

RICHMOND FIRST MILE/LAST MILE TRANSPORTATION STRATEGIC PLAN

INVENTORY OF BEST MULTIMODAL PRACTICES

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INTRODUCTION

This memo provides a description of approaches to address last-mile access to and from transit stations, including illustrative examples of projects and programs from North America and Europe. Although commonly referred to as “last-mile solutions,” the access tools described here address a broader range of access needs, including pedestrian access within the more immediate vicinity (a five to 10-minute walk) of stations, as well as bicycle, shuttle, or other vehicle access to locations a half-mile away or farther. It also includes a description and peer examples of supportive programs that combine information, education, marketing, and incentives to leverage capital and operational investments to further increase transit use.

Each section of this document provides an overview of “last-mile” tools used in other communities that are relevant to Richmond due to a variety of shared characteristics (including urban geography, social demographics, public-private partnerships, and transportation infrastructure). The memo concludes with summary tables with

more detailed descriptions of the tools and examples and best practices from communities in North America and Europe. Nelson\Nygaard will use this toolbox — and build upon it as the project progresses — to develop site-specific strategies for transit and activity hubs in Richmond.

PEDESTRIAN ACCESS

Walking is a free transportation option for accessing public transit and other key destinations, and is a viable option for most people within a quarter- to half-mile of transit stations/stops and other destinations. Consequently, a safe, comfortable, and convenient walking environment is key to supporting and facilitating transit use and reducing short driving trips. A well-designed network of streets and pathways that improve the pedestrian experience will enhance pedestrian accessibility and connectivity to transit and other key destinations. An appealing walking environment includes infrastructure that can be used by people with specialized mobility needs, safe intersections, low traffic speeds, and a pedestrian-oriented built environment.

When taking concrete action for pedestrian access improvements, there are multiple “toolkits” of strategies. These different sets can be primarily categorized by the specific location of such improvements in the context of the overall street network. Just like motor vehicles, pedestrians rely on a continuous network of public rights-of-way and safe, effective, and efficient intersections. Therefore, such strategies to improve pedestrian access from a first- and last-mile perspective include:

- **Streetscape Improvements**
- **Sidewalks**
- **Intersection Improvement Tools**
- **Intersection Crossing Enhancement Tools**
- **Mid-Block Crossing Enhancement Tools**
- **Lighting**
- **Traffic Speed**

BICYCLE ACCESS

Integrating bicycles with transit combines the long-distance coverage of transit with the door-to-door service of riding a bicycle. Transit is most effective for trips of moderate to long distance on busy corridors, and bicycles are effective for trips of shorter distances. For these reasons, the combination of bicycling and transit can provide a high level of mobility comparable to automobile travel in terms of the overall travel time and distance. BART and AC Transit promote and support the use of bicycles by allowing bikes onboard trains and providing racks on the front of all buses. Water Emergency Transportation Authority (WETA) ferryboats serving the Bay currently have capacity for parking bicycles at no additional cost.

Bikeways and Bicycle Parking

Allowing bicycles on transit is only one-step in promoting transit-bike integration. Safe and convenient bikeways to transit stations and key destinations such as schools are required, and secure and convenient bike parking at transit stations / stops and key destinations is equally important. In addition, planning should consider effective access, such as how bicyclists navigate to station areas. Maps of the bicycle network can be provided near stops, and wayfinding signage and/or pavement markings should guide bicyclists from the nearest bike path to stations and key destinations.

Folding Bikes

Encouraging folding bikes on transit has the advantage of addressing first-mile/last-mile barriers on *both* ends of the transit trip. Folding bikes on transit also increases user convenience (compared to leaving a non-folding bike at a transit stop/station all day) without exacerbating peak-hour transit capacity constraints (compared to bringing a non-folding bike on board a transit vehicle). As for the benefits to the rider, a folding bike is highly convenient for anyone who lacks the space to store their bicycle at any point in their journey or work day. Folding bikes can be easily stored in the office or cubicle, and then unfolded and ready to ride in seconds. The Capitol Corridor Joint Powers Authority (JPA), which services Richmond, recently inquired about building stations for folding bikes.

Bicycle Sharing

Similar to car sharing, bike sharing is a form of short-term bicycle rental where people can access a shared fleet of bicycles as needed. Bicycle sharing programs provide safe and convenient access to bicycles for short trips, such as running errands or transit-work trips. Cities of all sizes from around the world have experimented with bicycle sharing programs for nearly 40 years. In the summer of 2017, Ford GoBike (formerly called Bay Area Bike Share) expanded bike share facilities into the East Bay. Although Contra Costa County is not covered in the currently planned expansion phases for the East Bay, Motivate (the operator of Ford GoBike) is still accepting submissions and proposals for bicycle share stations. As of January 2017, over 20 individuals expressed support for a bicycle share dock located at the Richmond BART and Amtrak station.

TRANSIT ACCESS

Shuttles

Shuttle buses typically serve a defined group of riders within a defined area or along a specific route. Shuttle service is usually from point to point, or between one point and many to fill gaps or make connections with the broader public transit network, often for specific groups of individuals. Fares are usually free or nominal. Shuttles are an important aspect of first mile/last-mile connectivity because they provide convenient and direct service to desired destinations.

Private/institutional shuttle services have gained enormous popularity in recent years. In the past, Richmond had piloted a Circular Shuttle program, which was cancelled when the Bay Area Air Quality Management District removed funding in 2013. The city is currently served by some existing employer and medical shuttles, including the UC Berkeley shuttles from the El Cerrito Plaza BART station and Kaiser Permanente shuttles from the Richmond BART station.

Shuttles serve as connectors to and from the regional transit system with employers or institutions, and can also provide important neighborhood circulation. Effective shuttles offer a service that is finely tailored to local needs. Some of the most successful shuttles are privately funded, or funded through public/private partnerships, such as a Transportation Management Association (TMA). Shuttle operations usually fall under three main categories or combinations thereof: 1) city supported and operated, 2) transit agency operated, and 3) employer operated.

Intermodal Station Improvements

For the purposes of this memo, intermodal stations are defined as a transit facility in which an interchange or transfer of passengers is intended. These transfer opportunities may include connections to rail, bus stops, bicycle share docks, bicycle parking, car sharing pods, bikeways, and sidewalks. Facilities in intermodal stations may include information booths, Clipper Card vending machines, accessible paths of travel and elevators, and connections to surrounding developments.

Whether the priority is increasing transit ridership or maximizing economic development, it is critical that intermodal stations are designed around maximizing the security and convenience of its users. Such strategies can include the aforementioned pedestrian and bicycle improvements, but also greater wayfinding systems and fare media systems that facilitate easy and convenient transfers across the many regional transit options servicing Richmond and the East Bay.

MOTOR VEHICLE ACCESS

Carpooling

Carpooling is the shared use of a car by the driver—usually the owner of the vehicle—and one or more passengers. When carpooling, people either get a ride or offer a ride to others instead of each driving separately. Carpooling arrangements and schemes involve varying degrees of formality and regularity. Carpools may be formal (arranged through an employer, public website, etc.) or casual (the driver and passenger might not know each other or have agreed upon arrangements). Carpooling can be used as a first mile/last-mile connector by efficiently connecting with public transit or other alternative commute modes.

Short-Distance Vanpools

Short-distance vanpools (sometimes called van shares) are designed to provide “last-mile” connections between transit centers and nearby employment locations, typically two to five miles away. Vanpools consist of at least four or five commuters who rideshare to and from work in vans provided by an outside operator. Vans can be provided by an employer, provided through a vanpool vendor, or can be owned by individual employees.

Ride-Hailing Services

Ride-hailing services, sometimes called transportation network companies (TNCs), are on-demand ridesharing services where the ride is shared through mobile apps to connect passengers with drivers. Payment is collected through the mobile app and drivers are paid a portion of the user charge.

Ride-hailing services offer on-demand, point-to-point transportation that can augment public transit by providing a demand-responsive option. Similar to taxis, companies such as Uber and Lyft provide on-demand transportation services for compensation using an online-enabled application or platform (such as smart phone apps). The difference between ride-hailing services and taxis is that passengers are connected to drivers who use their personal vehicles rather than vehicles in association with a taxi or limousine company.

Taxis

A taxicab transports passengers between locations of their choice. Examples of services in Richmond include Yellow Cab, Metro Cab, and Richmond Taxi Cab Service. Taxis are best for short-distance trips. For these reasons, taxis are an excellent first/last-mile connector to bridge the gap between a transit station and a person’s origin or destination. Taxi fares can be costly for some. Some communities offer taxi voucher programs or help subsidize taxis for low-income residents or older adults. Taxis can use already existing technology to pick up multiple riders in proximity to one another, provide on-demand door-to-door travel and connect riders from home to transit or from transit to job centers.

Car Sharing

Car sharing programs allow people to have on-demand access to a shared fleet of vehicles on an as-needed basis. Usage charges are assessed at an hourly and/or mileage rate, in addition to a refundable deposit and/or a low annual membership fee. Car sharing is similar to conventional car rental programs with a few key differences

between most programs: a) system users must be members of a car-sharing organization, b) fee structures typically emphasize short-term rentals rather than daily or weekly rentals, c) vehicle reservations and access is “self-service,” d) vehicle locations are widely distributed rather than concentrated, and e) most systems require vehicles to be picked up and dropped off at the same location.¹

Car sharing has proven successful in reducing both household vehicle ownership and the percentage of employees who drive alone because of the need to have a car for errands during the workday. As a result, car sharing can be an important tool to reduce parking demand.

For residents, car sharing reduces the need to own a vehicle, or a second or third car. Survey have shown that more than half of car-share users have sold at least one vehicle since joining the program in the San Francisco Bay Area.² For employees, car sharing allows them to take transit to work, since they will have a vehicle available for errands during the day.

There is an important distinction in both the management structures of car sharing systems and the trip types that can be taken with car sharing.

