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TO: Project Team

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SUBJECT: Benton County Transportation Safety Action Plan

Emphasis Area Strategies   Project #25003-000

Emphasis Areas are near-term focus areas for safety mitigation that align with patterns and characteristics in crash data that are most predominant or that are overly represented in fatal and serious injury crashes compared to lower severity crashes. In Benton County, the following key emphasis areas have been identified:

- Roadway and Lane Departure
- Risky Behaviors (Drug and Alcohol Impairment, Distracted Driving, Speeding)
- Intersections
- Aging Drivers
- Bicyclists

This memorandum recommends sets of strategies for each emphasis area the County can implement to influence the elimination of crashes that result in fatalities and serious injuries. In contrast to the High Priority Projects identified that are limited to specific locations, these strategies applied to emphasis areas are intended to have broad-reaching influence to eliminate crashes county-wide.

ROADWAY AND LANE DEPARTURES

Of the 3,830 crashes reported during the 2018-2022 study period, 858 drivers crossed into the opposing lane, or ran off the roadway. Rural roadways within Benton County often have narrow shoulders and higher speeds, with side slopes that may be unrecoverable. 61% of roadway/lane departure crashes involved a vehicle hitting a fixed object.

- Percent of all Benton County crashes: 22%
- Percent of fatal and serious injury Benton County crashes: 47%

TABLE 1. POTENTIAL COUNTERMEASURES FOR ROADWAY AND LANE DEPARTURES

SAFE SYSTEM APPROACH	POTENTIAL COUNTERMEASURE	DESCRIPTION
SAFE ROADS	Install chevron signs on rural horizontal curves	The chevron alignment sign (W1-8) defines a change in horizontal alignment of a roadway. The signs show the shape and degree of curvature and help guide drivers through the curve or turn.
SAFE ROADS	Widen edge lines (for example 4 inches to 6 inches)	Increasing the width of roadway edge lines increases visibility for drivers. Improve safety by keeping drivers in their designated travel lane and allowing more time for drivers to focus on critical driving tasks.
SAFE ROADS	Install centerline rumble strips	Rumble strips are ground/milled in patterns on the roadway that provide both an audible warning (rumbling sound) and a physical vibration to drivers. Rumble strips alert drivers that they are leaving their travel lane, allowing them time to make a safe recovery back into their lane.
SAFE ROADS	Install post-mounted delineators on curves	A flexible fiber or aluminum post retroreflective device mounted above the roadway surface and along the side of the roadway in a series to show roadway alignment. Retroreflective material, such as post-mounted delineators, can be a highly effective treatment for delineating curves, especially at nighttime. They improve driver lane position both at the entry to the curve and at its midpoint.
SAFE ROADS	Install oversized doubled-up and/or fluorescent yellow sheeting for advance curve warning signs	Install larger signing, retroreflective material, additional identical signs, and other conspicuous elements to increase visibility.

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SAFE SYSTEM APPROACH	POTENTIAL COUNTERMEASURE	DESCRIPTION
SAFE ROADS	Provide adequate clear zones by removing/ relocating fixed obstacles on roadside (e.g., 3 feet to 16 feet)	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.
SAFE ROADS	Add or widen the shoulder along roadways or along the outside of curves to provide a greater area for a driver to regain control of a vehicle	Add or widen a shoulder to provide a greater area to regain control of a vehicle. This can also help vehicles come to an emergency stop or drive slowly, provide increased sight distance for through vehicles and for vehicles entering the roadway, and in some cases reduce passing conflicts between motor vehicles and bicyclists and pedestrians.
SAFE ROADS	Provide a safety edge	Safety edge is a pavement edge sloped at an angle (30-35 degrees) to make it easier for a driver to safely re-enter the roadway after inadvertently driving onto the shoulder.
SAFE ROADS	Upgrade existing markings to reflective pavement markings	Applied on existing roadway surface edge lines as a paint, tape, or a thermoplastic material. Wet-reflective elements allow a pavement marking to retain its retro reflectivity when covered by water.
SAFE ROADS	Increase pavement friction on curve segment by installing High Friction Surface Treatment	Applied at locations where frequent crashes are observed for which insufficient friction is a contributing factor. Generally, in areas where frequent braking occurs, such as curves. Prevents water build up on wet surfaces and provides exceptional roadway friction.
SAFE SPEEDS	Install dynamic speed feedback signs for curves	Supplemental beacons and/or messages that activate when a motorist approaches the curve at a high speed.

