# High-Risk Rural Roads (HRRR) Study

# Supporting Statement

# Survey Questions

Welcome. Thank you for your time.

Survey participation is voluntary. The information collected will be used by the Federal Highway Administration to update the “High Risk Rural Roads Study, Report to Congress, and Best Practices Manual” that is required under the 23 U.S.C. 148 note of the “Bipartisan Infrastructure Law” (BIL) (Public Law 117-58). Public reporting burden is estimated to average four (4) hours per response, including the time for reviewing instructions, gathering data if needed, and completing and reviewing the collection of information. The OMB control number for this collection is XXXXX. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, Federal Highway Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590.

*Survey Information.*

This questionnaire is designed to help identify roadway safety infrastructure improvements for State and local high risk rural roads and the levels of effectiveness, associated costs, and typical life cycles of these improvements.

High risk rural roads are defined in 23 USC 148(a)(1) as “any roadway functionally classified as a rural major or minor collector or a rural local road with significant safety risks, as defined by a State in accordance with an updated State strategic highway safety plan.”

For the purposes of this questionnaire, please consider, high risk rural roads where safety treatments have been implemented by your agency, regardless of the funding sources for those treatments. Each State defines “high risk,” but the treatment must occur on rural major or minor collectors or rural local roads.

For the questions in the survey, please answer them to the best of your ability, with the following timeframe in mind: calendar years 2013-2022.

*Survey Instructions.*

The survey does not have to be completed in one session. The survey automatically saves your answers, so you can complete the survey over multiple days. All questions require an answer to move to the next question. You are also able to return to previous questions to review and/or update answers. Please take your time completing this survey and consult your agency subject matter experts as appropriate, so we collect the best information for updating the “High Risk Rural Roads Study, Report to Congress, and Best Practices Manual.” (Link to Manual: <https://safety.fhwa.dot.gov/hsip/hrrr/manual/hrrr_2014.pdf>)

**QUESTIONS**

1. What type of agency do you represent?

* State transportation agency
* Local transportation agency
* Other à Explain: \_\_\_\_\_\_\_

*If the respondent indicated they are affiliated with a local agency, they* *will be presented with question a. and b.*

1. Does your agency have a dedicated safety improvement program (e.g., roadway safety plan, roadway safety related policies, dedicated safety funding)?
   * Yes
   * No

*[Note to reviewers: The purpose of this question is to determine if the agency has a formal safety program (and thus is likely to have more exposure to a wide array of treatments) or if funding for safety improvements is minimal, as this could influence the cost effectiveness assessments for such agencies.]*

1. Does your agency have a staff member or members primarily responsible for the oversight of safety improvements and/or maintenance of the improvements?
   * Yes
   * No
2. Please list the name and location (e.g., City, State) of the agency that you represent.

Agency Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Location: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. FHWA’s Proven Safety Countermeasure initiative promotes 28 countermeasures and strategies effective in reducing roadway fatalities and serious injuries on our Nation’s highways. What proven safety countermeasures has your agency used for high risk rural road locations? (check all that apply)

If you are unsure of what these countermeasures are, please review the FHWA Proven Safety Countermeasure website at: <https://highways.dot.gov/safety/proven-safety-countermeasures>. The list below is presented in the same order as shown on the website, organized into the following focus area categories: Speed Management, Pedestrian/Bicyclist, Roadway Departure, Intersections, and Crosscutting.

Speed Management:

* Appropriate speed limits for all road users
* Speed safety cameras
* Variable speed limits

Pedestrian/Bicyclist:

* Bicycle lanes
* Crosswalk visibility enhancements
* Leading pedestrian interval
* Medians and pedestrian refuge islands
* Pedestrian hybrid beacons
* Rectangular rapid flashing beacons
* Road diets (roadway configuration)
* Walkways

Roadway Departure:

* Enhanced delineation for horizontal curves (e.g., pavement markings, chevrons, delineators, etc.)
* Longitudinal rumble strips and stripes on two-lane roads
* Median barriers
* Roadside design improvements at curves (e.g., clear zone, slope flattening, shoulders, roadside barriers, etc.)
* SafetyEdgeSM
* Wider edge lines

Intersections:

* Traffic signal 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
* Traffic signal yellow change intervals

Crosscutting:

* Lighting
* Local road safety plans
* Pavement friction management
* Road safety audit

The next set of questions will ask you to identify individual safety infrastructure treatments used by your agency. Multiple treatments will be listed in each question, and you will be able to check all that apply. The 6 categories that individual treatments are listed under are shown below and correspond to the next set of questions.

