APPENDIX A:
VISION ZERO POLICY RESOLUTION

CITY OF CONCORD
RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CONCORD ADOPTING THE COMPREHENSIVE SAFETY ACTION PLAN (CSAP) AND COMMITTING TO A VISION ZERO GOAL OF ELIMINATING ALL TRAFFIC FATALITIES AND SERIOUS INJURIES BY 2050

WHEREAS, the City of Concord is committed to the health, safety, and wellbeing of all people who live, work, and travel within the City, regardless of their mode of transportation; and

WHEREAS, traffic fatalities and serious injuries are preventable and represent a significant public safety and public health concern requiring a proactive and coordinated response; and

WHEREAS, the United States Department of Transportation established the Safe Streets and Roads for All (SS4A) program to support local agencies in developing and implementing Comprehensive Safety Action Plans to significantly reduce roadway fatalities and serious injuries; and

WHEREAS, crashes within the City of Concord necessitate a comprehensive and coordinated approach to street planning, design, policy, enforcement, legal processes, education, and public communication; and

WHEREAS, the City has developed a Comprehensive Safety Action Plan (CSAP) to analyze collision trends, identify high-injury locations, and establish data-driven strategies to improve roadway safety and reduce traffic-related harm for all users; and

WHEREAS, the City of Concord recognizes that pedestrians, bicyclists, motorcyclists, children, older adults, and people with disabilities are among the most vulnerable roadway users and deserve particular attention and protection in transportation planning and design; and

WHEREAS, a commitment to zero traffic deaths and serious injuries reflects the value of human life and the equitable opportunity for all Concord residents to travel safely; and

WHEREAS, the City recognizes that achieving safer streets requires a comprehensive approach that integrates engineering, education, enforcement, and emergency response strategies; and

WHEREAS, safety improvements must be pursued in a data-driven and equitable manner responsive to the needs of all communities within the City, including historically underserved and disadvantaged populations, to ensure that safety benefits are distributed fairly across all neighborhoods; and

WHEREAS, implementation of the CSAP requires ongoing collaboration among City departments, partner agencies, community members, residents, business owners, and other stakeholders; and

WHEREAS, the City recognizes the importance of coordination with regional partners, including the Contra Costa Transportation Authority, Metropolitan Transportation Commission, California Department of Transportation, law enforcement agencies, and community organizations, to improve the safety, comfort, and accessibility of streets throughout the City; and

WHEREAS, the CSAP establishes a long-term vision of eliminating traffic fatalities and serious injuries and provides a framework for prioritizing safety investments and pursuing future grant funding opportunities; and

WHEREAS, the City of Concord is committed to regular monitoring, reporting, and evaluation of safety outcomes to ensure accountability and measure progress toward achieving the goals of the CSAP.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Concord hereby:

1. Commits to a Vision Zero goal of reducing traffic related fatalities and severe injuries (also referred to as serious injuries under the SS4A program) on City streets by fifty (50) percent by the year 2040, with the eventual goal of eliminating all traffic related fatalities and severe injuries on City streets by the year 2050, through a holistic and proactive Safe System Approach;
2. Adopts the Comprehensive Safety Action Plan (CSAP) as the City's guiding policy framework for achieving this Vision Zero goal through a holistic and proactive Safe System Approach;
3. Directs City staff to implement the strategies, programs, and projects identified in the CSAP, prioritizing engineering solutions, education initiatives, equitable enforcement, and interagency coordination;
4. Acknowledges that achieving this goal requires significant and sustained effort, resources, and dedicated safety planning activities, and commits to allocating appropriate resources toward this end;
5. Ensures that multimodal safety investments are made in a fair and equitable manner, with special consideration given to vulnerable road users and underserved communities; and

6. Directs City staff to conduct annual monitoring, reporting, and evaluation of CSAP implementation progress, and to communicate findings clearly to the City Council, partner agencies, and the public.

PASSED, APPROVED, AND ADOPTED by the City Council of the City of Concord on the _____ day of _____, 2026.

Mayor of the City of Concord

ATTEST:

_____

City Clerk of the City of Concord

APPENDIX B:
MATRIX OF RELEVANT PLANNING GOALS, OBJECTIVES AND POLICIES

Document	Highlights
Safe Trips to BART: An Action Plan for Safer Roadways (2025)	**Vision:** • Safe Trips to BART: An Action Plan for Safer Roadways establishes a vision in which riders can get to and from BART stations safely, comfortably, conveniently, and reliably, no matter how they travel. The goal of this Plan is to eliminate fatalities and severe injuries resulting from traffic crashes on public streets that provide access to BART stations. Designing roadways to prioritize the safety of vulnerable road users leads to better safety for everybody — transit users, drivers and their passengers, pedestrians, motorcyclists, wheelchair users, scooter riders and bicyclists alike. **Systemic Safety Strategies — Four-Tier Toolbox:** • Tier 1 — Remove Severe Conflicts: grade separation, protected intersections, road diets converting vehicle lanes to bicycle and pedestrian space, median barriers, and shared-use paths. • Tier 2 — Reduce Vehicle Speeds: lane narrowing, road diets, raised crosswalks, speed tables, curb extensions and bulb-outs, and signal retiming to encourage lower operating speeds. • Tier 3 — Manage Conflicts in Time: protected signal phasing, Leading Pedestrian Intervals (LPIs), and pedestrian hybrid beacons separating pedestrian and vehicle movements temporally. • Tier 4 — Increase Attentiveness and Awareness: high-visibility continental crosswalk markings, advance stop bars, Rectangular Rapid Flashing Beacons (RRFBs), pedestrian-scale lighting, and wayfinding signage.
Contra Costa County Complete Streets Safety Assessment (2024)	**Strategies:** • Prioritize safe target speeds and change road geometry to manipulate crash angles reducing fatal and severe injuries • Conduct off-cycle speed surveys after complete streets improvements to determine if speed limit reductions are needed • Consider 15 mph school zones where appropriate • Form Safe Routes to Schools steering committees with county staff, school district staff, and PTA leaders

Document	Highlights
	• Implement FHWA proven safety countermeasures including Leading Pedestrian Intervals, protected left turns, roundabouts, and medians • Use green pavement markings to highlight conflict zones at large intersections • Review design of slip/trap-right lanes and implement improvements • Identify and create inventory of pedestrian barriers with phased improvement recommendations • Conduct formal education campaigns targeting drivers, pedestrians, and bicyclists with focus on speed and safe driving • Implement sustained pedestrian safety enforcement involving media and distributing safety pamphlets • Include regular walking and bicycling audits in countywide safety programs
Pine Hollow Road Complete Streets Feasibility Study (2023)	**Goals and Strategies:** • Create a safe and complete pedestrian and bicycle network along the 2.2-mile corridor. • Reduce traffic speed and improve safety. • Enhance trail connectivity. • Address challenges associated with high traffic speeds, heavy truck traffic, and frequent collisions. • Provide continuous sidewalks and bike lanes where currently lacking.
Concord Local Roadway Safety Plan (2022)	**Vision Statement:** Roadway safety impacts the health and comfort of all those who live and travel in the City of Concord, and it is imperative to make the transportation system safer and more equitable for users of all transportation modes. The City of Concord is committed to eliminate traffic deaths and severe injuries by 2033. As part of this commitment, the City will prioritize safety when trade-off decisions are necessary between competing demands and visions for the roadway network. The City of Concord will form a standing Local Roadway Safety Working Group that will meet regularly to implement this Local Roadway Safety Plan, monitor progress towards the City's goal of eliminating traffic deaths and severe injuries, and communicate outcomes to the public regularly.

Document	Highlights
	Safety Goals: • Equity: Commit to equity in all aspects of Vision Zero, including data analysis that acknowledges and addresses reporting biases, project prioritization efforts that promote projects in historically under-invested communities rather than providing unequal opportunities to those with the historically "loudest" voices or most resources for civic participation, and enforcement strategies that follow data-driven approaches. • Eliminating Collisions: Eliminate fatal and serious injury collisions, particularly those involving people walking and biking. • Crossings: Enhance roadway crossings, especially near commercial areas, schools, and other high pedestrian activity areas, to promote and support safe travel for people walking and biking. • Nighttime Visibility: Improve the visibility of roadway users traveling at night, especially for people walking. • Safe Speeds and Safer Streets: Encourage safe driving practices (such as driving at lower speeds, obeying signal controls at intersections, and avoiding driving under the influence) through roadway design, outreach, and enhanced enforcement, including considerations of automated enforcement methods.
City of Concord Complete Streets Feasibility Study: Willow Pass Road, Galindo Street & Cowell Road (2020)	**Key Issues:** 1. Visual quality of corridors lacking safe and comfortable pedestrian environment 2. Auto-centric infrastructure with excessive lane widths and corner radii 3. Perceived safety concerns from high speeds and lack of buffering mechanisms 4. Lack of connectivity with excessive block sizes (1,000+ feet) limiting access 5. Lack of well-distributed open space network along corridors 6. Lack of place type and building type variety limiting community identity **Key Design Strategies:** 1. Establish distinct identity along each corridor and segments based on context

Document	Highlights
	2. Support walkability and bikeability prioritizing space-efficient transportation modes 3. Include frontages and gifts-to-the-street activating public realm and encouraging social interaction 4. Ensure 5-minute walk access to daily goods and services with 300-foot block faces 5. Provide smaller, high-quality, well-distributed public open spaces and trails 6. Define place types as destinations and building types as ingredients of place
Bicycle, Pedestrian & Safe Routes to Transit Plan (2016)	**Vision:** The City of Concord envisions an environment that supports walking, bicycling and active living, and enables people of all ages and abilities to comfortably access jobs, schools, recreation, shopping and transit by foot or on bicycle as a part of daily life. **Goals, Objectives and Policies:** ***GOAL 1: Safety*** **Prioritize travel safety for all modes of transportation.** **Objective 1.A:** Seek to eliminate all traffic fatalities and reduce the number of bicycle and pedestrian related injuries by 50 percent by 2020, consistent with the City's adopted Climate Action Plan. • **Policy 1.A.1:** Annually review most recent available crash data, including causes, to implement ongoing improvements throughout the transportation network. • **Policy 1.A.2:** Identify viable funding for an enforcement campaign targeting violations associated with severe and fatal injuries, high injury areas and corridors, schools and housing for seniors and people with disabilities. • **Policy 1.A.3:** Prioritize suggested roadway improvements at intersections and corridors with significant numbers of injuries and fatalities.

- **Policy 1.A.4:** Identify viable funding for an education campaign focusing on road safety for all users and the City's objective to reduce traffic fatalities.

GOAL 2: Design

Design active transportation projects that are accessible and comfortable for people of all ages and abilities.

Objective 2.A: Utilize designs that emphasize safety and comfort on all vulnerable road users.

- **Policy 2.A.1:** Apply state of the practice & emerging designs including Design Guidelines supplemented to this plan, the California Manual on Uniform Traffic Control Devices, and national manuals such as NACTO (National Association of City Transportation Officials) guides.
- **Policy 2.A.2:** Incorporate sustainable designs into transportation projects, recognizing limited maintenance resources.
- **Policy 2.A.3:** Prioritize pedestrian and bikeway designs to address the needs and safety for people of all ages and abilities, considering issues such as street design speed, hierarchy of streets, connectivity and level of stress experienced.
- **Policy 2.A.4:** Seek to provide enhanced walking and bicycling facilities that may require separation on higher volume and higher speed roads such as the City's Downtown, Community, Regional, and Service streets, and in school areas.

Objective 2.B: Preserve and enhance access to bicycle and pedestrian facilities for all new construction.

- **Policy 2.B.1:** Consider developing a policy to ensure new development plans do not block access to existing trails or active transportation facilities.

GOAL 3: Network

Identify and develop a complete and convenient active transportation network.

Document	Highlights
	Objective 3.A: Develop 5-year, 10 year, and 20 year strategies to realize this Plan's recommendations. **Objective 3.B:** Improve school and transit access. • **Policy 3.B.1:** Prioritize transportation projects that improve school and transit access. **Objective 3.C:** Seek to implement this Plan's recommended bikeways on Downtown, Neighborhood and Community streets by 2026. • **Policy 3.C.1:** Develop an implementation strategy for this Plan's recommended bikeway facilities on Downtown, Neighborhood, and Community streets by 2026. **Objective 3.D:** Strive to implement this Plan's priority sidewalk projects by 2026. • **Policy 3.D.1:** Develop an implementation strategy for this Plan's priority sidewalk projects by 2026. **Objective 3.E:** Aim to complete this Plan's recommended studies by 2026. • **Policy 3.E.1:** Develop an implementation strategy for this Plan's recommended studies on arterial and collector streets by 2026. **Objective 3.F:** Seek recommendations for pedestrians. • **Policy 3.F.1:** Seek to provide marked crossings at reasonable intervals in areas with existing or potential high pedestrian activity and establish vehicle speed and volume thresholds for appropriate treatments such as crossing control, curb extensions, and refuge islands. **Objective 3.G:** Provide plentiful, high quality support facilities that complement the travel network. • **Policy 3.G.1:** Identify viable funding to build support facilities such as bicycle parking and community/bikeway wayfinding.

Objective 3.H: Identify viable funding to realize this Plan's recommendations.

- **Policy 3.H.1:** Apply for available regional and state grants to implement this Plan's recommendations.
- **Policy 3.H.2:** Integrate bicycle and pedestrian facilities as part of new street design and resurfacing projects where feasible.

GOAL 4: Programs

Increase awareness and support of walking and bicycling through education, encouragement, and evaluation programs.

Objective 4.A: Support educational opportunities for those who drive, bicycle, and walk about their rights and responsibilities.

- **Policy 4.A.1:** Support Contra Costa Transportation Authority and the Mt. Diablo Unified School District to implement Safe Routes to School programs.
- **Policy 4.A.2:** Support the development of adult bicycling education programs.
- **Policy 4.A.3:** Support the development of a Safe Routes to Transit program that will facilitate walking and bicycling to transit.

Objective 4.B: Support encouragement opportunities that promote walking and bicycling as viable travel choices.

- **Policy 4.B.1:** Incorporate messaging in all City of Concord social media that promotes the benefits of active transportation and raises awareness of walking and bicycling opportunities.
- **Policy 4.B.2:** Support encouragement programs sponsored by regional agencies and local employers to encourage walking or bicycling.

Objective 4.C: Evaluate how well the City of Concord is progressing towards meet this Plan's goals.

Document	Highlights
	1. **Policy 4.C.1:** Review this Plan's recommendations annually with the Bicycle and Pedestrian Advisory Committee to evaluate progress and update priorities as necessary.
Concord 2030 General Plan - Transportation Element (2015)	• GOAL T-1: A Safe and Efficient Multi-Modal Transportation System • Principle T-1.1: Provide an Easily Accessible, Functional, and Attractive Circulation Network • Policy T-1.1.1: Maintain streets and pavement in optimal physical condition to provide safe and efficient travel. • Policy T-1.1.2: Continue to promote a wide variety of transportation alternatives and modes to serve all residents and businesses to enhance the quality of life. The City will strive to shift auto trips to walking, bicycling, and transit use, particularly in Downtown Concord and on the Concord Reuse Project site where other modes of travel are (or will be) available. • Policy T-1.1.3: Ensure that streets are designed to balance the needs of multiple travel modes, including vehicles, pedestrians, bicycles, and transit. This policy supports the concept of "complete streets," consistent with AB 1358. New streets should be designed to balance the needs of motorists with the needs of other travelers and should recognize the special needs of children, seniors, and persons with disabilities. • Policy T-1.1.4: Maintain and upgrade transportation systems to provide smooth flow of traffic, minimize vehicle emissions, and save energy. Transportation improvements should be consistent with statewide greenhouse gas reduction goals established by Assembly Bill 32. • Policy T-1.1.5: Maintain transportation levels of service benchmarks which consider not only vehicle speed and intersection delay, but also broader goals relating to environmental quality and community character. Lower levels of service may be acceptable in Downtown Concord, within one-half mile of the City's two BART stations, along designated transit routes, and in other locations as deemed appropriate by the City Council. • Policy T-1.1.8: Develop and operate a circulation system that directs the flow of vehicle traffic on residential streets to collector and arterial streets. • Policy T-1.1.9: Provide a high level of multimodal connectivity in the design of the citywide circulation system, particularly in the Concord Reuse Project area.

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	• Policy T-1.1.14: Enhance the visual quality of public space through the design and landscaping of streets, and the control of visual and functional aspects of abutting improvements. The City desires to ensure that streets provide an aesthetic driving, walking, and bicycling experience. • Policy T-1.1.16: Prioritize funding of pedestrian and bicycle safety improvements for designated truck routes that are in close proximity to schools. • Principle T-1.5: Provide a Safe and Convenient Pedestrian Circulation System • Policy T-1.5.1: Prioritize pedestrian safety in the design of new streets and the retrofit of existing streets. • Policy T-1.5.2: Support programs and infrastructure improvements which create an attractive and safe pedestrian environment, particularly in Downtown and around BART stations. Examples include wide sidewalks, illuminated crosswalks, signalized crossings, bulb-outs, and street lighting. • Policy T-1.5.3: Facilitate pedestrian circulation near high activity centers. • Policy T-1.5.4: Encourage new development to provide pedestrian connections to adjacent open spaces and trails. • Policy T-1.5.5: Identify critical deficiencies in the City's pedestrian circulation system and implement strategies, actions, and funding programs to address them. This will be done in concert with the Safe Routes to Schools program, the Capital Improvement Program and the Transportation Improvement Program, with priority given to pedestrian circulation improvements that will enhance pedestrian safety and promote walkability. • Policy T-1.5.6: Incorporate urban design measures in commercial and mixed use districts which accommodate pedestrians and support walking. Examples include ample shade trees, buildings constructed to the front setback line, ground floor storefronts with window displays, frequent building entrances, benches and other street furniture, and parking lots located behind buildings. • Principle T-1.6: Provide a Safe and Comprehensive Bicycle Network • Policy T-1.6.1: Implement strategies and actions for enhanced bicycle circulation throughout the City. • Policy T-1.6.2: Require provision of bicycle facilities in new developments, where appropriate. Examples include weather

Document	Highlights
	protected bicycle parking and direct and safe access for pedestrians and bicyclists to adjacent routes. • Policy T-1.6.4: Encourage, and where appropriate require, new development to provide bicycle access to parks, schools, and transit stops in the design of new residential neighborhoods.
Downtown Specific Plan (2014)	**CIRCULATION** **Objectives:** • Develop a green street framework of pedestrian friendly streets to promote healthy, active lifestyles. • Design and Construct Streets that integrate walking, biking, transit and other green infrastructure. • Connect Downtown Concord to the rest of the region by improving access to and from BART. **Major Policies:** • Design and retrofit existing streets to adhere to Complete Streets and improve accessibility. • Incorporate bike lanes into major streets that connect through the Downtown, particularly along Grant Street. • Provide greater ease of use for transit users in the downtown. • Facilitate a 'Park One Time' Parking Strategy. • Provide a strong connection between major open spaces within the downtown/connections between BART, Todos Santos Plaza and Ellis Park. • Review traffic signal synchronization in the Downtown core. **Major Implementation Strategies:** • Focus on redeveloping Grant Street from BART to Todos Santos Plaza as a walkable and pedestrian friendly street. • Focus on redeveloping Salvio Street from Todos Santos Plaza across Galindo to the Park and Shop. • Develop a transit circulator shuttle around the downtown with shortened headways.

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	• Provide more public parking near existing downtown uses- people like to once and walk to their other destinations.
Citywide Climate Action Plan (2013)	**Climate Action Strategies: Transportation Systems:** **Strategy TL1:** Develop a pedestrian master plan consistent with Citywide Complete Streets Standards to minimize barriers to pedestrian access and maximize pedestrian interconnectivity throughout the City. **Strategy TL2:** Implement programs and enforcement for safer active transportation with specific targets: 25% reduction in accidents involving pedestrians and bicyclists compared to baseline by 2017, 50% by 2020, 75% by 2035. **Strategy TL2:** Work with Police Department to prioritize traffic enforcement efforts in strategic locations to protect the safety and rights of cyclists and pedestrians. **Strategy TL2:** Develop and implement training programs to inform drivers of the need to respect cyclists and pedestrians. **Strategy TL3:** Implement pedestrian and bicycle-friendly traffic calming measures including curb bulb-outs, additional street trees, raised crosswalks, roundabouts, smaller corner radii, pavement treatments, and lane narrowing. **Strategy TL3:** Require traffic calming measures as a condition of development approvals where appropriate. **Strategy TL4:** Develop a bicycle master plan to make it more convenient and safe to ride bicycles throughout the City, identifying and addressing barriers and dangers, and maximizing connectivity to key destinations like transit stations, schools, medical services, and grocery stores. **Strategy TL4:** Leverage the off-road trails network and increase connections to the on-street network. A bicycle master plan could be developed as part of an update to the existing Concord Trails Master Plan.

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	Strategy TL5: Require bike parking facilities for all multi-family projects and non-residential uses. Provide secure and convenient bicycle parking at City facilities. **Strategy TL6:** Create a comprehensive Safe Routes to Schools program using the "five E's" framework: engineering, enforcement, encouragement, education, and evaluation. **Strategy TL6:** Implement 5 projects per year beginning 2017 improving pedestrian and bicycle access to schools, with goal of 80% of children walking or bicycling to school by 2035. **Strategy TL8:** Develop multi-modal wayfinding system to facilitate use of bicycles and walking by making it easier to find best routes to key destinations such as transit stations, schools, medical services, and grocery stores. **Strategy TL9:** Develop a street tree master plan for Downtown Concord and key street corridors specifying shade trees to provide traffic calming effects, make walking and bicycling more pleasant, and reduce heat island effect. **Strategy TL10:** Prioritize active modes in engineering and design by reviewing street reconstruction, development projects, and utility projects to identify opportunities to implement complete streets principles. **Strategy TL10:** Develop and apply a streamlined complete streets checklist for review of proposed transportation improvement projects. **Strategy TL10:** Design and improve streets to facilitate safe crossings, including accessible curb ramps, crosswalks, refuge islands, and pedestrian signals designed to meet needs of people with different abilities and ages. **Strategy TL10:** Use innovative and effective walkway features including buffers between pedestrians and vehicle traffic, wide sidewalks, illuminated crosswalks, signalized crossings, bulb-outs, pedestrian-scale lighting, benches, and street furniture. **Strategy TL11:** Prioritize active transportation in 10-year Capital Improvement Program and project funding to ensure systematic investment in bicycle and pedestrian infrastructure.

Document	Highlights
	Policy: All Transportation Systems and Land Use strategies (TL1-TL26) are mandatory for the City, ensuring systematic integration of safety and climate goals into transportation planning and investment decisions.
Concord Trails Master Plan (2002)	**Goals:** • Create a comprehensive network for recreation and alternative transportation modes including hiking, biking, and equestrian use. • Provide access to BART stations through dedicated trail connections enabling safe multimodal travel. • Provide access to schools throughout the city via safe walking and biking routes. • Create historic walking tours encouraging pedestrian activity and community connection. **Purpose:** • Support outdoor recreation providing healthy activity options for residents. • Provide transportation for commuters to get to work and school as alternative to driving, reducing vehicle miles traveled. • Improve public health by encouraging active transportation and outdoor physical activity. • Support education through environmental and historical interpretive opportunities along trails. • Enhance social and economic well-being by increasing economic benefit and property values through quality trail amenities. • Provide alternative emergency access and egress routes enhancing community resilience. **Strategies:** • Identify need for new bridges and filling roadway gaps to provide continuous safe pedestrian and bicycle facilities. • Include plans for pedestrian underpass under Highway 242 to eliminate dangerous at-grade crossings. • Develop trails within Naval Weapons Station development to provide connectivity for future residents. • Present regional trail connectors to Walnut Creek, Pleasant Hill, Clayton, Martinez, and East Bay Regional Parks for seamless regional active transportation network.

Document	Highlights
	• Detail bike parking requirements at trail access points to encourage multimodal connectivity. • Ensure bus and BART bicycle access through coordinated planning of trail connections to transit facilities. • Develop promotional materials including bikeway mapping, wayfinding signage, and basic trail information to encourage use and ensure safety. • Provide school bicycle safety education through Police Department in-class presentations and school newspaper features reaching grades 1-3. • Implement bicycle rodeo program providing hands-on safety training for youth. • Develop school district programming integrating bicycle and pedestrian safety into curriculum. • Deploy police officers on bikes for community engagement and safety enforcement on trails. • Develop auto trip reduction programs encouraging shift from driving to active transportation. • Implement adult bicycle safety and education programs addressing identified gap in safety training.

APPENDIX C:
ROAD SAFETY RELATED PROJECTS FROM EXISTING PLANNING

SAFE TRIPS TO BART: AN ACTION PLAN FOR SAFER ROADWAYS (2025)

1. Galindo Street Signal Timing Coordination, Shared-Use Path Planning, and Pedestrian Refuge

Location: Galindo Street from Salvio Street to Clayton Road/Willow Pass Road

FHWA Tier 1 Safety Countermeasure to Remove Severe Conflicts:

- A shared use path that is physically separated from vehicle traffic will provide safety and access benefits for people to bicycle to and from BART.
- Road diets reduce the number and width of vehicle lanes, which can help reduce vehicle speeds and allow for additional pedestrian and bicyclist safety treatments.

FHWA Tier 2 Safety Countermeasure to Reduce Vehicle Speeds:

- Coordinated signal timing can manage vehicle speeds, increasing pedestrian safety. It can also create a steady and predictable flow of traffic, minimizing abrupt stops and starts that can lead to rear-end collisions.

Estimated Cost: $40,000

2. Clayton Road Class IV Cycle Track, Bus Boarding Island, and Crossing Enhancements

Location: Clayton Road from Sutter Street to Grant Street

FHWA Tier 1 Safety Countermeasure to Remove Severe Conflicts:

- Physically separated bicycle lanes will provide more separation between bicyclist and vehicles to reduce chance for severe conflicts.

FHWA Tier 4 Safety Countermeasure to Increase Attentiveness and Awareness:

- High-visibility crosswalks and advance stop bars increase the visibility of pedestrians at marked crosswalks.
- Advance stop bars improve visibility of crossing pedestrians by increasing the distance between stopped motorists and crossing pedestrians.

Estimated Cost: $100,000

3. Clayton Road Pedestrian Safety and Complete Street Improvements

Location: Clayton Road from Park Street to the Alameda; Sunset Street and East Street

FHWA Tier 1 Safety Countermeasure to Remove Severe Conflicts:

- Bus bulbs reduce pedestrian crossing distance and minimize conflicts caused by buses pulling into and out of the travel lane.

FHWA Tier 2 Safety Countermeasure to Reduce Vehicle Speeds:
- Edge lines reduce the width of the travel lane, encouraging slower speeds.

FHWA Tier 3 Safety Countermeasure to Manage Conflicts in Time:
- Leading Pedestrian Intervals (LPIs) allow pedestrians to begin crossing before vehicles are given the green signal.

FHWA Tier 4 Safety Countermeasure to Increase Attentiveness and Awareness:
- High-visibility crosswalks increase the visibility of pedestrians at marked crosswalks.
- Advance stop bars improve visibility of crossing pedestrians by increasing the distance between stopped motorists and crossing pedestrians.

Estimated Cost: $100,000

4. Salvio Street Class IV Cycle Track, Bus Bulb, and Intersection Safety Improvements

Location: Salvio Street from East Street to Parkside Drive

FHWA Tier 1 Safety Countermeasure to Remove Severe Conflicts:
- Physically separated bicycle lanes will provide physical barrier between bicyclist and vehicles to reduce chance for severe conflicts.
- A pedestrian refuge reduces exposure and allows pedestrians to focus on crossing one direction of traffic at a time.
- Bulb-outs reduce the distance pedestrians need to cross, decreasing the time they are exposed to traffic.

FHWA Tier 4 Safety Countermeasure to Increase Attentiveness and Awareness:
- High-visibility crosswalks make crossing pedestrians more visible to drivers.
- Bulb-outs improve sight lines between pedestrians and drivers.

Estimated Cost: $200,000

5. Willow Pass Road and East Street Intersection Safety Improvements

Location: Willow Pass Road and East Street intersection

FHWA Tier 1 Safety Countermeasure to Remove Severe Conflicts:
- Bus bulbs reduce pedestrian crossing distance and exposure to conflicts with vehicles.

FHWA Tier 2 Safety Countermeasure to Reduce Vehicle Speeds:
- Bus bulbs reduce the width of the roadway and encourage drivers to reduce speed.

FHWA Tier 4 Safety Countermeasure to Increase Attentiveness and Awareness:

- High-visibility continental crosswalks make crossing pedestrians more visible to drivers.

Note: This intersection is adjacent to the Concord Village mixed-use development site (approximately 230 residential units), where increased pedestrian demand is anticipated upon project completion.

Estimated Cost: $100,000

6. Willow Pass Road and Parkside Drive Intersection Safety Improvements

Location: Willow Pass Road and Parkside Drive intersection, near the Concord Civic Center

FHWA Tier 2 Safety Countermeasure to Reduce Vehicle Speeds:
- Bulb-outs reduce the turn radii and vehicle turning speed by forcing vehicles to make sharper turns.

FHWA Tier 4 Safety Countermeasure to Increase Attentiveness and Awareness:
- High-visibility crosswalks make crossing pedestrians more visible to drivers.
- Advance stop bars improve visibility of crossing pedestians and increase distance between crossing pedestrians and stopped motorists.

Estimated Cost: $20,000 (Quick Build) – $200,000

CONTRA COSTA COUNTY COMPLETE STREETS SAFETY ASSESSMENT (2024)

Focus Area #1: Concord Avenue/Contra Costa Boulevard to Diamond Boulevard - Install continuous sidewalks minimum 6-foot width, ADA-compliant curb ramps, pedestrian-scale lighting at 30-foot spacing, street trees, protected bicycle facilities (Class II or IV), high-visibility crosswalks with refuge islands, curb extensions, countdown pedestrian timers, Leading Pedestrian Intervals, and narrowed travel lanes (10-11 feet).

Focus Area #2: Concord Avenue/John Glenn Drive to Via Mercados (Iron Horse Trail Access) - Enhance trail access with clear wayfinding signage, accessible pathways, bicycle parking, improved visibility at crossings with high-visibility markings and Rectangular Rapid Flashing Beacons, separated bicycle facilities connecting to trail network, pedestrian-scale lighting at access points, traffic calming with speed feedback signs, and consider grade-separated crossing at high-volume locations.

Focus Area #3: Concord Avenue at SR-242 Interchange - Redesign interchange ramps with tighter corner radii, install protected bicycle facilities with physical separation, provide high-quality lighting throughout undercrossing, implement pedestrian refuge islands, upgrade signal timing for adequate crossing time, add green conflict zone markings, coordinate with Caltrans, and consider long-term grade-separated crossing.

Countywide Safe Routes to School Program - Conduct walking/biking audits, prioritize infrastructure improvements including sidewalk extensions, crossing guards, enhanced crosswalks with beacons, traffic calming near schools, implement education programs, provide enforcement, encourage active transportation, and evaluate program effectiveness.

Systemic Signalized Intersection Enhancement Program - Implement Leading Pedestrian Intervals (3-7 seconds), protected left turn phasing, pedestrian countdown signals, accessible pedestrian signals, bicycle detection, signal timing optimization, high-visibility crosswalks, advance stop bars, green conflict zone markings, and Rectangular Rapid Flashing Beacons at uncontrolled crossings.

FY2025-FY2029 CAPITAL IMPROVEMENT PLAN (2024)

School Safety Assessment Program (Project 2539) - Location: Citywide. Ongoing proactive safety assessment for 50 schools focusing on pedestrian and bicycle infrastructure conditions near schools, providing recommendations for engineering solutions, education, and enforcement to address traffic calming for school-related transportation issues including drop-off/pick-up operations, traffic circulation, and parking in residential and commercial neighborhoods.

Streetlighting and Safety Improvement (Project 2695) - Location: Citywide with arterial lighting improvements on Port Chicago Highway, Clayton Road, Cowell Road, Monument Boulevard, Galindo Street, Kirker Pass Road, Treat Boulevard, Ygnacio Valley Road, and Concord Boulevard. Project updates streetlights to LED fixtures and adds streetlights where feasible to address the critical safety issue that 46 percent of pedestrian crashes and 66 percent of fatal and severe injury pedestrian collisions occur in dark conditions. Funded through HSIP Cycle 11 with total grant award of $7,409,470.

Traffic Safety and Traffic Calming Program (Project 2464) - Location: Citywide. Provides traffic calming for school-related transportation issues and neighborhood safety concerns, ensuring overall traffic safety through engineering interventions and systematic implementation of proven countermeasures.

Citywide Traffic Monitoring (Project 2537) - Location: Citywide. Collects average daily traffic data at all major streets every two years, updates citywide radar speed surveys for up to 30 segments annually, and deploys 35-40 devices to identify cut-through traffic using anonymous Bluetooth and Wi-Fi data to continuously monitor routes and implement mitigation measures.

West Concord Bikeways Phase 2 (Project 2524) - Location: West Concord area. Continues implementation of dedicated bicycle facilities to provide safe connectivity for cyclists in western portions of the city.

Sun Terrace Elementary School Crossing Enhancements (Project 2712) - Location: Sun Terrace Elementary School vicinity. Implements safety improvements at school crossings to protect students walking and biking to school.

Village Road/Cowell Road Crossing Improvements (Project 2717) - Location: Village Road and Cowell Road intersection. Enhances pedestrian and bicycle crossing safety at this key intersection through infrastructure improvements.

David Avenue Bicycle Improvements (Project 2605) - Location: David Avenue corridor. Provides dedicated bicycle facilities along this corridor to improve cyclist safety and connectivity.

Court Lane Bicycle Improvements (Project 2617) - Location: Court Lane corridor. Implements bicycle infrastructure improvements to create safer cycling conditions and fill network gaps.

Salvio Street Bikeway Improvements Phase 2 (Project 2619) - Location: Salvio Street corridor. Continues implementation of bicycle facilities on this important downtown connector street.

Pine Hollow Road Complete Street Project (Project TRA-30-003) - Location: Pine Hollow Road and Alberta Way, 2.2-mile segment from Clayton Valley Charter High School to Mount Diablo Elementary School. Constructs pedestrian and bicycle improvements including continuous sidewalks and bike lanes, implements multi-modal and operational strategies to improve safety, transit connections, and circulation. Based on 2022 feasibility study recommendations.

HSIP Cycle 11 RRFB Crossing Enhancements (Project 2696) - Location: Various high-priority crossing locations citywide. Implements Rectangular Rapid Flashing Beacon systems at pedestrian crossings to improve visibility and driver yielding behavior at uncontrolled crossings.

Citywide Bike Lane Enhancements (Project 2697) - Location: Citywide. Systematic improvements to existing bike lane network including upgraded striping, signage, and pavement markings to improve safety and comfort for cyclists.

Willow Pass Road Cycle Track (Project 2572) - Location: Willow Pass Road corridor. Provides protected cycle track facility on this major arterial to create safe separated space for cyclists.

East Downtown Concord PDA Access and Safe Routes to Transit Project (Project 2457) - Location: East Downtown Concord Priority Development Area. Improves pedestrian and bicycle access to transit facilities including BART station with focus on complete streets improvements and connectivity.

ADA Transition Plan Update (Project 2377) - Location: Citywide. Updates the citywide ADA transition plan to systematically identify and prioritize accessibility improvements throughout the pedestrian network.

Citywide Sidewalk Repair Program (Project 2666) - Location: Citywide. Ongoing program to repair damaged sidewalks and maintain pedestrian infrastructure in safe, accessible condition.

Citywide Sidewalk Replacement Program (Project 2341) - Location: Citywide. Systematic replacement of deteriorated sidewalk segments to maintain continuous, safe pedestrian facilities throughout the city.

PINE HOLLOW ROAD COMPLETE STREET FEASIBILITY STUDY (2023)

The Study identified a set of recommended improvements that would create a safe and connected transportation network for all users, prioritizing the needs of those most vulnerable and to encourage use of alternative modes. Improvements are proposed throughout the study area, in both the cities of Concord and Clayton:

- Sidewalk Improvements
- Protected Bike Lane
- Crosswalk Improvements
- Traffic Calming Features

Approach to developing potential Improvement Concepts: These inputs led to the development of the three, key improvement objectives:

- Reduce auto speeds and improve traffic safety
- Continuous, safer, and more comfortable pedestrian facilities
- Connected bicycle facilities throughout the corridor

Proposed Pedestrian Infrastructure Improvements:

- New sidewalks
- New crosswalks
- High-visibility crosswalk markings and advanced stop bars
- Raised crosswalks/raised intersections
- Rapid rectangular flashing beacons
- Median refuges
- Pedestrian lighting at crossings
- Upgrading curb ramps to current standards
- Tighten curb radii
- Landscape trimming and utility pole relocation to increase pedestrian visibility
- Adding leading pedestrian intervals to improve accessibility and safety

Bicycle Infrastructure Improvements:

A two-way cycle track on one side of the street, as proposed west of Indiana Drive, while the image on the bottom represents a one-way cycle track on both sides of the road, which is proposed east of Pennsylvania Boulevard. Note that these examples are representative of the basic concept only and differ in landscaping widths and roadway configuration from what is proposed for Pine Hollow Road.

Focused Intersections:

- Mitchell Canyon Road and Pine Hollow Rd
- Pine Hollow Road and Indiana Dr
- Pine Hollow Road and Pennsylvania Blvd
- Kaiser Quarry Road and Pine Hollow Road
- Rolling Woods Way and Pine Hollow Road
- Pine Hollow Road and Campus Dr
- Pine Hollow Road/ Albert Way and Ygnacio Valley Road
- Albert Way and Academy Road

CITY OF CONCORD LOCAL ROADWAY SAFETY PLAN (2022)

No Safety Projects Identified.

COMPLETE STREETS FEASIBILITY STUDY: WILLOW PASS ROAD, GALINDO STREET & COWELL ROAD (2020)

Willow Pass Road Enhanced Cycle Track (CIP #2449 Integration) - Location: Landana Drive to Parkside Drive, north side. Implement two-way protected cycle track with vertical delineators, special pavement markings, public realm improvements including street trees and lighting, and enhanced crossings with green conflict zone markings.

Willow Pass Road Long-Term Complete Streets Transformation - Location: Galindo Street to Market Street. Implement road diet removing one westbound lane, wider two-way cycle track on north side, move curb line toward center allowing sidewalk widening to 8-10 feet, street tree double rows at 25-30 foot spacing, green infrastructure bioswales, enhanced transit stops, traffic calming through lane width reduction, and enhanced crossings with curb extensions and refuge islands.

Willow Pass Road Bicycle Network Connectivity - Location: Parkside Drive to Salvio Street, Salvio Street to Grant Street and Galindo Street. Create continuous low-stress bicycle network connecting downtown corridors with dedicated facilities, wayfinding signage, bicycle parking at destinations, and coordination with downtown circulation plans.

Galindo Street Complete Street Redesign - Location: Willow Pass Road to Monument Boulevard/Cowell Road (1.2 miles). Maintain two through lanes each direction with varied turn lanes, implement varying shared spaces and pedestrian amenity zones (8-12 feet wide), install street trees at 30-foot spacing with double rows, integrate green infrastructure bioswales, implement bicycle facilities connecting to downtown, simplify intersection designs, enhance transit infrastructure, and evaluate transitioning Concord Boulevard and Clayton Road to two-way operation.

Cowell Road Complete Street Implementation - Location: Monument Boulevard to Ygnacio Valley Road (2.1 miles). Maintain existing lanes on most segments, implement road diet on Community Park area converting four lanes to two lanes with center turn lane, develop combination of shared-use paths and shared spaces between Mesa Street and Treat Boulevard, install enhanced bike lanes between Treat Boulevard and Ygnacio Valley Road, extend Community Park into roadway as shared space, upgrade Cowell Road/Treat Boulevard intersection, install street trees at 30-foot spacing, and enhance trail connections to East Bay Regional Parks.

Corridor-Wide Intersection Safety Improvements - Location: All intersections along three study corridors. Implement high-visibility crosswalk markings, curb extensions reducing crossing distances by 10-20 feet, ADA-compliant curb ramps, pedestrian countdown signals, advance stop bars setback 4-8 feet, green conflict zone markings, signal timing optimization with protected/permissive left turns, Leading Pedestrian Intervals, Rectangular Rapid Flashing Beacons at uncontrolled crossings, refuge islands, and tight corner radii (10-15 feet).

Wayfinding and Connectivity Enhancements - Location: All three corridors connecting downtown, BART, schools, parks, and regional trails. Implement directional signage for pedestrians and bicyclists, distance and time information to key destinations, bicycle route signage with pavement markings, interpretive signage at gateway features, maps at key decision points, integration with transit information, connectivity improvements filling gaps, and coordination with Downtown Specific Plan and Bicycle Pedestrian Plan.

Green Infrastructure and Streetscape Program - Location: All three corridors with focus at Community Park, downtown gateway, and neighborhood sections. Implement bioswales and rain gardens managing stormwater, permeable pavements, street trees at 25-30 foot spacing providing 50-60% canopy coverage, pedestrian-scale lighting at 30-40 foot spacing, street furniture including benches at 200-300 foot spacing, bicycle parking, wayfinding kiosks, public art and gateway features, and coordination with frontage improvements for outdoor dining and active uses.

MONUMENT CORRIDOR COMMUNITY-BASED TRANSPORTATION PLAN (2020)

The Metropolitan Transportation Commission (MTC) has allocated funds to develop Community- Based Transportation Plan (CBTP) updates for the Bay Area's Communities of Concern, including the Monument Corridor in the City of Concord.

Recommended Transportation Strategies (Tier I):

- **Safe Routed to School Improvements:**
  Concord has been actively supporting a local Safe Routes to School (SR2S) Program to make it easier, safer, and more enjoyable to walk or bike to school. The program consists of constructing bicycle and pedestrian infrastructure, in-classroom bicycle and pedestrian safety education, encouragement programs and contests to promote walking and biking. The City should continue its SR2S program, including applying for grant funding to construct further school-related infrastructure improvements.
    - **Walkway Improvements:** This strategy recommends reviewing existing bus stops that are in close proximity to schools, and the pedestrian infrastructure around the stops, including nearby crosswalks, sidewalks, curb ramps, traffic signals, etc., to catalog those which need improvement, and then making the changes necessary to make all stops in the areas around schools accessible.
    - **Walking School Bus/Bicycle Train:** Safety is one of the most common reasons parents who live within walking or bicycling distance to school are reluctant to allow their children to walk to school. Providing adult supervision may help reduce those worries for families. Two ways to help alleviate parents' concerns are to encourage parents to start a walking school bus or a bicycle train.
    - **Low- Stress Bikeways:** Adding and improving bike lanes will help guide bicyclists and alert cars to their presence. Bicycle network improvements should be targeted towards several different street segments with a goal of enhancing the City's network of bicycle facilities to provide continuous access to key destinations in and beyond the Monument Corridor.
    - **Transit youth Passes:** Outreach indicated community support for a discounted transit pass program for youth for CCCTA, BART, and other bus services. Such a program could help improve the mobility and transit use of youth who have difficulty affording transit fares. While this strategy should be sponsored and coordinated on a County-wide level, community groups, such as Monument Impact, youth groups, or local churches, could be responsible for disseminating passes from CCCTA, BART, or other transit agencies to eligible youth.
    - **Mobility Education:** This strategy recommends creating transportation information centers at schools, with up-to-date materials in English and Spanish including local and intercity transit information and maps, car sharing bulletin boards, school carpool matching services, walking or biking programs, and, potentially, internet access for adults.

- **Infrastructure Improvements:**
    - **Improve intersections, enhanced crossings at specific distances, and traffic signal coordination:** Intersections pose challenges to bicyclists/pedestrians, including long crossing distances, uncontrolled free right-turn movements. Bike lane treatments at intersections are inconsistent. The City should consider evaluating and improving selected

signalized intersections (for example, intersections with a history of bicycle-pedestrian-motor vehicle conflict, intersections located near schools, and intersections adjacent to major transit stops and centers). In particular, the City lanes, when necessary, so that they are located to the left of right turn lanes. Consider ways to eliminate conflicts between bicycle traffic and motor traffic (e.g. advanced or separate signal phases for bicycles).

- **Sidewalk gaps and consolidation of commercial driveways:** There was a strong interest in improved pedestrian facilities including safer roadway crossings and slower traffic speeds. Broken and misaligned sidewalks, and commercial driveways were also a significant concerns expressed.
- **Bus stop amenities:** Adding bus stop amenities is both relatively inexpensive and popular within the community as a very tangible improvement in the quality of the public transit experience. Although the solution does not necessarily improve origin-to-destination mobility in the community, it improves the experience of using transit service which can in turn encourage increased use of transit.

- **Bicycle Improvements:**
  - **Bike share:** The system is expected to expand to 7,000 bicycles around 540 stations in San Francisco, Oakland, Berkeley, Emeryville, and San Jose. Concord, on behalf of the Monument Corridor area, could reach out to Bay Wheels and private providers to gauge the feasibility of stationing docked or dockless bicycles in the Study Area.
  - **Separated Bikeways:** Community outreach indicated interest in improving bicycle safety and wayfinding through Monument Corridor streets by creating separated bikeways. Ideally, "separated" means protected by vertical separation elements, but it could also include paint-only facilities where motor traffic speeds and volumes are low enough.
  - **"Bike Kitchens":** Bike Kitchen teaches people of all ages and backgrounds how to repair bicycles. Bike Concord offers a community bicycle shop as well as a pop-up repair shop known as the "The Bike Tent".

CITY OF CONCORD BICYCLE, PEDESTRIAN & SAFE ROUTES TO TRANSIT PLAN (2016)

The City of Concord envisions an environment that supports walking, bicycling and active living, and enables people of all ages and abilities to safely and comfortably access jobs, schools, recreation, shopping and transit.

