Designing and Managing Trails for Next Gen Mobility

June 7, 2023
MTC Active Transportation and Shared Mobility

Bay Area Concerns: What We've Heard

1. **AB 1909** loosens the restrictions on Class 3 e-bikes and may have implications for user conflict/safety.

2. **Jurisdictions** are considering prohibiting e-scooters, Segways, and e-bikes.

3. **Policymakers and trail managers** want to be pro-active with full understanding of the issue, existing research, and any tested strategies.

4. **Policymakers and trail managers** want trail network expansion planning to account for both current and future trail uses.

Today's Presentation: Agenda

- Welcome/Introductions
- Micromobility Context
- What Now?
  - Setting Principles
  - Policy and Management Considerations
  - Design Considerations

Images Source: MTC

Today's Presentation: alta

Jean Crowther, AICP
Principal,
Innovative Mobility

Doug Arseneault
Planning Associate,
Innovative Mobility

Jeff Knowles, AICP
Principal,
California Planning Leader

Micromobility Context

What is Micromobility?

Micromobility refers to small, fully or partially human-powered vehicles, such as bicycles, scooters, skateboards, roller skates, self-balancing vehicles or other wheeled devices

Powered micromobility refers specifically to low-speed, motorized devices. These devices are most commonly electric
(e.g. e-bikes and e-scooters)
but may come in other forms

Images Source: Alta Planning + Design

Micromobility Device Classifications

International Transport Forum (ITF) uses **weight and speed** to distinguish micromobility vehicles

Types A & B
- Low speed
- Up to 770 lbs

Type C
- Higher speed
- Up to 77 lbs

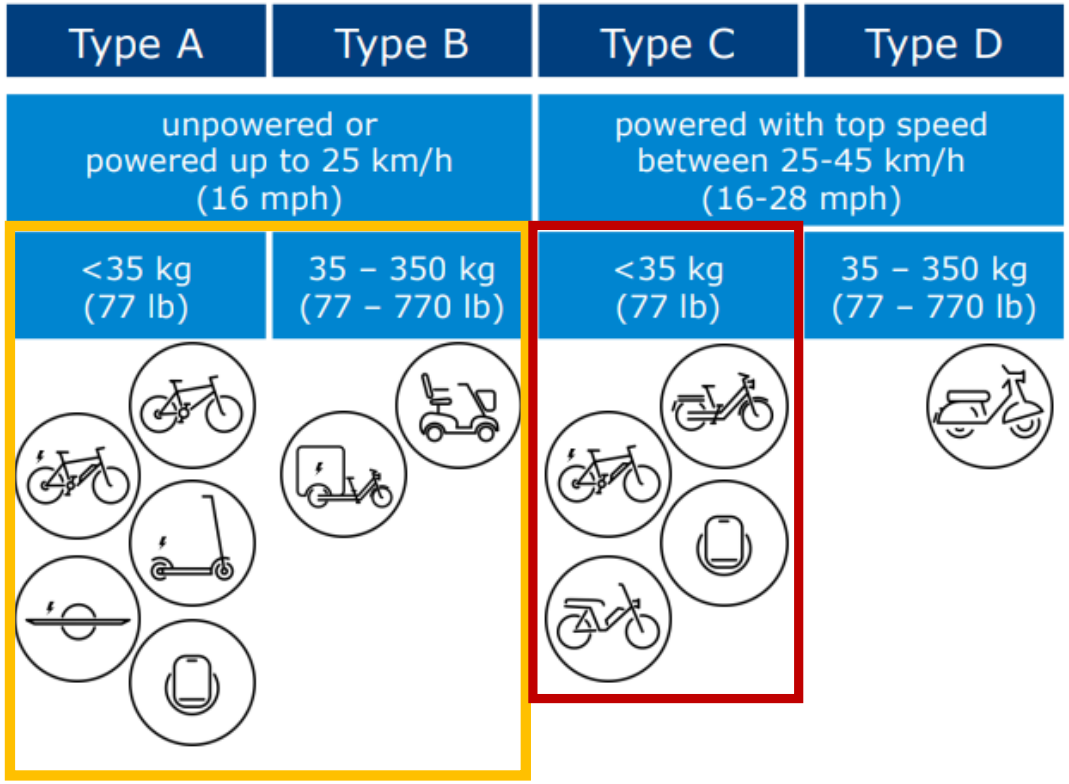


Image Source: *ITF Safe Micromobility*

Electric Bicycle Classifications (AB1096)

Type	Asset Type	Max Assist Speed	Minimum Age	Helmet
Class 1	Pedal	20 MPH	NA	17 and under
Class 2	Pedal / Throttle	20 MPH	NA	17 and under
Class 3	Pedal	28 MPH	16	All Ages

