VISION ZERO
ALAMEDA
SAFER STREETS FOR ALL

Alameda Crash Data Summary

A chapter of the
Alameda Vision Zero Action Plan
June 23, 2020

Prepared by

TOOLE
DESIGN

Vision Zero is an international movement that provides a framework for reducing traffic deaths and life-changing injuries to zero, while increasing safe, healthy, and equitable mobility for all. It follows a data-driven, systemic approach to reducing crashes associated with the most severe collision outcomes among users of all modes. In November 2019, the Alameda City Council adopted a resolution establishing Vision Zero as the City's guiding principle for transportation planning, design, and maintenance. In 2021, the City of Alameda will complete a Vision Zero Action Plan that includes specific actions and policy changes to increase roadway safety in Alameda.

www.AlamedaCA.gov/VisionZero

INTRODUCTION

Roadway safety has always been important in Alameda, but now, as the City is adopting its first Active Transportation Plan and taking new strides to prepare for climate change, it is more important than ever. The City of Alameda must ensure that our streets are safe for all users, especially those who are most vulnerable.

Between 2009 and 2018, 2,219 people were injured or killed in a collision on streets in Alameda. Each year, an average of two people die and 221 people suffer from an injury – 10 of which are life-altering injuries. As shown in Figure 1, the total number of annual crashes ranged from 83 to 122 among motorists, 6 to 17 among motorcyclists, 27 to 45 among bicyclists, and 24 to 43 among pedestrians.

The deaths and life-altering injury crashes (referred to together as severe crashes) are preventable and should not be treated otherwise. It is time for Alameda take a comprehensive and strategic approach to roadway safety. The Vision Zero Action Plan will present bold strategies to help Alameda create streets that are safe for people of all ages and abilities and

who travel by a variety of modes. This assessment highlights key collision trends that will help Alamedans take a more targeted and data-driven approach to understanding roadway safety and identifying effective strategies to reduce fatal and life-altering injuries on Alameda's streets. The crash data used in this analysis is from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS). The analysis includes data from 2009 to 2018, the ten most recent years of data available.[1] For a more detailed analysis of the crash data, refer to *Appendix A: Crash Analysis Summary*.

Each year, an average of two people die and 221 people suffer from an injury from traffic collisions in Alameda.
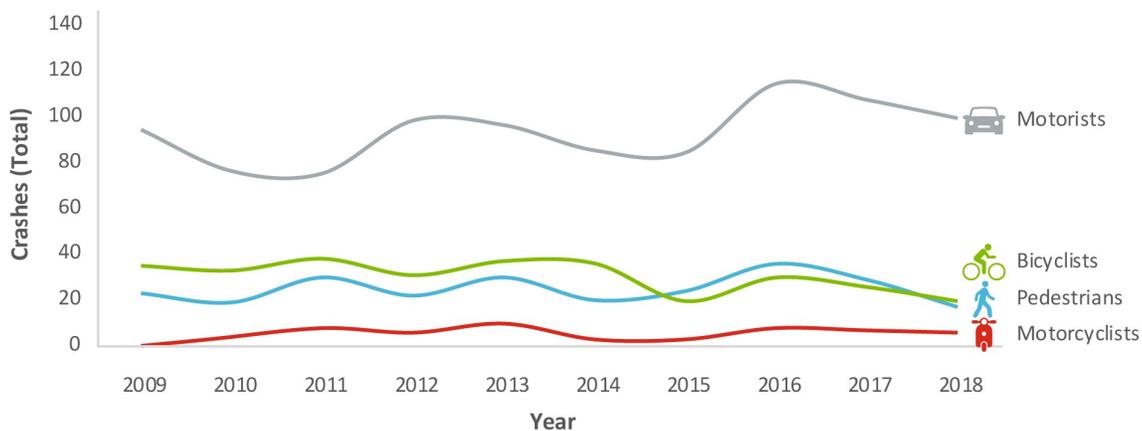

Figure 1. Total Crashes by Year and Mode from 2009 to 2018

[1] The 2016-2018 data are still considered "provisional," which means that the overall numbers could change slightly if additional reports are identified and processed. However, correspondence with the TIMS managers suggested that there are unlikely to be substantial changes from the current version, especially for 2016 values. Some fatal crashes have been added or corrected during a data review with the City of Alameda and the Alameda Police Department.

DISPROPORTIONATE IMPACTS

Motor vehicles are involved in the highest share of crashes; however, crashes involving only motor vehicles are much less likely to result in fatal or life-altering injuries when compared to crashes that involve other road users. Pedestrian, bicycle, and motorcycle crashes are disproportionately severe compared to motor vehicle crashes.

Pedestrians are involved in 18 percent of Alameda's crashes but 35 percent of the city's severe crashes. Alamedans need to work together to ensure that everyone has the ability to travel safely throughout the city.

