

Fremont Vision Zero – A Safe City Getting Safer

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1. Executive Summary

Fremont, California is a mid-size city in the San Francisco Bay Area that was an early adopter of Vision Zero traffic safety policy. Fremont has achieved a more than 50 percent reduction in major crashes (severe injuries and fatalities) in just three years since adopting Vision Zero. Fremont's Vision Zero action plan encompasses safer streets, safer people, and safer vehicles. Fremont has taken an opportunistic and proactive approach to implementing Vision Zero. Fremont has focused on systematic deployment of proven countermeasures that are based in analysis of major types of crashes in the City, such as LED streetlighting, citywide pedestrian countdown signals, enhanced uncontrolled pedestrian crossings, and narrower travel lanes. Fremont has also leveraged partnerships with other City Departments. These strategies have enabled Fremont to achieve its notable safety results with no additional dedicated funding or staffing for Vision Zero.

2. Background and policy adoption

Fremont, California is a mid-size city (235,000 population) in the San Francisco Bay Area. Fremont is the 4th largest city in the region and is a suburban community with a general plan focused on creating "strategic urbanism" in key nodes. Fremont is an ethnically diverse, family friendly city with excellent schools, regional transit connections. Fremont is located within the Silicon Valley area with Tesla Motors as the City's largest employer.

Fremont was an early adopter in the growing movement of cities in the United States that have embraced Vision Zero traffic safety policies. Fremont adopted its Vision Zero policy in late 2015 and subsequently approved a Vision Zero Action Plan in early 2016. Fremont was the seventh City nationally to implement a Vision Zero Action Plan (and the first mid-sized city).

Vision Zero is an approach to planning, designing, and operating the transportation system that is characterized by a bold goal of eliminating major traffic crashes (those crashes resulting in severe injuries or fatalities). A Vision Zero approach recognizes that drivers are prone to error and crashes are an inevitable occurrence, but holds that the outcome of crashes need not be life altering injuries or death. Vision Zero jurisdictions use rigorous analysis of crash data to focus interventions. Vision Zero jurisdictions approach the design and operation of the transportation with safety as the highest goal, including designing streets for safe speeds which improve reaction times and reduce crash severity and to minimize and control interactions between vulnerable road users and motor vehicles. Vision Zero jurisdictions also use a combination of education and enforcement to reduce high risk behaviors such as excessive speeding and impaired driving.

Fremont was already a leader in transportation safety when it adopted its Vision Zero policy. In 2015, Fremont's rate of fatal crashes (3.5 per 100,000 population) was substantially below the statewide rate for California (7.8) and the nation (10.3). Fremont had an engaged police department that tracked crashes as a performance measure, 10 intersections were equipped with automated red light enforcement, and the City had a robust traffic calming program with over 200 speed lumps located in neighborhoods citywide. Despite its strong baseline as a safe city, 2015 saw an uptick in crashes versus previous years, which led to interest from local political leaders in joining the Vision

Zero movement. Fremont’s adoption of Vision Zero has paid significant dividends, as the City has achieved a more than 50 percent reduction in major traffic crashes since 2015.

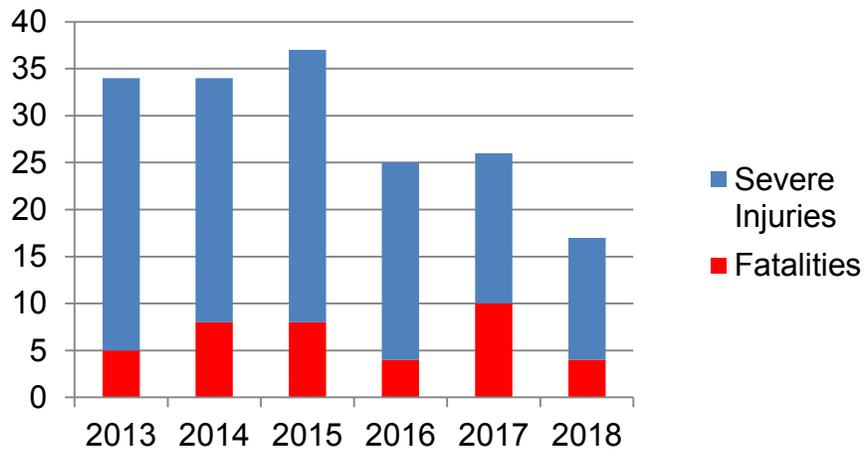


Figure 1: Fremont has seen a more than 50 percent decline in major crashes since implementing Vision Zero in 2015

