to pick up and then park a vehicle anywhere within a designated service area. Permitted parking opportunities may include on-street and/or metered parking in addition to off-street designated carshare spots).
- **One-way carshare** services, such as BlueIndy, Maven, and Zipcar, allow users to pick up a vehicle from one designated location and return it to another branded carshare station. Maven and Zipcar offer both round-trip and one-way carshare.
- **Peer-to-peer carshare** services such as Croove and Getaround allow private vehicle owners to rent their car by the hour to others within their community).

IMPLEMENTATION CONSIDERATIONS

- Assess the local market to see if there's demand for carshare. Work with municipal governments and transit agencies to understand where these services would serve people best.
- Review existing municipal codes and policies to determine whether carshare can operate in the public right-of-way.
- Provide dedicated parking for carshare vehicles. This first requires learning whether carshare parking can be provided at major transit stations; creating carshare vehicle "drop zones" within the mobility hub drive shed that are convenient for major destinations or special events; and identifying on-street locations for dedicated carshare parking within walking distance of transit stops. Overall, dedicated spaces help increase the visibility of carshare services, and make it more likely people will use them.
- Update parking enforcement guidelines, and educate parking enforcement staff on all carshare regulations.
- Determine whether transit agencies and/or local jurisdictions need to subsidize the carshare service. If it's economically feasible to operate independently, consider whether users should be charged a fee for parking spaces within the mobility hub area.
- Accessibility, equity, and environmental policies should be considered.
- Consider integrating alternative fuel vehicles into the program, based on existing and/or planned infrastructure such as electric vehicle charging stations.
- Partner with carsharing companies to identify needs and establish formal operating agreements.
- Identify opportunities to offer fare discounts to people who use both transit and carshare for their trips.
- Real-time carshare information should be integrated into a universal transportation account, with which users can find, access, and pay for a variety of mobility services. This will make it more convenient for people to use carshare as part of their multimodal trip.
- Provide clear wayfinding between transit and carshare services to make it easier and less stressful for people to find a vehicle.

Autonomous and/or connected vehicle carshare programs will need to be considered, possibly in partnership with ridehailing services such as Lyft or Uber. The carshare industry may evolve to become a shared-use, self-driving vehicle network.

ELEMENT IN ACTION

car2go – Austin, TX

In Austin, the carshare company car2go offers a large fleet of smart "fortwo" electric vehicles, available on-demand in the city center. Using a mobile app, members can locate and unlock a vehicle, drive it to any destination within the Home Area, and park it for another member to use. Several on-street parking spaces are provided exclusively to car2go users across the street from the MetroRail Red Line Downtown Station. In 2017, car2go Austin added two Mercedes-Benz models to the fleet – 25 CLA four-door coupes and 25 GLA five-door SUVs – to cater to families, small groups, and others who may need to transport more cargo.

4 MOTORIZED SERVICES AMENITIES

ON-DEMAND RIDESHARE

DEFINITION

On-demand rideshare services allow someone to request a ride in real-time using a mobile app. They link passengers with available drivers based on a trip's origin and destination, while also identifying the quickest route.

ON-DEMAND RIDESHARE MODELS

- **Dynamic ridesharing** is essentially carpooling, where drivers are matched with passengers who are traveling in the same direction. For people whose schedules and destinations match up in the morning and evening, dynamic ridesharing is a convenient and reliable transportation option. Ridesharing that uses mobile apps to match drivers and passengers can quickly fill empty seats, reducing congestion and auto emissions. Participating drivers can be reimbursed up to 54 cents per mile, an IRS limit that differentiates income from reimbursement for gas mileage and wear-and-tear. Examples of dynamic ridesharing services include Carma, Ryde, Scoop, Waze Carpool, and Zimride.
- **Ridehailing**, also known as ridesourcing, allows people to request rides in real-time from drivers who provide the ride in their personal vehicle in exchange for payment. These services have evolved to offer both pre-scheduled rides and ride-splitting, so that several passengers who are matched with the same driver may split the cost of the trip. In California, these services are classified as Transportation Network Companies (TNCs). Examples include Lyft and Uber.

IMPLEMENTATION CONSIDERATIONS

- Consider partnerships with dynamic rideshare services to promote carpooling to transit stations, particularly those that are experiencing a high demand for parking.
- Traditionally, TNCs have employed a rideshare model in which drivers sign on as independent contractors and use personal vehicles to transport passengers. This model has evolved to offer ridehailing drivers the opportunity to lease a vehicle as a result of partnerships between automobile companies and TNCs
- Determine which on-demand rideshare service feature may best assist mobility hub users:
  - A point-to-point ridehailing service, such as Lyft and uberX, provides a private ride from point A to point B for up to four people. The option to request a six-passenger vehicle, luxury car, or bilingual driver also may be included.
  - A pooled ride combines up to four passengers headed in the same direction, and each pays less than they would for a point-to-point ride offered by services such as Lyft Line and uberPOOL.
  - ADA accessible vehicles may better assist riders with wheelchairs, seniors, or others needing help entering and exiting. Services such as uberWAV and uberASSIST offer this. Additionally, web or concierge services are being incorporated into ridehailing services.
  - Employers may sponsor rides on behalf of their employees to better connect them between their employment site and transit, the airport, or other approved locations. Examples include Lyft for Work and Uber for Business.
- On busy urban streets, consider allowing shared or flexible curb space so that different mobility hub services such as microtransit, regular transit, carshare, and mobile retail can use curbs at different peak times, or so they can share the same space during specified hours.
- Designate curb space for passenger loading and unloading to help make rideshare services more efficient, while also reducing instances of double-parking or idling in red, blue, or other prohibitive curbside zones.
  - Designated on-demand rideshare pick-up/drop-off areas should be accompanied by wayfinding signs to clearly communicate the location to both passengers and drivers. Adequate lighting promotes safety for passengers and drivers.
  - Work with on-demand rideshare service providers to create in-app prompts that direct passengers to go to a dedicated pick-up area to meet the driver.
  - Consider creating a clear hierarchy of modes to help manage curb chaos and better allocate where each type of service should operate. This may require prioritizing on-demand rideshare pick-up/drop-off zones over the ability of personal vehicles to park, similar to prioritizing transit vehicle stops at curb space.

The on-demand ridesharing industry is expected to feature fleets of shared autonomous vehicles (SAVs) as autonomous vehicle technology becomes more prevalent. Driverless vehicles are expected to need efficient passenger loading areas, as well as "resting areas" for cars not in service.

