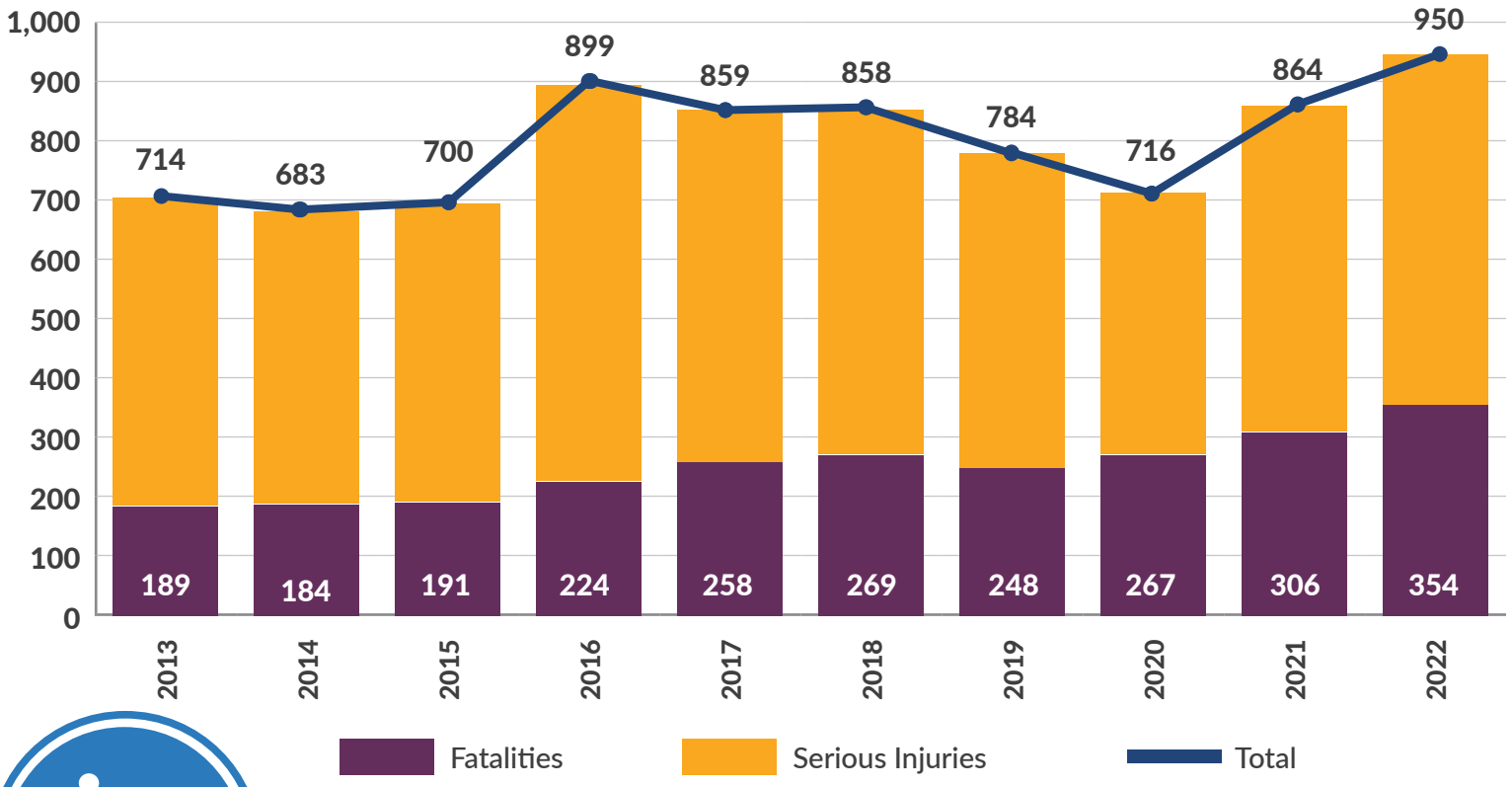
VULNERABLE ROAD USERS

ARIZONA STRATEGIC HIGHWAY SAFETY PLAN

EMPHASIS AREA DEFINITION

Vulnerable Road User crashes include crashes where one involved party is a pedestrian, bicyclist, or worker in a work zone.