* Signing and pavement marking safety infrastructure treatment
* Intersection-specific safety improvement infrastructure treatments
* Pavement and shoulder resurfacing and widening safety infrastructure treatments
* Roadside safety infrastructure treatments
* Pedestrian and bicyclist safety infrastructure treatments
* Other safety infrastructure treatments

1. Please identify the individual **signing and pavement marking safety infrastructure treatments** used by your agency at high risk rural road locations. (check all that apply)

* Install advance curve warning and advisory speed signs at horizontal curve locations
* Install chevron signs at horizontal curve locations
* Install large arrow signs at horizontal curve locations
* Install post-mounted delineators at horizontal curve locations
* Enhance warning signs (increase size, improve sheeting conspicuity, or double signs)
* Install variable speed limits signs
* Install dynamic speed feedback signs
* Install standard edge line markings where previously not present
* Convert standard edge line markings to wide (greater than 4”) edge line markings
* Install center line markings where previously not present
* Convert center line markings to wide (greater than 4”) center line markings
* Install raised pavement markers along the center line exclusively at horizontal curve locations
* Install raised pavement markers along the length of the center line for an entire segment or corridor
* Install edge line longitudinal rumble stripes (Note: rumble strips will be included in a later question) (https://highways.dot.gov/safety/proven-safety-countermeasures/longitudinal-rumble-strips-and-stripes-two-lane-roads)
* Install center line longitudinal rumble stripes
* Others àList: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. For the safety infrastructure improvements you previously selected (listed below), identify a minimum of one (1) and up to five (5) of the most effective treatments your agency has deployed since 2013. Note that for each treatment selected, you will be asked about approximate quantity installed, initial investment, projected life, maintenance and cost, and safety effectiveness.

*Respondent will be presented with all of the ones they selected in the previous question.*

* Selected option from previous question
* Selected option from previous question

*(and so on)*

*The following questions 4b-h will loop for each of the options the respondent selected in question 4a.*

1. Select the unit of measurement that best fits this treatment: {selected option from question 4a}. (Note: the unit selected will correspond to the upcoming questions.)

* Linear foot
* Linear mile
* Square foot
* Each
* Lump sum
* Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Approximate quantity installed of this treatment on high risk rural roads since 2013 (e.g., 5 roundabouts, 100 miles of rumble strips):

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Indicate initial investment of this treatment per the unit of measurement selected in 4b:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Projected life of this treatment for the initial installation:

* Less than 1 year
* 1-3 years
* 3-5 years
* 5-10 years
* 10-15 years
* 15-20 years
* Greater than 20 years
* Do not know

1. Required maintenance timeframe of this treatment:

* None
* Every 1 year
* Every 2 years
* Every 5 years
* Every 10 years
* Every 20 years
* Do not know

1. Maintenance cost per period per unit (refer to timeframe selected in 4f):

* Integrated into maintenance program, so unknown
* $1,000 to $5,000
* $5,000 to $10,000
* $10,000 to $25,000
* $25,000 to $50,000
* $50,000 to $75,000
* $75,000 to $100,000
* Greater than $100,000
* Do not know

1. Evaluation/assessment results of this treatment, measured in reduction of "fatal injury" and "suspected serious injury" crashes:

A fatal injury is an injury that results in death within 30 days aft er the motor vehicle crash in which the injury occurred.

A suspected serious injury is an injury other than fatal which results in one or more of the following:

* Severe laceration resulting in exposure of underlying tissue/muscle/organs or resulting in significant loss of blood
* Broken or distorted extremity (arm or leg)
* Suspected skull, chest, or abdominal injury other than bruises or minor lacerations
* Significant burns (second or third degree burns over 10 percent or more of the body)
* Unconsciousness when taken from the crash scene
* Paralysis
* Treatment has not been evaluated/assessed
* Greater than 30% reduction
* 21-30% reduction
* 11-20% reduction
* 10% or less reduction
* No change
* Do not know

1. Please identify the individual **intersection-specific safety infrastructure treatments** used by your agency at high risk rural road locations. (check all that apply)