- **High Visibility Crosswalk Project:**
  - Babel Lane and Clayton Road
  - Bacon St and East Street
  - Bel Air Dr and Treat Blvd
  - Clayton Road and Kirker Pass Road
  - Clayton Road and Farm Bureau Road
  - Commerce Avenue Concord Avenue
  - Concord Blvd and Landana Drive
  - Cowell Rd and Monument Blvd
  - Clayton Rd and Denkinger Ct (Shared Use Path Study)
  - Detroit Avenue and Monument Blvd
  - East St and Willow Pass Rd
  - Fairfield Avenue and Grant St

- Franquette Avenue and Willow Pass Road
- Fry Way and Willow Pass Rd
- Grant St and Olivera Rd
- Harrison St and Concord Avenue
- Mesa St and Cowell Road
- Oak Grove Road and Treat Blvd
- Palm Lake E and Oak Grove Road
- Port Chicago Highway and Willow Pass Rd
- Sutter St and Willow Pass Road
- Clayton Road and Terry Lynn Lane
- Clayton Road and Thornwood Dr
- 6th St and Concord Blvd
- Almond Avenue and East St
- Ayers Rd and Concord Blvd
- Ayers Rd and Clayton Rd
- Bailey Rd and Clayton Rd
- Bailey Rd and Concord Blvd
- Bonifacio St and East St
- Cary Dr and Monument Blvd
- Chestnut Ave and Clayton Rd
- Clayton Avenue and Clayton Rd
- Clayton Rd and Oakland Avenue
- Clayton Rd and Treat Blvd
- Clayton Rd and Park St
- Clayton Rd and Concord Blvd
- Concord Ave and Market St
- Concord Blvd and Kirker Pass Road
- Concord Blvd and Farm Bureau Rd
- Concord Blvd and West St
- Concord Blvd and Mendocino Dr
- Coventry Rd and Clayton Rd
- Coventry Rd and Cowell Rd
- Treat Blvd and Cowell Rd
- Babel Lane and Cowell Rd
- Cowell Rd and Ygnacio Valley Rd
- David Ave and Oak Grove Rd
- Denkinger Rd and Concord Blvd
- Diamond Blvd and Willow Pass Rd
- East St and Salvio St
- Esperanza Rd and Monument Blvd
- Erickson Rd and Monument Blvd
- Fredrick St and Grant St
- High School Ave and Grant St
- Hillside Avenue and Solano Way
- Hookston Rd and Creek
- Huron Dr and Ronald Way

- Keswick Lane and Oak Grove Rd
- Market St and Willow Pass Rd
- Michigan Blvd and Ygnacio Valley Rd
- Minert Rd and Oak Grove Rd
- Mohr Lane and Monument Blvd
- Monument Blvd and Mohr Lane
- Monument Blvd and Detroit Ave
- Monument Blvd and Walters Way
- Monument Blvd and Systron Dr
- Monument Blvd and Erickson Rd
- Monument Blvd and Carey Dr
- Moretti Dr and Esperanza Dr
- 6th St and Willow Pass Rd
- N Larwin Ave and Cowell Rd
- Navaronne Way and Treat Blvd
- Oak Grove Road and Minert Rd
- Oak Grove Road and Whitman Rd
- Oak Grove Road and David Ave
- Olivera Rd and Hillsborough Dr
- Pacheco St and Concord Ave
- Pacheco St and East St
- Park Highlands Blvd and Ygnacio Valley Rd
- Parkside Dr and Concord Blvd
- Parkside Dr and Willow Pass Rd
- Salvio St and Treat Blvd
- San Simeon Dr and Treat Blvd
- Solano Way and Broadmoor Avenue
- Systron Dr and Monument Blvd
- Terry Lynn Lane and Clayton Rd
- The Alameda and Clayton Rd
- West St and Clayton Rd
- West St and Concord Blvd
- Whitman Rd and Oak Grove Rd
- Willow Pass Rd and Farm Bureau Rd
- Willow Pass Rd and Diamond Blvd
- Willow Pass Rd and Market St
- Willow Pass Rd and Parkside Dr
- Clayton Rd and Colfax St
- Clayton Rd and Sunset Avenue
- Greenbush D and Thornwood Dr
- Lacey Lane and S Side of Cambridge Elementary Driveway Loop
- Olivera Rd and Sanford St

- **Complete Street Study Project:**
- Babel Lane and Cowell Road

- Clayton Road and The Alameda
- Clayton Road and Market St
- Concord Ave and Contra Costa Blvd
- Concord Blvd and Grant St
- Diamond Blvd and Concord Avenue
- Galindo St and Concord Blvd
- Grant St and Fairfield Avenue
- Grant St and Willow Pass Road
- Oak St and Galindo St
- Solano Way and Hilltop Road
- Systron Dr and Trailside Cir
- Treat Blvd and Clayton Road
- Willow Pass Road and Market St
- Willow Pass Road and 6th St
- Detroit Avenue and Monument Blvd
- Franquette Ave/ Waterworld Pkwy and CA-242 Undercrossing
- Galaxy Way and Meridian Park Blvd
- Market St and Meadow Lane
- Meadow Lane and Leland Way
- Minert Rd and Bancroft Rd
- Oak Grove Road and Chalomar Rd

- **Class I Bike Boulevard Project:**
- Bailey Rd and 180ft SW of Laura Dr
- Concord Community Park
- Market St and Meadow Lane
- Rolling Woods Way and Vista Point Lane
- Franquette Ave and Franquette Ave

- **Class II Bike Boulevard Project:**
- Clayton Road and Ashbury Drive
- Concord Blvd and Sattler Drive
- Fairfield Avenue and Crystal Avenue
- Galaxy Way and Meridian Park Blvd
- Grant St and Willow Pass Road
- John Glenn Dr and Concord Avenue
- Meridian Park Blvd and Concord Blvd (Buffered)
- Port Chicago Hwy and Salvio St
- Willow Way and Meridian Park Blvd
- Burnett Avenue and Meridian Park Blvd
- Clayton Rd and Village Rd
- Farm Bureau Rd and Wren Avenue
- Meadow Lane and 500ft NW of Oak Grove Rd
- Oakland Ave and Clayton Rd

- **Class III Bike Boulevard Project:**
  - Bonifacio St and Port Chicago Highway
  - Bonifacio St and Concord Avenue (Shared Lane Marking)
  - Burnett Avenue and Diamond Blvd
  - Chestnut Avenue and Clayton Road
  - Commerce Avenue Concord Avenue
  - Fairfield Avenue and Crystal Avenue
  - Laguna St and Detroit Avenue
  - Concord Blvd and Landana Drive (Shared Lane Marking)
  - Parkside Dr and Bonifacio St
  - Salvio St and Broadway St (Shared Lane Marking)
  - Victory Lane and Linden Dr
  - 6th St and Willow Pass Rd
  - Argonne Dr and Biscay Way
  - Avon venue and Solano Way
  - Babel Lane and Merridan Dr
  - Bantley St and Bancroft Rd
  - Broadway St and Market St
  - Cape Cod Way and Cowell Rd
  - Clayton Rd and Diamond Blvd
  - Concord Blvd and Bailey Rd
  - Consuelo Rd and Esperanza Dr
  - Coventry Rd and Cowell Rd
  - Court Lane and S Terminus
  - Diamond Avenue and Burnett Avenue
  - Esperanza Dr and W Terminus
  - Grant St and Gill Dr
  - Grove Way and Orchard Avenue
  - Hickroy Dr and Birch Avenue
  - Hillsborough Dr and Olivera Rd
  - Kaski Lan and Hitchcock Rd
  - Landana Dr and Willow Pass Rd
  - Live oak Avenue and Clayton Way
  - Maria Avenue and Dover Way
  - Clayton Rd and Mendocino Dr
  - Merridan Dr and Lancashire Dr
  - Minert Rd and Oak Grove Rd
  - Mohr Lane and Monument Blvd
  - Mt Diablo St and Mesa St
  - Mt Diablo St and Oak St
  - Mt Diablo St and Coventry Rd
  - Mt Diablo St and Laguna St
  - 6th St and Port Chicago Hwy
  - Nuala St and Mohr Lane
  - Oasis Dr and Whitman Rd
  - Olivera Rd and Solano Way

- Olivera Rd and Esperanza Dr
- Orchard Ave and W Terminus
- Panoramic Dr and St George Dr
- Reed Way Grove Way
- Rosal Lane and Joan Avenue
- Salvio St and Esperanza Dr
- Silverwood Dr and Village Rd
- St Francis Dr and Liscome Way
- The Alameda and Clayton Rd
- The Alameda and Walnut Avenue
- Third St and Willow Pass Rd
- Via De Mercados and Concord Ave
- Clayton Way and Village Rd
- Weaver Lane and Minert Rd
- Whitman Rd and Oasis Dr
- Wren Ave and 6th St
- Birch Avenue and Fairfield Ave
- Biscay Way and Weaver Lane
- Cardinal Dr and Thunderbird Dr
- Euclid Ave and Third St
- Falcon Dr and Cardinal Dr
- Galaxy Way and Via De Mercados
- Gelbke Lane and Evergreen Dr
- Hitchcock Rd and Court Lane
- Joan Ave and Babel Lane
- Liscome Way and St Francis Dr
- Lyon Cir and Wilmore Ave
- Marice Ct and Hitchcock Rd
- Ryan Rd and Wilmore Avenue
- St George Dr and Hillsborough Dr
- Sutter St and Market St
- Wilmore Ave Lyon Cir

- **Sidewalk Improvement Project:**
- Concord Blvd and Galindo Street
- E Olivera Rd and Salvio St
- E Olivera Rd and Mars St
- Oak St and Laguna St
- Willow Pass Road and Granada Dr
- Willow Pass Road and 6th St
- Willow Pass Road and Olivera Rd
- 5th Street and S of Marvalle Lane
- 5th Avenue and Clayton Rd
- Amador Avenue and Clayton Rd
- Arnold Industrial Way and Industrial Way

- Arnold Industrial Way and Pike Lane
- Arnold Industrial Way and Port Chicago Hwy
- Ayers Rd and Kenmore Dr
- Bailey Rd and Hakimi Ct
- Barbis Way and Gerald Dr
- Barbis Way and Pancho Via St
- Beach St and Bonifacio St
- Belmont Rd and Waltham Rd
- Bonifacio St and Port Chicago Hwy
- Chalomar Rd and Oak Grove Rd
- Chestnut Avenue and W of McCarl Lane
- Chestnut Avenue and Calyton Rd
- Chestnut Avenue and W of Stillman Ct
- Clayton Rd and S Willow Pass Rd
- Concord Avenue and W of Commerce Ave
- Concord Blvd and Vincente Rd
- Concord Blvd and NW of Kirker Pass Rd
- Concord Blvd and Denkinger Rd
- Concord Blvd and Yvonne Dr
- Concord Blvd and Mahoo Lane
- Concord Blvd and Princeton Ct
- Concord Blvd and Bailey Rd
- Coventry Rd and Cowell Rd
- Cowell Rd and Hale Dr
- Cowell Rd and Almendra Ct
- Cowell Rd and Monument Blvd
- Cowell Rd and Babel Lane
- Cowell Rd and S of Plumleigh Lane
- Cowell Rd and S of Treat Blvd
- Cowell Rd and Kaski Lane
- Cowell Rd and Almar St
- Craig Dr and Cowell Rd
- Crystal Avenue and Fairfield Ave
- David Ave and Cowell Rd
- Detroit Avenue and Monument Blvd
- Detroit Avenue and Walters Way
- E Olivera Rd and S of Montgomery Avenue
- East St and Crescent Dr
- Fabian Way and Clayton Rd
- Granada Dr and Willow Pass Rd
- Gross Lane and Orchard Avenue
- Grove Way and Orchard Ave
- Grove Way and Cowell Rd
- Hampton Dr and Hookston Rd
- Hilltop Rd and Solano Way
- Keswick Lane and Honister Lane

- Laguna St and Galindo St
- Laura Alice Way and Arnold Industrial Way
- Lee Lane and David Avenue
- Leland Way and Backfield Dr
- Maria Avenue and Dover Way
- March Dr and Iron Horse Regional Trail
- Mohr Lane and N of Mohr Ct
- Mohr Lane and N of Bentley St
- Mohr Lane and N of DaviD Avenue
- Monument Blvd and Cowell Rd
- Navaronne Way and NW of Viola Pl
- Oak Grove Road and Whitman Rd
- Olivera Rd and Peralta Rd
- Parkside Dr and Concord Blvd
- Parkside Dr and Salvio St
- Parkside Dr and Bonifacio St
- Peach Pl and Oak Grove Rd
- Pear Dr and Oak Grove Rd
- Port Chicago Hwy and S of Bates Ave
- Port Chicago Hwy and S of S of Salvio St
- Port Chicago Hwy and S of S of Kinne Blvd
- Port Chicago Hwy and S of S of Concord Blvd
- Ridgewood Dr and Ridgewood Ct
- Ridgewood Dr and Cowell Rd
- Risdon Rd and Risdon Ct
- Rose Lane and Treat Blvd
- Salvio St and 160ft W of Grant St
- Salvio St and Beach St
- Salvio St and N 6th St
- San Carlos Ave and Laguna St
- San Miguel Rd and Systron Dr
- Solano Way and Hilltop Rd
- St Francis Dr and Cowell Rd
- The Alameda and Corvada Way
- Thompson Dr and N of Thompson Dr
- Thunderbird Dr and Olivera Rd
- Treat Blvd and N of Thompson Dr
- Treat Blvd and Navaronne Way
- Treat Blvd and Vista Kelly Oaks Ct
- Treat Blvd and S of Marietta Ct
- Treat Blvd and N of Kingswood Dr
- Treat Blvd and Lynn Dr
- Treat Blvd and Cobblestone Dr
- Treat Blvd and NE of Cowell Rd
- Treat Blvd and E of Navaronne Way
- Whitman Rd and Oak Grove Rd

- Willow Pass Rd and St Phillps Ct

- **Corridor Conceptual Plan Project:**
- Monument Blvd and Walnut Creek
- Clayton Rd and Farm Bureau Rd
- Willow Pass Rd and Lynwood Dr

- **Short Term Bike Parking Project:**
- Mt Diablo St and 130ft S of Salvio St
- Pacheco St and 18ft E of Mt Diablo St
- Willow Pass Road and Mt. Diablo St
- Willow Pass Road and 200ft E of Grant St
- Willow Pass Road and Grant St
- Concord Community Park
- Meadow Home Park
- Parkside Cir and Between Beach St/ Parkside Dr
- Parkside Cir and 600ft NE of Beach St
- Parkside Cir and 600ft NW of Parkside Dr
- Salvio St and 160ft W of Grant St
- Victory Lane and Rea Anne Rd
- Willow Pass Community Park and N of Salvio Dr
- Willow Pass Community Park and S of Salvio Dr

- **Rectangular Rapid Flashing Beacon Project:**
- Alberta Way and N of Valmer Dr
- Alberta Way and Academy Rd
- Cowell Rd and Quail Ct
- Olivera Rd and Sanford St
- West St and Forest view Ave
- Floyd Lane and Cardinal Dr
- Lacey Lane and S Side of Cambridge Elementary Driveway Loop

- **Wayfinding/Sign Improvement Project:**
- Bonifacio St and Port Chicago Hwy
- CA-242 N and Undercrossing
- Wren Ave and Contra Costa Canal Trail

- **Pedestrian Scaled Lighting Project:**
- Clayton Rd and Sunset Avenue
- Colfax St and Pacheco St
- Concord Blvd and Galindo St
- East St and Pacheco St
- Grant St and Oak St
- Mt Diablo St and Concord Blvd
- Oakland Ave and Clayton Rd

- Pacheco St and Concord Ave
- Park St and Grant St
- Salvio St and Concord Ave
- Sunset Ave and Galindo St
- Willow Pass Rd and Concord Ave

- **Bicycle Access Study Project:**
- Monument Blvd and Iron Horse Trial
- Olive Dr and Mt Diablo Creek
- Panoramic Dr and Port Chicago Hwy
- Meridian Park Blvd and Willow Way

CONCORD COMPLETE STREETS STUDY (2014)

The City of Concord, located in Contra Costa County, faces a number of challenges in providing safe and accessible biking and walking facilities. The purpose of this study is to provide preliminary support in starting the process of creating a safer, bike friendly, walkable and livable Concord.

Proposed Treatments:

- **Galindo Street and Salvio Street Intersection (Intersection Improvement):**
  - Intersections create the biggest risk factors for bicyclists.
  - At intersections, right turning vehicle soften cross the bicycle lane to turn creating a conflict zone with bicycles. The most successful solution to this problem is the protected intersection design with refuge islands, also called Dutch intersection design because it was first developed and tested in the Netherlands.
  - Protected intersections resolve conflicts between bicyclists, pedestrians and vehicles by improving visibility and minimizing vehicle-bicycle conflicts.
- **Babel Lane and Cowell Road (Intersection Improvement):**
  - Bicyclist and pedestrian volume for this particular intersection is very low. However, to plan for future growth and greater use of the facilities, there appears to be a need for specific treatments. An addition of grade-separated sidewalks through much of this intersection will allow for safe use for both pedestrians and bicyclists.
  - Grade separated sidewalks will encourage walking and greater use by the residents living in the neighborhood. Next, striped signalized crossings will reinforce yielding of vehicles turning during a green signal phase.
  - Striping the crosswalks as wide as or wider than the walkway it connects to will ensure that when people walk, they can comfortably pass.
  - The use of high-visibility, zebra crosswalk markings are more visible to approaching vehicles. In addition, the crossing distances should be as short as possible for pedestrians.
  - For bicyclists, a clearly demarcated Class II bicycle lane with green striping in the existing pathway would help to alleviate confusion for pedestrians, cyclists and drivers. The high volume traffic and speeds along Cowell pose a risk to the safety of cyclists.
  - A "trail of bread crumbs" will guide the bicyclist across the intersection, while alerting drivers to approaching cyclist crossing. In the future, when bike path circulation is further coordinated and connected, implementing a buffered bike path with flexible delineators would help to shield cyclists from high volume and high-speed traffic.

    - A Class I facility would be appropriate for Babel as there were few bicyclists turning in from Babel onto Cowell. Most cyclists used Cowell.
- **Meadow Lane/Oak Grove Road Intersections and Monument Boulevard (Intersection Improvements):**
    - Add a protected/buffered Class II (Bike Lane) facility on Monument Blvd and improve the current.
    - Class II (Bike Route) on Oak Grove Rd/Meadow Lane to a protected/buffered Class II (Bike Lane). In order to achieve this, a road diet will need to be performed to allocate proper widths of the bike lanes and vehicular lanes. Add a Standard Crosswalk to complement the current textured crosswalk.
    - This will help to contrast the textured crosswalk, make pedestrians more visible, and cars will stop ahead of time. Since, cars were noticed to stop directly on the textured crosswalk adding a solid white border can help prevent cars from doing so. Add a bus shelter and bench on each bus stop to improve transit rider usage.
- **Clayton Road and The Alameda (Intersection Improvements):**
    - This is true for the existing advance stop lines at this intersection as well. It is also suggested that higher visibility pedestrian and cyclist warning signs and rectangular rapid flashing beacons to be installed to improve driver awareness of the trail crossing ahead.
    - Larger more visible signs, and the flashing beacons at the crosswalk can increase visibility for oncoming traffic when activated by pedestrians or cyclists.
- **Willow Pass Road and Diamond Boulevard (Intersection Improvements):**
    - This report strongly urges the city of Concord to reduce the overall width of automobile lanes, to under ten feet, and introduce highly visible Class II bicycle facilities throughout the corridor. As shown above, the Class II bicycle facilities will strategically utilize green paint throughout the intersection to increase bicycle visibility.
    - As the bicycle lanes approach the intersection, the design pattern shifts from a stripe pattern where the bicycle lane is marked with green paint every 10-15 feet, to a solid green line.
    - This is done to further increase bicyclist visibility near the intersection and to act as a traffic calming device. At turning lanes, where it is much more difficult to implement a bike-only lane, we introduce “sharrows”; large green arrows that let automobile drivers know that bicyclists are equally as able to utilize that lane to turn as they are.
- **Clayton Road and Fry Way (Intersection Improvements):**
    - A fully painted, dashed Class II bicycle lane is proposed, possible with textured pavement to visuals and physically inform drivers that they are crossing the bicycle lane. Due to the lower traffic volumes and a fewer number of lanes on Fry Way, sharrows are a more appropriate measure as there is not enough room for a full 5 foot Class II bicycle lane immediately off the intersection with the raised median further down the road.
    - Additional, and alterations at this intersection could include textured pavement along the crosswalk across Clayton Rd, the development of an elevated pedestrian bridge from the bus stop along eastbound Clayton Rd to the opposite side, and a Class II bicycle lane between the two turning lanes on southbound Fry Way.
    - These alternatives would be more costly than the initially proposed intersection alterations, but can have a greater effect on increasing pedestrian and bicycle comfort and safety.
- **Willow Pass Road and Galindo Street (Intersection Improvements):**

- Diagonal crossings stop all vehicular traffic at the intersection and safety allow pedestrians and cyclists alike to cross diagonally as they please.
- Furthermore, in order to accommodate bicyclists and pedestrian safety, this suggests highly visible Class II bicycle lanes along both Galindo Street and Willow Pass Road.

- **Galindo Street and Laguna Street (Intersection Improvements):**
  - A "zebra crossing" at this crosswalk in particular will help to increase the visibility of the intersection for pedestrians and drivers. Zebra crossings are recommended for all other crosswalks at this intersection.
  - The distance between these corners is approximately 101 feet in length. Because the average person walks at 3.4 feet per second, it would take approximately 30 seconds for the average person to cross the proposed diagonal crossing.
  - Bulb-outs are proposed on each corner of the intersection to reduce pedestrian crossing distance and the speed of turning vehicles. Improvements to signal timing would better accommodate pedestrian mobility at every crossing at this intersection, especially along the southern crosswalk on Galindo Street.
  - Class II bicycle lanes with green stripping for both Galindo and Laguna streets increase bicyclist safety and help to guide bicyclists through the intersection. Although class II bicycle lanes may currently conflict with existing automobile traffic volumes, they should be considered for future implementation as Concord's bicycle path circulation network is further developed.
- **Mt Diablo Street/Oakland Avenue and Mt Diablo Street/Mesa Street: (Intersection Improvements):**
  - To convert both intersections into roundabouts. This will improve traffic flow, and improve motorist satisfaction which will likely improve the chances of them yielding to pedestrians.
  - To further improve pedestrian safety at these two intersections the crosswalks should also include bulb outs and high visibility crosswalks.
- **Clayton Road and Grant Street: (Intersection Improvements):**
  - In order to embrace the TOD, higher visibility be given to crosswalks. Although there are different pavers to alert drivers of crossing an intersection, more visibility can be given in a zebra-like manner as shown in the image above. The design pattern would be striping every 16 inches to 2 feet along the crosswalk.
  - This allows for pedestrians to be clearly seen from further away, as well as accommodate for an increase in pedestrian usage. This in turn encourages more pedestrian-oriented development within the area and emphasizes on the TOD overlay of the site.
- **Panoramic Drive and Port Chicago Highway: (Intersection Improvements):**
  - Multiple interventions are suggested for the intersection at Port Chicago Highway and Panoramic Drive.
  - These suggested improvements are made based on observations and pedestrian and bicycle traffic counts made during AM and PM peak hours on May 7th and 8th. Measures are necessary to increase bicycle and pedestrian access, visibility, and safety. It is recommended that the sidewalk is continued on the east side of Port Chicago Highway north of Panoramic Drive.
  - This should continue to the north in order to connect with the existing sidewalk at the Hwy 4 North off ramp. In order to shorten crossing time and create a safer pedestrian crossing, improvements need to be made to the crosswalks.

- The crosswalks with the highest pedestrian volumes should have their medians extended into the crosswalks and pedestrian islands should be included.
- A crosswalk should also be added to the north side of the intersection. All crosswalks should have zebra stripping in order to increase visibility.
- This will improve access for pedestrians. In order to create a more comfortable transit riding experience, a shelter and bench should be added to the bus stop on southwest corner of the intersection. The class I bike path that travels along the BART line and Port Chicago Highway needs substantial improvement.
- This path is the key bicycle connection between the North Concord BART station and the surrounding neighborhoods with the rest of the city.
- It is underutilized and has the potential to increase bicycle usage throughout Concord. The path needs to be clearly marked with painted bicycle symbols and lanes. It must be connect to the rest of the path through proper street crossings and way-finding signage. Way-finding signage needs to be prominent at all cross streets and within the BART station to direct people to the class I path and the destinations found near the route.
- The path needs to be fully connected throughout the route. There should be no gaps in this path.
- This means that there needs to be a clear bicycle crossing within the BART station. Also the gap in the path to the north, between the intersection and the freeway entrance ramp, must be filled in. These improvements will become more necessary as the Naval Weapons Station Reuse Plan comes into effect. It is recommended that these improvements are made before development construction begins.

CONCORD DOWNTOWN SPECIFIC PLAN (2014, AMENDED 2021)

Central Concord Pedestrian Improvements and Streetscape Project - Location: Downtown area at 30 intersections. Rehabilitate crosswalks including pothole repair and re-staining of colored concrete crosswalks, improve curb ramps on Grant and Salvio Streets, install bicycle racks and lanes on Grant Street, add striping and sharrows on Salvio Street, update wayfinding at BART plaza, refurbish pedestrian light poles and tree lighting on Grant Street to improve pedestrian safety and visibility.

Concord BART Plaza Improvements - Location: Concord BART Station area, Grant Street, and Oak Street. Install bicycle lanes on Grant and Oak Streets, provide additional pedestrian lighting along Grant Street, create new pedestrian walkway from BART entrance to Grant Street, relocate taxi and Kiss 'N Ride parking for improved pedestrian flow, install new wayfinding signage to enhance pedestrian orientation and safety.

Downtown Concord Bicycle Lane Improvements - Location: Clayton Road, Concord Boulevard, Grant Street, Oakland Avenue, and Mt. Diablo Street. Implement bicycle routes and lanes throughout downtown corridor, construct and widen sidewalks on Clayton Road and Grant Street (east side between Concord Boulevard and Willow Pass Road) to provide dedicated safe space for cyclists and pedestrians.

Downtown Sewer and Streetscape Improvements - Location: Grant Street and surrounding downtown streets. Phased project combining sewer system replacement with street paving and striping, sidewalk

repair on portions of Grant Street, selected curb replacements to improve overall pedestrian and bicycle infrastructure quality during utility work.

Salvio Street Improvements at Mt. Diablo Street - Location: Salvio Street east of Mt. Diablo Street. Remove diagonal parking along north side of Salvio Street to improve sight lines and safety, enhance sidewalk conditions at intersection to create safer pedestrian environment.

Salvio Street Bicycle Lanes - Location: Salvio Street from Port Chicago Highway to Parkside Drive. Install bicycle sharrows to provide designated bicycle space and improve cyclist safety along this key downtown connector.

Willow Pass Road and Nearby Intersections Traffic Signal Upgrades - Location: Willow Pass Road and downtown intersections. Upgrade traffic signals and install new signals at multiple downtown intersections, add protected left turn phasing to reduce vehicle-pedestrian conflicts, implement ADA upgrades on Willow Pass Road including accessible curb ramps and crossing infrastructure.

Grant Street Two-Way Conversion - Location: Grant Street between BART Station and Todos Santos Plaza. Convert one-way street segments to two-way operation with consistent travel lanes, dedicated bike lanes, and wider sidewalks to reduce vehicle speeds and improve safety for all users.

BART Linear Park and Greenway - Location: Along BART tracks from North Concord BART station to Downtown Concord BART station. Develop open space and bicycle/pedestrian path beneath BART elevated tracks to create safe grade-separated active transportation connection providing direct access to BART station from surrounding neighborhoods.

Pedestrian Priority Zone Treatments - Location: Downtown core area within 10-minute walk of BART. Implement raised crosswalks, signal timing changes limiting traffic speeds, curb extensions, decorative pavement treatments, enhanced lighting, and other traffic calming measures to prioritize pedestrian safety in high-activity areas.

Clay Alley Pedestrian District - Location: Clay Alley and Salvio Street near Pacheco Adobe. Create pedestrian-oriented retail and dining environment with enhanced sidewalks, outdoor seating areas, pedestrian-scale lighting, and traffic calming measures centered around historic Pacheco Adobe.

CITYWIDE CLIMATE ACTION PLAN (2013)

The Climate Action Plan does not identify specific project locations but establishes mandatory programmatic safety strategies to be implemented citywide:

Pedestrian Master Plan Development - Location: Citywide. Develop comprehensive pedestrian master plan to strategize and prioritize efforts making walking easier, safer, and more comfortable, establishing bicycle and pedestrian mode share goals and monitoring provisions.

Safer Active Transportation Programs and Enforcement - Location: Citywide with focus on high-injury areas, schools, and senior housing. Implement enforcement campaigns targeting violations associated with

severe and fatal injuries in strategic locations, with annual collision data review and cause analysis to implement ongoing safety improvements.

Traffic Calming Implementation - Location: Citywide as conditions of development approval. Implement measures including curb bulb-outs, additional street trees, raised crosswalks, roundabouts, smaller corner radii, pavement treatments, and lane narrowing to slow traffic and encourage walking and bicycling.

Bicycle Master Plan Development and Implementation - Location: Citywide connecting transit stations, schools, medical services, grocery stores, and key destinations. Identify and address barriers and dangers to bicycling, maximize connectivity, increase local access to dedicated bicycle lanes and trails, coordinate infrastructure investments with pedestrian master plan.

Bike Parking Installations - Location: All new multi-family and non-residential development, City facilities citywide. Require and install secure, convenient bicycle parking within 30 feet of entrances, well-lit at night, to increase safety and visibility of bicycling as travel option.

Safe Routes to Schools Comprehensive Program - Location: All 50 schools citywide with priority for high-need areas. Implement engineering improvements including walkways, crossings, bike lanes, traffic calming; enforcement at schools; encouragement programs like walking school buses; education including bicycle safety training; evaluation through walk and bike audits identifying key safety improvements.

Multi-Modal Wayfinding System - Location: Citywide with emphasis on connections to transit stations, schools, medical services, grocery stores. Install directional signage helping pedestrians and cyclists find safest, most convenient routes across town and to key destinations.

City Forest Plan/Street Tree Implementation - Location: Downtown Concord and key street corridors citywide. Plant street trees strategically to provide traffic calming effects, shade sidewalks and bike lanes to make active travel more pleasant and safe, reduce heat island effect.

Complete Streets Checklist Application - Location: All street reconstruction, development projects, and utility projects citywide. Apply streamlined complete streets review ensuring safe crossings with accessible curb ramps, crosswalks, refuge islands, pedestrian signals, buffers between pedestrians and vehicles, wide sidewalks, illuminated crosswalks, bulb-outs, pedestrian-scale lighting.

Active Transportation CIP Priority Projects - Location: Citywide prioritized through 10-year Capital Improvement Program. Systematically fund bicycle and pedestrian infrastructure improvements identified through master plans, with coordination across all City infrastructure investments.

APPENDIX D:
COMMUNITY OUTREACH AND STEERING COMMITTEE PRESENTATIONS

MAKING CONCORD STREETS SAFER

Comprehensive Safety Action Plan

Community Outreach Meeting

March 30, 2026 | City of Concord

City of Concord
Transportation Division

Federally Funded by
U.S. DOT SS4A Program

www.concordsafestreets.org

Agenda

Community Outreach Meeting | March 30, 2026

- Welcome & Introductions
- What is the CSAP & Why It Matters
- Our Vision: Zero Traffic Fatalities and Serious Injuries
- 5-Year Collision Snapshot (2021–2025)
- Community Engagement
- Your Voice Shapes This Plan
- How to Stay Involved

What is a Comprehensive Safety Action Plan?

What It Is

A data-driven roadmap that identifies high-risk locations and defines strategies to reduce fatal and serious injury crashes.

Safe System Approach
No one should die or be seriously injured on our roadways. Safety is a shared responsibility.

SS4A Federal Funding
Supported by the U.S. DOT Safe Streets and Roads for All program. Positions Concord for implementation grants.

1. Collision data analysis
2. High-risk location identification
3. Community & stakeholder engagement
4. Safety countermeasure development
5. Project prioritization & funding plan
6. Monitoring & evaluation framework

Our Commitment: Zero Traffic Fatalities and Serious Injuries

Vision Zero – No death on our roads is acceptable or inevitable

Data-Driven Priorities

Uses 5 years of crash data to identify exactly where and why crashes are happening

Focused on Saving Lives

Every strategy targets fatal and severe injury (KSI) crashes first

Community Input

Your lived experience tells us which streets feel unsafe and what improvements matter most

Systemic Approach

Addresses crash patterns across the entire city network, not just one intersection

Funding Readiness

Positions Concord for future SS4A implementation grants to deliver real capital improvements

Measurable Outcomes

Clear metrics track progress and demonstrate impact over time

CSAP Process

Where we are today — and where we're heading

WE'RE HERE

Stakeholder and Community Engagement

5-Year Collision Snapshot

2021 – 2025 | City of Concord

1,804	164	19	145
Total Collisions	KSI Collisions	Fatal Collisions	Severe Injuries

Key Highlights

Severity	Segment	Intersection	Total
Fatal	3	16	**19**
Severe Injury	19	126	**145**
Visible Injury	79	348	**427**
Complaint of Pain	185	1,028	**1,213**
Total	**286**	**1,518**	**1,804**

Key Highlights

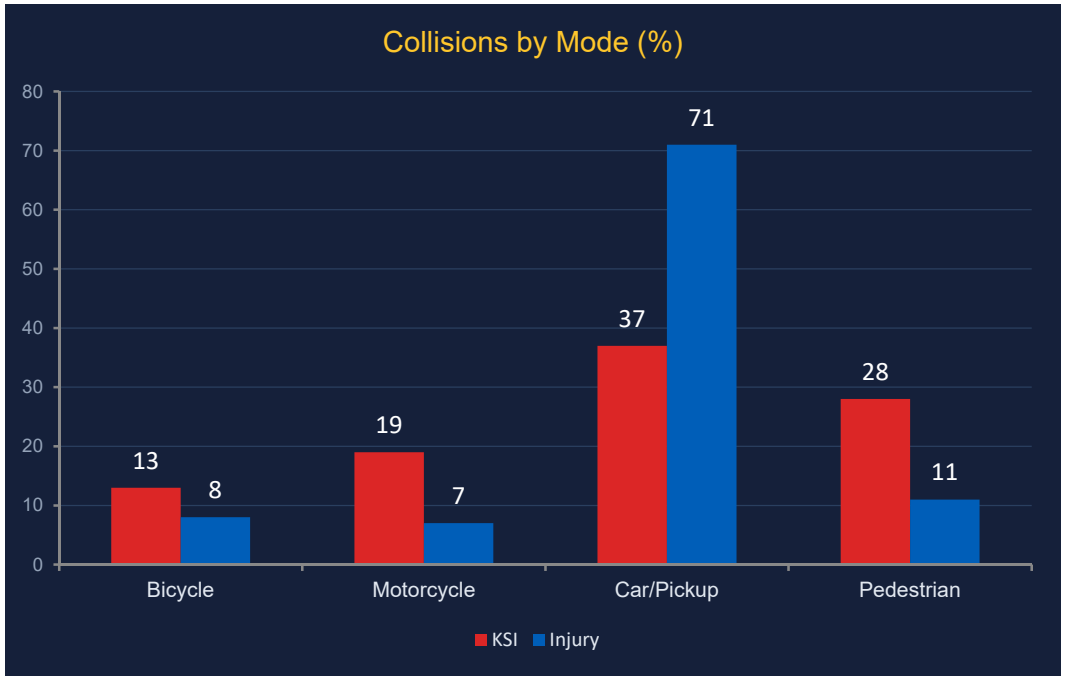
87% of KSI at intersections
142 of 164 KSI collisions occurred at intersection locations

60% of KSI: Peds, Bikes, Motos
Vulnerable road users far overrepresented in severe outcomes

12% of KSI involve alcohol
20 of 164 KSI collisions were alcohol-related

Collision Trends Over Time

2021 – 2025 | KSI and Total Collisions by Mode



Key Observations

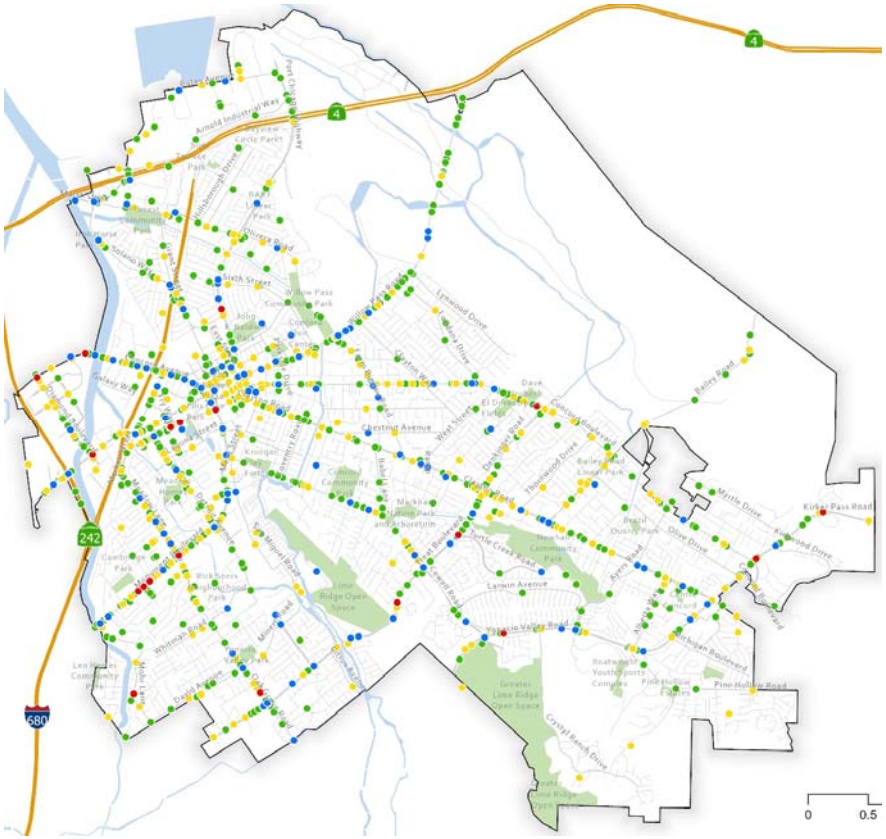
Peak year: 2022
383 total collisions and 39 KSI

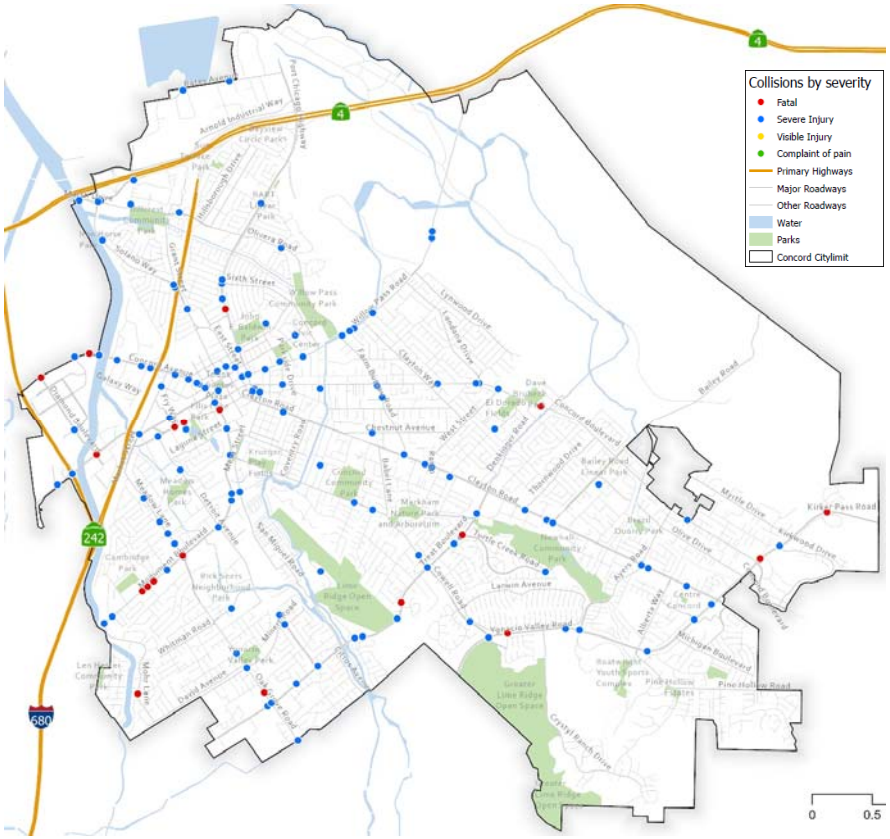
2025 shows decline
341 total collisions (∑11% from peak)

KSI remains elevated
34 KSI in 2025—same as 2021 despite overall decline

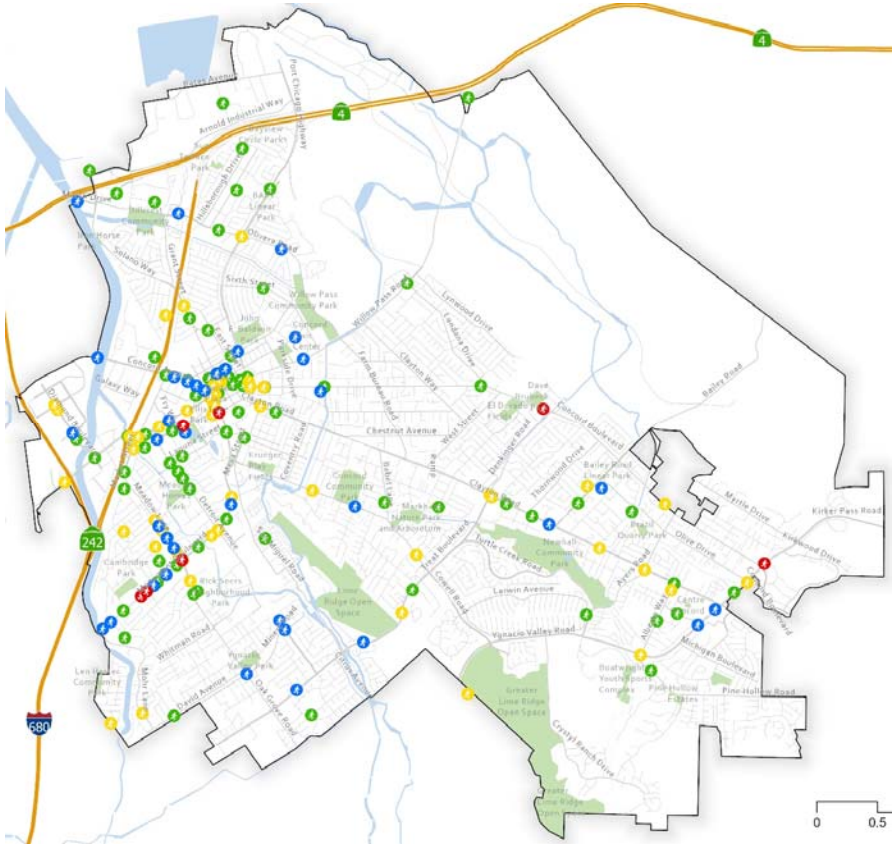
84% at intersections
1,518 of 1,804 collisions occurred at intersections

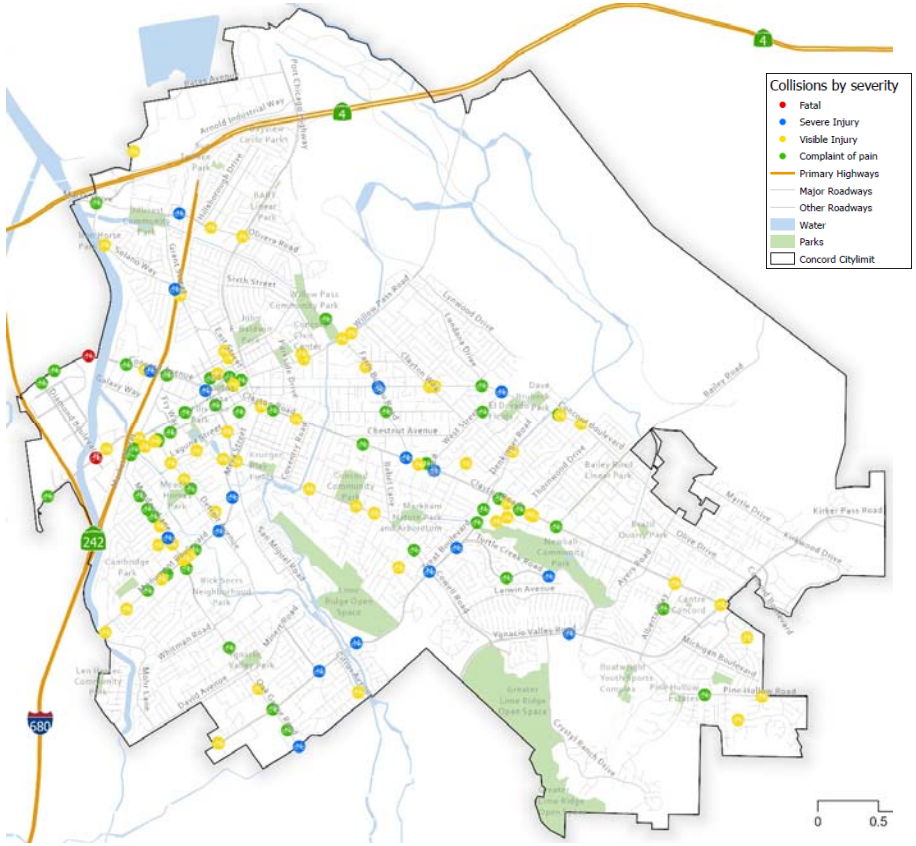
Where Crashes Are Happening





Pedestrian & Bicycle Crash Locations

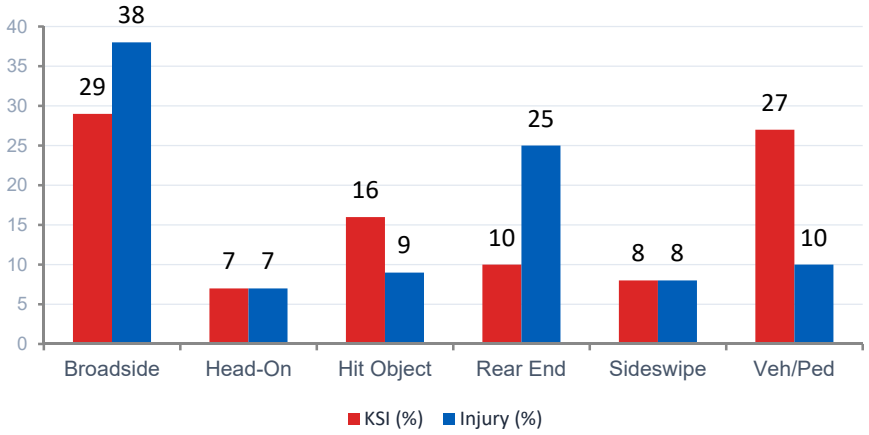




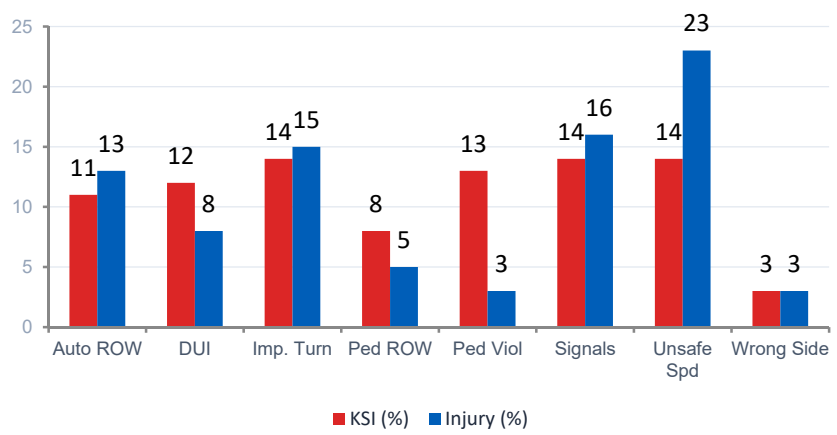
How & Why Crashes Are Happening

Understanding crash patterns helps target the right solutions

By Collision Type



By Violation Category



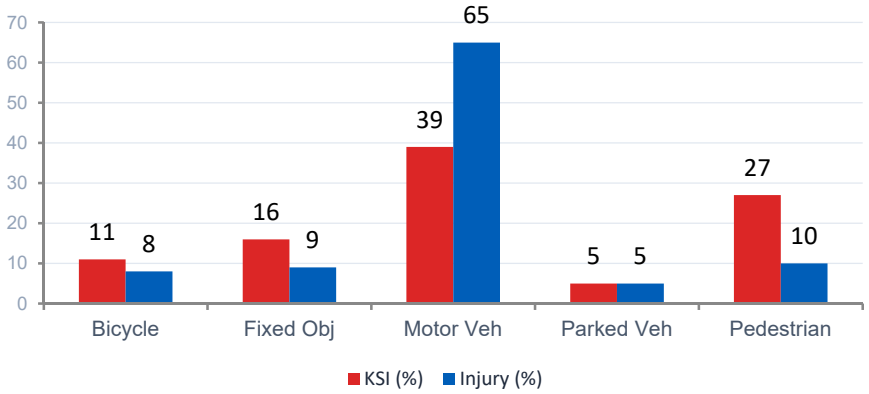
Key Finding:

Broadside and Vehicle/Pedestrian collisions accounted for 29% and 27% of KSI outcomes respectively, together responsible for over half of all deaths and severe injuries. Pedestrian/bicycle collisions are disproportionately severe relative to their overall share.

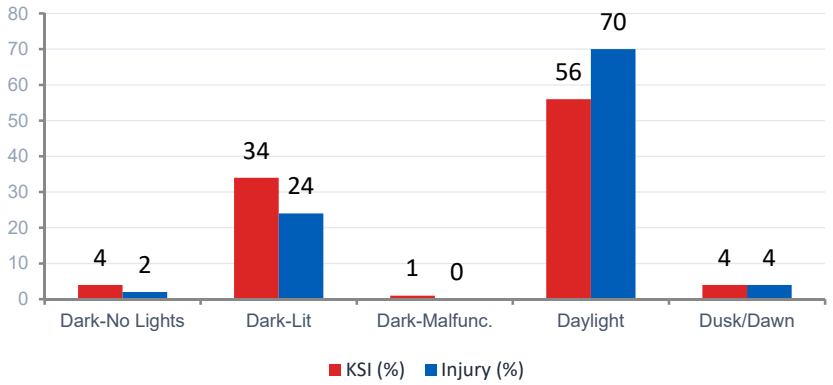
Vehicle Involvement & Lighting

What is involved and when are crashes most severe?

Motor Vehicle Involved With



Lighting Conditions



Top 5 KSI Corridors:
Willow Pass Rd (17 KSI), Clayton Rd (16), Monument Blvd (13), Treat Blvd (13), Concord Ave (10). Together: 69 of 164 citywide KSI = 42% of all severe crashes.

Lighting & Peak Hours:
38% of KSI occur in dark conditions. PM Peak (4–7 PM) is the single highest-risk period with 33 KSI, followed by evenings at 40 KSI.

Community Engagement

What are we doing?

- Webpage with Interactive Map to report your concern
- Web base survey
- Community Meetings

1. Meeting No. 1 – to receive feedback

2. Meeting with Bike Concord and Community Groups

3. Meeting No. 2 – Present the findings and recommendations

Community Survey: What We've Heard So Far

252 responses · March 11–27, 2026 | All Modes of Travel

252
Responses Received

79%
Had Personal Collision Experience

96%
Changed Travel Behavior Due to Safety

72%
Concerned About School Zone Safety

WHO RESPONDED

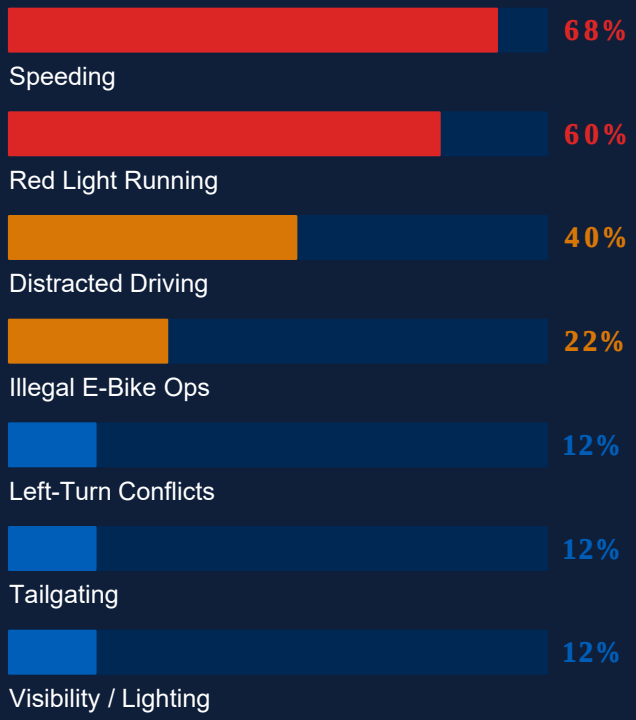
TOP GEOGRAPHIC FOCUS

Top ZIP: 94521 (38%) | English: 90% | Disability: 11%

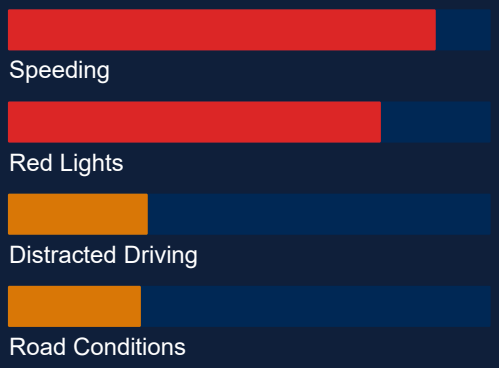
Top Safety Concerns — What Community is Telling Us

Multi-select responses · n=252

OVERALL SAFETY CONCERNS



DRIVERS



PEDESTRIANS

CYCLISTS

27% No Rules Followed

17% No Bike Lanes

School Zone Safety & Collision Experience

Two high-priority themes from community feedback

SCHOOL ZONE SAFETY

72% concerned about school-zone safety

Very Concerned	34%
Somewhat Concerned	38%
Not Concerned	13%

TOP SCHOOL ISSUES CITED

41%	Speeding near schools
38%	Pickup / dropoff backup
30%	Double-parking / sight lines
33%	Drivers failing to yield

PERSONAL COLLISION EXPERIENCE

79% have experienced a collision firsthand

32%	Near-miss personally
31%	Witnessed a collision
13%	Directly involved
21%	No experience

INSIGHT

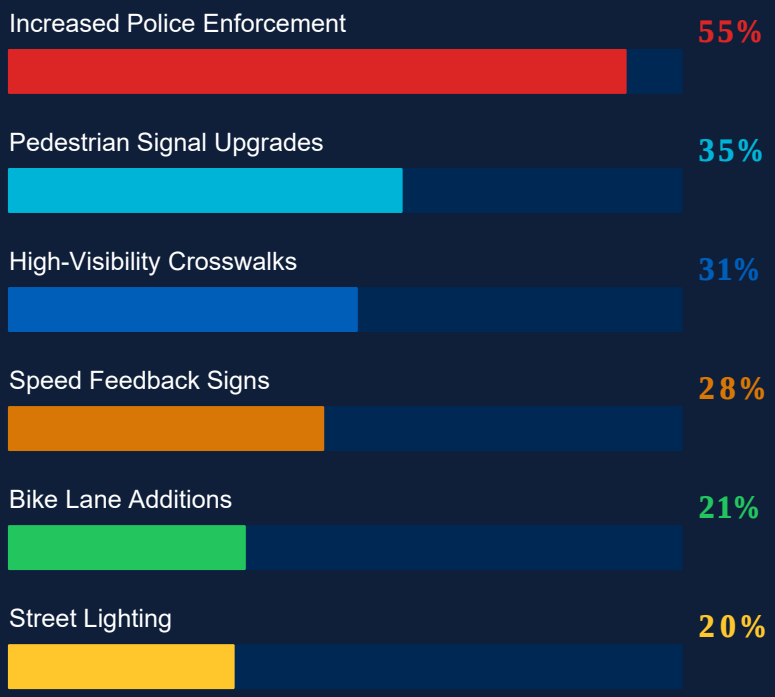
Residents directly involved in collisions cite distracted driving at 53% — 15 points higher than those with no experience (38%). Collision exposure sharpens concern for all violations.

What Community Wants — Priorities & Behavior Change

% of 252 respondents · March 11–27, 2026

REQUESTED IMPROVEMENTS

% of 252 respondents selecting each option



TRAVEL BEHAVIOR CHANGED BY SAFETY

96% of residents have modified their travel due to safety concerns

36%	Avoid certain streets
27%	Avoid certain times
26%	Drive / walk more cautiously
2%	Changed travel mode
4%	No change in behavior

Residents 65+ shift time (41% avoid times) · Working-age adults shift routes (47–52% avoid streets)

Key Takeaways: What the Survey Is Telling Us

Evidence-based priorities derived from 252 community survey responses · March 11–27, 2026

01 Enforcement Is the #1 Requested Fix

55% of residents named increased police enforcement as their top improvement — higher than any infrastructure measure. This holds across every geographic focus area.

02 Speeding + Red Lights Dominate Every Mode

68% cite speeding and 60% cite red light running. These dual violations top every subgroup: drivers, pedestrians, cyclists, and all age groups.

03 School Zone Safety Is a Shared Urgency

72% are concerned about school-zone safety. Very concerned residents identify speeding; somewhat concerned identify pickup congestion — requiring a two-stream response.

04 Pedestrian Signals Are the Top Infrastructure Ask

35% requested pedestrian signal upgrades, ranking 2nd overall. Residents with disabilities cited signals at 36% — key equity finding for crosswalk investment.

05 96% Changed How They Travel Due to Safety

Route avoidance (36%), time-shifting (27%), and cautious driving (26%) are widespread. Older adults shift when they travel; working-age adults shift where — both responses need parallel interventions.

06 Survey & Data Tell a Consistent Story

Community concerns align directly with collision data: high-injury corridors on Clayton Rd, Willow Pass, and Monument Blvd are the same streets residents call out most.

Your Voice Shapes This Plan

Crash data tells us WHERE. Your experience tells us WHY streets feel unsafe.

Take the Survey

5 minutes, anonymous. Share which streets feel unsafe and your top safety priorities.

concordsafestreets.org/survey

Contact the Team

Reach out directly to our project team with questions or detailed feedback.

abhishek.parikh@cityofconcord.org

Report a Concern

Pin your exact location on our interactive map at concordsafestreets.org to report a safety concern.

concordsafestreets.org

Stay Informed

Visit concordsafestreets.org for collision data, project updates, and event announcements.

www.concordsafestreets.org

Spread the Word

Share the project with neighbors, friends, and community groups. More voices = better plan.

Share with neighbors

Thank You — Your Input Matters

Together we are building safer streets for every person who walks, bikes, drives, and lives in Concord.