HIGHLIGHTS

25%

of total fatalities involve Vulnerable Road Users.*

75%

of Pedestrian fatalities occur when the Pedestrian was crossing the street.*

95%

of Bicyclist fatalities occur when the Bicyclist was crossing the street.*

**Data taken from 2013-2022, crashes may overlap with other Emphasis Areas*

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STRATEGIES

ID	STRATEGY	TIMEFRAME	COST/ EFFORT
	SAFE ROADS		
VRU.1A	Separate VRUs from vehicles using space and time.	*Long term*	*Medium*
VRU.1B*	**Improve visibility of VRUs.**	***Short term***	***Low***
VRU.1C	Enhance VRU connectivity.	*Long term*	*Medium*
VRU.1D*	**Incorporate VRUs more prominently in planning, design, and programming process.**	***Short Term***	***Low***
	SAFE ROAD USERS		
VRU.2A	Reduce VRU safety risks through education of pedestrians and bicyclists.	*Medium term*	*Medium*
VRU.2B	Promote driver education on VRU behaviors.	*Medium term*	*Medium*
VRU.2C	Clarify and enforce laws and policies for all road users related to VRUs.	*Short term*	*Medium*
	SAFE SPEEDS		
VRU.3A	Clarify and enforce laws and policies related to electric/ micromobility devices.	*Short term*	*Medium*
VRU.3B	Utilize context-appropriate speed limits.	*Medium term*	*Medium*
	SAFE VEHICLES		
VRU.4A	Promote early implementation of automated detection of VRUs by vehicle.	*Medium term*	*Low*
VRU.4B	Support, through the provision of information, programs that incentivize lower weight and height vehicles	*Medium term*	*Low*
	POST-CRASH CARE		
VRU.5A*	**Promote safety at crash scenes.**	***Short term***	***Medium***
VRU.5B	Improve VRU crash and trauma data collection and sharing.	*Medium term*	*Medium*
VRU.5C	Improve crash and trauma data-sharing with VRU advocacy groups.	*Short term*	*Low*

High Priority Strategy

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STRATEGY EXAMPLES

SEPARATE VRUs FROM VEHICLES USING SPACE AND TIME

Develop infrastructure projects that provide separation of VRUs from vehicular traffic in either space or time.

For separation of space:

- Sidewalk and bike lanes
- Channelized island or bridges

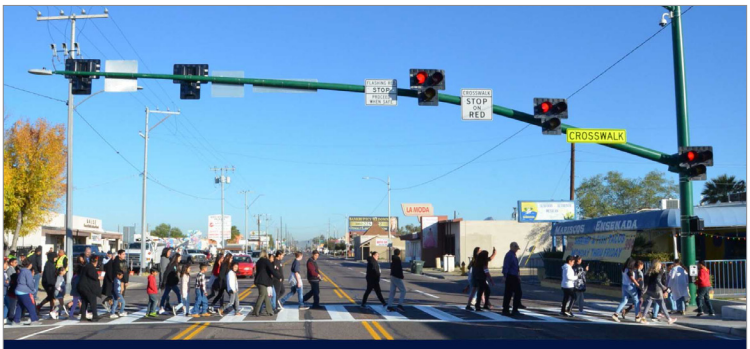
For separation of time:

- Enhanced VRU crossing
- Intersection traffic signal timing
- School guard crossing

Bicycle Lane

Source: City of Phoenix

HAWK Crossing



HAWK Pedestrian Signal at 16th Street and Palm Lane

Source: City of Phoenix

IMPROVE VISIBILITY OF VRUs

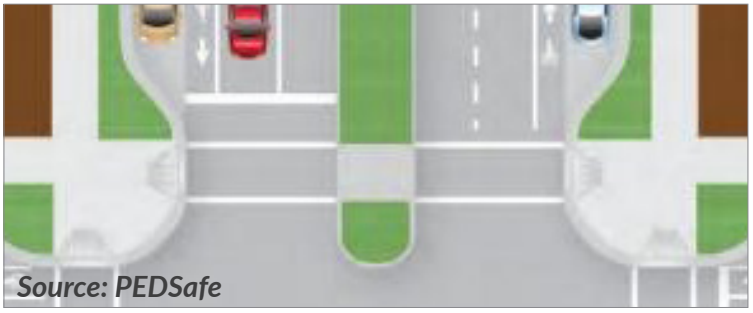
Develop infrastructure projects that improve the visibility of VRUs. At intersections and segments, these may include:

- Overhead lighting
- Static warning signs
- Activated flashing beacons
- Other methods that provide drivers a warning
- Curb bulbouts
- Features that place pedestrian and bicyclist in a better line of sight.