With regards to management structures, car sharing systems have included:

- Exclusive car sharing services in which vehicles are company-owned (e.g., Zipcar)
- Car sharing services provided under the banner of traditional car rental companies (e.g., Enterprise Car Share)
- Peer-to-peer car sharing services in which vehicles are owned and shared by individuals or households (e.g., Getaround)

The two kinds of trips taken with car share are:

- Round-trip or “static” trips: these are the typical trips used with car share. The user must return the car to the location they picked it up.
- One-way or “point to point” trips: these are a less prevalent option for car share, but many markets are testing them out. These trips fill a gap in both price and convenience between a transit ride and a TNC ride.

Autonomous Vehicles

Also commonly defined as “self-driving cars” and “highly automated vehicles,” the autonomous vehicle (AV) is an emerging technology that depends on computer and robotic science to conduct the driving of a vehicle. It is being tested by private corporations on roads throughout the Bay Area and in conjunction with other cities and states throughout the country. Although this is a nascent technology, AVs are a complex and consequential development in the built environment because they have the potential to affect traffic congestion, travel decisions, road safety, land use, and public health. Some researchers predict that autonomous vehicles will reduce vehicle ownership by upwards of 40%.³

¹ It should be noted that certain aspects of the service models offered by car rental companies and car-sharing organizations can overlap. For example, “Connect by Hertz” is a short-term car rental service that shares many of the same attributes as a carsharing service. A key distinction is that traditional carsharing organizations *only* provide short-term carsharing (rather than both short-term and long-term car rental) and typically have an organizational mission to reduce vehicle trips and vehicle miles traveled (VMT).

² Source: Survey by Nelson\Nygaard Consulting Associates for City Car Share – now Carma

³ <http://www.oregon.gov/ODOT/PT/PROGRAMS/transportation-options/ODOT-Rideshare-opportunities.pdf>

MULTIMODAL POLICIES AND PROGRAMS

These policies and programs often leverage multiple modes of transportation.

Integrated and Interactive Wayfinding

A successful wayfinding system provides integrated, consistent, and user-friendly information to confirm that chosen routes are efficient, safe, and ultimately lead directly to one's destination. Wayfinding particularly helps new users and visitors feel comfortable in an unfamiliar environment and is an essential element of both pedestrian and bicycle improvements. Wayfinding including directional signs, maps, schedules, and instructions. It also includes pavement markings to guide pedestrians, bicyclists, and transit users to their destinations. Branded wayfinding with consistent formatting and colors can help alert people to their location.

Real-Time Information

Real-time information provides transit arrival information, usually updated at regular intervals, based on automated vehicle locator (AVL) data, global positioning system (GPS) data, dispatch responders (or based on modeled assumptions about speed), or even social networking feedback. Real-time information helps passengers plan their trip (e.g. if the bus is delayed, the passenger may choose to walk instead. Real-time information also makes for a more pleasant waiting experience and overall transit experience; waiting without knowing is tedious and frustrating, and passengers tend to overestimate how long they wait for transit by up to 50%. Passengers with access to real-time information tend to rate their overall transit experience more highly than others without the information.⁴ Passengers have access to real-time information for BART, AC Transit, and Amtrak through digital signs or phone apps.

Marketing and Promotion

Awareness of transportation options affects travel behavior. Providing information about travel options affects a person's likelihood of using these options, and helps commuters learn about the health, financial, and environmental benefits of alternative commute modes. Marketing and promotion is critical to ensure that commuters are aware of commute options and are able to provide input needed to make the programs effective. These efforts may include a commuter website, apps and multimodal access guides, as well as pamphlets regarding walking and biking routes, transit options and real-time schedules, and information on accessing all the available transportation options.

Transportation Management Association

A Transportation Management Association (TMA) generally seeks to improve transportation access by reducing people's dependence on the single occupant vehicle and promoting strategies to make it easier to bicycle, vanpool, or take transit to a site. TMAs can be structured to serve one large development site, a group of employers, or an entire community. TMAs are generally financed through a public-private partnership or with private funding. Transportation Management Associations can provide a variety of services that encourage more efficient use of transportation and parking resources, such as:

- Access management
- Commuter programs
- Coordination between employers and facilitation with public agencies
- Parking management and brokerage

⁴ <http://www.citylab.com/commute/2014/01/why-technology-forever-changing-psychology-waiting-bus/8158/>

- Direct service provision
- Standard and guidelines development
- Wayfinding and multimodal navigation tools
- Marketing and promotion

Safe Routes to School

The Safe Routes to School (SRTS) program is a national program to encourage children to walk and bike to school. In Richmond, SRTS partnerships are enabled by the Contra Costa Health Services department.

SRTS programs consist of a variety of activities including:

- An audit and evaluation of existing walking conditions surrounding the school, usually leading towards advocacy for specific infrastructure (e.g., traffic calming, intersection improvements, pedestrian signals, bicycle facilities)
- Prearranged groups of children walking to school with a supervising adult, also known as a “walking school bus”
- Safety training for bicycle riders
- Monthly or annual “walk and roll to school days” in which students are actively encouraged and incented to walk or bike to school
- Development of an official “Walking routes” map for the school

Land Use Controls to Promote Walkable and Mixed-Use Environments

Land use controls (including zoning and urban design standards) has a direct influence – and is often influenced in return – on transportation needs and decisions. For example, if an individual decides to drive from their house to the post office, there are land use controls and regulations (or lack thereof) that may have motivated the decision. An integrated approach to land use controls with consideration towards the impacts on the transportation networks and people’s intentional transportation decisions can make a large difference. Some examples of positive land use controls include:

- Reform of parking codes, including implementing shared parking provisions and incentives, and maximum off-street requirements.
- Requirements that improve the pedestrian experience, including restricted parking at corners, visible frontage, sidewalk widths.
- Development impact fees to ensure that the costs of transportation infrastructure and services necessary to support new development are not borne disproportionately by existing residents and businesses.
- Public-private partnerships to open up programming streams for multimodal infrastructure and services (including capital and operations).
- Transit-oriented development (TOD) land use policies to encourage mixed use development within walking distance of transit stations to increase transit ridership. As a first and last-mile strategy, a TOD effectively shortens the mile to make create convenient access to transit. A TOD includes high-density development, a pedestrian-friendly environment, and a mix of complementary land uses.

Transportation Demand Management

Transportation Demand Management (TDM) is a general term for strategies that increase overall system efficiency, most often by encouraging a shift from single-occupant vehicle (SOV) trips to non-SOV modes, or shifting trips out of peak periods. TDM seeks to reduce auto trips – and hopefully vehicle miles traveled (VMT) –

by increasing travel options, providing incentives and information to encourage and help individuals modify their travel behavior, or reducing the physical need to travel through transportation-efficient land uses. The cumulative impact of a comprehensive set of TDM strategies can have a significant benefit on system efficiency, accommodation of new growth, and success of a metropolitan area. Typically, public agencies, employers, and public-private partnerships implement TDM programs. A TDM program can provide support and incentives to employees to leave their cars at home and use transit, rideshare, walk, or bike to work. A few examples of supportive programs include many of the strategies discussed earlier in this memo, in addition to:

- Priority parking for carpools/vanpools
- Parking cash-out programs
- Employee shuttles
- Information and assistance with transportation options
- Guaranteed or emergency ride home programs
- Subsidies or other incentives such as the commuter pre-tax transit benefit program and deep discount bulk transit pass programs
- Flexible work schedules (to facilitate ridesharing arrangements)
- On-site amenities or vehicles (bicycles or cars) available to run errands during the day
- Lockers and showers for those who bicycle to work as well as secure and convenient bicycle parking

Parking Management

Parking is a way for people to access transit and other modes, but it requires effective parking management to avoid incentivizing driving and adding to congestion and GHG emissions. Without effective management, pricing, and right-sizing the parking supply, the amount of land devoted to parking will expand and incentivize more people to drive for all trips and purposes. Additionally, the pricing and regulation of parking, if not intentionally managed, can exacerbate congestion as drivers will devote time to searching for the most convenient and cheapest spaces available.

A comprehensive management program's primary goal is to create availability for all types of users of parking resources (i.e. residents, employees, commuters, and visitors). Such parking management practices include:

- Residential and business permit programs
- City government fleet management and accounting
- Customer-friendly enforcement
- Pricing locations based on demand
- Right-sizing (in which citywide development regulations respond to demand trends and observed utilization to promote sharing of existing resources)
- Improving wayfinding and multimodal access to parking

Employer-Based Incentives and Support

Employers can provide TDM measures for their employees to encourage people to walk, bike and take transit to and from work. These measures are similar to the TDM measures listed above, including shuttles, flexible work schedules, and transit subsidies. The TDM measures take advantage of existing transportation infrastructure and can financially support options other than driving alone, such as an employer-based shuttle to and from the nearby transit station. Businesses in Richmond with at least 10 employees are required to offer a pre-tax selection of TDM strategies.

CONCLUSION

This toolbox of multi-modal mobility strategies highlights the many options available to the City of Richmond. Summary tables of the different types of strategies and best practices follow. Which tools to use and prioritize in Richmond will depend on the City's existing infrastructure and programs, along with input from members of the public and local stakeholders.