* Construct left-turn lanes where none currently exist
* Modify existing left-turn lanes to be offset left-turn lanes
* Construct offset left-turn lanes where left-turn lanes currently do not exist
* Construct two-way left turn lanes (TWLTL) on two lane roads.
* Construct right-turn lanes
* Construct bypass lanes on two-lane roadways (lane that allows traffic to move around a vehicle waiting in the through lane to make a left turn)
* Construct acceleration lanes
* Install advance intersection warning signage where it currently does not exist
* Improve existing advance intersection warning signage
* Provide flashing beacons at intersection approaches
* Add dynamic advanced warning sign systems at intersection approaches
* Convert two-way STOP control intersection to four-way STOP control intersection
* Construct mini-roundabout
* Convert STOP control intersection to signalized intersection
* Improve traffic signal visibility (larger diameter lens or install signal backplate)
* Install signal backplates with retroreflective borders
* Install priority control systems for emergency vehicles
* Install or improve intersection lighting
* Install transverse rumble strips on stop-controlled approaches
* Convert a traditional intersection (stop-controlled or signalized) into a roundabout
* Convert a traditional intersection (stop-controlled or signalized) into a reduced left-turn conflict intersection (<https://highways.dot.gov/safety/proven-safety-countermeasures/reduced-left-turn-conflict-intersections>)
* Reconstruct a skewed intersection
* Convert an at-grade intersection into a grade-separated interchange
* Install railroad crossing hardware and warning systems where they currently do not exist
* Upgrade existing railroad crossing hardware and warning systems
* Remove an existing railroad crossing
* Convert an at-grade railroad crossing to a grade-separated railroad crossing
* Others à List: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. For the safety infrastructure improvements you previously selected (listed below), identify a minimum of one (1) and up to five (5) of the most effective treatments your agency has deployed since 2013. Note that for each treatment selected, you will be asked about approximate quantity installed, initial investment, projected life, maintenance and cost, and safety effectiveness.

*Respondent will be presented with all of the ones they selected in the previous question.*

* Selected option from previous question
* Selected option from previous question

*(and so on)*

*The following questions 5b-h will loop for each of the options the respondent selected in question 5a.*

1. Select the unit of measurement that best fits this treatment: {selected option from question 5a}. (Note: the unit selected will correspond to the upcoming questions.)

* Linear foot
* Linear mile
* Square foot
* Each
* Lump sum
* Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Approximate quantity installed of this treatment on high risk rural roads since 2013 (e.g., 5 roundabouts, 100 miles of rumble strips):

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Indicate initial investment of this treatment per the unit of measurement selected in 5b:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Projected life of this treatment for the initial installation:

* Less than 1 year
* 1-3 years
* 3-5 years
* 5-10 years
* 10-15 years
* 15-20 years
* Greater than 20 years
* Do not know

1. Required maintenance timeframe of this treatment:

* None
* Every 1 year
* Every 2 years
* Every 5 years
* Every 10 years
* Every 20 years
* Do not know

1. Maintenance cost per period per unit (refer to timeframe selected in 5f):

* Integrated into maintenance program, so unknown
* $1,000 to $5,000
* $5,000 to $10,000
* $10,000 to $25,000
* $25,000 to $50,000
* $50,000 to $75,000
* $75,000 to $100,000
* Greater than $100,000
* Do not know

1. Evaluation/assessment results of this treatment, measured in reduction of "fatal injury" and "suspected serious injury" crashes:

A fatal injury is an injury that results in death within 30 days aft er the motor vehicle crash in which the injury occurred.

A suspected serious injury is an injury other than fatal which results in one or more of the following:

* Severe laceration resulting in exposure of underlying tissue/muscle/organs or resulting in significant loss of blood
* Broken or distorted extremity (arm or leg)
* Suspected skull, chest, or abdominal injury other than bruises or minor lacerations
* Significant burns (second or third degree burns over 10 percent or more of the body)
* Unconsciousness when taken from the crash scene
* Paralysis
* Treatment has not been evaluated/assessed
* Greater than 30% reduction
* 21-30% reduction
* 11-20% reduction
* 10% or less reduction
* No change
* Do not know

1. Please identify the individual **pavement and shoulder resurfacing and widening safety infrastructure treatments** used by your agency at high risk rural road locations. (check all that apply)