Image Source: *People for Bikes*

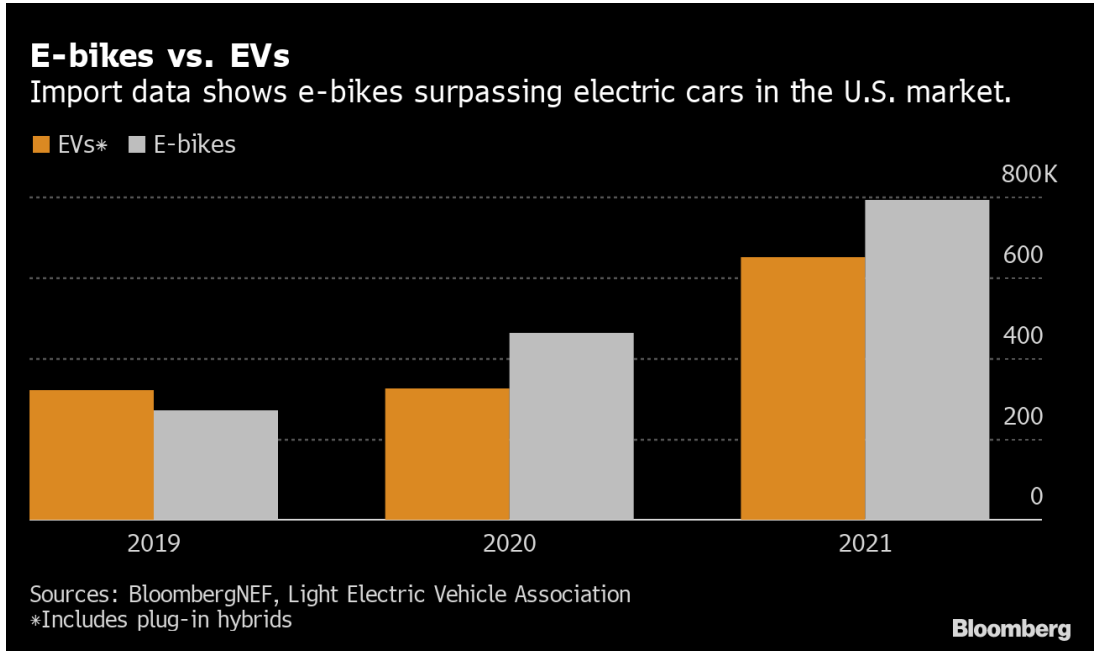
Type 2 E-Bike Throttle

Image Source: *Electric Bike Report*

Why Now?

E-bike sales in the U.S. **grew** three-fold from 2019 to 2021

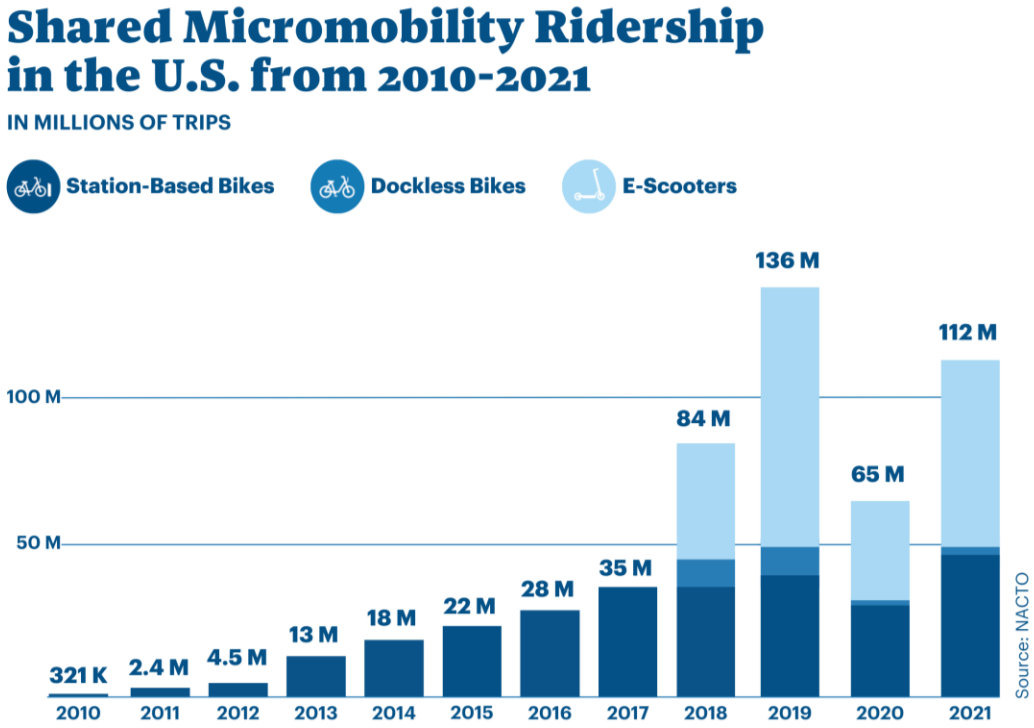
E-bike sales **exceeded** electric vehicle (EV) sales in the U.S. in 2020 and 2021



Why Now? (National)

112 million shared micromobility trips in 2021

Shared e-bike trips **doubled** from 9.5 million in 2018 to 17 million in 2021



Since the introduction of the country's first bike share system in 2010, people in the U.S. have taken half a billion trips total on shared micromobility