3. Vision Zero Action Plan

Fremont began its efforts to implement its Vision Zero policy with a thorough analysis of major crash data, including locations of crashes and common collision factors and circumstances. The analysis revealed that approximately 50 miles of streets in Fremont (10 percent of the City’s network mileage) accounted for 90 percent of fatalities and 67 percent of major crashes. This “Safety Priority Network” is comprised entirely of arterial roadways, most of which have posted speed limits of 35 mile per hour or greater. The finding that most severe crashes are on arterials has been invaluable for staff in justifying a significant focus in attention and resources on these streets (particularly when public complaints and inquiries often focus on local streets).

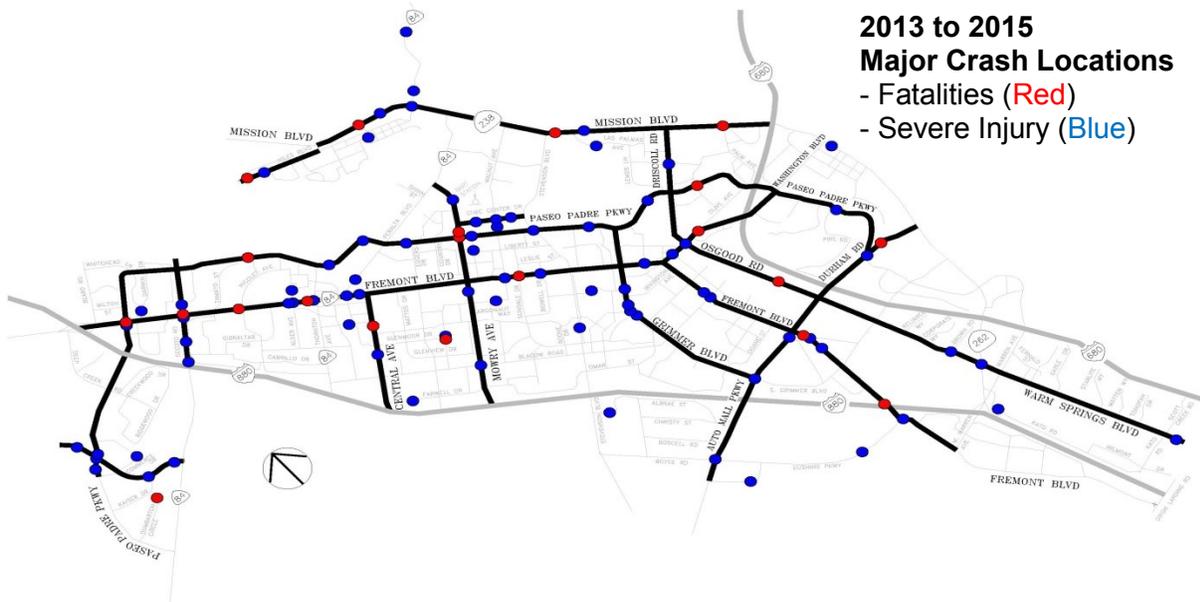


Figure 2: Fremont's Safety Priority Streets comprises 10 percent of roadway miles and includes 90 percent of fatal crashes

City staff used the collision analysis to develop the City’s Vision Zero Action Plan. The Action Plan included key focus areas of safer streets, safer people, and safer vehicles and actions with clear connections to frequent collision types. For instance, analysis of crash data indicated several instances of pedestrians crossing with insufficient walk time, leading to inclusion of an action to retrofit all traffic signals citywide with pedestrian countdown signals. Similarly, crash data revealed an overrepresentation of crashes after dark. In response, staff undertook an upgrading of all 16,000 street lights citywide from “yellow” sodium vapor to “white” LED. The citywide retrofit was expedited by bonding against future operating expense savings from more energy efficient lighting. Crash data also revealed a number of crashes involving DUI or other types of impairment. Transportation staff worked with the Police Department to focus Traffic Unit enforcement efforts on DUI and speeding, to triple the number of traffic stops, and to ensure focus on safety priority streets. The City’s Police Department expanded enforcement efforts beyond the day shift Traffic Unit to include evening shift patrol officers by providing training and purchasing additional equipment for these officers. Notably, the Police Department has focused on traffic stops (which provide a teaching moment and a visible enforcement presence) as opposed to citations.

