EXECUTIVE SUMMARY

APTA Standards Development Program **BICYCLE & TRANSIT INTEGRATION** A PRACTICAL TRANSIT AGENCY GUIDE TO BICYCLE INTEGRATION AND EQUITABLE MOBILITY

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HOW TO USE THIS DOCUMENT

The purpose of this document is to provide guidance to transit agencies and municipalities seeking to encourage and leverage active first/last mile connections to transit, reduce congestion and stimulate healthy community development. This document is intended to help educate transit agencies on the benefits of transit and bicycle integration and provide practical steps and checklists to support that integration.

Each section includes an introduction to the topic, an overview of issues for consideration, and an agency action checklist. *This document is an Executive Summary of the full report, Bicycle and Transit Integration: A Practical Transit Agency Guide to Bicycle Integration and Equitable Mobility.* (To be published summer 2018.)

1)This document outlines step-by-step processes to help transit agencies develop programs, policies, and facilities that enable customers to reach transit stations by bicycle, and

2) how to manage the practical issues transit agencies face once customers arrive at the station by bicycle—parking, wayfinding, and taking bicycles on-board transit. Optimal strategies for integrating bicycles with transit are context driven based on an agency's mode(s), ridership, geography, regulatory environment and other place-based factors. The full report is designed to accommodate variability by providing flexible decision-making frameworks which guide agencies in adapating to transit customer demand for bicycle transportation.

This document was developed with the generous commitment of time and expertise from the following transit agencies and organizations; Bay Area Rapid Transit (BART), the Washington Metropolitan Area Transit Authority (WMATA), New Jersey Transit, Metro Transit, Regional Transportation District (RTD- Denver), King County Metro, Sound Transit, New York City Transit, San Francisco Municipal Transportation Agency (SFMTA), Cap Metro, Cascade Bicycle Club, Toronto Transit Commission (TTC), Utah Transit Authority (UTA), the League of American Bicyclists, the Association of Pedestrian and Bicycle Professionals (APBP), SYSTRA, TransPro Consulting, Capital District Transportation Authority (CDTA), New York Bicycling Coalition, New Jersey Bike and Walk Coalition, WSP, and Cambridge Systematics, Inc.

WHY BICYCLE AND TRANSIT INTEGRATION BENEFITS TRANSIT

The core mission of any transit agency is to provide equitable mobility to transit customers and facilitate community connectivity. In today's changing transportation landscape, agencies need to look beyond conventional transit services and prioritize mobility from the customer's perspective in order to remain competitive and responsive to demand. While on-time performance for trains, ferries and buses is critical, this customer focus requires planning for the complete trip, including the first/last mile to/from transit. Bicycling is a tool for transit agencies to enhance mobility for customers and augment the scope of conventional services (bus, rail, ferry, etc.).

Bicycles represent an ideal mode of transportation for short trips beyond walkable distance, but accessible without an automobile, typically one to three miles. Municipalities across North America are developing strategies to facilitate biking as a mode of transportation with a place-based mix of bicycle infractructure and bike-friendly policies. As these same communities also leverage their public transit assets in planning for future development, it is critical for public officials, planners and advocates to recognize opportunities for active transportation connections which facilitate enhanced transit customer mobility, public health and economic development. Prioritizing bicycle routes to transit stops and stations, and improving bicycle and transit integration (parking, bikes onboard capacity) is essential to getting transit customers out of their cars and into a saddle for their first and/or last mile of travel. Bicycle and transit integration strategies are context-driven based on the dynamic needs of individual communities.



INTEGRATED BIKES AND TRANSIT...

- Augments transit service and enhances mobility for transit customers.
- Expands the reach of transit—both geographically and span of service.
- Creates safer more convenient connections to fixed route transit service.
- Increases transit ridership.
- Results in healthier, safer and more livable communities around transit facilities.
- Is an inexpensive tool for managing demand on fixed route transit services.
- Enables affordable and equitable mobility for underserved transit customers.
- Provides a low-cost, high-value option for progressive transportation and good will with customers.