In active work zones and traffic incidents:

- Use appropriate reflective gear
- Traffic control devices
- Physical barriers that improve worker/responder safety

Curb Bulb Outs



Source: PEDSafe

Traffic Control

Source: ASSP

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ENHANCE VRU CONNECTIVITY

Develop infrastructure projects that enhance VRU connectivity within the roadway network and between modes/services. For roadways, priority projects will be those that fill in gaps with the sidewalk or bicycle system along major routes and/or near major activity centers. Coordination should be conducted between adjacent jurisdictions as part of this effort.

Incomplete Sidewalk

Source: City of Chandler

INCORPORATE VRUs MORE PROMINENTLY IN PLANNING, DESIGN, AND PROGRAMMING PROCESS

Develop internal policies and processes that require the incorporation of VRUs in the planning, design, and programming process.

- Performance-based practical design (PBPD)
- Complete Streets
- Approaches with a focus on statewide, regional, and local pedestrian and bicycle plans.

An agency champion should be established to assist in coordination and development of a comprehensive approach.

Complete Streets Graphic

Source: Smart Growth America

REDUCE VRU SAFETY RISKS THROUGH EDUCATION OF PEDESTRIANS AND BICYCLISTS

Develop education campaigns that focus on VRU safety risks. Campaigns should focus on a wide variety of user types and risk areas:

- Safe Routes to School
- Enhanced pedestrian and bicycle crossings
- Bicyclist safety
- Disability groups (ADA)

Statewide and regional efforts can be combined to reach larger audiences and increase efficiency of resources along with coordination with advocacy groups. This can be done:

- Online
- Promoted on social media
- Presented to community groups

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PROMOTE DRIVER EDUCATION ON VRU BEHAVIORS

Develop education campaigns that focus on driver understanding of VRU behaviors.

Campaigns should target vehicular drivers and highlight the vulnerability of pedestrians and bicyclists. Increased awareness of VRU safety can be incorporated into driver training courses/tests and can be developed into media campaigns such as Maricopa Association of Government's See Me AZ.

Can be promoted:

- Online
- On social media
- Presented to community groups

See Me Az

Source: MAG

CLARIFY AND ENFORCE LAWS AND POLICIES FOR ALL ROAD USERS RELATED TO VRUs

Provide education on existing laws and policies for all road user related to VRU safety including clarification of:

- User types
- Definitions
- Preferred locations
- Legal restrictions

Utilize existing data and statistics regarding VRU violations and incidents to refine enforcement locations and tactics.

Crossing Enforcement

Source: City of Chicago

VULNERABLE ROAD USERS

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CLARIFY AND ENFORCE LAWS AND POLICIES RELATED TO ELECTRIC/MICROMOBILITY DEVICES

Provide education on existing laws and policies related to micromobility devices such as:

- Electric scooters
- Motorized bicycles
- Similar higher speed non-vehicles

Include clarification of:

- Definitions
- Preferred locations
- Any legal restrictions

Utilize existing data and statistics regarding violations and incidents to refine enforcement locations and tactics. Provide subject matter expertise regarding proposed laws and policies related to micromobility devices.

Micromobility

Source: City of Phoenix

UTILIZE CONTEXT-APPROPRIATE SPEED LIMITS

Utilize context-appropriate vehicle speed limits through policy, education, and enforcement.

Policy efforts can include speed-setting policies that incorporate roadway functions as well as environment, land uses, user types, and overall context.

Education efforts can include:

- Open discussion with community
- Two-way communication
- Use of speed feedback signs

Enforcement should be conducted in targeted areas experiencing high levels of noncompliance or sensitive to speeding risks.

Speed Feedback Sign

Source: Iowa DOT

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PROMOTE EARLY IMPLEMENTATION OF AUTOMATED DETECTION OF VRUs BY VEHICLES

Provide the automotive industry and lawmakers existing data regarding the relationship between crash frequency and severity and VRU involvement, as requested. Offer support to potential new federal vehicle equipment and design initiatives that can automatically detect VRU conflicts using a combination of sensors and algorithms as well as connected vehicle and autonomous vehicle technologies.