* Resurface existing road to improve skid resistance
* Widen existing travel lanes by two feet or less per lane
* Adjust superelevation through the limits of a horizontal curve
* Add passing lanes or truck climbing lanes
* Install or maintain a graded shoulder
* Pave an existing shoulder
* Widen an existing paved shoulder
* Install turnouts (used for refuge space for disabled vehicles or enforcement)
* Install a SafetyEdgeSM (https://highways.dot.gov/safety/proven-safety-countermeasures/safetyedgesm)
* Install continuous longitudinal rumble strips (https://highways.dot.gov/safety/proven-safety-countermeasures/longitudinal-rumble-strips-and-stripes-two-lane-roads)
* Install targeted longitudinal rumble strips at key locations (such as on the outside of horizontal curves only)
* Install sinusoidal rumble strips/mumble strips
* Install transverse rumble strips prior to horizontal curves
* Others à List: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*If the respondent selects, “Install continuous longitudinal rumble strips,” they will be presented with question a.*

* 1. Where did you install continuous longitudinal rumble strips? (check all that apply)
* Center line
* Shoulder

1. For the safety infrastructure improvements you previously selected (listed below), identify a minimum of one (1) and up to five (5) of the most effective treatments your agency has deployed since 2013. Note that for each treatment selected, you will be asked about approximate quantity installed, initial investment, projected life, maintenance and cost, and safety effectiveness.

*Respondent will be presented with all of the ones they selected in the previous question.*

* Selected option from previous question
* Selected option from previous question

*(and so on)*

*The following questions 6c-i will loop for each of the options the respondent selected in question 6b.*

1. Select the unit of measurement that best fits this treatment: {selected option from question 6b}. (Note: the unit selected will correspond to the upcoming questions.)

* Linear foot
* Linear mile
* Square foot
* Each
* Lump sum
* Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Approximate quantity installed of this treatment on high risk rural roads since 2013 (e.g., 5 roundabouts, 100 miles of rumble strips):

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Indicate initial investment of this treatment per the unit of measurement selected in 6c:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Projected life of this treatment for the initial installation:

* Less than 1 year
* 1-3 years
* 3-5 years
* 5-10 years
* 10-15 years
* 15-20 years
* Greater than 20 years
* Do not know

1. Required maintenance timeframe of this treatment:

* None
* Every 1 year
* Every 2 years
* Every 5 years
* Every 10 years
* Every 20 years
* Do not know

1. Maintenance cost per period per unit (refer to timeframe selected in 6g):

* Integrated into maintenance program, so unknown
* $1,000 to $5,000
* $5,000 to $10,000
* $10,000 to $25,000
* $25,000 to $50,000
* $50,000 to $75,000
* $75,000 to $100,000
* Greater than $100,000
* Do not know

1. Evaluation/assessment results of this treatment, measured in reduction of "fatal injury" and "suspected serious injury" crashes:

A fatal injury is an injury that results in death within 30 days aft er the motor vehicle crash in which the injury occurred.

A suspected serious injury is an injury other than fatal which results in one or more of the following:

* Severe laceration resulting in exposure of underlying tissue/muscle/organs or resulting in significant loss of blood
* Broken or distorted extremity (arm or leg)
* Suspected skull, chest, or abdominal injury other than bruises or minor lacerations
* Significant burns (second or third degree burns over 10 percent or more of the body)
* Unconsciousness when taken from the crash scene
* Paralysis
* Treatment has not been evaluated/assessed
* Greater than 30% reduction
* 21-30% reduction
* 11-20% reduction
* 10% or less reduction
* No change
* Do not know

1. Please identify the individual **roadside safety infrastructure treatments** used by your agency at high risk rural road locations. (check all that apply)

* Install breakaway sign posts or breakaway light/signal poles
* Flatten road sideslope
* Remove roadside objects such as isolated trees or boulders
* Increase the clear zone distance to rigid roadside features
* Relocate outside the clear zone, redesign, or bury utilities
* Improve sight distance by maintaining roadside vegetation
* Convert culvert headwalls to traversable end treatments
* Shield roadside objects (with a concrete barrier or guardrail)
* Upgrade non-crashworthy end treatments of existing guardrail
* Upgrade existing guardrail system
* Install median barrier
* Install median guardrail
* Install median cable barrier
* Widen existing median
* Install crash cushions at select roadside object locations (such as bridge abutments or concrete barrier ends)
* Others à List: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*If the respondent selects, “Install median barrier,” they will be presented with question a.*