4 MOTORIZED SERVICES AMENITIES

IMPLEMENTATION CONSIDERATIONS (continued)

- Incorporate on-demand rideshare services in a bundle of subsidized multimodal travel options that is offered to multifamily development tenants where no parking is provided.
- Taxi cab companies are starting to offer technology-based options for hailing a ride. Mobile apps such as Curb, Hailo, and FlyWheel, and SIM-card enabled push buttons such as Ride Yellow, are being placed in San Diego hotels, restaurants, and hospitals. Partnering with services that already may have dedicated passenger pick-up zones or be regulated by the local transit agency can help people better access transit and other locations in a mobility hub.
- Subsidize on-demand rideshare services that increase the use of challenged or under-performing transit routes.
- Partnerships with local governments and transit agencies can help encourage on-demand ridesharing as an alternative to driving alone to transit stations. This type of public-private partnership can help reduce parking demand at high-volume transit stations.
- Partnerships between TNCs and major employers can provide convenient and affordable commute alternatives for employees. For example, several commuter benefit programs now classify certain uberPOOL rides to be eligible for pre-tax transportation costs.
- Partnerships between rideshare technology providers, vehicle manufacturers, and public agencies will be key to ensuring that on-demand mobility services meet climate goals.
- Real-time information about on-demand ridesharing services should be integrated into a universal transportation account, with which users can find, access, and pay for a variety of mobility options.
- Increase local awareness of all the potential benefits of on-demand rideshare services.

ELEMENT IN ACTION

Scoop to BART Station Partnership – Pleasanton, CA

Photo courtesy of Scoop

In January 2017, Bay Area Rapid Transit (BART) and the Metropolitan Transportation Commission partnered with Scoop to deliver a new option for securing parking at the Dublin/Pleasanton station. Commuters who use Scoop to carpool to the station are guaranteed parking until 10 a.m. High parking demand is an issue at many BART stations, as 99 percent of passengers drive alone to a station. The project was made possible through a $358,000 Mobility on Demand Sandbox grant from the Federal Transit Administration. The program has since expanded to several other BART stations.

Lyft/San Clemente Partnership – San Clemente, CA

Photo courtesy of Lyft

In October 2016, the City of San Clemente partnered with Lyft to offer reduced price on-demand rides in response to the discontinuation of two local bus routes. Given the challenges of operating fixed route transit service in suburban communities, on-demand rideshare was seen as a way to help residents get around without having to own a car. Eligible rides are taken between 6 a.m. and 8 p.m., and passengers must be picked up and dropped off along the discontinued bus corridors. Helpful signs were also installed at participating bus stops.

Uber/MTS Partnership – San Diego, CA

Photo courtesy of MTS

Between July 8-24, 2016, the San Diego Metropolitan Transit System (MTS) and Uber partnered to offer one-time discounts of $5 for uberPOOL riders who arrived at or departed from one of 20 selected transit centers. The promotion was designed to encourage people to leave their cars at home, catch a transit ride, and then reverse the trip to get back home. It also provided people with an easy way to travel downtown during Comic-Con International and the Major League Baseball All-Star Game.

4 MOTORIZED SERVICES AMENITIES

MICROTRANSIT

DEFINITION

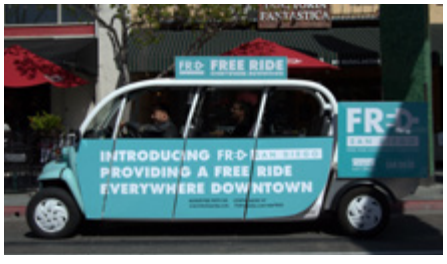
Microtransit often targets peak period commute travel, offering a flexible, on-demand option for small groups of people. It's ideal in places where high-frequency transit isn't warranted, or where or it's too costly to operate. Microtransit can be particularly convenient when traditional fixed-route transit options are full or when they simply don't serve certain destinations. Microtransit services use smaller vehicles that carry between five and 12 passengers, and riders typically can order service through a mobile app that directs them to gather at common locations along the service route for pick-up.

IMPLEMENTATION CONSIDERATIONS

- Microtransit, flex service, and employer-provided shuttle services should complement one another. Schedules can be coordinated, agreements to share fares can be made, wayfinding can be offered between services, and loading zones can be strategically situated so services don't conflict with one another.
- Microtransit can make larger transit services more attractive by extending their reach into areas that don't receive frequent all-day service. To help coordinate these services, transit authorities can provide space adjacent key transit stops so people can transfer easily to and from microtransit.
- Consider whether any priority will be given to microtransit vehicles that use a passenger loading zone, and if so, how much.
- Determine whether microtransit services can share curb space at specific transit stops as part of a formal agreement.
- Decisions about where to situate dedicated and shared curb spaces should be coordinated with local jurisdictions, transit agencies, and shared mobility services like microtransit.
- Determine if microtransit services should pay to use curbside space at a mobility hub. For example, the San Francisco Municipal Transportation Agency (SFMTA) is conducting a pilot program that requires commuter shuttles to obtain permits to use the City's limited curbside space.
- Consider granting microtransit vehicles access or partial access to dedicated transit lanes.
- Ridehailing services such as Lyft and Uber may increase traffic and crowd loading zones. Consider the impact of adding microtransit into the mix.
- Evaluate any ADA regulations that may influence how microtransit vehicles are designed and how those vehicles use passenger loading curb spaces.
- Microtransit vehicles may operate on alternative fuels such as renewable natural gas, electricity, and biodiesel. Which one to choose depends on several factors, including the kinds of daily operations expected, the cost of maintenance, and the demand for vehicle replacements over time.
- Leverage innovative funding sources such as grants, parking meter revenue, development impact fees, and private sponsorships to subsidize microtransit services in a community.
- Public transit operators may leverage microtransit technology to integrate on-demand services into the existing transit network.
- Real-time information on microtransit should be integrated into a universal transportation account, with which users can find, access, and pay for a variety of mobility services.

ELEMENT IN ACTION

Some microtransit services have recently ceased operations, but others are finding their niche:



Free Ride Everywhere Downtown (FRED) – San Diego, CA

FRED is a microtransit option available at no cost to anyone needing a ride within Downtown San Diego. Funded by a combination of downtown parking revenues and corporate sponsors, FRED's all-electric vehicles provide an on-demand mobility option as early as 7 a.m. on weekdays and as late as midnight on weekends. Rides can be hailed from the street or by using the FRED mobile app. Each low speed vehicle is equipped to carry five passengers and provides a convenient way to move around downtown neighborhoods and connect to Trolley or heavy rail services. Additionally, the service aims to reduce parking demand, traffic congestion, noise pollution, and air pollution.