Why Now? (Bay Area)

In the Bay Area between September 2022 and May 2023:

1,662,499 Shared e-bike rides*

1,222,399 Shared e-scooter trips**

14,520 Shared seated e-scooter trips***

**In San Francisco and San José via Bay Wheels*
***In San Francisco, San José, Emeryville, Oakland, and Berkeley via Bird, Lime, Link, Spin and VeoRide*
****In Oakland via Link*

Jan-June 2022 Ridership: Bay Wheels is Bay Area's 8th largest transit

Rank	Ridership	Agency	Rank 2019
1	53,361,521	SFMTA	1
2	20,403,858	BART	2
3	15,153,241	AC Transit	3
4	9,771,938	VTA	4
5	3,729,028	SamTrans	6
6	1,715,150	Caltrain	5
7	1,246,245	Marin Transit	9
8	1,225,025	Bay Wheels	11
9	992,665	GGBHTD	7
10	964,650	County Connection	8
11	782,542	WETA	10
12	546,392	Santa Rosa CityBus	13
13	498,169	Tri Delta Transit	12
14	484,577	MTC	22
15	452,700	LAVTA	14
16	305,115	SolTrans	16
17	284,270	WestCAT	17
18	271,191	Sonoma County Transit	19
19	230,280	Napa Vine	18
20	199,054	SMART	21
21	180,084	FAST	20
22	176,931	ACE	15
23	6,488	Bikeshare Capital Grant Program	-

Why Allow Powered Micromobility Use?

1. Enable equitable and affordable transportation
2. Reduce GHG emissions due to mode shift
3. Expand the number and demographic of people who can travel by active transportation
4. Improve health outcomes

Image Source: *MTC*

Why Allow Powered Micromobility Use?

Communities can expand individuals' range of mobility and attract trail use by determining how shared-use paths can safely function with powered micromobility users

Images Source: MTC

Changes with California's AB 1909 (2022)

1. **Eliminates** the statewide ban of Class 3 electric bicycles on a bicycle path or trail, bikeway, bicycle lane, equestrian trail, or hiking or recreational trail.

2. **Eliminates** local authority to ban electric bicycles on bike paths.

3. **Authorizes** the state Department of Parks and Recreation (California State Parks) to prohibit the operation of electric bicycles or any class of electric bicycles on any bicycle path or trail within the department's jurisdiction.

Myth-busting Common Concern 1

Myth #1

"Trail users don't want to share."

Lessons from other Trails

Communities prefer trail etiquette strategies rather than prohibiting access, when surveyed.

Source: Surveys in Half Moon Bay, CA and Fort Collins, CO

Images Source: Karl Nielsen

Further Reading:

- https://www.half-moon-bay.ca.us/DocumentCenter/View/5283/ebike-survey-results
- https://www.fcgov.com/bicycling/files/2022-e-bike-evaluation-report.pdf

Myth-busting Common Concern 2

Myth #2

"E-powered users are going too fast for trails."

Lessons from other trails

People riding e-bikes on trails and local routes typically ride at the same speed or slower than people riding traditional bikes.

Source: Evaluations in Fort Collins, CO; Vancouver, BC; Pinellas, FL

Image Source: Karl Nielsen

Further Reading:

- https://www.fcgov.com/bicycling/files/2022-e-bike-evaluation-report.pdf
- https://civil-reactlab.sites.olt.ubc.ca/files/2022/05/HumanElectricHybridVehicles_StreetDesignAndPolicy_FinalReport_2022.pdf
- https://forwardpinellas.org/blog/pinellas/the-pinellas-trail-is-perception-reality-and-what-can-we-do-about-it/

Myth-busting Common Concerns 3

Myth #3

"E-powered users are reckless."

Lessons from other trails

People riding e-bikes tend to be more courteously behaved on trails than people riding traditional bikes

Source: Evaluation in Fort Collins, CO

Images Source: Bike Portland

Further Reading:

- https://www.fcgov.com/bicycling/files/2022-e-bike-evaluation-report.pdf

Myth-busting Common Concern 4

Myth #4

"E-powered devices are causing more and worse crashes on trails."

Lessons from other trails

Crash data are currently not collected in such a way to accurately assess the number and severity of crashes involving people riding e-bikes and e-scooters.

Source: NTSB Report

Images Source: East Bay Regional Parks District

Further Reading:

- https://www.ntsb.gov/safety/safety-studies/Documents/SRR2201.pdf

What Now?

Multiple Approaches

Trail Principles

1. What are the goals of the community?
2. What are the goals of the trail?
3. Who does the trail serve?

Trail Policy and Management

4. Rules for who, what, when, where, how
5. Education and etiquette

Trail Design

6. Designing for the activity you want

Images Source: MTC

Setting Principles

Principles to Guide Decision Making 1

Advance Mobility Justice

Shared-use paths provide access to health, economic opportunity, and safe and affordable transportation. There is potential that powered micromobility further extends that reach through longer trip distances, faster travel, and a wider range of abilities. Historically marginalized communities and people facing the greatest mobility barriers have the most to gain from improved access and should be centered in the planning and design process. This includes making decisions about a trail's "design users" and "design uses."