VISION ZERO ACTION PLAN

SAFER STREETS

- 1 ENHANCE PEDESTRIAN CROSSINGS
- 2 TAME HIGH-SPEED ARTERIAL STREETS
- 3 PROVIDE NEW TRAFFIC SIGNALS AT PRIORITY LOCATIONS
- 4 EXPAND SAFE ROUTES TO SCHOOLS PROGRAMS
- 5 BUILD BETTER BIKEWAYS
- 6 MAKE FREEWAY INTERCHANGES SAFER FOR WALKING AND BICYCLING

SAFER PEOPLE

- 7 EXPAND TRAFFIC SAFETY PROGRAMS
- 8 CONTINUE TARGETED ENFORCEMENT OF SPEEDING
- 9 REDUCE IMPAIRED DRIVING

SAFER VEHICLES

- 10 PROMOTE CRASH AVOIDANCE TECHNOLOGY IN VEHICLES

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Figure 3: Fremont’s Vision Zero Action Plan

A major focus of the City’s Action Plan has been taming high speed arterial streets. In the three years preceding adoption of Vision Zero, more than half of crashes (61 of 104) happened on roadways with posted speed limits of 40 mph or more (and 82 of 104 on roadways with speed limits of 35 mph or more). Most of Fremont’s arterials were built with 12’ to 14’ wide travel lanes and 5’ to 7’ bike lanes. To manage speeds and promote safety, the City has implemented a 10’ travel lane standard on all arterial roadways, based on research that this lane width maximizes safety on urban streets. Excess width is used to add bike lane buffers, providing additional protection and enhancing comfort for cyclists. Bike lane buffers also accommodate large vehicles, by providing a space that they can overhang. The City has implemented more than 40 miles of 10’ travel lanes and bike lane buffers to date by systematically using this design standard in pavement maintenance projects. Moreover, beginning in 2019, the City is accelerating implementation of these safe and

complete streets by implementing striping only projects that target safety priority streets (and key bikeway connections) where pavement is in good condition (and no pavement maintenance work is planned in the next 5 years). The City ultimately aims to conduct speed surveys and lower posted speeds on these roadways based on changed operating conditions. Speed limits were lowered on 12 segments in the last citywide speed survey (2015) which captured early years of the new complete street design standards.



Figure 4: Narrowed travel lanes promote speed management and more comfortable bike facilities

Enhancing pedestrian crossings has been another significant focus of the City's Vision Zero efforts. The City has completed significant planning work to identify priority locations for enhanced pedestrian safety, including a Pedestrian Master Plan which inventoried all uncontrolled crossings citywide and conducting Safe Routes to Schools safety audits at all 42 public schools (a two-year effort achieved through a partnership with the City's school district). Fremont is systematically implementing high visibility crosswalks, advance yield lines, in-pavement "yield to pedestrian" markers, and delineators between travel lanes at uncontrolled crossings citywide. The delineators and yield markers serve to raise awareness of the crossing location, slow motorists approaching the crosswalk, and physically prohibit lane changing behavior which can lead to "multiple threat" crashes. Fremont is also systematically implementing "paint and plastic" bulbouts at school crossings and at crosswalk locations along major arterial roadways citywide. These pedestrian crossing improvements are being implemented rapidly through a partnership between the City's Transportation Division and Street Maintenance Division.

Fremont's Vision Zero program has also included significant education and outreach component. The City has promoted its program and distributed educational materials through a variety of media including City Newsletters mailed to all residents, advertisements on local transit buses, social media, tables at community events, media appearances, presentations at local organizations and committees, and giveaways such as stickers and kites with a Fremont Vision Zero

logo. Communications have focused on promoting the concept/approach of Vision Zero and educating users on how to use new types of roadway striping and traffic control devices.