RISKY BEHAVIORS (DRUG/ALCOHOL IMPAIRMENT, DISTRACTED DRIVING, SPEEDING)

Overall, risky driving behaviors (i.e., drivers under the influence of drugs or alcohol, distracted driving, and driving above the speed limit) accounted for 16% of all crashes within the 2018-2022 study period. Of the 3,830 crashes reported during the study period, 116 (3%) crashes involved drivers impaired by alcohol and 48 (1%) crashes involved drivers impaired by drugs. About 71% of impaired driving crashes involved a driver departing their lane or roadway, and 30% also involved speeding.

136 crashes (about 4% of all crashes) involved a distracted/inattentive driver. Crashes involving distracted drivers accounted for about 5% of all fatal and serious injury crashes.

406 crashes involved a vehicle driving faster than the speed limit. This accounts for 11% of all Benton County crashes, and 17% of crashes resulting in either a fatal or serious injury.

- Percent of all Benton County crashes: 16%
- Percent of fatal and serious injury Benton County crashes: 31%

TABLE 2. POTENTIAL COUNTERMEASURES FOR RISKY BEHAVIORS

SAFE SYSTEM APPROACH	POTENTIAL COUNTERMEASURE	DESCRIPTION
SAFE ROADS	Provide adequate clear zones by removing/ relocating fixed obstacles on roadside (e.g., 3 feet to 16 feet)	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.
SAFE ROADS	Install guide signs	Install guide signs to provide directional and mileage information to specific destinations.
SAFE ROADS	Flatten rural side slopes	Flatten rural side slopes to provide safe recovery areas during the event when vehicles are leaving the roadway.
SAFE ROADS	Install speed feedback signs	Speed feedback signs provide drivers with real-time information about their speed as they pass the sign.
SAFE SPEEDS	Install dynamic speed feedback signs for curves	Supplemental beacons and/or messages that activate when a motorist approaches the curve at a high speed.

SAFE SYSTEM APPROACH	POTENTIAL COUNTERMEASURE	DESCRIPTION
SAFE SPEEDS	Set appropriate posted speed limits	Set appropriate posted speed limits, in compliance with current ODOT policies.
SAFE PEOPLE	Alternative Transportation	Partner with local organizations and law enforcement to provide alternative transportation to and from locations or events to avoid impaired driving.
SAFE PEOPLE	High-visibility saturation patrols	Large numbers of law enforcement officers patrol a specific area to deter unsafe driving behavior including impaired driving.
SAFE PEOPLE	Educational campaigns	Create educational campaigns targeting risky driver behaviors such as speeding, distracted driving, impaired driving, and drowsy driving.
SAFE VEHICLES	Prioritize in-vehicle technology for collision avoidance in County fleet vehicles	Technology that enhances safety by alerting drivers to hazards, such as blind spot encroachments and lane departures, and can autonomously apply brakes to avoid crashes or lessen their severity.
POST-CRASH CARE	Robust communication network	Support a robust communication network to ensure that crashes can be quickly reported to emergency services.

INTERSECTIONS

Within the 2018-2022 study period, 1,919 crashes took place at an intersection or were related to an intersection. 686 of all intersection crashes took place at a traffic signal, while 884 crashes took place at stop-controlled intersections.

- Percent of all Benton County crashes: 50%
- Percent of fatal and serious injury Benton County crashes: 35%

TABLE 3. POTENTIAL COUNTERMEASURES FOR INTERSECTIONS

SAFE SYSTEM APPROACH	POTENTIAL COUNTERMEASURE	DESCRIPTION
SAFE ROADS	Increase triangle sight distance	Remove sight distance restrictions (e.g., vegetation, parked vehicles, signs, buildings) from the sight triangles at an intersection. Improves drivers' ability to see approaching vehicles on the main line without obstruction.
SAFE ROADS	Provide street lighting at intersections	A permanent source of artificial lighting installed at an intersection that provides greater visibility of the intersection.
SAFE ROADS	Provide actuated flashing beacons triggered by approaching vehicles	Flashing beacons that only flash when a sensor detects a vehicle approaching an intersection.
SAFE ROADS	Install intersection visibility upgrades	For example, oversized stop signs, doubled-up stop signs, high-visibility intersection warning signs, flashing beacons on advanced warning signs, reflectorized tape on signposts, etc.
SAFE ROADS	Install transverse rumble strips on stop-controlled approach(es)	Rumble strips placed across the roadway to provide audible warning (rumbling sound) to alert drivers of an upcoming intersection. Transverse rumble strips have been proven to be effective at reducing the number of vehicles disregarding a stop sign.
SAFE ROADS	Provide flashing beacons at minor-road stop-controlled intersections	Flashing beacons provide a visible signal indicating the presence of an intersection.
SAFE ROADS	Provide "STOP AHEAD" pavement markings	These pavement markings can be used to increase drivers' alertness to the presence of an unsignalized intersection.