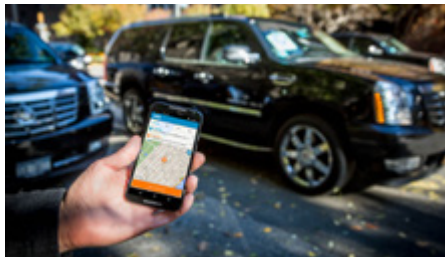


Photo courtesy of MTS

Via

Via is an on-demand microtransit service operating in many cities including Chicago, New York, Washington, D.C., and West Sacramento. Hours of operation differ by service area, but the mission of Via remains the same – to provide a convenient and reliable travel option. An app is used to book a ride, and passengers are matched with a vehicle traveling in the same direction within seconds. The average wait time is five minutes, and an estimate of the vehicle arrival time is provided. As a bonus, transportation benefit debit cards can be used to pay for trips, assuming the vehicle seats six or more people.

4 MOTORIZED SERVICES AMENITIES

NEIGHBORHOOD ELECTRIC VEHICLES (NEVs)

DEFINITION

Neighborhood electric vehicles (NEVs) offer a low speed, zero-emission motorized travel option for some mobility hub applications. NEVs typically have a maximum speed of 25 miles per hour (mph) and a maximum driving range of 40 miles on a single charge. Models range in size accommodating one to six people and may be used on local roads with posted speed limits of 35 mph or less (regulations differ by state). NEVs are used mostly for local trips in self-contained areas such as planned communities, resorts, college campuses, and industrial parks. They offer older adults and other licensed drivers who don't want to use a conventional auto but may not be able to walk or ride bikes easily a way to get around.

IMPLEMENTATION CONSIDERATIONS

- If cities intend to operate low-speed vehicles on streets that have posted limits above 35 mph, then state legislation and a transportation plan are needed. For example, AB 61 (2011) authorized the County of Riverside and cities within the county to establish a NEV transportation plan.
- California state law requires NEV drivers to have a valid driver's license and insurance.
- For NEVs to be a viable option for people, the local road network must be designed to accommodate them. NEVs are smaller, lighter, and slower than traditional cars, so drivers and their occupants are especially vulnerable in crashes. At the same time, NEVs may be too large and fast to safely share narrow lanes and off-road trails with cyclists and pedestrians.
- A road network for NEVs can be designed for continuous, direct, and relatively flat routes throughout a community. The dedicated paths or streets must have speed limits of 35 mph or less.
- Dedicated paths that accommodate NEVs can be considered in newer, lower-density suburban communities where road widths or adjacent greenspace permit them. They must be at least nine feet wide to allow for unidirectional travel, and 18 feet wide for bi-directional travel.
- NEVs can operate in dedicated on-street lanes (including bike lanes) if these lanes are at least seven feet wide.
- NEV networks should avoid crossings at major intersections. Whether the network is dedicated or in mixed traffic, an efficient NEV network around a mobility hub should be designed to provide as direct a route as possible to employment centers, retail centers, and other points of concentrated activity within a five-minute drive of the hub.
- A fleet of NEVs could be owned by a company, and operated by employees so they could make short trips within the corporate campus. Parking, charging stations, striping, signs, and educational tools should be provided.
- To safely incorporate NEVs into a mobility hub, a transportation network already should be in place or planned for the area. On-street parking may be repurposed for NEV lanes or charging spaces.
- Most dedicated NEV plans and infrastructure investments are found in suburban areas with large and often age-restricted planned communities. NEVs also can be used in urban areas, but they are less common. As a result, there is less information available about how to effectively design, establish, and operate NEVs in urban areas. Furthermore, the cost may be high to create complete NEV networks in urban areas that already have street networks unsuited for NEVs.
- Transit station parking lots that have space for NEVs also should provide charging facilities. At busy transit parking lots, planners will have to consider how many NEV spaces with charging stations to install, whether to limit parking hours for charging, and how to regulate pricing.
- NEV charging stations have different siting considerations and electrical needs than conventional plug-in electric vehicle (PEV) charging stations. Refer to the Electric Vehicle Charging Stations chapter for more information.
- There are currently few if any areas in the San Diego region with large numbers of individually owned NEVs. Consider contracting with a private operator to provide a shared fleet of NEVs at suitable mobility hubs.
- NEV and PEV technology is advancing. Compact, electric vehicles are being manufactured to reach much higher speeds (examples include Renault Twizy and Toyota i-Road), while also offering more flexible options for personal mobility.
- Real-time information on shared NEVs should be integrated into a universal transportation account, with which users can find, access, and pay for a variety of mobility services.

RESOURCES

- The National Highway Transportation Safety Administration (NHTSA) classifies any four-wheeled motor vehicle with top speeds of 20 to 25 miles per hour as a "low-speed vehicle."
- Regulations governing low-speed vehicles differ by state, but the California Vehicle Code (CVC) classifies NEVs as low-speed vehicles that may operate on any street that has a posted speed limit of 35 mph or less. Vehicles can cross streets with higher speed limits if the intersections are controlled and the cross streets are approximately at right angles.
- California Streets and Highways Code, Division 2.5 (City Streets), Chapters 7 and 8 allow for local NEV transportation plans.

  Examples include:

  - Chapter 7, Section 1962 amended to allow the County of Riverside or any city within the county to prepare a NEV transportation plan. Refer to AB 61 (2011).
  - Chapter 7, Section 1963 amended to allow the City of Lincoln and the City of Rocklin in the County of Placer to prepare a NEV transportation plan.
  - Chapter 8 allows for a NEV transportation plan for the Ranch Plan Planned Community in Orange County

4 MOTORIZED SERVICES AMENITIES

ELEMENT IN ACTION

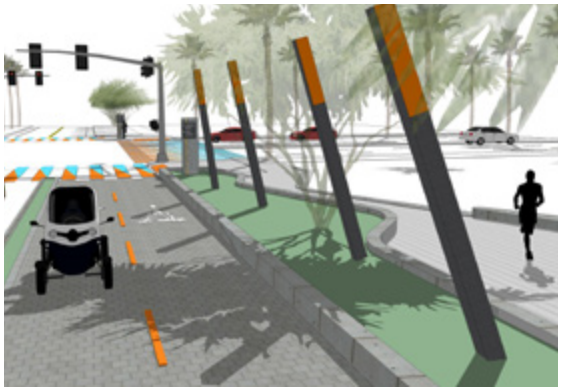


Photo courtesy of Coachella Valley Association of Governments

CV Link Master Plan Volume 4: NEV Transportation Plan - Coachella Valley, CA

Authorized by AB 61 (2011), the Coachella Valley Association of Governments developed a neighborhood electric vehicle plan to identify priority NEV routes and needed improvements. Considerations include traffic speeds and volumes, road widths, and public charging facilities. The plan also includes design guidelines for NEV paths, lanes, and parking spots, and it discusses next steps for implementation. The plan contributes to the development of a multimodal vision for the Coachella Valley, also referred to as CV Link.