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Table 1 Pedestrian Mobility Tools

First-/Last-Mile Improvement	Description	Case Study Examples
<p>Streetscape Improvements: Streetscape includes the overall look, feel, and design of the roadway and public right-of-way, including sidewalks, street trees and landscaping, green infrastructure, lighting, paving, signage, and street furnishings.</p>	<p>Encourages walking and can improve pedestrian safety. Applicable to key pedestrian routes within quarter- to half-mile of transit stations/stops and key destinations.</p>	<ul style="list-style-type: none"> ▪ North American cities have made streetscape, sidewalk, intersection and other improvements to enhance the quality and safety of the pedestrian environment to increase the number of trips made on foot.
<p>Sidewalks: The sidewalk zone is the portion of the street right of way between the curb and building front. Sidewalks should be wide enough to accommodate people with wheelchairs and strollers.</p>	<p>Improves pedestrian safety and mobility, particularly for those with disabilities. All roadways within ¼ mile to ½ mile of stations/stops should have sidewalks on both sides of the roadway.</p>	<ul style="list-style-type: none"> ▪ The National Association of City Transportation Officials (NACTO) states in the “Urban Street Design Guide” that throughway zones of sidewalks should be 5-7 feet wide in residential settings and 8-12 feet wide in commercial or downtown settings.
<p>Intersection Improvement Tools:</p> <ul style="list-style-type: none"> ▪ Curb Extensions ▪ Reduced curb radii ▪ Pedestrian refuge islands ▪ Curb ramp improvements 	<p>Increases pedestrian safety and mobility by improving visibility, slowing vehicular traffic, and reducing crossing distances for pedestrians. Roadway intersections on key pedestrian routes should be designed to maximize pedestrian mobility, safety, and visibility, particularly on roadways with high traffic volumes and/or speeds.</p>	<ul style="list-style-type: none"> ▪ The City of Richmond has completed a Pedestrian Plan (http://www.ci.richmond.ca.us/2738/Pedestrian-Plan) that incorporates many of the pedestrian improvements listed on the left. The adopted Pedestrian Plan also includes two detailed subarea plans-Iron Triangle Walkable Neighborhood Plan and the Richmond Wellness Trail.
<p>Intersection Crossing Enhancement Tools:</p> <ul style="list-style-type: none"> ▪ Advanced yield markings for multi-lane roadways ▪ Longer traffic signal walk phases ▪ Pedestrian signal countdown timers ▪ Accessible pedestrian signals ▪ Leading pedestrian signal intervals ▪ Marked and high visibility crosswalks ▪ Raised crosswalks ▪ In-street pedestrian crossing signs ▪ High-visibility signs and markings 	<p>Increases pedestrian safety and mobility by improving visibility, separating or phasing pedestrian and vehicular movements, and providing more time and/or shorter distances to cross roadways. Roadway intersections on key pedestrian routes should be designed to maximize pedestrian mobility, safety, and visibility, particularly on wide roadways with high traffic volumes and/or speeds and large turning volumes.</p>	<ul style="list-style-type: none"> ▪ The County of Alameda developed a sidewalk construction prioritization tool for high-demand pedestrian areas in unincorporated communities. The project used a points system to prioritize sidewalk projects for construction based on demand and safety. http://www.pedbikeinfo.org/cms/downloads/ENG_SidewalkConstructionProgram.pdf
<p>Mid-Block Crossing Enhancement Tools:</p> <ul style="list-style-type: none"> ▪ HAWK (High Intensity Activated Crosswalks) or Pedestrian Crossing Hybrid beacons ▪ Rectangular Rapid Flash Beacon (RRFB) ▪ In-pavement flashing lights crosswalk warning system ▪ Staggered pedestrian refuge island 	<p>Pedestrians often cross the street at locations other than intersections due to the location of trail crossings, transit stops, or key attractions. These crossings are more frequent when the spacing between intersections is very wide. Creating safe mid-block crossings can shorten pedestrian travel distances significantly and make walking a more attractive choice.</p>	<ul style="list-style-type: none"> ▪ The City of Albany, CA installed bulbouts at an uncontrolled crosswalk to improve pedestrian safety. Research showed an increase in drivers yielding to pedestrians at the crosswalk with a bulbout compared to a crosswalk without a bulbout. http://nacto.org/docs/usdq/pedestrian_safety_impacts_of_curb_extensions_randal.pdf

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First-/Last-Mile Improvement	Description	Case Study Examples
<p>Lighting:</p> <ul style="list-style-type: none"> ▪ Pedestrian-oriented street lighting 	<p>Pedestrian-oriented lighting is generally at a lower height (10-12 feet) and more closely spaced than conventional street lighting, which is used to light the roadway. Pedestrian-oriented lighting increases pedestrian visibility for drivers and enhances safety and security, ultimately creating a more inviting and appealing walking environment.</p>	<p>Several resources provide both general and specific guidance for improving the pedestrian environment. These include:</p> <ul style="list-style-type: none"> ▪ “Urban Street Design Guide,” NACTO, A “Blueprint for 21st Century Streets” (http://nacto.org/publication/urban-street-design-guide/)
<p>Traffic Speed:</p> <ul style="list-style-type: none"> ▪ Speed limit reductions ▪ Roadway narrowing (10-12 foot travel lanes) ▪ Reductions in the number of travel and turning lanes 	<p>High traffic speeds pose a significant safety threat to pedestrians and can create an unpleasant walking environment. The risk of death or a severe injury to a pedestrian being hit by a vehicle travelling 30 MPH is over three times higher than if the car was travelling 20 MPH. If the car was travelling 40 MPH, the risk of death or a severe injury to a person walking is 80%.⁵ Physical design changes that cause drivers to reduce their speed can improve both safety and overall walkability.</p>	<ul style="list-style-type: none"> ▪ “Designing Walkable Urban Thoroughfares: A Context Sensitive Approach”, an Institute of Transportation Engineers (ITE) Recommended Practice (http://www.ite.org/css/) ▪ “Model Design Manual for Living Streets”, Los Angeles County (http://www.modelstreetdesignmanual.com/) ▪ “Metrorail Bicycle and Pedestrian Access Improvements Study”, Washington D.C. Metro (http://planitmetro.com/wp-content/uploads/2010/12/Metrorail-Bicycle-Pedestrian-Access-Improvements-Study-Final.pdf) ▪ “<u>Complete</u> Intersections: A Guide to Reconstructing Intersections and Interchanges for Bicyclists and Pedestrians,” Caltrans (http://nacto.org/docs/usdg/complete_intersections_caltrans.pdf) ▪ The City of Berkeley, CA has a citywide speed limit of 25 MPH, with a handful of exceptions for highways and overpasses, where speed limits reach 35 MPH, and school zones, where speed limits are 15 MPH. (http://www.ci.berkeley.ca.us/ContentDisplay.aspx?id=8244 http://www.ci.berkeley.ca.us/ContentPrint.aspx?id=99348)

⁵ AAA Foundation for Traffic Safety, “Impact Speed and Pedestrian’s Risk of Severe Injury or Death”, p. 12

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Table 2 Bicycle Connectivity Tools

First-/Last-Mile Improvement	Description	Case Study Examples
<p>Bikeways:</p> <ul style="list-style-type: none"> ▪ Bicycle trails and paths ▪ Bicycle lanes (conventional, buffered, protected) ▪ Shared vehicular lanes ▪ Bicycle detection at signalized intersections ▪ Signage/wayfinding 	<p>Bikeways improve mobility for people who bicycle, and studies have shown that higher levels of bicycle infrastructure are positively and significantly correlated with higher rates of bicycle commuting.⁶ Bicycle facilities also enable a wider range of bicyclists with varying skills and abilities to comfortably and safely travel.</p> <p>The bikeway design should provide the lowest stress environment to encourage more people to bike. The type of bikeway will depend on the existing roadway conditions, including traffic volume and traffic speed.</p>	<p>A number of cities have provided a combination of bikeway facilities and secure bicycle parking as one of the primary modes of transportation from home to rail stations to destinations within the city. Recent improvements around MacArthur BART Station in Oakland include a protected bicycle lane built in tandem with a new parking garage and future transit-oriented development. In Richmond, bikeways were proposed in the South Richmond Transportation Connectivity Plan and Richmond Bay Specific Plan, including protected lanes along Harbour Way, Carlson Boulevard, and Hoffman Boulevard.</p> <p>Resources for bikeway planning and design include:</p> <ul style="list-style-type: none"> ▪ National Association of City Transportation Officials Urban Bikeway Design Guide (http://nacto.org/cities-for-cycling/design-guide/) ▪ "Guidelines for Successful Pedestrian and Bicycle Facilities in the Denver Region", Denver Regional Council of Governments (http://www.drcog.org/index.cfm?page=BicycleandPedestrianPlan) ▪ Oakland Bicycle Facility Design Guidelines, City of Oakland (http://www2.oaklandnet.com/government/o/PWA/o/E/C/s/BicycleandPedestrianProgram/OAK024653) <p>The City of Richmond has completed a Bicycle Master Plan "Richmond Bicycle Master Plan," City of Richmond, CA (http://www.ci.richmond.ca.us/2739/Bicycle-Master-Plan) that identifies a network of bicycle improvements and design guidelines.</p>
<p>Bicycle Parking and Storage:</p> <ul style="list-style-type: none"> ▪ Shelters ▪ Lockers 	<p>Long-term bicycle parking is for people to park their bikes for longer than two hours. Long-term bicycle</p>	<p>In the San Francisco Bay Area, BikeLink (http://www.bikelink.org/) provides secure on-demand parking for bicycles and other small vehicles to make it</p>

⁶ The Atlantic Cities Place Matters, "Do Bike Paths Promote Bike Riding?" <http://www.theatlanticcities.com/commute/2012/02/do-bike-paths-promote-bike-riding/1318/> (accessed January 3, 2017).