Figure 5: Yield markers and delineators improve yielding compliance and prevent "multiple threat" crashes

A unique aspect of Fremont's Vision Zero program has been a focus on safer vehicles, including technologies such as blind spot detection, advance pedestrian and bicycle warning, and forward collision warning. Fremont's focus on safer vehicles as a pillar of its program stems in part from Transportation staff's regular review of collision reports, including the detailed narratives from traffic enforcement unit officers. A subset of crashes are best described as drivers approaching the limits of human perception and reaction, in which "typical" driving behavior results in a severe crash that could have been prevented by safety technologies available in vehicles today. All major auto manufacturers in the U.S. have voluntarily agreed to install safer vehicle technologies in all new vehicles by model year 2022. Fremont's Safer Vehicle work includes educating the Fremont community as to the benefits of these technologies to accelerate deployment and to ensure that drivers do not disable safety features.

4. Initial results

2018 marked the third full year since Fremont adopted its Vision Zero policy, and the City's actions and investments have led to significant reductions in major traffic crashes. Severe injury and fatal crashes have dropped by more than 50 percent, from 36 major crashes in 2015 to just 17 in 2018. This decline has come even as collisions have increased in the Bay Area and nationally. Fremont's rate of fatal crashes per capita is now down to just 1.7 fatalities per 100,000 in population, significantly lower than the national and state rates and lower than the rates for the Bay Area and the three most populous cities in the region (San Francisco, Oakland, and San Jose).

Fremont has also seen declines in types of collisions that correspond to specific actions that the City has taken. Comparing the three years prior to Vision Zero with the three years after adoption, collisions after dark have dropped by 23 percent and collisions involving DUI have dropped by 33

percent. These declines may reflect the City’s work to upgrade streetlights to brighter LEDs and increased DUI saturation patrols. Crashes on roads with a posted speed limit of 40 mph or more have dropped by 52 percent and crashes involving pedestrians have dropped by 38 percent, which may reflect actions to manage speeds on major arterials (narrower lanes, increased enforcement) and to enhance pedestrian crossings.

Table 1: Fremont Fatal Crash Benchmarking

Jurisdiction	Fatal Crashes	Population	Fatalities per 100,000 population
U.S.	37,133	327,000,000	11.4
California	3,602	39,800,000	9.0
Bay Area	455	7,770,000	5.9
San Jose	52	1,050,000	4.9
Oakland	16	430,000	3.7
San Francisco	23	880,000	2.6
Fremont	4	235,000	1.7

Table 2: Fremont Major Crash Trends

Category	Type	2013	2014	2015	Pre-Vision Zero 2013-2015	2016	2017	2018	Post Vision Zero 2016-2018	Change
Severity	Major Crashes	34	34	36	104	25	26	17	68	-35%
	Fatal Crashes	5	8	8	21	4	10	4	18	-14%
	Severe Crashes	29	26	28	83	21	16	13	50	-40%
Mode (Major Crashes)	Pedestrian	9	8	17	34	7	7	7	21	-38%
	Bike	6	3	4	13	4	1	3	8	-38%
	Motorcycle	5	6	1	12	4	6	2	12	0%
	Motor Vehicle	14	17	14	45	10	12	5	27	-40%
Speed (Major Crashes)	35 mph or less	15	17	11	43	15	16	7	38	-12%
	40 mph or more	19	17	25	61	10	9	10	29	-52%
Special Conditions	DUI	5	5	5	15	2	7	1	10	-33%
	Dark	14	15	18	47	16	10	10	36	-23%

5. Next steps

In coming years, the Fremont’s Vision Zero actions can largely be characterized as “continuing what is working.” Fremont plans to continue with systematic application of narrower travel lanes on arterial roadways, with a goal of retrofitting all safety priority arterials with a 10’ lane width complete street design standard within five years. The City is supplementing these narrower travel lanes with radar

feedback speed limit signs at 20 “hot spot” locations identified through crash analysis. In 2019, the City is also conducting a “mid-cycle” speed survey to ascertain if improvements on major arterials have brought about a decrease in operating speeds that justifies reductions in posted speed limits based on the 85th percentile speed. Ultimately, Fremont envisions setting speed limits citywide based on policy priorities and context rather than existing motor vehicle operations.