Otay Ranch Trail/Path System – Chula Vista, CA

The Otay Ranch master planned community was designed with an extensive Village Pathway network that connects villages with major community destinations and local transit routes. Existing and planned pathways are either 10 or 15 feet wide to accommodate pedestrians, casual cyclists, and NEVs. These pathways could accommodate a shared fleet of NEVs for residents and visitors, helping to reduce traffic congestion and also the demand for parking.

The GEM © 2008 miheco available under CC BY-SA 2.0

Polaris GEM Neighborhood Electric Vehicle

The Polaris GEM is a neighborhood electric vehicle that can be used for personal transportation, shuttle service, and other campus or business park needs such as security or hospitality. The low-speed vehicles can carry between two and six people, based on the vehicle model. The GEM is an example of an emission-free mobility option that could be incorporated into an NEV transportation network.

4 MOTORIZED SERVICES AMENITIES

ELECTRIC VEHICLE CHARGING

DEFINITION

An electric vehicle charging station (EVCS) gives people the opportunity to charge plug-in electric vehicles (PEVs) at a mobility hub. Battery-powered electric vehicles, plug-in hybrid electric vehicles, and electric vehicle conversions of hybrid or internal combustion engine vehicles are examples of PEVs. Passenger cars, microtransit vehicles, shuttles, and large transit buses can all be PEVs. They are critical to California's zero emission vehicle (ZEV) planning.

SAMPLE EV CHARGING TECHNOLOGIES[1]

The types and configuration of charging stations depend on how people use PEVs at a given location. Stations can be sited in specific areas of a transit station, or within the greater mobility hub zone. In addition to EVCS options that are available today, advanced technologies for EV charging such as wireless induction could be considered for future mobility hubs as they become available and vehicles become compatible for wireless charging.

CHARGING TYPE	MILES OF RANGE PER HOUR OF CHARGE[2]	MOBILITY HUB APPLICATION
Level 1 (L1)	~3-6 miles/hour	• Slowest charging method • PEVs recharge using an L1 charger, or by plugging into a standard 110/120-volt outlet • Electric bikes, mopeds, scooters, and neighborhood electric vehicles (NEVs) recharge using a 110/120-volt outlet
Level 2 (L2) 3.3kW (low) 6.6kW (medium) 9.6kW (high) 19.2kW (highest)	8-12 miles/hour 16-24 miles/hour 32-48 miles/hour > 60 miles/hour	• Home, office, and public applications • All PEVs can use Level 2 chargers • Each charging station can have 1 to 4 ports • Supports PEVs of parked transit riders, waiting ridehailing services, microtransit, and passing drivers who may stop at a mobility hub to charge up on their way to their ultimate destination
DC Fast and Super-Fast Charging (50kW to 350kW)	~80% of battery charged in 15-30 minutes	• Preferred method for corridor/freeway charging • Quick charge for transit riders, TNCs or other microtransit, shuttles, and for passing drivers to continue trips on electric • Not compatible with all PEVs, so typically installed along with L2 chargers • Superfast charging was exclusive to Tesla, but it's becoming an option for more PEVs
Wireless and future advanced charging technologies	TBD; Likely similar to ranges identified above	• Cater to new and future PEV models ranging from cars to buses • Allow vehicles to charge without plugging in • Older vehicle models not compatible with wireless

1 Table adapted from: Electric Vehicle Charging Station Installation Best Practices: A Guide for San Diego Region Local Governments and Contractors Report (SANDAG 2016)
2 Electric vehicles have battery packs in various sizes; the size determines the amount of energy stored in the vehicle and the actual time to charge.

4 MOTORIZED SERVICES AMENITIES

IMPLEMENTATION CONSIDERATIONS

- Consider how electric vehicle charging at a mobility hub fits in with the overall network of public charging stations in the region.
- Statewide data show a need for more charging stations within disadvantaged communities. Consider measures that help encourage people in disadvantaged communities to buy PEVs and/or use electric carsharing services.
- When installing charging stations at mobility hubs, consider the following:
  - Add wayfinding signs to direct PEV drivers to station locations and increase awareness about public charging stations.
  - If parking is limited, assess whether charging stations can be installed at nearby properties to accommodate transit riders, TNCs, and other shuttles.
  - If electrical capacity is limited, consider installing onsite electricity storage and/or renewable sources of energy.
  - Bollards and/or curbs can protect charging equipment from collisions.
  - Determine the distance between planned charging stations and electrical connections. Where possible, site charging stations nearby the electrical substations.
  - Provide a dedicated electric meter for charging stations at a hub.
  - Provide a network connection to track overall usage and show real-time availability at each station through phone apps and other networks.
  - Install stations with multiple ports between stalls, to increase access to charging equipment from multiple stalls. Do this where physical configuration, vendor technologies, accessibility requirements, and other design constraints allow.
- Consider how charging stations will be managed, operated, monitored, and maintained. Local agencies or jurisdictions that partner with vendors to provide stations may pay a fee to the vendor to install, manage, operate, and maintain it.
- A variety of smartphone applications and websites provide information on how to locate charging stations. This could be integrated with other trip planning websites, applications, and kiosks to encourage EV charging at mobility hubs.
- Universal transportation accounts could be expanded to allow users to pay for charging fees.
- Funding opportunities are available to support the purchase of charging stations for some types of installations and each program has its own eligibility requirement:
  - The San Diego Gas & Electric program, Power Your Drive, provides charging stations for workplaces and multi-family dwellings, if they meet certain qualifications. SDG&E aims to deploy up to 3,500 charging stations in its service territory, and the utility will pilot a project that will feature chargers at eight park-and-ride stations in the San Diego region.
  - Electrify America will invest $800 million in California for EV charging over the next ten years, and a San Diego Metro Area program will be a beneficiary. Funding comes from a $1.2 billion federal settlement with Volkswagen over emission violations.
  - SANDAG is developing a regional charging program to offer incentives to agencies and businesses for the purchase and installation of publicly accessible charging stations. The program is expected to be available in 2021.