Principles to Guide Decision Making 2

Design for Safety

An expanded range of users indicates an expanded range of speeds, volumes, vehicle maneuverability, and potential hazards. Designing for safety requires identifying and prioritizing the most vulnerable trail user first, then accounting for design features that will improve safety for all users. This could include turn radii, signage placement, speed guidance, sight distances, and surface maintenance or repair. High volumes or heavy vehicles (e.g. NEVs) warrant physical separation, speed designated lanes, or policy actions such as designating no-power zones and the use of geofencing technologies for speed control.

Principles to Guide Decision Making 3

Complement the Natural Environment

Shared-use paths can provide access for multimodal and powered mobility while still preserving users' experience with the natural environment. Design and management strategies should reduce interferences with the natural context with considerations for sound, wildlife interactions (e.g. bird watching), and speed reductions.

Principles to Guide Decision Making 4

Prioritize the Human Experience

Shared-use path design should strive for a consistent user experience and predictable level of comfort. With a “do no harm” approach to accommodating new modes alongside traditional shared-use path users, design modifications and new management policies should prioritize the human experience, including the experience of the trail’s most vulnerable user. Future-ready trails recognize perceptions of safety and level of comfort as very real factors that influence trail usage.

Principles to Guide Decision Making 5

Expand User Amenities

New amenities will improve how shared-use paths accommodate new users. With powered micromobility and other new and emerging modes, public charging infrastructure offers convenience while also reducing risk of “stranded” users or inoperable devices/vehicles that have lost power. Such investments can also provide public charging for motorized wheelchairs or personal phones. Other amenities could include added storage or parking at trailheads and maps/signage for connecting to shared micromobility docking stations and parking corrals.

Principles to Guide Decision Making 6

Design for the Future Trail

Plan for the shared-use path's future. A range of tools available now can leverage big data, local transportation trends, and modernized modeling tools to estimate future volumes of trail users. Trail designers and managers should track trends, identify shifts in user groups, and conduct research when possible (e.g. counts or intercept surveys). Understanding latent demand and estimated future volumes for a growing suite of trail modes, users, and uses will determine effective design solutions that will have lasting impacts on trail success.

Principles to Guide Decision Making

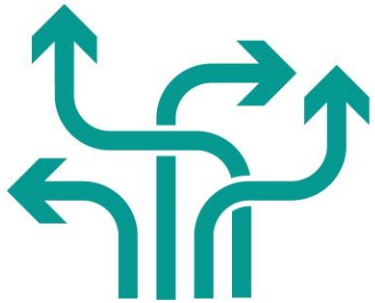
Advance Mobility Justice

Design for Safety

Complement the Natural Environment

Prioritize the Human Experience

Expand User Amenities



Design for the Future Trail

Policy & Management Considerations

Policy & Management Considerations

1. Trail Classifications
2. User Behavior
3. User Types & Devices

Images Source: Alta Planning + Design

Trail Classification

A single trail rarely accommodates all user types

Trail classifications can establish **appropriate trail use** by considering:

1. Trail type
2. Managed use
3. Design use

Image Source: City of Greenville, greenvillejournal.com

User Behavior

Regulate the concern rather than the device

Examples

- Speed
- Access
- Parking
- Noise
- Air pollution

Image Source: Kuhmute. Retrieved on 2/16/2021 from https://www.kuhmute.com/

CASE STUDY:

Travel Speed

Vancouver, BC

Minimal difference in speed between traditional bicycles and e-bicycles (~2.5 mph)

Fort Collins, CO

Average speed for traditional bikes was 11.78 mph compared to 11.86 mph for e-bikes

Image Source: Emma Tsui, New York Times

Further Reading:

- https://www.fcgov.com/bicycling/files/2022-e-bike-evaluation-report.pdf
- https://civil-reactlab.sites.olt.ubc.ca/files/2022/05/HumanElectricHybridVehicles_StreetDesignAndPolicy_FinalReport_2022.pdf

CASE STUDY:

Adhering to Speed Limits

Pinellas County, FL

Of the 67 total e-bike/e-scooter users observed, only 3 (4.5%) were speeding, and only 1 was engaging in unsafe speeding behavior

Fort Collins, CO

More traditional bikes (11.7%) were observed going over the 15-mph speed limit than e-bikes (3.9%).

Vancouver, BC

About 2% of traditional bicycles traveled faster than the posted speed limit, while 7-8% of e-bikes traveled faster than the speed limit.