BICYCLING AS A TOOL FOR TRANSIT

TRANSIT AND BICYCLE BENEFITS

According to APTA, between 1995 and 2011 national transit ridership across all types of transit—has increased almost 40%, outpacing national population growth. And, according to the League of American Bicyclists, between 2000 and 2013, the United States saw a 62% increase in bike commuting. The same survey of the 70 largest cities in the country revealed a 105% increase in bicycle commuting in communities designated as "bicycle friendly" by the League. Since many people in the United States live within a 5-minute bicycle ride of transit, building better bicycle facilities to transit, at transit and on transit can build on the increase in both transit and bicycle use.

In addition to environmental, social and public health benefits, this guide illustrates the various roles transit agencies play in advancing bicycle and transit integration in a variety of contexts including:



AT Transit

Providing a range of bike parking options at transit facilities reduces pressure for car parking spaces and onboard bike demand.



ON Transit

Carrying bikes on or in coaches and rail cars helps riders complete a trip where transit service is less available, allowing transit to focus on productive routes.



TO Transit

Partnering with municipalities and other right-of-way owners improves safe routes to transit, making first- and last-mile connections more attractive, reducing local traffic, and reducing demand for car parking.



With Transit

Enabling public or private bike-share services on or near transit properties augments the transit system with efficient connections.



To All Transportation System Users

Through a combination of demandmanagement strategies, education and incentives, transit agencies can advance safety and shift travel behavior to more sustainable modes.





EQUITY

Transit agencies should strive to ensure equal opportunity for active first/last mile connections for current and potential transit users. While this naturally includes people who already bike, efforts should focus on reaching populations that could bike to transit by providing the right combination of infrastructure, education and incentives. Vulnerable populations stand to gain significant benefit from bicycle connections to transit in terms of health and economics, but they are not necessarily represented in discussions on bikes. These same populations may also be underserved by transit, making bicycles an ideal mechanism to add linkages to transit without major capital investment. Communities with aging populations should consider bicycle accommodations for riders with disabilities or impaired mobility. The relatively low-impact nature of biking may be an easier choice for the elderly than walking.

DATA

Agencies are most successful integrating bikes with transit when they clearly and unequivocally articulate their policies about why and how bikes support their system and community objectives. Agencies that establish robust, reliable data collection methods are better able to make decisions and justify investments to improve services and facilities for bikes. Agencies need to remain nimble in their bike services, both responding to and influencing changes in demand, technology and new opportunities. When planning for active connections to transit, agencies should consider that data on existing cyclists may not capture certain populations or latent demand from cyclists desiring higher levels of bicycle infrastructure that is appropriate for all ages and abilities. It is therefore critical to remain proactive in identifying opportunities for bike transit connections as well as existing barriers. Traffic crash data is one possible non-endemic transit dataset which might provide information on barriers to first- and last-mile connections.

GETTING STARTED

Understanding how to address bike ridership and connections can be daunting. First, take time to address basic questions and considerations that your agency will need to address when approaching the development or augmentation of a bicycle program.



ESTABLISHING DIALOGUE ON CYCLING

Empowering transit customers to bike the first- and last-mile requires clear communications to educate potential riders and promote bicycling to transit.

BICYCLE PARKING

Bike parking is a central component of a transit agency strategy for bikes.

BIKES ONBOARD TRANSIT VEHICLES

Many transit systems allow limited access to bikes onboard transit vehicles to facilitate linkages to transit.

BIKE SHARE INTEGRATION

As bike share systems continue to augment transit systems throughout the United States, it is important for transit agencies to facilitate connections, and interoperability where possible.

SAFE ROUTES TO TRANSIT

Before many commuters consider biking to transit facilities, they must have a network of safe, accessible bike facilities and a clear navigation system.

DATA COLLECTION

Data helps agencies respond to demand and anticipate future needs.



transit operations planners, policy makers and designers. These six steps represent key considerations for implementing successful bike and transit integration programs.



BIKES AT TRANSIT MAKING SPACE FOR BIKE PARKING

Bike parking is a critical piece of a holistic bicycle integration strategy for transit agencies. Robust parking facilities support active first/last mile connection by reducing hassle and instilling confidence in bike security. Secured bicycle parking at transit facilities represents an all-day assurance that bicycles will be safe while customers are off site. If the facility is well-designed, riders will feel safe in knowing that their bike will remain protected from theft, the elements or other damage while in storage. Conversely, in the absence of adequate bike parking facilities, cyclists will naturally turn to informal parking solutions such as signs, trees and street furniture. In addition to discouraging a significant segment of possible riders, this also affects streetscape and may create potential conflicts with ADA access and pedestrian safety.