RESOURCES

- **State policies and resources** that support the increased deployment of EVCSs include:
  - Executive Order B-16-12 calls for 1 million ZEVs by 2020 and 1.5 million by 2025, including required infrastructure to support these vehicles. Senate Bill 1275 (2014) extended the 2020 ZEV deadline to 2023.
  - The California Energy Commission Alternative and Renewable Fuel and Vehicle Technology Program provides grants to support vehicle deployments; regional EVCS planning; and research, development, and demonstration of emerging technologies.
  - The 2016 California Building Standards Code includes EVCS requirements that apply to new construction and to alterations of existing structures.
  - The California Green Building Standards Code (CALGreen), includes information on voluntary and mandatory requirements for EV charging stations.
  - The California Electrical Code (Title 24, Part 3, Article 625) specifies required methods for wiring, equipment construction, and safety [shock] protection systems and overcurrent control and protection. It also covers proper equipment marking, placement, orientation, and location.
  - For proper signage and pavement markings, refer to Caltrans Traffic Operations Policy Directive 13-01 or the California Manual on Uniform Traffic Control Devices (MUTCD).
- **Regional and local policies and resources** that support the increased deployment of EVCSs include:
  - San Diego Forward: The Regional Plan and its Environmental Impact Report identify several measures supporting the electrification of transportation. Among them:
    - Prepare a regional alternative fuels readiness plan.
    - Develop a regional charger incentive program.
    - Integrate EV charging infrastructure into new transportation projects that include parking lots and/or facilities.
  - Plug-in SD Electric Vehicle Charging Station Installation Best Practices: A Guide for San Diego Region Local Governments and Contractors Report (2016), prepared by SANDAG with CSE, includes:
    - A review of codes and standards relating to EVCS installations
    - An overview of common installation challenges in different scenarios
    - EVSC installation checklists and other best practices to help local building departments and electrical contractor

4 MOTORIZED SERVICES AMENITIES

ELEMENT IN ACTION

Del Lago Transit Station – Escondido, CA

Located off Interstate 15, the Del Lago Transit Station provides access to five Level 2 chargers and a DC Fast Charger with two ports. The Level 2 chargers are compatible with all PEVs and provide a full charge in four to six hours. The DC Fast Charger works well for users who need a quick charge before continuing their trip. Only electric vehicles are permitted to park in these charging spots.

Sabre Springs/Peñasquitos Transit Station – San Diego, CA

Located off the intersection of Interstate 15 and Ted Williams Parkway, this station provides access to ten Level 2 chargers and is pre-plumbed for 20 more. The chargers are compatible with all PEVs and provide a full charge in four to six hours. Only electric vehicles are permitted to park in these charging spots. This transit station incorporated other mobility hub features including smart parking, bike lockers, and solar shading for rooftop parking.

Metro Charge Stations – Los Angeles County

Metro has installed 62 EV charge stations at 15 rail station parking lots throughout Los Angeles County. The charge stations allow users to charge their vehicles while they ride Metro. Charge stations are available for $1 per hour with a $3 daily max to riders who sign up for an account through Metro's website. There is no monthly or start-up fee. An app-based system is used to initiate a charge, and a user can receive an email, text, or a mobile app notification when the charging session is completed or if it's experienced any interruptions.

PacNW Electric Vehicle Recharging © 2013 Dennis S. Hurd available under CC BY-NC-ND 2.0

EVCS Portals

The U.S. Department of Energy's Alternative Fuel Data Center station locator provides information on alternative fueling station locations and features, and the infrastructure is verified by the Clean Cities Coalition. PlugShare and ChargeHub are crowd-sourced tools that allow users to find electric vehicle charging stations. These resources are available online or via a mobile app.

4 MOTORIZED SERVICES AMENITIES

SMART PARKING

DEFINITION

Smart parking uses technology to make searching and paying for parking more convenient and efficient. Smart parking solutions can be used to better inform people of available parking, streamline enforcement and maintenance, provide data on parking patterns within the community, and give people a better parking experience overall.

SAMPLE SMART PARKING SOLUTIONS

- **Smart meters** support a wide variety of payment options, and they can be implemented using single-space meters or pay stations that serve multiple parking spaces on a single block. Parking rates may be adjusted based on demand, the time of day, and the length of stay.
- **Pay-by-phone** options, whether a voice call, text, or smartphone app, can offer customers flexibility and save them time and money because they only pay for the actual time parked.
- **In-street sensors** can keep track of how many parking spaces are filled at any given moment. This data can be used by a parking management system to optimize rates, time limits, and hours of operation.
- **Real-time information** on available parking spaces, delivered to a person's smartphone or on mounted signs, can help motorists find a parking spot faster. Online applications that include mapping can show the location of parking lots, how many spaces are currently available in those lots, parking rates, and other pertinent information.
- **Parking guidance systems** typically consist of dynamic signs that direct motorists to available parking spaces. These systems require a significant investment in data collection technology, including loop detection systems or camera detection systems.
- **Parking reservations systems** allow motorists to book a space online and often pay for it in advance, reducing the time it takes park.

IMPLEMENTATION CONSIDERATIONS

- Technology can make parking easier for drivers and easier for those who manage the parking system.
  - Keep up with the latest parking technology. Outdated technology can limit the capabilities of a parking system and may no longer serve drivers' needs. Communities should do their best to stay ahead of the trends, so investments in technology are not wasted or updates are required sooner than anticipated.
  - At the same time, too much of the latest technology can become overwhelming or confusing for drivers, and it won't necessarily improve parking management. One type of technology used efficiently can make more of a difference than a handful of various technologies.
- Smart parking technology that indicates in real-time when a parking supply can be used by different individuals – employees vs. residents, for example – can help achieve shared parking goals. Parking spaces also can be allocated based on demands by shared mobility services such as carshare and scootershare.
- Before implementing any smart parking technology, conduct a comprehensive study that examines community characteristics, parking inventory, occupancy, and turnover.
- Smart parking technology should be integrated in a way that fits the needs of the local community, makes it easier for people to use multiple transportation options, and makes the entire parking system run more smoothly.
- Consider why smart parking is needed at a mobility hub. Reasons might include customer convenience, improving access to commerce, reducing congestion, and generating revenue. These and other reasons will drive which technological solution to pursue.
- Look for opportunities to integrate smart parking technology with transit applications, particularly those that offer real-time information. This could help people better plan their trips as they check the availability of parking spaces in advance, reserve parking spaces before their trip, and even pay in advance.
- Consider developing a policy for managing curb lanes, to help planners and parking managers establish priorities along the curb that make sense for their community. This effort can help decision-makers better balance competing needs for curb space.
- Consider demand-based pricing that can be updated in real-time to improve the availability of parking and reduce congestion generated by people looking for a place to park.
- Consider the advantages of public versus private parking facilities, as well as different management strategies, standards, and regulations that can best serve the organization's goals for parking.
- Consider how much performance-based data is needed to be compatible with regional data systems – as well as the required type and format – in order to integrate it with other regional datasets such as the Integrated Corridor Management (ICM) in San Diego County.
- Smart parking information should be integrated into a universal transportation account, with which users can find, access, and pay for a variety of mobility services.
- The SANDAG Regional Parking Management Toolbox has additional guidance on implementing smart parking technology.