City of Concord — Transportation Division

Survey: concordsafestreets.org/survey | Concerns: concordsafestreets.org

Comprehensive Safety Action Plan | 2026

MAKING CONCORD STREETS SAFER

Comprehensive Safety Action Plan

Community Outreach Meeting No. 2

April 13th, 2026 | City of Concord

City of Concord
Transportation Division

Federally Funded by
U.S. DOT SS4A Program

www.concordsafestreets.org

Agenda

Community Outreach Meeting | April 13, 2026

- Welcome & Introductions
- What is CSAP ?
- Our Vision: Zero Traffic Fatalities and Serious Injuries
- 5-Year Collision Snapshot (2021–2025)
- Community Engagement
- Your Voice Shapes This Plan
- How to Stay Involved

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Funding Readiness

Positions Concord for future SS4A implementation grants to deliver real capital improvements

Measurable Outcomes

Clear metrics track progress and demonstrate impact over time

CSAP Process

Where we are today — and where we're heading

WE'RE HERE

1

Data Collection

Compile 6 years of collision data (Jan 2020–Dec 2025)

2

Collision Trend Analysis

Examine patterns, time periods, and contributing factors

3

Identify High-Risk Network

Pinpoint corridors, intersections, and zones with highest risk

4

Develop Safety Countermeasures

Propose engineering, enforcement, and education measures

5

Integrate Inputs & Prioritize

Incorporate stakeholder feedback and prioritize projects

6

Action Plan & Report

Document findings, strategies, and recommendations

Stakeholder and Community Engagement

5-Year Collision Snapshot

2021 – 2025 | City of Concord

1,804
Total Collisions

164
KSI Collisions

19
Fatal Collisions

145
Severe Injuries

Key Highlights

Severity	Segment	Intersection	Total
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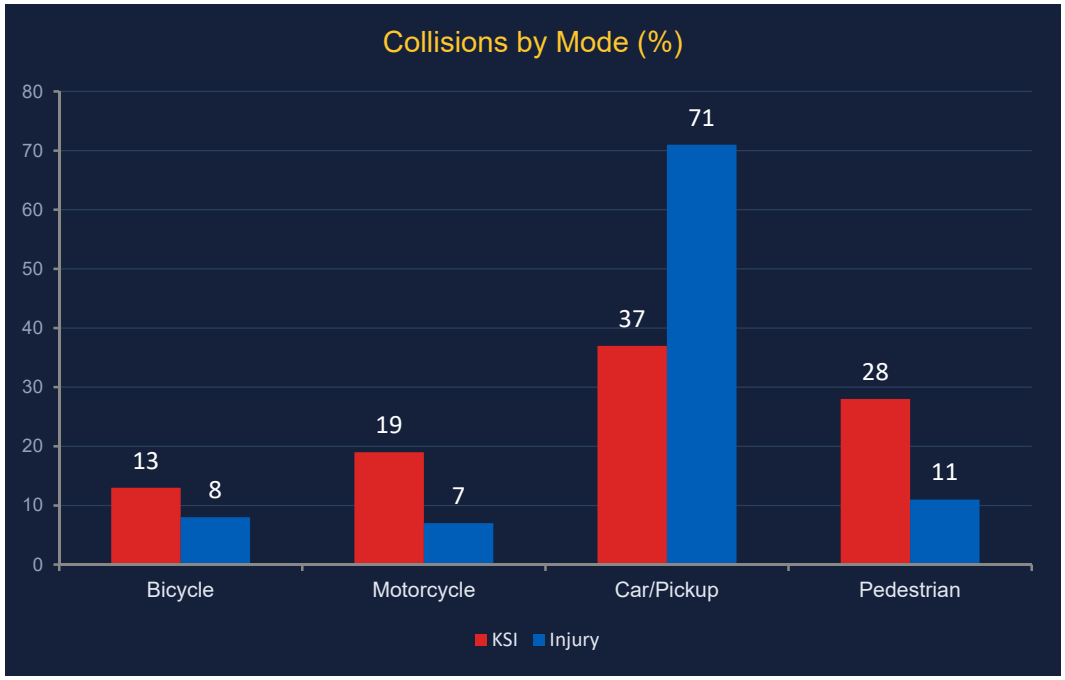

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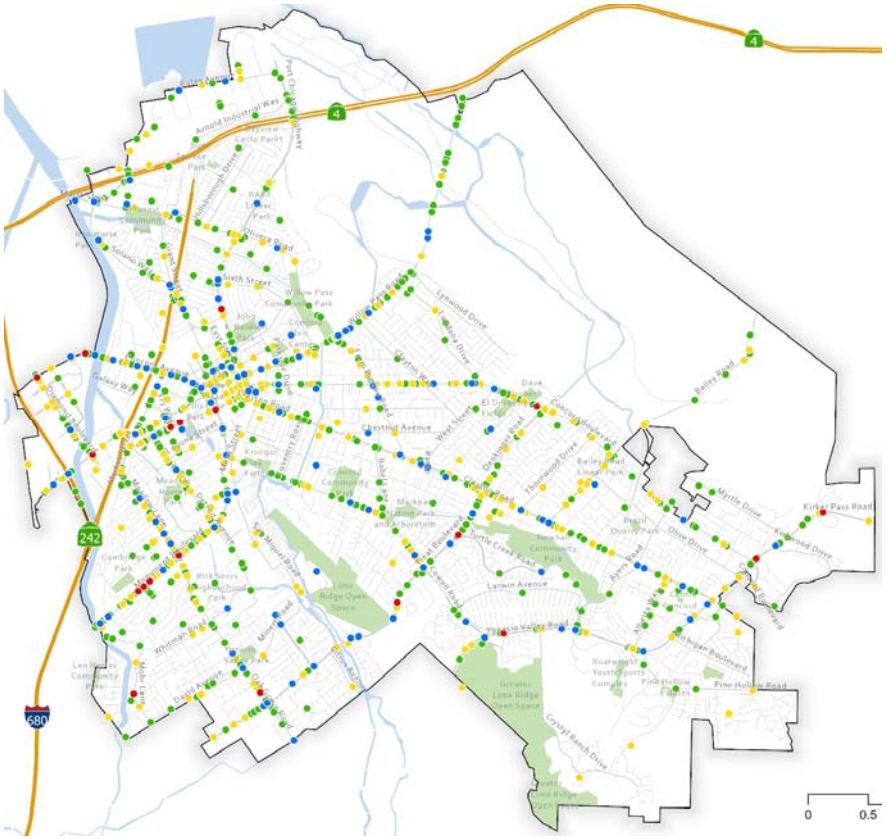
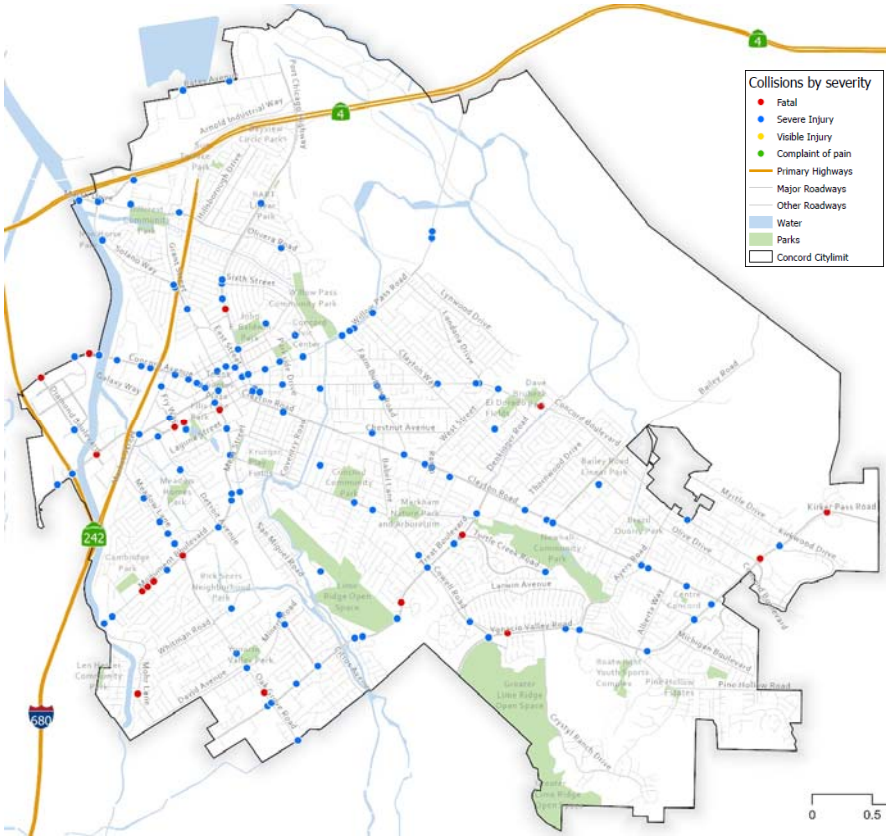
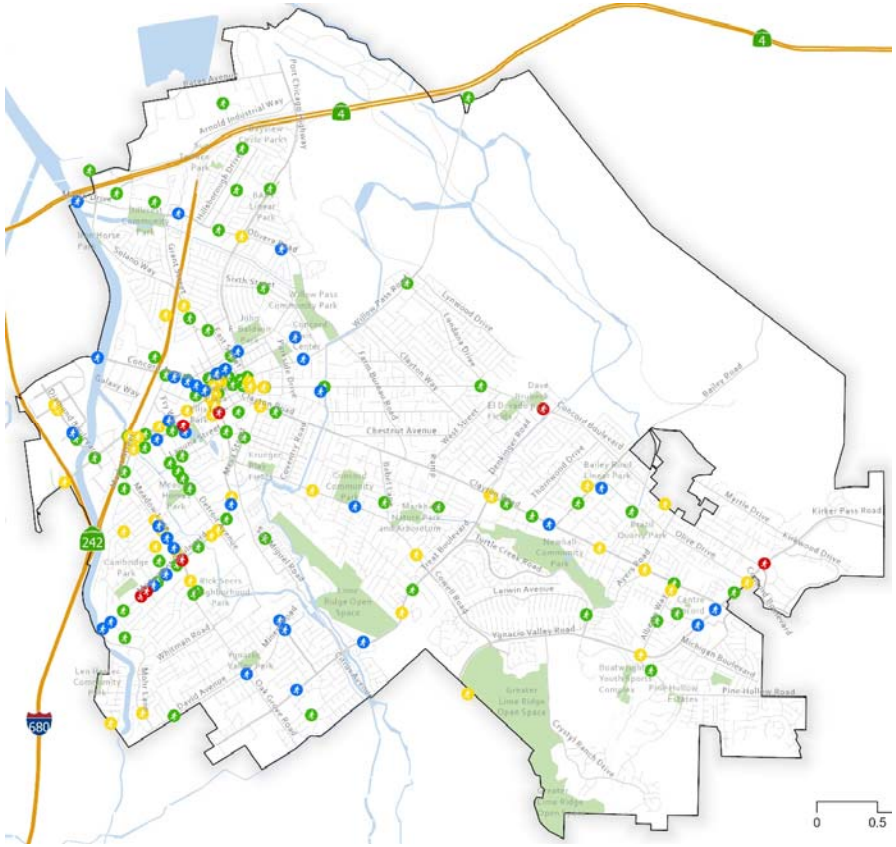
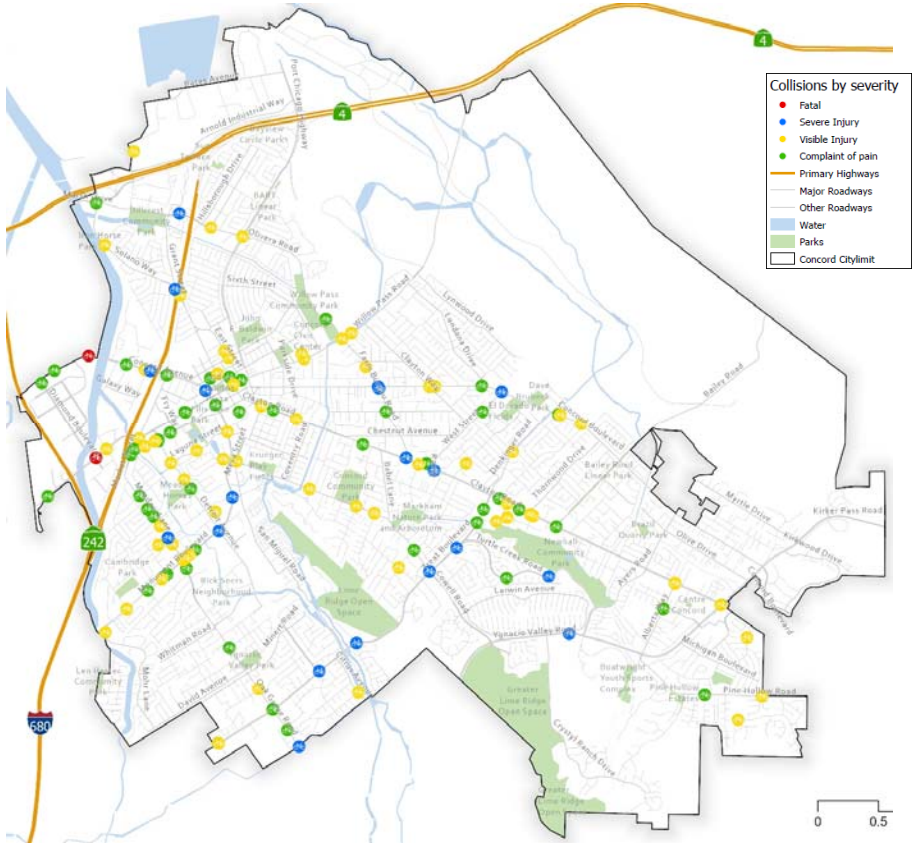
Where Crashes Are Happening





Pedestrian & Bicycle Crash Locations

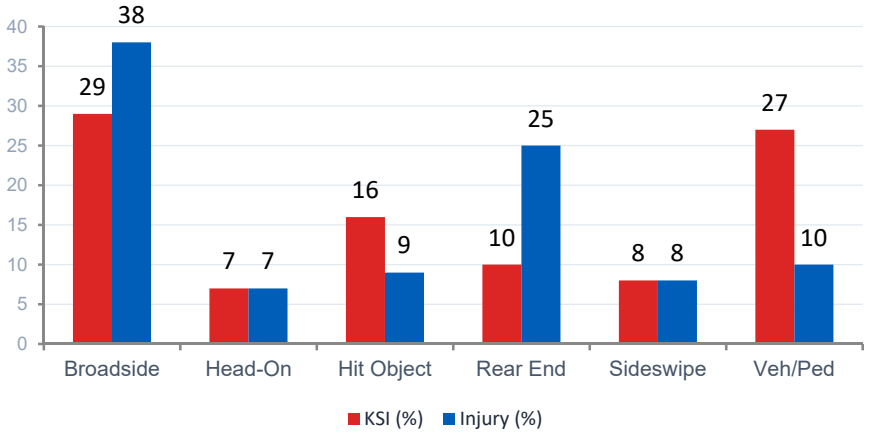




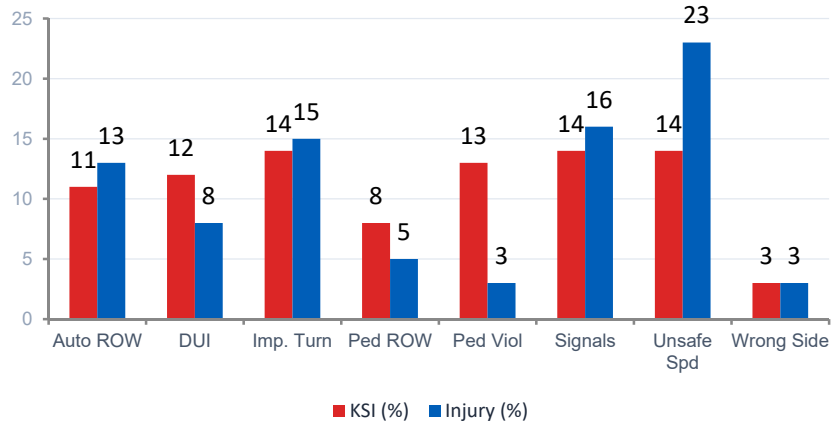
How & Why Crashes Are Happening

Understanding crash patterns helps target the right solutions

By Collision Type



By Violation Category



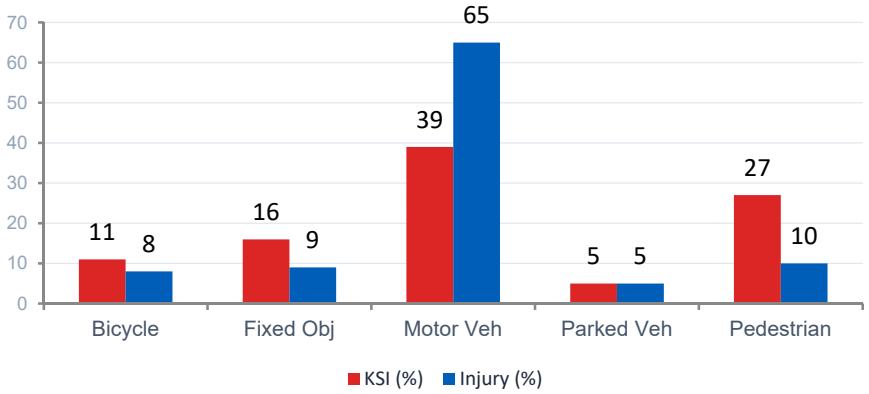
Key Finding:

Broadside and Vehicle/Pedestrian collisions accounted for 29% and 27% of KSI outcomes respectively, together responsible for over half of all deaths and severe injuries. Pedestrian/bicycle collisions are disproportionately severe relative to their overall share.

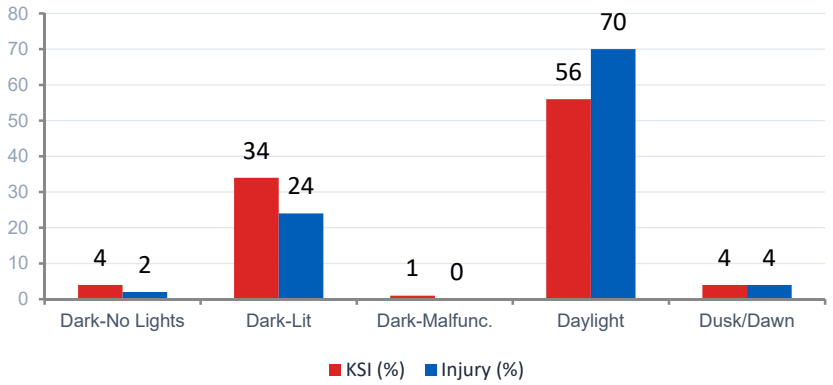
Vehicle Involvement & Lighting

What is involved and when are crashes most severe?

Motor Vehicle Involved With



Lighting Conditions



Top 5 KSI Corridors:
Willow Pass Rd (17 KSI), Clayton Rd (16), Monument Blvd (13), Treat Blvd (13), Concord Ave (10). Together: 69 of 164 citywide KSI = 42% of all severe crashes.

Lighting & Peak Hours:
38% of KSI occur in dark conditions. PM Peak (4–7 PM) is the single highest-risk period with 33 KSI, followed by evenings at 40 KSI.

Community Engagement

What are we doing?

- Webpage with Interactive Map to report your concern
- Web base survey
- Community Meetings

1. Meeting No. 1 – to receive feedback
2. Meeting No. 2 – to receive feedback
3. Meeting No. 3 – Present the findings and recommendations
4. Meeting with Bike Concord and Community Groups

Community Survey: What We've Heard So Far

523 responses · March 11–April 12, 2026 | All Modes of Travel

523
Responses Received

73%
Reported a Traffic Incident Experience

96%
Changed Travel Behavior Due to Safety

70%
Expressed Concern About School Zone Safety

WHO RESPONDED

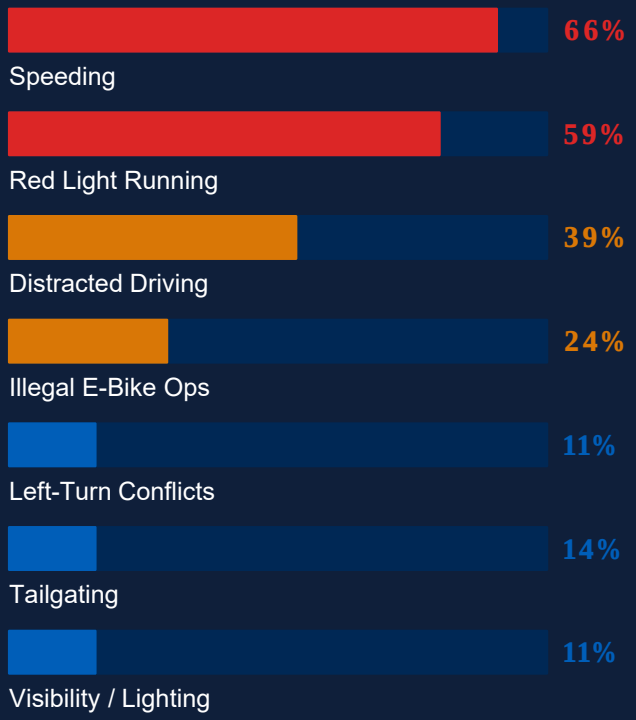
TOP GEOGRAPHIC FOCUS

Top ZIP: 94521 (37%) | English: 91% | Disability: 11%

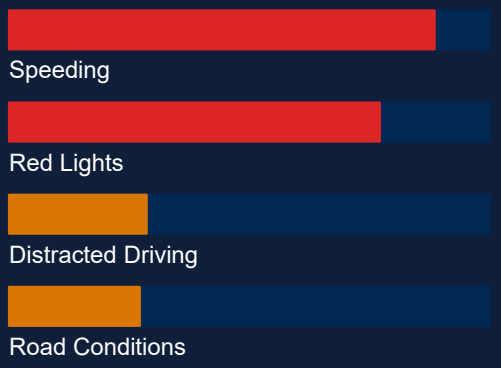
Top Safety Concerns — What Community is Telling Us

Multi-select responses · n=523

OVERALL SAFETY CONCERNS



DRIVERS



PEDESTRIANS

CYCLISTS

26% No Rules Followed

16% No Bike Lanes

School Zone Safety & Collision Experience

Two high-priority themes from community feedback

SCHOOL ZONE SAFETY

70% concerned about school-zone safety

Very Concerned	33%
Somewhat Concerned	37%
Not Concerned	16%

TOP SCHOOL ISSUES CITED

40%	Speeding near schools
40%	Pickup / dropoff backup
30%	Double-parking / sight lines
33%	Drivers failing to yield

PERSONAL COLLISION EXPERIENCE

73% have experienced a collision firsthand

31%	Near-miss personally
29%	Witnessed a collision
10%	Directly involved
27%	No experience

INSIGHT

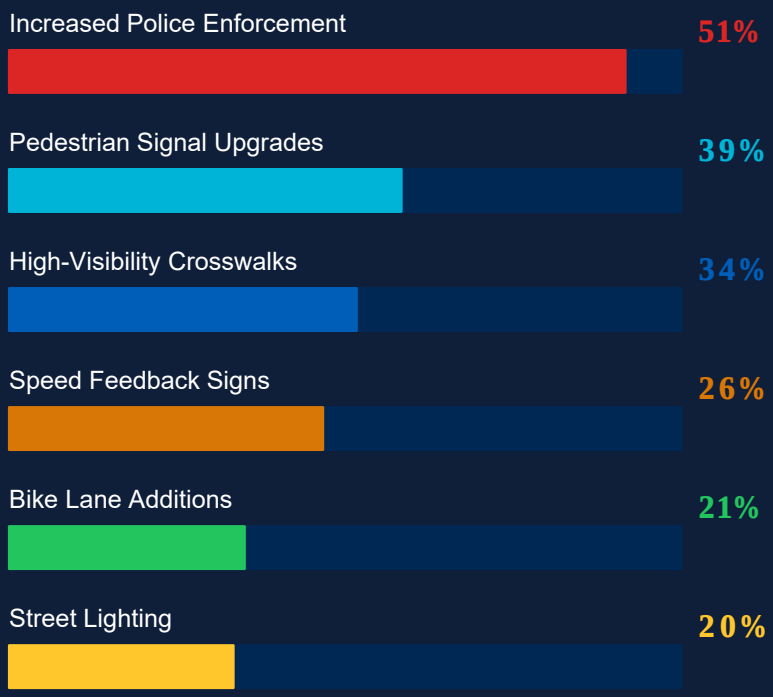
Afternoon (3–6 PM) and morning (6–9 AM) are the periods when the most respondents across all modes cited elevated concerns — 63% of drivers, 33% of pedestrians, and 26% of cyclists. These windows align with collision data peak hours.

What Community Wants — Priorities & Behavior Change

% of 523 respondents · March 11–April 12, 2026

REQUESTED IMPROVEMENTS

% of 523 respondents selecting each option



Enforcement ranks first in every geographic focus area. The one exception: residents

SCHOOL ZONE SAFETY CONCERNS

70% of respondents expressed concern about school-zone safety

40%	Speeding near schools
38%	Pickup/dropoff congestion
30%	Double-parking near schools
33%	Drivers failing to yield to children
19%	No dedicated bike route to school

E-bike concerns near schools were cited by 20% of respondents — the highest rate among any school-related bike issue. Physical separation of bike and pedestrian facilities near schools was a common open-text request.

Key Takeaways: What the Survey Is Telling Us

Key findings from 523 community survey responses · March 11–April 12, 2026

01 Enforcement Is the #1 Requested Fix

51% of respondents selected increased police enforcement as their top requested improvement — the highest of any option. This preference was consistent across all geographic focus areas, from crash intersections to school zones.

02 Speeding + Red Lights Dominate Every Mode

66% of respondents cited speeding and 60% cited red light running as top safety concerns. These two issues were cited consistently across all respondent groups — by drivers, pedestrians, cyclists, and every age group.

03 School Zone Safety Is a Shared Urgency

70% of respondents expressed concern about school-zone safety. Speeding near schools (40%), pickup/dropoff congestion (38%), and double-parking (30%) were the most frequently cited issues.

04 Sidewalks and Crosswalks Are Priority Infrastructure Gaps

18% of respondents cited missing sidewalks and 14% cited missing crossings. These gaps were noted across residential areas and near schools. Respondents with mobility limitations cited sidewalk gaps at a higher rate than those without.

05 Afternoon and Morning Are the Highest-Concern Time Windows

63% of respondents identified the afternoon (3–6 PM) as an elevated-concern period for drivers, and 58% identified the morning (6–9 AM). School hours were cited by 34%. These windows align with peak collision periods in the CSAP data.

06 Survey & Data Tell a Consistent Story

Community-cited locations align with collision data. The corridors most frequently mentioned in open-text responses — Clayton Road, Willow Pass Road, Treat Boulevard, and Ygnacio Valley Road — correspond directly with the corridors identified in the CSAP High Injury Network analysis.

Your Voice Shapes This Plan

Crash data tells us WHERE. Your experience tells us WHY streets feel unsafe.

Take the Survey

5 minutes, anonymous. Share which streets feel unsafe and your top safety priorities.

concordsafestreets.org/survey

Contact the Team

Reach out directly to our project team with questions or detailed feedback.

abhishek.parikh@cityofconcord.org

Report a Concern

Pin your exact location on our interactive map at concordsafestreets.org to report a safety concern.

concordsafestreets.org

Stay Informed

Visit concordsafestreets.org for collision data, project updates, and event announcements.

www.concordsafestreets.org

Spread the Word

Share the project with neighbors, friends, and community groups. More voices = better plan.

Share with neighbors

Thank You — Your Input Matters

Together we are building safer streets for every person who walks, bikes, drives, and lives in Concord.

City of Concord — Transportation Division

Survey: concordsafestreets.org/survey | Concerns: concordsafestreets.org

Comprehensive Safety Action Plan | 2026

COMPREHENSIVE SAFETY ACTION PLAN

Steering Committee Meeting #1

February 23, 2026 | 2:00 PM

City of Concord

Transportation Division

Prepared by TJKM

Agenda

Steering Committee Meeting #1

- Introduction
- Your Role as a Safety Champion
- What is a Comprehensive Safety Action Plan?
- Benefits of CSAP
- CSAP Process Overview
- Preliminary Collision Analysis Findings
- Next Steps
- Discussion & Questions

Steering Committee

Abhishek Parikh – City of Concord Public Works Department
Virendra Patel – City of Concord Public Works Department, Project Manager
Phalen Shwan – City of Concord
Jesse Crawford – City of Concord
Danielle Thomas – Contra Costa County Fire Protection Department
Pranjal Dixit – CCCTA
Kamla Parks – BART
Melanie Koslow – Mt. Diablo Unified School District

Your Role as a Safety Champion

Set Goals

Help set the goals and objectives of the CSAP

Share Issues

Tell us about traffic-safety-related issues you see

Community Voice

Tell us what you've heard from community members

Report Concerns

Use the survey and interactive map on the project webpage

Share Experience

Share your experience with recently implemented countermeasures

Spread the Word

Share project details and help increase community awareness

Monitor Progress

Help monitor the program and evaluate implemented strategies

Stay Informed

Stay up to date on the project and its milestones

What is a Comprehensive Safety Action Plan?

CSAP Definition

A data-driven roadmap that identifies high-risk locations and defines strategies to reduce fatal and serious injury crashes. It uses the Safe System approach to prioritize and implement effective roadway safety improvements.

Key Elements

1. Collision data analysis
2. High-risk location identification
3. Stakeholder engagement
4. Safety countermeasure development
5. Project prioritization
6. Implementation & funding plan
7. Monitoring & evaluation

Safe System Approach

No one should die or be seriously injured on our roadways. Safety is a shared responsibility across road design, vehicle safety, speeds, and user behavior.

Benefits of the CSAP

Data-Driven Priorities

Uses data to identify high-risk locations and prioritize improvements

Focused on Saving Lives

Reduces fatal and serious injury (KSI) crashes

Community Input

Incorporates community and stakeholder feedback

Systemic Approach

Addresses crash patterns across the entire network

Funding Readiness

Positions the City for state and federal safety grants

Measurable Outcomes

Establishes clear metrics for monitoring and evaluation

CSAP Process

Our structured approach to safety improvement

WE'RE HERE

1 — Data Collection

Compile 6 years of collision data (Jan 2020–Dec 2025)

2 — Collision Trend Analysis

Examine patterns, time periods, and contributing factors

3 — Identify High-Risk Network

Pinpoint corridors, intersections, and zones with highest risk

4 — Develop Safety Countermeasures

Propose engineering, enforcement, and education measures

5 — Integrate Inputs & Prioritize

Incorporate stakeholder feedback and prioritize projects

6 — Action Plan & Report

Document findings, strategies, and recommendations

Collision Analysis Findings

2020 – 2025 | Six-Year Analysis Period

2,108
Total Injury Collisions

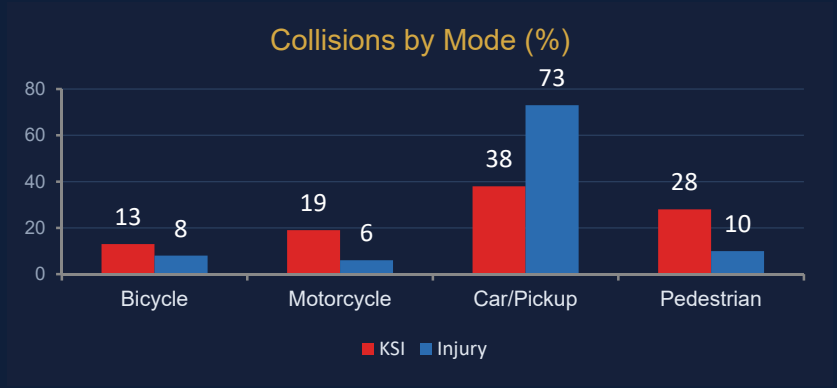
191
KSI Collisions

23
Fatal Collisions

168
Severe Injury Collisions

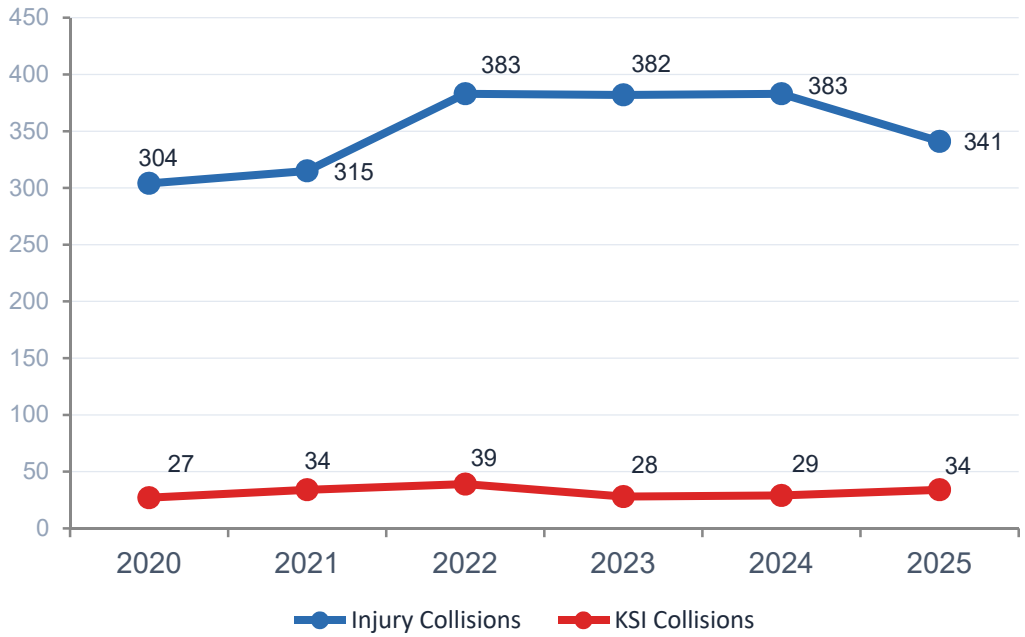
Collisions by Severity and Location

Severity	Segment	Intersection	Total
Fatal	4	19	**23**
Severe Injury	23	145	**168**
Visible Injury	93	416	**509**
Complaint of Pain	214	1,194	**1,408**



Yearly Collision Trends

2020 – 2025 | KSI and Total Injury Collisions



Key Observations

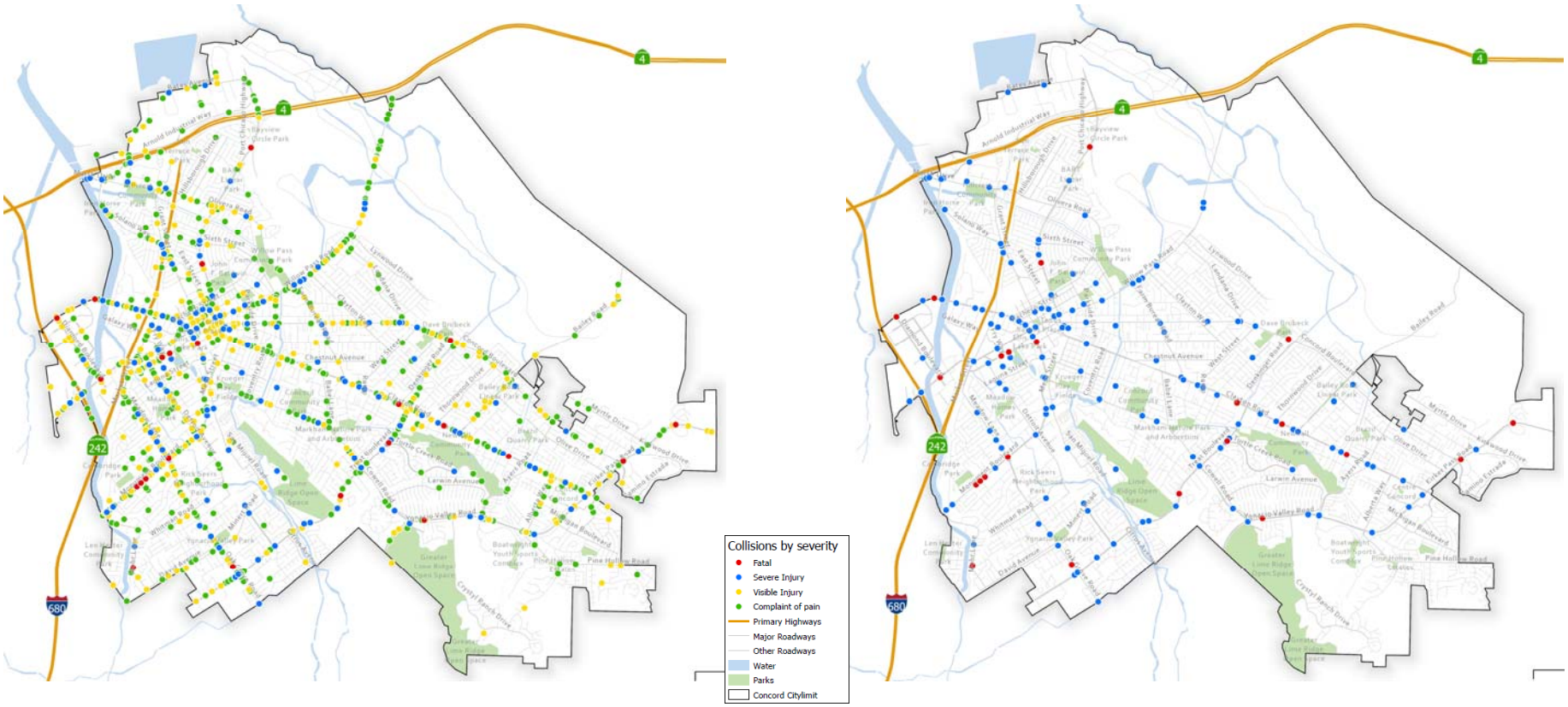
Peak year: 2022
383 total collisions and 39 KSI

2025 shows decline
341 total collisions (∑11% from peak)

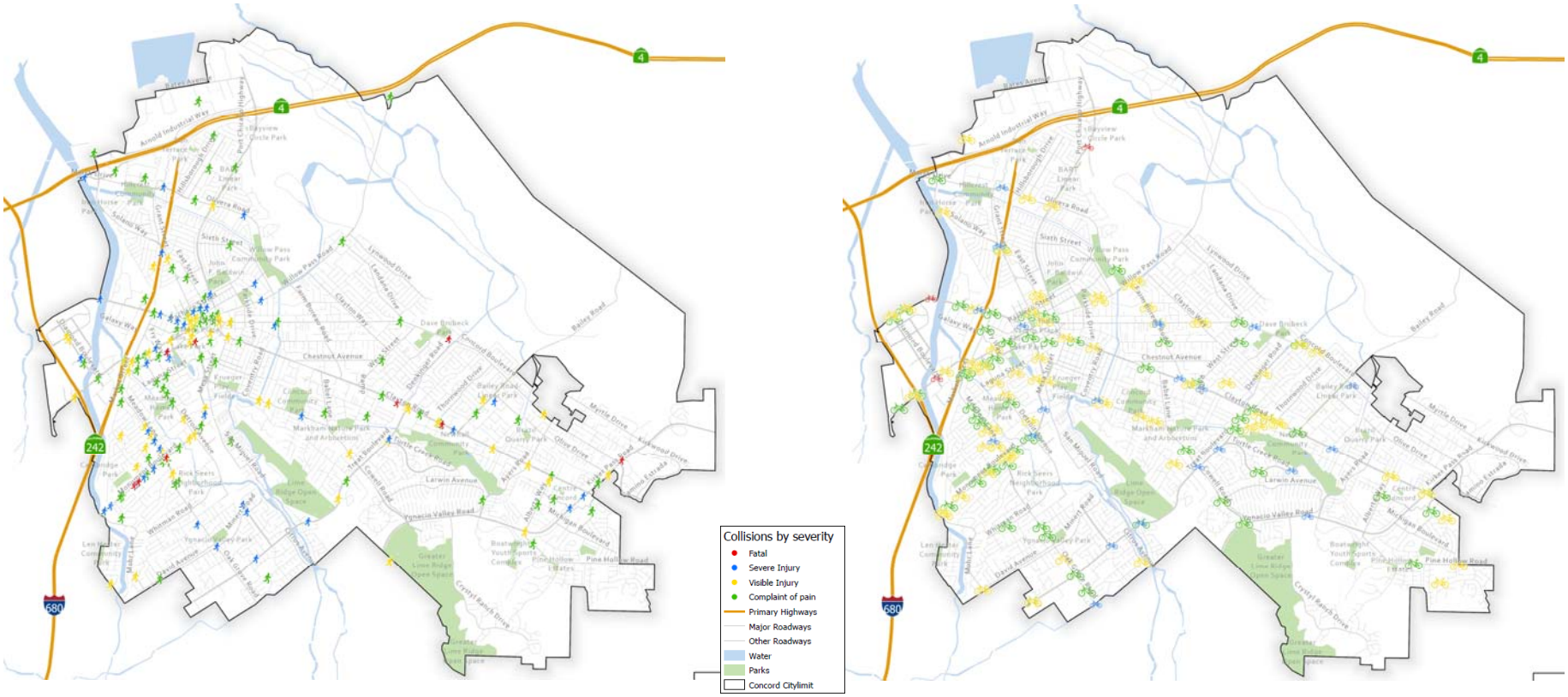
KSI remains elevated
34 KSI in 2025—same as 2021 despite overall decline

84% at intersections
1,774 of 2,108 collisions occurred at intersections

Injury and Collision Map



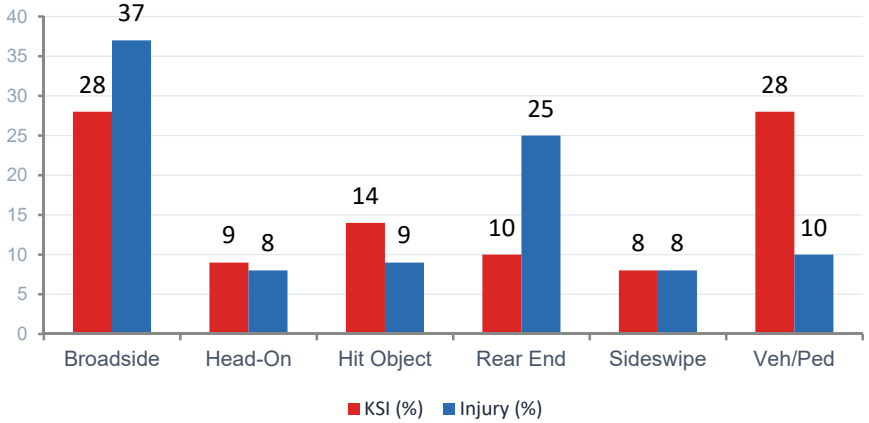
Pedestrian and Bicycle Collision Map



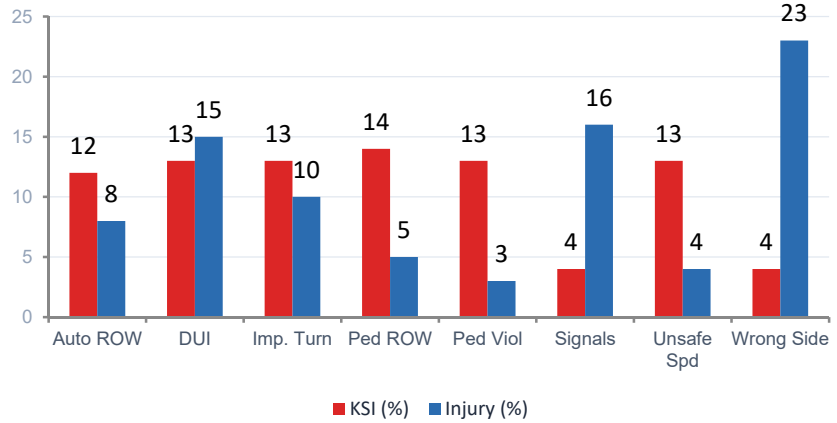
Collisions by Type & Violation

What types of crashes are occurring and why?

By Collision Type



By Violation Category



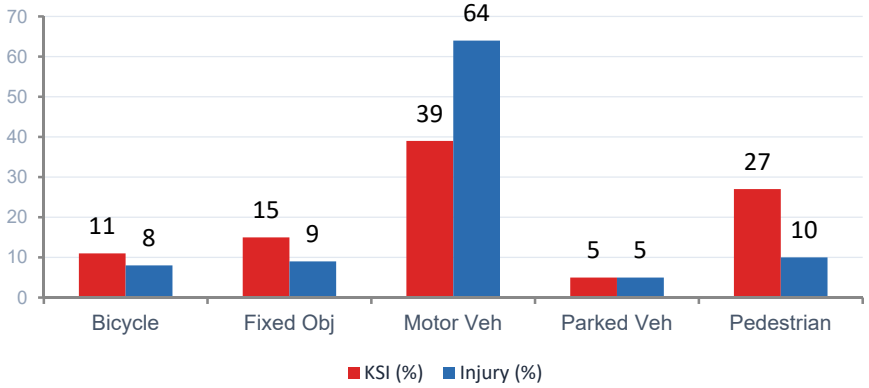
Key Finding:

Broadside and Vehicle/Pedestrian collisions each account for 28% of KSI outcomes together responsible for over half of all deaths and severe injuries. Pedestrian/bicycle collisions are disproportionately severe relative to their overall share.

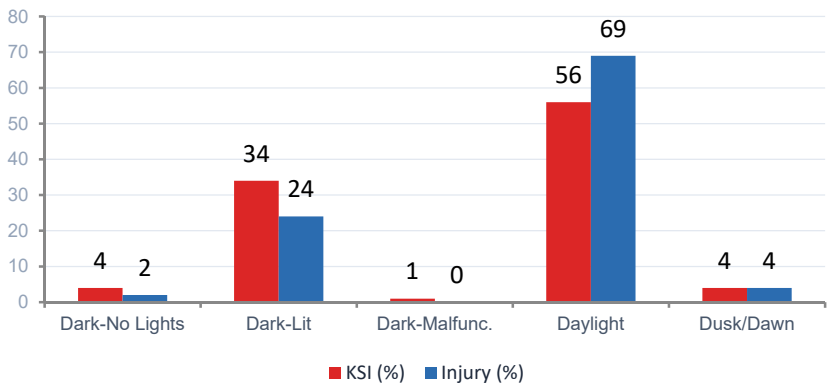
Vehicle Involvement & Lighting

What's involved and when are crashes most severe?

Motor Vehicle Involved With



Lighting Conditions



VRU Disproportionality:
Pedestrians and bicycles account for 38% of KSI but only 18% of all injury collisions, a 2.1x disproportionality ratio.

Darkness Severity Spike:
Dark conditions account for 39% of KSI but only 26% of injury collisions. KSI rate is significantly elevated after dark, especially for pedestrians.

Next Steps

1

High-Risk Location Identification

Pinpoint specific corridors, intersections, and zones with the highest collision risk for targeted analysis.

2

Safety Countermeasures & Strategies

Develop engineering, enforcement, and education measures tailored to the identified collision patterns.

3

Project Prioritization

Rank safety improvements by impact, feasibility, and cost-effectiveness to maximize safety investment returns.

4

Safety Action Plan

Compile findings into a comprehensive, adopted plan with timelines, responsibilities, and funding strategies.

Discussion & Questions

Thank you for your partnership in making Concord's streets safer.