Bike parking serves an important operational function by decreasing demand for on-vehicle storage. Transit agencies should invest in secure bike facilities to minimize bike conflicts with transit riders onboard vehicles as well as facilitate ridership. This is achieved by using quality data to determine the type of parking and how much space to allocate for bikes on transit property. Both secured and open bike parking are significantly less expensive than automobile parking.

Agencies should strive for thoughtful design for bike parking instead of last minute decisions to keep pace with demand. A data-focused approach enables agencies to remain flexible and responsive to changes in bike parking demand.



AGENCY ACTION CHECKLIST



BIKES AT TRANSIT MAKING SPACE FOR BIKE PARKING

Context, ridership and flexibility are core factors when considering the installation of bicycle parking at transit stops and stations. Agencies must remain flexible and responsive to demand; this requires a defined process and budget for installation of bicycle parking facilities. Agencies must consider what type of parking is required as well as location and operational impacts. As it relates to capacity planning, agencies should think about the amount of space to allocate and future space needs to accommodate anticipated growth in demand for bike parking. These decisions should be informed by consistent methodologies for regularly gathering data on bike ridership.

HOW MUCH SPACE TO ALLOCATE FOR BIKES?

The capacity for bike storage at transit facilities is context driven. Is the station/stop in a new development zone or the central hub in a transit-oriented development zone? Or, is the station/stop located proximate to a significant non-motorized trail or bicycle corridor? These factors help determine the amount of space to allocate for bikes and provide insight into future demand for bike parking.

Given the relative cost of bicycle parking compared to other amenities, transit agencies should provide as much bike parking as possible.

Many transit agencies set quantitative metrics for bicycle parking based on peak transit ridership. Agencies should proactively plan for growth and integrate bicycles into their expansion plans.













BIKES AT TRANSIT BICYCLE PARKING TYPE AND PLACEMENT



There are many options available to transit agencies when selecting which type of bicycle parking best suits the community's need. Each type has significantly different implications on capacity (how many bikes can be accommodated in a given space), budget, operations, customer service and security. In addition, agencies must consider risk tolerance for some of the more advanced technological parking solutions such as smart racks versus a proven technology. Agencies should provide a range of options including free and fee-for-service bike parking. Regular data collection on bicycle parking facilities is critical for planning and upkeep of facilities. Many agencies conduct an annual inventory of bicycle parking and occupancy to provide a snapshot of demand for each type of bike parking at each station. This allows agency staff to assess the condition of bike parking facilities on a regular basis and determine priorities for investment in expansion and/or upkeep. Agency strategic plans and station designs should prioritize bicycle amenities to facilitate first/last mile connections. Transit agencies should consider key security factors to ensure bicycle and bicyclist safety, such as APTA lighting standards, locking options, use of security cameras such as CCTV, and proper messaging about steps to follow for bike safety.

WHAT TYPE OF PARKING

- Bicycle Cage/Room
- Free Standing Bicycle Racks
- Wall Racks
- Double Decker Racks
- Smart Racks
- Lockers

ADDITIONAL FEATURES & AMENITIES

- Weather Protection
- Showers and Lockers
- Repair Stand
- Security Monitoring
- Emergency Call Box
- Interior Cage
- Valet Service
- Independent Cage Facility
- Bike Station

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BIKES AT TRANSIT BICYCLE PARKING OPERATIONS AND MAINTENANCE

Bike parking should be integrated into a station's operations documentation and maintenance cycle for cleaning, inspection and replacement as appropriate. Different types of bicycle parking present a broad range of operational considerations. Where simple bike parking solutions like open racks only require regular maintenance and cleaning, more complex parking solutions, such as lockers, cages, and smart racks, require transit agencies to establish a user registration system. Depending on an agency's preferred parking solution, transit operators may require specific user data which must be collected by program staff or included as a core responsibility in a third-party contract.

OPERATING RULES

Agencies should establish and publish a series of clear operating rules that address lost, found and abandoned bicycles, removal procedures for abandoned bicycles, and facilities usage requirements for bicyclists. For example, transit agencies should establish and communicate a timeframe for bicycle parking to users before they are considered abandoned and removed by the transit agency.