Pedestrians and bicyclists make up…

5% of Alameda's commute to work mode share,

39% of Alameda's crashes, and

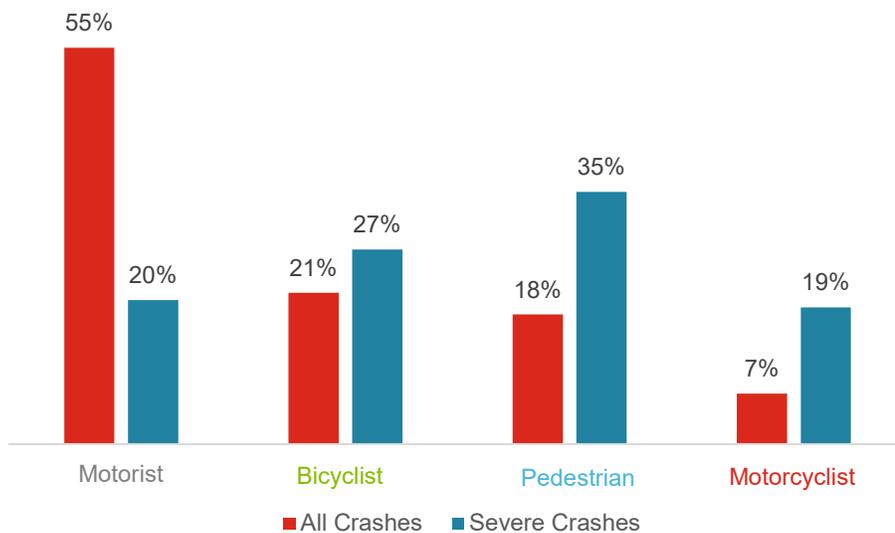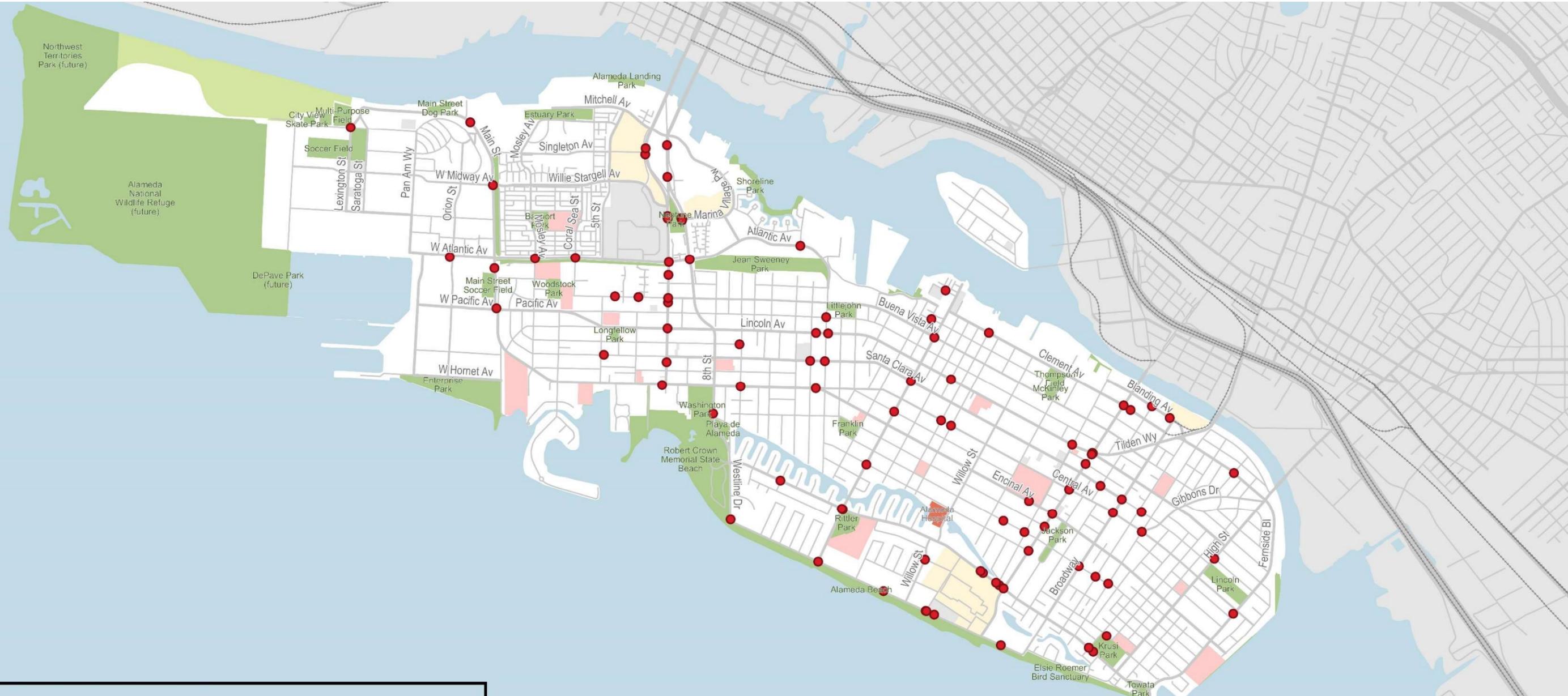**62%** of Alameda's severe crashes.

Figure 2. All Crashes and Severe Crashes by Mode

Certain demographic populations are also more vulnerable than others. **On average, younger and older victims (ages 10-24 and 65-84) were over-represented in severe crashes compared to other age groups.** Vulnerabilities may also be compounded, meaning that older pedestrians, bicyclists, and motorcyclists may be more at risk of experiencing a serious injury when involved in a crash compared to older motorists. Older pedestrians are especially vulnerable when involved in a crash – 34

percent of pedestrian victims of severe crashes were 65 years old or older, though they only represent 15 percent of the population (American Community Survey, 2018, five-year estimates).

There are two main factors associated with crashes – dangerous behaviors and street design. Following is a summary of collision trends related to both of these elements so that the Vision Zero Action Plan can include strategies to address them both.

Severe Crashes

Crash Analysis, 2009-2018 Data
City of Alameda

- Severe Crashes (fatal and life-altering injuries)
- Hospital
- Shopping and Business
- Parks
- Future
- Schools and Libraries
- Municipal

0   0.25   0.5 mi

N

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VISION ZERO ALAMEDA

DANGEROUS BEHAVIORS

The crash analysis revealed that a select group of behaviors are more commonly associated with all crashes and severe crashes than other behaviors. Alameda can take a larger step towards reducing traffic-related injuries and deaths by focusing on strategies that will mitigate the impacts of these top dangerous behaviors.