1. What type(s) of median barrier did you install? (check all that apply)

* Concrete median barrier
* Median guardrail
* Median cable barrier

1. For the safety infrastructure improvements you previously selected (listed below), identify a minimum of one (1) and up to five (5) of the most effective treatments your agency has deployed since 2013. Note that for each treatment selected, you will be asked about approximate quantity installed, initial investment, projected life, maintenance and cost, and safety effectiveness.

*Respondent will be presented with all of the ones they selected in the previous question.*

* Selected option from previous question
* Selected option from previous question

*(and so on)*

*The following questions 7c-i will loop for each of the options the respondent selected in question 7b.*

1. Select the unit of measurement that best fits this treatment: {selected option from question 7b}. (Note: the unit selected will correspond to the upcoming questions.)

* Linear foot
* Linear mile
* Square foot
* Each
* Lump sum
* Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Approximate quantity installed of this treatment on high risk rural roads since 2013 (e.g., 5 roundabouts, 100 miles of rumble strips):

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Indicate initial investment of this treatment per the unit of measurement selected in 7c:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Projected life of this treatment for the initial installation:

* Less than 1 year
* 1-3 years
* 3-5 years
* 5-10 years
* 10-15 years
* 15-20 years
* Greater than 20 years
* Do not know

1. Required maintenance timeframe of this treatment:

* None
* Every 1 year
* Every 2 years
* Every 5 years
* Every 10 years
* Every 20 years
* Do not know

1. Maintenance cost per period per unit (refer to timeframe selected in 7g):

* Integrated into maintenance program, so unknown
* $1,000 to $5,000
* $5,000 to $10,000
* $10,000 to $25,000
* $25,000 to $50,000
* $50,000 to $75,000
* $75,000 to $100,000
* Greater than $100,000
* Do not know

1. Evaluation/assessment results of this treatment, measured in reduction of "fatal injury" and "suspected serious injury" crashes:

A fatal injury is an injury that results in death within 30 days aft er the motor vehicle crash in which the injury occurred.

A suspected serious injury is an injury other than fatal which results in one or more of the following:

* Severe laceration resulting in exposure of underlying tissue/muscle/organs or resulting in significant loss of blood
* Broken or distorted extremity (arm or leg)
* Suspected skull, chest, or abdominal injury other than bruises or minor lacerations
* Significant burns (second or third degree burns over 10 percent or more of the body)
* Unconsciousness when taken from the crash scene
* Paralysis
* Treatment has not been evaluated/assessed
* Greater than 30% reduction
* 21-30% reduction
* 11-20% reduction
* 10% or less reduction
* No change
* Do not know

1. Please identify **pedestrian and bicyclist safety infrastructure treatments** used by your agency at high risk rural road locations. (check all that apply)

* Construct continuous pedestrian facilities (e.g. sidewalk, separated multi-use path, etc.)
* Install pedestrian signal heads at existing signalized intersections
* Modify signal timing to benefit pedestrians (e.g., leading pedestrian interval, exclusive pedestrian phase)
* Install crosswalks
* Construct pedestrian refuge islands
* Construct curb extensions/bump-outs
* Install pedestrian hybrid beacons (PHB)
* Install rectangular rapid flashing beacons (RRFB)
* Construct shared-use path (used for both pedestrians and bicycles)
* Construct dedicated bicycle lane
* Mark paved shoulder as bicycle lane
* Sign and/or mark a shared bicycle lane (bicycle and vehicle share the same space)
* Install treatment to improve transit/bus stop safety à List: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Deploy traffic calming techniques à List: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Others à List: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. For the safety infrastructure improvements you previously selected (listed below), identify a minimum of one (1) and up to five (5) of the most effective treatments your agency has deployed since 2013. Note that for each treatment selected, you will be asked about approximate quantity installed, initial investment, projected life, maintenance and cost, and safety effectiveness.

*Respondent will be presented with all of the ones they selected in the previous question.*

* Selected option from previous question
* Selected option from previous question

*(and so on)*

*The following questions 8b-h will loop for each of the options the respondent selected in question 8a.*

1. Select the unit of measurement that best fits this treatment: {selected option from question 8a}. (Note: the unit selected will correspond to the upcoming questions.)