City of Concord — Transportation Division
Virendra Patel

Prepared by TJKM Transportation Consultants

Comprehensive Safety Action Plan | 2026

COMPREHENSIVE SAFETY ACTION PLAN

Steering Committee Meeting #2

April 14, 2026 | 2:00 PM

City of Concord

Transportation Division

Prepared by TJKM

Agenda

Steering Committee Meeting #2

- Introduction
- Your Role as a Safety Champion
- CSAP Process Overview
- Collision Analysis Findings
- Community Survey Findings
- Next Steps & Discussion

Steering Committee

Abhishek Parikh – City of Concord Public Works Department
Virendra Patel – City of Concord Public Works Department, Project Manager
Phalen Shwan – City of Concord
Jesse Crawford – City of Concord
Danielle Thomas – Contra Costa County Fire Protection Department
Pranjal Dixit – CCCTA
Kamla Parks – BART
Melanie Koslow – Mt. Diablo Unified School District
Cristian Lepe – Mt. Diablo Unified School District

Your Role as a Safety Champion

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Help set the goals and objectives of the CSAP

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Tell us about traffic-safety-related issues you see

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CSAP Process

Our structured approach to safety improvement

WE'RE HERE

1 — Data Collection

Compile 5 years of collision data (Jan 2021 –Dec 2025)

2 — Collision Trend Analysis

Examine patterns, time periods, and contributing factors

3 — Identify High-Risk Network

Pinpoint corridors, intersections, and zones with highest risk

4 — Develop Safety Countermeasures

Propose engineering, enforcement, and education measures

5 — Integrate Inputs & Prioritize

Incorporate stakeholder feedback and prioritize projects

6 — Action Plan & Report

Document findings, strategies, and recommendations

5-Year Collision Snapshot

2021 – 2025 | City of Concord

1,804	164	19	145
Total Collisions	KSI Collisions	Fatal Collisions	Severe Injuries

Key Highlights

Severity	Segment	Intersection	Total
Fatal	3	16	**19**
Severe Injury	19	126	**145**
Visible Injury	79	348	**427**
Complaint of Pain	185	1,028	**1,213**
Total	**286**	**1,518**	**1,804**

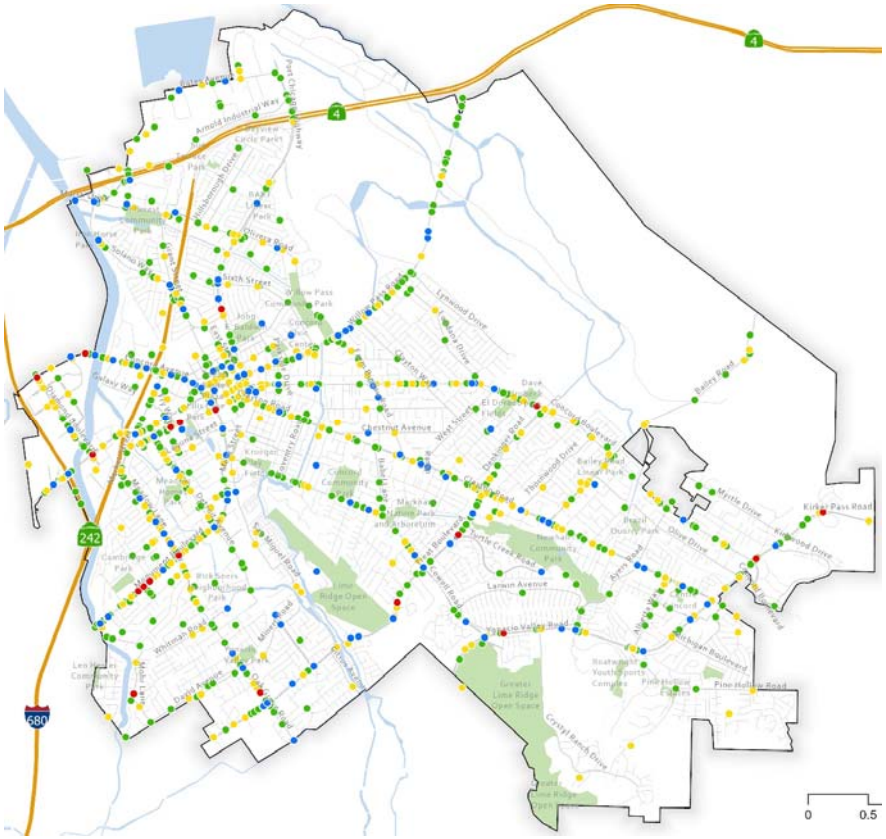
Key Highlights

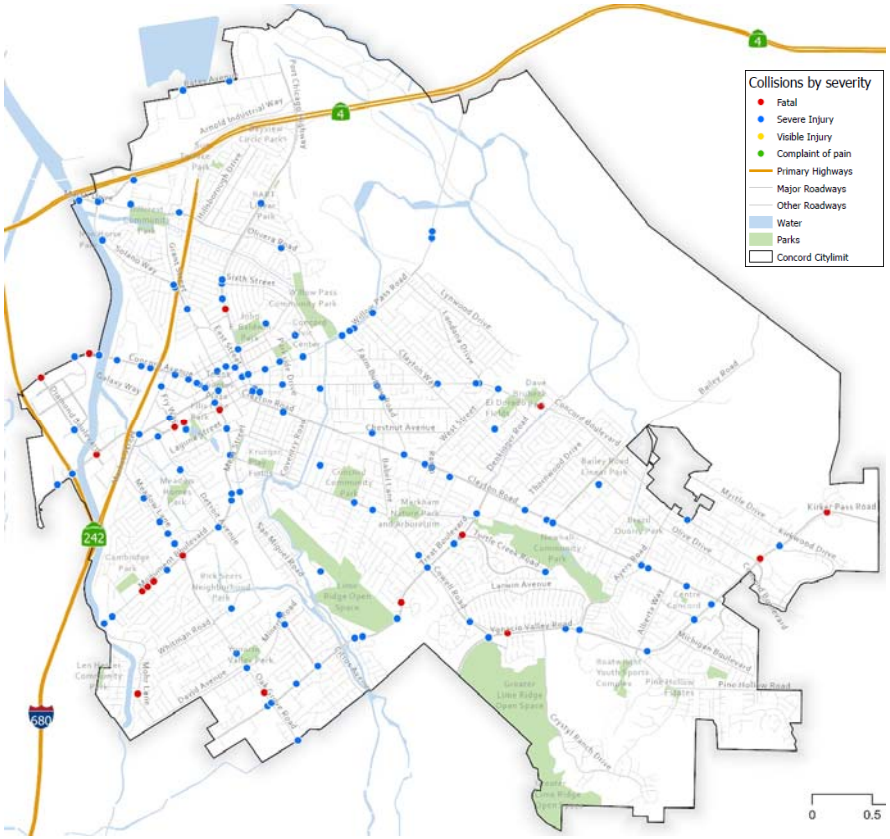
87% of KSI at intersections
142 of 164 KSI collisions occurred at intersection locations

60% of KSI: Peds, Bikes, Motos
Vulnerable road users far overrepresented in severe outcomes

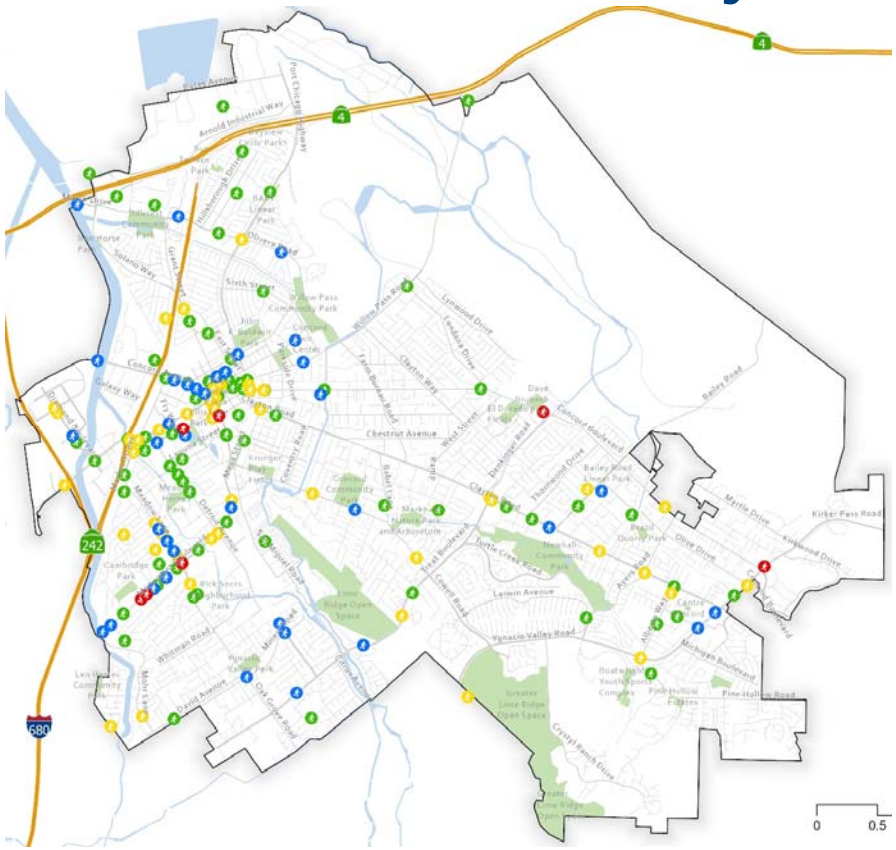
12% of KSI involve alcohol
20 of 164 KSI collisions were alcohol-related

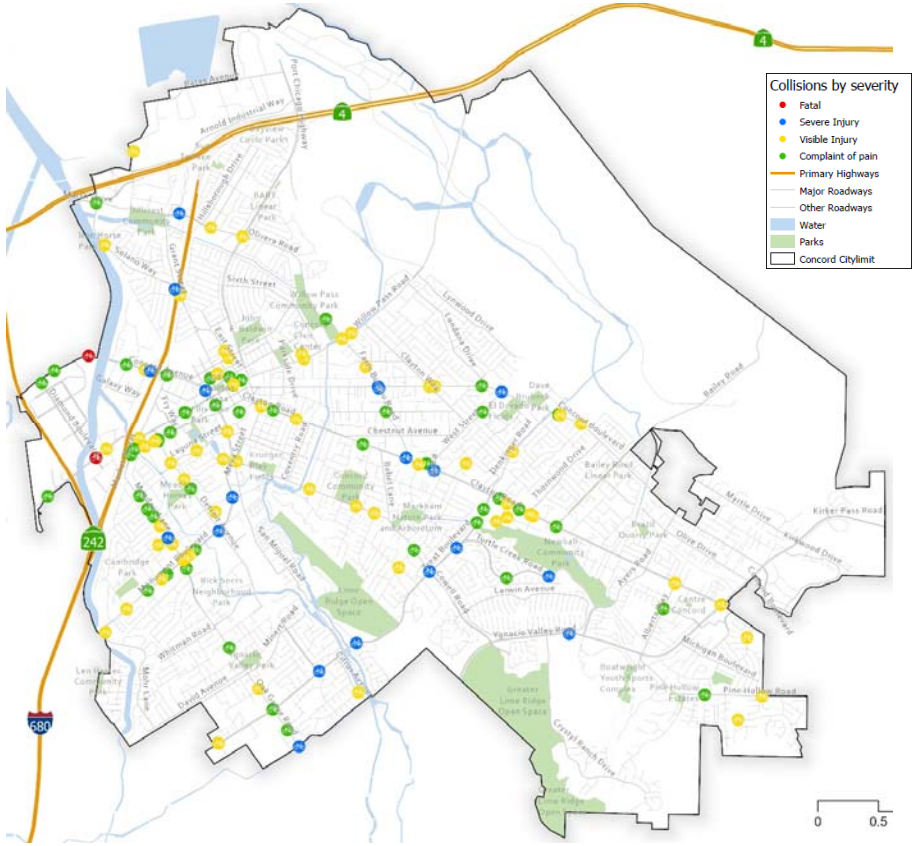
Where Crashes Are Happening





Pedestrian & Bicycle Crash Locations

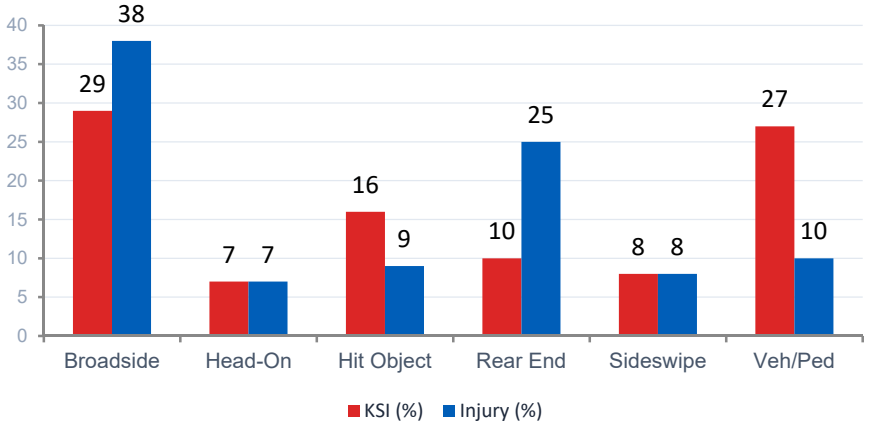




How & Why Crashes Are Happening

Understanding crash patterns helps target the right solutions

By Collision Type



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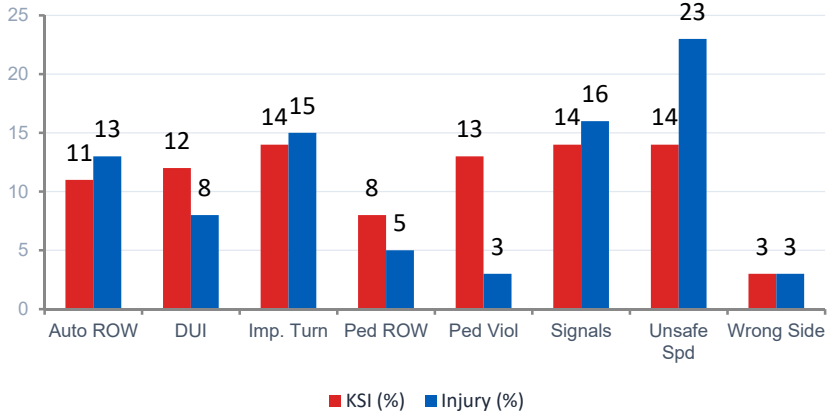


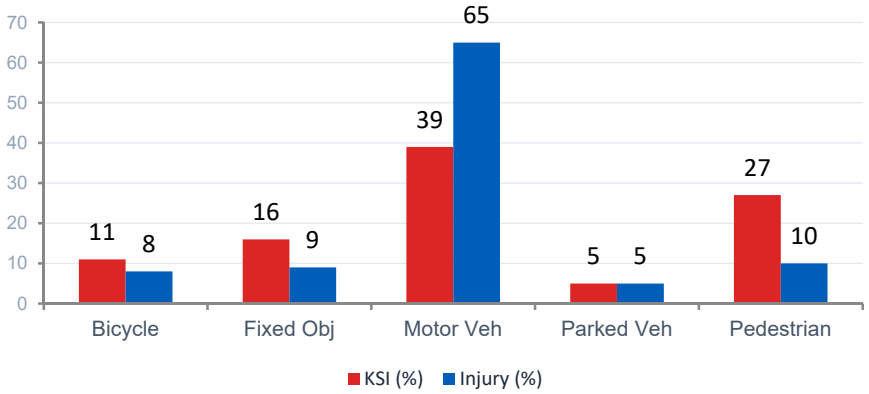
Key Finding:

Broadside and Vehicle/Pedestrian collisions accounted for 29% and 27% of KSI outcomes respectively, together responsible for over half of all deaths and severe injuries. Pedestrian/bicycle collisions are disproportionately severe relative to their overall share.

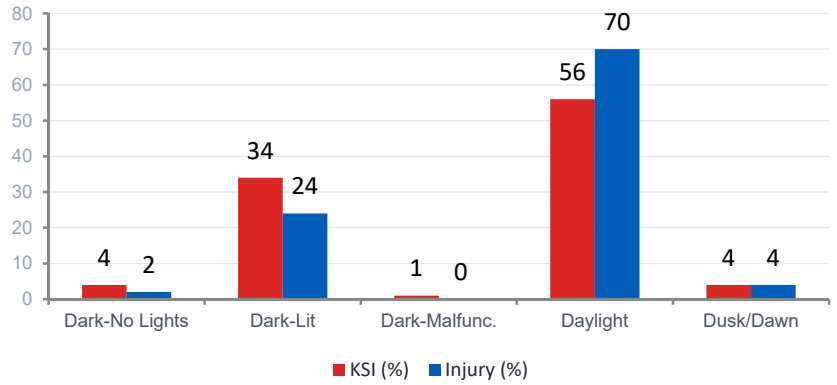
Vehicle Involvement & Lighting

What is involved and when are crashes most severe?

Motor Vehicle Involved With



Lighting Conditions



Top 5 KSI Corridors:
Willow Pass Rd (17 KSI), Clayton Rd (16), Monument Blvd (13), Treat Blvd (13), Concord Ave (12). Together: 71 of 164 citywide KSI = 43% of all severe crashes.

Lighting & Peak Hours:
39% of KSI occur in dark conditions (all categories). PM Peak (2–5 PM) is the single highest-risk window with 36 KSI, followed by the evening hours (6–11 PM) with 40 KSI.

What Concord Residents Are Telling Us

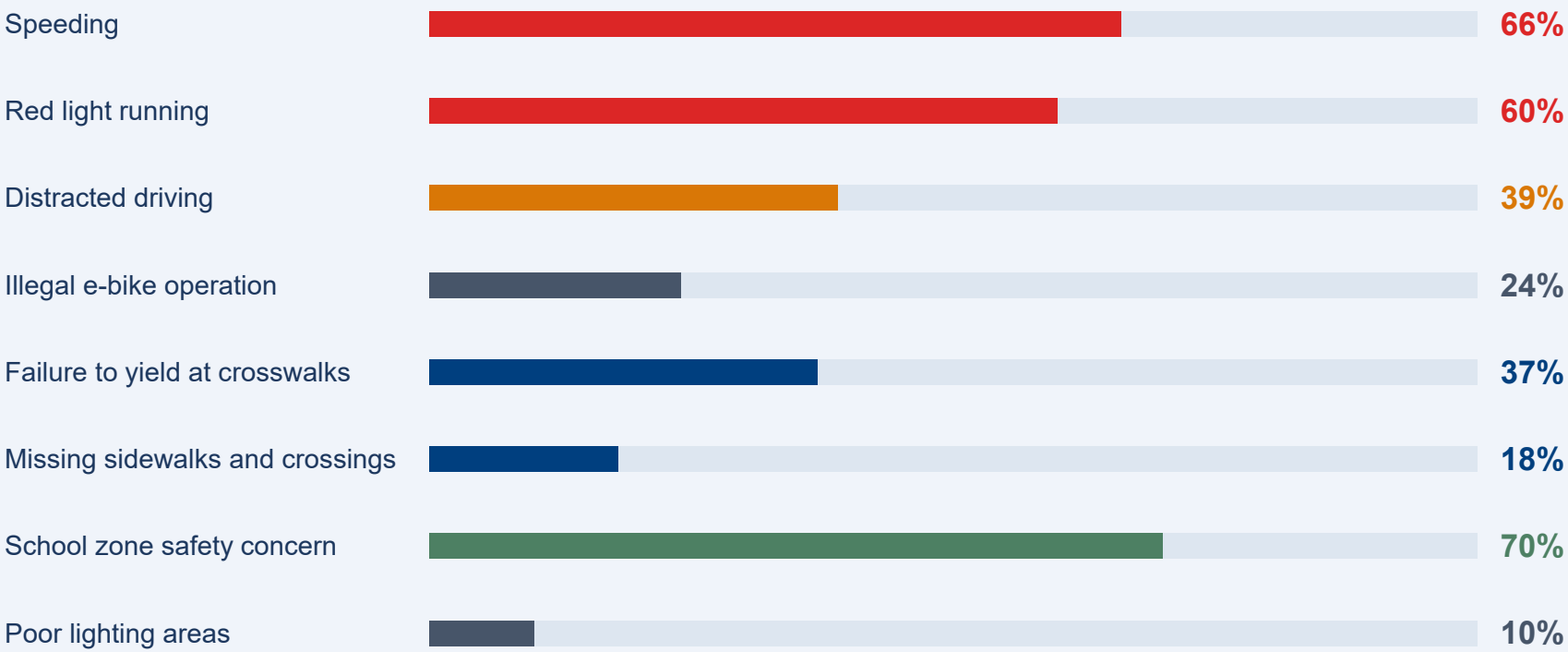
523 residents shared their safety concerns, priorities, and experiences across all travel modes

523	73%	70%	51%
Responses	Reported an Incident	School Zone Concern	Enforcement Requested

City of Concord CSAP Community Safety Survey | March 11 - April 12, 2026 | n = 523

Top Safety Concerns Reported by Community Residents

Multi-select question — 523 respondents — March 11 - April 12, 2026



Focus areas: crash-prone intersections (54%) · commercial corridors (36%) · residential streets (34%) · schools and parks (31%)

Survey vs. Collision Data: Where They Agree

Three community concerns directly confirmed by 5 years of collision records (2021-2025)

MATCH

Speeding and signal violations lead both survey and crash data

66% of respondents cite speeding; 60% cite red light running — the two top concerns across all age groups and modes.

These exactly match the top 2 Primary Collision Factors in KSI records: Unsafe Speed and Signals/Signs violations.

Together they account for 28% of all KSI events over 5 years and appear consistently on every top HIN corridor.

MATCH

Community-cited corridors match the High Injury Network exactly

Clayton Rd, Willow Pass Rd, Treat Blvd, Monument Blvd, and Ygnacio Valley Rd cited most in open-text responses.

Each is a top-5 KSI corridor in the CSAP HIN analysis — Clayton Rd (#1 with 16 KSI, Willow Pass #3 with 17 KSI.

Community-perceived risk is geographically aligned with measured crash concentration — a strong validation of this CSAP.

MATCH

PM peak is the highest-concern and highest-KSI time window

63% of respondents identified the afternoon (3-6 PM) as the period of greatest concern for drivers across all modes.

Collision data confirms: PM peak (4-7 PM) accounts for 36 KSI events — the single highest window in the 5-year record.

School hours (34%) and morning commute (58%) are also cited — aligning with Profile 3 school-zone collision patterns.

Survey vs. Collision Data: What Is New

Three community signals not visible in historical crash records — emerging priorities for the CSAP

NEW

E-bike safety: an emerging concern not yet in crash data

24% of all respondents cited illegal or unsafe e-bike operation — the 4th highest concern overall.

Historical SWITRS data does not disaggregate e-bikes as a distinct collision category, so this risk is invisible in the record.

Open-text responses specifically cite sidewalk riding near schools and park trails — a forward-looking planning signal.

DIVERGE

Late-night danger is severely underrepresented in survey perceptions

Only 14% of driver respondents flagged late night (10 PM+) as a concern — the lowest of any time window surveyed.

63% of all FATAL collisions occur in dark conditions; nighttime KSI rate = 13% vs. citywide 9.1% average.

Gap likely explained by fewer residents traveling at night — the community underestimates one of the highest-risk scenarios.

NEW

School zone operational issues absent from collision records

70% expressed school-zone concern; pickup congestion (38%) and double-parking (30%) were cited as distinct problems.

These are operational issues — blocking sightlines, impeding pedestrian flow — not captured in SWITRS crash data at all.

The survey is the only data source revealing these conditions, identifying the cause of risk before crashes occur.

School Zone Safety and Time-of-Day: Operational Priorities

Community-identified patterns that inform engineering, enforcement, and operational planning

SCHOOL ZONE SAFETY

70% of residents expressed concern

33% Very Concerned	37% Somewhat	16% Not

DRIVER ISSUES

40% Speeding near schools

38% Pickup / drop-off congestion

30% Double-parking / sight lines blocked

PEDESTRIAN + BIKE

33% Drivers failing to yield near crossings

21% Child pedestrian habits near schools

19% No dedicated bike route to school

TIME-OF-DAY CONCERNS

All modes of travel | n = 523 respondents

Time Period	Drivers	Peds	Cyclists
Afternoon (3-6 PM)	63%	33%	26%
Morning (6-9 AM)	58%	29%	19%
School hours	34%	27%	17%
Midday (10AM-2PM)	27%	19%	13%
Evening (6-10 PM)	24%	21%	13%
Weekends	23%	15%	13%
Late night (10PM+)	14%	9%	7%

KEY INSIGHT: Afternoon and morning are the only windows where all three modes simultaneously report elevated concern — directly aligning with PM peak KSI concentration in collision data.

High Injury Network — Methodology & Scoring

What is the High Injury Network?

The HIN identifies streets and intersections where fatal and severe injury (KSI) crashes are most concentrated.

FHWA Safe System Weighted Scoring

1 **KSI Collisions** Weight: 30
2 **Pedestrian Collisions** Weight: 20
3 **Bicycle Collisions** Weight: 20
4 **Injury Collisions** Weight: 20
5 **Intersection Collisions** Weight: 10

Score = (KSI/Total KSI ×30) + (Injury/Total Injury ×20) + (Intersection/Total Intersection ×10) + (Ped/Total Ped ×20) + (Bicycle/Total Bicycle ×20)

Corridor Prioritization

- Corridors are ranked by their final Safe System Score.
- Higher scores indicate a greater concentration of severe crashes and vulnerable road user collisions.

High-Injury Intersection Ranking

- Intersections are ranked by total **injury collisions** and **KSI collisions** recorded at each location.

Top Priority Corridor

Clayton Road

SR-242 to Washington Boulevard

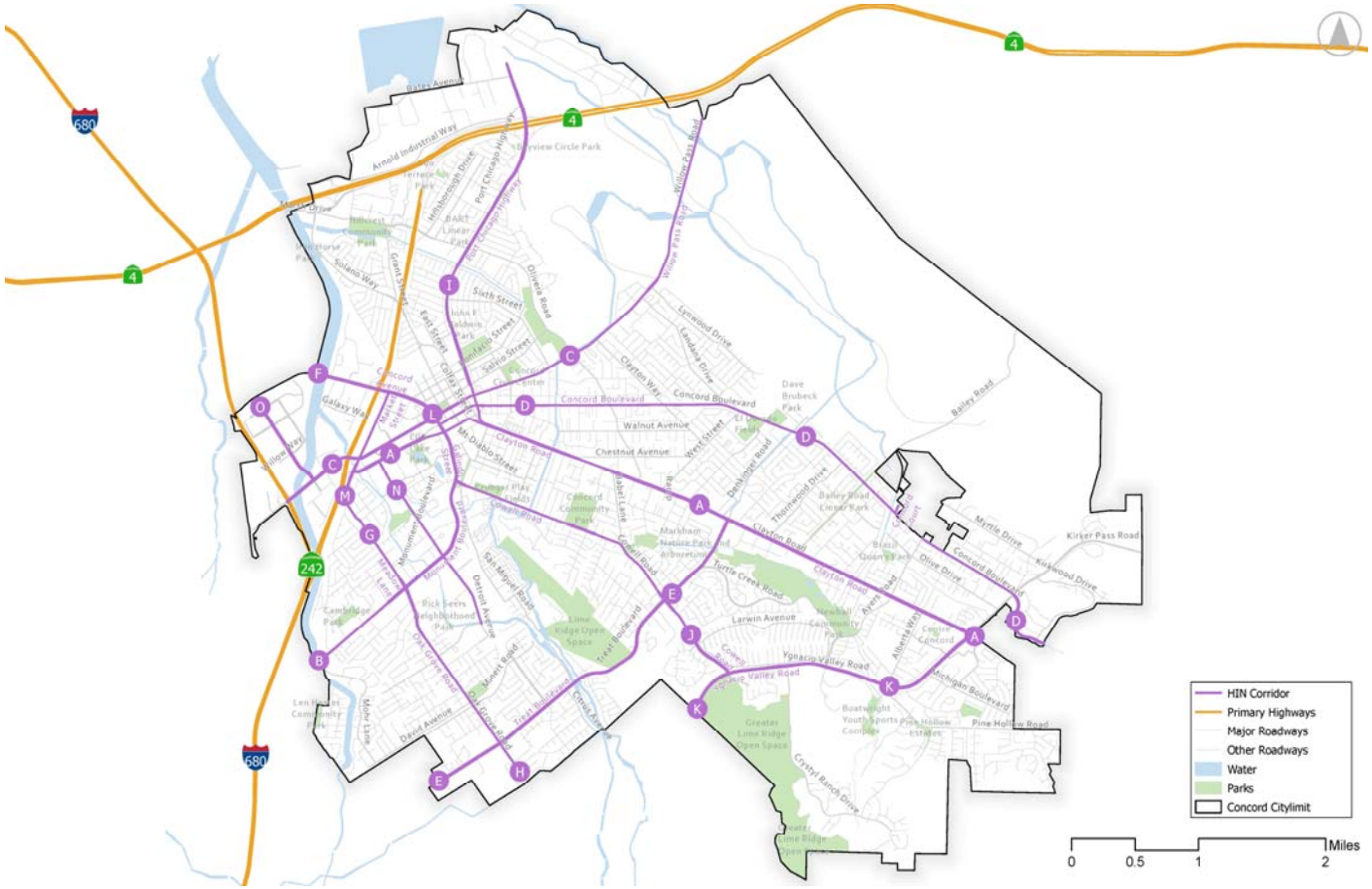
11.36 Safe System Score

16 KSI • 224 Injury Collisions
18 Pedestrian • 20 Bicycle Collisions

High Injury Network - Corridors

Rank	Corridor	KSI	Injury	Collisions occurred at Intersections	Pedestrian Collisions	Bicycle Collisions	Safe System Score
A	Clayton Rd: SR-242 to Washington Blvd	16	224	208	18	20	**11.36**
B	Monument Blvd: Cowell Rd to Mohr Ln	13	144	114	24	14	**9.13**
C	Willow Pass Rd: I-680 to Avila Rd	17	181	153	16	9	**9.02**
D	Concord Blvd: Galindo St to Yolanda Cir	10	159	150	9	10	**6.87**
E	Treat Blvd: Argonne Dr to Clayton Rd	13	78	71	10	4	**5.30**
F	Concord Ave: John Glenn Dr to Salvio St	12	78	67	5	7	**4.97**
G	Meadow Ln: Market St to Monument Blvd	6	51	43	9	8	**3.97**
H	Oak Grove Rd: Monument Blvd to Canal Trail	7	48	40	3	6	**3.20**
I	Port Chicago Hwy: Clayton Rd to Bates Ave	8	66	52	4	1	**3.09**
J	Cowell Rd: Monument Blvd to Ygnacio Valley Rd	5	58	52	2	6	**2.92**
K	Ygnacio Valley Rd: Clayton Rd to Cowell Rd	7	55	42	3	2	**2.75**
L	Galindo St: Salvio St to Cowell Rd	2	60	60	5	3	**2.36**
M	Market St: Concord Ave to Meadow Ln	1	36	30	4	5	**1.87**
N	Detroit Ave: Clayton Rd to Whitman Rd	1	40	27	6	2	**1.70**
O	Diamond Blvd: Willow Pass Rd to Concord Ave	2	46	30	4	1	**1.63**

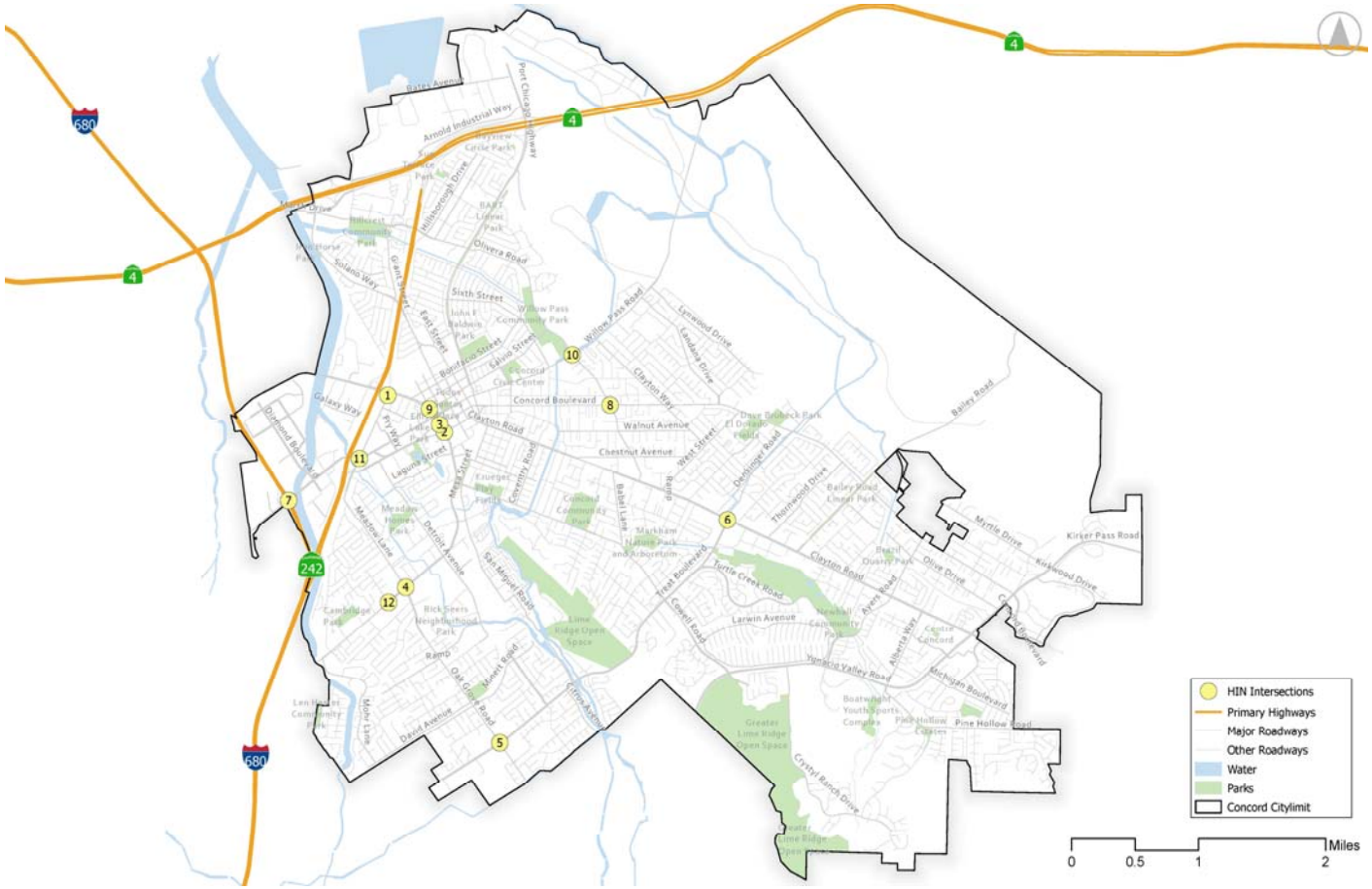
High Injury Network – Corridors



High Injury Network - Intersections

Rank	Intersection	KSI	Injury	Pedestrian Collisions	Bicycle Collisions
1	Market Street & Concord Avenue	0	32	1	1
2	Galindo Street & Clayton Road	1	27	2	0
3	Galindo Street & Concord Boulevard	1	26	3	2
4	Monument Boulevard & Meadow Lane	4	23	4	4
5	Treat Boulevard & Oak Grove Road	2	21	0	1
6	Clayton Road & Treat Boulevard	0	20	2	0
7	Willow Pass Road & I-680	1	16	1	0
8	Concord Boulevard & Farm Bureau Road	2	15	0	3
9	Concord Avenue & Salvio Street	3	13	3	1
10	Willow Pass Road & Farm Bureau Road	1	13	0	2
11	Willow Pass Road & Market Street	1	13	1	1
12	Monument Boulevard & Virginia Lane	1	13	4	2

High Injury Network - Intersections



Collision Profiles Summary | 10 profiles | 2021–2025 | City Roads Only

#	Profile Name	Injuries	KSI	KSI Rate
1	Improve Safety at Intersections	1,518	142	9%
2	Reduce Broadside Collisions	687	47	7%
3	Address Collisions near Schools	667	57	9%
4	Reduce Nighttime Collisions	544	71	13%
5	Reduce Rear-End Collisions	450	16	4%
6	Reduce Unsafe Speed Collisions	418	23	6%
7	Address Traffic Signs & Signal Violations	292	23	8%
8	Improve Pedestrian Safety	190	46	24%
9	Improve Bicycle Safety	149	21	14%
10	Reduce DUI-Related Collisions	139	20	14%

Profile 8 — Improve Pedestrian Safety | 190 Injury Collisions | 46 KSI | KSI Rate: 24%

190
Injury Collisions

46
KSI Collisions

24%
KSI Severity Rate

KEY INSIGHTS

1. 46 KSI collisions — 24% severity rate, nearly 3× the citywide 9% average
2. 181 of 190 collisions (95%) involve a vehicle striking a pedestrian
3. 86% at intersections — pedestrian crossing design is the primary intervention target

86% at intersections

32% at night

TOP COLLISION TYPES

Vehicle/Pedestrian — **181** (95%)

TOP VIOLATION CATEGORIES

Ped Right-of-Way Violation — **75** (39%)

Pedestrian Violations — **48** (25%)

Profile 9 — Improve Bicycle Safety | 149 Injury Collisions | 21 KSI | KSI Rate: 14%

149
Injury Collisions

21
KSI Collisions

14%
KSI Severity Rate

KEY INSIGHTS

1. 21 KSI collisions — 14% severity rate, above the citywide 9% average
2. 133 of 149 collisions (89%) at intersections — bicycle infrastructure at crossings is key
3. 33 collisions (22%) occurred at night — lighting and visibility are critical factors

89% at intersections

22% at night

TOP COLLISION TYPES

Broadside — **89** (60%)

Sideswipe — **22** (15%)

TOP VIOLATION CATEGORIES

Wrong Side of Road — **52** (35%)

Signal Violations — **30** (20%)

Profile 10 — Reduce DUI-Related Collisions | 139 Injury Collisions | 20 KSI | KSI Rate: 14%

139
Injury Collisions

20
KSI Collisions

14%
KSI Severity Rate

KEY INSIGHTS

1. 20 KSI collisions — 14% severity rate, above the citywide 9% average
2. 107 of 139 collisions (77%) at night — highest nighttime share of all profiles
3. 81% at intersections — DUI enforcement and intersection lighting are primary countermeasures

77% at intersections

81% at night

TOP COLLISION TYPES

Hit Object — **48** (35%)

Rear-End — **35** (25%)

TOP VIOLATION CATEGORIES

DUI — **139** (100%)

Unsafe Speed — **42** (30%)

Next Steps

1

Safety Countermeasures & Strategies

Develop engineering, enforcement, and education measures tailored to the identified collision patterns.

2

Project Prioritization

Rank safety improvements by impact, feasibility, and cost-effectiveness — incorporating community-identified priorities from 523 survey responses.

3

Safety Action Plan

Compile collision data findings and community survey input into a comprehensive, adopted plan with timelines, responsibilities, and funding strategies.

APPENDIX

Safe Street Toolkit

Countermeasures Aligned to Concord Collision Profiles

Profile 4 — Reduce Nighttime Collisions | 544 Injury Collisions | 71 KSI | KSI Rate: 13%

RECOMMENDED COUNTERMEASURES

Add / Upgrade Intersection Lighting

Crash Type: Nighttime CRF: 40% **Cost: $$···**

13% KSI severity rate — 44% above citywide average. 84% at intersections. New LED poles + foundations at top dark-condition KSI locations: $60K-$120K per intersection.

Pushbutton-Activated Pedestrian Lighting (PPLS)

Crash Type: Pedestrian / Nighttime CRF: 40% **Cost: $$$··**

Dynamic overhead LED floods that activate on pedestrian pushbutton press. Concentrates illumination on crosswalk zone only when pedestrians are present. Most effective at nighttime ped collision locations.

C-V2X Roadside Units (RSUs)

Crash Type: All CRF: N/A **Cost: $$$··**

Broadcast SPaT, MAP, and hazard data to connected vehicles at fatality locations. Concord's AXIS fiber backbone supports deployment. $30K-$50K per RSU. Leverages existing SS4A project infrastructure.

DUI Saturation / High Visibility Enforcement

Crash Type: All (DUI) CRF: N/A **Cost: $$···**

20% of nighttime collisions involve DUI — 107 of 544 events. Targeted HVE deployments during high-risk hours (10 PM-3 AM). Coordinate with Concord PD at top nighttime corridors.

Upgrade Signs with Fluorescent Sheeting

Crash Type: All CRF: 15% **Cost: $····**

High-intensity retroreflective sheeting on regulatory and warning signs dramatically improves nighttime conspicuity. Very High systemic opportunity. $500-$1,250 per sign installed systemically.

Discussion & Questions

Thank you for your partnership in making Concord's streets safer.

City of Concord — Transportation Division
Abhishek Parikh, T.E.

Prepared by TJKM Transportation Consultants

Comprehensive Safety Action Plan | 2026

Profile 1 — Improve Safety at Intersections | 1,518 Injury Collisions | 142 KSI | KSI Rate: 9%

1,518
Injury Collisions

142
KSI Collisions

9%
KSI Severity Rate

KEY INSIGHTS

1. 142 KSI collisions — severity rate consistent with the citywide 9% average
2. Broadside collisions dominate — 607 events (40%), primarily at signalized intersections
3. 457 collisions (30%) occurred at night — nighttime intersection safety is a priority

40% broadside collisions

30% at night

TOP COLLISION TYPES

Broadside — **607** (40%)

Rear-End — **374** (25%)

TOP VIOLATION CATEGORIES

Unsafe Speed — **340** (22%)

Signal Violations — **287** (19%)

Profile 2 — Reduce Broadside Collisions | 687 Injury Collisions | 47 KSI | KSI Rate: 7%

687
Injury Collisions

47
KSI Collisions

7%
KSI Severity Rate

KEY INSIGHTS

1. 47 KSI collisions — 6.8% severity rate, below the citywide 9% average
2. 607 of 687 collisions (88%) at intersections — signal and right-of-way violations are primary factors
3. Bicycle involvement is significant — 89 bicycle collisions within this profile

88% at intersections

26% at night

TOP COLLISION TYPES

Broadside — **607** (88% at intersections)

TOP VIOLATION CATEGORIES

Signal Violations — **253** (37%)

Auto Right of Way — **190** (28%)

Profile 3 — Address Collisions near Schools | 667 Injury Collisions | 57 KSI | KSI Rate: 9%

667
Injury Collisions

57
KSI Collisions

9%
KSI Severity Rate

KEY INSIGHTS

1. 57 KSI collisions — 8.5% severity rate, near the citywide 9% average
2. 589 of 667 collisions (88%) at intersections — consistent with the citywide pattern
3. 70 pedestrian and 52 bicycle collisions — elevated VRU exposure near school zones

88% at intersections

30% at night

TOP COLLISION TYPES

Broadside — **243** (36%)

Rear-End — **166** (25%)

TOP VIOLATION CATEGORIES

Unsafe Speed — **155** (23%)

Signal Violations — **105** (16%)

Profile 4 — Reduce Nighttime Collisions | 544 Injury Collisions | 71 KSI | KSI Rate: 13%

544	71	13%
Injury Collisions	KSI Collisions	KSI Severity Rate

KEY INSIGHTS

1. 71 KSI collisions — 13% severity rate, significantly above the citywide 9% average
2. DUI is a major contributing factor — 107 of 544 collisions (20%) are DUI-related
3. Pedestrians are disproportionately impacted — 60 pedestrian collisions recorded

84% at intersections

20% DUI-related

TOP COLLISION TYPES

Broadside — **179** (33%)

Rear-End — **136** (25%)

TOP VIOLATION CATEGORIES

Unsafe Speed — **122** (22%)

DUI — **107** (20%)

Profile 5 — Reduce Rear-End Collisions | 450 Injury Collisions | 16 KSI | KSI Rate: 4%

450
Injury Collisions

16
KSI Collisions

4%
KSI Severity Rate

KEY INSIGHTS

1. 16 KSI collisions — 4% severity rate, among the lowest of all profiles
2. 373 of 450 collisions (83%) at intersections — signal timing and following distance are key
3. 135 collisions (30%) occurred at night — nighttime rear-end risk is elevated

83% at intersections

30% at night

TOP COLLISION TYPES

Broadside — **354** (79%)

Rear-End — **60** (13%)

TOP VIOLATION CATEGORIES

Unsafe Speed — **152** (34%)

Following Too Closely — **98** (22%)

Profile 6 — Reduce Unsafe Speed Collisions | 418 Injury Collisions | 23 KSI | KSI Rate: 6%

418
Injury Collisions

23
KSI Collisions

6%
KSI Severity Rate

KEY INSIGHTS

1. 23 KSI collisions — 6% severity rate, below the citywide 9% average
2. 338 of 418 collisions (81%) at intersections — speed management at signals is critical
3. 121 collisions (29%) at night — lighting and speed enforcement both apply

81% at intersections

29% at night

TOP COLLISION TYPES

Hit Object — **148** (35%)

Rear-End — **89** (21%)

TOP VIOLATION CATEGORIES

Unsafe Speed — **418** (100%)

Unsafe Lane Change — **42** (10%)

Profile 7 — Address Traffic Signs & Signal Violations | 292 Injury Collisions | 23 KSI | KSI Rate: 8%

292	23	8%
Injury Collisions	KSI Collisions	KSI Severity Rate

KEY INSIGHTS

1. 23 KSI collisions — 8% severity rate, near the citywide 9% average
2. 286 of 292 collisions (98%) at intersections — highest concentration of all profiles
3. 70 collisions (24%) at night — signal compliance is critical across all hours

98% at intersections

24% at night

TOP COLLISION TYPES

Broadside — **204** (70%)

Rear-End — **44** (15%)

TOP VIOLATION CATEGORIES

Auto Right of Way — **292** (100%)

Signal Violations — **58** (20%)

Profile 1 — Improve Safety at Intersections | 1,518 Injury Collisions | 142 KSI | KSI Rate: 9%

RECOMMENDED COUNTERMEASURES

Provide Protected Left-Turn Phase

Crash Type: All (Angle, Broadside) CRF: 30% **Cost: $$$··**

Add protected left-turn phasing where left pockets exist. Removes driver judgment gaps vs. oncoming traffic. High priority at Concord's 87%-intersection KSI cluster.

Leading Pedestrian Interval (LPI)

Crash Type: Pedestrian & Bicycle CRF: 60% **Cost: $····**

Give pedestrians a 3-7 second head start before vehicles receive green. Low-cost timing change with highest CRF of any ped countermeasure. Deployable citywide via software.

Improve Signal Timing & Coordination

Crash Type: All CRF: 15% **Cost: $$···**

Re-time signals, extend clearance intervals, add all-red extensions. Addresses signal violations (14% of KSI) and reduces angle conflicts at approach speeds.

High Friction Surface Treatment (HFST)

Crash Type: All (Wet-Road, Failure to Stop) CRF: 55% **Cost: $$···**

Apply HFST epoxy or polyurethane on stop bars and approach lanes. Reduces skid-related broadside and rear-end events. Strong CRF, 10-year life, federally eligible.

Near-Miss Video Analytics (AI Platform)

Crash Type: All (Diagnostic Tool) CRF: N/A **Cost: $$$··**

Deploy AI-based conflict detection at priority intersections using Concord's existing AXIS cameras. Identifies near-miss hotspots pre-crash, supports grant applications with quantitative data.

Profile 2 — Reduce Broadside Collisions | 687 Injury Collisions | 47 KSI | KSI Rate: 7%

RECOMMENDED COUNTERMEASURES

Protected Left-Turn Phase (Existing Pocket)

Crash Type: All (Broadside, Angle) CRF: 30% **Cost: $$$··**

88% of this profile occurs at intersections. Signal violations and auto ROW are the top violations. Protected phasing directly eliminates the gap-acceptance conflict driving broadside events.

Install Left-Turn Lane + Protected Phase

Crash Type: All CRF: 55% **Cost: $$$$·**

Where no left-turn pocket exists, add channelization plus signal phase. Costs vary $100K-$250K+ with mast arm. Highest CRF of geometric countermeasures for left-turn conflicts.

Improve Signal Hardware (Backplates, LEDs)

Crash Type: All CRF: 15% **Cost: $····**

Retroreflective backplates and upgraded LED heads improve signal conspicuity. Very High systemic opportunity. Low cost relative to impact — $800-$2,700 per head for backplate + LED retrofit.

All-Red Clearance Interval Extension

Crash Type: All (Angle, Red-Light Running) CRF: 15% **Cost: $····**

Extend all-red phase via controller reprogramming only — no hardware needed. Especially effective at wide intersections. Controller programming only: $2,000-$5,000 per intersection.

High Visibility Enforcement (HVE)

Crash Type: All CRF: N/A **Cost: $$···**

Deploy targeted enforcement at top broadside intersections. Signal violations = 14% of KSI in this profile. Engineering + enforcement pairing maximizes impact at priority locations.

Profile 3 — Address Collisions Near Schools | 667 Injury Collisions | 57 KSI | KSI Rate: 9%

RECOMMENDED COUNTERMEASURES

Rectangular Rapid Flashing Beacon (RRFB)

Crash Type: Pedestrian & Bicycle CRF: 35% **Cost: $$···**

Pedestrian-activated irregular flash pattern at unsignalized crossings near schools. 70 ped + 52 bike collisions in this profile. Solar-powered pairs: $25K-$40K. Proven VRU safety impact.

Enhanced School Zone Package

Crash Type: All CRF: 30% **Cost: $$$··**

Reduced speed zone + flashing beacons + speed feedback signs + high-visibility markings. Full package $120K-$300K per school. 88% of this profile at intersections near school zones.

Accessible Pedestrian Signal (APS)

Crash Type: Pedestrian & Bicycle CRF: 45% **Cost: $····**

Audible/vibrotactile signals at school crossings improve compliance for all users, not just visually impaired. Retrofit $4,500-$8,500 per location. Very High systemic opportunity.

Leading Pedestrian Interval (LPI)

Crash Type: Pedestrian & Bicycle CRF: 60% **Cost: $····**

Head-start walk phase is the single highest-CRF pedestrian countermeasure available. Timing-only implementation near school zones: $4K-$18K. Concord has existing hardware to support.

Safe Routes to School (SRTS) Program

Crash Type: All CRF: N/A **Cost: $$···**

Expand curriculum, walking audits, and Vision Zero training for students, parents, and staff. Addresses unsafe speed (23%) and pedestrian violations near schools. $50K-$120K per school.

Profile 8 — Improve Pedestrian Safety | 190 Injury Collisions | 46 KSI | KSI Rate: 24%

RECOMMENDED COUNTERMEASURES

Pedestrian Hybrid Beacon (HAWK Signal)

Crash Type: Pedestrian & Bicycle CRF: 55% **Cost: $$$$·**

24% KSI rate — nearly 3x citywide. 95% are vehicle/pedestrian events. HAWK provides active stop compliance for mid-block and uncontrolled crossings. $300K-$500K per location.

High-Visibility Ladder Crosswalk Markings

Crash Type: Pedestrian & Bicycle CRF: 25% **Cost: $····**

Continental/ladder striping dramatically increases driver recognition distance at crossings. 86% at intersections. $2,500-$6,000 per crossing. SS4A project standard at all 23 priority locations.

Leading Pedestrian Interval (LPI)

Crash Type: Pedestrian & Bicycle CRF: 60% **Cost: $····**

Highest-CRF ped countermeasure. Ped ROW violations = 39% of Profile 8 violations. LPI directly addresses driver yielding failure by giving pedestrians a visible head start before vehicle green.

Bulb-Outs / Curb Extensions

Crash Type: Pedestrian & Bicycle CRF: 20% **Cost: $$···**

Narrow crossing distance, slow turning vehicles, improve ped-driver sightlines. Concord project cost estimate: $8K-$10K per location (per recent project data). Very High systemic opportunity.

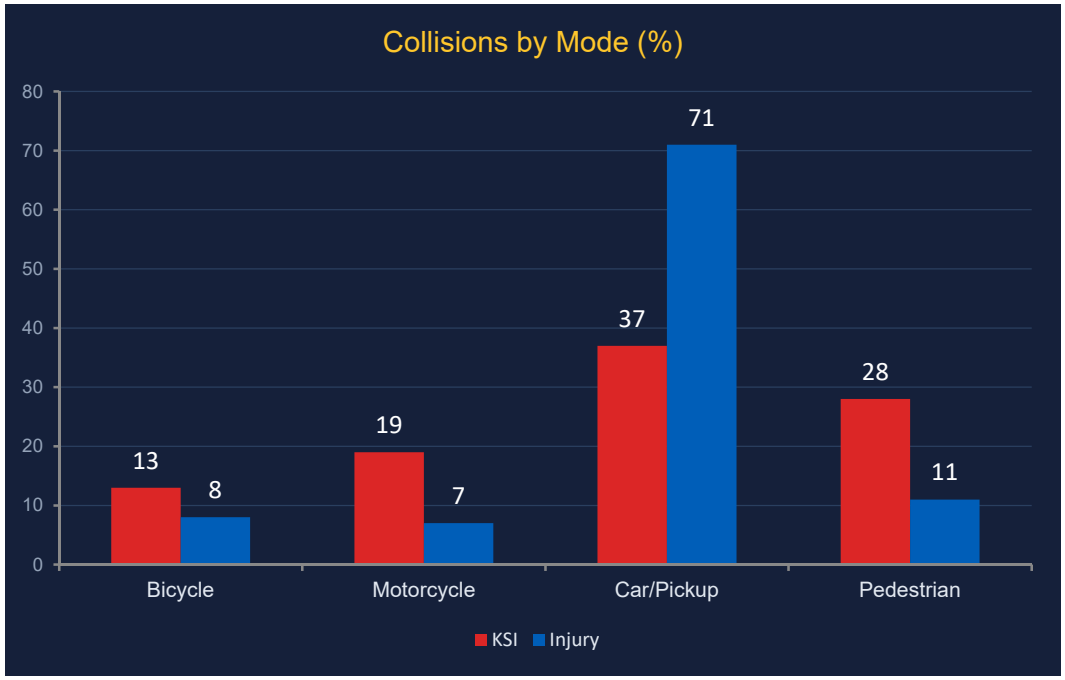
Advance Pedestrian Warning System (Activated)

Crash Type: Pedestrian & Bicycle CRF: 30% **Cost: $$···**

Radar/IR-activated W11-2 warning signs alert far-lane drivers that a pedestrian is actively crossing. Addresses multiple-threat scenarios at multilane crossings. $12K-$55K per approach.