Four dangerous driver behaviors are most common among ALL crashes in Alameda: automobile right of way, unsafe speed, pedestrian right of way, and improper turning.
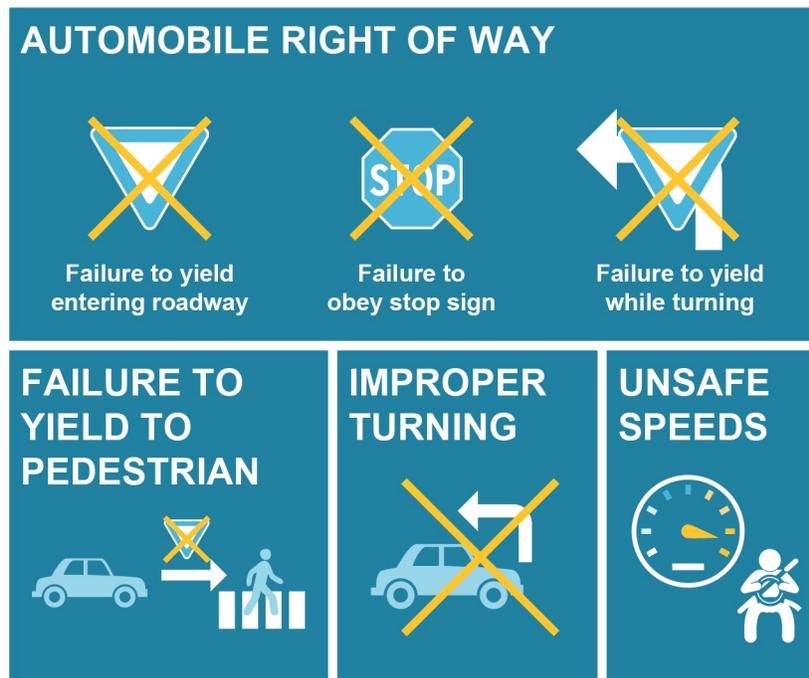

Figure 3. Top Four Behaviors Associated with All Crashes

The top two dangerous behaviors associated with SEVERE crashes are failure to yield to pedestrians and unsafe speed.
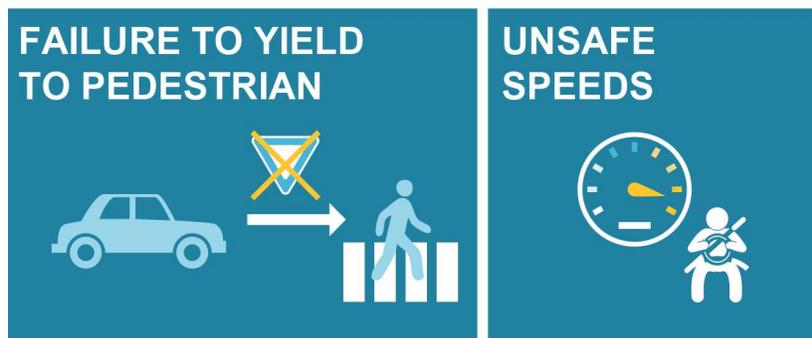

Figure 4. Top Two Behaviors Associated with Severe Crashes

Among pedestrian crashes, the most common behaviors were related to improper yielding, most frequently by drivers. In 55 percent of pedestrian crashes, the driver failed to yield to a pedestrian (either at a marked or unmarked crosswalk), and in 20 percent of pedestrian crashes a pedestrian failed to yield right of way to a driver.

Among bicycle crashes, the crash causes are distributed across a much larger number of behaviors; however, improper yielding (by both drivers and bicyclists) and improper turning were the most frequently cited traffic violations and were associated with 27 percent and 14 percent of bicycle crashes, respectively.

A few combinations of motorist, bicyclist, and pedestrian movements are associated with severe crashes in Alameda. The most common crash types vary by roadway user.
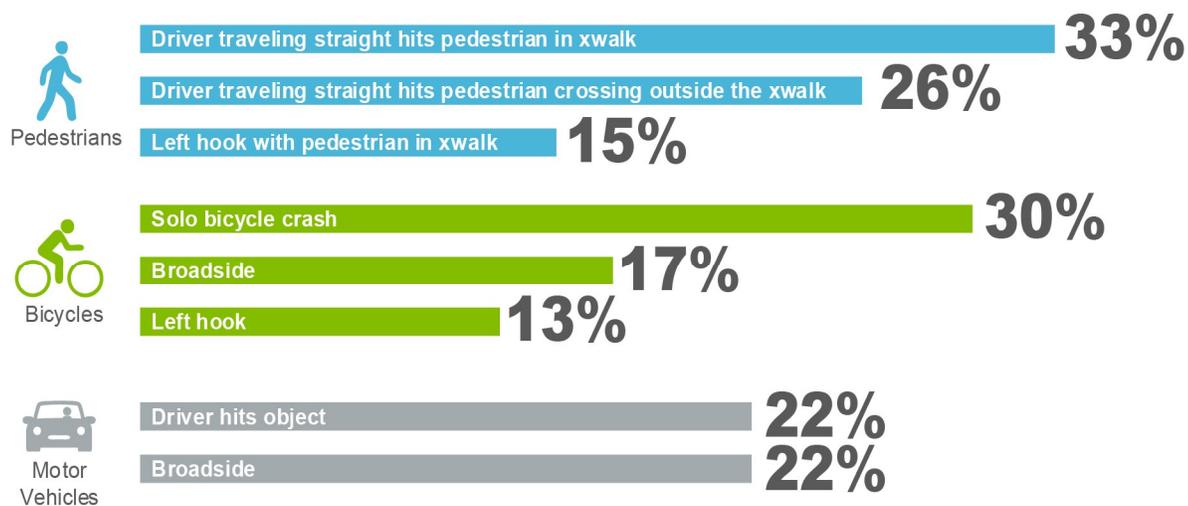
Pedestrians

- Driver traveling straight hits pedestrian in xwalk **33%**
- Driver traveling straight hits pedestrian crossing outside the xwalk **26%**
- Left hook with pedestrian in xwalk **15%**

Bicycles

- Solo bicycle crash **30%**
- Broadside **17%**
- Left hook **13%**

Motor Vehicles

- Driver hits object **22%**
- Broadside **22%**

Figure 5. Most Common Road User Movements Associated with Severe Crashes
Broadside = T-bone crash where both road users are traveling straight in perpendicular travel paths
Left hook = one road user is traveling straight, the other is turning left

63% of crashes involving younger victims (ages 18 or younger) occurred within ¼ mile of a school while only 38% of Alameda's streets are within a ¼ mile of a school.

A disproportionate share of severe crashes occurred during dark conditions (with streetlights present). This trend was most pronounced among pedestrian crashes.