Further Reading:

- https://www.fcgov.com/bicycling/files/2022-e-bike-evaluation-report.pdf
- https://civil-reactlab.sites.olt.ubc.ca/files/2022/05/HumanElectricHybridVehicles_StreetDesignAndPolicy_FinalReport_2022.pdf
- https://forwardpinellas.org/blog/pinellas/the-pinellas-trail-is-perception-reality-and-what-can-we-do-about-it/

CASE STUDY:

Observed Etiquette

Fort Collins, CO

- E-bike riders were more likely than traditional bike riders to give an audible signal when passing another trail user (33% vs 24%).
- E-bike riders were more likely than traditional bike riders to give three feet when passing (50% vs 44 %).
- Zero incidents of conflict were observed between people walking and people riding e-bikes.
    - The only mode of transportation with observed conflict (reckless riding and near misses) were people riding traditional bikes.

Further Reading:

- https://www.fcgov.com/bicycling/files/2022-e-bike-evaluation-report.pdf

User Types/Devices

- **Each trail user type** has its own needs and demands.
- **Policy, messaging, and signage tell trail users where they belong.**
- **Trail policy** can allow or prohibit bicycles, e-bicycles, scooters, e-scooters, Neighborhood Electric Vehicles, all-terrain vehicles, skateboards, e-skateboards, and more.

  However, in California, local authorities cannot ban e-bicycles from Class I bike paths (per AB 1909).

Image Source: City of Greenville, greenvillejournal.com

CASE STUDY:

Device-Specific Restriction

Atlanta Beltline, GA

- Reduced Speed Zone through a virtual perimeter that restricts e-scooters to a maximum speed of 8 mph during periods of congested activity.
- Resulted in fewer complaints about unsafe riding behavior and trail users say they feel safer.
- Some e-scooter companies reported cost and time factors hurting their bottom line, while others reported no effect from the policy.

Further Reading:

- https://altago.com/wp-content/uploads/Next-Generation-Trails-White-Paper_2020_-Alta.pdf