Collision Trends Over Time

2021 – 2025 | KSI and Total Collisions by Mode



Key Observations

Peak year: 2022
383 total collisions and 39 KSI

2025 shows decline
341 total collisions (∑11% from peak)

KSI remains elevated
34 KSI in 2025—same as 2021 despite overall decline

84% at intersections
1,518 of 1,804 collisions occurred at intersections

APPENDIX E:
MAP INPUT PUBLIC COMMENTS

S.No.	ID	Complaint	Latitude	Longitude	Mode	Major Street	Minor Street	Location Type	Issue Category
1	77	There are bike lanes on Farm Bureau Road and sharrows and a 25 mph speed limit on the northern portion of E. Olivera Road, but there is no bike provision, and little pedestrian provision, on this busy and fast section of E. Olivera Road.	37.98563573067052	-122.0180648	Bicycle	Olivera Rd	-	Roadway Segment	Bike Lane
1	77	There are bike lanes on Farm Bureau Road and sharrows and a 25 mph speed limit on the northern portion of E. Olivera Road, but there is no bike provision, and little pedestrian provision, on this busy and fast section of E. Olivera Road.	37.98563573067052	-122.0180648	Pedestrian	Olivera Rd	-	Roadway Segment	Sidewalk
2	76	The two sections of Olive Drive are meant to be connected over the stream for cyclists and pedestrians, but this involves scrambling up and down the stream banks.	37.96368728510119	-121.9701009		Olive Drive	-	Roadway Segment	Bicycle Safety
3	75	Not safe to cycle on this stretch of the freeway.	38.01158516589001	-122.009426	Bicycle	California Delta Hwy	-	Roadway Segment	Bicycle Safety
4	74	Not safe to cycle over this bridge	38.00307693751492	-121.9997398	Bicycle	Willow Pass Rd	-	Roadway Segment	Bicycle Safety
5	73	Not safe to cycle along Willow Pass Road beneath freeway.	37.966125944317724	-122.0563323	Bicycle	Willow Pass Rd	-	Roadway Segment	Bicycle Safety
6	72	Not safe to cycle along Willow Pass Road beneath freeway	37.97115987	-122.0474274	Bicycle	Willow Pass Rd	-	Roadway Segment	Bicycle Safety
7	71	Not safe to cycle along Clayton Road beneath freeway.	37.978876071055566	-122.0433163	Bicycle	Clayton Rd	-	Roadway Segment	Bicycle Safety
8	70	Not safe to cycle along Grant Street beneath the freeway.	37.988632977568656	-122.0402823	Bicycle	Grant Street	-	Roadway Segment	Bicycle Safety
9	69	Lots of cars coming off the freeway and speeding down this road, but there are no sidewalks.	37.98871416056805	-122.0383328	Vehicle	Birch Ave	-	Roadway Segment	Speeding
9	69	Lots of cars coming off the freeway and speeding down this road, but there are no sidewalks.	37.98871416056805	-122.0383328	Pedestrian	Birch Ave	-	Roadway Segment	Sidewalk
10	68	North bound bike lane just dies on the wrong side of the road, leading cyclists to ride into oncoming traffic. The plans for this intersection were better, but the city did not build what was on the plans.	37.98506744	-122.0382417	Grant St	Frederick St	-	Intersection	Bicycle Safety
11	67	Concord will not fix broken street lights unless they are provided with grant money specifically for this purpose. Currently they may not replace broken streetlights until next year. This has been city policy since before last year.	37.98162376710759	-122.0242699	All	Grant Street	Frederick St	Roadway Segment	Broken Streetlights
12	65	Speeding cars past Concord High school.	37.97646994558026	-121.9894923	All	Concord Blvd	-	Roadway Segment	Speeding
13	64	Treat boulevard from San Miguel to the Walnut Creek boundary is terrible for pedestrians and bicycles. It could be reduced to 2 lanes of traffic to provide more space for sidewalks and bike lanes, just like the stretch from San Miguel east to Clayton road.	37.944802493085376	-122.0157812	Pedestrian	Treat Blvd	San Miguel to the Walnut Creek boundary	Roadway Segment	Sidewalk
13	64	Treat boulevard from San Miguel to the Walnut Creek boundary is terrible for pedestrians and bicycles. It could be reduced to 2 lanes of traffic to provide more space for sidewalks and bike lanes, just like the stretch from San Miguel east to Clayton road.	37.944802493085376	-122.0157812	Bicycle	Treat Blvd	San Miguel to the Walnut Creek boundary	Roadway Segment	Bike lane
13	64	Treat boulevard from San Miguel to the Walnut Creek boundary is terrible for pedestrians and bicycles. It could be reduced to 2 lanes of traffic to provide more space for sidewalks and bike lanes, just like the stretch from San Miguel east to Clayton road.	37.944802493085376	-122.0157812	All	Treat Blvd	San Miguel to the Walnut Creek boundary	Roadway Segment	Road Diet

14	63	Speeding vehicles, poor visibility for pedestrians, blind curve in crosswalk and for cars turning left onto Solano Way from Hilltop Rd. In 2025 the STOP sign on Hillcrest at this corner of concern was actually run down by speeding vehicle. Location needs Stop light or STOP signs / Speedbumps for BOTH directions. Drivers are just heading into and out of town in this area making this strip of Solano Way a very dangerous raceway for drivers and pedestrians. I have personally witnessed many near misses of pedestrians in the crosswalk in the past 5 years in particular. I have also been the victim of a head on collision in this very same area in 2020. The perpetrator was speeding into the area, lost control and crossed the center divide and collided with our vehicle just past the same Hilltop Rd/Solano Way location. Our car was totaled. I was 17 days post a major abdominal cancer surgery. My hospital bill was $58,000. The guilty driver had minimum insurance coverage. My husband and I have lived on Hilltop Rd for 40 years and we have witnessed many many dangerous incidents at this location. Though there is now a “Slow Down” sign past the crosswalk, it is only on one side of the rode. This is sorely inadequate and needs to be updated to a fulll STOP sign or traffic light AND/ or speed bumps on BOTH directions of Crosswalk. Your attention and funding of this project is badly needed BEFORE someone is killed, not afterward.	37.99453032605385	-122.0520473	Pedestrian	Solano Way	Hilltop Rd	Intersection	Pedestrian Safety
14	63	Speeding vehicles, poor visibility for pedestrians, blind curve in crosswalk and for cars turning left onto Solano Way from Hilltop Rd. In 2025 the STOP sign on Hillcrest at this corner of concern was actually run down by speeding vehicle. Location needs Stop light or STOP signs / Speedbumps for BOTH directions. Drivers are just heading into and out of town in this area making this strip of Solano Way a very dangerous raceway for drivers and pedestrians. I have personally witnessed many near misses of pedestrians in the crosswalk in the past 5 years in particular. I have also been the victim of a head on collision in this very same area in 2020. The perpetrator was speeding into the area, lost control and crossed the center divide and collided with our vehicle just past the same Hilltop Rd/Solano Way location. Our car was totaled. I was 17 days post a major abdominal cancer surgery. My hospital bill was $58,000. The guilty driver had minimum insurance coverage. My husband and I have lived on Hilltop Rd for 40 years and we have witnessed many many dangerous incidents at this location. Though there is now a “Slow Down” sign past the crosswalk, it is only on one side of the rode. This is sorely inadequate and needs to be updated to a fulll STOP sign or traffic light AND/ or speed bumps on BOTH directions of Crosswalk. Your attention and funding of this project is badly needed BEFORE someone is killed, not afterward.	37.99453032605385	-122.0520473	Vehicle	Solano Way	Hilltop Rd	Intersection	Speeding

15	62	My wife and I have lived on Navaronne Way in Concord for over 40 years. During this time, we have routinely hiked the paths/walkways from Concord to Walnut Creek. During the Pandemic, the paths/walkways were overtaken by Mountain Bikers flying down the hills. Now, young kids have taken over the paths/walkways on Electronic Bikes, flying down the paths/walkways at high rates of speed, with the only indication they are coming from behind you is from the loud sound of the knobby tires against the payment. Numerous times they have flown by us walking on the trails, barely dodging/missing us. Furthermore, over time it appears as if the paths/walkways have become a throughway for kids commuting back and forth to school and/or friends' houses, as we see the same kids in the same areas constantly. Adults, 16 years of age and older, are required to have an operator's license to operate a motorized vehicle(car/motorcycle) on the streets, be it an internal combustion gas vehicle or an Electronic Vehicle. However, on the paths/walkways, kids with no instruction/operators' licenses, are flying at high rates of speed on Electronic Bikes, as if it were an open roadway for vehicles. On numerous occasions I have seen people and/or their pets nearly struck by kids on Electronic Bikes and/or kids on the side of the pathways injured from wrecks. In conclusion, it is my belief that the pathways/trails in the Open Spaces are intended for people to walk and/or people to ride conventional bicycles and not have the pathways/trails overrun, by unlicensed kids on motorized vehicles.	37.93345200584385	-121.9898741	Pedestrian	Buckeye Trl	-	Roadway Segment	Pedestrian Safety

15	62	My wife and I have lived on Navaronne Way in Concord for over 40 years. During this time, we have routinely hiked the paths/walkways from Concord to Walnut Creek. During the Pandemic, the paths/walkways were overtaken by Mountain Bikers flying down the hills. Now, young kids have taken over the paths/walkways on Electronic Bikes, flying down the paths/walkways at high rates of speed, with the only indication they are coming from behind you is from the loud sound of the knobby tires against the payment. Numerous times they have flown by us walking on the trails, barely dodging/missing us. Furthermore, over time it appears as if the paths/walkways have become a throughway for kids commuting back and forth to school and/or friends' houses, as we see the same kids in the same areas constantly. Adults, 16 years of age and older, are required to have an operator's license to operate a motorized vehicle(car/motorcycle) on the streets, be it an internal combustion gas vehicle or an Electronic Vehicle. However, on the paths/walkways, kids with no instruction/operators' licenses, are flying at high rates of speed on Electronic Bikes, as if it were an open roadway for vehicles. On numerous occasions I have seen people and/or their pets nearly struck by kids on Electronic Bikes and/or kids on the side of the pathways injured from wrecks. In conclusion, it is my belief that the pathways/trails in the Open Spaces are intended for people to walk and/or people to ride conventional bicycles and not have the pathways/trails overrun, by unlicensed kids on motorized vehicles.	37.93345200584385	-121.9898741	Pedestrian	Buckeye Trl	-	Roadway Segment	E-Bike Enforcement
16	61	A woman on a bicycle was just killed here recently. Please extend the PH bike lane that ends at CCC all the way along Willow Pass. This area near the mall and 680 is deadly for anyone who's not in a car (and dangerous for car drivers as well). i see people riding bicycles on the sidewalk here everyday. They should have their own safe lane to travel in the roadway.	37.96284927457624	-122.0609375	Bicycle	Sunvalley Blvd	B/w Contra Costa Blvd & Willow Pass Rd	Roadway Segment	Bike lane
17	60	Constant street racing at night during the week and weekends. Numerous homes being hit by out of control cars.	37.96203683568193	-121.994176	Vehicle	Treat Blvd	Bel Air Dr	Roadway Segment	Street Racing
18	59	This area is very dangerous for people on bicycles. Please consider finding a route either here or along Willow Pass that would accommodate non car travellers.	37.97928630113958	-122.0427459	Bicycle	Willow Pass Rd	-	Roadway Segment	Bike lane
19	58	This intersection is very dangerous for all road users. I drive it to go to my job in Concord from my home in Pleasant Hill and it's scary as a driver. I see crashes there a lot. I'm sure you have data on this. I would actually prefer to ride my bicycle to my job on this route but I'm petrified of being on a bike at this intersection and along Willow Pass. Can you build out a protected bike lane along this route?	37.97197089607671	-122.0456894	All	Willow Pass Rd	Market St	Intersection	Intersection Safety

19	58	This intersection is very dangerous for all road users. I drive it to go to my job in Concord from my home in Pleasant Hill and it's scary as a driver. I see crashes there a lot. I'm sure you have data on this. I would actually prefer to ride my bicycle to my job on this route but I'm petrified of being on a bike at this intersection and along Willow Pass. Can you build out a protected bike lane along this route?	37.97197089607671	-122.0456894	All	Willow Pass Rd	Market St	Roadway Segment	Bike Lane
20	57	poor road conditions	37.99021238385524	-122.0368131	Vehicle	Hickory Dr	-	Roadway Segment	Pavement
21	56	poor road conditions & end of street barrier needs repair	37.98832299920383	-122.0384214	Vehicle	Mountain View Dr	-	Roadway Segment	Pavement
22	55	Poor visibility, no sidewalks so when parents park on both sides, no safe route for residents to drive out of neighborhood. Unsafe for pedestrians. Should be no parking zone up one block	37.940865738463344	-121.9565989	All	Krona Ln	-	Roadway Segment	Poor Visibility
22	55	Poor visibility, no sidewalks so when parents park on both sides, no safe route for residents to drive out of neighborhood. Unsafe for pedestrians. Should be no parking zone up one block	37.940865738463344	-121.9565989	Pedestrian	Krona Ln	-	Roadway Segment	Sidewalk
22	55	Poor visibility, no sidewalks so when parents park on both sides, no safe route for residents to drive out of neighborhood. Unsafe for pedestrians. Should be no parking zone up one block	37.940865738463344	-121.9565989	Vehicle	Krona Ln	-	Roadway Segment	Unsafe/ Illegal Parking or Parking Violation
23	54	The L turn into the high school is still timed even on a weekend. We had to wait, with zero cars traveling, to have a green L turn into the high school for a track meet.	37.93712599024833	-122.0236389	Vehicle	Oak Grove Rd	Ygnacio Valley High School Driveway	Intersection	Signal Timing
24	53	The median cones on Oak Grove Rd, west of Treat, block cars from entering the left turn lanes to eastbound Treat Blvd. When the southbound OGR light is red. This results in many cars that want to turn left having to wait through an additional cycle.	37.939240365335735	-122.025581	Vehicle	Oak Grove Rd	Treat Blvd	Roadway Segment	Lane Configuration
25	52	The intersection at concord blvd and denkinger is a hot spot for car accidents and a disaster waiting to happen. My family lives in the neighbor hood on the north side of this intersection (on denkinger where it dead ends). Whenever we leave our neighborhood (heading south on denkinger) we almost get a hit by oncoming traffic heading north on denkinger and turning west on concord blvd. Straight has the right of way yet people constantly turn in front of us and my family personally has come very close to be in an accident. There are signs saying left turn needs to yield yet people never do!! This light should be changed to flashing yellow left turn signal from denkinger (heading north) to concord blvd (heading west). This needs to be addressed before something serious happens. I have witnessed accidents myself and like I said have nearly been in accidents with my whole family in the car. My wife has reported the same thing to me while she's driving our kids! It's a simple fix that the city should implement to protect people obeying the law. This needs to be addressed if concord is serious about drivers safety! I have even seen a concord police officer not yielding to oncoming traffic at this intersection! Please do something to fix this hot spot	37.97498365848239	-121.9836582	Vehicle	Concord Blvd	Denkinger Rd	Intersection	Sign/Signal Violation

26	51	The traffic near Willow Pass and Galindo is nasty much of the time and especially betwen 4 and 6 p.m. with cars blocking traffic because of the timing of the traffic lights. The City of Concord has gone overboard with traffic lights of obnoxiously long cycles so that we often wait for a green light even when there are no other cars. Other cities uses 4-way stop signs . Whenever the lights temporarily stop functioning, drivers take turns and get through intersections safely and faster. I walk and also ride my bicycle and find the cycles to be crummy for them, too. I am sorry we can't do better. I'd love to get a response about this. cocoswendy@gmail.com	37.97575551556835	-122.0348713	Vehicle	Willow Pass Rd	Galindo St	Intersection	Signal Timing
27	50	People from both the Virginia side and Trees side often do not check for pedestrians when left turning into Mounment.	37.95052877233675	-122.0473087	Pedestrian	Monument Blvd	Victory Ln/Trees Dr	Intersection	Pedestrian Safety
28	49	People from Virginia left turning into Monument often do not check for pedestrians and I've seen them almost get hit more than once.	37.954628011198366	-122.0413378	Pedestrian	Monument Blvd	Virginia Ln	Intersection	Pedestrian Safety
29	48	When turning left from Victory Lane onto Brookview Circle (coming from Monument Boulevard), it is difficult to see oncoming traffic from the opposite direction of Victory Lane. The problem is worsened by cars often parked on the right side of that curve, which block the view for drivers attempting the left turn. It would be safer to install a mirror on the Brookview corner to improve visibility or to prohibit parking on the right side of Victory Lane at the curve.	37.95399228451298	-122.0505959		Victory Lane	Brookview Circle	Intersection	Sight Distance
29	48	When turning left from Victory Lane onto Brookview Circle (coming from Monument Boulevard), it is difficult to see oncoming traffic from the opposite direction of Victory Lane. The problem is worsened by cars often parked on the right side of that curve, which block the view for drivers attempting the left turn. It would be safer to install a mirror on the Brookview corner to improve visibility or to prohibit parking on the right side of Victory Lane at the curve.	37.95399228451298	-122.0505959		Victory Lane	Brookview Circle	Intersection	Unsafe/ Illegal Parking or Parking Violation
30	47	Speeding vehicles in a residential street. Possibly add a Stop Sign or speed bump. A lot of kids walk around the neighborhood. Vehicles (small, med & large trucks) are speeding at a consistent rate.	37.98726268855468	-122.0366506	Vehicle	Fairfield Ave	-	Roadway Segment	Speeding
31	46	The traffic light usually takes a long time for the light to turn green which causes traffic and annoying waiting.	37.95473560479566	-122.0414218	Vehicle	Monument Blvd	Virginia Ln	Intersection	Signal Timing
32	45	Pedestrian almost got hit, drivers going to right lane to Clayton Way to turn right, zooming even it is red light and pedestrian crossing.	37.977879360731734	-122.002031	Pedestrian	Concord Blvd	Clayton Way	Intersection	Pedestrian Safety
33	44	Cars running the stop signs and speeding resulting in parked cars being hit	37.96880399593722	-122.0366768	Vehicle	Ellis St	Toyon Dr	Intersection	Speeding
33	44	Cars running the stop signs and speeding resulting in parked cars being hit	37.96880399593722	-122.0366768	Vehicle	Ellis St	Toyon Dr	Intersection	Sign/Signal Violation
34	43	Speeding vehicles all hours of the day. Difficult to walk because there are no sidewalks and it’s a through street. Seen a lot of people texting while driving. Many students walk home on Margo Drive and it’s unsafe for them.	37.97884157434895	-121.998531	Vehicle	Morgo Dr	-	Roadway Segment	Speeding

34	43	Speeding vehicles all hours of the day. Difficult to walk because there are no sidewalks and it’s a through street. Seen a lot of people texting while driving. Many students walk home on Margo Drive and it’s unsafe for them.	37.97884157434895	-121.998531	Pedestrian	Morgo Dr	-	Roadway Segment	Sidewalk
34	43	Speeding vehicles all hours of the day. Difficult to walk because there are no sidewalks and it’s a through street. Seen a lot of people texting while driving. Many students walk home on Margo Drive and it’s unsafe for them.	37.97884157434895	-121.998531	All	Morgo Dr	-	Roadway Segment	Distracted Driving
35	42	This pole was involved in a traffic incident months ago, affecting the timer for the light.	37.94815300357165	-121.9782917	Vehicle	Ygnacio Valley Rd	Ayers Rd	Intersection	Signal Timing
36	41	I make a right turn from pine holloe on to comino solano. First you force all traffic into the left lane and then there is a right turning lane. People stay in the right lane and run right into the right turning lane. Those trying to follow the rules are in danger of being hit. It would be safer to just turn the right lane into a right turn only lane and not force us left and then right to make the turn.	37.94118117007163	-121.9598939	Vehicle	Pine Hollow Rd	Cam Solano	Roadway Segment	Lane Configuration
37	40	Now that the speed bumps have been installed on Glazier Dr the amount of excessive speed has increased on Baywood Dr between Glazier Dr and Wilson Ln. It's only a matter of time before a pedestrian, child or pet gets hit.	37.96844729042685	-121.9850144	Vehicle	Baywood Dr	-	Roadway Segment	Speeding
38	39	Throughout the stretch of Wilson Ln between Denkinger and Thornwood the amount of 4 way "Stop" runners is out of control. The 25 mph speed limit is rarely adhered to. I rarely see any police enforcement in this area.	37.96823786008903	-121.9867759	Vehicle	Wilson Ln	Denkinger Rd to Thornwood Dr	Roadway Segment	Speeding
38	39	Throughout the stretch of Wilson Ln between Denkinger and Thornwood the amount of 4 way "Stop" runners is out of control. The 25 mph speed limit is rarely adhered to. I rarely see any police enforcement in this area.	37.96823786008903	-121.9867759	Vehicle	Wilson Ln	Denkinger Rd to Thornwood Dr	Roadway Segment	Sign/Signal Violation
39	38	Cars are driving too fast between David and Hookston on the Bancroft Road. It is difficult for residents along the road to make a left turn to get on the Bancroft Road. Adding few speed bumps along the road will definitely help. Thanks!	37.93812005346648	-122.0503751	Vehicle	Bancroft Rd	David Ave to Hookston Rd	Roadway Segment	Sign/Signal Violation
40	37	The parking signs on corner are of colfex st and concord blvd. are allowed to park 2 hrs but people are parking for whole day and not getting any citations. the businesses around that area are loosing customers because of these careless service. I am one of the business owner asking the city to change these signs to loading unloading signs so our customers can use that space. city is not loosing any money by doing that. our customers can park and shop at our business and go. I will appreciate you help and we can grow our business and bring some funds to city. Please we need your help.	37.977999214310785	-122.0318856	Vehicle	Concord Blvd	Colfax St	Roadway Segment	Unsafe/ Illegal Parking or Parking Violation
41	36	Once again, there is a giant access door open that drops a couple feet down into the sidewalk. Extremely dangerous for children and literally anybody walking. Should be addressed right away.	37.99895210454321	-122.0410777	Pedestrian	Northwood Dr	-	Roadway Segment	Pedestrian Safety

42	35	On Bancroft Rd, between David St and Hookston St in Concord. Literally our properties are being depreciated due to the cars pass by so fast, I think over 55 mph. Please help. too many accidents in the intersection on Bancroft Rd and Mayhew Rd.	37.937493818097636	-122.049712	Vehicle	Bancroft Rd	David Ave to Hookston Rd	Roadway Segment	Speeding
42	35	On Bancroft Rd, between David St and Hookston St in Concord. Literally our properties are being depreciated due to the cars pass by so fast, I think over 55 mph. Please help. too many accidents in the intersection on Bancroft Rd and Mayhew Rd.	37.937493818097636	-122.049712	Vehicle	Bancroft Rd	Mayhew Way	Intersection	Intersection Safety
43	34	When is the traffic engineer going to drive round 3:00 pm to see how the 8 tier, traffic light system just backs up traffic, Maybe trying the 5 tier system to see if it work any better	37.97945853371064	-122.0226075	Vehicle	Willow Pass Rd	Parkside Dr	Intersection	Signal Timing
44	33	What is the timeline for putting street lines back in. It's a multi lane road, with a center lane and it's all unmarked currently	37.966784032701966	-121.9909758	Vehicle	Denkinger Rd	-	Roadway Segment	Lane Striping
45	32	6 vehicles parked on our narrow street with expired tags on their plates. Who is responsible to ticked these vehicles. I will gladly get the address & license plate of the vehicles & pass it on to the authorities. John	37.954840383037435	-122.018739	Vehicle	Via Montanas y	-	Roadway Segment	Unsafe/ Illegal Parking or Parking Violation
46	31	Why is this series of lights no longer synced together. Salvio -> willow pass -> concord blvd -> Clayton. One will be red and the others green and you catch every single red.	37.97552815992313	-122.034706	Vehicle	Galindo St	Salvio St to Concord Blvd	Intersection	Signal Cordination
47	30	The two lights at this intersection are not properly timed. Mesa street will be green but monument will be red, creating a huge backlog into the intersection and down cowell.	37.96845572768308	-122.0317716	Vehicle	Cowell Rd	Galindo St/ Monument Blvd to Mesa St	Intersection	Signal Cordination
48	29	This intersection lacks vehicle sensored lights, cycling through entire sequence even when there are no other vehicles	37.9461954	-121.969255	Vehicle	Ygnacio Valley Rd	Alberta Way	Intersection	Vehicle Detection
49	28	M-F 7:30 AM to 9:00 AM there is a lot of cut through traffic using Crystal Ranch Dr to avoid Ygnacio Valley Rd. Large percentage of vehicles coming off Rolling Wood on E/B Crystal Ranch Dr fail to stop at the stop sign controlled intersection endangering pedestrians and also not yielding to pedestrians in the crosswalk just east of the intersection.	37.93075289284954	-121.9728421	Vehicle	Crystyl Ranch Dr	Rolling Woods Way	Intersection	Sign/Signal Violation
49	28	M-F 7:30 AM to 9:00 AM there is a lot of cut through traffic using Crystal Ranch Dr to avoid Ygnacio Valley Rd. Large percentage of vehicles coming off Rolling Wood on E/B Crystal Ranch Dr fail to stop at the stop sign controlled intersection endangering pedestrians and also not yielding to pedestrians in the crosswalk just east of the intersection.	37.93075289284954	-121.9728421	Pedestrian	Crystyl Ranch Dr	Rolling Woods Way	Intersection	Pedestrian Safety
49	28	M-F 7:30 AM to 9:00 AM there is a lot of cut through traffic using Crystal Ranch Dr to avoid Ygnacio Valley Rd. Large percentage of vehicles coming off Rolling Wood on E/B Crystal Ranch Dr fail to stop at the stop sign controlled intersection endangering pedestrians and also not yielding to pedestrians in the crosswalk just east of the intersection.	37.93075289284954	-121.9728421	Pedestrian	Crystyl Ranch Dr	-	Roadway Segment	Cut Through Traffic
50	27	My kids walk to school here and it's very dangerous. There are 3 schools in this vicinity and kids walking around all over the place every weekday morning. There needs to be a crossing guard. Please assign a crossing guard. Kids have been hit in this area.	37.97547356564334	-121.9931746	Pedestrian	West St	Roland Dr	Intersection	School Safety

51	26	West Street, between Concord BLVD and Wilson Lane. We continue to have safety issues for students preschool thru High School crossing the street and walking cross neighboring streets. There is an elementary school, preschool, middle school and high school here. Just a few weeks ago a middle school student was hit by a car when crossing the crosswalk to El Dorado MS. There is lots of car traffic in the morning and afternoon during pick up and drop off. Many parents have complained and witness several close calls with students crossing and cars going too fast. We have 2 crosswalks but neither have cross walk guards. The lights on the ground are tempermental and don't go off when someone is crossing and also have gone off in the evening when no one is crossing. Concord HS has 1200 students, El Dorado has 900 students and Westwood has -300 students and 50 Preschool students.	37.97585444108583	-121.9930224	Pedestrian	West St	Concord Blvd to Wilson Lane	Roadway Segment	School Safety
52	25	Asphalt has deteriorated at the corner of Elm Rd and Concord Blvd. Once it fills with water it is an extremely hazardous spot for bicycles and motorcycles turning from Elm to Concord Blvd.	37.97758461144906	-122.0144107	All	Concord Blvd	Elm Rd	Intersection	Pavement
53	24	The street is terrible. The middle of the street sinking in. Also Reganti is bad, Apple drive too.	37.94924200237823	-122.0431153	Vehicle	Ernst Way	-	Roadway Segment	Pavement
53	24	The street is terrible. The middle of the street sinking in. Also Reganti is bad, Apple drive too.	37.94924200237823	-122.0431153	Vehicle	Apple Dr	-	Roadway Segment	Pavement
53	24	The street is terrible. The middle of the street sinking in. Also Reganti is bad, Apple drive too.	37.94924200237823	-122.0431153	Vehicle	Reganti Dr	-	Roadway Segment	Pavement
54	23	Poor visibility intersection between commute hours. I've almost been into car accidents getting out of Ashdale Drive on to Willow pass road. You can't see the on coming traffic on willow pass road. This intersection is also near Monte garden school, it needs to be safer. Their needs to be stops in both directions of willow pass road, instead of the keep clear no one stops there. Please fix this issue!	37.98878553028071	-122.0070341	Vehicle	Willow Pass Rd	Ashdale Dr	Intersection	Poor Visibility
54	23	Poor visibility intersection between commute hours. I've almost been into car accidents getting out of Ashdale Drive on to Willow pass road. You can't see the on coming traffic on willow pass road. This intersection is also near Monte garden school, it needs to be safer. Their needs to be stops in both directions of willow pass road, instead of the keep clear no one stops there. Please fix this issue!	37.98878553028071	-122.0070341	Vehicle	Willow Pass Rd	Ashdale Dr	Intersection	Four Way Stop Sign
55	22	Poor visibility on Cobblestone turning right onto Treat.This is especially because drivers on Treat are always speeding! So the poor visibility + speeding has caused countless near misses not to mention a 3-car accident tonight.	37.96076323218438	-121.995251	Vehicle	Treat Blvd	Cobblestone Dr	Intersection	Poor Visibility
55	22	Poor visibility on Cobblestone turning right onto Treat.This is especially because drivers on Treat are always speeding! So the poor visibility + speeding has caused countless near misses not to mention a 3-car accident tonight.	37.96076323218438	-121.995251	Vehicle	Treat Blvd	Cobblestone Dr	Intersection	Speeding

56	21	Cars regularly park on Pennsylvania directly next to the crosswalk (although now against state law). This makes it really difficult to see if kids are waiting to cross to get to highlands elementary. This could be fixed by painting the curb on either side of the crosswalk red.	37.94179561	-121.9562104	Vehicle	Pennsylvania Blvd	Alabama Dr	Intersection	Unsafe/ Illegal Parking or Parking Violation
57	20	this is one of many, many areas where reckless drivers with illegal exhaust mods. terrorize the community, specifically between 4 and 6 p.m.	37.97876795697724	-122.0311095	Vehicle	East St	-	Roadway Segment	Reckless Driving
58	19	I've lived in this area of Concord for the last 6 years and there has been concerning elements that have progressively continued or gotten even worse. First, the 4 way intersection at the corner of Sunshine Dr. and Detroit Ave in front of the "Meadow Homes Park" sign needs to be turned into a traffic light. This area is so heavily populated with children and pedestrians and I've witnessed countless people and children walking across the street to and from the park or school who have almost gotten hit by drivers running the stop signs all around, or not noticing people walking across the street. This area needs to have walking signals for pedestrians and a light that forces cars to stop or go that is metered. I've also personally experienced almost getting hit a few times walking a stroller with my child in it or walking my dog and it's starting to get out of hand. The park itself is wonderful, but also problematic for children and families most of the time. There are so many people sleeping in their cars around the park, doing drugs, drinking excessively and publicly during school hours while children at Meadow Homes School are present or playing outside. Additionally, people illegally park all up and down the streets surrounding the park, most notably on Sunshine Dr, Detroit Ave, and in all the cul de sacs surrounding Meadow Homes park. They illegally park inside cul de sacs during the week, (Charles Court, Haven Court, etc.) every weekend and most days during the week. We've had issues of people parking illegally inside the cul de sac during medical emergencies where abulances or firetrucks can't get through. Hit and runs of parked cars along Sunshine Drive happens constantly, during the day and during the night time. There aren't enough streetlights, or brighter streetlights on Sunshine Dr, so when people are driving drunk it's dark and they end up smashing into cars that are parked along the sides of homes. This area is also always scattered with broken and smashed alcohol bottles. Overall, this area has such high traffic of families, children, and pedestrians and it's just not safe and progressively gets worse. I	37.964446690700115	-122.0387294	Vehicle	Sunshine Dr	Detroit Ave	Intersection	Traffic Light

58	19	I've lived in this area of Concord for the last 6 years and there has been concerning elements that have progressively continued or gotten even worse. First, the 4 way intersection at the corner of Sunshine Dr. and Detroit Ave in front of the "Meadow Homes Park" sign needs to be turned into a traffic light. This area is so heavily populated with children and pedestrians and I've witnessed countless people and children walking across the street to and from the park or school who have almost gotten hit by drivers running the stop signs all around, or not noticing people walking across the street. This area needs to have walking signals for pedestrians and a light that forces cars to stop or go that is metered. I've also personally experienced almost getting hit a few times walking a stroller with my child in it or walking my dog and it's starting to get out of hand. The park itself is wonderful, but also problematic for children and families most of the time. There are so many people sleeping in their cars around the park, doing drugs, drinking excessively and publicly during school hours while children at Meadow Homes School are present or playing outside. Additionally, people illegally park all up and down the streets surrounding the park, most notably on Sunshine Dr, Detroit Ave, and in all the cul de sacs surrounding Meadow Homes park. They illegally park inside cul de sacs during the week, (Charles Court, Haven Court, etc.) every weekend and most days during the week. We've had issues of people parking illegally inside the cul de sac during medical emergencies where abulances or firetrucks can't get through. Hit and runs of parked cars along Sunshine Drive happens constantly, during the day and during the night time. There aren't enough streetlights, or brighter streetlights on Sunshine Dr, so when people are driving drunk it's dark and they end up smashing into cars that are parked along the sides of homes. This area is also always scattered with broken and smashed alcohol bottles. Overall, this area has such high traffic of families, children, and pedestrians and it's just not safe and progressively gets worse. I	37.964446690700115	-122.0387294	Vehicle	Sunshine Dr	Detroit Ave	Intersection	Pedestrian Safety

58	19	I've lived in this area of Concord for the last 6 years and there has been concerning elements that have progressively continued or gotten even worse. First, the 4 way intersection at the corner of Sunshine Dr. and Detroit Ave in front of the "Meadow Homes Park" sign needs to be turned into a traffic light. This area is so heavily populated with children and pedestrians and I've witnessed countless people and children walking across the street to and from the park or school who have almost gotten hit by drivers running the stop signs all around, or not noticing people walking across the street. This area needs to have walking signals for pedestrians and a light that forces cars to stop or go that is metered. I've also personally experienced almost getting hit a few times walking a stroller with my child in it or walking my dog and it's starting to get out of hand. The park itself is wonderful, but also problematic for children and families most of the time. There are so many people sleeping in their cars around the park, doing drugs, drinking excessively and publicly during school hours while children at Meadow Homes School are present or playing outside. Additionally, people illegally park all up and down the streets surrounding the park, most notably on Sunshine Dr, Detroit Ave, and in all the cul de sacs surrounding Meadow Homes park. They illegally park inside cul de sacs during the week, (Charles Court, Haven Court, etc.) every weekend and most days during the week. We've had issues of people parking illegally inside the cul de sac during medical emergencies where abulances or firetrucks can't get through. Hit and runs of parked cars along Sunshine Drive happens constantly, during the day and during the night time. There aren't enough streetlights, or brighter streetlights on Sunshine Dr, so when people are driving drunk it's dark and they end up smashing into cars that are parked along the sides of homes. This area is also always scattered with broken and smashed alcohol bottles. Overall, this area has such high traffic of families, children, and pedestrians and it's just not safe and progressively gets worse. I	37.964446690700115	-122.0387294	Vehicle	Sunshine Dr	Detroit Ave	Intersection	Unsafe/ Illegal Parking or Parking Violation
59	18	This intersection has been a problem since we have moved in 6 years ago. I have seen many accidents and have almost been apart of them multiple times. For some reason people coming from Deckenger and turning left towards concord HS forget that they need to give on coming traffic (from the neighborhood ex Yeoman/ Deckenger drive) the right away. I have almost been hit several times leaving our neighborhood but now always have to proceed with caution. I have seen pedestrians also almost hit by turning cars. There are several signs posted but that has done nothing. I think something as simple as a flashing yellow left hand signal would change this problem. Also, there are lots of cars driving on Concord BLVD that run yellow and red lights at this intersection. Is there something that can be done to lengthen the time a light turns red to green to prevent accidents? Thank you!	37.97493282307548	-121.9835809	Vehicle	Concord Blvd	Denkinger Rd	Intersection	Intersection Safety

59	18	This intersection has been a problem since we have moved in 6 years ago. I have seen many accidents and have almost been apart of them multiple times. For some reason people coming from Deckenger and turning left towards concord HS forget that they need to give on coming traffic (from the neighborhood ex Yeoman/ Deckenger drive) the right away. I have almost been hit several times leaving our neighborhood but now always have to proceed with caution. I have seen pedestrians also almost hit by turning cars. There are several signs posted but that has done nothing. I think something as simple as a flashing yellow left hand signal would change this problem. Also, there are lots of cars driving on Concord BLVD that run yellow and red lights at this intersection. Is there something that can be done to lengthen the time a light turns red to green to prevent accidents? Thank you!	37.97493282307548	-121.9835809	Vehicle	Concord Blvd	-	Roadway Segment	Sign/Signal Violation
60	17	Vehicles entering Estates Drive do not know that the street is technically a dead end after crossing the Highland Drive intersection. It would help if the city install a “not a through street” sign before the intersection so people are aware of this.	37.994139264514374	-122.0460906	Vehicle	Estates Dr	-	Roadway Segment	Signage
61	16	I find the intersection of Estates Drive and Overhill road to be dangerous. Cars turning from estates cannot see incoming traffic. I was hoping that the city can install mirrors to help gauge overhill before committing to the turn.	37.99208709271994	-122.0471969	Vehicle	Estates Dr	Overhill Rd	Intersection	Sight Distance
62	15	The traffic light changes on Monument Blvd. have made for an absolutely ridiculous time to get from the freeway to Reganti Dr. Today it was 35 min at 3pm! Now people seem to love to gas it after they have passed Victory Ln. due to frustration. Removing the no turn on red at Reganti Dr recently has also made many pedestrians almost get hit. It will be happening soon enough. Reganti Dr itself is in terrible condition. I would say it needs to be resurfaced with a higher weight limit or something since all the big rigs, fire trucks and large work vehicles go to El Molino and destroy the road with their weight. There is always a yellow box truck on the corner of Reganti Dr. and Peach Pl. that covers the stop sign, especially on the weekends. I have seen many people not stop since they don’t see it as well as almost hit pedestrians since it makes it a blind corner.	37.948118508625925	-122.0509262	Vehicle	Monument Blvd	Reganti Dr to I680	Intersection	Signal Timing

62	15	The traffic light changes on Monument Blvd. have made for an absolutely ridiculous time to get from the freeway to Reganti Dr. Today it was 35 min at 3pm! Now people seem to love to gas it after they have passed Victory Ln. due to frustration. Removing the no turn on red at Reganti Dr recently has also made many pedestrians almost get hit. It will be happening soon enough. Reganti Dr itself is in terrible condition. I would say it needs to be resurfaced with a higher weight limit or something since all the big rigs, fire trucks and large work vehicles go to El Molino and destroy the road with their weight. There is always a yellow box truck on the corner of Reganti Dr. and Peach Pl. that covers the stop sign, especially on the weekends. I have seen many people not stop since they don’t see it as well as almost hit pedestrians since it makes it a blind corner.	37.948118508625925	-122.0509262	Vehicle	Monument Blvd	Reganti Dr	Intersection	Intersection Safety
62	15	The traffic light changes on Monument Blvd. have made for an absolutely ridiculous time to get from the freeway to Reganti Dr. Today it was 35 min at 3pm! Now people seem to love to gas it after they have passed Victory Ln. due to frustration. Removing the no turn on red at Reganti Dr recently has also made many pedestrians almost get hit. It will be happening soon enough. Reganti Dr itself is in terrible condition. I would say it needs to be resurfaced with a higher weight limit or something since all the big rigs, fire trucks and large work vehicles go to El Molino and destroy the road with their weight. There is always a yellow box truck on the corner of Reganti Dr. and Peach Pl. that covers the stop sign, especially on the weekends. I have seen many people not stop since they don’t see it as well as almost hit pedestrians since it makes it a blind corner.	37.948118508625925	-122.0509262	Vehicle	Reganti Dr	-	Roadway Segment	Pavement
63	14	Every single day hundreds if not thousands of drivers illegally make a U-Turn here at this light at panoramic drive during commute hours. If they don't do the U-Turn at the light they will turn on Panoramic and make an illegal turn at the first left which clearly states no u-turns. Super annoying and unsafe as a person who crosses this street every day!	38.00449592865223	-122.0239909	Vehicle	Port Chicago Hwy	Panoramic Dr	Intersection	Illegal U-Turn
64	13	A favorite dead end for racers to do donuts. Look no further than the street to see rubber evidence of unlimited donuts. Multiple vehicles all times of the day. Mostly a black Nissan 350Z and an older silver Mustang with a black stripe on the hood. More patrols in this area and enforcement of parking laws would help. Many vehicles double parked, on the sidewalk, on private property, leaking fluids into the gutter from the nearby auto body shop. Racing up and down Cloverdale Ave., and extension of the street racing on Monument Blvd.	37.95974440798747	-122.0295745	Vehicle	Cloverdale Ave	-	Roadway Segment	Street Racing

64	13	A favorite dead end for racers to do donuts. Look no further than the street to see rubber evidence of unlimited donuts. Multiple vehicles all times of the day. Mostly a black Nissan 350Z and an older silver Mustang with a black stripe on the hood. More patrols in this area and enforcement of parking laws would help. Many vehicles double parked, on the sidewalk, on private property, leaking fluids into the gutter from the nearby auto body shop. Racing up and down Cloverdale Ave., and extension of the street racing on Monument Blvd.	37.95974440798747	-122.0295745	Vehicle	Cloverdale Ave	-	Roadway Segment	Unsafe/ Illegal Parking or Parking Violation
65	12	Constant street racers between Detroit and Cowell on Monument. Cars, motorcycles, especially evenings and weekends. I don't understand how they can race so close to the PD and not get noticed, pulled over and cited or towed. I've seen them race past a marked police unit and nothing was done. There's already been a couple of bad accidents and a rollover at the curve near the cemetery, and trees never grow up very large between Systron and Cowell in the median because they're constantly being wiped out. Large trees in this median would protect opposing traffic from a head-on, but the trees never last that long. It's a matter of time before pedestrians are hit and killed in this vicinity or a gruesome head-on takes place.	37.96252793529845	-122.0319689	Vehicle	Monument Blvd	Cowell Rd to Detroit Ave	Roadway Segment	Street Racing
66	11	We have noticed lately that there has been quite a few accidents on Birch Ave. between Hickory and Fairfield. There is a dip on Birch Ave and Upland Dr and the cars don’t slow down and they speed up trying to avoid it. On the same spot there have been some cars doing donuts. As a matter of fact there was a big accident on the streets mentioned above on 3/14/26. We have seen an increase of traffic in a couple of years because people are trying to make a short cut because the heavy traffic on the freeway. On these streets there are a lot of potholes, these streets have not been paved in a long, long time. On the corner of 2297 Upland Dr and Birch Ave when it rains it collects a big puddle of water and the drainage is on the other side of the street and this is because the street hasn’t been paved for a long time. I got some pictures in case are needed. Thanking you in advance	37.989778345163174	-122.037835	Vehicle	Birch Ave	Hickory Dr to Fairfield Ave	Roadway Segment	Pavement
66	11	We have noticed lately that there has been quite a few accidents on Birch Ave. between Hickory and Fairfield. There is a dip on Birch Ave and Upland Dr and the cars don’t slow down and they speed up trying to avoid it. On the same spot there have been some cars doing donuts. As a matter of fact there was a big accident on the streets mentioned above on 3/14/26. We have seen an increase of traffic in a couple of years because people are trying to make a short cut because the heavy traffic on the freeway. On these streets there are a lot of potholes, these streets have not been paved in a long, long time. On the corner of 2297 Upland Dr and Birch Ave when it rains it collects a big puddle of water and the drainage is on the other side of the street and this is because the street hasn’t been paved for a long time. I got some pictures in case are needed. Thanking you in advance	37.989778345163174	-122.037835	Vehicle	Birch Ave	Hickory Dr to Fairfield Ave	Roadway Segment	Street Racing

67	10	Black truck with flat tire and no plates parked on street; large ford transit bus parked on street with extension cord often plugged into it.	37.963962029239696	-121.9992637	Vehicle	Joan Ave	Cape Cod Way	Roadway Segment	Unsafe/ Illegal Parking or Parking Violation
68	9	Poor visibility and traffic concern due to blue pickup truck with large trailer parked alongside tree line	37.96437653690113	-121.9997403	Vehicle	Rosal Ln	Joan Ave	Roadway Segment	Unsafe/ Illegal Parking or Parking Violation
69	8	Frequently, cars are going the wrong way down 1 way street. Dogs are off leash at the park and in the Eichler neighborhood. Swim meet parking on Cowell are not ticketed even though they are over the 4hr parking limit.	37.96383699984628	-122.014494	Vehicle	Cowell Rd	-	Roadway Segment	Wrong Side of Rd
69	8	Frequently, cars are going the wrong way down 1 way street. Dogs are off leash at the park and in the Eichler neighborhood. Swim meet parking on Cowell are not ticketed even though they are over the 4hr parking limit.	37.96383699984628	-122.014494	Vehicle	Cowell Rd	-	Roadway Segment	Unsafe/ Illegal Parking or Parking Violation
70	7	Traffic light needs to be adjusted at Cowell and Babel. Frequently there is a long line of traffic on Cowell, but light is red d/t sensing of car turning left from Babel to Cowell. Onse the traffic on Cowell gets the green light, it once again turns red as soon as the Babel light senses another car needing to turn left onto Cowell. Sometimes, only 3 cars get to progress down Cowell after the green light only for the light to turn red once again. This leads to a long line at this intersection on Cowell street.	37.96096599779929	-122.0086676	Vehicle	Cowell Rd	Babel Ln	Intersection	Signal Timing
71	6	need a bike lane here to complete the throughway for bikes from Concord to Clayton. Car speeds are very scary	37.95856492407073	-121.9759312	Bicycle	Clayton Rd	-	Roadway Segment	Bike lane
72	5	Farm bureau Rd, from concord Blvd to Clayton Rd. 1. Unsafe auto speeds - speed limit is 30 mpg, yet cars and trucks repeatedly speed on this section, blowing past stop signs. 2. Large trucks using this short cut even though limit is 5 tons 3. No real sidewalks, what little asphalt paving serving as walkway is ALWAYS blocked by cars and trucks. This poses dangerous situation for pedestrians who have to walk close to , or in the street to get by. 4. Surface road is in desperatthis short cute need of new paving. Potholes, cracked asphalt. With so many cars/trucks using this shortcut, (especially during morning and evening rush hour, it is troubling that upgrades and safety is not a higher priority. 5. Non existing bike lanes - Hard to commute thru here with so many cars and such a narrow road. we've bee harassed numerous times, forcing us to alter our commutes and enjoyment of riding in our community	37.97290296354238	-122.0077198	Vehicle	Farm Bureau Rd	-	Roadway Segment	Speeding

72	5	Farm bureau Rd, from concord Blvd to Clayton Rd. 1. Unsafe auto speeds - speed limit is 30 mpg, yet cars and trucks repeatedly speed on this section, blowing past stop signs. 2. Large trucks using this short cut even though limit is 5 tons 3. No real sidewalks, what little asphalt paving serving as walkway is ALWAYS blocked by cars and trucks. This poses dangerous situation for pedestrians who have to walk close to , or in the street to get by. 4. Surface road is in desperatthis short cute need of new paving. Potholes, cracked asphalt. With so many cars/trucks using this shortcut, (especially during morning and evening rush hour, it is troubling that upgrades and safety is not a higher priority. 5. Non existing bike lanes - Hard to commute thru here with so many cars and such a narrow road. we've bee harassed numerous times, forcing us to alter our commutes and enjoyment of riding in our community	37.97290296354238	-122.0077198	Vehicle	Farm Bureau Rd	-	Roadway Segment	Cut Through Traffic
72	5	Farm bureau Rd, from concord Blvd to Clayton Rd. 1. Unsafe auto speeds - speed limit is 30 mpg, yet cars and trucks repeatedly speed on this section, blowing past stop signs. 2. Large trucks using this short cut even though limit is 5 tons 3. No real sidewalks, what little asphalt paving serving as walkway is ALWAYS blocked by cars and trucks. This poses dangerous situation for pedestrians who have to walk close to , or in the street to get by. 4. Surface road is in desperatthis short cute need of new paving. Potholes, cracked asphalt. With so many cars/trucks using this shortcut, (especially during morning and evening rush hour, it is troubling that upgrades and safety is not a higher priority. 5. Non existing bike lanes - Hard to commute thru here with so many cars and such a narrow road. we've bee harassed numerous times, forcing us to alter our commutes and enjoyment of riding in our community	37.97290296354238	-122.0077198	Pedestrian	Farm Bureau Rd	-	Roadway Segment	Sidewalk
72	5	Farm bureau Rd, from concord Blvd to Clayton Rd. 1. Unsafe auto speeds - speed limit is 30 mpg, yet cars and trucks repeatedly speed on this section, blowing past stop signs. 2. Large trucks using this short cut even though limit is 5 tons 3. No real sidewalks, what little asphalt paving serving as walkway is ALWAYS blocked by cars and trucks. This poses dangerous situation for pedestrians who have to walk close to , or in the street to get by. 4. Surface road is in desperatthis short cute need of new paving. Potholes, cracked asphalt. With so many cars/trucks using this shortcut, (especially during morning and evening rush hour, it is troubling that upgrades and safety is not a higher priority. 5. Non existing bike lanes - Hard to commute thru here with so many cars and such a narrow road. we've bee harassed numerous times, forcing us to alter our commutes and enjoyment of riding in our community	37.97290296354238	-122.0077198	Vehicle	Farm Bureau Rd	-	Roadway Segment	Pavement

72	5	Farm bureau Rd, from concord Blvd to Clayton Rd. 1. Unsafe auto speeds - speed limit is 30 mpg, yet cars and trucks repeatedly speed on this section, blowing past stop signs. 2. Large trucks using this short cut even though limit is 5 tons 3. No real sidewalks, what little asphalt paving serving as walkway is ALWAYS blocked by cars and trucks. This poses dangerous situation for pedestrians who have to walk close to , or in the street to get by. 4. Surface road is in desperatthis short cute need of new paving. Potholes, cracked asphalt. With so many cars/trucks using this shortcut, (especially during morning and evening rush hour, it is troubling that upgrades and safety is not a higher priority. 5. Non existing bike lanes - Hard to commute thru here with so many cars and such a narrow road. we've bee harassed numerous times, forcing us to alter our commutes and enjoyment of riding in our community	37.97290296354238	-122.0077198	Bicycle	Farm Bureau Rd	-	Roadway Segment	Bike lane
73	4	I am an owner of a residence on Bel Air Drive. I find it very challenging to turn onto Bel Air from Treat Blvd or onto Treat Blvd from Bel Air Drive due to the timing of the street light. I understand that traffic on Bel Air is discouraged, however, why should I, a resident of that street be penalized.	37.962009739654235	-121.994132	Vehicle	Treat Blvd	Bel Air Dr	Intersection	Signal Timing

APPENDIX F:
ANALYSIS OF COMMUNITY SAFETY SURVEY

COMMUNITY SURVEY REPORT

Comprehensive Safety Action Plan — Public Safety Survey Results

March 2026 | 651 Respondents | City Streets | All Modes of Travel

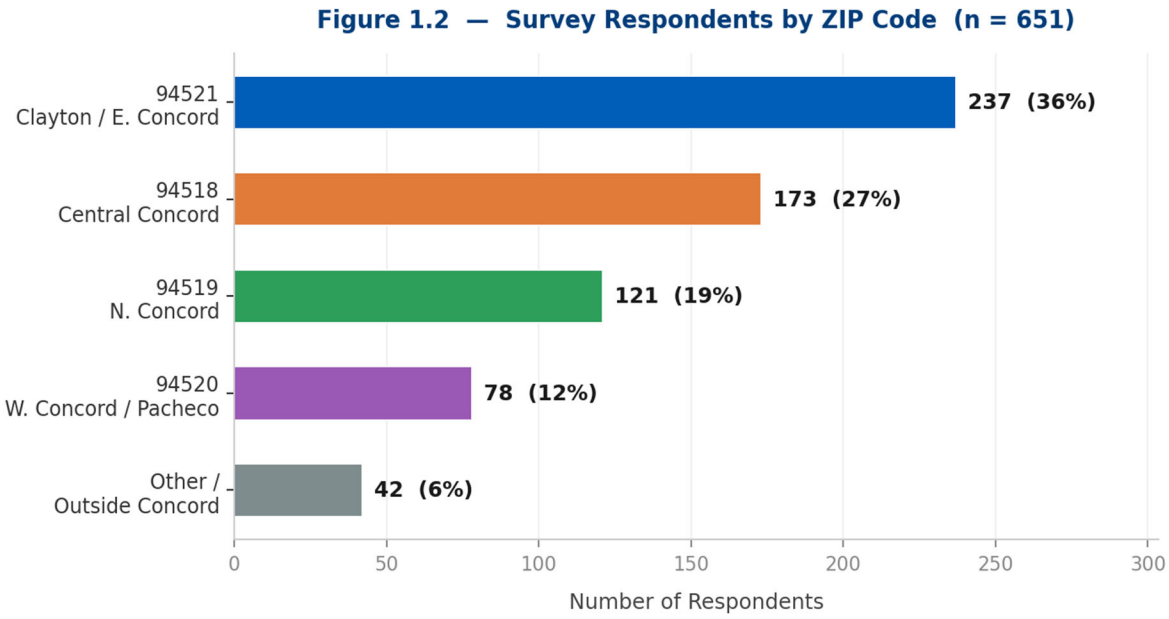
Summary Finding: 74% of survey respondents reported personal experience with a traffic incident on Concord streets — including near-misses, witnessed events, or direct collision involvement. Speeding and red light running were the most frequently cited concerns across all respondent groups. 92% of respondents reported modifying their travel behavior in response to their perceptions of street conditions.

1. Survey Overview

This report summarizes 651 responses to the City of Concord's Comprehensive Safety Action Plan (CSAP) community safety survey, collected between March 11 and April 20, 2026. The survey asked residents about their travel habits, safety concerns, collision experiences, school-zone issues, and priority improvements. Responses span all major Concord zip codes and all primary modes of travel.

Table 1.1 — Survey snapshot

Responses	Collection Period	Top ZIP Code	Primary Language
651	Mar 11–Apr 20, 2026	94521 (37%)	English (91%)



Respondent Demographics

The survey skewed toward older residents, with 51% of respondents aged 55 or older. Residents aged 35–54 comprised 36%, and 8% were under 35. This age distribution reflects typical civic engagement patterns and should be noted when interpreting results. Nearly all respondents (94%) travel primarily by personal vehicle, with walking (3%), bicycle (3%), and transit (1%) as secondary modes — consistent with Concord's auto-dependent street network. Respondents reported using their vehicles for local trips (56%), a mix of local and through travel (36%), and through-traffic or commuting (5%).

Table 1.2 — Age distribution of respondents

Response	Count	%	Distribution (n=651)
65 and older	**161**	31%	30%
55–64	**106**	20%	26%
45–54	**94**	18%	26%
35–44	**93**	18%	16%
25–34	**42**	8%	8%
18–24	**2**	0%	0%

2. Safety Concerns

Respondents were asked to identify their primary safety concerns across all modes. Speeding and red light running dominate every concern category — for drivers, for pedestrians, and for cyclists. These two behaviors appear consistently across the survey and represent the clearest consensus among respondents.

Table 2.1 — Overall safety concerns (multi-select, n=523)

Response	Count	%	Distribution (n=651)
Speeding	**346**	66%	68%
Red light running	**316**	60%	59%
Distracted driving	**204**	39%	32%
Illegal e-bike operation	**123**	24%	23%
Left turn conflicts	**60**	11%	11%
Tailgating	**72**	14%	14%
Visibility/lighting	**59**	11%	11%

Driver Concerns

Among driver-specific concerns, speeding (59%) and red light running (52%) were most frequently cited, followed by distracted driving (23%) and road condition concerns (20%). Respondents consistently cited arterial streets as the most challenging environments. Unprotected left turns on Concord Boulevard, Treat Boulevard, Clayton Road, and Ygnacio Valley Road were mentioned repeatedly in open-ended responses, with many calling for protected left-turn phases at major intersections.

Table 2.2 — Driver-specific concerns

Response	Count	%	Distribution (n=651)
Speeding	**371**	60%	59%
Red light running	**324**	53%	53%
Distracted driving	**144**	23%	23%
Road condition	**115**	19%	18%
Visibility	**48**	8%	8%
Unprotected left turns	**30**	5%	5%

Pedestrian Concerns

Among pedestrian concerns, failure to yield at crosswalks (37%) and turning vehicle conflicts (32%) rank highest. Missing sidewalks (19%) and missing crossings (13%) indicate clear infrastructure gaps. Respondents with disabilities more frequently cited missing sidewalks and inadequate crossings, reflecting a higher rate of sidewalk gap citations among this group. Poor lighting was noted by 10% of all respondents, particularly on Monument Boulevard and Meadow Lane.