SAFE SYSTEM APPROACH	POTENTIAL COUNTERMEASURE	DESCRIPTION
SAFE ROADS	Convert minor road stop-controlled intersection into roundabout	Convert an unsignalized intersection into a roundabout. Roundabouts eliminate up to 75% of vehicle conflict points typically associated with traditional intersections. Roundabouts should always be given preference over new traffic signals unless an intersection control evaluation finds that a traffic signal is a more appropriate treatment.

AGING DRIVERS (AGES 65+)

Of the 3,830 crashes reported during the 2018-2022 study period, 428 crashes involved an older driver. Among crashes involving aging drivers, 24% took place at a stop-controlled intersection. Additionally, 16% of crashes involving aging drivers resulted in the driver leaving their lane or running off the road.

- Percent of all Benton County crashes: 11%
- Percent of fatal and serious injury Benton County crashes: 25%

TABLE 4. POTENTIAL COUNTERMEASURES FOR AGING DRIVERS ON RURAL ROADWAYS

SAFE SYSTEM APPROACH	POTENTIAL COUNTERMEASURE	DESCRIPTION
SAFE ROADS	Provide street lighting at intersections and roadway segments	A permanent source of artificial light installed at an intersection that provides greater visibility of the intersection. This countermeasure reduces nighttime crashes.
SAFE ROADS	Improving the reflectivity of pavement marking and signs	This countermeasure improves visibility of the pavement markings and signs, especially during dark lighting conditions.
SAFE PEOPLE	Formal courses for older drivers	Courses that provide basic safe driving practices and in how to adjust driving to accommodate age-related cognitive and physical changes.
SAFE PEOPLE	License restrictions	Restrict drivers who are medically at-risk to increase the safety of the driver and others on the road.
SAFE PEOPLE	Medical review protocols	License agencies evaluate people with medical conditions or functional limitations that could affect their ability to drive safely.
SAFE PEOPLE	Education and outreach regarding transportation options	Expand education for aging drivers to improve understanding of how to use available alternatives to driving (e.g., BAT Lift).
SAFE VEHICLES	Education and outreach regarding safer vehicle adaptations and technology	Promote education about features in vehicles that are most helpful for older drivers (e.g., large mirrors, collision avoidance technology, high-visibility lights, larger font dashboards, simplified interfaces, pedal extenders). This could include partnerships with local dealerships to give demonstrations and test drives for seniors.

BICYCLISTS

Of the 3,830 total crashes reported during the study period, 119 crashes involved a person biking. A majority of these crashes took place at intersections.

- Percent of all Benton County crashes: 3%
- Percent of fatal and serious injury Benton County crashes: 4%

TABLE 5. POTENTIAL COUNTERMEASURES FOR BICYCLISTS

SAFE SYSTEM APPROACH	POTENTIAL COUNTERMEASURE	DESCRIPTION
SAFE ROADS	Install bike lanes in urban areas and widen shoulders in rural areas	Bicycle lanes and shoulders make the movements of both motorists and bicyclists more predictable and provide consistent separation between bicyclists and passing motorists.
SAFE ROADS	Install bicycle warning signs along segments where cyclists share the road with motor vehicle traffic and at intersections	Yellow warning symbol signs with appropriate supplemental plaques warning of bicycles and/or pedestrians on the roadway.
SAFE ROADS	Install radar-activated dynamic warning systems to alert drivers to people biking on the roadway ahead	Radar devices detect cyclists riding along the roadway, which triggers a flashing sign that alerts drivers to people biking on the roadway ahead. This may be most effective in high-risk areas where biking activity is relatively common, and visibility may be limited due to curves.
SAFE PEOPLE	Create and promote educational campaigns to encourage safe behaviors related to biking	For example, for people biking, topics like helmet use, obeying traffic control devices, crossing at intersections or designated crossing locations, wearing reflective clothing at night and installing additional lights on bikes, etc. For people driving, topics like safe passing, yielding, turn interactions, and how to share the road.
SAFE PEOPLE	Cycling skills clinics, bike fairs, bike rodeos	Provide events that promote improving bicycle skills.