* Linear foot
* Linear mile
* Square foot
* Each
* Lump sum
* Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Approximate quantity installed of this treatment on high risk rural roads since 2013 (e.g., 5 roundabouts, 100 miles of rumble strips):

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Indicate initial investment of this treatment per the unit of measurement selected in 8b:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Projected life of this treatment for the initial installation:

* Less than 1 year
* 1-3 years
* 3-5 years
* 5-10 years
* 10-15 years
* 15-20 years
* Greater than 20 years
* Do not know

1. Required maintenance timeframe of this treatment:

* None
* Every 1 year
* Every 2 years
* Every 5 years
* Every 10 years
* Every 20 years
* Do not know

1. Maintenance cost per period per unit (refer to timeframe selected in 8f):

* Integrated into maintenance program, so unknown
* $1,000 to $5,000
* $5,000 to $10,000
* $10,000 to $25,000
* $25,000 to $50,000
* $50,000 to $75,000
* $75,000 to $100,000
* Greater than $100,000
* Do not know

1. Evaluation/assessment results of this treatment, measured in reduction of "fatal injury" and "suspected serious injury" crashes:

A fatal injury is an injury that results in death within 30 days aft er the motor vehicle crash in which the injury occurred.

A suspected serious injury is an injury other than fatal which results in one or more of the following:

* Severe laceration resulting in exposure of underlying tissue/muscle/organs or resulting in significant loss of blood
* Broken or distorted extremity (arm or leg)
* Suspected skull, chest, or abdominal injury other than bruises or minor lacerations
* Significant burns (second or third degree burns over 10 percent or more of the body)
* Unconsciousness when taken from the crash scene
* Paralysis
* Treatment has not been evaluated/assessed
* Greater than 30% reduction
* 21-30% reduction
* 11-20% reduction
* 10% or less reduction
* No change
* Do not know

1. Please identify **other safety infrastructure treatments** used by your agency at high risk rural road locations. (check all that apply)

* Convert a two-lane two-way road into a three-lane road with one lane in each direction of travel plus a continuous two-way left-turn lane
* Convert a two-lane two-way road into a four-lane divided two-way road
* Convert a four-lane undivided two-way road into a three-lane road with one lane in each direction of travel plus a continuous two-way left-turn lane (i.e., Road Diet)
* Convert a four-lane undivided two-way road into a five-lane road with two lanes in each direction of travel plus a continuous two-way left-turn lane
* Modify horizontal geometry to enhance safety (e.g., increase radii) à Identify: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Modify vertical geometry to improve vertical sight distance à Identify: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Install reference location signs (e.g., milepost markers that provide a means to identify the location of an incident/crash)
* Construct snow fences
* Install automatic anti-icing systems (often used on bridges)
* Install ITS road-weather signs/systems that detect and warn motorists of road weather conditions (e.g., fog, flooding, high winds, dust storms, ice storms, blizzards)
* Install ITS wrong-way driver system
* Construct wildlife fencing
* Install grade-separated wildlife crossing structure (e.g., culvert or bridge)
* Install ITS wildlife detection signs/systems
* Implement variable speed limits
* Others à List: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. For the safety infrastructure improvements you previously selected (listed below), identify a minimum of one (1) and up to five (5) of the most effective treatments your agency has deployed since 2013. Note that for each treatment selected, you will be asked about approximate quantity installed, initial investment, projected life, maintenance and cost, and safety effectiveness.

*Respondent will be presented with all of the ones they selected in the previous question.*

* Selected option from previous question
* Selected option from previous question

*(and so on)*

*The following questions 9b-h will loop for each of the options the respondent selected in question 9a.*

1. Select the unit of measurement that best fits this treatment: {selected option from question 9a}. (Note: the unit selected will correspond to the upcoming questions.)