Table 2.3 — Pedestrian concerns

Response	Count	%	Distribution (n=651)
Failure to yield at crosswalk	**230**	37%	37%
Turning vehicle conflicts	**201**	32%	35%
Missing sidewalks	**112**	18%	18%
Missing crossings	**80**	13%	13%
Poor lighting	**62**	10%	10%
Faded crosswalk markings	**42**	7%	11%

Bicycle Concerns

Bicycle concerns center on behavior and infrastructure in roughly equal measure. Cyclists not following traffic rules ranked first (26%), followed by no bike lanes (18%), poor road conditions (15%), and no safe routes (12%). A notable theme in open-ended responses was the prevalence of **e-bikes operated at high speed on sidewalks** — particularly near schools — with many respondents noting the need for consistent enforcement of electric bike regulations. Several respondents also noted that existing bike lanes abruptly end without connecting to destinations, reducing their functional utility.

Table 2.4 — Bicycle concerns

Response	Count	%	Distribution (n=651)
Cyclists not following rules	**161**	26%	26%
No bike lanes	**105**	15%	18%
Poor road conditions	**93**	18%	19%
No safe routes	**72**	12%	12%
Riding too close to traffic	**61**	10%	10%
Right-of-way conflicts	**59**	10%	10%

3. Personal Collision Experience

74% of respondents reported personal experience with a traffic incident on Concord streets, including near-misses, witnessed events, or direct collision involvement.

Table 3.1 — Collision experience (single-select, n=523)

Response	Count	%	Distribution (n=651)
Near-miss personally experienced	**187**	30%	30%
Witnessed a collision	**184**	30%	30%
Directly involved in a collision	**68**	11%	11%
No collision experience	**160**	26%	26%

The combined 74% who reported any traffic incident experience represents the majority of survey respondents. Near-misses were the most commonly reported experience (30%), cited by 193 respondents. Direct collision involvement was reported by 11% of respondents (72 respondents). Witnessed collisions were reported by 30% (196 respondents).

4. Locations Identified by Residents

Open-ended responses identified specific locations cited with elevated frequency across all mode categories. The following corridors and intersections were most often mentioned. These align with High Injury Network corridors identified in the CSAP collision data analysis.

Table 4.1 — Most frequently cited locations (open-text responses)

Location	Mentions	Primary Concern Cited
Clayton Road (all segments)	**20+**	Speeding, red light running, school zones
Treat Blvd / Oak Grove intersection	**12+**	Speeding, signal timing, cut-through traffic
Willow Pass Road (full length)	**10+**	Speeding, lane confusion, pedestrian crossings
Ygnacio Valley Road	**10+**	Speeding, red light running, cut-through traffic
Concord Boulevard	**9+**	Lane design, unprotected left turns, bike lanes
Monument Boulevard	**6+**	Speeding, pedestrian safety, sight lines
Cowell Road / Treat intersection	**5+**	Unprotected left turns, red light running
Clayton Rd & Treat Blvd intersection	**5+**	Starbucks traffic backup, lane weaving
Galindo St & Clayton Road	**4+**	Speeding, visibility, pedestrian conflicts
Port Chicago Hwy / Willow Pass	**3+**	Speed, signal sequencing, freight traffic

5. Time-of-Day Safety Patterns

Respondents most frequently identified the afternoon (63%) and morning (58%) as elevated-concern periods for drivers — consistent with the AM and PM commute peaks identified in the CSAP collision data. School hours were identified as an elevated-concern period by 34% of respondents, consistent with the school-zone findings in Section 6. Evening hours were cited by 21% of pedestrian respondents.

Table 5.1 — Worst time of day by mode (multi-select)

Time Period	Drivers	Pedestrians	Cyclists
Morning (6–9 AM)	378 (58%)	191 (29%)	129 (20%)
Afternoon (3–6 PM)	405 (62%)	218 (33%)	169 (26%)
School hours	226 (35%)	182 (28%)	109 (17%)
Midday (10 AM–2 PM)	152 (23%)	133 (20%)	87 (13%)
Evening (6–10 PM)	176 (27%)	119 (18%)	89 (14%)

Weekends	141 (22%)	101 (16%)	86 (13%)
Late Night (10 PM+)	93 (14%)	59 (9%)	46 (7%)

6. School Zone Safety

School-zone safety was one of the most frequently cited themes in the survey. 71% of respondents expressed some level of concern, with 35% describing themselves as very concerned. Traffic backup (38%), speeding near schools (40%), and double-parking (30%) were the most frequently cited driver-related issues. Among pedestrian concerns, drivers failing to yield (33% of respondents) and child pedestrian habits (21%) were most commonly cited. No dedicated bike route to school was noted by 19% of respondents.

Table 6.1 — School safety concern level (n=179 respondents with school-age context)

Level	Count	%	Distribution
Very concerned	212	35%	35%
Somewhat concerned	227	37%	37%
Not concerned	91	16%	19%

Table 6.2 — School zone issues by mode (multi-select)

Issue	Count	% of Respondents
DRIVER ISSUES		
Traffic backup at drop-off/pick-up	237	36%
Speeding near schools	254	41%
Double-parking blocking sight lines	185	29%
Poor sight lines	72	12%
PEDESTRIAN ISSUES		
Drivers failing to yield to children	200	30%
Unsafe child pedestrian habits	117	26%
Missing or inadequate sidewalks	190	12%
BICYCLE ISSUES		
Speeding near school bike routes	131	18%
No bike route to school	112	19%

Conflict between bikes and cars	94	15%

7. Priority Focus Areas and Requested Improvements

Respondents were asked to identify geographic focus areas and specific improvement types. Crash-prone intersections (54%) and commercial corridors (36%) were the most frequently selected geographic focus areas. Residential streets (34%) and schools/parks (31%) followed closely. Police enforcement, pedestrian signals, and high-visibility crosswalks were the most commonly requested improvement types.

Table 7.1 — Geographic focus areas (multi-select, n=523)

Response	Count	%	Distribution (n=651)
Crash-prone intersections	**334**	54%	54%
Commercial corridors	**221**	36%	30%
Residential streets	**209**	32%	39%
Schools and parks	**195**	34%	30%
Poor lighting areas	**58**	9%	9%
Transit corridors	**29**	5%	5%

Table 7.2 — Improvements requested (multi-select, n=523)

Response	Count	%	Distribution (n=651)
Increased police enforcement	**323**	52%	52%
Pedestrian signal improvements	**236**	38%	32%
High-visibility crosswalks	**210**	34%	35%
Speed feedback signs	**162**	26%	26%
Bike lane additions	**132**	22%	26%
Street lighting improvements	**127**	21%	26%

8. Travel Behavior Changes Due to Safety Concerns

92% of respondents reported modifying their travel behavior due to traffic safety concerns. Reported changes include avoiding certain streets (32%), increasing personal caution while traveling (30%), or avoiding certain travel times (26%).

Table 8.1 — Travel behavior changes due to safety (multi-select, n=523)

Response	Count	%	Distribution (n=651)
Avoid certain streets	195	32%	30%
Avoid certain times	162	30%	30%
Drive/walk more cautiously	185	30%	30%
No change in behavior	24	4%	4%
Changed travel mode	27	4%	4%

Open-text explanations provided context for the structured responses; however, travel behavior change is a self-reported measure and should be interpreted with appropriate caution. **Frequently cited streets include Ygnacio Valley Road, Clayton Road, and Treat Boulevard.**

9. Key Takeaways and Recommended Actions

Summary of findings from 523 community survey responses

01

Enforcement Is the Top Requested Intervention

Increased police enforcement was the most frequently requested improvement type, cited by 52% of respondents — the highest of any single improvement option. Community responses indicate support for increased enforcement activity on frequently cited corridors, including Clayton Road, Treat Boulevard, and Ygnacio Valley Road.

02

Speeding and Red Light Running Require a Dual-Track Response

Speeding (68%) and red light running (59%) were the two most frequently cited safety concerns across all respondent groups, appearing consistently across mode categories and open-text responses. Signal coordination along Ygnacio Valley Road and Clayton Road was referenced in multiple open-text responses.

03

School Zone Safety Requires Targeted Infrastructure Investment

71% of respondents expressed some level of concern about school-zone safety. Traffic backup, double-parking, and absence of designated bike routes near schools were the most frequently identified issues. Schools named most frequently in open responses include Ayers Elementary (Ygnacio Valley / Clayton corridor), Monte Gardens, Glenbrook, and CVCHS. Drop-off zone redesigns, parking enforcement during school hours, and protected pedestrian crossings at school approaches are near-term investments supported by the data.

04

Infrastructure Gaps Disproportionately Affect Vulnerable Residents

Missing sidewalks (19% of respondents) and missing crossings (13%) were cited across residential areas and locations near schools. Respondents who identified a disability or mobility limitation cited missing sidewalks at a higher rate than those who did not. Survey data reflects support for completing sidewalk and crosswalk connections on residential streets, including corridors such as Monument Boulevard, Meadow Lane, and Sunshine Drive.

05

E-Bike Concerns Identified by Respondents

23% of respondents cited illegal or unsafe e-bike operation as a safety concern. Open-text responses referenced e-bikes operating on sidewalks, near schools, and on park trails. Respondents noted the need for enforcement of e-bike regulations and physical separation of bicycle and pedestrian facilities.

06

Route Avoidance and Time-Shifting Reported by Respondents

92% of respondents reported modifying their travel behavior due to traffic safety concerns. 32% reported avoiding specific streets, 30% reported traveling more cautiously, and 26% reported avoiding certain travel times.

Data Sources & Methodology

Survey data collected via the City of Concord CSAP public engagement platform, March 11–April 20, 2026. Total valid responses: 651. Survey used multi-select, single-select, and open-text question formats. Percentages for multi-select questions exceed 100% as respondents could select multiple options. Open-text responses were reviewed thematically; locations cited fewer than three times were noted but not individually tabulated. Analysis and report prepared by the Transportation Division, Public Works Department, City of Concord.

SECTION 2

Cross-Question Analysis & Deep Survey Insights

Question-by-Question Cross-References | Response Patterns | Actionable Findings

The following analysis cross-references responses across survey questions to identify patterns that individual question results alone cannot reveal. Each finding connects two or more questions — for example, who reports the most danger, what they want done about it, and how they have already changed their behavior. These cross-references help distinguish perceptions from lived experience and surface the strongest signals for investment prioritization.

XR-1 Collision Experience (Q7) × Safety Concerns (Q6)

Q7 asked whether respondents had been directly involved in a collision, witnessed one, experienced a near-miss, or had no experience. Q6 asked about their top safety concerns. Comparing these reveals whether lived experience intensifies specific concern types.

Table XR-1.1 — Top safety concerns by collision experience level

Collision Experience (Q7)	n	#1 Concern	#2 Concern	#3 Concern	% Citing Speeding
Directly involved	68	Speeding (68%)	Red lights (59%)	Distracted (54%)	69%
Near-miss (personal)	187	Speeding (68%)	Red lights (73%)	Distracted (42%)	68%
Witnessed collision	184	Speeding (67%)	Red lights (72%)	Distracted (34%)	71%
No experience	160	Speeding (62%)	Red lights (47%)	Distracted (39%)	62%

Survey Insight: Collision exposure amplifies distracted driving concern most sharply.

Respondents directly involved in a collision cited distracted driving at 54% vs 39% among those with no experience — a 15-point gap. Speeding and red light running are universally high across all groups, suggesting these are not just concerns among those harmed — they are objective, observable conditions. The elevated distracted driving citation among those involved in actual collisions is a strong signal that phone enforcement should be a component of any enforcement strategy.

XR-2 Trip Purpose (Q5) × Safety Concerns (Q6) & School Issues (Q12)

Q5 asked how respondents describe most of their Concord trips: local, through, mixed, commute, school, or leisure. Comparing trip purpose against safety concerns and school-zone issues shows whether different traveler types identify different problems.

Table XR-2.1 — Safety concerns by primary trip purpose

Trip Purpose (Q5)	n	Top Concern	2nd Concern	Notable Difference
Local trips	292	Speeding (68%)	Red lights (62%)	Distracted driving 38% — highest rate among local-trip respondents
Mixed trips	189	Speeding (65%)	Red lights (58%)	E-bike illegal operation cited by 25% among mixed-trip respondents
Through traffic	21	Red lights (62%)	Speeding (73%)	Equal top concerns — consistent with arterial use
School trips	4	Red lights (86%)	E-bike illegal (43%)	No speeding in top 3 — unique school-zone profile

Survey Insight: School-trip respondents flag e-bikes and signal violations — not speed — as their primary concern.

The four respondents making primarily school-related trips cited red lights at 100% and illegal e-bike operation at 75%. This diverges sharply from all other trip-purpose groups where speeding dominates. The finding suggests that the experience of navigating school zones on foot or by bike reorients concern away from vehicle speed (which is lower in school zones) toward signal compliance and e-bike conflicts at crossing points. School-zone signal engineering and e-bike enforcement should be treated as distinct from general speed management.

XR-3 Age Group (Q17) × Safety Concerns (Q6) & Travel Changes (Q15)

Q17 captured respondent age. Cross-referencing with Q6 (safety concerns) and Q15 (travel behavior changes) reveals whether different generations experience or respond to Concord's safety conditions differently.

Table XR-3.1 — Safety concerns and behavior change by age group

Age Group (Q17)	n	Top Concern (Q6)	2nd Concern	Primary Behavior Change (Q15)	Avoids Streets	Avoids Times
25–34	50	Speeding (62%)	Red lights (50%)	Avoid streets (29%) or times (24%)	32%	19%
35–44	110	Red lights (58%)	Speeding (63%)	Avoid streets (38%)	32%	18%
45–54	113	Speeding (67%)	Red lights (66%)	Avoid streets (46%)	46%	19%
55–64	129	Speeding (68%)	Red lights (63%)	Avoid streets (29%) or times (30%)	30%	30%

65+	184	Speeding (72%)	Red lights (62%)	Avoid times (37%)	 23%	 37%

Survey Insight: Older adults adapt by changing when they travel; working-age adults adapt by changing where.

Respondents aged 65+ showed the highest rate of avoiding travel at certain times (37%), while those aged 35–54 showed the highest rate of avoiding specific streets (38–46%). This split reflects different trip flexibility: working-age residents with fixed school and work schedules cannot easily avoid peak hours, so they reroute. Older residents with more schedule flexibility avoid peak times instead. Both represent significant quality-of-life costs. Interventions addressing arterial safety conditions during peak hours are consistent with the travel patterns of both groups.

XR-4 Safety Concerns (Q6) → Requested Improvements (Q13): Do They Align?

Q6 asked what safety concerns residents hold. Q13 asked which improvements they believe would help most. Cross-referencing tests whether the improvements respondents select are logically matched to the concerns they identified — or whether there are disconnects that warrant attention.

Table XR-4.1 — Improvement preferences among respondents citing each concern

Safety Concern (Q6)	n	Top Improvement Chosen	2nd Improvement	Alignment Assessment
Speeding	346	Enforcement (60%)	Ped signals (40%)	Strong alignment — enforcement cited first, physical measures second
Red lights	316	Enforcement (62%)	Ped signals (43%)	Strong alignment — enforcement prioritized
Distracted driving	204	Enforcement (54%)	Ped signals (41%)	Aligned — no engineering fix for phones, enforcement primary
Illegal e-bikes	123	Enforcement (53%)	Ped signals (45%)	Partial — bike lanes may not deter illegal e-bike use
Left turns	60	Enforcement (45%)	Ped signals (42%)	Strong — protected signal phases directly address left turns
Visibility	59	Ped signals (44%)	Enforcement (44%)	Strong — physical visibility improvements chosen

Survey Insight: Enforcement dominates improvement requests across all concern types — but engineering solutions rank second everywhere.

Respondents who flag speeding cite enforcement first (60%) and pedestrian signals second (40%), indicating they understand that engineering and enforcement work together. The notable exception is the left-turn concern group, which chose enforcement first (45%) and pedestrian signals second (42%) — correctly identifying protected-phase signals as the primary countermeasure. The e-bike concern group's second choice (pedestrian signals, 45%) may reflect a desire for physical separation from e-bike traffic rather than a belief that lanes alone reduce illegal riding. Survey responses consistently indicate support for both enforcement and infrastructure improvements together.

XR-5 School Concern Level (Q11) × School Issues (Q12) × Travel Change (Q15)

Q11 asked how concerned respondents are about school-area safety. Q12 asked what specific school-zone issues they observe. Q15 asked if concerns have changed their travel behavior. This three-way cross-reference identifies the most activated respondents — those who are very concerned, identify specific issues, and have already changed their behavior.

Table XR-5.1 — School concern level vs. top driver and pedestrian issues cited

School Concern (Q11)	n	Top Driver Issue (Q12)	Top Ped Issue (Q12)	% Who Avoid Streets (Q15)	% Avoid Times (Q15)
Very concerned	553	Speeding (66%)	Yield failure (53%)	43%	23%
Somewhat concerned	227	Traffic backup (52%)	Yield failure (33%)	29%	41%
Not concerned	91	—	—	23%	20%

Survey Insight: Very concerned school-zone respondents identify speeding as the primary driver issue — somewhat concerned respondents name traffic backup.

This is a meaningful split. "Very concerned" respondents focus on speeding (68%) as the core school-zone driver problem, while "somewhat concerned" respondents focus on traffic backup (53%). These reflect two different experience profiles: families who identify vehicle speed as the primary concern, and families who experience school-zone congestion as the primary problem. The former calls for speed calming; the latter calls for drop-off zone redesign. Both are valid, and both patterns are reflected in the data. Survey findings suggest that school-zone interventions addressing both speed and traffic management may serve the range of concerns identified.

XR-6 Disability Status (Q4) × Pedestrian Concerns (Q9) & Improvements (Q13)

Q4 asked whether respondents have a disability or mobility limitation affecting travel. Q9 asked about pedestrian safety concerns. Q13 asked about improvements. This cross-reference identifies whether residents with disabilities identify distinct needs that general infrastructure planning may not address.

Table XR-6.1 — Pedestrian concerns and improvement requests by disability status

Disability Status (Q4)	n	Top Ped Concern (Q9)	2nd Ped Concern	Top Improvement (Q13)	2nd Improvement
Has disability/mobility limitation	64	Yield failure (27%)	Turning conflicts (27%)	Enforcement (53%)	Hi-vis crosswalks (40%)
No disability	524	Yield failure (38%)	Turning conflicts (34%)	Enforcement (52%)	Ped signals (40%)

Survey Insight: Respondents with disabilities prioritize pedestrian signal upgrades at nearly 1.5× the rate of those without.

Among respondents with disabilities, 40% cited high-visibility crosswalks as a top improvement request vs 40% among those without. Enforcement was cited by 53% of disability respondents vs 52% of non-disability respondents. Missing sidewalks ranked as the 2nd concern (19%) for disability respondents — significantly higher proportionally than for the general population. Accessible pedestrian signals (APS), curb ramp upgrades, and sidewalk gap closures in high-demand areas directly serve this group and are also consistent with ADA compliance requirements. These investments address both ADA compliance requirements and the specific needs identified by this respondent group.

XR-7 Time-of-Day Alignment Across Modes (Q10)

Q10 asked respondents to identify the worst time of day for traffic safety issues separately for drivers, pedestrians, and cyclists. Comparing the three modes reveals when all three user groups perceive danger simultaneously — these are the highest-priority intervention windows.

Table XR-7.1 — Worst time of day by mode: aligned danger windows

Time Period	Driver Citations	Ped Citations	Cyclist Citations	All-Mode Alignment
Afternoon (3–6 PM)	63%	35%	30%	HIGHEST — all three modes peak simultaneously
Morning (6–9 AM)	58%	26%	19%	HIGH — drivers and peds aligned; cyclists moderate
School hours	37%	23%	19%	MODERATE — driver/ped concern, cyclist lower
Evening (7–10 PM)	23%	26%	12%	MODERATE — ped concern elevated relative to cyclists

Weekends	26%	11%	18%	LOW — consistent across modes; not a peak window
Late night (10 PM+)	14%	9%	8%	LOW — lower volume but high KSI rate in data

Survey Insight: Afternoon and morning commute windows are the periods when all three mode groups simultaneously report elevated safety concerns.

The afternoon window (3–6 PM) is the period when the highest proportion of respondents across all three modes cited elevated safety concerns: 63% of drivers, 33% of pedestrians, and 26% of cyclists. This is consistent with the CSAP collision data, which identifies the PM peak as the period with the highest recorded KSI count. Enforcement, signal optimization, and school-zone management concentrated in the 7–9 AM and 3–6 PM windows address the concerns of the maximum number of users simultaneously. Late-night hours received lower citation rates in this survey; the CSAP collision data show a higher proportional KSI rate during these hours.

XR-8 Travel Behavior Change (Q15) × Focus Area (Q14) × Safety Concerns (Q6)

Q15 asked whether safety concerns changed how or when respondents travel. Q14 asked where the City should focus improvements. Q6 captured top safety concerns. This three-way cross-reference reveals what specific concerns are driving behavior change, and whether respondents who have changed behavior select different geographic priorities than those who have not.

Table XR-8.1 — Focus area priorities by travel behavior change type

Behavior Change (Q15)	n	#1 Focus Area (Q14)	#2 Focus Area	Top Safety Concern (Q6)
Avoid specific streets	166	Crash intersections (54%)	Commercial corridors (43%)	Speeding (72%)
Avoid certain times	139	Crash intersections (48%)	Residential (39%)	Speeding (67%)
More cautious / alert	157	Crash intersections (58%)	Commercial corridors (49%)	Speeding (69%)
Changed travel mode	17	Schools/parks (47%)	Commercial (47%)	Speeding (59%)
No impact on travel	22	Commercial (67%)	Crash intersections (50%)	Speeding cited by 50% even among those without behavior change

Survey Insight: Respondents who avoid specific streets most frequently selected crash intersections as the priority focus area and cited speeding as their top concern (72%).

"Avoid streets" respondents cite speeding at 73% — 10 points higher than the overall average of 67%. Their focus on crash intersections (54%) suggests they are routing around specific known locations, not avoiding entire corridors. This precision matters for intervention targeting: these respondents are telling the City exactly where the problems are. Their top focus-area choice (crash intersections) combined with their top improvement request (enforcement) reflects a consistent pattern across this respondent group.

XR-9 Focus Area Priority (Q14) → Improvement Requests (Q13): Geographic Specificity

Q14 asked where the City should focus safety investment geographically. Q13 asked which improvement types would help most. This cross-reference tests whether different geographic priorities produce different improvement requests — or whether the same improvements are wanted everywhere.

Table XR-9.1 — Top improvement requests by geographic focus area preference

Priority Focus Area (Q14)	n	Top Improvement (Q13)	2nd Improvement	3rd Improvement	Unique Finding
Crash intersections	280	Enforcement (57%)	Ped signals (46%)	Hi-vis cross (33%)	—
Commercial corridors	190	Enforcement (62%)	Hi-vis cross (40%)	Ped signals (43%)	—
Residential streets	179	Enforcement (54%)	Hi-vis cross (41%)	Speed signs (37%)	★
Schools & parks	164	Enforcement (54%)	Ped signals (42%)	Hi-vis cross (41%)	—
Poor lighting areas	52	Lighting (73%)	Enforcement (53%)	Hi-vis cross (46%)	★★

★ **Residential:** "Other" improvements at 36% reflect unique residential issues — speed humps, cut-through traffic barriers, and stop sign enforcement — not captured in the standard options.

★★ **Poor lighting:** This is the only geographic category where a non-enforcement improvement (lighting, 74%) outranks enforcement as the primary request. Lighting improvements in this group are not just a preference — they are the primary safety need.

Survey Insight: Enforcement is the #1 request in every geographic focus area except poor lighting zones — where it ranks second to lighting.

This consistency strengthens the enforcement signal across the survey: regardless of where residents want the City to focus, they want enforcement first. The single exception — poor lighting areas — is also the most actionable geographic signal in the entire survey. The 74% who identified poor lighting as a concern and lighting improvements as their top request represent a self-selected, geographically specific group. Street lighting upgrades in the identified corridors (Monument Blvd, Meadow Lane, Oak Grove Road, Sunshine Drive) directly address both the safety concern and the improvement preference of this cohort.

XR-10 Synthesis: The Highest-Signal Cross-Reference Findings

The following table distills the nine cross-reference analyses into a prioritized action matrix. Each row links a cross-reference finding to its survey evidence base, recommended action type, and relative priority.

Table XR-10.1 — Cross-reference synthesis and priority action matrix

#	Finding	Evidence (Cross-ref)	Recommended Action	Mode Impact	Priority
1	Distracted driving concern spikes among those directly involved in collisions (+15 pts vs no-experience group)	XR-1: Q7 × Q6	Phone enforcement + automated detection at high-crash intersections	All modes	High
2	School-trip respondents cite e-bikes + signal violations, not speed — unique school-zone profile	XR-2: Q5 × Q6/Q12	Dedicated e-bike enforcement at school approaches; protected pedestrian phases at school crossings	Ped/Bike	High
3	Older adults time-shift travel; working-age adults route-shift — both are safety-driven adaptations	XR-3: Q17 × Q15	Peak-hour enforcement + arterial safety improvements benefit both groups simultaneously	All modes	High
4	Enforcement leads improvement requests for ALL concern types — but physical measures rank 2nd everywhere	XR-4: Q6 × Q13	Dual-track: enforcement at violation hot spots + engineering countermeasures at crash intersections	All modes	High
5	Very concerned school-zone respondents flag speeding; somewhat concerned flag traffic backup — different problems	XR-5: Q11 × Q12	Two-stream school response: speed calming for high-concern corridors + drop-off redesign for congestion	Driver/Ped	High
6	Disability respondents request pedestrian signals at 1.5× the rate of non-disability respondents	XR-6: Q4 × Q9/Q13	APS signals + sidewalk gap closures on primary pedestrian routes = high equity + safety return	Pedestrian	High
7	Afternoon window is the only time all three mode groups simultaneously identify elevated danger	XR-7: Q10 cross-mode	Concentrate enforcement + signal optimization in 7–9 AM and 3–6 PM windows	All modes	High
8	Route-avoiders cite speeding at 73% and target crash intersections — most precise geographic signal in survey	XR-8: Q15 × Q14 × Q6	Deploy enforcement at specific intersections identified in Q8 open text + address by residents	All modes	Medium

9	Lighting areas: only category where lighting (74%) outranks enforcement as top improvement request	XR-9: Q14 × Q13	Prioritize LED street lighting upgrades on Monument Blvd, Meadow Lane, Oak Grove, Sunshine Drive	Ped/Bike	**Medium**

Cross-Reference Analysis Notes

All cross-reference analyses use the 651 survey responses collected March 11–April 20, 2026. Sub-group sample sizes are noted for each table. Percentage calculations in cross-reference tables use the sub-group n as denominator (e.g., "67% of speeding-concerned respondents chose enforcement" means 67% of the 142 respondents who cited speeding). Multi-select questions allow percentages to sum beyond 100%. Cross-references with sub-groups smaller than n=10 are noted but treated as directional only. Analysis performed by the Transportation Division, Public Works Department, City of Concord.

APPENDIX G:
FHWA PROVEN SAFETY COUNTERMEASURES

MAKING OUR ROADS SAFER

One Countermeasure at a Time

28 Proven Safety Countermeasures that offer significant and measurable impacts to improving safety

U.S. Department of Transportation
Federal Highway Administration

ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE
https://safety.fhwa.dot.gov/

Technical Report Documentation Page

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15. SUPPLEMENTARY NOTES

The Contract Manager for this report was Phillip Bobitz (FHWA Office of Safety). Matt Albee (VHB) was thePrincipal Investigator.

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16. ABSTRACT

The Proven Safety Countermeasure Initiative (PSCi) is a collection of 28 countermeasures and strategieseffective in reducing roadway fatalities and serious injuries on our Nation's highways. Transportationagencies are strongly encouraged to consider widespread implementation of PSCs to accelerate theachievement of local, State, and National safety goals. This booklet provides 1-page handouts for all 28PSCs, broken into the focus areas of speed management, roadway departure, intersections,pedestrians/bicyclists, and crosscutting for countermeasures that apply across categories.

17. KEY WORDS	18. DISTRIBUTION STATEMENT
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OFFICE OF SAFETY

Proven Safety Countermeasures

SPEED MANAGEMENT

Speed Safety Cameras

Variable Speed Limits

Appropriate Speed Limits for All Road Users

ROADWAY DEPARTURE

Wider Edge Lines

Enhanced Delineation for Horizontal Curves

Longitudinal Rumble Strips and Stripes on Two-Lane Roads

SafetyEdge℠

Roadside Design Improvements at Curves

Median Barriers

INTERSECTIONS

Backplates with Retroreflective Borders

Corridor Access Management

Dedicated Left- and Right-Turn Lanes at Intersections

Reduced Left-Turn Conflict Intersections

Roundabouts

Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections

Yellow Change Intervals

PEDESTRIANS/BICYCLES

Crosswalk Visibility Enhancements

Bicycle Lanes

Rectangular Rapid Flashing Beacons (RRFB)

Leading Pedestrian Interval

Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

Pedestrian Hybrid Beacons

Road Diets (Roadway Reconfiguration)

Walkways

Crosscutting

Pavement Friction Management

Lighting

Local Road Safety Plans

Road Safety Audit

Introduction

Widespread use of the 28 Proven Safety Countermeasures (PSCs) identified in this booklet can offer significant, measurable impacts as part of any agency's approach to improving safety. These strategies are designed for all road users and all kinds of roads—from rural to urban, from high-volume freeways to less traveled two-lane State and county roads, from signalized crossings to horizontal curves, and everything in between. Each countermeasure addresses at least one safety focus area – speed management, intersections, roadway departures, or pedestrians/bicyclists – while others are crosscutting strategies that address multiple safety focus areas.

Between 2016 and 2019, 85 percent[1] of all public highway fatalities occurred on Federal-aid highways, which represent 25 percent[2] of the entire public highway network. FHWA's partner agencies have invested in highway safety through the Highway Safety Improvement Program (HSIP), which provides targeted safety funding that is eligible for use on all public roads. However, this dedicated funding source represents only about 6 percent of the total Federal-aid program.[3] Every transportation project, whether or not the specific project purpose is safety related, is a new opportunity to save lives on our roadways. The FHWA's Proven Safety Countermeasures are eligible under most Federal-aid highway funding programs, and can support state, local, and tribal agency efforts to effectively accomplish goals to reduce fatalities and serious injuries. These countermeasures should serve as the basis for what agencies consider and implement when designing any highway project to improve safety.

To assist practitioners with determining the most appropriate PSC for their location of interest, the PSC webpage includes a filter tool that allows users to obtain a tailored listing of potential PSCs. Users answer questions regarding area types, functional classification, traffic volumes, issue identified, targeted crash types, and other information to receive a list of PSCs meeting thecriteria. This search function is intended to better serve practitioners, including those with limited safety background, when identifying and considering treatments and strategies that can improve safety as part of their program or project.

Transportation agencies are strongly encouraged to consider widespread implementation of PSCs to accelerate the achievement of local, State, and National safety goals. Reaching our goal of zero deaths and serious injuries requires all of us to take ownership in safety. Together, we can consider the safety needs at every stage of the project development process, the safety impact of every investment decision, and the appropriate safety countermeasures for every Federal-aid project.

1 NHTSA Fatality Analysis Reporting System (FARS) 2016-2018 Final and 2019 Annual Report File (ARF)
2 FHWA Highway Statistics 2019 (https://www.fhwa.dot.gov/policyinformation/statistics/2019/hm16.cfm)
3 Federal-aid apportioned programs under the Fixing America's Surface Transportation (FAST) Act (https://www.fhwa.dot.gov/fastact/funding.cfm)

U.S. Department of Transportation
Federal Highway Administration

Speed Safety Cameras

Safe Speeds is a core principle of the Safe System Approach since humans are less likely to survive high-speed crashes. Enforcing safe speeds has been challenging; however, with more information and tools communities can make progress in reducing speeds. Agencies can use speed safety cameras (SSCs) as an effective and reliable technology to supplement more traditional methods of enforcement, engineering measures, and education to alter the social norms of speeding. SSCs use speed measurement devices to detect speeding and capture photographic or video evidence of vehicles that are violating a set speed threshold.

Safety Benefits:

Fixed units can reduce crashes on urban principal arterials up to:

54% for all crashes.[4]

48% for injury crashes.[4]

P2P units can reduce crashes on urban expressways, freeways, and principal arterials up to:

37% for fatal and injury crashes.[2]

Mobile units can reduce crashes on urban principal arterials up to:

20% for fatal and injury crashes.[5]

In New York City, fixed units reduced speeding in school zones up to 63% during school hours.[6]

For more information on this and other FHWA Proven Safety Countermeasures, please reference the: Speed Safety Camera Program Planning and Operations Guide.

FHWA-SA-21-070

Applications

Agencies should conduct a network analysis of speeding-related crashes to identify locations to implement SSCs. The analysis can include scope (e.g., widespread, localized), location types (e.g., urban/suburban/rural, work zones, residential, school zones), roadway types (e.g., expressways, arterials, local streets), times of day, and road users most affected by speed-related crashes (e.g., pedestrians, bicyclists).

SSCs can be deployed as:

- **Fixed units**—a single, stationary camera targeting one location.
- **Point-to-Point (P2P) units**—multiple cameras to capture average speed over a certain distance.
- **Mobile units**—a portable camera, generally in a vehicle or trailer.

The table below describes suitable circumstances for SSC deployment.[1]

Considerations

- SSCs can produce a crash reduction upstream and downstream, thus generating a spillover effect.[2]
- Public trust is essential for any type of enforcement. With proper controls in place, SSCs can offer fair and equitable enforcement of speeding, regardless of driver age, race, gender, or socio-economic status. SSCs should be planned with community input and equity impacts in mind.
- Using both overt (i.e., highly visible) and covert (i.e., hidden) enforcement may encourage drivers to comply with limits everywhere, not only at sites they are aware are enforced.
- Agencies should conduct evaluations regularly to determine if SSCs are accomplishing safety goals and whether changes in strategy, scheduling, communications, or public engagement are necessary.
- Agencies should conduct a legal and policy review to determine if SSCs are authorized within a jurisdiction and how the authorization and other traffic laws will affect a SSC program.
- Agencies should develop an SSC program plan with consideration of the USDOT SSC guidelines for planning, public involvement, stakeholder coordination, implementation, maintenance, evaluation, etc.[3]

Considerations for Selection	Fixed	P2P	Mobile
Problems are long-term and site-specific.	X	X	—
Problems are network-wide, and shift based on enforcement efforts.	—	—	X
Speeds at enforcement site vary largely from downstream sites.	—	X	X
Overt enforcement is legally required.	X	X	X
Sight distance for the enforcement unit is limited.	X	X	—
Enforcement sites are multilane facilities.	X	X	—

1 Speed Safety Camera Program Planning and Operations Guide. FHWA, (2023).
2 (CMF ID: 7718) Montella et al. "Effects on speed and safety of point-to-point speed enforcement systems". Accident Analysis and Prevention, Vol. 75, (2015). Note that this is an international study.
3 Speed Enforcement Camera Systems Operational Guidelines. NHTSA, (2008).
4 (CMF ID: 2915,2921) Shin et al. "Evaluation of the Scottsdale Loop 101 automated speed enforcement demonstration program." Accident Analysis and Prevention, Vol. 41, (2009).
5 (CMF ID: 7582) Li et al. "A Before-and-After Empirical Bayes Evaluation of Automated Mobile Speed Enforcement on Urban Arterial Roads." Presented at the 94th Annual Meeting of the Transportation Research Board, Paper No. 15-1563, Washington, D.C., (2015). Note that this is an international study.
6 Automated Speed Enforcement Program Report 2014-2017. New York City DOT, (2018).

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Variable Speed Limits

Selecting appropriate speed limits on roadways is important in maintaining a safe and efficient transportation network. Speed limits are established with an engineering study based on inputs like traffic volumes, operating speeds, roadway characteristics, and crash history. However, conditions on the roadway are susceptible to change in a short amount of time (e.g., congestion, crashes, weather). Drivers typically determine their operating speeds under normal weather conditions on a straight roadway section with good pavement quality and adequate sight distances. If ideal conditions do not exist and the roadway does not meet the driver's expectations, there is a greater chance that a driver error could result in a crash. Providing variable speeds limits (VSLs) capable of adapting to changing circumstances could reduce crash frequency and severity.

Speed management strategies, including VSLs, are integral to the Safe Speeds element of the Safe System Approach. Because humans are unlikely to survive high-speed crashes, VSLs reduce speeds so that human injury tolerances are accommodated in three ways: improving visibility, providing additional time for drivers to stop, and reducing impact forces.

Safety Benefits:

VSLs can reduce crashes on freeways up to:

34%
for total crashes.[1]

65%
for rear-end crashes.[1]

51%
for fatal and injury crashes.[1]

Benefit/Cost Ratios range between[1]

9:1 - 40:1

Applications

VSLs use prevailing information on the roadway, like traffic speed, volumes, weather, and road surface conditions, to determine appropriate speeds and display them to drivers. This strategy improves safety performance and traffic flow by reducing speed variance (i.e., improving speed harmonization). VSLs may also improve driver expectation by providing information in advance of slowdowns and potential lane closures, which could reduce the probability for secondary crashes. VSLs can mitigate adverse weather conditions or to slow faster-moving traffic as it approaches a queue or bottleneck.

Agencies can implement VSLs for the following applications:

CONGESTION

INCIDENTS

WORK ZONES

INCLEMENT WEATHER

Considerations

- Particularly effective on urban and rural freeways and high-speed arterials with posted speed limits greater than 40 mph.
- Often implemented as part of Active Traffic Management (ATM) plans or incorporated into existing Road Weather Information Systems.
- When used with ATM, VSLs can mitigate rear-end, sideswipe, and other crashes on high-speed roadways.
- May be implemented as a regulatory and/or an advisory system.
- Can be applied to an entire roadway segment or individual lanes.

Source: WSDOT

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/speed-management/reference-materials.

1 (CMF ID: 11002,11005,11003) Avelar et al. Developing Crash Modification Factors for Variable Speed Limit. FHWA, (2020).

FHWA-SA-21-054

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Appropriate Speed Limits for All Road Users

There is broad consensus among global roadway safety experts that speed control is one of the most important methods for reducing fatalities and serious injuries. Speed is an especially important factor on non-limited access roadways where vehicles and vulnerable road users mix.

A driver may not see or be aware of the conditions within a corridor, and may drive at a speed that feels reasonable for themselves but may not be for all users of the system, especially vulnerable road users, including children and seniors. A driver traveling at 30 miles per hour who hits a pedestrian has a 45 percent chance of killing or seriously injuring them.[1] At 20 miles per hour, that percentage drops to 5 percent.[1] A number of cities across the United States, including New York, Washington, Seattle and Minneapolis, have reduced their local speed limits in recent years in an effort to reduce fatalities and serious injuries, with most having to secure State legislative authorization to do so.

States and local jurisdictions should set appropriate speed limits to reduce the significant risks drivers impose on others—especially vulnerable road users—and on themselves. Addressing speed is fundamental to the Safe System Approach to making streets safer, and a growing body of research shows that speed limit changes alone can lead to measurable declines in speeds and crashes.[2]

Safety Benefits:

Traffic fatalities in the City of Seattle decreased 26 percent after the city implemented comprehensive, city-wide speed management strategies and countermeasures inspired by Vision Zero. This included setting speed limits on all non-arterial streets at 20 mph and 200 miles of arterial streets at 25 mph.[5]

One study found that on rural roads, when considering other relevant factors in the engineering study along with the speed distribution, setting a speed limit no more than 5 mph below the 85th-percentile speed may result in fewer total and fatal plus injury crashes, and lead to drivers complying closely with the posted speed limit.[6]

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/speed-management/reference-materials.

Applications

Posted speed limits are often the same as the legislative statutory speed limit. Agencies with designated authorities to set speed limits, which include States, and sometimes local jurisdictions, can establish non-statutory speed limits or designate reduced speed zones, and a growing number are doing so. While non-statutory speed limits must be based on an engineering study, conducted in accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD) involving multiple factors and engineering judgment, FHWA is also encouraging agencies to use the following:[3]

- Expert Systems tools.
  - USLIMITS2.
  - NCHRP 966: Posted Speed Limit Setting Procedure and Tool.
- Safe System approach.

Based on international experience and implementation in the United States, the use of 20 mph speed zones or speed limits in urban core areas where vulnerable users share the road environment with motorists may result in further safety benefits.[4]

Considerations

When setting a speed limit, agencies should consider a range of factors such as pedestrian and bicyclist activity, crash history, land use context, intersection spacing, driveway density, roadway geometry, roadside conditions, roadway functional classification, traffic volume, and observed speeds.

To achieve desired speeds, agencies often implement other speed management strategies concurrently with setting speed limits, such as self-enforcing roadways, traffic calming, and speed safety cameras. Additional information is in the following FHWA resources:

- FHWA Speed Management website.
- Self-Enforcing Roadways: A Guidance Report.
- Noteworthy Speed Management Practices.
- Jurisdiction Speed Management Action Plan Development Package.
- Traffic Calming ePrimer.

1 Reducing the speed limit to 20 mph in urban areas: Child deaths and injuries would be decreased.
2 Lowering the speed limit from 30 to 25 mph in Boston: effects on vehicle speeds.
3 FHWA's Methods and Practices for Setting Speed Limits: An Informational Report, (2012).
4 Recommendations of the Academic Expert Group for the 3rd Global Ministerial Conference on Road Safety.
5 https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa20047/sec8.cfm#foot813
6 Safety and Operational Impacts of Setting Speed Limits below Engineering Recommendations.

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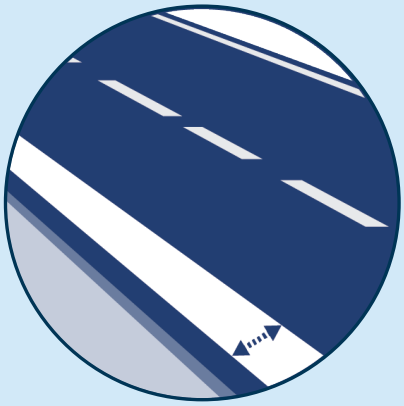

Wider Edge Lines

Roadway departures account for over half of all traffic fatalities in the United States. If drivers cannot clearly identify the edge of the travel lanes and see the road alignment ahead, the risk of roadway departure may be greater. Wider edge lines enhance the visibility of travel lane boundaries compared to traditional edge lines. Edge lines are considered "wider" when the marking width is increased from the minimum normal line width of 4 inches to the maximum normal line width of 6 inches.[1]

Safety Benefits:

Wider edge lines can reduce crashes up to:

37%
for non-intersection, fatal and injury crashes on rural, two-lane roads.[2]

22%
for fatal and injury crashes on rural freeways.[3]

Benefit Cost Ratio
25:1
for fatal and serious injury crashes on two-lane rural roads.[4]

Applications

Wider edge lines increase drivers' perception of the edge of the travel lane and can provide a safety benefit to all facility types (e.g., freeways, multilane divided and undivided highways, two-lane highways) in both urban and rural areas.[2] Wider edge lines are most effective in reducing crashes on rural two-lane highways, especially for single-vehicle crashes.[3] Agencies should also consider implementing a systemic approach to wider edge line installation based roadway departure crash risk factors. Potential risk factors for two-lane rural roads include:

- Pavement and shoulder widths.
- Presence of curves.
- Traffic volumes.
- History of nighttime crashes.

Considerations

- Wider edge lines are relatively low cost.
- Wider edge lines can be implemented using existing equipment during maintenance procedures like re-striping and resurfacing, with the only cost increase being the additional material.
- Paint may have a lower initial cost, but more durable materials (e.g., thermoplastic) may result in a lower life cycle cost based on their longer service life.
- As the number of automated vehicles increases on roadways, wider edge lines may provide better guidance for these vehicles' sensors.

Source: Texas Transportation Institute

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/other/visibility/pavement-markings.

1 Manual on Uniform Traffic Control Devices, Section 3A.06. FHWA, (2009).
2 (CMF ID: 4737) Park et al. "Safety effects of wider edge lines on rural, two-lane highways." Accident Analysis and Prevention Vol. 48, pp.317-325, (2012).
3 Potts et al. Benefit/Cost Evaluation of MoDOT's Total Striping and Delineation Program: Phase II. Missouri Department of Transportation, (2011).
4 Abdel-Rahim et al. Safety Impacts of Using Wider Pavement Markings on Two-Lane Rural Highways in Idaho. Idaho Transportation Department, (2018).

FHWA-SA-21-055

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Enhanced Delineation for Horizontal Curves

Enhanced delineation at horizontal curves includes a variety of potential strategies that can be implemented in advance of or within curves, in combination, or individually.

Potential Strategies	In Advance of Curve	Within Curve
Pavement markings (standard width or wider)	✓	✓
In-lane curve warning pavement markings	✓	
Retroreflective strips on sign posts	✓	✓
Delineators		✓
Chevron signs		✓
Enhanced Conspicuity (larger, fluorescent, and/or retroreflective signs)	✓	✓
Dynamic curve warning signs (including speed radar feedback signs)	✓	
Sequential dynamic chevrons		✓

Enhanced delineation treatments can alert drivers to upcoming curves, the direction and sharpness of the curve, and appropriate operating speed.

Agencies can take the following steps to implement enhanced delineation strategies:

1. Review signing practices and policies to ensure they comply with the Manual on Uniform Traffic Control Devices (MUTCD) principles of traffic control devices. Consistent practice for similar curves sets the appropriate driver expectancy.
2. Use the systemic approach to identify and treat problem curves. For example, Minnesota uses risk factors that include curve radii between 500 and 1,200 ft, traffic volumes between 500 and 1,000 vehicles per day, intersection in the curve, and presence of a visual trap.[1]
3. Match the appropriate strategy to the identified problem(s), considering the full range of enhanced delineation treatments. Once the MUTCD requirements and recommendations have been met, an incremental approach is often beneficial to avoid excessive cost.

Chevron signs with retroreflective strips on sign posts installed along a curve. Source: FHWA

Safety Benefits:

Chevron Signs

25% reduction in nighttime crashes.[1]

16% reduction in non-intersection fatal and injury crashes.[2]

Oversized Chevron Signs

15% reduction in fatal and injury crashes.[3]

Sequential Dynamic Chevrons

60% reduction in fatal and injury crashes.[4]

In-Lane Curve Warning Pavement Markings

35 - 38% reduction in all crashes.[5]

New Fluorescent Curve Signs or Upgrade Existing Curve Signs to Fluorescent Sheeting

18% reduction in non-intersection, head-on, run-off-road, and sideswipe in rural areas.[1]

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/rwd/keep-vehicles-road/horizontal-curve-safety.

FHWA-SA-21-035

1 (CMF ID: 2439,2431,2432) Albin et al. Low-Cost Treatments for Horizontal Curve Safety 2016. FHWA-SA-15-084, (2016).
2 (CMF ID: 2438) Srinivasan et al. Safety Evaluation of Improved Curve Delineation. FHWA-HRT-09-045, (2009).
3 (CMF ID: 8978) Lyon et al. Safety Evaluation of Two Curve Warning Treatments: In-Lane Curve Warning Pavement Markings and Oversized Chevron Signs. Presented at the 96th TRB Annual Meeting, Paper No. 17-00432, (2017).
4 (CMF ID: 10362) Hallmark, S. Evaluation of Sequential Dynamic Chevrons on Rural Two-lane Highways. FHWA, (2017).
5 (CMF ID: 10312,9167) Donnell et al. Reducing Roadway Departure Crashes at Horizontal Curve Sections on Two-lane Rural Highways. FHWA-SA-19-005, (2019).

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Longitudinal Rumble Strips and Stripes

Longitudinal rumble strips are milled or raised elements on the pavement intended to alert drivers through vibration and sound that their vehicle has left the travel lane. They can be installed on the shoulder, edge line, or at or near the center line of an undivided roadway.

Rumble stripes are edge line or center line rumble strips where the pavement marking is placed over the rumble strip. This can increase the visibility and durability of the pavement marking during wet, nighttime conditions, and can improve the durability of the marking on roads with snowplowing operations.

Safety Benefits:

Center Line Rumble Strips

44-64%

reduction in head-on fatal and injury crashes on two-lane rural roads.[4]

Shoulder Rumble Strips

13-51%

reduction in single vehicle, run-off-road fatal and injury crashes on two-lane rural roads.[4]

With roadway departure crashes accounting for more than half of the fatal roadway crashes annually in the United States, rumble strips and stripes are designed to address these crashes by alerting distracted, drowsy, or otherwise inattentive drivers who drift from their lane. They are most effective when deployed systemically.

Transportation agencies should consider milled center line rumble strips (including in passing zone areas) and milled edge line or shoulder rumble strips with bicycle gaps for systemic safety projects, location-specific corridor safety improvements, as well as reconstruction or resurfacing projects.

Considerations

- Rumble strips are relatively low-cost, and economic analyses have indicated benefit/cost ratios that exceed 100.[1]
- Where rumble strips cannot be placed due to noise concerns, agencies may consider a design using an oscillating sine wave pattern (also known as "mumble strips") that reduces noise outside of the vehicle. However, the safety benefits of this design need more study.[2]
- Maintenance concerns:
  - Where rumble strips are placed along a pavement joint, there are typically no issues with joint stability if the pavement structure and joint was already in good condition.
  - Studies have shown no evidence of issues related to snow, ice, or rain build-up in the rumble strip.[3]

Shoulder rumble strips and center line rumble stripes are installed on this roadway. Source: FHWA

Example of an edge line rumble stripe. Source: Missouri DOT

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/rwd/keep-vehicles-road/rumble-strips.

FHWA-SA-21-036

1 Himes, S., and McGee, H. Decision Support Guide for the Installation of Shoulder and Center Line Rumble Strips on Non-Freeways. Federal Highway Administration Report No. FHWA-SA-16-115. (August 2016).
2 Bedsole et al. *Did You Hear That?* Public Roads Magazine, Volume 80, No. 4. FHWA Publication No. FHWA-HRT-17-002, (2017).
3 NCHRP Synthesis 339: Centerline Rumble Strips – A Synthesis of Highway Practices, (2005
4 (CMF ID: 3358, 3356, 3425, 3648) NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips, (2009).

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OFFICE OF SAFETY
Proven Safety Countermeasures

SafetyEdge℠

The SafetyEdge℠ technology shapes the edge of the pavement at approximately 30 degrees from the pavement cross slope during the paving process. This safety practice eliminates the potential for vertical drop-off at the pavement edge, has minimal effect on project cost, and can improve pavement durability by reducing edge raveling of asphalt.

Safety Benefits:

11%
reduction in fatal and injury crashes.[2]

21%
reduction in run-off-road crashes.[2]

19%
reduction in head-on crashes.[2]

Benefit-Cost Ratio Range[3]

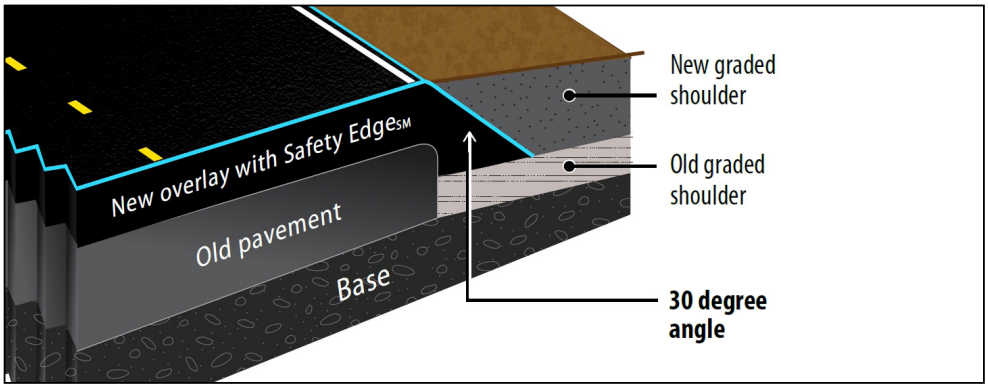
700:1 to 1,500:1

Rural road crashes involving edge drop-offs are 2-4 times more likely to include a fatality than other crashes on similar roads.[1] Vehicles may leave the roadway for various reasons ranging from distracted driver errors to low visibility, or to the presence of an animal on the road. Exposed vertical pavement edges can cause vehicles to become unstable and prevent their safe return to the roadway. The SafetyEdge℠ gives drivers the opportunity to return to their travel lane while maintaining control of their vehicle.