Design Considerations

Trail Design

Trail width, surface type, a adjacent space commonly set tone for trail u

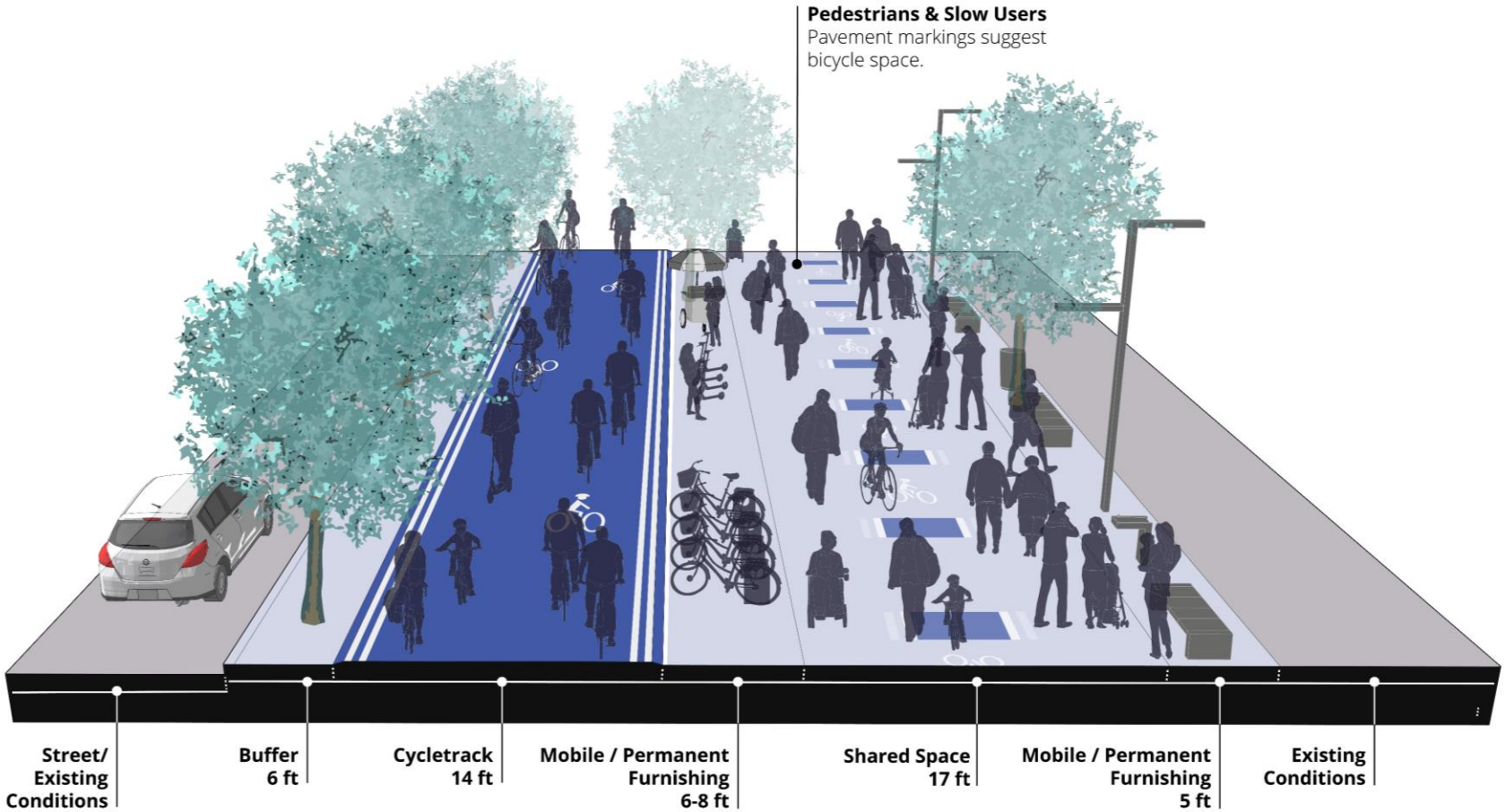


Image Source: Alta Planning + Design

User types inform design

Walkers | Runners | Wheelchair Users | Casual and New Cyclists | Experienced Cyclists | E-Bike Riders | E-Scooter Riders | Neighborhood Electric Vehicles