SUPPORT, THROUGH THE PROVISION OF INFORMATION, PROGRAMS THAT INCENTIVIZE LOWER WEIGHT AND HEIGHT VEHICLES.

Provide lawmakers existing data and input that support the need for new and/or revised laws and policies that promote smaller vehicles (size and/or weight), as requested.

PROMOTE SAFETY AT CRASH SCENES

Promote traffic safety at crash scenes through internal training on traffic incident management (TIM), incident command system (ICS), and other topics to law enforcement, first responders, and other public agencies. Provide public education on the need for safety around active crash scenes and the importance of responder safety. Educate on supporting initiatives such as “Move Over” law and clearing roadway with minor crashes.

Promote stop-the-bleed and CPR training for all motorists and bystanders so they can render emergency care at crash scenes as needed until emergency responders arrive. Support training of emergency medical care technicians and job placement in rural and medically underserved areas.

Move Over AZ

Source: NHTSA

IMPROVE VRU CRASH AND TRAUMA DATA COLLECTION AND SHARING

Improve crash data collection at the scene of VRU incidents to ensure accurate and complete safety data. Crash data collection should follow the state’s crash record form, ideally in electronic format to facilitate efficiency in transmittal to the statewide custodial platform. Crash narratives should provide a descriptive account of the crash with details not explicitly within the form. Improve VRU incident EMS and trauma registry data collection, maintenance, and enhancement of related databases.

IMPROVE CRASH AND TRAUMA DATA-SHARING WITH VRU ADVOCACY GROUPS

Improve data sharing of VRU incident outcomes to VRU advocacy groups to support localized community outreach and media campaigns. VRU crash data, emergency medical services data, and trauma data should be limited to an aggregate level and not include any personally identifiable information. Statistics and trends can be used to leverage resources in terms of public education.

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STRATEGY RESOURCES

FHWA – Safety Resources	https://highways.dot.gov/safety
Proven Safety Countermeasures	https://highways.dot.gov/safety/proven-safety-countermeasures
Zero Death Resources	https://highways.dot.gov/safety/zero-deaths/resources
Intersection Safety Resources	https://highways.dot.gov/safety/intersection-safety/resources
Safe System Intersections	https://highways.dot.gov/safety/intersection-safety/safe-system-intersections
Transportation Safety Planning	https://highways.dot.gov/safety/other/transportation-safety-planning-tsp
Intersection Control Evaluation	https://highways.dot.gov/safety/intersection-safety/ice
Bicycle and Pedestrian Safety	https://highways.dot.gov/safety/pedestrian-bicyclist
Local & Rural Safety	https://highways.dot.gov/safety/local-rural/training-tools-guidance-and-countermeasures-locals-practitioners
Speed Management Safety	https://highways.dot.gov/safety/speed-management/reference-materials
Roadway Departure Safety	https://highways.dot.gov/safety/RwD

NHTSA – Safety Resources	https://www.nhtsa.gov/
Risky Driving	https://www.nhtsa.gov/risky-driving
Vehicle Safety	https://www.nhtsa.gov/vehicle-safety
Road Safety	https://www.nhtsa.gov/road-safety

Other Resources	
Arizona–Move Over AZ	https://moveoveraz.org/
BIKESAFE–Bicycle Safety	http://www.pedbikesafe.org/BIKESAFE/countermeasures.cfm
FHWA - Bicycle and Pedestrian Program	https://www.fhwa.dot.gov/environment/bicycle_pedestrian/resources/
GHSA – Speed and Red Light Cameras	https://www.ghsa.org/issues/speed-and-red-light-cameras
IIHS – Highway Loss Data Institute	https://www.iihs.org/
MAG – See Me AZ	https://azmag.gov/Programs/Transportation/Safety-Programs/See-Me-AZ
PEDSAFE–Pedestrian Safety	http://www.pedbikesafe.org/PEDSAFE/countermeasures.cfm
TZD–Marketing & Communications Toward Zero deaths	https://www.towardzerodeaths.org/marketing-communications/#plans
USDOT – Preparing for the future of transportation	https://www.transportation.gov/AV
USDOT – Traffic Safety Marketing	https://www.trafficsafetymarketing.gov/