FEE STRUCTURE

Bike parking fees serve a variety of important administrative functions, however, they should be nominal and remain low to encourage bicycle use.

Fees should not be considered a source of revenue, usage will tend to plateau or decline as user costs increase.

Fees based on hourly rates can help mitigate clutter from long-term bike storage.

Bicycle parking policies should align with an agency's modal priorities (e.g., if an agency wishes to prioritize biking, then fees should be low in comparison to car parking).

Agencies should provide free bicycle parking options to accommodate visitors and spontaneous users.



BIKES ON TRANSIT



Bicycle parking onboard transit vehicles is a vital component of a holistic bicycle access strategy. In some cases, the ability to bring bikes onboard may extend the first and last mile beyond the 2-3 mile station catchment area, allowing transit users to consider longer-range connections as well as previously inaccessible routes (e.g., bridges without bike paths) and topographical challenges (e.g., steep hills). In addition to expanding the reach of transit and potentially increasing regional ridership, successful onboard accommodations





for bicycles can open new opportunities for regional tourism, and provide commuters more flexibility by allowing more linked trips between different modes. For transit customers, bringing bikes onboard also provides a valuable safety net in the event of inclement weather or unexpected issues such as flat tires. Onboard bicycle storage can also serve to supplement fixed bike parking at stops and stations.

General Design Best Practices Onboard Transit Vehicles

The elements of a good bicycle rack for public transit vehicles apply to exterior and vehicle interior racks except as noted.

- No User Conflict—Transit users should not be placed in conflict space for bicycles.
- 2. Independent load and unload areas.
- 3. Fast and Intuitive to unload.
- 4. Holds bicycle securely.
- 5. Durable rack.
- 6. Not prone to accidental or intentional misuse.
- 7. Maximize bicycle density and use of space.
- 8. Safe and secure design—no pinch points, sharp corners or edges, or protrusions.
- 9. Fits a variety of bicycles sizes, shapes, and wheel styles.
- 10. ADA compliant, separate areas from designated ADA seating and boarding locations.

The fixed nature of rail emphasizes the need for radial connections on alternate modes for the first and last miles of travel. Bicycle transportation provides a means to extend the rail commute, and onboard storage gives users the ability to complete their trip by bicycle, if desired. Rail vehicles may have higher capacity for onboard bicycle storage than buses due to the size and number of cars.

BIKES ON TRANSIT RAII

AGENCY ACTION CHECKLIST



- Assess the nature of rail service.
- Identify available data on corridor mode share and potential ridership.
- Identify the space limitations.
- Assess the bicycle landscape.
- Consider how demand is managed.
- Assess whether or not transit policies and procedures for bicycle onboard are enforceable.
- Assess bicycle access and mitigate potential for conflicts with pedestrians.
- Make a plan communicate bicycle integration and policies for transit customers.
- Create a plan to track bicycle integration.
- Determine how the agency will define and evaluate success.

CAPACITY

Transit agency should communicate how much onboard capacity is available, where bikes should load and any limitations on rush-hour use.



DATA

Demand, data collection strategies include video analytics at stations and questions-regular ridership survey.



POLICY

For security and capacity management, Users should be directed to stay with their bicycles onboard rail transit vehicles, even when is present.

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LOADING & UNLOADING

Provide information on bicycle loading and unloading procedures via, platform announcements, user education, train decals, and crowd sourced information.



OPERATIONS & MAINTENANCE

Bike accommodations on rail should be easy to use and secure.





BIKES ON TRANSIT

Conventional bus and Bus Rapid Transit (BRT) make up the majority share of public transit systems in the United States. The pervasive use of bus transit indicates a significant opportunity to both enhance bicycle accessibility and augment transit service by bridging the gap in the first and last mile for millions of commuters. Buses, while providing more flexibility than fixed route systems, are still subject to first and last mile gaps for commuters, thus making active connections all the more critical. Despite increased flexibility, buses suffer from significant spatial limitations born of capacity constraints. Finding approaches to make bikes on board successful is key to transit and bicycle integration. To successfully implement solutions, space needs to be made available, but also policies need to be set in place to ensure smooth functioning of loading and unloading.