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First-/Last-Mile Improvement	Description	Case Study Examples
<ul style="list-style-type: none"> ▪ Stations ▪ Racks ▪ Repair Stations along highly used bicycle routes or stations 	<p>parking is secured and protected from the elements. Examples include lockers, shelters and stations.</p> <p>To effectively increase the capacity of bicycle lockers and provide more convenience and flexibility to users, transit agencies have installed "eLockers": computerized, on-demand systems that allow users to check for available lockers or sign up for them online.</p> <p>Models from eLocker and CycleSafe allow keyless access to the locker with the use of a SmartCard or cell phone. Advance reservation systems are being tested that would enable users to reserve a locker in advance. With an internet connection, centralized computerized administration allows the transit agency to monitor and respond to demand for one-time use as well as reserved lockers.</p> <p>Lockers available for one-time use have the advantage of serving multiple users a week. Monthly rentals, by contrast, ensure renters that their own personal locker will always be available, however incidental users cannot be accommodated, and rentals are limited to a particular location.</p> <p>Bicycle stations provide a range of services to people who ride bicycles, including security, valet bicycle parking, bicycle repair, and sales on-site, and in some cases bicycle rentals or bike sharing.</p>	<p>easier to use transit and other mobility alternatives. Lockers are located outside of BART, Caltrain, VTA, and Capitol Corridor rail stations—as well as multiple park-and-ride termini. Richmond Ferry Terminal also proposed to provide lockers.</p> <ul style="list-style-type: none"> ▪ eLockers are available at BART stations throughout the system, including 24 at the Richmond station. (https://www.bart.gov/guide/bikes) ▪ Caltrain has on-demand and 6-month rental eLockers. (http://www.caltrain.com/riderinfo/Bicycles/BicycleParking.html) <p>Bike stations are located at US and European train stations.</p> <ul style="list-style-type: none"> ▪ The Caltrain Bike Station in San Francisco offers repairs, rentals, and free valet parking. (http://bikehub.com/caltrain-bike-station/) ▪ The Radstation in Muenster, Germany includes bike parking and other amenities, including a bike washing machine (http://www.radstation.de/). ▪ BikeHub® operates bike stations on the BART system. Services vary, but include free valet, 24-hour controlled access, and repairs. (http://bikehub.com/bartbikestation/) ▪ Bikestation® has several North American locations (http://home.bikestation.com/) and offers secure bicycle parking and other services and facilities for bicyclists. <p>Bicycle parking resources include:</p> <ul style="list-style-type: none"> ▪ "Essentials of Bike Parking" and "Bicycle Parking Guidelines, 2nd Edition", Association of Pedestrian and Bicycle Professionals (http://www.apbp.org/?page=Publications) ▪ "Metrorail Bicycle and Pedestrian Access Improvements Study", Washington D.C. Metro (http://planitmetro.com/wp-content/uploads/2010/12/Metrorail-Bicycle-Pedestrian-Access-Improvements-Study-Final.pdf)

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<p>Folding Bicycles</p>	<p>Folding bicycles can provide ultimate flexibility for transit users since they can be used for both first and last-mile travel and do not necessarily require special storage facilities on trains, stations or at final destinations. Many folding bikes provide all the comfort and ease of use of a full-size bike, but that then fold easily and quickly for transport and storage.</p>	<ul style="list-style-type: none"> ▪ The City of Santa Cruz, CA initiated a folding bicycle program to allow riders greater access to METRO buses by bicycle. Although buses were equipped with bike racks, racks on higher-ridership routes were often full. The program offered \$200 in rebates on specific vendors' folding bicycles, and offered program participants the option of purchasing two months' worth of Santa Cruz Metropolitan Transit District bus passes at up to 70% off retail price. Participants were required to attend a two-hour safety program first before they could qualify for the program. ▪ At Stanford University in Palo Alto, CA, Parking and Transportation Services partners with the on-campus bike shop to offer free one-week rentals and \$100 subsidies for certain models. http://transportation.stanford.edu/alt_transportation/BikingAtStanford.shtml
<p>Bicycle Sharing:</p> <ul style="list-style-type: none"> ▪ Publicly shared bicycles ▪ Private or employer-based programs 	<p>Ford GoBike is a public bike sharing system serving the Bay Area for short (30 minutes or less) trips. System members can pick up a bike at any station and return it to any other station when done. System membership (annual or daily) or a single ride can be purchased online or at any kiosk. Members can use their Clipper Card or a mobile app to unlock and use a bike. As of the summer of 2017, Ford GoBike serves parts of San Francisco, Oakland, Berkeley, and San Jose.</p> <p>There are smaller bike share systems in the Bay Area that serve private campuses (e.g., Google) or other city-specific services, such as San Mateo Bay Bikes.</p>	<ul style="list-style-type: none"> ▪ Google, based in Mountain View, CA provides a fleet of bikes distinctively painted in red, green, blue, and yellow for employees to use to travel around its campus and run errands during the workday. ▪ In 2016, the City of College Park, MD, in coordination with the University of Maryland and Zagster (a bike sharing provider throughout North America), launched mBike, a bike share system available to the public. Supported by grant funding, the system has 120 bikes across 14 stations (including the two Metrorail stations serving College Park). Although there is a larger regional bike share system in Washington, DC (Capital Bikeshare), the establishment of mBike ensured that bike share could be implemented in College Park more quickly, with more bikes, and at a lower cost, than what the regional bike share system could offer. ▪ European cities have used bicycle sharing to facilitate bicycle use for several years. Copenhagen has one of the oldest (and now somewhat outdated systems) that offers free public bikes with the deposit of a coin.

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		<ul style="list-style-type: none"> Since September 2011, the City of Lille, France provides a public bicycle sharing system called V'Lille. Each V'lille station is equipped with an automatic rental terminal and has stands for dozens of bicycles. Maps showing the locations of the city's V'lille stations are available at all kiosks. Users must have a daily, weekly or annual subscription. With a subscription, bike rental is free for the first half hour. A trip that lasts longer than 30 minutes incurs a charge of €1 for each subsequent 30-minute period. Over 1000 Free Service bikes are available in areas with transit access in the municipalities of Lille, La Madeleine and Mons in Baroeuland, and 3000 bicycles are available for longer-term rentals, with plans to expand. In addition, a local bike manufacture ("btwin") is planning to build a bike-friendly, car-free campus in the area.
<p>Station Bicycles</p>	<p>For some who want to travel between transit stations and their workplace by bicycle, it may be most convenient to keep a bicycle at the station for this express purpose (and to use for errands and other trips during the workday). Rather than expect a person to buy multiple bicycles (and leave them scattered throughout the transportation network), one could reserve a shared bicycle at their destination station for a guaranteed last-mile connection. These "station bicycles" are typically low-cost bikes and ideally would be stored in lockers or covered bicycle parking areas.</p>	<ul style="list-style-type: none"> In 33 stations throughout the United Kingdom, Brompton Bike Hire has established docks with folding bicycles for people to reserve in advance and take with them for transportation needs immediately preceding and following a transit trip. The system is intended to be "accessible to all, easy and cheap to install and run, economical to use, not dependent on state subsidies, flexible and compact." In Oakland, CA, the Capitol Corridor Joint Powers Authority has reached out to Brompton about the feasibility of such a program in tandem with its Bicycle Access Plan.
<p>Electric Bicycles</p>	<p>Electric bicycles provide a more attractive alternative for some users, particularly in hilly areas, and for riders who have difficulty accelerating and maintaining higher speeds. Electric bicycles can be combined with trailers or other equipment so that they can transport cargo as well as people.</p>	<ul style="list-style-type: none"> The My-Go-Pasadena pilot program provided rebates to transit commuters to purchase a two-wheel electric bicycle from one of several participating dealers in the Pasadena area. The goal of the program was to demonstrate the value of these electric vehicles as new transportation options to connect to Metro Gold Line transit stations in lieu of single occupancy automobiles. The Los Angeles M.T.A., the City of Pasadena, Pasadena Water and Power, and the Federal Transit Administration generously funded the

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		program. (http://www.calstart.org/projects/first-mile/First-Mile-Projects/MyGo-Pasadena.aspx)
Bicycle Events and Programs <ul style="list-style-type: none"> ▪ General marketing and promotion ▪ Bike to Work Day ▪ Bicycle commuter events throughout the year 	<p>A marketing and educational campaign can promote bicycling as an everyday activity. Campaigns can also educate the public about new facilities, such as improved bicycle parking facilities. People are unlikely to change from established patterns unless they are persuaded that parking bicycles at the transit stop is easier than bringing their bicycles with them, that spaces will be available, that they will be able to retrieve their bicycles easily upon their return, and that it is not going to cost them too much additional money or time.</p>	<ul style="list-style-type: none"> ▪ GoLloyd, a TMA in Portland, OR, sponsors several supportive programs to encourage cycling and walking, including the distribution of safety lights, bicycle maps, sponsored group bike rides, bicycle commuter breakfasts, and a “Bike Champ” mentoring program. (www.golloyd.org) ▪ Cycling Scotland sponsors a “Cycle Friendly Employer” program that provides information, support and other services to encourage and facilitate cycling to work. (http://www.cyclingscotland.org/our-projects/award-schemes/cycle-friendly-employer/)

Table 3 Transit First-/Last-Mile Tools

First-/Last-Mile Improvement	Description	Case Study Examples
Shuttle Programs: <ul style="list-style-type: none"> ▪ Partnership Programs ▪ Employer Sponsored Shuttles ▪ Agency Sponsored Shuttles ▪ Short-Distance Vanpools 	<p>Shuttle services provide point-to-point transportation, or between one point and many to fill gaps or make connections with the broader public transit network, often for specific groups of individuals. Shuttle services typically serve riders in a well-defined area or along a specific route and provide convenient and direct service to desired destinations.</p> <p>Shuttles can be costly and difficult to administer, however. There are several approaches to shuttle programs, described further below, that can be used to address these issues:</p> <ul style="list-style-type: none"> ▪ Partnership Programs: Several partners financially sponsor Shuttles, including employers, TMAs, and government agencies. Typically, one agency is responsible for ongoing administration, and a governing board makes major decisions. ▪ Employer Sponsored: Shuttles are paid for and administered solely by an employer or group of employers and serve specific employees only. 	<p>Examples of different shuttle programs include:</p> <ul style="list-style-type: none"> ▪ South of San Francisco, CA, a number of employer shuttles connecting commuter rail stations to nearby employers are jointly funded by the transit authority, air district, and local employers (http://www.caltrain.com/schedules/Shuttles.html) ▪ Downtown Walnut Creek Trolley service is operated by the City of Walnut Creek, which supports a number of free transportation options for residents and visitors including the Route 4 Downtown Trolley, and the Route 5 Shuttle. The Free Downtown Trolley operates 7 days a week from the Walnut Creek BART Station to various downtown destinations. The Route 5 Shuttle operates from the Walnut Creek BART Station to Creekside Drive Monday through Friday. ▪ The Emery Go-Round shuttles connects destinations in Emeryville with the nearest BART rail station. The service is funded entirely by commercial property owners in the citywide transportation business improvement district and does not charge a fare to passengers (http://www.emerygoround.com/).