SPEED MATTERS

As shown in figures three and four, speeding was among the top factors associated with all crashes and severe crashes in Alameda. It was associated with 26 percent of automobile-automobile crashes and 35 percent of motorcycle crashes. While *unsafe speed* was only noted as a factor in a small share of crashes involving bicyclists and pedestrians, all travel at *higher* speeds has a direct influence on road user safety. Speed impacts the ability of road users to avoid a crash and impacts victim injury severity if a crash occurs; the impacts are especially significant for crashes between motor vehicles and pedestrians or bicyclists. The speed limit on most Alameda streets is 25 mph.
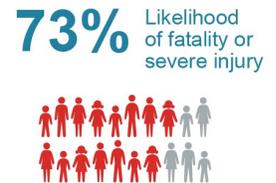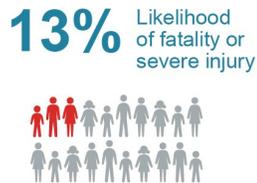
When a person is driving at...

20 MPH   30 MPH   40 MPH

this is their field of vision.

It takes[1]...

115' TO STOP   200' TO STOP   305' TO STOP

Pedestrians hit at this speed have a...

13% Likelihood of fatality or severe injury

40% Likelihood of fatality or severe injury

73% Likelihood of fatality or severe injury

[1] Includes 2.5 seconds breaking reaction time.

Sources: Bartmann, A., Spijkers, W., and Hess, M. 1991. Street Environment, Driving Speed and Field of Vision. Vision in Vehicles III.
W. A. Leaf, W.A. and Preusser, D.F. Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. DTNH22-97-D-05018 Task Order 97-03. U.S. Department of Transportation, 1999.
AASHTO Green Book—A Policy on Geometric Design of Highways and Streets, 7th Edition. American Association of State and Highway Transportation Officials, 2018.
Teff, B. 2013. Impact Speed and a Pedestrian's Risk of Severe Injury or Death. Accident Analysis & Prevention, 50(87): 1-8. DOI: 10.1016/j.aap.2012.07.022

Figure 6. As Speed Increases, a Driver's Field of Vision Decreases, and the Distance and Time Required to Stop and Avoid a Crash Increases but is Less Likely to be Available

STREET DESIGN

One of the core tenets of Vision Zero is designing streets that are forgiving. While it is important for all road users to travel safely and follow the law, Alameda's streets should be designed so that if someone makes a mistake the result is not a life-altering injury or death. The crash analysis indicates that certain locations are associated with a higher share of crashes than others. Implementing evidence-based design improvements at locations associated with a higher number of crashes and identifying the common design elements of these locations can help Alameda reduce the likelihood and severity of crashes that occur.

Arterial streets are disproportionately dangerous for all road users. These types of streets have higher motor vehicle volumes than local streets, and often also have more travel lanes; examples of arterial streets include Park Street, Broadway, Lincoln Avenue, and Otis Drive. These streets have a higher share of pedestrian and bicycle crashes in terms of frequency and severity on a per-mile basis. According to public input, these roadways also had a higher share of near misses (also called close calls) compared to local streets.

The vast majority of all crashes and severe crashes occurred at intersections, specifically unsignalized intersections. This trend is especially prominent among bicycle crashes. This suggests a need for

60% of all crashes and 62% of severe crashes occurred on arterials.
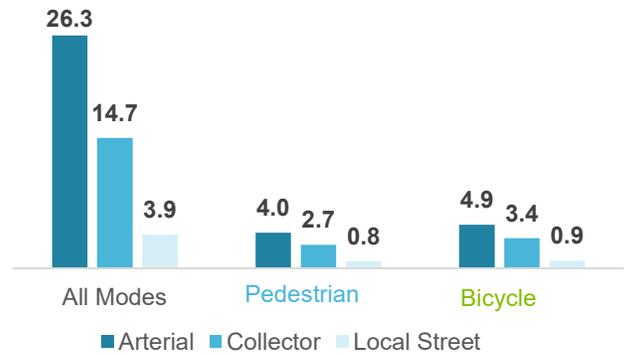
Figure 7. Number of Crashes per Mode Per Mile

enhanced crossing treatments at unsignalized locations.

Public feedback indicated that unsignalized intersections had a higher share of near misses compared to signalized intersections or non-intersection locations. However, less than seven percent of intersections in Alameda are signalized, indicating that a disproportionate share of crashes (and severe crashes) among all modes occurred at signalized intersections., since nearly 22 percent of crashes occurred at signalized intersections.
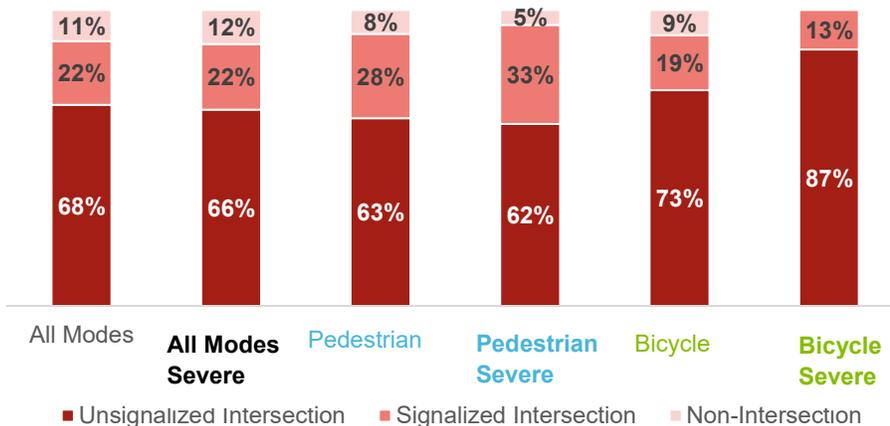
Figure 8. Location of Crashes by Mode for All Crashes and Fatal and Life-altering Injury Crashes

Crashes involving all types of road users were mapped and analyzed to identify the most dangerous streets in Alameda; these streets are referred to as high injury corridors. The high injury corridor map was developed by identifying the streets with the highest crash densities and weighting crashes by severity. Crashes that resulted in a fatal or life-altering injury received a higher weight than other injury crashes. The high injury corridors map is a useful tool for focusing design improvements and other roadway safety strategies to where they are likely to have the largest impact on improving safety for all users.

73% of crashes occurred along 20% of Alameda's roadways.