Safe Operating Widths

Allocate extra width to accommodate wider devices and passing

Account for

- Riding space
- Passing space
- Shy distance

Image Source: MTC

When to Separate Users

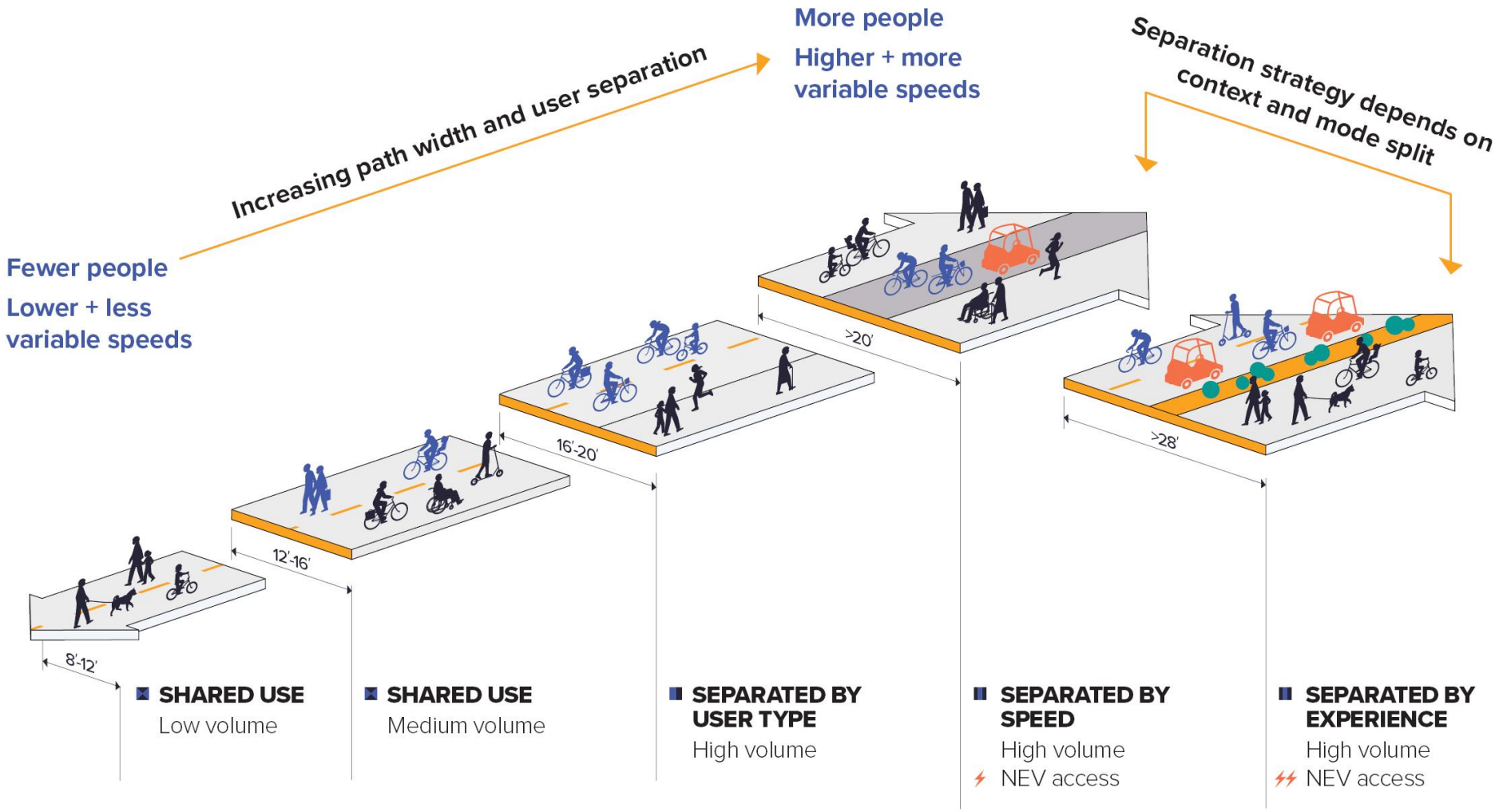


Image Source: Alta Planning + Design

Other Design Considerations

Create safe and maneuverable spaces at **intersections and driveways**

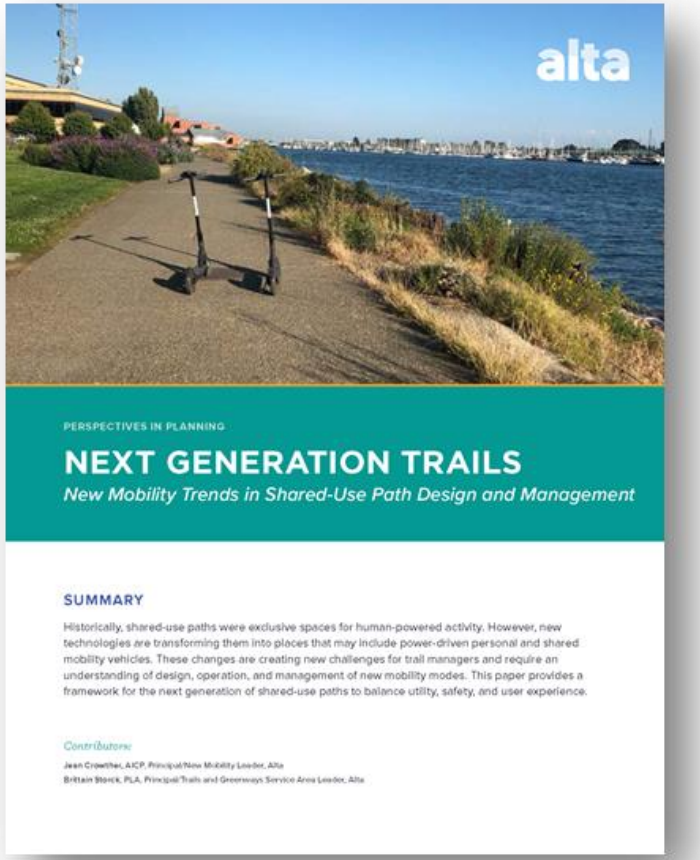
Provide **smooth surfaces** for devices with small wheels

Make the best place to **ride obvious**

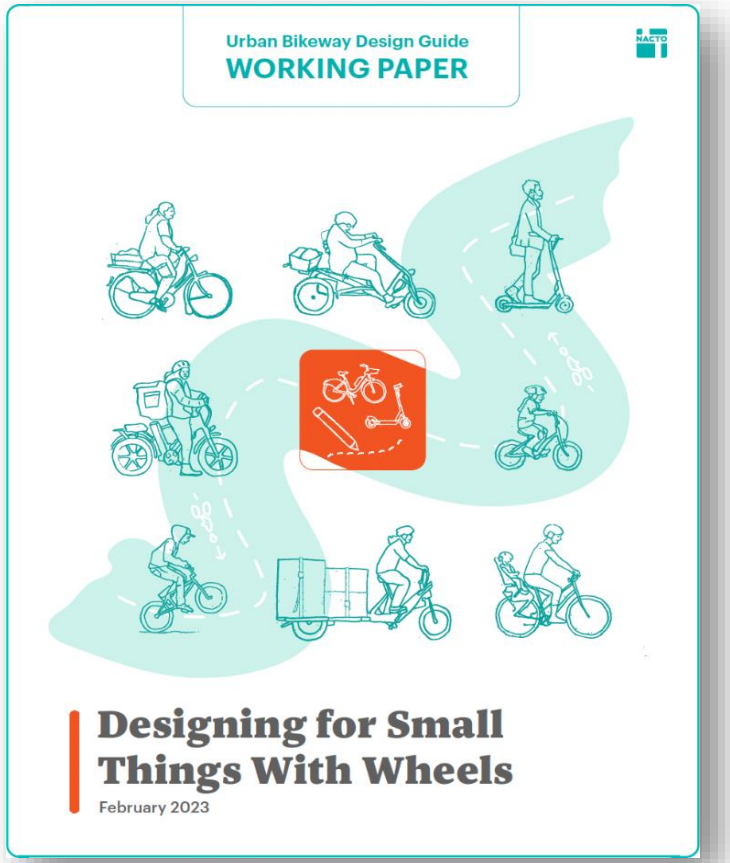
1. Signage
2. Pavement markings
3. Network connectivity