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First-/Last-Mile Improvement	Description	Case Study Examples
	<ul style="list-style-type: none"> ▪ Agency Sponsored: Shuttles are paid for and administered by an agency or TMA and are open to the public. ▪ Short-Distance Vanpools: Employees, employers, or an agency sponsor vans. Vans are parked at transit stations and driven by employees to the worksite, then driven back to the station at the end of the day (or shift). 	<ul style="list-style-type: none"> ▪ Kaiser Permanente provides a free, public shuttle between its medical campus in Richmond and both the Richmond and El Cerrito Del Norte BART stations. ▪ In Oakland, CA, the fare-free Broadway Shuttle connects nearby destinations with Amtrak, BART, ferry, and other bus routes. As of December 2016, the shuttle is funded through a partnership of eight different organizations and agencies and is operated by AC Transit (http://www.meetdowntownoak.com/shuttle.php). ▪ In the Seattle, WA area, King County Metro sponsors a van share program to provide last-mile connections between public transit and workplaces (http://metro.kingcounty.gov/tops/van-car/commutervans.html).
<p>Intermodal Station Improvements</p>	<p>The experience of a rider in a transit station, when transferring, arriving, or disembarking, can affect the decision to ride transit as much as the trip itself. If one does not feel comfortable or satisfied in the stop and station environment, they may decide the transfer or waiting experience makes the entire trip no longer worth it. Therefore, access improvements are key to solving such deficiencies in intermodal stations. Solutions include: accessible and direct paths of travel for riders' transferring and access needs, sufficient space to ensure the smooth maneuvering of buses, safe and clean elevators/escalators, protection from the elements, and convenient locations for multimodal pickup, drop-off, and parking. Some of these elements, including those dependent on safety and wayfinding systems, are also indicative of good practice in urban design for pedestrians.</p> <p>In addition to improving station design for bicycle and pedestrian access, many transit agencies are interested in fare payment media that is itself multimodal—one card or smartphone app that is accepted as payment on transit, car share, bike share, parking, or other mobility options. The main challenge with these programs is the high level of coordination and lead time required to</p>	<ul style="list-style-type: none"> ▪ Improvements in transit station access were researched as part of a plan for the West Contra Costa Transportation Advisory Committee (WCCTAC) in 2011. Among other recommendations and stations throughout the County, a number of enhancements in wayfinding systems, bus bays, shuttle connections, and rider crossings were proposed for the Richmond BART Station, Richmond Parkway Transit Center, and the proposed Richmond Ferry Terminal. ▪ WMATA in Washington, DC, has begun an 18-month pilot of its New Electronics Payment Program, which will allow passengers to pay using a smart card, government I.D. cards, contactless credit cards, and smartphones. One of the program's primary objectives is to maintain seamless regional transfers among existing transit services. WMATA has partnered with more than a dozen agencies to implement this program. The pilot will encompass Metro rail, bus, and parking, though the agency is in conversation with regional bike share and car share companies about integrating with their systems, as well. It is several years from implementation.

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First-/Last-Mile Improvement	Description	Case Study Examples
	implement; a long lead time can render chosen technologies obsolete or outdated by the time of implementation.	

Table 4 Motor Vehicle First-/Last-Mile Tools

First-/Last-Mile Improvement	Description	Case Study Examples
Carpooling & Vanpooling	<p>Carpooling is the shared use of a car by the driver—usually the owner of the vehicle—and one or more passengers. When carpooling, people either get a ride or offer a ride to others instead of each driving separately. Carpooling arrangements and schemes involve varying degrees of formality and regularity.</p> <p>Vanpools typically serve commuters who live and work near each other and travel more than 15 miles to work one-way.</p> <p>It may be possible for longer-distance car- or vanpools to pick up additional passengers at light rail stations and transport them the last few miles to work. Given the fact that stations are located within close proximity of freeway exits, the detour required to pick up someone from the station would be minimal.</p>	<ul style="list-style-type: none"> ▪ The City of Portland has a preferential on-street parking program for people who carpool to certain districts of the city. These locations, surrounding Downtown and Lloyd Center, are well served by transit. The program is so popular that that the City is not accepting new applications as of December 2016. ▪ In the Bay Area, 511.org provides a carpool matching program for over 60,000 commuters, but also links to other private matching firms operating in the Bay Area, including Scoop (www.takescoop.com) and Carzac (www.carzac.com).
Employer-Specific Ridematching	<p>Some employers facilitate ridesharing among their employees, either through a company intranet site or through a third-party provider. This approach enables a greater degree of customizability and has proven more attractive to some employees, particularly those of large employers who have enough individuals to support their own ridematching system. Such systems can be easily combined with incentives and other promotions into a comprehensive employer-based commute program.</p>	<ul style="list-style-type: none"> ▪ Many online ride-matching services already exist, allowing potential users to enter information about their trips – including origin and destination, time of day, which days of the week, etc. – and the system can pair them up with others with similar requirements. Some examples include RideAmigos (http://www.rideamigos.com/), and TripSpark (http://www.tripspark.com/). Bay Area companies (e.g. Google) and academic institutions (e.g. UCSF, Castilleja School) use RideAmigos.
Ride-Hail Services (Lyft, Uber, etc.)	<p>To be a successful first and last mile solution, a ride-hail service needs to find balance in its driver supply and customer demand, coordination with transit agencies, and effective marketing. This may be an expensive</p>	<ul style="list-style-type: none"> ▪ Beginning August 17, 2016, riders within the Centennial (CO) City Call-n-Ride (dial-a-ride) service area are now able to summon free shared Lyft rides (known as “Lyft Line”) to and from the Regional Transportation District’s (RTD) Dry Creek light-rail station southeast of Denver. Riders have the option of

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	<p>first/last mile solution for transit riders to use on a regular basis.</p> <p>Driver supply: Achieving balance between driver supply and customer demand is the most critical key to success when formalizing a last-mile ride-hail service program. While targeting the use of ride-hail services for last-mile trips is a growing phenomenon, a program that does not offer sufficient driver supply to meet demand will likely correspond to a lack of perceived reliability from the user's standpoint.</p> <p>Coordination with transit agencies: Instead of viewing ride-hail services as competition, transit agencies are beginning to partner with this type of service to fill in service gaps and improve the transit experience.</p> <p>Effective marketing: Education and promotion are critical to ensure transit users understand how ride-hail services can support transit trips. While the Federal Transit Administration is still assessing whether federal funding can be appropriated through transit agencies and directed to ride-hail services, active marketing and promotion will be critical to incentivize operational changes to meet last-mile needs.</p>	<p>putting in their request on the Lyft app or on Go Denver, a mobile platform developed by Xerox that integrates scheduling and payment information for transit and ride-hailing services around the metro area. The six-month pilot project is expected to end in February 2017. Free Lyft rides are available 5:30 a.m. to 7 p.m. on weekdays only.</p> <ul style="list-style-type: none"> ▪ Also in 2016, the Livermore Amador Valley Transit Authority (LAVTA) proposed Wheels on Demand, a partnership with the private sector to provide service to low-density suburban areas in Dublin, CA where existing fixed-route LAVTA Wheels service is underperforming. Wheels on Demand is an extension of a traditional user side subsidy program, which is used by transit systems nationwide to partner with taxicab companies, but this partnership would extended to ride-hail services such as Uber or Lyft.
<p>Conventional Taxi Service</p>	<p>As evidenced by the presence of taxi stands outside of many BART stations (including Richmond), taxis have been a last-mile solution for decades. However, there are limitations to depending on taxis as a last-mile solution. Primarily, many individuals may not be able to afford routine taxi rides, the probability of hailing a cab on the street is very low outside of city centers, and even when one expects to find a taxi at a location like a BART station, there is no guarantee it will be waiting. Nevertheless, opportunities exist to make taxis more appealing, easier to access, and more affordable.</p> <p>Under a taxi-sharing program, cab drivers can pick up multiple passengers at the same time, provided each passenger is headed in the same direction.</p> <p>Under a taxi-sharing program, cab drivers can pick up multiple passengers at the same time, provided each passenger is headed in the same direction. Taxi sharing</p>	<p>Following are best practice examples that facilitate the use of taxis as a last-mile solution:</p> <ul style="list-style-type: none"> ▪ Dedicated taxi phones at rail stations and major bus stops, currently in use by the London Underground. ▪ Advance taxi dispatch service available from transit vehicles, currently used in several German cities. ▪ Integrated transit-taxi fare payment, potentially using "smart card" technology. The Hong Kong Oyster Card enables users to pay for multiple means of transportation, as well as transactions in many convenience stores and markets located adjacent to rail stations. ▪ Streetside taxi stand infrastructure (shelters, lighting, emergency call boxes). Outdoor advertising companies often subsidize the capital and

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	<p>allows passengers to pay lower fares for door-to-door journeys than they would if travelling alone. A taxi-sharing program is especially beneficial when passengers have a common destination, such as from a transit station to downtown. These arrangements not only benefit customers, but the trade and local communities too. Sharing taxis results in fewer taxi trips overall, which reduces traffic congestion and pollution.</p>	<p>maintenance costs of transit shelters and associated infrastructure as part of their franchise agreement.</p> <ul style="list-style-type: none"> ▪ Development of enhanced reservation system (online, text messages, etc.). For example, Flywheel in San Francisco uses a unique taxi hailing mobile app and fleet management software. ▪ Development of a “taxi pool” system to allow passengers with similar origins/destinations to “share the fare.” Precedent: New York City shared taxi pilot programs (http://home2.nyc.gov/html/tlc/downloads/pdf/pass_info_card.pdf); online carpool matching systems. ▪ Development of a “flat fare” pricing structure for targeted areas (such as downtown and near transit stations) to simplify customer experience. Atlanta, for example, establishes “flat rate zones” for all taxi rides originating and ending within a defined area surrounding three of the region’s busiest transit station areas (Downtown, Midtown, and Buckhead).
<p>Car Sharing Organizations</p>	<p>Car share programs allow for 24/7 on-demand access to a shared fleet of vehicles on an as-needed basis. Members to reserve a car for a short period of time – typically a number of hours or a day. Car share vehicles reduce the need for people to need to own their own vehicle, and therefore can reduce the need to build parking. In 2011, a survey coordinated between Nelson\Nygaard and City Carshare (now Carma), demonstrated that 65% of respondents with car share memberships rode transit multiple times in a given week, while only 41% of respondents without memberships did the same.</p>	<ul style="list-style-type: none"> ▪ In early 2008, the Emeryville, CA TMA negotiated with Zipcar to initiate and help fund car sharing services at several locations throughout Emeryville. The TMA is under a license fee agreement with Zipcar to provide free membership and corporate rates to TMA members, and helps advertise the services to employees at commercial properties near the Zipcar Pods. Any business that pays into the TMA (including residential complexes) can join Zipcar for free, and users receive a discount on the standard usage rate (subsidized by the TMA). Other residents of Emeryville can join Zipcar and use the cars at the Emeryville pods at the regular Zipcar rates. All members of Zipcar can also use their services elsewhere at the standard rate. The Emeryville TMA is no longer subsidizing car sharing pods. Zipcar has expressed appreciation for the support the TMA has provided in helping them expand their market. ▪ In the Washington, DC area, WMATA contracts with Zipcar; shared cars are available at almost half of