The SafetyEdge℠ technology only requires adding one of several commercially available devices to the screed or endgate when placing hot-mix asphalt. Forms for shaping the edge of concrete pavement are simpler and can be made on site by the contractor. Some agencies allow the SafetyEdge℠ to remain exposed while a segment is under construction, unlike conventional pavement edges. However, before construction ends, agencies should bring the adjacent roadside flush with the top of the pavement for both the SafetyEdge℠ and traditional pavement edge. Over time, regardless of the edge type, the edge may become exposed due to settling, erosion, and tire wear. When this occurs, the gentle slope provided by the SafetyEdge℠ is preferred versus the traditional vertical pavement edge.

Transportation agencies should develop standards for implementing the SafetyEdge℠ systemwide on all new asphalt paving and resurfacing projects where curbs and/or guardrail are not present, while also encouraging standard application for concrete pavements.

Example of the SafetyEdge℠ after backfill material settles or erodes. Source: FHWA



Cross-section view of an overlay with the SafetyEdge℠. Source: FHWA-SA-17-044

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/rwd/provide-safe-recovery/safetyedge.

FHWA-SA-21-038

1 Hallmark et al. Safety Impacts of Pavement Edge Drop-offs, (Washington, DC: AAA Foundation for Traffic Safety: 2006), p 93.
2 (CMF ID: 9205, 9211, 9217) Donnell et al. Development of Crash Modification Factors for the Application of the SafetyEdge℠ on Two-Lane Rural Roads. FHWA-HRT-17-081, (2017).
3 Safety Effects of the SafetyEdge℠, FHWA-SA-17-044, (2017).

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Safety Benefits:

Flatten sideslope from 1V:3H to 1V:4H:

8%

reduction for single-vehicle crashes.[2]

Flatten sideslope from 1V:4H to 1V:6H:

12%

reduction for single-vehicle crashes.[2]

Increase the distance to roadside features from 3.3 ft to 16.7 ft:

22%

reduction for all crashes.[3]

Increase the distance to roadside features from 16.7 ft to 30 ft:

44%

reduction for all crashes.[3]

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/rwd/provide-safe-recovery/clear-zones/clear-zones.

FHWA-SA-21-029

Roadside Design Improvements at Curves

Horizontal curves account for 27 percent of all fatal crashes and 80 percent of all fatal crashes at curves are roadway departure crashes.[1] Roadside design improvements at curves is a strategy encompassing several treatments that target the high-risk roadside environment along the outside of horizontal curves. These treatments can reduce roadway departure fatalities and serious injuries by giving vehicles the opportunity to recover safely and by reducing crash severity.

Roadside design improvements can be implemented alone or in combination, and are particularly recommended at horizontal curves—where data indicates a higher risk for roadway departure fatalities and serious injuries.

Roadside Design Improvements to Provide for a Safe Recovery

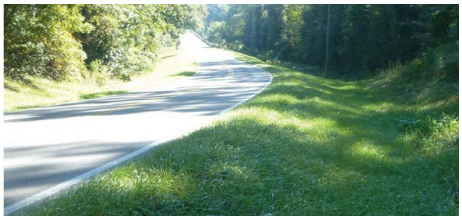
In cases where a vehicle leaves the roadway, having strategic roadside design elements, including an added or widened shoulder, flattened sideslopes, or a widened clear zone can provide drivers with an opportunity to regain control and re-enter the roadway in their lane or come to a safe stop before rolling over or encountering a fixed object.

- A **clear zone** is an unobstructed, traversable roadside area that allows a driver to stop safely or regain control of a vehicle that has left the roadway. Agencies should avoid adding new fixed objects such as trees and utility cabinets or poles in the clear zone. AASHTO's *Roadside Design Guide* details the clear zone width adjustment factors to be applied at horizontal curves.
- **Slope flattening** reduces the steepness of the sideslope to increase drivers' ability to keep the vehicle stable, regain control of the vehicle, and avoid obstacles. Slopes of 1V:4H or flatter are considered recoverable (i.e., drivers can retain control of a vehicle by slowing or stopping). Slopes between 1V:3H and 1V:4H are generally considered traversable, but non-recoverable (i.e., errant vehicle will continue to the bottom of the slope).
- **Adding or widening shoulders** gives drivers more recovery area to regain control in the event of a roadway departure.

Roadside Design Improvements to Reduce Crash Severity

Since not all roadside hazards can be removed, relocated, or redesigned at curves, installing roadside barriers to shield unmovable objects or steep embankments may be an appropriate treatment. Three common types of roadside barriers are:

- **Cable barrier** is a flexible barrier made from steel cables mounted on weak steel posts. Flexible barriers are more forgiving and have the most deflection.
- **Metal-beam guardrail** is a semi-rigid barrier where a W-beam or box-beam is mounted on steel or timber posts. These deflect less than cable barriers, so they can be located closer to objects where space is limited.
- **Concrete barrier** is a rigid barrier that has little to no deflection.



Clear zone provided on the outside of the curve. Source: FHWA.

1 Fatality Analysis Reporting System.
2 (CMF ID: 4627,4632) NCHRP Report 617: Accident Modification Factors for Traffic Engineering and ITS Improvements, (2008).
3 (CMF ID: 35,36) Elvik, R., and Vaa, T. Handbook of Road Safety Measures, (2004).

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8%

of all fatalities on divided highways are due to head-on crashes.[1]

Safety Benefits:

Median Barriers Installed on Rural Four-Lane Freeways

97%

reduction in cross-median crashes.[2]

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/rwd/reduce-crash-severity.

FHWA-SA-21-037

Median Barriers

Median barriers are longitudinal barriers that separate opposing traffic on a divided highway and are designed to redirect vehicles striking either side of the barrier. Median barriers significantly reduce the number of cross-median crashes, which are attributed to the relatively high speeds that are typical on divided highways. AASHTO's ***Roadside Design Guide*** (RDG) recommends guidelines for the use of median barriers on high-speed, fully controlled-access roadways for locations where the median is 30 ft in width or less and the average daily traffic (ADT) is greater than 20,000 vehicles per day (vpd). For locations with median widths greater than 50 ft and where the ADT is less than 20,000 vpd, a median barrier is optional. For locations where the median is between 30 and 50 feet, the RDG suggests an analysis to determine the cost effectiveness of median barrier installation. Median barriers can be cable, metal-beam, or concrete.

- **Cable barriers** are flexible barriers, made from steel cables mounted on weak steel posts, resulting in less occupant impact force as it absorbs energy from the crash, capturing or redirecting the vehicle. Due to larger deflection, median width is an important consideration. These barriers are more adaptable to slopes typically found in medians. Cable barriers tend to require more frequent maintenance and repair than other barrier types.
- **Metal-beam guardrails** are considered semi-rigid barriers, where the W-beam or box-beam is mounted to steel or timber posts. When impacted, they are designed to deform and deflect, absorbing some of the crash energy and redirecting the vehicle. Metal-beam guardrails often do not require maintenance after minor impacts. They deflect less than cable barriers, so they can be located closer to objects where space is limited.
- **Concrete barriers** are usually rigid and result in little to no deflection. They redirect rather than absorb energy from the impact. Rigid concrete barriers seldom require repair or maintenance. Some agencies have used portable concrete barriers as median barriers. These barriers require repositioning after an impact but are typically less maintenance than a post mounted barrier.

To reduce cross-median crashes, transportation agencies should review their head-on crash history on divided highways to identify hot spots. Agencies should also consider implementing a systemic approach to median barrier placement based on cross-median crash risk factors. Potential risk factors include:

- Traffic volumes.
- Vehicle classifications.
- Median crossover history.
- Crash incidents.
- Vertical and horizontal alignment.
- Median terrain configurations.

Median cable barrier prevents a potential head-on crash.
Source: Washington State DOT

1 Fatality Analysis Reporting System.
2 (CMF ID: 7040) NCHRP Report 794: Median Cross-Section Design for Rural Divided Highways, (2011).

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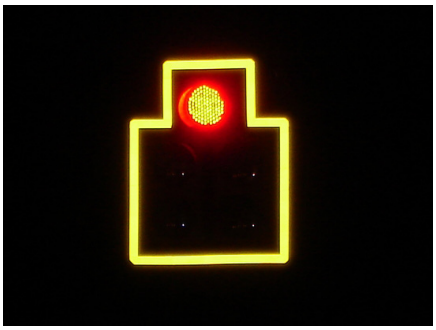
Backplates with Retroreflective Borders

Backplates added to a traffic signal head improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background. The improved visibility of a signal head with a backplate is made even more conspicuous by framing it with a 1- to 3-inch yellow retroreflective border. Signal heads that have backplates equipped with retroreflective borders are more visible and conspicuous in both daytime and nighttime conditions.

Safety Benefits:

15%
reduction in total crashes.[1]

This treatment is recognized as a human factors enhancement of traffic signal visibility, conspicuity, and orientation for both older and color vision deficient drivers. This countermeasure is also advantageous during periods of power outages when the signals would otherwise be dark, providing a visible cue for motorists to stop at the intersection ahead.



Retroreflective borders are highly visible during the night. Source: South Carolina DOT

Considerations

Transportation agencies should consider backplates with retroreflective borders as part of their efforts to systematically improve safety performance at signalized intersections. Adding a retroreflective border to an existing signal backplate is a very low-cost safety treatment. This can be done by either adding retroreflective tape to an existing backplate or purchasing a new backplate with a retroreflective border already incorporated. The most efficient means of implementing this proven safety countermeasure is to adopt it as a standard treatment for signalized intersections across a jurisdiction or State.

Implementation challenges include minimizing installation time, accessing existing signal heads, and structural limitations due to added wind load in instances where an entire backplate is added. Agencies should consider the design of the existing signal support structure to determine if the design is sufficient to support the added wind load.

Signal backplate framed with a retroreflective border. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://rosap.ntl.bts.gov/view/dot/42807.

1 (CMF ID: 1410) Sayed, T., Leur, P., and Pump, J., "Safety Impact of Increased Traffic Signal Backboards Conspicuity." 2005 TRB 84th Annual Meeting: Compendium of Papers CD-ROM, Vol. TRB#05-16, Washington, D.C., (2005).

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Safety Benefits:

Reducing driveway density

5-23%
reduction in total crashes along 2-lane rural roads.[3]

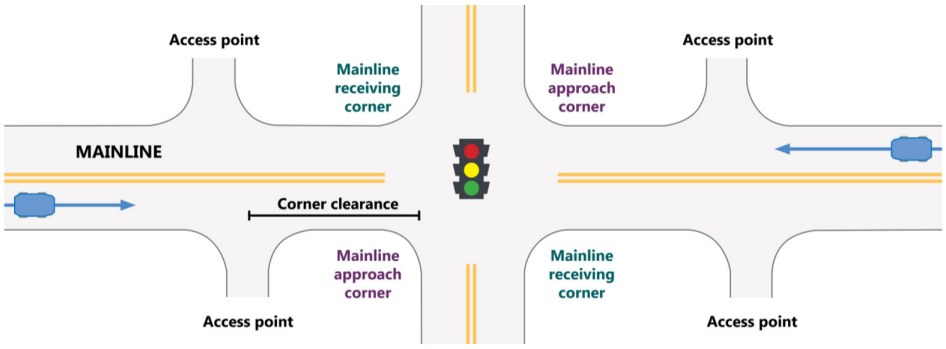
25-31%
reduction in fatal and injury crashes along urban/ suburban arterials.[4]

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/intersection-safety/cam.

FHWA-SA-21-040

Corridor Access Management

Access management refers to the design, application, and control of entry and exit points along a roadway. This includes intersections with other roads and driveways that serve adjacent properties. Thoughtful access management along a corridor can simultaneously enhance safety for all modes, facilitate walking and biking, and reduce trip delay and congestion.



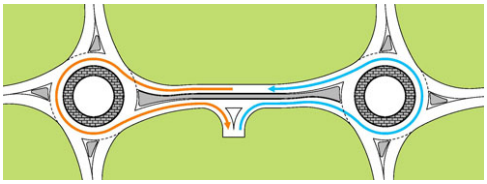
Schematic of an intersection and adjacent access points. Source: FHWA

Every intersection, from a signalized intersection to an unpaved driveway, has the potential for conflicts between vehicles, pedestrians, and bicyclists. The number and types of conflict points—locations where the travel paths of two users intersect—influence the safety performance of the intersection or driveway. FHWA developed corridor-level crash prediction models to estimate and analyze the safety effects of selected access management techniques for different area types, land uses, roadway variables, and traffic volumes.[1]

The following access management strategies can be used individually or in combination with one another:

- Reduce density through driveway closure, consolidation, or relocation.
- Manage spacing of intersection and access points.
- Limit allowable movements at driveways (such as right-in/ right-out only).
- Place driveways on an intersection approach corner rather than a receiving corner, which is expected to have fewer total crashes.[2]
- Implement raised medians that preclude across-roadway movements.
- Utilize designs such as roundabouts or reduced left-turn conflicts (such as restricted crossing U-turn, median U-turns, etc.).
- Provide turn lanes (i.e., left-only, right-only, or interior two-way left).
- Use lower speed one-way or two-way off-arterial circulation roads.

Successful corridor access management involves balancing overall safety and mobility for all users along with the needs of adjacent land uses.



Tandem roundabouts with a continuous raised median eliminates left-turn and across-roadway conflicts. Source: FHWA

1 Gross et al. Safety Evaluation of Access Management Policies and Techniques. FHWA-HRT-14-057, (2018).
2 Le et al. Safety Evaluation of Corner Clearance at Signalized Intersections. FHWA-HRT-17-084, (2018).
3 Harwood et al. Prediction of the Expected Safety Performance of Rural Two-Lane Highways. FHWA-RD-99-207, (2000).
4 (CMF ID: 179,178) Elvik, R. and Vaa, T., Handbook of Road Safety Measures. Oxford, United Kingdom, Elsevier, (2004).

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Dedicated Left- and Right-Turn Lanes at Intersections

Auxiliary turn lanes—either for left turns or right turns—provide physical separation between turning traffic that is slowing or stopped and adjacent through traffic at approaches to intersections. Turn lanes can be designed to provide for deceleration prior to a turn, as well as for storage of vehicles that are stopped and waiting for the opportunity to complete a turn.

Safety Benefits:

Left-Turn Lanes

28-48%

reduction in total crashes.[1]

Positive Offset Left-Turn Lanes

36%

reduction in fatal and injury crashes.[2]

Right-Turn Lanes

14-26%

reduction in total crashes.[1]

Left- and right-turn lanes at a two-way stop-controlled intersection. Source: City of Greeley, CO

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://www.fhwa.dot.gov/publications/research/safety/02103/02103techbrief.pdf.

FHWA-SA-21-041

While turn lanes provide measurable safety and operational benefits at many types of intersections, they are particularly helpful at two-way stop-controlled intersections. Crashes occurring at these intersections are often related to turning maneuvers. Since the major route traffic is free flowing and typically travels at higher speeds, crashes that do occur are often severe. The main crash types include collisions of vehicles turning left across opposing through traffic and rear-end collisions of vehicles turning left or right with other vehicles following closely behind. Turn lanes reduce the potential for these types of crashes.

Installing left-turn lanes and/or right-turn lanes should be considered for the major road approaches for improving safety at both three- and four-leg intersections with stop control on the minor road, where significant turning volumes exist, or where there is a history of turn-related crashes. Pedestrian and bicyclist safety and convenience should also be considered when adding turn lanes at an intersection. Specifically, offset left- and right-turn lanes will lengthen crossing distances for pedestrians.

Offset Turn Lanes

Providing offset of left- and right-turn lanes to increase visibility can provide added safety benefits, and is preferable in many situations, particularly at locations with higher speeds, or where free-flow or permissive movements are possible.

At turn lanes with zero or negative offset, turning vehicles can block sightlines. For left-turn lanes, this usually involves opposing left-turning vehicles occupying the turn lanes at the same time. For right-turn lanes, this typically involves right-turning vehicles from the major road and vehicles entering the intersection from the minor road. In both scenarios, adding positive offset to turn lanes enhances the sight distance to approaching vehicles that conflict with the turning movement. Offset turn lanes should be considered when there is a high frequency of these types of conflicts in order to reduce the likelihood of a severe crash.

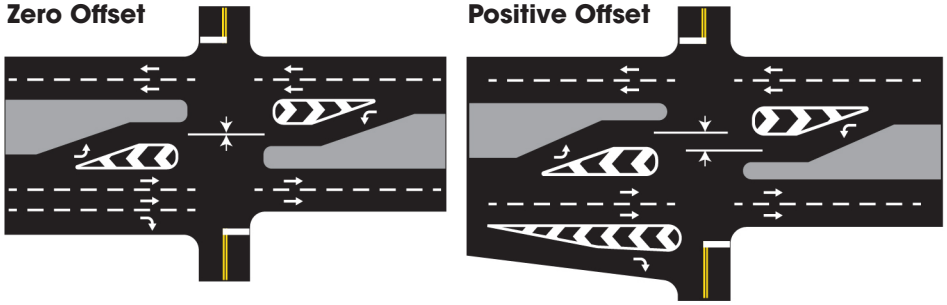

Illustration comparing zero offset to positive offset of left- and right-turn lanes. Source: FHWA

1 (CMF ID: 260, 268, 285, 289) Harwood et al. Safety Effectiveness of Intersection Left- and Right-Turn Lanes. FHWA-HRD-02-089, (2002).
2 (CMF ID: 6096) Persaud et al. Safety Evaluation of Offset Improvements for Left-Turn Lanes. FHWA-HRT-09-035, (2009).

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Safety Benefits:

RCUT

Two-Way Stop-Controlled to RCUT:

54%

reduction in fatal and injury crashes.[2]

Signalized Intersection to Signalized RCUT:

22%

reduction in fatal and injury crashes.[3]

Unsignalized Intersection to Unsignalized RCUT:

63%

reduction in fatal and injury crashes. [4]

MUT

30%

reduction in intersection-related injury crash rate.[5]

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/intersection-safety/intersection-types/reduced-left-turn-conflict-intersections.

FHWA-SA-21-030

Reduced Left-Turn Conflict Intersections

Reduced left-turn conflict intersections are geometric designs that alter how left-turn movements occur. These intersections simplify decision-making for drivers and minimize the potential for higher severity crash types, such as head-on and angle. Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the Restricted Crossing U-turn (RCUT) and the Median U-turn (MUT).

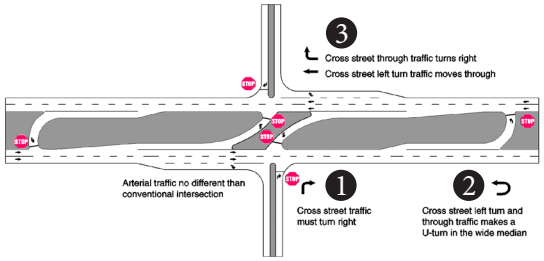
Restricted Crossing U-turn

The RCUT intersection, also known as a J-Turn, Superstreet, or Reduced Conflict Intersection, modifies the direct left-turn and through movements from cross-street approaches. Minor road traffic makes a right turn followed by a U-turn at a designated location—either signalized or unsignalized—to continue in the desired direction. The RCUT is suitable for and adaptable to a wide variety of circumstances, ranging from isolated rural, high-speed locations to urban and suburban high-volume, multimodal corridors. It is a competitive and less costly alternative to constructing an interchange. RCUTs work well when consistently used along a corridor, but also can be used effectively at individual intersections. Studies have shown that installing an RCUT can result in a 30-percent increase in throughput and a 40-percent reduction in network intersection travel time.[1]

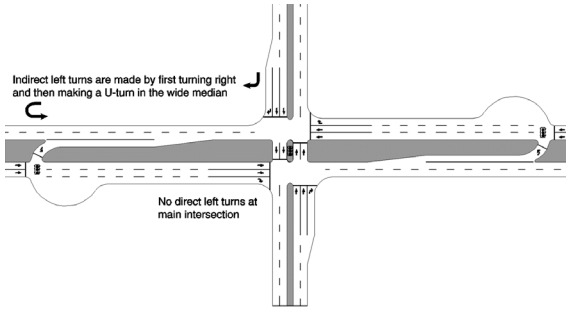
Median U-turn

The MUT intersection modifies direct left turns from the major approaches. Vehicles proceed through the main intersection, make a U-turn a short distance downstream, followed by a right turn at the main intersection. The U-turns can also be used for modifying the cross-street left turns, similar to the RCUT.

The MUT is an excellent choice for intersections with heavy through traffic and moderate left-turn volumes. Studies have shown a 20- to 50-percent improvement in intersection throughput for various lane configurations as a result of implementing the MUT design. When implemented at multiple intersections along a corridor, the efficient two-phase signal operation of the MUT can reduce delay, improve travel times, and create more crossing opportunities for pedestrians and bicyclists.



Example of a unsignalized RCUT intersection. Source: FHWA



Example of a MUT intersection. Source: FHWA

1 Hugher and Jagannathan. Restricted Crossing U-Turn Intersection. FHWA-HRT-09-059, (2009).
2 (CMF ID: 5556) Edara et al. Evaluation of J-turn Intersection Design Performance in Missouri. MoDOT, (2013).
3 (CMF ID: 9985) Hummer and Rao. Safety Evaluation of a Signalized Restricted Crossing U-Turn. FHWA-HRT-17-082, (2017).
4 (CMF ID: 4884) Hummer et al. Superstreet Benefits and Capacities. FHWA/NC/2009-06, NC State University, (2010).
5 (CMF ID: 10867) Synthesis of the Median U-Turn Treatment, Safety, and Operational Benefits, FHWA-HRT-07-033, (2007).

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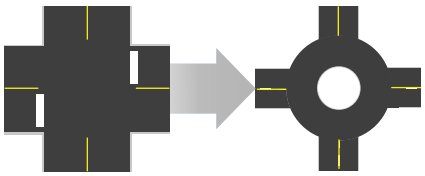
Roundabouts

The modern roundabout is an intersection with a circular configuration that safely and efficiently moves traffic. Roundabouts feature channelized, curved approaches that reduce vehicle speed, entry yield control that gives right-of-way to circulating traffic, and counterclockwise flow around a central island that minimizes conflict points. The net result of lower speeds and reduced conflicts at roundabouts is an environment where crashes that cause injury or fatality are substantially reduced.

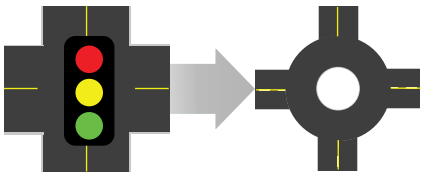
Safety Benefits:

Two-Way Stop-Controlled Intersection to a Roundabout



82%
reduction in fatal and injury crashes.[1]

Signalized Intersection to a Roundabout



78%
reduction in fatal and injury crashes.[1]

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/intersection-safety/intersection-types/roundabouts.

FHWA-SA-21-042

Roundabouts are not only a safer type of intersection; they are also efficient in terms of keeping people moving. Even while calming traffic, they can reduce delay and queuing when compared to other intersection alternatives. Furthermore, the lower vehicular speeds and reduced conflict environment can create a more suitable environment for walking and bicycling.

Roundabouts can be implemented in both urban and rural areas under a wide range of traffic conditions. They can replace signals, two-way stop controls, and all-way stop controls. Roundabouts are an effective option for managing speed and transitioning traffic from high-speed to low-speed environments, such as freeway interchange ramp terminals, and rural intersections along high-speed roads.

Illustration of a multilane roundabout. Source: FHWA

Example of a single-lane roundabout. Source: FHWA

1 (CMF ID: 211,226) AASHTO. The Highway Safety Manual, American Association of State Highway Transportation Professionals, Washington, D.C., (2010).

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Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections

This systemic approach to intersection safety involves deploying a package of multiple low-cost countermeasures, including enhanced signing and pavement markings, at a large number of stop-controlled intersections within a jurisdiction. These countermeasures increase driver awareness and recognition of the intersections and potential conflicts.

Safety Benefits:

10%
reduction of fatal and injury crashes at all locations/types/areas.

15%
reduction of nighttime crashes at all locations/types/areas.

27%
reduction of fatal and injury crashes at rural intersections.

19%
reduction of fatal and injury crashes at 2-lane by 2-lane intersections.

Average Benefit-Cost Ratio

12:1

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/fhwasa18047.pdf.

FHWA-SA-21-031

There are several benefits to systemically applying multiple low-cost countermeasures at stop-controlled intersections, including,

- Resources are maximized because the treatments are low cost.
- A high number of intersections can receive treatment.
- Improvements are highly cost-effective, with an average benefit-cost ratio of 12:1, even assuming a conservative 3-year service life.

Example of countermeasures on the through approach.
Source: South Carolina DOT

Example of countermeasures on the stop approach.
Source: South Carolina DOT

The low-cost countermeasures for stop-controlled intersections generally consist of the following treatments:

On the Through Approach

- Doubled-up (left and right), oversized advance intersection warning signs, with supplemental street name plaques (can also include flashing beacon).
- Retroreflective sheeting on sign posts.
- Enhanced pavement markings that delineate through lane edge lines.

On the Stop Approach

- Doubled-up (left and right), oversized advance "Stop Ahead" intersection warning signs (can also include flashing beacon).
- Doubled-up (left and right), oversized Stop signs.
- Retroreflective sheeting on sign posts.
- Properly placed stop bar.
- Removal of vegetation, parking, or obstructions that limit sight distance.
- Double arrow warning sign at stem of T-intersections.

Source: (CMF ID: 8867, 8870, 8874, 8893) T. Le et al. "Safety Effects of Low-Cost Systemic Safety Improvements at Signalized and Stop-Controlled Intersections," 96th Annual Meeting of the Transportation Research Board, Paper Number 17-05379, January 2017.

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Safety Benefits:

36-50%
reduction in red light running.[2]

8-14%
reduction in total crashes.[2]

12%
reduction in injury crashes.[2]

Yellow Change Intervals

At a signalized intersection, the yellow change interval is the length of time that the yellow signal indication is displayed following a green signal indication. The yellow signal confirms to motorists that the green has ended and that a red will soon follow.

Since red-light running is a leading cause of severe crashes at signalized intersections, it is imperative that the yellow change interval be appropriately timed. Too brief an interval may result in drivers being unable to stop safely and cause unintentional red-light running. Too long of an interval may result in drivers treating the yellow as an extension of the green phase and invite intentional red-light running. Factors such as the speed of approaching and turning vehicles, driver perception-reaction time, vehicle deceleration, and intersection geometry should all be considered in the timing calculation.

Transportation agencies can improve signalized intersection safety and reduce red-light running by reviewing and updating their traffic signal timing policies and procedures concerning the yellow change interval. Agencies should institute regular evaluation and adjustment protocols for existing traffic signal timing. Refer to the *Manual on Uniform Traffic Control Devices* for basic requirements and further recommendations about yellow change interval timing. As part of strategic signal system modernization and updates, incorporating automated traffic signal performance measures (ATSPMs) is a proven approach to improve on traditional retiming processes. ATSPMs provide continuous performance monitoring capability and the ability to modify timing based on actual performance, without requiring expensive modeling or data collection.[1]

Appropriately timed yellow change intervals can reduce red-light running and improve overall intersection safety. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/fhwasa13027.pdf.

FHWA-SA-21-043

1 Federal Highway Administration. "Automated Traffic Signal Performance," (2020).
2 (CMF ID: 380,384) NCHRP Report 731: Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections, (2011).

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Crosswalk Visibility Enhancements

Poor lighting conditions, obstructions such as parked cars, and horizontal or vertical roadway curvature can reduce visibility at crosswalks, contributing to safety issues. For multilane roadway crossings where vehicle volumes are in excess of 10,000 Average Annual Daily Traffic (AADT), a marked crosswalk alone is typically not sufficient. Under such conditions, more substantial crossing improvements could prevent an increase in pedestrian crash potential.

Three main crosswalk visibility enhancements help make crosswalks and the pedestrians, bicyclists, wheelchair and other mobility device users, and transit users using them more visible to drivers. These include high-visibility crosswalks, lighting, and signing and pavement markings. These enhancements can also assist users in deciding where to cross. Agencies can implement these features as standalone or combination enhancements to indicate the preferred location for users to cross.

Safety Benefits:

High-visibility crosswalks can reduce pedestrian injury crashes up to:

40% [1]

Intersection lighting can reduce pedestrian crashes up to:

42% [2]

Advance yield or stop markings and signs can reduce pedestrian crashes up to:

25% [3]

High-visibility crosswalks

High-visibility crosswalks use patterns (i.e., bar pairs, continental, ladder) that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks. They should be considered at all midblock pedestrian crossings and uncontrolled intersections. Agencies should use materials such as inlay or thermoplastic tape, instead of paint or brick, for highly reflective crosswalk markings.

Improved Lighting

The goal of crosswalk lighting should be to illuminate with positive contrast to make it easier for a driver to visually identify the pedestrian. This involves carefully placing the luminaires in forward locations to avoid a silhouette effect of the pedestrian.

Enhanced Signing and Pavement Markings

On multilane roadways, agencies can use "YIELD Here to Pedestrians" or "STOP Here for Pedestrians" signs 20 to 50 feet in advance of a marked crosswalk to indicate where a driver should stop or yield to pedestrians, depending on State law. To supplement the signing, agencies can also install a STOP or YIELD bar (commonly referred to as "shark's teeth") pavement markings.

In-street signing, such as "STOP Here for Pedestrians" or "YIELD Here to Pedestrians" may be appropriate on roads with two- or three-lane roads where speed limits are 30 miles per hour or less.

Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/techSheetVizEnhancemt2018.pdf.

FHWA-SA-21-049

1 (CMF ID: 4123) Chen, L., C. Chen, and R. Ewing. The Relative Effectiveness of Pedestrian Safety Countermeasures at Urban Intersections - Lessons from a New York City Experience. (2012).
2 (CMF ID: 436) Elvik, R. and Vaa, T. Handbook of Road Safety Measures. Oxford, United Kingdom, Elsevier, (2004).
3 (CMF ID: 9017) Zeeger et al. Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, FHWA, (2017).

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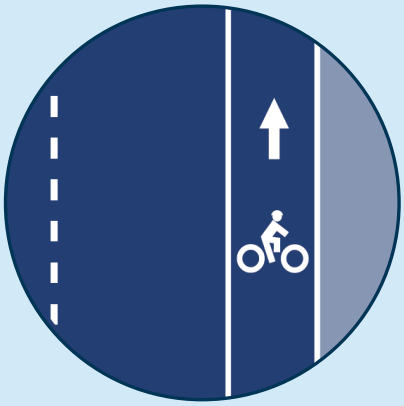

Bicycle Lanes

Most fatal and serious injury bicyclist crashes occur at non-intersection locations. Nearly one-third of these crashes occur when motorists are overtaking bicyclists[1] because the speed and size differential between vehicles and bicycles can lead to severe injury. Many people are not comfortable riding a bicycle because of their fear that this type of crash may occur. To make bicycling safer and more comfortable for most types of bicyclists, State and local agencies should consider installing bicycle lanes. Providing bicycle facilities can mitigate or prevent interactions, conflicts, and crashes between bicyclists and motor vehicles, and create a network of safer roadways for bicycling. Bicycle Lanes align with the Safe System Approach principle of recognizing human vulnerability—where separating users in space can enhance safety for all road users.

Safety Benefits:

Converting traditional or flush buffered bicycle lanes to a separated bicycle lane with flexible delineator posts can reduce crashes up to:

53%

for bicycle/vehicle crashes.[3]

Bicycle Lane Additions can reduce crashes up to:

49%

for total crashes on urban 4-lane undivided collectors and local roads.[7]

30%

for total crashes on urban 2-lane undivided collectors and local roads.[7]

Bicycle lane in Washington, DC. Source: Alex Baca, Washington Area Bicyclist Association.

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-07/fhwasa18077.pdf.

FHWA-SA-21-051

Applications

The FHWA's *Bikeway Selection Guide* and *Incorporating On-Road Bicycle Networks into Resurfacing Projects* assist agencies in determining which facilities provide the most benefit in various contexts. Bicycle lanes can be included on new roadways or created on existing roads by reallocating space in the right-of-way through *Road Diets*. Separated bicycle lanes, which use vertical elements—such as flexible delineator posts, curbs, or vegetation—between the bicycle lane and motorized traffic lanes provide additional safety benefits.[2,3] For a marked bike lane without vertical elements, a lateral offset with marked buffer can help to further separate bicyclists from vehicle traffic.

Considerations

- In order to maximize a roadway's suitability for riders of all ages and abilities, bicycle lane design should vary according to roadway characteristics (number of lanes, motor vehicle and truck volumes, speed, presence of transit), user needs (current and forecasted ridership, types of bicycles and micromobility devices in use within the community, role within the bicycling network), and land-use context (adjacent land uses, types and intensity of conflicting uses, demands from other users for curbside access). Separated bicycle lanes are recommended on roadways with higher vehicle volumes and speeds, such as arterials.
- City and State policies may require minimum bicycle lane widths, although desirable bicycle lane widths can differ by agency and functional classification of the road, current and forecasted bicycle volumes, and contextual attributes such as topography.
- Studies have found that roadways did not experience an increase in crashes or congestion when travel lane widths were decreased to add a bicycle lane.[4]
- Studies and experience in U.S. cities show that bicycle lanes increase ridership and may help jurisdictions better manage roadway capacity.
- In rural areas, rumble strips can negatively impact bicyclists' ability to ride if not properly installed. Agencies should consider the dimensions, placement, and offset of rumble strips when adding a bicycle lane.[5]
- Bicycle lanes should be considered on roadways where adjacent land use suggests that trips could be served by varied modes, particularly to meet the safety and travel needs of low-income populations likely to use bicycles to reach essential destinations.[6]

1 Thomas et al. *Bicyclist Crash Types on National, State, and Local Levels: A New Look*. Transportation Research Record 673(6), 664-676, (2019).
2 Separated Bike Lane Planning and Design Guide. FHWA-HEP-15-025, (2015).
3 (CMF ID: 11296) Developing CMFs for Separated Bicycle Lanes. FHWA-HRT-23-025, (2023).
4 Park and Abdel-Aty. *Evaluation of safety effectiveness of multiple cross sectional features on urban arterials*. Accident Analysis and Prevention, Vol. 92, pp. 245-255, (2016).
5 FHWA Tech Advisory Shoulder and Edge Line Rumble Strips, (2011).
6 Sandt et al. Pursuing Equity in Pedestrian and Bicycle Planning. FHWA, (2016).
7 (CMF ID: 10738, 10742) Development of Crash Modification Factors for Bicycle Lane Additions While Reducing Lane and Shoulder Widths. FHWA-HRT-21-012, (2021).

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Rectangular Rapid Flashing Beacons (RRFB)

A marked crosswalk or pedestrian warning sign can improve safety for pedestrians crossing the road, but at times may not be sufficient for drivers to visibly locate crossing locations and yield to pedestrians. To enhance pedestrian conspicuity and increase driver awareness at uncontrolled, marked crosswalks, transportation agencies can install a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) to accompany a pedestrian warning sign. RRFBs consist of two, rectangular- shaped yellow indications, each with a light-emitting diode (LED)-array-based light source.[1] RRFBs flash with an alternating high frequency when activated to enhance conspicuity of pedestrians at the crossing to drivers.

For more information on using RRFBs, see the Interim Approval in the *Manual on Uniform Traffic Control Devices (MUTCD)*.[1]

Safety Benefits:

RRFBs can reduce crashes up to:

47%

for pedestrian crashes.[4]

RRFBs can increase motorist yielding rates up to:

98%

(varies by speed limit, number of lanes, crossing distance, and time of day).[3]

RRFBs used at a trail crossing.
Source: LJB

Applications

The RRFB is applicable to many types of pedestrian crossings but is particularly effective at multilane crossings with speed limits less than 40 miles per hour.[2] Research suggests RRFBs can result in motorist yielding rates as high at 98 percent at marked crosswalks, but varies depending on the location, posted speed limit, pedestrian crossing distance, one- versus two-way road, and the number of travel lanes.[3] RRFBs can also accompany school or trail crossing warning signs.

RRFBs are placed on both sides of a crosswalk below the pedestrian crossing sign and above the diagonal downward arrow plaque pointing at the crossing.[1] The flashing pattern can be activated with pushbuttons or passive (e.g., video or infrared) pedestrian detection, and should be unlit when not activated.

Considerations

Agencies should:[2]

- Install RRFBs in the median rather than the far-side of the roadway if there is a pedestrian refuge or other type of median.
- Use solar-power panels to eliminate the need for a power source.
- Reserve the use of RRFBs for locations with significant pedestrian safety issues, as over-use of RRFB treatments may diminish their effectiveness.

Agencies shall not:[2]

- Use RRFBs without the presence of a pedestrian, school or trail crossing warning sign.
- Use RRFBs for crosswalks across approaches controlled by YIELD signs, STOP signs, traffic control signals, or pedestrian hybrid beacons, except for the approach or egress from a roundabout.

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/techSheet_RRFB_2018.pdf.

FHWA-SA-21-053

1 *MUTCD* Interim Approval 21 - RRFBs at Crosswalks.
2 "Rectangular Rapid Flash Beacon" in PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. FHWA, (2013).
3 Fitzpatrick et al. "Will You Stop for Me? Roadway Design and Traffic Control Device Influences on Drivers Yielding to Pedestrians in a Crosswalk with a Rectangular Rapid-Flashing Beacon." Report No. TTI-CTS-0010. Texas A&M Transportation Institute, (2016).
4 (CMF ID: 9024) NCHRP Research Report 841 Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments, (2017).

U.S. Department of Transportation
Federal Highway Administration

Safety Benefits:

13%

reduction in pedestrian-vehicle crashes at intersections.[1]

Leading Pedestrian Interval

A leading pedestrian interval (LPI) gives pedestrians the opportunity to enter the crosswalk at an intersection 3-7 seconds before vehicles are given a green indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left.

LPIs provide the following benefits:

- Increased visibility of crossing pedestrians.
- Reduced conflicts between pedestrians and vehicles.
- Increased likelihood of motorists yielding to pedestrians.
- Enhanced safety for pedestrians who may be slower to start into the intersection.

FHWA's Handbook for ***Designing Roadways for the Aging Population*** recommends the use of the LPI at intersections with high turning vehicle volumes. Transportation agencies should refer to the ***Manual on Uniform Traffic Control Devices*** for guidance on LPI timing and ensure that pedestrian signals are accessible for all users. Costs for implementing LPIs are very low when only signal timing alteration is required.

An LPI allows a pedestrian to establish a presence in the crosswalk before vehicles are given a green indication. Source: FHWA

LPIs reduce potential conflicts between pedestrians and turning vehicles. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/fhwasa19040.pdf.

1 (CMF ID: 9918) Goughnour, E., D. Carter, C. Lyon, B. Persaud, B. Lan, P. Chun, I. Hamilton, and K. Signor. "Safety Evaluation of Protected Left-Turn Phasing and Leading Pedestrian Intervals on Pedestrian Safety." Report No. FHWA-HRT-18-044. Federal Highway Administration. (October 2018)

FHWA-SA-21-032

U.S. Department of Transportation
Federal Highway Administration

Safety Benefits:

Median with Marked Crosswalk

46%

reduction in pedestrian crashes.[2]

Pedestrian Refuge Island

56%

reduction in pedestrian crashes.[2]

Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

A **median** is the area between opposing lanes of traffic, excluding turn lanes. Medians in urban and suburban areas can be defined by pavement markings, raised medians, or islands to separate motorized and non-motorized road users.

A **pedestrian refuge island** (or crossing area) is a median with a refuge area that is intended to help protect pedestrians who are crossing a road.

Pedestrian crashes account for approximately 17 percent of all traffic fatalities annually, and 74 percent of these occur at non-intersection locations.[1] For pedestrians to safely cross a roadway, they must estimate vehicle speeds, determine acceptable gaps in traffic based on their walking speed, and predict vehicle paths. Installing a median or pedestrian refuge island can help improve safety by allowing pedestrians to cross one direction of traffic at a time.

Transportation agencies should consider medians or pedestrian refuge islands in curbed sections of urban and suburban multilane roadways, particularly in areas with a significant mix of pedestrian and vehicle traffic, traffic volumes over 9,000 vehicles per day, and travel speeds 35 mph or greater. Medians/refuge islands should be at least 4-ft wide, but preferably 8 ft for pedestrian comfort. Some example locations that may benefit from medians or pedestrian refuge islands include:

- Mid-block crossings.
- Approaches to multilane intersections.
- Areas near transit stops or other pedestrian-focused sites.

Example of a road with a median and pedestrian refuge islands. Source: City of Charlotte, NC

Median and pedestrian refuge island near a roundabout. Source: www.pedbikeimages.org / Dan Burden

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-08/techSheet_PedRefugeIsland2018.pdf.

FHWA-SA-21-044

1 National Center for Statistics and Analysis. (2020, March). Pedestrians: 2018 data (Traffic Safety Facts. Report No. DOT HS 812 850). National Highway Traffic Safety Administration

2 (CMF ID: 175) Desktop Reference for Crash Reduction Factors, FHWA-SA-08-011, September 2008, Table 11.

U.S. Department of Transportation
Federal Highway Administration

Safety Benefits:

55%
reduction in pedestrian crashes.[2]

29%
reduction in total crashes.[3]

15%
reduction in fatal and serious injury crashes.[3]

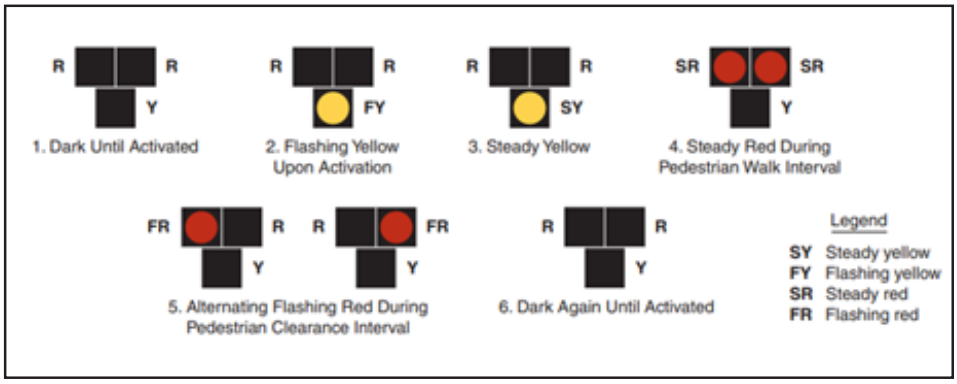
Example of PHBs mounted on a mast arm. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/sites/fhwa.dot.gov/files/2022-06/fhwasa18064.pdf.

FHWA-SA-21-045

Pedestrian Hybrid Beacons

The pedestrian hybrid beacon (PHB) is a traffic control device designed to help pedestrians safely cross higher-speed roadways at midblock crossings and uncontrolled intersections. The beacon head consists of two red lenses above a single yellow lens. The lenses remain "dark" until a pedestrian desiring to cross the street pushes the call button to activate the beacon, which then initiates a yellow to red lighting sequence consisting of flashing and steady lights that directs motorists to slow and come to a stop, and provides the right-of-way to the pedestrian to safely cross the roadway before going dark again.



Sequence for a PHB. Source: MUTCD 2009 Edition, p. 511, FHWA

Nearly 74 percent of pedestrian fatalities occur at non-intersection locations, and vehicle speeds are often a major contributing factor.[1] As a safety strategy to address this pedestrian crash risk, the PHB is an intermediate option between a flashing beacon and a full pedestrian signal because it assigns right of way and provides positive stop control. It also allows motorists to proceed once the pedestrian has cleared their side of the travel lane(s), reducing vehicle delay.

Transportation agencies should refer to the *Manual on Uniform Traffic Control Devices* (MUTCD) for information on the application of PHBs. Transportation agencies should locate pedestrian signals to be accessible for all users.

In general, PHBs are used where it is difficult for pedestrians to cross a roadway, such as when gaps in traffic are not sufficient or speed limits exceed 35 miles per hour. They are very effective at locations where three or more lanes will be crossed or traffic volumes are above 9,000 annual average daily traffic. Installation of a PHB must also include a marked crosswalk and pedestrian countdown signal. If PHBs are not already familiar to a community, agencies should conduct appropriate education and outreach as part of implementation.

1 National Center for Statistics and Analysis. (2020, March). Pedestrians: 2018 data (Traffic Safety Facts. Report No. DOT HS 812 850). National Highway Traffic Safety Administration
2 (CMF ID: 9020) Zegeer et al. NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. TRB, (2017).
3 (CMF ID: 2911,2917) Fitzpatrick, K. and Park, E.S. Safety Effectiveness of the HAWK Pedestrian Crossing Treatment, FHWA-HRT-10-042, (2010).

U.S. Department of Transportation
Federal Highway Administration

Safety Benefits:

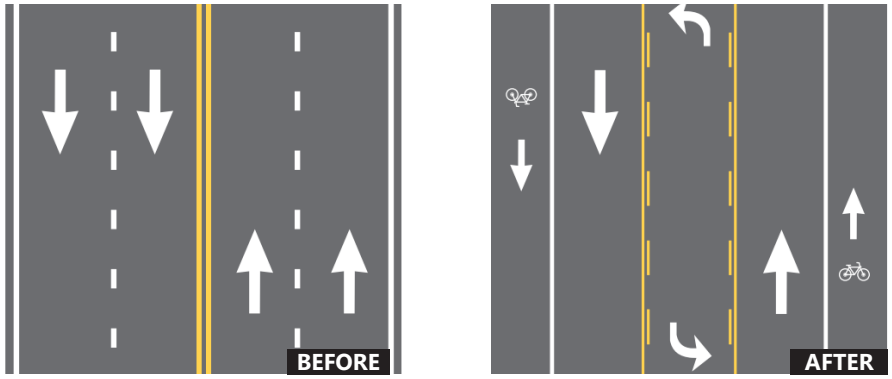
4-Lane to 3-Lane Road Diet Conversions

19-47%

reduction in total crashes.[1]

Road Diets (Roadway Reconfiguration)

A Road Diet, or roadway reconfiguration, can improve safety, calm traffic, provide better mobility and access for all road users, and enhance overall quality of life. A Road Diet typically involves converting an existing four-lane undivided roadway to a three-lane roadway consisting of two through lanes and a center two-way left-turn lane (TWLTL).



Before and after example of a Road Diet. Source: FHWA

Benefits of Road Diet installations may include:

- Reduction of rear-end and left-turn crashes due to the dedicated left-turn lane.
- Reduced right-angle crashes as side street motorists cross three versus four travel lanes.
- Fewer lanes for pedestrians to cross.
- Opportunity to install pedestrian refuge islands, bicycle lanes, on-street parking, or transit stops.
- Traffic calming and more consistent speeds.
- A more community-focused, Complete Streets environment that better accommodates the needs of all road users.

A Road Diet can be a low-cost safety solution when planned in conjunction with a simple pavement overlay, and the reconfiguration can be accomplished at no additional cost. Typically, a Road Diet is implemented on a roadway with a current and future average daily traffic of 25,000 or less.

Road Diet project in Honolulu, Hawaii. Source: Leidos

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/other/road-diets.

1 (CMF ID: 5554,2841) *Evaluation of Lane Reduction "Road Diet" Measures on Crashes*, FHWA-HRT-10-053, (2010).

FHWA-SA-21-046

U.S. Department of Transportation
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Safety Benefits:

Sidewalks

65-89%

reduction in crashes involving pedestrians walking along roadways.[3]

Paved Shoulders

71%

reduction in crashes involving pedestrians walking along roadways.[3]

Walkways

A walkway is any type of defined space or pathway for use by a person traveling by foot or using a wheelchair. These may be pedestrian walkways, shared use paths, sidewalks, or roadway shoulders.

With more than 6,200 pedestrian fatalities and 75,000 pedestrian injuries occurring in roadway crashes annually,[1] it is important for transportation agencies to improve conditions and safety for pedestrians and to integrate walkways more fully into the transportation system. Research shows people living in low-income communities are less likely to encounter walkways and other pedestrian-friendly features.[2]

Well-designed pedestrian walkways, shared use paths, and sidewalks improve the safety and mobility of pedestrians. Pedestrians should have direct and connected network of walking routes to desired destinations without gaps or abrupt changes. In some rural or suburban areas, where these types of walkways are not feasible, roadway shoulders provide an area for pedestrians to walk next to the roadway, although these are not preferable.

Transportation agencies should work towards incorporating pedestrian facilities into all roadway projects unless exceptional circumstances exist. It is important to provide and maintain accessible walkways along both sides of the road in urban areas, particularly near school zones and transit locations, and where there is a large amount of pedestrian activity. Walkable shoulders should also be considered along both sides of rural highways when routinely used by pedestrians.

Example of a sidewalk in a residential area. Source: pedbikeimages.org / Burden

Paved shoulder used as a walkway. Source: pedbikeimages.org / Burden

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and http://www.pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=1.

FHWA-SA-21-047

1 National Center for Statistics and Analysis. (2020, March). Pedestrians: 2018 data (Traffic Safety Facts. Report No. DOT HS 812 850). National Highway Traffic Safety Administration.
2 Gibbs, et all. Income Disparities in Street Features that Encourage Walking. Bridging the Gap, (2012, March).
3 Gan et al. Update of Florida Crash Reduction Factors and Countermeasures to Improve the Development of District Safety Improvement Projects. Florida DOT, (2005).

U.S. Department of Transportation
Federal Highway Administration

Safety Benefits:

HFST can reduce crashes up to:

63%
for injury crashes at ramps.[2]

48%
for injury crashes at horizontal curves.[2]

20%
for total crashes at intersections.[3]

Automated application of HFST.
Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/rwd/keep-vehicles-road/pavement-friction/hfst.

FHWA-SA-21-052

Pavement Friction Management

Friction is a critical characteristic of a pavement that affects how vehicles interact with the roadway, including the frequency of crashes. Measuring, monitoring, and maintaining pavement friction—especially at locations where vehicles are frequently turning, slowing, and stopping—can prevent many roadway departure, intersection, and pedestrian-related crashes.

Pavement friction treatments, such as High Friction Surface Treatment (HFST), can be better targeted and result in more efficient and effective installations when using continuous pavement friction data along with crash and roadway data.

Continuous Pavement Friction Measurement

Friction data for safety performance is best measured with Continuous Pavement Friction Measurement (CPFM) equipment. Spot friction measurement devices, like locked-wheel skid trailers, cannot safely and accurately collect friction data in curves or intersections, where the pavement polishes more quickly and adequate friction is so much more critical. Without CPFM equipment, agencies will assume the same friction over a mile or more.

CPFM technology measures friction continuously at highway speeds and provides both network and segment level data. Practitioners can analyze the friction, crash, and roadway data to better understand and predict where friction-related crashes will occur to better target locations and more effectively install treatments.[1]

High Friction Surface Treatment

HFST consists of a layer of durable, anti-abrasion, and polish-resistant aggregate over a thermosetting polymer resin binder that locks the aggregate in place to restore or enhance friction and skid resistance. Calcined bauxite is the aggregate shown to yield the best results and should be used with HFST applications.

Applications

HFST should be applied in locations with increased friction demand, including:

- Horizontal curves.
- Interchange ramps.
- Intersection approaches.
  - Higher-speed signalized and stop-controlled intersections.
  - Steep downward grades.
- Locations with a history of rear-end, failure to yield, wet-weather, or red-light-running crashes.
- Crosswalk approaches.

Considerations

- HFST is applied on existing pavement, so no new pavement is added.
- If the underlying pavement structure is unstable, then the HFST life cycle may be shortened, resulting in pre-mature failure.
- The automated installation method is preferred as it minimizes issues often associated with manual installation: human error due to fatigue, inadequate binder mixing, improper and uneven binder thickness, delayed aggregate placement, and inadequate aggregate coverage.
- The cost can be reduced when bundling installations at multiple locations.

1 Izeppi et al. Continuous Friction Measurement Equipment as a Tool for Improving Crash Rate Prediction: A Pilot Study. Virginia Department of Transportation, (2016).
2 (CMF ID: 10342, 10333) Merritt et al. Development of Crash Modification Factors for High Friction Surface Treatments. FHWA, (2020).
3 (CMF ID: 2259) NCHRP Report 617: Accident Modification Factors for Traffic Engineering and ITS Improvements, (2008).

U.S. Department of Transportation
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Lighting

The number of fatal crashes occurring in daylight is about the same as those that occur in darkness. However, the nighttime fatality rate is three times the daytime rate because only 25 percent of vehicle miles traveled (VMT) occur at night. At nighttime, vehicles traveling at higher speeds may not have the ability to stop once a hazard or change in the road ahead becomes visible by the headlights. Therefore, lighting can be applied continuously along segments and at spot locations such as intersections and pedestrian crossings in order to reduce the chances of a crash.

Adequate lighting (i.e., at or above minimum acceptable standards) is based on research recommending horizontal and vertical illuminance levels to provide safety benefits to all users of the roadway environment. Adequate lighting can also provide benefits in terms of personal security for pedestrians, wheelchair and other mobility device users, bicyclists, and transit users as they travel along and across roadways.