High Crash Intersections and High Injury Corridors - All Modes

Crash Analysis, 2009-2018 Data
City of Alameda,

- ⊙ High Crash Intersection
- **High Injury Corridor Tiers**
  - Tier 1
  - Tier 2
  - Tier 3

- Hospital
- Shopping and Business
- Parks
- Future
- Schools and Libraries
- Municipal

0   0.25   0.5 mi

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VISION ZERO ALAMEDA
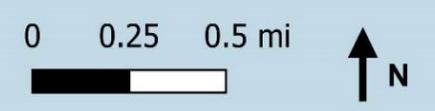
The network of High Injury Corridors was broken into three tiers with Tier 1 indicating the streets with the greatest frequency and severity of crashes. Tiers were determined through investigation of natural breaks in the data analysis of crash totals.
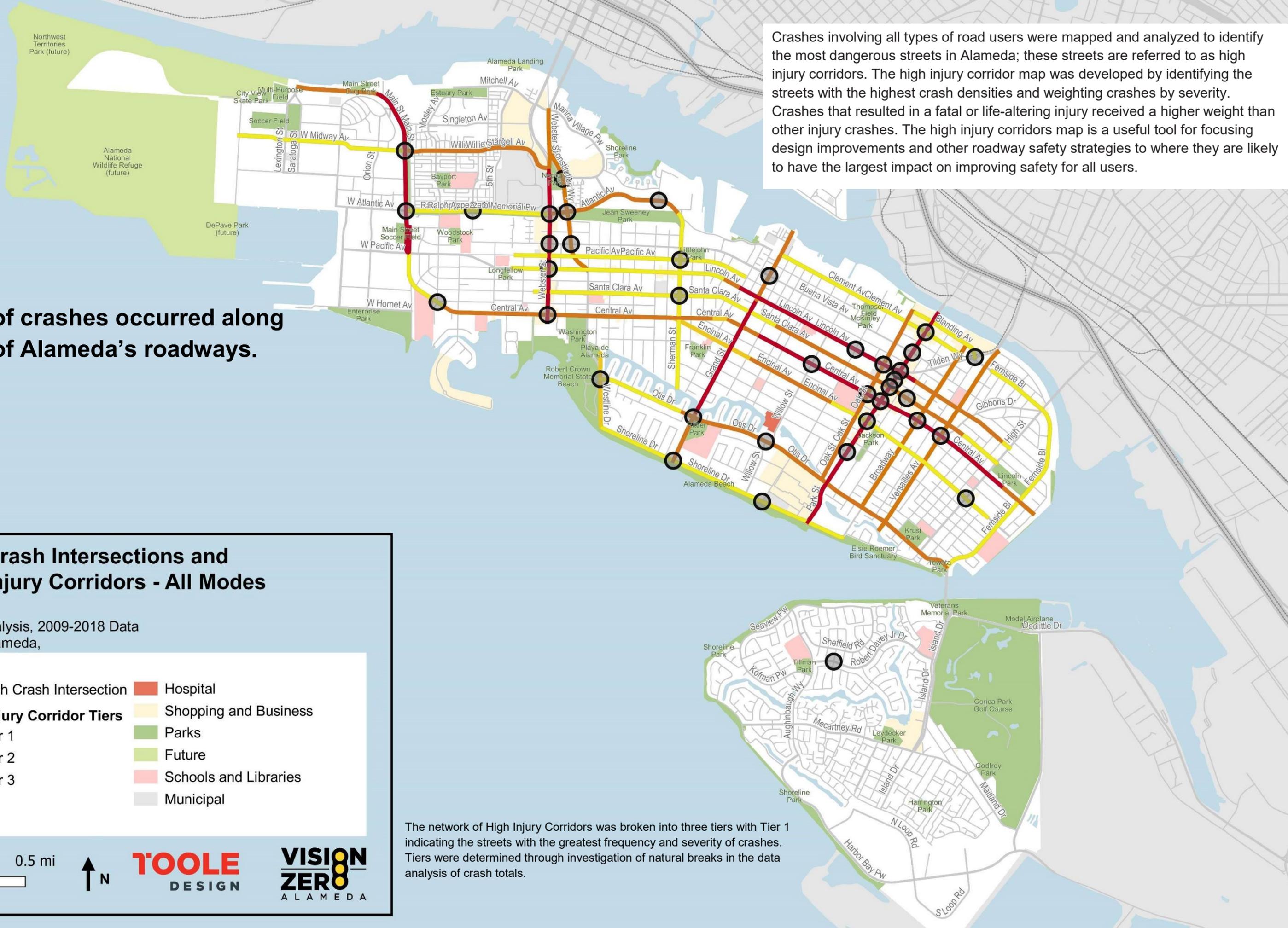
41% of severe crashes occurred in a Socially Vulnerable Community while only 30% of Alameda's roadways are within a Socially Vulnerable Community.

Crashes Compared to Areas of High Social Vulnerability

Crash Analysis, 2009-2018 Data
City of Alameda

Crashes in Areas with High Social Vulnerability

● Severe Crash
● Non-severe Crash

Other Crashes

● Severe Crash
● Non-severe Crash

Highest and High Social Vulnerability Level

Hospital

Shopping and Business

Parks

Future

Schools and Libraries

Municipal

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This analysis was normalized by the mileage of roadways in Socially Vulnerable Areas compared to the mileage outside of these areas. Socially Vulnerable Communities include those categorized as "High" or "Highest" in the Social Vulnerability Assessment completed for the City of Alameda's *Climate Action and Resiliency Plan* (2019).