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		<p>Metrorail Park & Ride lots. Zipcar does not pay for parking spaces. WMATA informally monitors trends in car share usage through their partnership with Zipcar. They know that Zipcars at Metro stations are used about 30-40% over a typical 24-hour weekday period, and demand “skyrockets” on weekends. In addition, DDOT has reserved several on-street parking spaces for car share vehicles, typically located near Metro and/or residential locations. The City of Berkeley and the City of Oakland are currently seeking car share providers that will offer one-way car sharing. This concept has been successfully implemented in locations like Boston (with Zipcar), Portland (ReachNow), and Austin (Car2Go)</p> <ul style="list-style-type: none"> Car sharing can also be used for the purposes of efficient fleet management. In 2009, Washington, D.C. partnered with Zipcar to launch the first FastFleet system. Unlike Zipcar’s normal service, FastFleet allows an organization to use its own vehicles and pick storage locations. Using GPS data provided by the service, managers can then optimize their system and track vehicles using real-time GPS information. Such tracking can facilitate the ability of employees to coordinate rides between off-campus facilities and the main campus, thus reducing the overall parking demand generated by these remote workers on the main campus parking supply. The city government reduced its fleet size from 360 to 58 vehicles. The installation of the technology cost \$1,200 per vehicle, plus an additional \$115 fee per month per vehicle to maintain it and operate the technology. Within the first four months of the pilot project, the city saved more than \$300,000. It was estimated to save the city \$6.6 million over five years.
<p>Car Sharing from Traditional Car Rental Agencies (Short-Term and Hourly Car Rental)</p>	<p>Since car sharing services may not be successful in all contexts, existing national rental car companies might be able to provide some of the same benefits (i.e. short-term car rental with convenient pick-up and low rates) in lieu of or in addition to traditional membership-based car-sharing organizations.</p>	<ul style="list-style-type: none"> Enterprise (www.enterprise-carshare.com) and U-Haul (www.uhaul-carshare.com) are currently active in the short-term and hourly car rental market. Among other locations, Enterprise CarShare is set up throughout San Francisco, including in garages owned by the City and County.

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	<p>Car sharing and short-term car rental can exist side-by-side, and programs can be designed to provide multiple types of membership or rentals, including hourly, daily, and "shared lease" monthly rates, depending on need and demand.</p>	<ul style="list-style-type: none"> ▪ A lesson learned from both successful and failed programs (such as the first iteration of U-Haul's service and a program from Hertz), is that convenience, cost, and availability trump nearly everything else. People like fun and attractive cars, but will stop using a service if it becomes inconvenient or unavailable.
<p>Personal Car Sharing or Peer-to-Peer Car Sharing</p>	<p>A number of companies are enabling individuals to rent out their cars (similar to other car sharing operations) when not in use. Companies provide in-car technology to enable borrowing and provide insurance when the car is being used by other members. Owners have the ability to set their own price and schedule for their cars.</p> <p>Peer-to-peer car sharing could serve an important supportive function for employees who use transit in Richmond by providing them with access to vehicles during the day for errands and work trips.</p>	<ul style="list-style-type: none"> ▪ Turo, JustShareIt, and Getaround are some of the companies that are enabling individuals to share their vehicles with others for a profit. Currently, these companies only operate in a few locations; however, they are expanding to other areas based on demand. ▪ Google employees use Turo to share their personal vehicles while they are parked at work. This enables employees who did not drive to work to use other employees' cars (who did drive) for trips during the day.
<p>Autonomous Vehicle Governing Policies</p>	<p>Governing policies now primarily are dealing with the legal definition of AVs, the necessary safety prerequisites, and the extent to which car occupants may be required, if not, responsible for operation. Many interested governments are partnering with technology entities to test out AVs on streets. As knowledge becomes more prevalent and mainstream, a more widespread adoption of AV policies may emerge.</p>	<ul style="list-style-type: none"> ▪ The District of Columbia officially defines AVs as "a vehicle capable of navigating District roadways and interpreting traffic-control devices without a driver actively operating any of the vehicle's control systems." Provisions that were removed included alternative fuel requirements and a vehicle-miles-travelled (VMT) tax. ▪ In 2016, the State of California authorized AV testing on public roads by the Contra Costa Transportation Authority (AB 1592). If the vehicle is not operating at "specified locations" and "at speeds of less than 35 miles per hour," then the vehicle must be equipped with a steering wheel, brake pedal, an accelerator, and a driver "seated in the driver's seat and is capable of taking immediate manual control of the vehicle." In partnership with Honda, the CCTA is prioritizing testing in two locations: and Gomentum Station, a research and testing facility in Concord, and the Bishop Ranch business district in San Ramon. Commercial vehicles, including freight and shuttle buses, are also being tested at these locations.

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Autonomous Vehicle Curbside Management, Land Use, and Parking	<p>Although there is little agreement on the order and timing of the rollout of autonomous vehicles, its potential impact on the design of streets, land uses, and parking is noteworthy. To that end, it will be important to pay attention to how AV's interact with these elements.</p> <p>The Nashville region's transit master plan "recognizes that autonomous vehicles will very likely have a connection to future transit service and infrastructure. In particular, fully autonomous vehicles could jointly use "managed lanes" with BRT and emergency vehicles. Neighborhood and regional transit centers could serve as the connecting points between localized, autonomous circulation and the regional mass transit system. Recommendations will continue to be responsive to changes in the industry as these vehicles make their way onto our roads."</p>	<ul style="list-style-type: none"> ▪ The Center for Automotive Research acknowledges the potential to "retrofit" all curbsides (including on-street parking, street frontage, transit stops). http://greaterannarborregion.org/prosperity/wp-content/uploads/2016/11/CAR-RPI-Presentation-Draft-16Nov2016.pdf

Table 5 Multimodal Policy and Program Tools

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Integrated and Interactive Wayfinding <ul style="list-style-type: none"> ▪ Station area signage and maps ▪ Local area signage for bicyclists and pedestrians ▪ Guidelines and standards 	<p>Wayfinding signage helps orient visitors, shoppers, and residents alike, pointing them to area parking facilities, retail establishments, pedestrian and bicycle access routes, and other important destinations. A wayfinding program can be tailored to specific groups depending on contextual factors and desired outcomes; however, these tools are most relevant and important for those unfamiliar with an area. Wayfinding informs people of the best way to access an area, depending on their mode of travel.</p> <p>A successful wayfinding system provides integrated, consistent and user-friendly information to confirm that chosen routes are efficient, safe, and ultimately lead directly to one's destination. Wayfinding particularly helps new users and visitors feel comfortable in an unfamiliar environment.</p>	<ul style="list-style-type: none"> ▪ The City of Portland has a comprehensive pedestrian wayfinding system that combines with transit and bicycle wayfinding. Additionally, TriMet, Portland's regional transit agency has incorporated the use of "quick response" (QR) codes into its transit signage: http://trimet.org/qrcodes/index.htm. ▪ The West Contra Costa Transit Enhancement Strategic Plan And the West Contra Costa/Albany Transit Wayfinding Plan were prepared by WCCTAC in October 2011 to generate increased transit ridership by identifying specific strategies that improve access to transit centers and routes.
Real-Time Information Transit information (arrival/departure)	<p>Real-time arrival information gives passengers the comfort of knowing exactly when the next bus will arrive. Passengers can look online, on their cell phones, or at a</p>	<ul style="list-style-type: none"> ▪ In 2004, TriMet – Portland, Oregon's regional transit service – launched its real-time arrival information system TransitTracker.™ Using satellite tracking on

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	<p>digital sign at the station to know exactly how long they have to wait – or they can choose to stay at home or at work a little longer and catch the bus just in the nick of time. Communicating when the bus will arrive in real-time makes transit more dependable. Open sourcing transit agency data is a key to the success of real-time systems, as the private sector can often take these applications to the next level. AC Transit and BART have a real-time information available for passengers.</p>	<p>buses and sensors in the train tracks, TransitTracker estimates when the next vehicle will arrive based on its scheduled speed and last reported location. In 2005, it was among the nation’s first transit agencies to open source its data. Today, over 50 on-line applications from the private developer community help area residents and commuters plan their transit trip in real time. In addition to a strong on-line resource, TriMet has installed over 15 real-time arrival information displays at major transit stations. Open source data can encourage technology companies and universities to develop innovative products that a transit agency would not have the expertise or capacity to develop. https://trimet.org/tools/transittracker.htm</p>
<p>Marketing and Promotion</p>	<p>Marketing is an important component of implementing first-/last-mile strategies. From a customer perspective, marketing is important for two reasons: 1) What you don’t know can’t help you, and some auto commuters may be predisposed to take transit but don’t know or understand their options; 2) First impressions really do matter, and no program will succeed if first-time users have a negative experience because of technical failure, unclear operating instructions, or even inflated expectations that the service can’t meet.</p>	<ul style="list-style-type: none"> ▪ One of the most effective forms of marketing for “choice” transit riders can be personalized marketing programs (sometimes called “personal travel encouragement” or “high touch marketing”). ▪ Several online apps also make the marketing process easier for potential participants in TDM programs. <ul style="list-style-type: none"> – Scoop is a mobile app that connects commuters who are driving to work with those who are not. With a growing following in the Bay Area (in locations like Hacienda Business Park and San Jose State University), a user-friendly interface, a streamlined registration process, and the capability to integrate with Luum (see below), Scoop can help to hasten a company-wide shift toward carpool commuting. ▪ Commute gamification creates a fun way of tracking one’s own travel patterns while simultaneously providing useful data to the user’s employer. It can also help to inform users on other available transportation options and lead to tangible user benefits down the road. Luum is an online platform that encourages users to take sustainable modes of transportation by employing the aforementioned approach. Luum can integrate with Automatic License