4 MOTORIZED SERVICES AMENITIES

ELEMENT IN ACTION

City of San Diego

In 2014, the City of San Diego began upgrading about 5,000 on-street parking meters so drivers could use their credit cards and pay-by-phone, as well as paying with coins. The ability to collect real-time data is helping to streamline operations for the back-office system, and providing better insight into how meters are used. Additionally, Civic San Diego unveiled a comprehensive map of real-time parking information, which drivers can access with a mobile app. ParkItDTSD aims to simplify the parking experience for people who visit, live, and work in downtown San Diego.

Photo courtesy of SFMTA

SFpark– San Francisco, CA

SFpark uses smart pricing to help drivers quickly find open spaces. To help achieve the right level of parking availability, SFpark periodically adjusts on-street meter and garage pricing up or down to match existing demand. Demand-responsive pricing encourages drivers to park in underused areas and garages, reducing demand in overused areas. Through SFpark, demand-responsive pricing works to re-adjust parking patterns in the city so people can find parking spots more easily.

Photo courtesy of LADOT

LA Express Park – Los Angeles, CA

LA Express Park combines technology and demand-based pricing to better manage parking. Parking meter technology, a parking guidance system, in-ground vehicle sensors, and a parking management control center all help the city achieve its goals of maximizing the use of a limited number of parking spaces, reducing traffic congestion and air pollution, and encouraging people to use alternative modes of transportation.

4 MOTORIZED SERVICES AMENITIES

FLEXIBLE CURB SPACE

DEFINITION

For a wide variety of transit, shared mobility, and supporting services to operate efficiently within a mobility hub, curb space should be used flexibly. For example, specific curb space can be designated for some mobility services during their peak demand periods, while the same space can be designated for other uses during off-peak periods. "Flexible curb space" allows the mobility network to better balance street demands as they change throughout the day.

IMPLEMENTATION CONSIDERATIONS

- Clear curb markings and signs could designate how curbs can be reserved for a variety of uses. This information should indicate the type of use allowed such as mobility service, mobile retail, and passenger loading; restrictions on uses during certain times of the day, certain days of the week, and the type of uses allowed; and how to make a reservation (if applicable).
- On-street parking policies can impact a community aesthetically, environmentally, financially, and with traffic. Dynamic parking policies should not be set in a vacuum, and they must be open to small adjustments as needed.
- Some flexible curb space zones may require supporting urban, civil, and safety design elements. These may include a physical separation from traffic/safety barriers, traffic calming, electrical service, and urban design elements such as colored or special pavement treatments and landscaping treatments to distinguish different use areas.
- Designating flexible curb space can conflict with the needs of transit, delivery trucks, and other large vehicles that may need more space to maneuver into and out of a loading zone or parking space. Consider extending the length of loading zones
- to accommodate all types of vehicles, and avoid high traffic areas if possible.
- Extended loading zones may eliminate through-traffic lanes and street parking.
- Shared mobility services can efficiently use flexible curb space if passenger loading is restricted to hours when transit service is light and excess space is available.
- If a particular flexible curb space is used intensively by various groups, notifications can be sent to managers of those groups and mobility hub management so everyone can plan for times of peak use. For example, extra bicycles can be placed at key locations to let people know that bikeshare is an option.
- Notify people of the various uses of curb space at or near mobility hubs. Offer this information through wayfinding.
- Deploy dynamic signs and mobile app alerts to let people know in real time how curbs are being used.
- Determine whether fees for occupying flexible curb space will be collected; this can support its continued use.
- Flexible curb space should be actively monitored and managed in order to operate successfully.

Shared mobility services using autonomous and connected vehicles may leverage 'real-time' information to recognize when curb space has changed from passenger pick-up/drop-off to allow mobile retail services and goods movement activity.

ELEMENT IN ACTION

Fifth Avenue Passenger Loading Zone – San Diego, CA

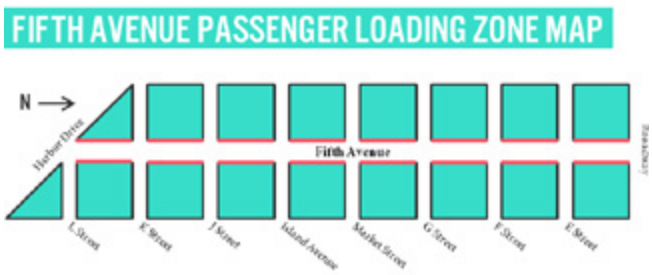


Photo courtesy of Gaslamp Quarter Association

Demand for curb space is exceptionally high in downtown San Diego. Taxis, Uber/Lyft vehicles, valet parking stations, tourist shuttles, commercial deliveries, pedicabs, bikeshare, and an on-demand microtransit service all are competing for curb space at various times of day and night. In 2016, the San Diego City Council approved a Fifth Avenue Passenger Loading Zone as a two-year pilot program along the main artery of San Diego's Gaslamp Quarter. The zone prohibits vehicles from parking on-street between 8 p.m. and 3 a.m. on Friday and Saturday evenings, so that a wide variety of shared mobility services can access the limited curb space. The flexible curb space pilot aims to improve traffic flow, decrease congestion, and improve pedestrian safety.

4 MOTORIZED SERVICES AMENITIES

ELEMENT IN ACTION (continued)

Shared Transit Stop Pilot – Seattle, WA

Photo courtesy of The Seattle Times

In April 2017, the City of Seattle and King County Metro partnered with the Seattle Children's Hospital and Microsoft to conduct a six-month pilot program to allow employee shuttles to share 11 transit stops with King County Metro buses. The pilot will evaluate the feasibility of allowing employer-provided shuttles to use public transit stops, while minimizing impacts to public transit operations. If the pilot is successful, the program could be expanded to include additional employer-provided shuttles and more transit stops. Special signs will designate the select transit stops as shuttle pick-up/drop-off locations.