Pedestrian High Injury Corridors

Crash Analysis, 2009-2018 Data
City of Alameda

High Injury Corridor Tiers
— Tier 1
— Tier 2
— Tier 3

Hospital
Shopping and Business
Parks
Future
Schools and Libraries
Municipal

0   0.25   0.5 mi

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Bicycle High Injury Corridors

Crash Analysis, 2009-2018 Data
City of Alameda

High Injury Corridor Tiers
— Tier 1
— Tier 2
— Tier 3

Hospital
Shopping and Business
Parks
Future
Schools and Libraries
Municipal

0   0.25   0.5 mi

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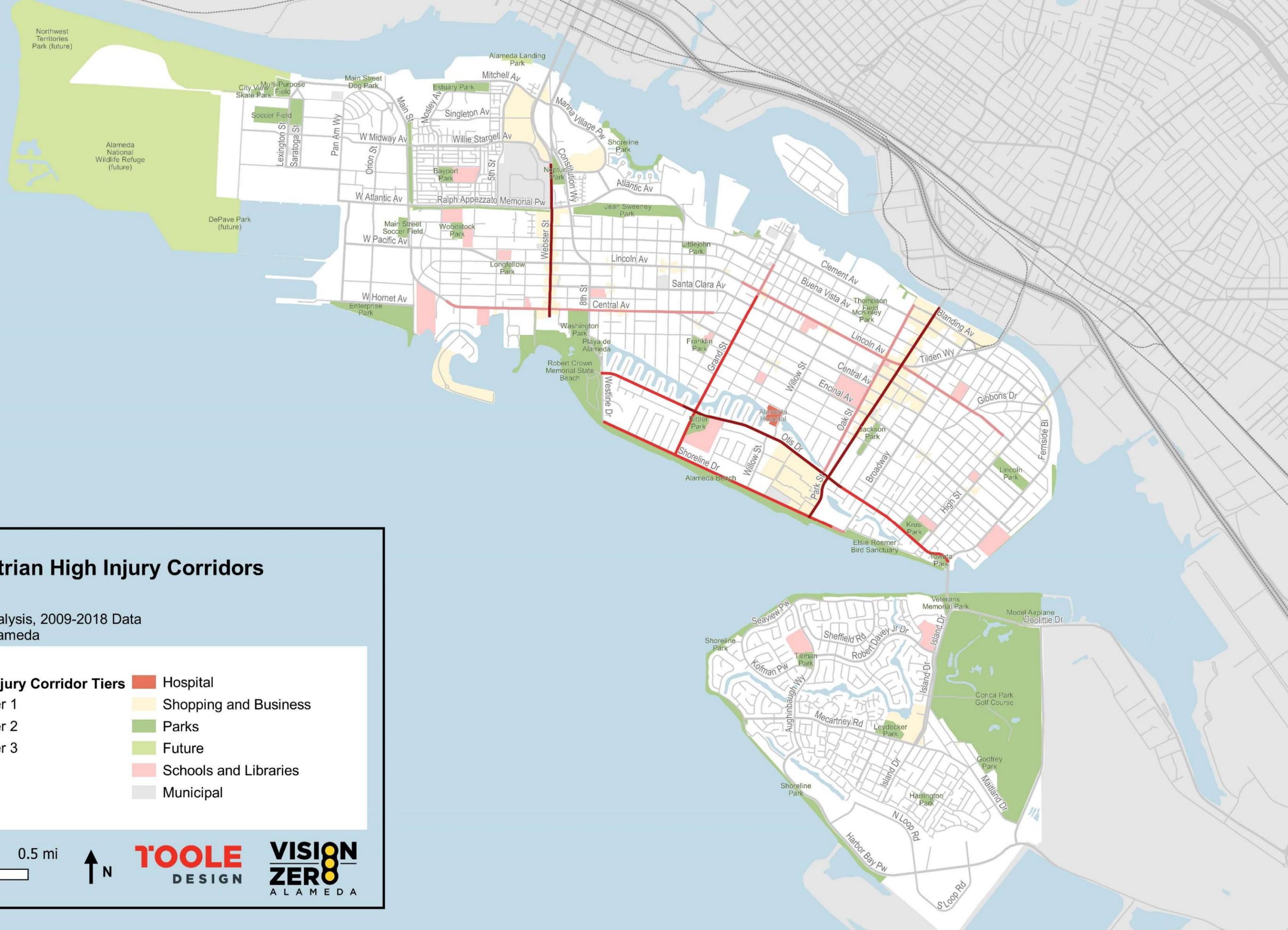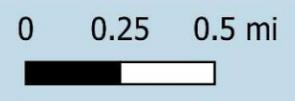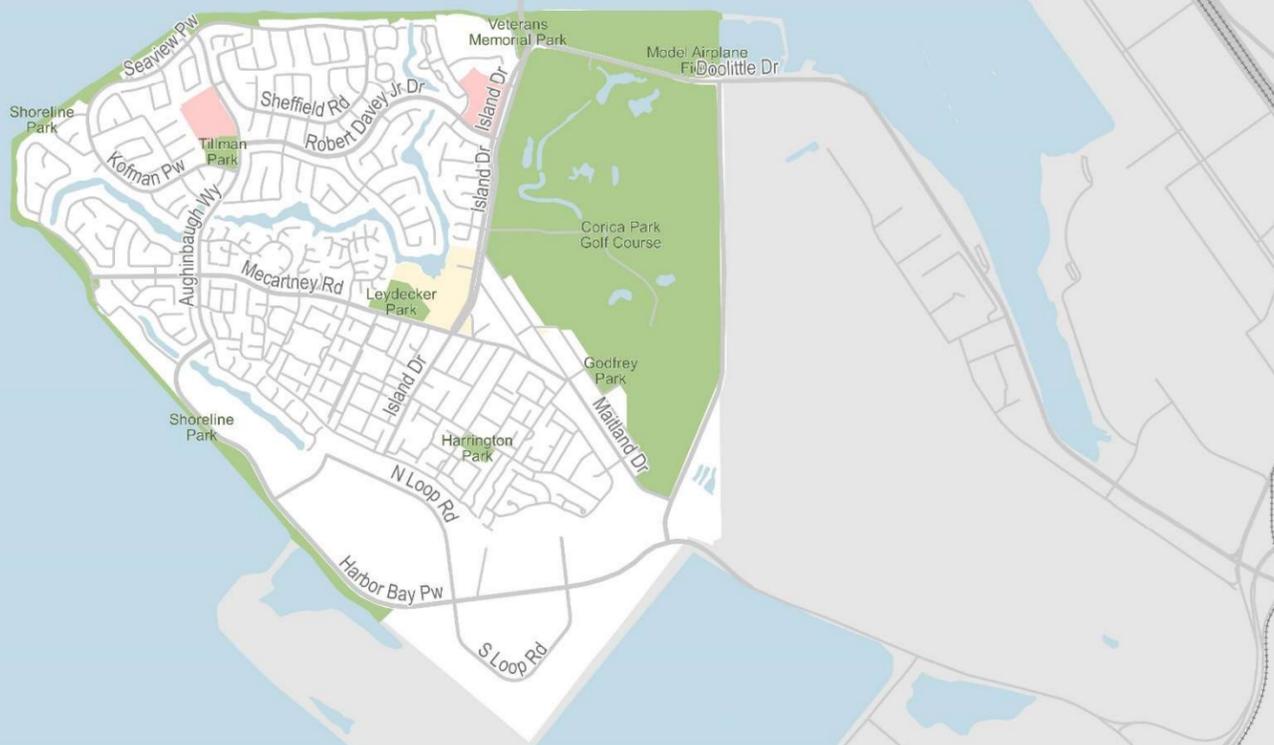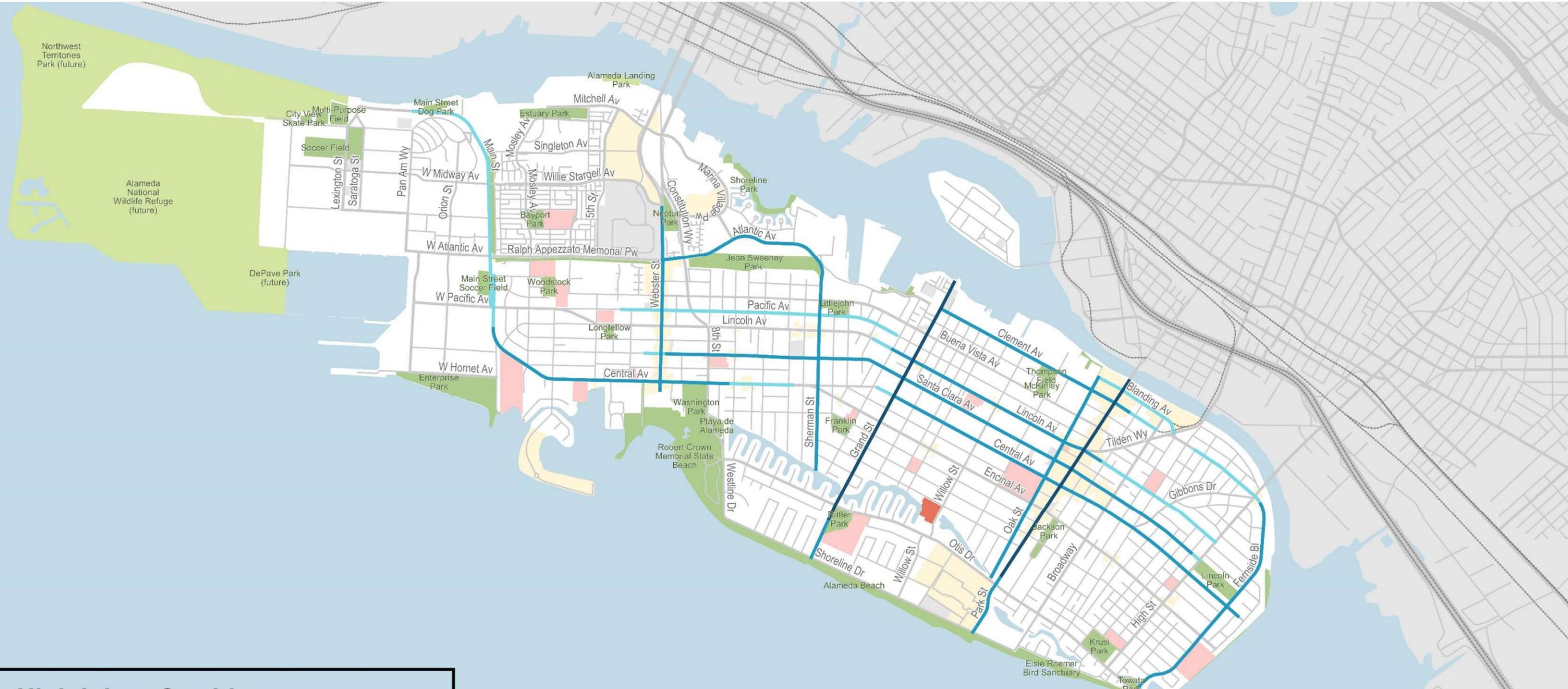
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Motorcycle High Injury Corridors