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		Plate Reader (LPR) and radio-frequency identification (RFID) technologies, making it easier to track user parking behavior and patterns, and thus help to inform parking data collection efforts in the future
Transportation Management Association (TMA)	<p>TMA's can take on a variety of functions, depending on the reasons they were formed and their financing structures. Some TMA's are task driven. A TMA designed solely to manage and run a shuttle service would be a task driven TMA. TMA's are also "mission driven." A mission-driven TMA might be set up to address transportation access in a specific area and will develop its tasks and programs based on this mission. Following is a list of the many functions a TMA can perform:</p> <ul style="list-style-type: none"> ▪ Transit pass sales and subsidies ▪ Vanpools – promotion, van formation, administration, van provision, and/or subsidies ▪ Shuttle services ▪ Parking management ▪ Bicycling programs – advocacy, bike commuter clubs, bike lockers, showers, etc. ▪ Bicycle parts/repair/locker discount programs ▪ Guaranteed Ride Home - Free Ride for Employees ▪ Rideshare matching service for carpools and vanpools (can be done through the 511 Regional Rideshare program, but customized to TMA members) ▪ Prizes & financial incentives to employees who use alternatives to driving alone (A commuter club for employee members) ▪ Discounts & promotions geared toward increasing alternate commute participation ▪ Transportation information through a website, brochures, on-site transportation fairs, promotional events, an on-site information center, and employer or employee newsletters ▪ Information to employers about transportation and air quality legislation. 	<ul style="list-style-type: none"> ▪ Programs to reduce commuter parking demand can have significant impacts on the overall cost to develop downtown, reduce congestion and better allocate existing and future built parking to resident, visitor, and employee needs. TMA's have provided the vehicle through which downtowns and business districts have successfully addressed this issue in other areas of the United States. As an example, Downtown Vancouver, WA recently completed a TMA feasibility study and concluded that reducing its current employee commute rate of 88% to 65% (over 20 years) could result in parking development cost savings of approximately \$67 million. ▪ The Emeryville (CA) TMA Board of Directors, which also serves as the official representative of property owners for the business improvement district, sets the service parameters for the Emery Go-Round, provides fiscal oversight, approves the annual operating budget and sets organizational policy. ▪ In Portland, OR, the GoLloyd TMA reduced the drive-alone rate from 86 percent to 41 percent between 1994 and 2009 through a comprehensive package of business-based programs for transit, biking, walking, and business/employee assistance. GoLloyd employers meet the requirements of the state-mandated Employer Commute Options (ECO) rule that requires employers with more than 100 employees to track mode split every two years. The TMA assists over 75 employers and 9,000 employees adhere to ECO requirements. ▪ Some TMA's (GoLloyd, for example) have voluntary membership. Others, including Emeryville TMA and Irvine Spectrum TMA, require membership for new development and businesses in their service area. The policy process by which membership is required

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	<ul style="list-style-type: none"> ▪ Advocate for transportation projects or employer transportation interests ▪ Networking meetings for area employers to discuss transportation issues. ▪ Employer training and consulting about setting up on-site employer programs ▪ Telecommuting consulting <p>There is no single method of forming a TMA, but they typically rely on these programming strategies:</p> <ul style="list-style-type: none"> ▪ Regional or local governments, chambers of commerce, or the management of a major facility (such as a mall or hospital) can help create a TMA and provide seed funding. ▪ Developers or facility managers may be required to establish a TMA to mitigate local congestion and parking problems. ▪ TMAs are typically staffed by a mobility coordinator who administers and actively markets local transportation demand management programs. ▪ Through the TMA, a mobility coordinator will serve as a facility-wide concierge, providing personalized information on transit routes and schedules, ridesharing information, bicycle routes and facilities, and other transportation options available to residents, employees and customers. They may also negotiate with transit agencies for low-cost transit passes. ▪ Initial funding to establish TMAs normally comes from local governments, highway or planning authorities, major private businesses, etc. Federal funds, such as the Congestion Mitigation Air Quality (CMAQ) program can be used to support TMA start-up costs and up to three years of operating assistance. ▪ Later, TMAs are typically funded through dues paid by member businesses and government grants. ▪ TMAs can also charge a certain amount in fees for their services, such as shuttles, parking management, etc. 	<p>varies. The Irvine Spectrum TMA was formed when the property was initially developed, and thus new tenants and property owners must also join the TMA. The Emeryville TMA is citywide and funded by a Property-Based Business Improvement District, which assesses a property tax for all commercial land uses in the city.</p> <ul style="list-style-type: none"> ▪ The Santa Cruz Metropolitan TMA was started by the area's Chamber of Commerce, but is now a freestanding organization financed solely through membership dues.

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	<ul style="list-style-type: none"> ▪ Business Improvement Districts (BID) can also provide funding for businesses to implement tailored TDM strategies. ▪ Foundation funding is also sometimes available for TMAs to fund specific projects and programs. The TMA can either take the lead in responding to foundation opportunities or work with area partners on a joint application. 	
<p>Safe Routes to Schools (SRTS)</p>	<p>The National Safe Routes to School Program provides the following eight-step process to create a Safe Routes to School Program:</p> <ul style="list-style-type: none"> ▪ Bring together the right people: Identify the people in your community who want to make walking and bicycling to school safer and more appealing for children and families (parents, teachers, law enforcement, etc.). ▪ Hold a kick-off meeting: The kick-off meeting creates a vision and generates next steps. ▪ Gather information and identify issues: Assess the walking and bicycling conditions for students to understand what the barriers and opportunities are. ▪ Identify solutions: Solutions will include a combination of education, encouragement, engineering, and enforcement strategies. ▪ Make a plan: A Safe Routes to School plan should include a description of tasks and programs from step 4, a schedule, and an explanation of how the program will be evaluated. ▪ Fund the plan: Work with local, regional, and/or state partners and the private sector to help fund the plan. ▪ Act on the plan: Hold a kick-off event to initiate the plan, such as Walk to School Day. ▪ Evaluate, make improvements, and keep moving: Carefully monitor whether or not identified strategies, 	<ul style="list-style-type: none"> ▪ The National Center for Safe Routes to School (http://www.saferoutesinfo.org/) has a comprehensive database of best practices, collected data on various SRTS programs, and standard guides, forms, and questionnaires for implementing a program at a school.

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	<p>programs, and investments are increasing the number of children safely walking and bicycling to school.⁷</p>	
<p>Land Use Controls</p>	<p>Transportation options should be considered at the very beginning of the planning process, not just as a mitigation tool. There is a need to articulate how transportation options benefits can be better included in planning processes. Guidance, recommendations, impact fees, and potential credits to integrate transportation options into the land development process should also be considered. Developing planning and design guidance on transportation options requirements and incentives for development to be implemented at the local level can be beneficial.</p>	<ul style="list-style-type: none"> ▪ The Transit Impact Development Fee (TIDF) is a reliable source of operating and capital revenue for the San Francisco Municipal Transportation Agency (SFMTA), which operates San Francisco's entire surface transportation network including the transit system, Muni. TIDF has generated about \$120 million (including interest) since 1981. Originally a \$5 per square foot fee on office developers in the downtown area, it was expanded in 2004 to encompass most non-residential projects citywide. Fees were also raised and indexed to inflation, and are now \$9.07 or \$11.34 per square foot depending on land use type.⁸ ▪ http://www.newportbeachca.gov/Home/ShowDocument?id=11819 ▪ The San Diego Municipal Code uses transit infrastructure as the primary basis for reductions in minimum parking requirements, though it also recognizes the lower rates of auto ownership and use in lower income communities. The Code allows reduced minimum parking requirements for residential, office, retail, institutional, and industrial uses in designated transit areas and for residential uses in designated very low-income areas. For residential uses, the minimum parking requirements can be reduced in multi-family residential developments, generally depending on the number of bedrooms. For non-residential uses, reduction factors generally depend on nearby transit infrastructure. Although the potential minimum reductions depend on multiple factors in both residential and non-residential cases, reductions generally amount to around 85 percent of the original, baseline parking requirement.