AGENCY ACTION CHECKLIST

- Assess the nature of bus service. Identify available data on corridor mode-share and potential ridership.
- Determine how onboard racks are deployed on vehicles.
- Establish representation of internal stakeholders in the planning process. Consider how demand can be managed as it increases.
- Define exceptions and/or allowances for onboard policies.
- Minimize burden on operators.
- Prepare education plan for transit customers to mitigate user anxiety.
- Determine how the agency will define and evaluate success.

CAPACITY

Planning must address physical capacity limits, a major factor for bikes on buses.



DATA COLLECTION

Data on bicycle and bus linkages are essential for the transit industry to understand the state of the practice and what is needed to accomodate and facilitate growing demand.

LOADING & UNLOADING

Provide online, on bus and hands-on opportunities to learn how to load/unload bikes on buses to overcome barriers for use.



OPERATIONS & MAINTENANCE

Bike racks on buses produce a marginal increase in a bus's footprint and should not adversly affect bus vehicle storage and maintenance.

POLICY

Transit agencies shall take a leadership role in mandating consistent and safe vehicle requirements for bus operators and bicyclists.

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BIKES ON TRANSIT BUS CASE STUDY

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Metro Transit, Minneapolis, MN Case Study–Data collection

Metro Transit of Minneapolis, Minnesota initiated a bicycles-on-bus data collection pilot study in 2017. They have equipped 22 buses with sensors that are attached to bus bike racks. When the bike rack handle is lifted for loading and unloading, the sensor collects the geographic position/stop of the bus, and sends the data to Metro Transit.

The pilot study will inform Metro Transit of the reliability and durability of the sensor system and effectiveness of the data communication. Once pilot testing confirms the system is ready it will be rolled out to all of Metro Transit's 900 buses. This data will help Metro Transit understand where bikes racks are most used, and where and how frequently they are full. Metro Transit will also be able to share bike rack availability data through a mobile app and on real time signage to inform users. In addition, this data will help Metro Transit plan for better bike parking at transit station and appropriately prioritize secure bike parking as they will better understand demand.

BIKES ON TRANSIT FERRIES AND PRIVATE SHUTTLES

Port cities and other municipalities intersecting with bodies of water can leverage ferry networks to provide enhanced bicycle access throughout the region. In this context, Ferries can also bridge geographical barriers where tunnels and bridges either do not allow bicycles, or do not exist.

GETTING TO THE FERRY

- Waterfront bike paths are ideal linkages for ferry transit.
- Path wayfinding should indicate ferry transit facilities.
- Clearly articulate bicycle path of travel at the facility (which door do customers with bikes enter, where is the waiting area for bikes within the facility, etc.).

GETTING ON THE FERRY

• Designated boarding areas for bikes to reduce conflicts with pedestrain traffic and allow for additional security measures if needed.

ONBOARD STORAGE

- Multi-level ferries should have bike parking on the primary deck to facilitate roll on/roll off service.
- Bike parking should be easily accessible by rolling on and off the vessel and it should be located where bikes will be protected from weather and spray.

This can be customized where there are multiple level points of access. For example, a dock-level deck for cars and an overhead pathway from a terminal that could have roll-on bike access with peds. Another example is where bikes roll on at the car level but then are directed to an upper ramp where there's more bike parking.

- Racks or tie-downs should hold bicycles securely in rough tides with minimal swinging.
- Racks should be designed to fit numerous types of bikes and accessories (fenders, racks, panniers, e-assist bikes, cargo bikes, different shapes/sizes of handle bars and wheels, etc.).

PRIVATE SHUTTLES

- College campuses and private office parks may provide transit service to facilitate mobility. This could include full-scale bus systems and/or shuttle service. Shuttles may also be used to bridge arterial gaps for bicycle and pedestrian transit customers. Bridges without biking and walking paths, for example, may have a circulator service which allows customers to load bicycles on the vehicle, ride across the bridge or tunnel, and resume their bicycle trip on the other side.
- As people gravitate to cycling as a mainstream mode of transportation, college campuses with transit systems can augment service by providing seamless linkages with internal transit amenities. This includes racks on buses.

Bike share presents transit agencies with a relatively inexpensive method to augment and enhance their systems by providing connections between underserved areas and transit. A report by U.S. DOT's Bureau of Transportation Statistics indicates that roughly 86% of all bike share stations in the United States are located proximate to some mode of scheduled public transit, effectively expanding the range of many transit systems across the country. The majority of these connect with bus transportation with 74.9% of stations located within a block or less of a bus stop.