Crash Analysis, 2009-2018 Data
City of Alameda

High Injury Corridor Tiers

— Tier 1
— Tier 2
— Tier 3

Hospital
Shopping and Business
Parks
Future
Schools and Libraries
Municipal

0   0.25   0.5 mi

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Automobile High Injury Corridors
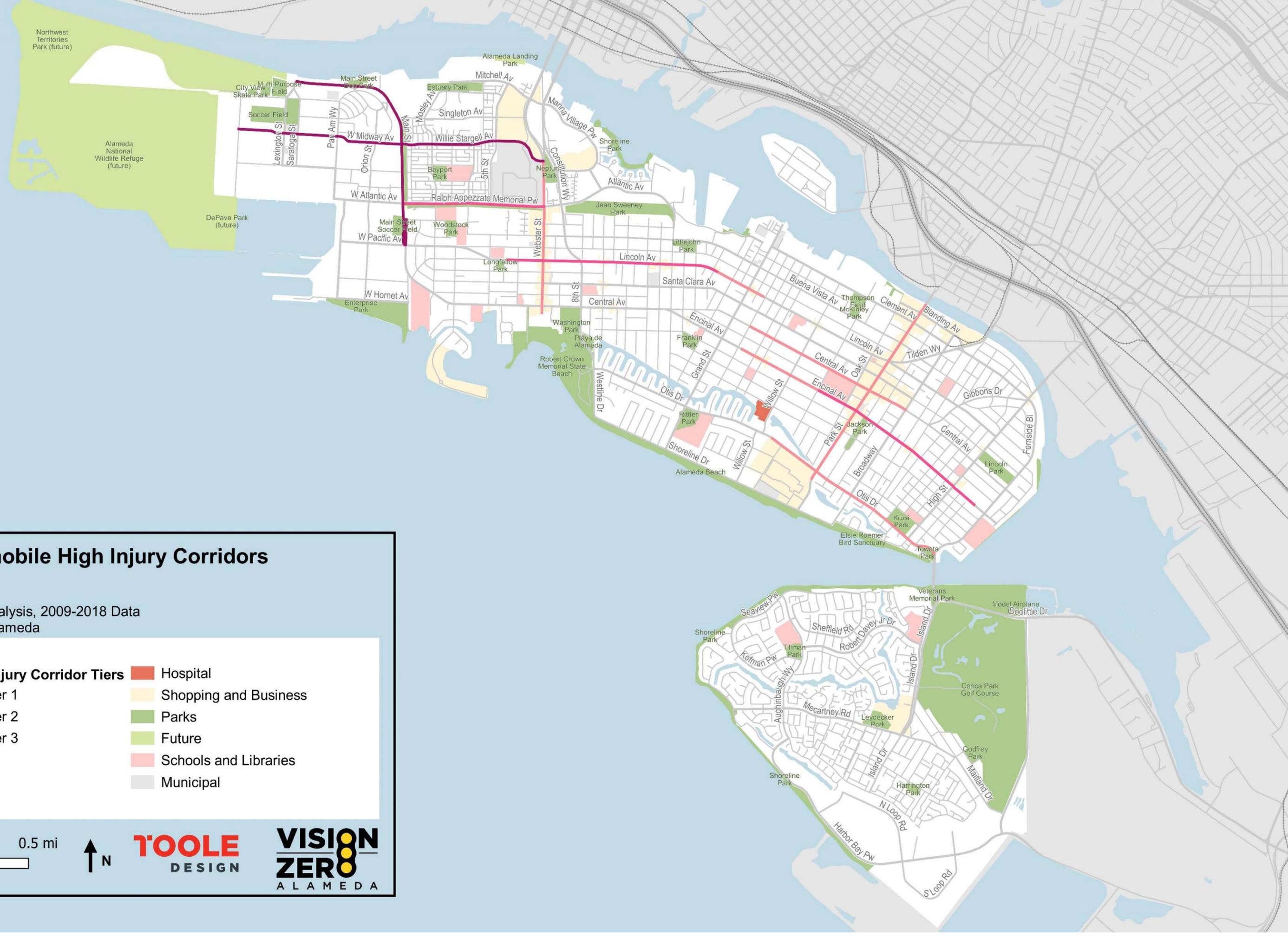
Crash Analysis, 2009-2018 Data
City of Alameda

High Injury Corridor Tiers

— Tier 1
— Tier 2
— Tier 3

Hospital
Shopping and Business
Parks
Future
Schools and Libraries
Municipal

0   0.25   0.5 mi

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NEAR MISSES

As part of the Alameda Active Transportation planning process, an online, interactive map was open to the public in December and January 2020. Members of the public could provide feedback on bicycle and pedestrian conditions via two separate maps: one for bicycling facilities and the other for pedestrian facilities. On the maps, users were asked to identify locations where they were nearly hit by a motor vehicle, also known as a near miss. Approximately 75 unique individuals provided input. These users identified a total of 85 locations where near misses

occurred. The figures on the following two pages show the near misses associated with the online pedestrian and bicycle maps, respectively. Responses were dispersed throughout the city, but several near-miss locations were located on the bicycle and pedestrian high injury corridors. Some near misses do not align with the bicycle or pedestrian high injury corridors but do align with the all modes HIC (e.g., parts of Lincoln Avenue and Fernside Boulevard, Shoreline Drive, and Otis Drive). Note that while some users provided input on both the bicycle and pedestrian maps, other users only provided input on the first map they saw (bicycle map), regardless of which mode they were commenting about.

Reported Near Misses,
Online Pedestrian Map

City of Alameda

Reported Near Misses
• Near Miss
— Near Miss

Crash Analysis, 2009-2018 Data
○ Pedestrian Crash
— Pedestrian High Injury Corridors

■ Hospital
■ Shopping and Business
■ Parks
■ Future
■ Schools and Libraries
■ Municipal

0   0.25   0.5 mi

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ALAMEDA

Reported Near Misses, Online Bicycle Map

City of Alameda

Reported Near Misses
- Near Miss
- Near Miss

Crash Analysis, 2009-2018 Data
- Bicycle Crash
- Bicycle High Injury Corridor

Hospital
Shopping and Business
Parks
Future
Schools and Libraries
Municipal

0   0.25   0.5 mi

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VISION ZERO ALAMEDA

This map includes some reported pedestrian near-misses. Because the bicycle map loaded first, some users provided all their input on it, regardless of which mode they were commenting about.

Northwest Territories Park (future)
Multi-Purpose Field
City View Skate Park
Soccer Field
Alameda National Wildlife Refuge (future)
DePave Park (future)
Main Street Dog Park
Estuary Park
Alameda Landing Park
Mitchell Av
Singleton Av
Main St
Mosley Av
Willie Stargell Av
Lexington St
Saratoga St
Orion St
Pan Am Wy
W Midway Av
W Atlantic Av
Beaufort Av
Mosley Av
Coral Sea St
5th St
Viking St
Shoreline Park
Neptune Marina
Atlantic Av
Jean Sweeney Park
Woodstock Park
Main Street Soccer Field
W Pacific Av
Pacific Av
Longfellow Park
Lincoln Av
Buena Vista Av
W Hornet Av
Enterprise Park
Washington Park
Playa de Alameda
Robert Crown Memorial State Beach
Westline Dr
Franklin Park
Santa Clara Av
Thompson Field
McKinley Park
Clement Av
Blanding Av
Tilden Wy
Willow St
Encinal Av
Central Av
Broadway
Gibbons Dr
Fernside Bl
Littlejohn Park
Alameda Hospital
Jackson Park
Lincoln Park
Alameda Beach
Willow St
Elsie Roemer Bird Sanctuary
Krusi Park
Towata Park

Veterans Memorial Park
Model Airplane Field
Doolittle Dr
Shoreline Park
Seaview Pw
Sheffield Rd
Robert Davey Jr Dr
Island Dr
Corica Park Golf Course
Kofman Pw
Tillman Park
Aughinbaugh Wy
Mecartney Rd
Leydecker Park
Island Dr
Maitland Dr
Godfrey Park
Shoreline Park
Harrington Park
Harbor Bay Pw
N Loop Rd
S Loop Rd