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Micromobility and Public Transit Environmental Design Integration

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Issue

Micromobility—transportation using lightweight vehicles such as bicycles or scooters—has the potential to reduce greenhouse gas emissions, traffic congestion, and air pollution, particularly when it is used to replace private vehicle use and for first- and last-mile travel in conjunction with public transit. The design of the built environment in and around public transit stations plays a key role in the integration of public transit and micromobility. The San Francisco Bay Area is a potential testbed for innovative and adaptive transit station design features that support micromobility, since it has relatively high public transit and shared micromobility usage, as well as high micromobility usage rates for trips to and from transit. The region's Bay Area Rapid Transit (BART) heavy rail stations are in the operation zone of seven shared micromobility operators.

Design may facilitate or hinder the use of bikes, e-bikes, and e-scooters for first-and last-mile connections to public transit. Researchers at UC Davis inventoried design features at, and near, 19 BART stations in Berkeley, Oakland, San Fransisco, and San Jose. Researchers focused on bike lane level of protection and connectivity, service vehicle density, parking for micromobility [Figure 1], station safety, and et cetera. The team developed a Micromobility Map tool (https://www.adaptingcity.org/micromobility.html) with interactive layers to show train stations, bike lanes, bike share kiosks, and micromobility operation zones. The purpose of the study was to highlight best practices and opportunities for improvement, including those that could be applied to other types of transit stations to promote micromobility and transit use.

Figure 1. Lake Merritt BART station in Oakland, CA, with e-scooter racks and bike lockers available.

Key Research Findings

Many transit stations lack adequate parking facilities, particularly for dockless bikes and e-scooters that require a bike rack. The presence and capacity of indoor and outdoor bike racks and secure private bike storage ranged widely across stations (Table 1). They were particularly limited in underground San Francisco stations with minimal above-ground space. Parking corrals, which provide designated space and reliable access for shared dockless e-scooters and e-bikes, were present at only 2 of 19 stations.

	East Bay and San Jose	San Francisco	All Stations
E-scooter corral	Present at 2 stations	Present at 0 stations	Present at 2 stations
Outdoor racks	28 (2–169)	3 (0–12)	12 (0–169)
Indoor racks	14 (0–60)	0 (0–45)	0 (0–60)
Secure storage spaces	154 (12–383)	6 (0-100)	96 (0–383)

Table 1. Micromobility parking facilities at BART stations; shown as median (minimum-maximum) number of bike racks (each accommodating 1-2 bikes or 1-3 scooters) and secure parking spaces (i.e., at valet bike parking, bike stations, and bike lockers).

The areas around many transit stations lack safe street facilities for micromobility. All stations had at least some nearby street segment without any type of bike lane. The bike lane networks that did exist often lacked consistency. For example, on a given route there were intermittent Class 2 bike lanes (i.e., designated with stripes and stencils) and Class 3 bike boulevards (i.e., roads marked to be shared by bikes and vehicles without a separate bike lane); bike lanes that stopped altogether from block-to-block; and the absence of bike lanes on streets directly adjacent to stations.

Few transit stations include information about shared micromobility in communication materials. Shared micromobility signage indicating where users should drop off their scooters and bikes was only observed at the two stations with parking corrals. At other stations, signage for bus schedules and maps of stations and surroundings were prevalent, but none included place markers for shared micromobility docking stations or corrals.

The numerous micromobility services operating in the Bay Area are not consistently available from city to city, creating complexity for users. Bay Wheels, the docked bikeshare system available at certain points in the Bay Area, allows for a seamless travel experience in which travelers can use a shared bike from the same system on both ends of a transit trip. In contrast, the multiple dockless micromobility fleets are not consistently available across Bay Area cities, creating complexity that could inhibit adoption.

Policy Implications

To encourage micromobility and transit connectivity, cities and public transit agencies should work together to implement networks of protected bike lanes within a two- to five-mile radius of transit stations. Bike lane investments, street lighting, and marked wayfinding around stations will improve safety for, and increase use of, shared micromobility and cycling in general. Stations need to prioritize corrals with racks to increase reliability and ease of use of shared micromobility services, maintain order, and protect pedestrians from trip hazards. Transit stations should update their printed maps and websites to highlight shared micromobility docking stations in and around the station, dockless vehicle parking zones, and recommended safe routes for bikes and e-scooters. Finally, each operating micromobility service should be consistently available throughout a highly connected urban region so users do not have to learn to navigate multiple service apps, use different vehicle types, and remember different rules.

More Information

This policy brief is drawn from the report "Environmental Design for Micromobility and Public Transit" prepared by Beth Ferguson and Dr. Angela Sanguinetti with the University of California, Davis. The report can be found here: https://www.ucits.org/research-project/2020-09/.

For more information about findings presented in this brief, please contact Beth Ferguson at Bferguson@ucdavis.edu.

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