⁷ National Safe Routes to School "Steps to Creating a Safe Routes to School Program"

⁸ City of Seattle "Transit Master Plan," <http://www.seattle.gov/transportation/docs/tmp/final/TMPFinalSummaryReportandAppendices.pdf>, p. 6-16

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<p>Transit-Oriented Development (TOD)</p>	<p>Successful transit-oriented development requires the coordination of multiple partners, including the transit agency, the city, the community, and the developer. Nevertheless, TOD plans and guidelines may come from a variety of partners with a vision placed on the long-term growth and accessibility of the urban and suburban areas surrounding transit hubs and corridors.</p>	<ul style="list-style-type: none"> ▪ In June 2016, the Bay Area Rapid Transit (BART) Board approved an updated TOD Policy. There are many goals and strategies incorporated in the Policy, but of particular importance are the “Sustainable Communities” and “Transportation Choice” goals. Additionally, a major component of the strategy to “Increase Sustainable Transportation Choices using Best Practices in Land Use and Urban Design” includes the objective of BART to “ensure that combined TOD/parking/access improvements on and around each BART station encourage net new BART ridership, utilizing corridor-level, shared, and off-site approaches to parking replacement as appropriate.” BART’s TOD Guidelines are “currently being updated to reflect the new TOD Policy.” ▪ In September 2014, the City of El Cerrito adopted the San Pablo Avenue Specific Plan to guide development in the corridor. The plan and associated form-based development code are intended to enable San Pablo Avenue to transition from an auto-oriented corridor, to a mixed-use district, with housing and shops, served by a truly multimodal corridor. ▪ The Richmond Bay Specific Plan (2015) was designed around reuniting auto-oriented areas presently separated by auto-oriented land uses and corridors. Context-sensitive land use planning and designs for safer multimodal access across over 10 corridors were created. Additionally, standards for actual developments were also built around a form-based code. Both the San Pablo Avenue corridor and Richmond Bay area were located within Priority Development Areas (PDAs) set by the Metropolitan Transportation Commission, a broader regional policy that identifies responsible sites and contexts for responsible TOD planning—rather than increasing population density in greenfields and other areas not served by any public transportation. ▪ There are many examples of TOD planning from the perspective of different government agencies:

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		<ul style="list-style-type: none"> – At the regional level, Portland Metro developed a TOD Strategic Plan in 2011: http://reconnectingamerica.org/resource-center/browse-research/2011/metro-tod-program-transit-oriented-development-strategic-plan/ – From the perspective of a transit agency, Translink in Vancouver, BC released a primer on transit-oriented development design guidelines that maximize access to transit: http://www.reconnectingamerica.org/assets/Uploads/20120718TransitOrientedCommunitiesDesignGuidelines.pdf – In 2013, the City Council of Charlotte, NC, approved a transit station area plan for urban and suburban transit stations. The plans address conceptual land uses, propose new mobility and accessibility for bicycles and pedestrians, and set critical land use and community design policies for each station area, as well as the surrounding rail corridor and right-of-way: http://www.charmeck.org/Planning/Land%20Use%20Planning/Transit_Station_Area_Plans/Northeast_Corridor/BLE_AdoptedPlan.pdf ▪ Although it is difficult to fulfill every promise made in a TOD plan for a variety of reasons, there are successful implementations of transit-oriented plans and developments, if success is measured in the form of increasing density, accessibility, and overall activity in a formerly underutilized urban land use. Such sites include Fruitvale Station in Oakland, CA, Olympic Village in Vancouver, WA, and several locations along the Red Line in Los Angeles, CA.
<p>Transportation Demand Management (TDM)</p>	<p>Across the United States, communities, cities, regions and employers have used TDM as part of other strategies to help manage growth, alleviate congestion, and encourage economic development. In many regions, the main objective is to increase the accessibility of</p>	<ul style="list-style-type: none"> ▪ Cambridge, MA has long included TDM measures in development review, with a formal TDM Ordinance adopted in 2006. The ordinance identifies a series of TDM measures and defines thresholds for when they take effect and become effective requirements of

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	<p>employment, much of which is located in suburban areas and is inaccessible due to a lack of regional transit service and poor (or nonexistent) pedestrian infrastructure. Providing greater access helps both potential employees by opening up economic opportunities and employers by enlarging their potential labor pool and minimizing costs. In many cases, there are direct tax benefits or available funding for the implementation of existing TDM strategies. TDM strategies are designed to work together, with the most significant impact on creating options and changing travel behaviors arising from implementing different combinations of strategies.</p> <p>Many TDM strategies are designed to be implemented by employers but can be established or supported through partnerships at a municipal or regional level. Employers around the country, recognizing that difficult or costly commutes is one of the primary reasons employee leave their jobs, have demonstrated an interest and willingness to develop these strategies because they have proven effective at helping employers attract and retain a quality workforce.</p>	<p>development. Mandated use of a TDM program is triggered by an increase in off-street parking (as little as one space), with development adding twenty spaces requiring a more involved level of commitment.</p> <ul style="list-style-type: none"> ▪ Faced with both a shortage of parking for customers and citizens' aversion to additional traffic, the City of Boulder developed a program that combines reduced subsidies for downtown parking with aggressive transportation demand management. All downtown parking revenue, including more than \$1 million per year from meters and over \$2 million per year from garages, is returned to the community for area improvements, including streetscape enhancements and bicycle parking. ▪ Among major TDM programs, Contra Costa Guaranteed Ride Home Program (GRH) already serves Richmond. Additionally, there are many resources, including carpool/vanpool matching services, trip planning tools, and information for employers provided by the Metropolitan Transportation Commission (MTC) at www.511.org. Like all TDM programs, the use of such resources depends on whether employers are aware of the programs, their ease of use, and their applicability to the context of each home and work location. ▪ Richmond adopted a TDM Ordinance (see RMC Section 15.04.612) that requires projects of a certain size to incorporate measures to reduce single-occupancy vehicle use. ▪ TransForm GreenTrip certifies residential projects that apply strategies to reduce vehicle trips, excessive parking and greenhouse gases, while making transportation more affordable.
<p>Parking Management</p>	<p>With decentralized management, each department or authority manages parking to achieve its own goals. Working together and establishing consolidated and documented parking goals will make the system work together, instead of competing against one another.</p>	<ul style="list-style-type: none"> ▪ In 2010, the Seattle (WA) City Council approved criteria to allow SDOT to manage on-street parking with a goal of maintaining each block face at 75-88% occupied. The SDOT Director has authority to adjust rates (ranging between \$1 and \$4) within zones by

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		<p>location and time of day. Data collected in 2011 indicates that price increases created availability and price decreases had little impact.</p> <ul style="list-style-type: none"> ▪ Berkeley, California coordinates their on-and off-street parking prices to both simplify information for drivers and to set rates for off-street facilities that are lower than nearby on-street rates. (http://www.goberkeley.info) ▪ In-lieu fees may be used to finance the construction and management of parking spaces in centrally located public garages that serve various developments, including ones that opt for in-lieu fees instead of providing on-site parking. Locations from Santa Monica, CA to Montgomery County, MD have in-lieu fees established. ▪ Situations arise where the minimum parking requirements interfere with the ability of the owner/occupant to change the use of their property. As discussed above, often the minimum parking requirements set out in the zoning code require more off street parking than is feasible within the constraints of the property. In mid- to high-density town centers where lots are small and available space is limited, this can become a serious obstruction to sensible redevelopment. ▪ The designation of curbsides --for reasons including freight loading and maintaining traffic flows and visibility-- also affect parking. The city of San Francisco has a "Color Curb Program" in which not only are all curbs given one of five colors denoting parking regulations, but also that residents or businesses can apply for a new curbside color on a monthly basis.⁹

⁹ San Francisco Municipal Transportation Agency, "Color Curb Program," https://www.sfmta.com/sites/default/files/pdfs/2017/ColorCurbBrochure_2017%20Eng_0.pdf

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		<ul style="list-style-type: none"> ▪ Per the code of Providence, RI, any spaces reserved for car share facilities “may count toward minimum parking requirements.”¹⁰
<p>Employer-Based Incentives and Support</p> <ul style="list-style-type: none"> ▪ Priority parking for carpools/vanpools ▪ Parking cash-out programs ▪ Information and assistance with transportation options ▪ Guaranteed or emergency ride home (GRH) programs ▪ Subsidies or other incentives such as the commuter pre-tax transit benefit program and deep discount bulk transit pass programs ▪ Flexible work schedules (to facilitate ridesharing arrangements) ▪ On-site amenities or vehicles (bicycles or cars) available to run errands during the day ▪ Lockers and showers for those who bicycle to work as well as secure and convenient bicycle parking 	<p>Per City Ordinance, all businesses in Richmond with at least 10 employees are required to offer a pre-tax election of transit, vanpool, or bicycle commuting costs, a paid transit pass (or equivalent reimbursement for vanpools), employer furnished transit at no cost to the employee, or an alternative benefit pre-approved by the City. The threshold for this requirement (10 employees) is much lower than a similar measure required for all Bay Area employers to register with a commuter benefits program (50 employees).</p> <p>Priority parking recognizes that parking is a finite resource and should be managed to assure maximum access for patrons. It reserves the most convenient parking spaces to support customer, client, vendor, and visitor access and to promote ridesharing in the form of carpool/vanpool or car sharing (also sometimes used to promote electric vehicles and motorcycles).</p> <p>Parking cash out is a policy whereby employees who may be offered parking as a benefit of their job are offered monthly cash benefits or free transit passes in exchange for giving up their free or employee paid parking. Often, revenues from paid parking facilities will pay for the free employee transit passes and other related benefits. A parking cash out policy reduces employee parking demand through financial incentives or free alternative transportation.</p> <p>GRH programs provide an occasional subsidized ride to commuters who use alternative modes, for example, if a bus rider must return home in an emergency or a carpooler must stay at work later than expected.</p> <p>Employers can offer a wide range of incentives to encourage the use of commute alternatives among employees, including selling transit passes on site,</p>	<ul style="list-style-type: none"> ▪ The Community Transportation Association provides a comprehensive Transportation to Work Toolkit for the business community (http://web1.ctaa.org/webmodules/webarticles/anviewer.asp?a=1442), including a number of profiles of employer-sponsored transportation programs (http://www.ctaa.org/webmodules/webarticles/articfiles/ProfilesofEmployer-SupportedTransportationPrograms.pdf). ▪ The Moving to Work in the Bay Area report in 2013 provides greater context of the jobs and housing balance challenges in the Bay Area (and the important role of transportation solutions): http://reconnectingamerica.org/resource-center/books-and-reports/2013/moving-to-work-in-the-bay-area/ ▪ Major employers throughout the Bay Area have taken strides to support employees who commute to work by means other than single-occupant vehicles: <ul style="list-style-type: none"> – Adobe provides employees with a monthly subsidy of \$100 for transit commuters and \$20 for bicycle commuters. ▪ The Lawrence Berkeley Laboratory provides a dedicated web page listing all pertinent commute trip planning information. LBL also permits bicycles to be parked indoors within an individual’s workspace. Additionally an advisory group of staff and faculty is empowered to assess current transportation and parking conditions and propose needs for the campus “in support of science.” http://commute.lbl.gov/TPSS

¹⁰ Providence Municipal Code of Ordinances, 1402.D.1, accessed July 7, 2017.

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	providing transit subsidies and establishing pre-tax spending accounts to pay for commuting expenses.	