Image Source: MTC

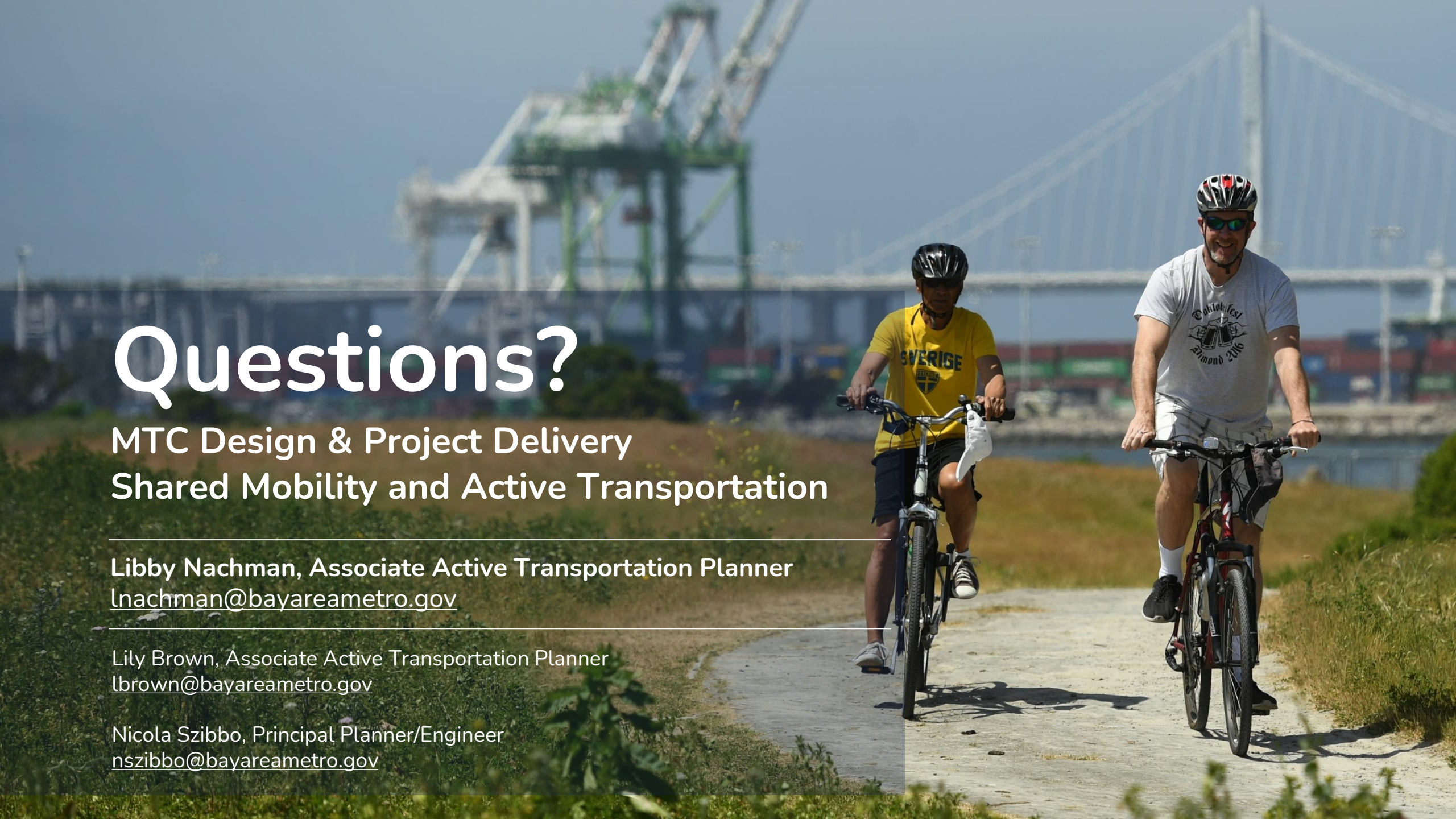
Resources



https://altago.com/wp-content/uploads/Next-Generation-Trails-White-Paper_2020_-Alta.pdf



https://nacto.org/publication/designing-for-small-things-with-wheels/



Questions?

MTC Design & Project Delivery
Shared Mobility and Active Transportation

Libby Nachman, Associate Active Transportation Planner
lnachman@bayareametro.gov

Lily Brown, Associate Active Transportation Planner
lbrown@bayareametro.gov

Nicola Szibbo, Principal Planner/Engineer
nszibbo@bayareametro.gov

Works Cited

Half Moon Bay, CA: https://www.half-moon-bay.ca.us/DocumentCenter/View/5283/ebike-survey-results

Fort Collins, CO: https://www.fcgov.com/bicycling/files/2022-e-bike-evaluation-report.pdf

Golden Gate Bridge Study: https://www.goldengate.org/assets/1/25/2021-0225-bocomm-no7-attachment_bicyclesafetystudy.pdf?6592

Vancouver, BC: https://civil-reactlab.sites.olt.ubc.ca/files/2022/05/HumanElectricHybridVehicles_StreetDesignAndPolicy_FinalReport_2022.pdf

Pinellas, FL: https://forwardpinellas.org/blog/pinellas/the-pinellas-trail-is-perception-reality-and-what-can-we-do-about-it/

NTSB Study: https://www.ntsb.gov/safety/safety-studies/Documents/SRR2201.pdf

ITF: https://www.itf-oecd.org/sites/default/files/docs/safe-micromobility_1.pdf

SAE International: https://www.sae.org/binaries/content/assets/cm/content/topics/micromobility/sae-j3194-summary---2019-11.pdf

DOT: https://highways.dot.gov/sites/fhwa.dot.gov/files/wfl-e-bike-final-report.pdf