King Street – Kitchener, Ontario, Canada

Photo courtesy of City of Kitchener and IBI Group

In 2010, the City of Kitchener redesigned King Street to give priority to pedestrians while still meeting the needs of other users. A variety of traffic calming measures were implemented, such as wider sidewalks, lower curbs, planter beds, enhanced lighting, and seating. The most notable features are removable, European-style bollards that provide greater flexibility to accommodate events and festivals. The bollards can be used to delineate on-street parking spaces, close off portions of the street to traffic, or convert on-street parking spaces into areas for outdoor cafes and patios. Due to these improvements, a more flexible curb space was created to better align with time-specific demands.

5

SUPPORT SERVICES & AMENITIES

5 SUPPORT SERVICES & AMENITIES

WAYFINDING

DEFINITION

Wayfinding is a tool that helps people navigate from place to place. In the context of a mobility hub, these places might include transit stations, civic and community buildings, parks, and more. Static and interactive signs can provide maps and directions to points of interest, transit schedules and routes, and other information on available mobility services and facilities. This mobility hub feature can exist throughout the five-minute walk, bike, and drive access sheds and be customized based on user type and travel mode.

IMPLEMENTATION CONSIDERATIONS

- The development of a successful wayfinding program requires extensive participation from the public, local jurisdictions, business owners, and civic groups.
- Develop a comprehensive strategy for wayfinding. Consider whom the wayfinding effort is designed to help, how far people are attempting to travel, and where they want to go.
- Use wayfinding signs to develop and promote a distinct identity for the area. Branding can help create a strong sense of place. However, work with transit properties to ensure that branding is compatible. Often, it can be a challenge to incorporate a transit agency's branding into a business district or a city's wayfinding branding.
- Integrating important information about transit and shared mobility service into wayfinding tools can help improve mobility for locals and visitors.
- Coordinate with transit services to ensure that future service changes or enhancements are integrated smoothly into the wayfinding system.
- Consider how the wayfinding program will be funded and maintained.
- Consider whether wayfinding signs should be open to advertising or to promoting some locations over others through fees or contracts.
- Consider all accessibility guidelines to ensure that people with visual, physical, or hearing impairments can access information.

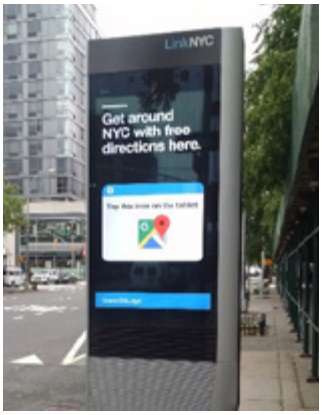
Enhanced wayfinding technology will enhance access for seniors, young people, and those with disabilities, as these populations use autonomous vehicles for everyday trips.

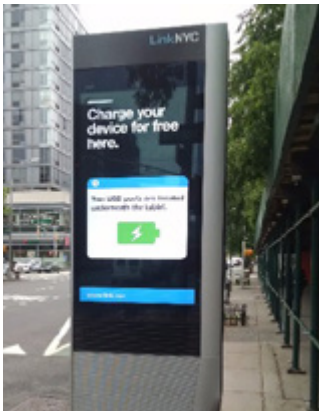
ELEMENT IN ACTION

Downtown San Diego Wayfinding Project – San Diego, CA

Civic San Diego spearheaded an effort to install more than 200 static wayfinding signs throughout the downtown parking district to help drivers and pedestrians navigate the urban core. Each category of signs shared a similar color scheme and font for consistency. The project was funded through a combination of downtown on-street parking meter revenues, downtown parking garage revenues, and a grant from the San Diego Association of Governments (SANDAG).

LinkNYC – New York, NY





LinkNYC is replacing more than 7,500 pay phones around New York City with free, high-tech interactive kiosks called Links. LinkNYC is funded through advertising, and it provides the public with free communication and wayfinding services. Links are ADA-compliant design, and they provide the public with maps and directions, free domestic phone calls including emergency 911 communications, WiFi, a USB port for device charging, and an interactive tablet with information on city services and travel updates.

5 SUPPORT SERVICES & AMENITIES

PACKAGE DELIVERY

DEFINITION

Package delivery stations are secure lockers in which online orders can be held for pick up at any time of day. They can be conveniently situated at retail centers or transit stations. Offering package delivery services within a mobility hub can save people an extra trip by car to pick up a package – offering them one more reason to embrace an alternative to driving alone.

IMPLEMENTATION CONSIDERATIONS

- Situating package delivery services near high-volume transit stations, dense employment centers, and commercial areas is recommended. This can help people avoid making an extra stop on the way to their primary destination.
- Consider incorporating privacy and security features at package delivery stations within a mobility hub.
- Consider municipal business and regulation policies that govern for-profit businesses in a public right-of-way.
- Anticipate the demand for package delivery stations in different communities by analyzing data gathered from existing stations.
- Develop memoranda of understanding (MOUs) or other agreements between package delivery services such as Amazon, USPS, UPS, and FedEx.
- Situate package delivery stations in retail locations in a way that makes it convenient for people to access them but doesn't create inconveniences for other people shopping in the area.
- Package delivery lockers actually may reduce a parcel company's reliance on delivery trucks, because independent contractors can help deliver goods using smaller vehicles.
- The package delivery industry always is looking for ways to streamline its operations. For example, drones and robots are being tested to deliver packages.
- Packages could be delivered using the same vehicles that people use to get around. For example, ridehailing services also could deliver food, groceries, flowers, and other goods as part of their business model.
- Many parcel delivery companies struggle with failed deliveries, and package delivery stations may help alleviate this problem while also helping those companies reduce their greenhouse gas emissions.
- Parcel delivery companies are exploring the idea of allowing customers to pick up their packages while on-board public transit. Transit agencies could partner with parcel delivery companies to ensure that this business model is trouble-free for transit drivers and convenient for riders.

Logistics companies are evaluating autonomous vehicles to deliver packages more quickly and efficiently. In the future, vehicles may be equipped with an attachment for parcel loading and unloading at package delivery stations. Package delivery stations themselves may autonomously travel closer to customers.