BIKE SHARE



- Identify the agency or organization managing the bike share system.
- Determine the operational model (private ownership vs. public subsidy).
- Assess operational needs that may affect transit operations or agency assets.
- Consider if the bike share system will be station-based or dockless (not requiring bike share stations); plan for bike share station locations.
- Identify the physical requirements for bike share stations.
- What are the functional impacts of a dockless system?
- Create a plan for the transit agency to incentivize/facilitate bike share usage.



INCENTIVIZING BIKE SHARE

Inform users where bikes should be located onboard, and if there are limitations on rushhour boarding.

PLACEMENT

Bike share stations should be placed proximate to transit facilities without impeding heavy volumes of pedestrian, automobile, and bicycle traffic during peak times.



Transit connection options

Connection to another mode

Near connection

No connection

No service

SYSTEM INTEGRATION

Fare card interoperability enables seamless transfers to and from bus and rail transit to bike share.



DOCKLESS BIKE SHARE

A type of bike share that does not require fixed docks or kiosks. The system is managed using a combination of GPS and bike locks built into the bike frames, with payment typically managed via a smart phone application.

SAFE ROUTES AND PARTNERSHIPS

AGENCY ACTION CHECKLIST

- Assess the nature of bus service. Identify available data on corridor mode-share and potential ridership.
- Determine how onboard racks are deployed on vehicles.
- Establish representation of internal stakeholders in the planning process.
- Consider how demand can be managed as it increases.
- Define exceptions nd allowances for onboard policies.
- Minimize burden on operators.
- Prepare education for on transit customers to mitigate user anxiety.
- Determine how the agency will define and evaluate success.



Optimizing bicycle connections begins with providing safe routes and streamlined navigation systems for commuters to access transit facilities. Navigation is a key element of a robust bike network, including clear and consistent wayfinding signage strategic placed at key decision points along major routes. The complexities of route planning and transit connectivity, and the fact that transit agencies do not have control of land use nor street improvements where they operate, requires interagency coordination ensure a consistent approach. Bicycle networks, wayfinding and related facilities typically fall outside the jurisdiction of transit agencies. Transit agencies should work with transportation agency partners responsible for on-street infrastructure for safe routes to their facilities. Agencies should clearly communicate operational concerns affecting bicycle movement so municipalities can provide effective planning solutions (e.g., routing cyclists through one station to a particular entrance as not to impede bus movement form a terminal). The longitudinal nature of most regional transit systems necessitates cross-jurisdictional coordination with numerous municipalities to ensure a consistent approach to multimodal transit access.

CUSTOMER VALUES AND AGENCY ROLES

HOW do I GET to transit?

Safe Routes To Transit Lead: Municipality Support: Transit Agency or Advocacy Group

Customer Communication Education Lead: The Municipality,Transit Agency or Advocacy could lead in this effort

Is there a **SAFE PLACE** to **STORE** my bicycle?

Bicycle Parking atTransit Stations Lead: Transit Agency

Support: Municipality and in some cases Advocacy Groups also suppor

AVAILABLE to me to bike to transit?

What **RESOURCES** are

Bike Share Connectivity and Tansit Stations Lead: Municipality or Transit Agency Support: Advocacy Groups Can I **EXTEND MY** transit **RIDE** with a bike?

Support: Advocacy Groups, Municipality role is limited

Bicycles Onboard Tansit

Lead: Transit Agency

Can I get to transit WITHOUT USING my own bike?

PARTNERING LESSONS FOR TRANSIT AGENCIES:

- Agencies and municipalities should keep agreements simple to streamline implementation of joint projects.
- Transit agencies and municipal partners would benefit from a master cooperation agreement that outlines general intent for collaborative work.
- Shorter, project-specific agreements can be issued on a case-by-case basis.
- Agencies should pursue opportunities to take the lead in applications for funding.
- Transit agency planners should actively pursue partnerships with external bicycle advocacy and education organizations in addition to identifying internal advocates.





BICYCLE & TRANSIT INTEGRATION A PRACTICAL TRANSIT AGENCY GUIDE TO BICYCLE INTEGRATION AND EQUITABLE MOBILITY

Document designed by Cambridge Systematics, Inc.

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