Fremont will also continue enhancing pedestrian crossings citywide. The City will install high visibility crosswalks and yield markers at all uncontrolled crossings by the end of 2019 as a short-term measure. Longer-term, the City plans to install Rectangular Rapid Flashing Beacons or Pedestrian Hybrid Beacons at all uncontrolled crossings on arterial roadways citywide (16 of 40 locations have projects implemented or in design). In addition, the City is currently conducting a systemic analysis of locations where pedestrian crossing demand is high but no formal crossing opportunity is provided and of pedestrian crossing locations that do not meet minimum lighting standards. These questions are being investigated based on continued review of crash data that indicate that while severe and fatal pedestrian collisions overall have declined, these areas persist as causes of pedestrian involved crashes.

Fremont will continue to implement school area safety and better bikeway improvements in coming years. The City is undertaking a two-year effort to implement “short-term” improvements at all schools citywide, including new stop-signs, upgraded crosswalks, daylighting of intersections and school driveways, and “paint and plastic” bulbouts, and other “quick build” improvements. These improvements follow directly from the school safety assessments conducted at all 42 Fremont schools and are being implemented using City Maintenance Crews. The effort began in 2018 and will conclude in 2019. The City will also implement better bikeways, converting the buffered bike lanes it has installed as part of complete street retrofits to separated bikeways by installing vertical delineators in the buffers. In addition, Fremont currently has 10 protected intersections in design and construction (a mix of grant funded projects and developer improvements) all of which should be implemented by 2020.

Fremont plans to continue efforts related to outreach and engagement, supplementing its current initiatives. Fremont will deploy a street banner program (with safety messages that target high risk behaviors based on crash data). The City is also developing a reckless driving testimonial video, through a collaboration with the Police Department and the mother of a teenage driver who died in a high speed crash who agreed to share her perspective on the emotional impact. The City is also working with other Vision Zero cities in the region to pursue broader media engagement around traffic safety and the Vision Zero approach.

6. Lessons learned and transferability

Fremont has achieved big results, as a mid-sized city making relatively small but impactful investments. Fremont’s experience and success holds a number of lessons, particularly for small- to mid-size cities that are considering starting a Vision Zero program, but may not see the model of larger cities as relevant.

Fremont has demonstrated that a Vision Zero program can be started and implemented with existing staff resources and no new funding. Fremont has conducted all analysis and developed its Action Plan in house and has no dedicated Vision Zero Program Manager. Fremont did reallocate \$2

million in funding from existing projects to new priorities in conjunction with adopting its Vision Zero policy, but by and large its safety interventions, enforcement efforts, and outreach have been achieved by making sure that existing projects and initiatives have a safety focus.

Fremont has found significant value from a partnership with Police Department. The Transportation Division holds regular coordination meetings with PD Traffic Enforcement officers who often have very helpful information and serve as “eyes on the street.” Fremont PD shares detailed collision reports with Transportation staff for all severe and fatal crashes, which have extremely helpful information as to the circumstances surrounding a crash not available in standard crash databases. The detailed collision reports often spur additional analysis of whether circumstances leading to a crash need to be addressed through more systemic intervention.

Fremont has found adoption of a Vision Zero policy and identification of a Safety Priority Network extremely valuable in justifying to elected leaders and community members a focus on arterials rather than neighborhood streets. Identifying a Safety Priority Network has also been a powerful tool for answering questions from community members about why a street is being redesigned.

Fremont has maximized value from use of existing projects (e.g. pavement maintenance) and from City maintenance crews. This approach of ensuring that existing projects focus on safety and consider all opportunities to implement low-cost, high-impact countermeasures has allowed Fremont to implement numerous safety improvements with no new funding.



Figure 6: “Paint and plastic” bulbout implemented to improve a school crossing

Lastly, Fremont is demonstrating that engineering details matter, and in particular that there is significant value from a 10’ travel lane width standard. The downward trend in collisions on higher speed roadways suggests that the continued retrofit of arterials is paying dividends. Anecdotally, Fremont community members report that the narrower lanes “feel tighter” and force them to pay closer attention to the driving task.