* Linear foot
* Linear mile
* Square foot
* Each
* Lump sum
* Other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Approximate quantity installed of this treatment on high risk rural roads since 2013 (e.g., 5 roundabouts, 100 miles of rumble strips):

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Indicate initial investment of this treatment per the unit of measurement selected in 9b:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Projected life of this treatment for the initial installation:

* Less than 1 year
* 1-3 years
* 3-5 years
* 5-10 years
* 10-15 years
* 15-20 years
* Greater than 20 years
* Do not know

1. Required maintenance timeframe of this treatment:

* None
* Every 1 year
* Every 2 years
* Every 5 years
* Every 10 years
* Every 20 years
* Do not know

1. Maintenance cost per period per unit (refer to timeframe selected in 9f):

* Integrated into maintenance program, so unknown
* $1,000 to $5,000
* $5,000 to $10,000
* $10,000 to $25,000
* $25,000 to $50,000
* $50,000 to $75,000
* $75,000 to $100,000
* Greater than $100,000
* Do not know

1. Evaluation/assessment results of this treatment, measured in reduction of "fatal injury" and "suspected serious injury" crashes:

A fatal injury is an injury that results in death within 30 days aft er the motor vehicle crash in which the injury occurred.

A suspected serious injury is an injury other than fatal which results in one or more of the following:

* Severe laceration resulting in exposure of underlying tissue/muscle/organs or resulting in significant loss of blood
* Broken or distorted extremity (arm or leg)
* Suspected skull, chest, or abdominal injury other than bruises or minor lacerations
* Significant burns (second or third degree burns over 10 percent or more of the body)
* Unconsciousness when taken from the crash scene
* Paralysis
* Treatment has not been evaluated/assessed
* Greater than 30% reduction
* 21-30% reduction
* 11-20% reduction
* 10% or less reduction
* No change
* Do not know

1. What is the lowest benefit/cost ratio your agency is willing to accept to treat a known safety issue?

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do Not Know

1. What considerations go into establishing the limit for project costs to treat a known safety issue? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Consider safety projects that your agency has implemented with only agency funding (i.e., not seeking funds from other agencies). What is typically the highest cost of those projects?

* Cost in dollars: \_\_\_\_\_\_\_\_\_\_\_\_\_
* Not applicable à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do Not Know

1. How does your agency assess the effectiveness of a safety treatment after it has been implemented? (check all that apply)

* Crash frequency (all crashes)
* Crash frequency (serious injury and fatal crashes)
* Crash rate (crash frequency divided by exposure data, typically traffic volume or roadway mileage)
* Cost-benefit ratio (or benefit-cost ratio)
* Cost-effectiveness index (present value of project costs divided by the estimated average annual crash reduction)
* Severity index à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Other method Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Our agency does not assess effectiveness of specific treatments à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do not know
* Not applicableà Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Does your agency use performance measures to evaluate the safety effectiveness on high risk rural road facilities? (check all that apply)

* Yes, for infrastructure safety treatments
* Yes, for projects
* Yes, for safety programs
* No
* Do not know

*If the respondent selects any of the yes options, they will be presented with question a.*

1. Please describe the performance measures your agency uses: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What data sources does your agency use to evaluate the safety effectiveness of treatments? (check all that apply)

* Crash data
* Conflict studies
* Surrogate measures (an alternate way to detect if safety has been improved, e.g., no more tire braking marks or tire rutting off the edge of pavement) à Explain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Others à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do not know
* Not applicable

*If the respondent indicated that their agency uses crash data for safety evaluation, they will be presented with question a.*

1. What period of years does your agency use when evaluating crash data?

* 1 year
* 3 years
* 5 years
* Other à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What methods does your agency use to identify rural road locations that need safety infrastructure improvements? (check all that apply)

* Network screening (method that considers crash history, roadway factors, and traffic characteristics that may contribute to future crashes)
* Crash frequency
* Crash rate
* Excess predicted crash frequency using SPFs
* Excess expected crash frequency with the EB adjustment
* Excess proportions of specific crash types
* Expected crash frequency with EB adjustment
* Level of service of safety (LOSS)
* Probability of specific crash types
* Locations are identified and/or recommended by a different agency
* Other à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do not know
* Not applicable

1. Which methods does your agency use to assist in selecting appropriate safety treatments? (check all that apply)

* Crash data analysis
* Data-driven safety analysis tools (e.g., Highway Safety Manual, Crash Modification Factors Clearinghouse, Safety Analyst, usRAP)
* Locally-derived CMFs, crash reduction factors (CRF), and/or safety performance functions
* Road safety assessment or audit
* Engineering study à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Strategic highway safety plan or local road safety plan
* Intersection control evaluation (ICE)
* Stakeholder and public input
* Independent research and/or peer State/agency communication
* Other à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Do not know
* Not applicable