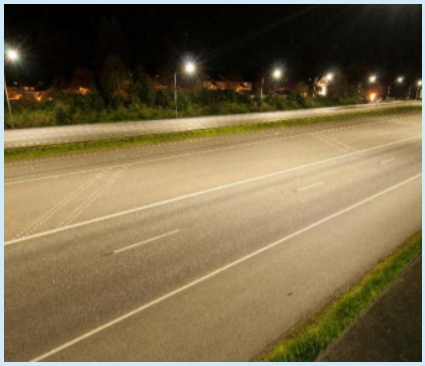
Safety Benefits:

Lighting can reduce crashes up to:

42%
for nighttime injury pedestrian crashes at intersections.[1]

33-38%
for nighttime crashes at rural and urban intersections.[2,1]

28%
for nighttime injury crashes on rural and urban highways.[1]



Source: WSDOT

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/other/visibility/roadway-lighting-resources.

FHWA-SA-21-050

Applications

Roadway Segments

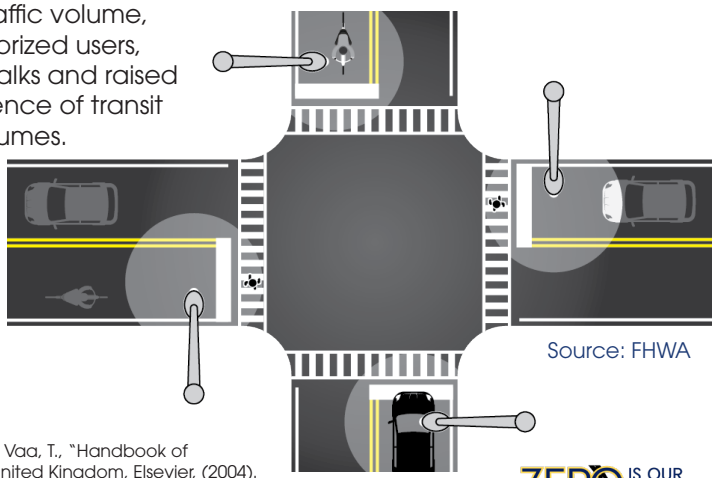
Research indicates that continuous lighting on both rural and urban highways (including freeways) has an established safety benefit for motorized vehicles.[1] Agencies can provide adequate visibility of the roadway and its users through the uniform application of lighting that provides full coverage along the roadway and the strategic placement of lighting where it is needed the most.

Intersections and Pedestrian Crossings

Increased visibility at intersections at nighttime is important since various modes of travel cross paths at these locations. Agencies should consider providing lighting to intersections based on factors such as a history of crashes at nighttime, traffic volume, the volume of non-motorized users, the presence of crosswalks and raised medians, and the presence of transit stops and boarding volumes.

Considerations

Most new lighting installations are made with breakaway features, shielded, or placed far enough from the roadway to reduce the probability and/or severity of fixed-object crashes. Modern lighting technology gives precise control with minimal excessive light affecting the nighttime sky or spilling over to adjacent properties. Agencies can equitably engage with underserved communities to determine where and how new and improved lighting can most benefit the community by considering their priorities, including eliminating crash disparities, connecting to essential neighborhood services, improving active transportation routes, and promoting personal safety.



Source: FHWA

1 (CMF ID: 436,433,192) Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004).
2 (CMF ID: 2376) Ye et al. A Simultaneous Equations Model of Crash Frequency By Collision Type for Rural Intersections, 87th Annual Meeting of the Transportation Research Board, (2008).

U.S. Department of Transportation
Federal Highway Administration

Safety Benefits:

Agencies have experienced the following benefits after LRSP implementation:

25%
reduction in county road fatalities in Minnesota.

17%
reduction in fatal and serious injury crashes on county-owned roads in Washington State.

35%
reduction in severe curve crashes in Thurston County, WA.

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/local-rural/local-road-safety-plans.

FHWA-SA-21-033

Local Road Safety Plans

A local road safety plan (LRSP) provides a framework for identifying, analyzing, and prioritizing roadway safety improvements on local roads. The LRSP development process and content are tailored to local issues and needs. The process results in a prioritized list of issues, risks, actions, and improvements that can be used to reduce fatalities and serious injuries on local roads. FHWA has developed several resources including an LRSP Do-It-Yourself website which further explains the process and includes resources local agencies and their partners need to create and implement an LRSP.[1]

Approximately 75 percent of rural roads are owned by local agencies.[2] While local roads are less traveled than State highways, they have a much higher rate of fatal and serious injury crashes.[2] Developing an LRSP is an effective strategy to improve local road safety for all road users and support the goals of a State's overall Strategic Highway Safety Plan (SHSP).

Although the development process and resulting plan can vary depending on the local agency's needs, available resources, and targeted crash types, aspects common to LRSPs include:

- Stakeholder engagement representing the 4E's: engineering, enforcement, education, and emergency medical services.
- Collaboration among municipal, county, Tribal, State, and/or Federal entities to leverage expertise and resources.
- Identification of target crash types and crash risk with corresponding recommended proven safety countermeasures.
- Timeline and goals for implementation and evaluation.

Local road agencies should consider developing an LRSP to be used as a tool for reducing roadway fatalities, injuries, and crashes.[3] LRSPs can help agencies create a prioritized list of improvements. LRSPs are also a proactive risk management technique to demonstrate an agency's responsiveness. The plan should be viewed as a living document that can be updated to reflect changing local needs and priorities.

Infographic showing the LRSP process. Source: FHWA

1 https://highways.dot.gov/safety/local-rural/local-road-safety-plans
2 Anderson et al. Noteworthy Practices: Addressing Safety on Locally-Owned and Maintained Roads A Domestic Scan, FHWA-SA-09-019, (2010).
3 Developing Safety Plans: A Manual for Local Rural Road Owners, FHWA-SA-12-017, provides guidance on developing an LRSP.

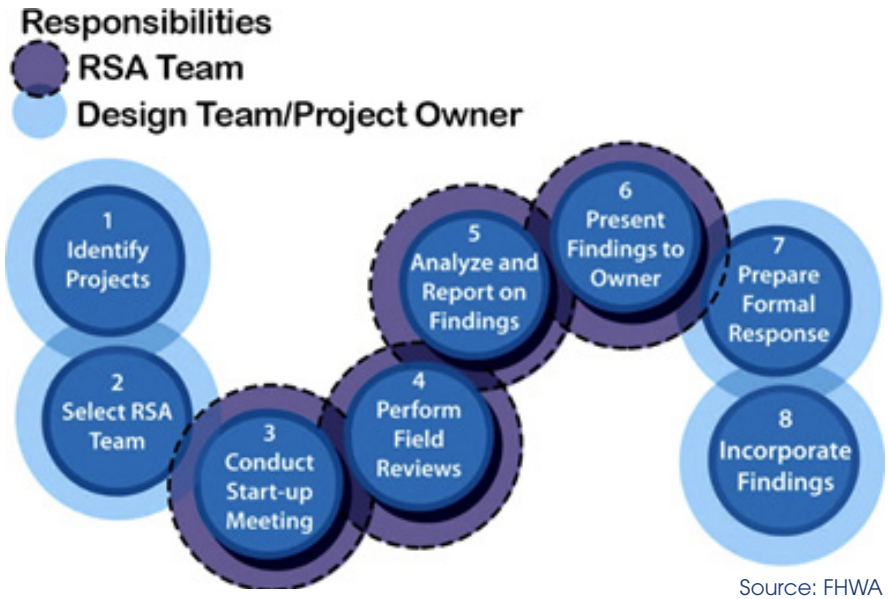
U.S. Department of Transportation
Federal Highway Administration

Safety Benefits:

10-60%
reduction in total crashes.[1]

Road Safety Audit

While most transportation agencies have established traditional safety review procedures, a road safety audit (RSA) or assessment is unique. RSAs are performed by a multidisciplinary team independent of the project. RSAs consider all road users, account for human factors and road user capabilities, are documented in a formal report, and require a formal response from the road owner. (See the eight steps for conducting an RSA below.)



Source: FHWA

RSAs provide the following benefits:

- Reduced number and severity of crashes due to safer designs.
- Reduced costs resulting from early identification and mitigation of safety issues before projects are built.
- Increased opportunities to integrate multimodal safety strategies and proven safety countermeasures.
- Expanded ability to consider human factors in all facets of design.
- Increased communication and collaboration among safety stakeholders.
- Objective review by independent multidisciplinary team.

RSAs can be performed in any phase of project development, from planning through construction. Agencies may focus RSAs specifically on motorized vehicles, pedestrians, bicyclists, motorcyclists, or a combination of these roadway users. Agencies are encouraged to conduct an RSA at the earliest stage possible, as all roadway design options and alternatives are being explored.

Multidisciplinary team performs field review during an RSA. Source: FHWA

For more information on this and other FHWA Proven Safety Countermeasures, please visit https://highways.dot.gov/safety/proven-safety-countermeasures and https://highways.dot.gov/safety/data-analysis-tools/systemic/road-safety-audits-rsa.

1 Road Safety Audits: An Evaluation of RSA Programs and Projects, FHWA-SA-12-037; and FHWA Road Safety Audit Guidelines, FHWA-SA-06-06.

FHWA-SA-21-048

https://safety.fhwa.dot.gov/provencountermeasures/

FHWA-SA-21-071

APPENDIX H:
PRELIMINARY SAFETY PROJECT COST ESTIMATES

CITY OF CONCORD
Safety Action Plan - Cost Estimate
Project 1: High Injury Network Corridor Improvements

Project 1: High Injury Network Corridor Improvements

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Clayton Rd Safety Improvements	Clayton Rd: SR-242 to Washington Blvd	Various Improvements along Corridor. See Breakdown.	LS	$ 5,497,030.00	1	$ 5,497,030.00	
2	Monument Blvd Safety Improvements	Monument Blvd: Cowell Rd to Mohr Ln	Various Improvements along Corridor. See Breakdown.	LS	$ 2,609,620.00	1	$ 2,609,620.00	
3	Willow Pass Rd Safety Improvements	Willow Pass Rd: I-680 to Avila Rd	Various Improvements along Corridor. See Breakdown.	LS	$ 2,002,960.00	1	$ 2,002,960.00	$ 14,490,420.00
4	Concord Ave Safety Improvements	Concord Ave: John Glenn Dr to Salvio St	Various Improvements along Corridor. See Breakdown.	LS	$ 1,146,310.00	1	$ 1,146,310.00	
5	Galindo St Safety Improvements	Galindo St: Salvio St to Cowell Rd	Various Improvements along Corridor. See Breakdown.	LS	$ 3,234,500.00	1	$ 3,234,500.00	
							Project Cost Total	**$ 14,490,420.00**
							Contingency Cost(20%)	**$ 2,898,084.00**
							Subtotal	**$ 17,388,600.00**
							Environmental (5%)	**$ 869,430.00**
							PS&E (15%)	**$ 2,608,290.00**
							Construction Engineering (10%)	**$ 1,738,860.00**
							Total	**$ 22,605,180.00**

CITY OF CONCORD
Safety Action Plan - Cost Estimate
Project 1: High Injury Network Corridor Improvements

1.1-Clayton Rd: SR-242 to Washington Boulevard

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Speed Feedback Sign	Clayton Rd: SR-242 to Washington Boulevard	Install Dynamic/Variable Speed Warning Sign (Solar-Powered)	EA	$ 15,000.00	8	$ 120,000.00	$ 120,000.00
2	Safety Lighting Upgrades	Clayton Rd & Detroit Ave Clayton Rd & Ellis St Clayton Rd & Galindo St Clayton Rd & Grant St Clayton Rd & Colfax St Clayton Rd & Oakland Ave Clayton Rd & Treat Blvd Clayton Rd & Bailey Rd Clayton Rd & Ayers Rd	Replace Existing Luminaire Fixture	EA	$ 750.00	48	$ 36,000.00	$ 36,000.00
3	Street Lighting Improvements	Clayton Rd and San Carlos Ave	Install Street Light Pole, Foundation and Luminaire Fixture	EA	$ 20,000.00	1	$ 20,000.00	$ 121,000.00
			Install Street Light Pull Box	EA	$ 1,500.00	1	$ 1,500.00	
			Install Conduit and Cabling	LF	$ 110.00	75	$ 8,250.00	
		Clayton Rd and Roslyn Dr	Upgrade Existing Fixtures	EA	$ 500.00	4	$ 2,000.00	
		Between Bailey Rd and Matheson Rd	Install Street Light Pole, Foundation and Luminaire Fixture	EA	$ 20,000.00	3	$ 60,000.00	
			Install Street Light Pull Box	EA	$ 1,500.00	3	$ 4,500.00	
			Install Conduit and Cabling	LF	$ 110.00	225	$ 24,750.00	
4	Intersection Safety Analytics	Clayton Rd & Galindo St Clayton Rd & Treat Blvd Clayton Rd and Thornwood Dr Clayton Rd and Fry Way Clayton Rd and Ayers Rd Clayton Rd and Ellis St	Intersection Safety Analystics Camera and System	LS	$ 40,000.00	6	$ 240,000.00	$ 240,000.00
5	CV2X Improvements	Clayton Rd & Galindo St Clayton Rd & Treat Blvd Clayton Rd & Fry Way Clayton Rd & Ellis St	CV2X Roadside Unit System	EA	$ 35,000.00	4	$ 140,000.00	$ 140,000.00
6	EVP GPS	Clayton Rd: SR-242 to Washington Boulevard	Install GPS-Based EVP system	EA	$ 20,000.00	28	$ 560,000.00	$ 560,000.00
7	High Friction Surface Treatment	Clayton and Farm Bureau Rd	Install High Friction Surface Treatment	SF	$ 6.00	30000	$ 180,000.00	$ 187,300.00
			Install striping	LF	$ 4.00	1200	$ 4,800.00	
			Install Pavement Marking	EA	$ 500.00	5	$ 2,500.00	
8	PPLS	Clayton Rd & Detroit Ave Clayton Rd & Ellis St Clayton Rd & Galindo St Clayton Rd & Oakland Ave Clayton Rd & Treat Blvd Clayton Rd & Bailey Rd Clayton Rd & Claycord Ave Clayton Rd & Ayers Rd	Install Pedestrian Light Pole, Foundation and Luminaire Fixture	EA	$ 15,000.00	27	$ 405,000.00	$ 573,250.00
			Install Pull Box	EA	$ 2,000.00	27	$ 54,000.00	
			Install Conduit and Cabling	LF	$ 110.00	675	$ 74,250.00	
			Install PPLS System	EA	$ 5,000.00	8	$ 40,000.00	

9	ADA Compliant Curb Ramps	Clayton Rd and Washington Blvd (NE & NW)	Install Curb Ramp	EA	$ 10,000.00	2	$ 20,000.00	$ 20,000.00
10	High Visibility Crosswalks and Advance Stop Bar	Clayton Rd and Galindo St	Install High Visibility Crosswalk	EA	$ 1,000.00	4	$ 4,000.00	$ 9,040.00
		Clayton Rd and Oakland Ave	Install High Visibility Crosswalk	EA	$ 1,000.00	4	$ 4,000.00	
			Install Stop Bar	LF	$ 8.00	130	$ 1,040.00	
11	Pedestrian Passive Detection and LPI	Clayton Rd & Detroit Ave Clayton Rd & Ellis St Clayton Rd and Galindo St Clayton Rd and Oakland Ave Clayton Rd and Treat Blvd Clayton Rd & Bailey Rd Clayton Rd & Claycord Ave Clayton Rd & Ayers Rd	Modify Signal Phasing to Implement a Lead Pedestrian Interval	LS	$ 3,000.00	8	$ 24,000.00	$ 386,500.00
			Install Pedestrian Passive Detection	LS	$ 20,000.00	8	$ 160,000.00	
			Install Blankout Sign	EA	$ 7,500.00	27	$ 202,500.00	
12	Curb Line Reconfiguration	Clayton Rd and Thornwood Dr	Curb line Reconfiguration	EA	$ 25,000.00	2	$ 50,000.00	$ 150,000.00
		Clayton Rd and Galindo St, NE & NW	Curb line Reconfiguration	EA	$ 25,000.00	2	$ 50,000.00	
		Clayton Rd & Bailey Rd	Curb line Reconfiguration	EA	$ 25,000.00	2	$ 50,000.00	
13	Fill Sidewalk Gaps	Fabian Way to Julia Ln	Site Preparation and Removal	SF	$ 20.00	3925	$ 78,500.00	$ 384,000.00
			Install Sidewalk	SF	$ 40.00	3925	$ 157,000.00	
			Install Curb and Gutter	LF	$ 80.00	785	$ 62,800.00	
			Install Curb Ramp	EA	$ 10,000.00	7	$ 70,000.00	
			Striping Reconfiguration	LS	$ 4.00	3925	$ 15,700.00	
14	Crosswalk Enhancements	Clayton and Mt Diablo Mid Block Crossing	Curb line Reconfiguration	EA	$ 25,000.00	2	$ 50,000.00	$ 97,000.00
			Install Pull Box	EA	$ 2,000.00	2	$ 4,000.00	
			Install Conduit and Cabling	LF	$ 110.00	100	$ 11,000.00	
			Install Pole and Foundation	EA	$ 13,000.00	2	$ 26,000.00	
			Install New 3- Section Signal Head	EA	$ 3,000.00	2	$ 6,000.00	

15	Install Shared Use Path	Ellis St to Grant St	Site Preparation and Removal	SF	$ 8.00	24000	$ 192,000.00	$ 1,860,200.00
			Install Sign and Post	EA	$ 750.00	20	$ 15,000.00	
			Remove Striping	LF	$ 2.50	16800	$ 42,000.00	
			Install Striping	LF	$ 4.00	16800	$ 67,200.00	
			Remove Curb and Gutter	LF	$ 30.00	2400	$ 72,000.00	
			Install Curb and Gutter	LF	$ 80.00	2400	$ 192,000.00	
			Install Curb Ramp	EA	$ 10,000.00	20	$ 200,000.00	
			Install PCC Shared Use Path	SF	$ 45.00	24000	$ 1,080,000.00	
16	Remove Slip Lane	Clayton Rd and Farm Bureau Rd	Site Preparation and Removal	SF	$ 8.00	780	$ 6,240.00	$ 112,740.00
			Install Curb and Gutter	LF	$ 80.00	130	$ 10,400.00	
			Install Sidewalk	SF	$ 40.00	480	$ 19,200.00	
			Install Stamped Concrete	SF	$ 30.00	480	$ 14,400.00	
			Install Curb Ramp	EA	$ 10,000.00	1	$ 10,000.00	
			Remove Existing Mast Arm Pole and Equipment	EA	$ 7,500.00	1	$ 7,500.00	
			Install New Mast arm pole and Equipment	EA	$ 45,000.00	1	$ 45,000.00	
17	Protected Bike Intersection	Clayton and Galindo Clayton and Grant	Install Bike Protected Intersection	EA	$ 250,000.00	2	$ 500,000.00	$ 500,000.00
							Project Cost Total	**$ 5,497,030.00**
							Contingency Cost(20%)	**$ 1,099,406.00**
							Subtotal	**$ 6,596,500.00**
							Environmental (5%)	**$ 329,830.00**
							PS&E (15%)	**$ 989,470.00**
							Construction Engineering (10%)	**$ 659,650.00**
							Total	**$ 8,575,450.00**

CITY OF CONCORD
Safety Action Plan - Cost Estimate
Project 1: High Injury Network Corridor Improvements

1.2-Monument Blvd: Cowell Road to Mohr Lane

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Speed Feedback Sign	Cowell Road to Mohr Lane	Install Dynamic/Variable Speed Warning Sign (Solar-Powered)	EA	$ 15,000.00	4	$ 60,000.00	$ 60,000.00
2	Safety Lighting Upgrades	Mohr Ln Carey Dr Reganti Dr Virginia Ln Oak Grove Rd Systron Dr Cowell Rd	Replace Existing Luminaire Fixture	EA	$ 750.00	29	$ 21,750.00	$ 21,750.00
3	Street Lighting Improvements	Mohr to Detroit	Install Street Light Pole, Foundation and Luminaire Fixture	EA	$ 20,000.00	3	$ 60,000.00	$ 114,000.00
			Install Street Light Pull Box	EA	$ 1,500.00	3	$ 4,500.00	
			Install Conduit and Cabling	LF	$ 110.00	450	$ 49,500.00	
4	Intersection Safety Analysis	Monument Boulevard & Oak Grove/Meadow Lane Monument Boulevard & Virginia Lane Cowell Rd and Cowell Rd Monument Blvd & Mohr Ln Monument Blvd & Systron Dr	Intersection Safety Analystics Camera and System	LS	$ 40,000.00	6	$ 240,000.00	$ 240,000.00
5	CV2X	Monument Boulevard & Meadow Lane Monument Boulevard & Virginia Lane	CV2X Roadside Unit System	EA	$ 35,000.00	2	$ 70,000.00	$ 70,000.00
6	EVP GPS	Corridor Wide	Install GPS-Based EVP system	EA	$ 20,000.00	10	$ 200,000.00	$ 200,000.00
7	Access Management (Median)	Mohr Ln to Virginia Ln	Site Preparation and Removal	SF	$ 8.00	35090	$ 280,720.00	$ 991,520.00
			Landscaping	SF	$ 10.00	31900	$ 319,000.00	
			Install Median Curb	LF	$ 60.00	6380	$ 382,800.00	
			Install Sign and Post	EA	$ 750.00	12	$ 9,000.00	
8	PPLS	Monument Blvd & Mohr Ln Monument Blvd & Carey Dr Monument Blvd & Reganti Dr Monument Blvd & Virginia Ln Monument Blvd & Systron Dr	Install Pedestrian Light Pole, Foundation and Luminaire Fixture	EA	$ 15,000.00	19	$ 285,000.00	$ 400,250.00
			Install Pull Box	EA	$ 2,000.00	19	$ 38,000.00	
			Install Conduit and Cabling	LF	$ 110.00	475	$ 52,250.00	
			Install PPLS System	EA	$ 5,000.00	5	$ 25,000.00	
9	Curb Ramps	Monument Blvd & Mohr Ln Monument Blvd & Carey Dr	Install Curb Ramp	EA	$ 10,000.00	5	$ 50,000.00	$ 50,000.00
10	Pedestrian Passive Detection & Leading Pedestrian Interval	Monument Blvd & Mohr Ln Monument Blvd & Carey Dr Monument Blvd & Reganti Dr Monument Blvd & Virginia Ln Monument Blvd & Systron Dr	Modify Signal Phasing to Implement a Lead Pedestrian Interval	LS	$ 3,000.00	5	$ 15,000.00	$ 257,500.00
			Install Pedestrian Passive Detection	LS	$ 20,000.00	5	$ 100,000.00	
			Install Blankout Sign	EA	$ 7,500.00	19	$ 142,500.00	
11	Curb line Reconfiguration	Monument Blvd and Lacey Ln	Curb line Reconfiguration	EA	$ 25,000.00	2	$ 50,000.00	$ 50,000.00
12	Bus Stop Improvements	Cowell Road to Mohr Lane	Install Bus Shelter, Trash Can and Bench	LS	$ 15,000.00	10	$ 150,000.00	$ 150,000.00
13	Crosswalk Enhancements	Monument Blvd and Mohr Lane	Install High Visibility Crosswalk	EA	$ 1,000.00	4	$ 4,000.00	$ 4,600.00
			Install Stop Bar	LF	$ 8.00	75	$ 600.00	
							Project Cost Total	**$ 2,609,620.00**
							Contingency Cost(20%)	**$ 521,924.00**
							Subtotal	**$ 3,131,600.00**
							Environmental (5%)	**$ 156,580.00**
							PS&E (15%)	**$ 469,740.00**
							Construction Engineering (10%)	**$ 313,160.00**
							Total	**$ 4,071,080.00**

CITY OF CONCORD
Safety Action Plan - Cost Estimate
Project 1: High Injury Network Corridor Improvements

1.3-Willow Pass Rd: I-680 to Avila Road

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Speed Feedback Sign	I-680 to Avila Road	Install Dynamic/Variable Speed Warning Sign (Solar-Powered)	EA	$ 15,000.00	4	$ 60,000.00	$ 60,000.00
2	Safety Lighting Upgrades	Diamond Blvd Franquette Ave Market St Mt Diablo East St Port Chicago Hwy	Replace Existing Luminaire Fixture	EA	$ 750.00	22	$ 16,500.00	$ 16,500.00
3	Street Lighting Improvements	Saint Philips Ct Between 5th and 6th St 3rd St North of Lynwood	Install Street Light Pole, Foundation and Luminaire Fixture	EA	$ 20,000.00	6	$ 120,000.00	$ 195,000.00
			Install Street Light Pull Box	EA	$ 1,500.00	6	$ 9,000.00	
			Install Conduit and Cabling	LF	$ 110.00	600	$ 66,000.00	
4	Intersection Safety Analysis	Willow Pass Rd & Fry Way Willow Pass Road & I-680 Willow Pass Road & Farm Bureau Road Willow Pass Road & Market Street	Intersection Safety Analystics Camera and System	LS	$ 40,000.00	4	$ 160,000.00	$ 160,000.00
5	CV2X	Willow Pass Rd & Fry Way Willow Pass Road & I-680 Willow Pass Road & Farm Bureau Road Willow Pass Road & Market Street	CV2X Roadside Unit System	EA	$ 20,000.00	4	$ 80,000.00	$ 80,000.00
6	EVP GPS	Corridor Wide	Install GPS-Based EVP system	EA	$ 20,000.00	18	$ 360,000.00	$ 360,000.00
7	Access Management (Median)	Parkside - Farm Bureau	Site Preparation and Removal	SF	$ 8.00	30070	$ 240,560.00	$ 837,460.00
			Landscaping	SF	$ 10.00	27320	$ 273,200.00	
			Install Median Curb	LF	$ 60.00	5320	$ 319,200.00	
			Install Sign and Post	EA	$ 750.00	6	$ 4,500.00	
8	PPLS	Willow Pass Rd & Diamond Blvd Willow Pass Rd & Fry Way	Install Pedestrian Light Pole, Foundation and Luminaire Fixture	EA	$ 15,000.00	8	$ 120,000.00	$ 168,000.00
			Install Pull Box	EA	$ 2,000.00	8	$ 16,000.00	
			Install Conduit and Cabling	LF	$ 110.00	200	$ 22,000.00	
			Install PPLS System	EA	$ 5,000.00	2	$ 10,000.00	
9	Curb Ramps	Willow Pass Rd & Diamond Blvd	Install Curb Ramp	EA	$ 10,000.00	2	$ 20,000.00	$ 20,000.00
10	Pedestrian Passive Detection & Leading Pedestrian Interval	Willow Pass Rd & Diamond Blvd Willow Pass Rd & Fry Way	Modify Signal Phasing to Implement a Lead Pedestrian Interval	LS	$ 3,000.00	2	$ 6,000.00	$ 106,000.00
			Install Pedestrian Passive Detection	LS	$ 20,000.00	2	$ 40,000.00	
			Install Blankout Sign	EA	$ 7,500.00	8	$ 60,000.00	

Project Cost Total	**$ 2,002,960.00**
Contingency Cost(20%)	**$ 400,592.00**
Subtotal	**$ 2,403,600.00**
Environmental (5%)	**$ 120,180.00**
PS&E (15%)	**$ 360,540.00**
Construction Engineering (10%)	**$ 240,360.00**
Total	**$ 3,124,680.00**

CITY OF CONCORD
Safety Action Plan - Cost Estimate
Project 1: High Injury Network Corridor Improvements

1.4 - Concord Ave: John Glenn Drive to Salvio Street

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Speed Feedback Sign	Concord Ave: John Glenn Drive to Salvio Street	Install Dynamic/Variable Speed Warning Sign (Solar-Powered)	EA	$ 15,000.00	2	$ 30,000.00	$ 30,000.00
2	Safety Lighting Upgrades	Pacheco St Via De Mercados New Dr	Replace Existing Luminaire Fixture	EA	$ 750.00	8	$ 6,000.00	$ 6,000.00
3	Street Lighting Improvements	Fremont St Between Pacheco and Salvio Between Stanwell and Sams Club Signal	Install Street Light Pole, Foundation and Luminaire Fixture	EA	$ 20,000.00	3	$ 60,000.00	$ 147,000.00
			Install Street Light Pull Box	EA	$ 1,500.00	3	$ 4,500.00	
			Install Conduit and Cabling	LF	$ 110.00	750	$ 82,500.00	
4	Intersection Safety Analysis	Concord Ave & Market St Concord Avenue & Salvio Street	Intersection Safety Analystics Camera and System	LS	$ 40,000.00	2	$ 80,000.00	$ 80,000.00
5	CV2X	Concord Ave & Market St Concord Avenue & Salvio Street	CV2X Roadside Unit System	EA	$ 20,000.00	2	$ 40,000.00	$ 40,000.00
6	EVP GPS	Corridor Wide	Install GPS-Based EVP system	EA	$ 20,000.00	8	$ 160,000.00	$ 160,000.00
7	PPLS	Concord Ave and New Dr Concord Ave and Commerce Ave Concord Ave and Harrison St Concord Ave and Pacheco St Concord Ave and Salvio St	Install Pedestrian Light Pole, Foundation and Luminaire Fixture	EA	$ 15,000.00	19	$ 285,000.00	$ 400,250.00
			Install Pull Box	EA	$ 2,000.00	19	$ 38,000.00	
			Install Conduit and Cabling	LF	$ 110.00	475	$ 52,250.00	
			Install PPLS System	EA	$ 5,000.00	5	$ 25,000.00	
8	Curb Ramps	Concord Ave and Fremont St	Install Curb Ramp	EA	$ 10,000.00	2	$ 20,000.00	$ 20,000.00
9	High Visibility Crosswalks & Advance Stop Bar	Concord Ave and New Dr	Install High Visibility Crosswalk	EA	$ 1,000.00	4	$ 4,000.00	$ 5,560.00
			Install Stop Bar	LF	$ 8.00	195	$ 1,560.00	
10	Pedestrian Passive Detection & Leading Pedestrian Interval	Concord Ave and New Dr Concord Ave and Commerce Ave Concord Ave and Harrison St Concord Ave and Pacheco St Concord Ave and Salvio St	Modify Signal Phasing to Implement a Lead Pedestrian Interval	LS	$ 3,000.00	5	$ 15,000.00	$ 257,500.00
			Install Pedestrian Passive Detection	LS	$ 20,000.00	5	$ 100,000.00	
			Install Blankout Sign	EA	$ 7,500.00	19	$ 142,500.00	

Project Cost Total	**$ 1,146,310.00**
Contingency Cost(20%)	**$ 229,262.00**
Subtotal	**$ 1,375,600.00**
Environmental (5%)	**$ 68,780.00**
PS&E (15%)	**$ 206,340.00**
Construction Engineering (10%)	**$ 137,560.00**
Total	**$ 1,788,280.00**

CITY OF CONCORD
Safety Action Plan - Cost Estimate
Project 1: High Injury Network Corridor Improvements

1.5 - Galindo St: Salvio St to Cowell Rd

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Speed Feedback Sign	Salvio St to Cowell Rd	Install Dynamic/Variable Speed Warning Sign (Solar-Powered)	EA	$ 15,000.00	2	$ 30,000.00	$ 30,000.00
2	Safety Lighting Upgrades	Salvio St Clayton Rd Laguna St	Replace Existing Luminaire Fixture	EA	$ 750.00	10	$ 7,500.00	$ 7,500.00
3	Intersection Safety Analysis	Galindo St & Clayton Rd Galindo St & Concord Blvd	Intersection Safety Analystics Camera and System	LS	$ 40,000.00	2	$ 80,000.00	$ 80,000.00
4	CV2X	Galindo St & Clayton Rd Galindo St & Concord Blvd	CV2X Roadside Unit System	EA	$ 20,000.00	2	$ 40,000.00	$ 40,000.00
5	EVP GPS	Corridor Wide	Install GPS-Based EVP system	EA	$ 20,000.00	6	$ 120,000.00	$ 120,000.00
6	Optimize change and Clearance Interval	Galindo St & Clayton Rd Galindo St & Concord Blvd	Modify Signal Timing	LS	$ 5,000.00	2	$ 10,000.00	$ 10,000.00
7	PPLS	Galindo St & Clayton Rd Galindo St & Concord Blvd	Install Pedestrian Light Pole, Foundation and Luminaire Fixture	EA	$ 15,000.00	8	$ 120,000.00	$ 168,000.00
			Install Pull Box	EA	$ 2,000.00	8	$ 16,000.00	
			Install Conduit and Cabling	LF	$ 110.00	200	$ 22,000.00	
			Install PPLS System	EA	$ 5,000.00	2	$ 10,000.00	
8	Class-I Shared Use Path	Galindo Street: Salvio Street to Cowell Road	Site Preparation and Removal	SF	$ 25.00	38400	$ 960,000.00	$ 2,688,000.00
			Install PCC Shared Use Path	SF	$ 45.00	38400	$ 1,728,000.00	
9	Pedestrian Passive Detection & Leading Pedestrian Interval	Galindo St & Clayton Rd Galindo St & Concord Blvd	Modify Signal Phasing to Implement a Lead Pedestrian Interval	LS	$ 3,000.00	2	$ 6,000.00	$ 91,000.00
			Install Pedestrian Passive Detection	LS	$ 20,000.00	2	$ 40,000.00	
			Install Blankout Sign	EA	$ 7,500.00	6	$ 45,000.00	
							Project Cost Total	**$ 3,234,500.00**
							Contingency Cost(20%)	**$ 646,900.00**
							Subtotal	**$ 3,881,400.00**
							Environmental (5%)	**$ 194,070.00**
							PS&E (15%)	**$ 582,210.00**
							Construction Engineering (10%)	**$ 388,140.00**
							Total	**$ 5,045,820.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 2: Complete Streets Design and Construction

2-Complete Streets Design and Construction

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Cowell Rd Complete Streets Improvements	Cowell Rd: Monument Boulevard to Ygnacio Valley Road	Complete Streets Design and Construction	LS	$10,000,000.00	1	$ 10,000,000.00	
2	Monument Blvd Complete Streets Improvements	Monument Boulevard: Cowell Road to Mohr Lane	Complete Streets Design and Construction	LS	$20,000,000.00	1	$ 30,000,000.00	$ 45,000,000.00
3	Galindo St Complete Streets Improvements	Galindo Street: Concord Blvd to Cowell Road	Complete Streets Design and Construction	LS	$5,000,000.00	1	$ 5,000,000.00	
							Project Cost Total	**$ 45,000,000.00**
							Contingency Cost(20%)	**$ 9,000,000.00**
							Subtotal	**$ 54,000,000.00**
							Environmental (5%)	**$ 2,700,000.00**
							PS&E (20%)	**$ 10,800,000.00**
							Construction Engineering (10%)	**$ 5,400,000.00**
							Total	**$ 72,900,000.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 5: Concord Blvd Safety Improvements

5 - Concord Boulevard: Galindo Street to Yolanda Cir

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Fill Sidewalk Gaps	240' West of Alary Dr to Woodside Ct	Site Preparation and Removal	SF	$ 8.00	5500	$ 44,000.00	$ 442,700.00
			Install Curb and Gutter	LF	$ 80.00	550	$ 44,000.00	
			Landscaping	SF	$ 10.00	2750	$ 27,500.00	
			Install ADA Compliant Curb Ramp	EA	$ 10,000.00	3	$ 30,000.00	
			Install Sidewalk	SF	$ 40.00	2750	$ 110,000.00	
		Sutter St to Galindo St (North Side of Island)	Site Preparation and Removal	SF	$ 8.00	3900	$ 31,200.00	
			Install Sidewalk	SF	$ 40.00	3900	$ 156,000.00	
2	Enhance Pedestrian Crossings	**At 2nd St** Convert Existing RRFB controlled Crosswalk to HAWK with Advance LED Flashing Warning Sign	Install HAWK Signal	LS	$ 650,000.00	1	$ 650,000.00	$ 684,600.00
			Remove Sign and Post	EA	$ 400.00	2	$ 800.00	
			Install Advance LED Flashing Pedestrian Crossing Warning Sign	EA	$ 7,500.00	2	$ 15,000.00	
			Remove and Salvage Existing RRFB System	LS	$ 3,000.00	1	$ 3,000.00	
		Contra Costa Trail Crossing Install Advance LED Flashing Warning Sign for Ex PED Crossing	Remove Sign and Post	EA	$ 400.00	2	$ 800.00	
			Install Advance LED Flashing Pedestrian Crossing Warning Sign	EA	$ 7,500.00	2	$ 15,000.00	
3	Sight Distance Improvements	Minor Approaches with broadside collisions having sight distance issues due to trees, poles and objects	Relocate Obstruction	EA	$ 10,000.00	10	$ 100,000.00	$ 100,000.00
4	Speed Feedback Signs	Concord Blvd: Highway 242 to Kirker Pass Rd	Install Dynamic/Variable Speed Warning Sign (Solar-Powered)	EA	$ 15,000.00	10	$ 150,000.00	$ 150,000.00

Project Cost Total	**$ 1,377,300.00**
Contingency Cost(20%)	**$ 275,460.00**
Subtotal	**$ 1,652,800.00**
Environmental (5%)	**$ 82,640.00**
PS&E (20%)	**$ 330,560.00**
Construction Engineering (10%)	**$ 165,280.00**
Total	**$ 2,231,280.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 6: Port Chicago Hwy Safety Improvements

6 - Port Chicago Hwy Safety Improvements

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Speed Feedback Signs	North of High School Ave	Install Dynamic/Variable Speed Warning Sign (Solar-	EA	$ 15,000.00	2	$ 30,000.00	$ 30,000.00
2	Sight Distance Improvements	Minor Approaches with broadside collisions having sight distance issues due to trees, poles and objects	Relocate Obstruction	EA	$ 10,000.00	5	$ 50,000.00	$ 50,000.00
3	Median and Access Management	6th St to Gehringer	Site Preparation and Removal	SF	$ 8.00	6760	$ 54,080.00	$ 200,830.00
			Landscaping	SF	$ 10.00	5000	$ 50,000.00	
			Install Median Curb	LF	$ 60.00	1130	$ 67,800.00	
			Install Median Concrete	SF	$ 40.00	630	$ 25,200.00	
			Install Sign and Post	EA	$ 750.00	5	$ 3,750.00	
4	Modify Signal Timing and Hardware	Bonifacio St	Remove Existing Signal Head	EA	$ 500.00	2	$ 1,000.00	$ 121,000.00
			Remove Existing Pole and Equipment	EA	$ 2,500.00	2	$ 5,000.00	
			Install New Mast arm pole and Equipment	EA	$ 45,000.00	2	$ 90,000.00	
			Modify Signal Timing	LS	$ 5,000.00	1	$ 5,000.00	
			Install New 4- Section Signal Head	EA	$ 3,000.00	2	$ 6,000.00	
			Install New 3-Section Signal Head	EA	$ 3,500.00	4	$ 14,000.00	
5	Protected Left Turn	N 6th St	Remove Existing Signal Head	EA	$ 500.00	2	$ 1,000.00	$ 20,000.00
			Modify Signal Timing	LS	$ 5,000.00	1	$ 5,000.00	
			Install New 3-Section Signal Head	EA	$ 3,500.00	4	$ 14,000.00	
6	Pedestrian Crossing Improvements	Bonifacio St E Olivera Rd	Install ADA Compliant Curb Ramp	EA	$ 10,000.00	4	$ 40,000.00	$ 48,440.00
			Install Stop Bar	LF	$ 8.00	180	$ 1,440.00	
			Install High Visibility Crosswalk	EA	$ 1,000.00	7	$ 7,000.00	
							Project Cost Total	**$ 470,270.00**
							Contingency Cost(20%)	**$ 94,054.00**
							Subtotal	**$ 564,400.00**
							Environmental (5%)	**$ 28,220.00**
							PS&E (20%)	**$ 112,880.00**
							Construction Engineering (10%)	**$ 56,440.00**
							Total	**$ 761,940.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 7: Willow Pass Rd Northern Improvements

7 - Willow Pass Rd Northern Improvements

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Delineators, Wider Edgeline, and Rumble Strips	North of Lynwood to City Limits	Install Edgeline Rumble Strips	EA	$ 5.00	11420	$ 57,100.00	$ 197,900.00
			Remove Striping	LF	$ 2.50	12800	$ 32,000.00	
			Install Wider Edge Lines	LF	$ 8.00	12800	$ 102,400.00	
			Install Delineators	EA	$ 75.00	85	$ 6,400.00	
2	Street Lighting	North of Lynwood to City Limits	Install Street Light Pole, Foundation and Luminaire Fixture	EA	$ 20,000.00	3	$ 60,000.00	$ 178,500.00
			Install Street Light Pull Box	EA	$ 1,500.00	3	$ 4,500.00	
			Install Conduit and Cabling	LF	$ 110.00	900	$ 99,000.00	
			Install Service Point	EA	$ 15,000.00	1	$ 15,000.00	
3	Enhance Curve Delineation	North of Lynwood to City Limits	Remove Sign and Post	EA	$ 400.00	2	$ 800.00	$ 34,350.00
			Install Flashing Beacon System (per pole) with curve warning Signs	EA	$ 15,000.00	2	$ 30,000.00	
			Install Sign on Existing Post	EA	$ 300.00	6	$ 1,800.00	
			Install Delineators	EA	$ 75.00	24	$ 1,750.00	
4	Signs and Object Markers	North of Lynwood to City Limits	Install Object Markers	EA	$ 250.00	20	$ 5,000.00	$ 7,500.00
			Instll Reflectors on Existing Guardrail	EA	$ 50.00	50	$ 2,500.00	
							Project Cost Total	**$ 418,250.00**
							Contingency Cost(20%)	**$ 83,650.00**
							Subtotal	**$ 501,900.00**
							Environmental (5%)	**$ 25,100.00**
							PS&E (20%)	**$ 100,380.00**
							Construction Engineering (10%)	**$ 50,190.00**
							Total	**$ 677,570.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 8: Treat Blvd Safety Improvements

8 - Treat Blvd Safety Improvements

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Upgrading pedestal mounted left turn heads to mast arm mounted	Winton Dr, San Simeon Dr, San Miguel Rd, Navaronne Way, Turtle Creek, Bel Air Dr	Remove Existing Pole and Equipment	EA	$ 2,500.00	12	$ 30,000.00	$ 915,000.00
			Modify Signal Timing	LS	$ 5,000.00	6	$ 30,000.00	
			Install New Mast arm pole and Equipment	EA	$ 75,000.00	10	$ 750,000.00	
			Install 1-A Pole and Equipment	EA	$ 15,000.00	7	$ 105,000.00	
2	Fill Sidewalk Gaps	Lancelot Dr to San Miguel Rd	Site Preparation and Removal	SF	$ 8.00	45150	$ 361,200.00	$ 2,565,200.00
			Install Sidewalk	SF	$ 40.00	45150	$ 1,806,000.00	
			Install Curb and Gutter	LF	$ 80.00	1600	$ 128,000.00	
			Install Curb Ramp	EA	$ 10,000.00	27	$ 270,000.00	
3	Advanced Traffic Signal beacon	Navaronne Way WB	Install Mast Arm Pole and Warning Beacons	EA	$ 75,000.00	1	$ 75,000.00	$ 130,000.00
			Install Conduit and Cabling	LF	$ 110.00	500	$ 55,000.00	
4	Leading Pedestrian Interval	Corridor Wide Traffic Signals with Crossings	Modify Signal Phasing to Implement a Lead Pedestrian Interval	LS	$ 3,000.00	9	$ 27,000.00	$ 27,000.00
5	HAWK Signal	Blarney Ave	Install HAWK Signal	LS	$ 650,000.00	1	$ 650,000.00	$ 650,000.00
6	Speed Feedback Signs	Corridor Wide	Install Dynamic/Variable Speed Warning Sign (Solar-	EA	$ 15,000.00	6	$ 90,000.00	$ 90,000.00
7	Enhanced Curve Delineation	Between Navaronne Way and Cowell Rd	Install LED Signs or Beacons	EA	$ 13,000.00	4	$ 52,000.00	$ 62,000.00
			Install Sign and Post	EA	$ 500.00	20	$ 10,000.00	
							Project Cost Total	**$ 4,439,200.00**
							Contingency Cost(20%)	**$ 887,840.00**
							Subtotal	**$ 5,327,100.00**
							Environmental (5%)	**$ 266,360.00**
							PS&E (20%)	**$ 1,065,420.00**
							Construction Engineering (10%)	**$ 532,710.00**
							Total	**$ 7,191,590.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 9: Oak Grove Rd Safety Improvements

9 - Oak Grove Road Safety Improvements

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Median and Access Management	Gilly Ln to City Limits	Site Preparation and Removal	SF	$ 8.00	32580	$ 260,640.00	$ 2,235,440.00
			Landscaping	SF	$ 50.00	32580	$ 1,629,000.00	
			Install Median Curb	LF	$ 60.00	5430	$ 325,800.00	
			Install Sign and Post	EA	$ 500.00	40	$ 20,000.00	
2	Speed Feedback Signs	Various Locations Throughout Corridor	Install Dynamic/Variable Speed Warning Sign (Solar-Powered)	EA	$ 15,000.00	6	$ 90,000.00	$ 90,000.00
3	Sight Distance Improvements	Unsignalized Intersections	Remove Obstruction	EA	$ 10,000.00	8	$ 80,000.00	$ 80,000.00
4	Pedestrian Crossing Enhancements	Contra Costa Trail	Install Curb Ramp	EA	$ 10,000.00	2	$ 20,000.00	$ 41,000.00
			Install Median Refuge	EA	$ 10,000.00	2	$ 20,000.00	
			Install High Visibility Crosswalk	EA	$ 1,000.00	1	$ 1,000.00	
							Project Cost Total	**$ 2,446,440.00**
							Contingency Cost(20%)	**$ 489,288.00**
							Subtotal	**$ 2,935,800.00**
							Environmental (5%)	**$ 146,790.00**
							PS&E (20%)	**$ 587,160.00**
							Construction Engineering (10%)	**$ 293,580.00**
							Total	**$ 3,963,330.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 10: Ygnacio Valley Rd/Kirker Pass Rd Safety Improvements

10 - Ygnacio Valley Rd/Kirker Pass Rd Safety Improvements

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Fill Sidewalk Gaps	Ygnacio Valley Rd Crystl Ranch to Pine Hollow	Site Preparation and Removal	SF	$ 8.00	45000	$ 360,000.00	$ 3,864,100.00
			Install Sidewalk	SF	$ 40.00	45000	$ 1,800,000.00	
			Install Curb and Gutter	LF	$ 80.00	4500	$ 360,000.00	
			Install Curb Ramp	EA	$ 10,000.00	5	$ 50,000.00	
			Remove Median	SF	$ 15.00	3000	$ 45,000.00	
			Install Median Curb	LF	$ 60.00	500	$ 30,000.00	
		Ygnacio Valley Rd Michigan to Park Highlands	Site Preparation and Removal	SF	$ 8.00	6300	$ 50,400.00	
			Install Sidewalk	SF	$ 40.00	6300	$ 252,000.00	
			Install Curb Ramp	EA	$ 10,000.00	2	$ 20,000.00	
			Remove Curb	LF	$ 30.00	1050	$ 31,500.00	
			Install Curb and Gutter	LF	$ 80.00	1050	$ 84,000.00	
		Kirker Pass Rd Concord to Myrtle	Site Preparation and Removal	SF	$ 8.00	14400	$ 115,200.00	
			Install Sidewalk	SF	$ 40.00	14400	$ 576,000.00	
			Install Curb Ramp	EA	$ 10,000.00	9	$ 90,000.00	
2	Traffic Signal Warning Beacons	Ygnacio and Cowell EB	Install Mast Arm Pole and Warning Beacons Equipment	EA	$ 75,000.00	1	$ 75,000.00	$ 85,500.00
			Remove Existing Pole and Equipment	EA	$ 2,500.00	2	$ 5,000.00	
			Install Conduit and Cabling	LF	$ 110.00	50	$ 5,500.00	
3	High Friction Surface Treatment	Ayers/Alberta	Install High Friction Surface Treatment	SF	$ 6.00	20000	$ 120,000.00	$ 564,400.00
			Install Striping	LF	$ 4.00	1500	$ 6,000.00	
			Install Pavement Marking	EA	$ 500.00	8	$ 4,000.00	
		Myrtle to 1,000 feet past ClearBrook	Install High Friction Surface Treatment	SF	$ 6.00	70000	$ 420,000.00	
			Install Striping	LF	$ 4.00	3600	$ 14,400.00	
			Install Pavement Marking	EA	$ 500.00	5	$ 2,500.00	
4	Raised Median or Barrier	City Limits to Michigan	Site Preparation and Removal	SF	$ 8.00	2500	$ 20,000.00	$ 1,625,000.00
			Install Median Concrete	SF	$ 40.00	18750	$ 750,000.00	
			Install Median Curb	LF	$ 60.00	2500	$ 150,000.00	
			Install Sign and Post	EA	$ 500.00	10	$ 5,000.00	
			Install Median Barrier	LF	$ 100.00	7000	$ 700,000.00	
5	Street Lighting	City Limits to Michigan	Install Street Light Pole, Foundation and Luminaire	EA	$ 20,000.00	28	$ 560,000.00	$ 2,504,000.00
			Install Street Light Pull Box	EA	$ 1,500.00	32	$ 48,000.00	
			Install Conduit and Cabling	LF	$ 110.00	16800	$ 1,848,000.00	
			Service Location	EA	$ 12,000.00	4	$ 48,000.00	
6	Upgrade Striping	Corridor Limits	Remove Striping	LF	$ 2.50	79200	$ 198,000.00	$ 514,800.00
			Install Striping	LF	$ 4.00	79200	$ 316,800.00	
7	Install Guardrail and Impact Attentuator	City East Limit Mast Arm Pole	Install Guardrail	LF	$ 250.00	100	$ 25,000.00	$ 31,000.00
		East of Pavilion at Start of Median barrier	Install Impact Attentuator	EA	$ 6,000.00	1	$ 6,000.00	
8	Curb Line Reconfiguration	Alberta Way/ Pine Hollow Road	Install Curb Extension	EA	$ 25,000.00	3	$ 75,000.00	$ 197,000.00
		Alberta Way/ Pine Hollow Road	Install Curb Ramp	EA	$ 10,000.00	6	$ 60,000.00	
		Alberta Way/ Pine Hollow Road	Striping Improvements	LS	$ 5,000.00	1	$ 5,000.00	
		Park Highlands Blvd	Install Curb Extension	EA	$ 25,000.00	1	$ 25,000.00	
		Park Highlands Blvd	Install Curb Ramp	EA	$ 10,000.00	3	$ 30,000.00	
		Park Highlands Blvd	Striping Improvements	LS	$ 2,000.00	1	$ 2,000.00	
							Project Cost Total	**$ 9,385,800.00**
							Contingency Cost(20%)	**$ 1,877,160.00**
							Subtotal	**$ 11,263,000.00**
							Environmental (5%)	**$ 563,150.00**
							PS&E (20%)	**$ 2,252,600.00**
							Construction Engineering (10%)	**$ 1,126,300.00**
							Total	**$ 15,205,050.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 11: Citywide Pedestrian Sidewalk Improvements

11 - Citywide Pedestrian Sidewalk Improvements

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Fill Sidewalk Gaps	Citywide	Site Preparation and Removal	SF	$ 8.00	3041280	$ 24,330,240.00	$ 156,119,040.00
			Install Sidewalk	SF	$ 40.00	3041280	$ 121,651,200.00	
			Install Curb and Gutter	LF	$ 80.00	126720	$ 10,137,600.00	
							Project Cost Total	**$ 156,119,040.00**
							Contingency Cost(20%)	**$ 31,223,808.00**
							Subtotal	**$ 187,342,900.00**
							Environmental (5%)	**$ 9,367,150.00**
							PS&E (20%)	**$ 37,468,580.00**
							Construction Engineering (10%)	**$ 18,734,290.00**
							Total	**$ 252,912,920.00**

CITY OF CONCORD

Safety Action Plan - Cost Estimate

Project 12: Citywide Pedestrian Signal Improvements

1.3-Willow Pass Rd: I-680 to Avila Road

No.	Improvement	Locations	Description	Unit	Unit Cost	Quantity	Subtotal	Total
1	Leading Pedestrian Interval	Citywide (~15 Locations)	Modify Signal Phasing to Implement a Lead Pedestrian Interval	LS	$ 12,000.00	15	$ 180,000.00	$ 180,000.00

Project Cost Total	**$ 180,000.00**
Contingency Cost(20%)	**$ 36,000.00**
Subtotal	**$ 216,000.00**
Environmental (5%)	**$ 10,800.00**
PS&E (20%)	**$ 43,200.00**
Construction Engineering (10%)	**$ 21,600.00**
Total	**$ 291,600.00**