ELEMENT IN ACTION

Amazon Lockers

Amazon customers can now pick up their online orders from an Amazon locker, instead of relying on home or office delivery. Upon ordering, customers choose the locker location that is most convenient, and then they stop by within three days of delivery. A unique pick-up code is provided for each order. Lockers are situated at a variety of locations such as 7-Eleven stores, college campuses, and multifamily housing complexes.

Grocery Distribution Lockers

Similar to Amazon lockers, grocery distribution lockers allow customers to place an online order and pick up their groceries while in route to another destination. Lockers may include temperature control features to keep perishables chilled until a customer arrives. Siting these lockers at a transit or ferry station makes it a convenient amenity at mobility hubs.

5 SUPPORT SERVICES & AMENITIES

MOBILE RETAIL SERVICES

DEFINITION

Mobile retail services can offer people a convenient way to complete regular errands without relying on a personal car. In other words, businesses come directly to customers, instead of the other way around. What's more, when mobile vendors are situated at a mobility hub people may be more willing to choose public transit over driving alone to get their errands done. Examples of mobile vendors include food trucks, mobile dry cleaning, grocery delivery, salon services, and florists. Many of these services operate during normal business hours, so people visit them when they're heading to work, during lunch, or when they're on their way home.

IMPLEMENTATION CONSIDERATIONS

- Mobile vendors can be situated at business parks, within individual company buildings, and near transit stations:
  - Providing services that are attractive to employees can help make transit a more attractive option for commuting.
  - Vendors can occupy a designated space inside a business or parking lot, or operate out of vehicles.
  - Mobile vendors partnered with courier companies, with the approval of property managers, can offer services such as dry cleaning.
- Mobile vendors can be allowed to use flexible curb space at designated times to make shopping more convenient for customers.
- Where feasible, mobile food vendors can position their vehicles in pedestrian-oriented locations with safe pedestrian walkways, adequate lighting, seating, and shade. These locations could have designated food truck zones with specified time limits along curbs. The zones would be designed to encourage mobile vendors to park their vehicles.
- Underused parking lots could be repurposed as places where mobile vendors could park near transit stations. For example, commuters could use a mobile dry cleaning service situated at a transit station, saving themselves a trip later.
- Mobile vendors must comply with local city laws that apply to the services or goods they deliver. A vendor also must work with local government to obtain required permits.
- Mobile vendors may fill gaps in the shopping environment that a mobility hub already offers, or introduce new shopping opportunities to a community that lacks retail options. On the other hand, local jurisdictions should consider whether new mobile vendors would add shopping options or duplicate what's already available.
- Clear and easily understood signs can inform mobile vendors where they can park and when, and also provide them with directions.

ELEMENT IN ACTION

Photo courtesy of STERLINGS Mobile Salon & Barber Co.

STERLINGS Mobile Salon – San Diego, CA

STERLINGS Mobile Salon & Barber Co. provides men and women on-site haircuts at many locations throughout San Diego, saving people a trip to the salon. Customers can schedule a haircut online. STERLINGS' mobile salons are self-contained, climate controlled units that do not require any hookups to local facilities. Revolving locations include Downtown San Diego, Mission Valley, and UTC. Local employers can partner with STERLINGS as a benefit to their employees.

Food Trucks Near Transit - Baltimore, MD

In April 2017, the City of Baltimore expanded its food truck program by adding ten new mobile food zones across the city. The zones are situated near transit stations and other areas with high foot traffic such as hospitals and college campuses. The zones include space for two trucks to operate everyday between 9 a.m. and 3 p.m. Food truck zones were established in 2014 to help prevent mobile vendors from operating within 300 feet of a brick-and-mortar business that sells similar products. The city plans to build a more robust food truck program such as those in Portland, Oregon and Austin, Texas.

5 SUPPORT SERVICES & AMENITIES

UNIVERSAL TRANSPORTATION ACCOUNT

DEFINITION

The vision for a universal transportation account (UTA) is to provide people with an integrated payment solution for a wide variety of mobility services. A single smartphone app can be used to find, access, and pay for transit, parking, tolling, shared mobility services, EV charging, and more. The UTA also can be used to administer travel-based incentives to reward people who seek alternatives to driving alone.

IMPLEMENTATION CONSIDERATIONS

- Assess the technological challenges and consumer benefits of the program.
- Identify who will manage, maintain, and support the program. Clearly identify roles and responsibilities.
- Develop a phased plan for testing, piloting, and long-term implementation.
- Every aspect, including farebox and communications equipment, customer service, training, maintenance, operations, fare policies, and marketing must be considered during implementation.
- Determine which public agencies and which private mobility and technology service providers will be included in the payment program. There must be a strong effort to coordinate with transit agencies and private vendors.
- Different interests among stakeholders may make launching a UTA system challenging. Develop a marketing strategy to educate the public on UTA benefits, and allow people to provide meaningful feedback that is incorporated into the program.
- People may be encouraged to set up a universal transportation account and use public transit if they are rewarded with toll credits, free shared mobility credits, or other incentives.
- Consider offering people discounted fares on long trips, or when public transit is combined with privately operated shared mobility solutions.
- Incorporate services and amenities that are not related to mobility, such as retail purchases, into the UTA. This way, incentives for using a UTA can expand beyond increased mobility.
- Work to create a UTA that works with all mobility options in the region, and work toward inter-regional compatibility.
- Integrated payment plans can encourage people to use alternatives to driving alone. Consider offering people fare discounts to reward them for using alternative forms of travel such as public transit. This can be done on one leg of a multimodal trip, or within a specified time period.
- Consider policies related to financial regulations and privacy protection policies that are associated with integrated payment systems.
- Anticipate future technologies, and define policies to effectively incorporate them into a UTA.

ELEMENT IN ACTION

NextCity

Cubic Transportation Systems, which specializes in transportation revenue collections systems, is developing an app called NextCity that is expected to consolidate all forms of transportation into one account. This app is being designed to show travel times, offer the fastest routes, and provide pricing information. Before launch, however, Cubic Transportation Systems must acquire massive amounts of data to predict travel times accurately across modes. The timing of deployment is expected to vary from city to city.

5 SUPPORT SERVICES & AMENITIES

ELEMENT IN ACTION (continued)

Photo courtesy of MaaS Global

Whim

Available in the Helsinki region, the Whim app offers convenient access to a variety of shared mobility options – transit, taxi, and rental cars - with bikeshare to be added in 2018. Whim includes convenient payment options, including two monthly subscription plans for frequent users. The flexibility of Whim allows for a seamless travel experience while reducing reliance on the private automobile.