1. A systemic approach to safety involves widely implemented improvements based on high-risk roadway features correlated with specific crash types. (<https://highways.dot.gov/safety/data-analysis-tools/systemic>) Select the safety infrastructure improvements for high risk rural roads that your agency has implemented throughout your State or local region, using a systemic approach. (check all that apply)

* Cable median barriers
* Clear zone improvements
* High friction surface treatment
* Horizontal curve signage enhancements
* Improved pavement marking/delineation
* Intersection signage enhancements
* Pedestrian/bicycle safety (STEP countermeasures)
* Pavement/shoulder widening
* Rumble strips
* SafetyEdgeSM
* Upgrade barrier (guardrails, end treatments, etc.)
* Wrong way driving treatments
* Other\_\_\_\_\_\_\_\_\_\_\_
* Do not know
* N/A

1. Does your agency use federal funding for safety infrastructure improvements on high risk rural roads?

* Yes
* No
* Do not know

*If the respondent answers no, they will be presented with question a.*

a. Why not? (check all that apply)

* + - Unaware of or lack sufficient information about federal funding programs
    - Agency projects do not meet federal funding requirements.
    - Federal process requirements are too cumbersome
    - Difficulty identifying roads that qualify for federal program funding
* Other à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. In some cases, candidate infrastructure treatments may not be selected due to real or perceived constraints in acquiring or deploying the treatments. Which challenges apply in your agency? (check all that apply)
   * + My agency does not have the expertise to deploy certain safety improvements
     + It is difficult for my agency to work in conjunction with other transportation agencies and/or to hire outside expertise to help guide safety improvement decisions
     + My agency does not have the funds to routinely deploy safety improvements
     + My agency has limited funding and does not utilize Federal funding due to Federal process requirements
     + Other à Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     + Do not know
     + Not applicable
2. What more could be done to help your agency deploy cost-effective improvements on high risk rural roads? Explain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Is your agency undertaking any experimental research on new cost-effective improvements on high risk rural roads?
   * + Yes
     + No

* Do Not Know

*If the respondent indicated yes, they will be presented with question a.*

1. Provide more information on your agency's experimental research on new cost-effective improvements on high risk rural roads: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Is there any additional information on effective practices your agency uses for high risk rural roads or is aware of that is not captured in the previous questions?
   * + Yes

* No

*If the respondent indicated yes, they will be presented with question a.*

1. Provide additional details on effective practices for high risk rural roads not captured in the previous questions. \_\_\_\_\_\_\_\_\_\_\_\_
2. As part of this study and update of the “best practices manual” ([Manual for Selecting Safety Improvements on High Risk Rural Roads](https://safety.fhwa.dot.gov/hsip/hrrr/manual/hrrr_2014.pdf)), agencies may be featured, with their permission, for noteworthy practices, procedures, and projects using case-studies, highlights, and/or pictures. Additionally, cost-effectiveness analysis will be conducted for a wide variety of infrastructure safety improvements and FHWA is seeking agency data to support this analysis. Candidate information would include crash data before and after installation of the treatment, initial treatment cost, maintenance cost and frequency, and life cycle of the treatment. If your agency is willing to assist with either of the above, FHWA representatives may want to contact you or someone from your agency to acquire this additional information. Please provide applicable contact information below.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Agency: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Telephone Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Email Address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Looking ahead to the update of the [Manual](https://safety.fhwa.dot.gov/hsip/hrrr/manual/hrrr_2014.pdf), there are many ways to spread information to make agencies aware of and encourage implementation of noteworthy practices. Please rank each of the techniques below from most useful to least useful when you are learning about and considering new practices.

*(There will be a 1-5 scale for each; 1-least useful to 5-most useful)*

* + - Workshops, Conferences, and Seminars
    - Peer Exchanges
    - Webinars
    - Case Studies
    - Fact Sheets
    - Websites
    - Newsletters and Magazine Articles
    - Social Media/Interactive Media

*End of Survey.*

You have completed the survey!

Thank you very much for your time and effort. If you would like to go back and review or adjust any answers, please do so now by selecting the previous question button. Otherwise, select submit and your answers will be final and recorded.