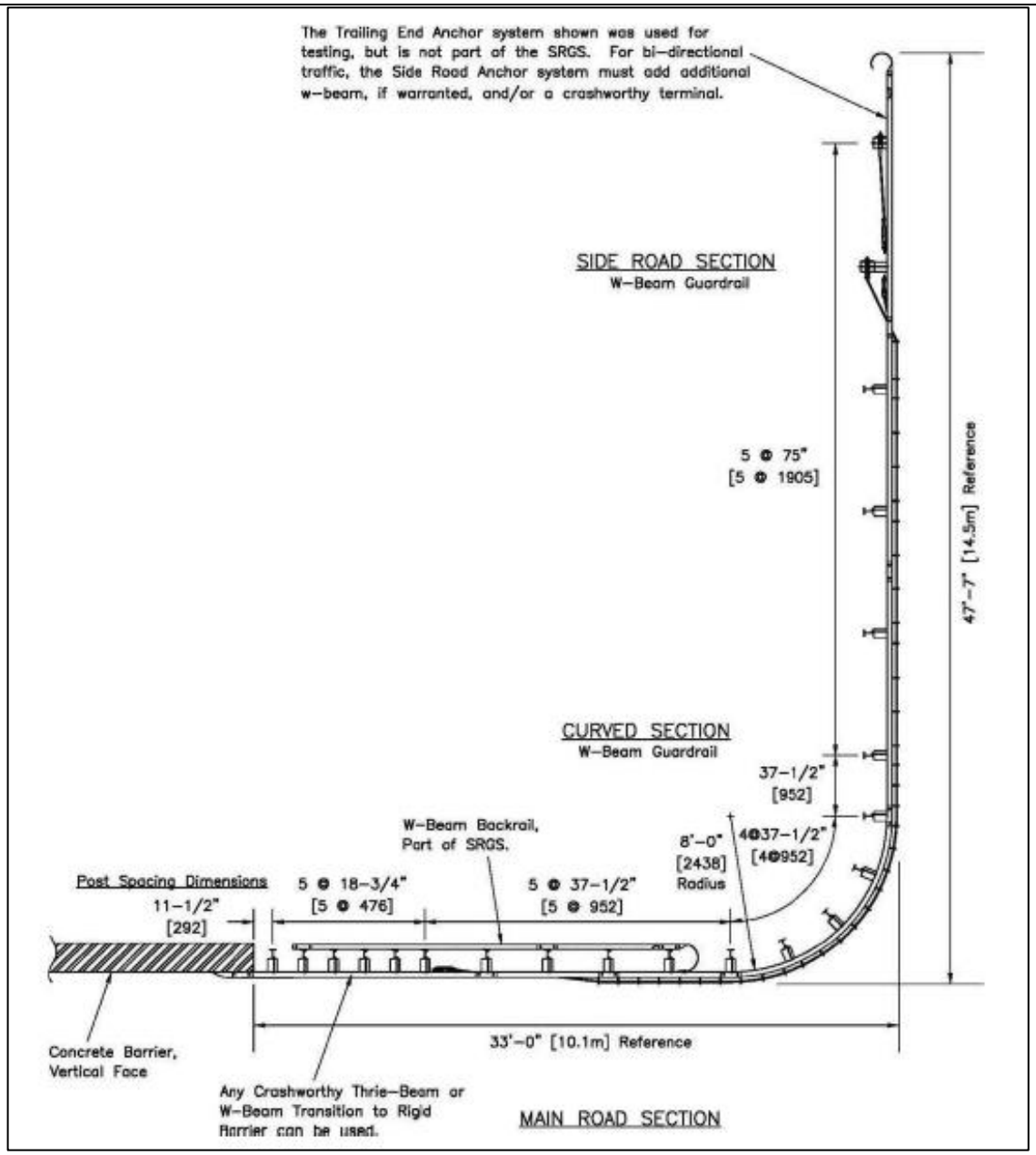
Roadside Safety Pooled Fund

Research Problem Statement

Project Title:	**Short Radius Guardrail System (SRGS) – Additional Testing (**2024-06-LSRB**)**  
Project Synopsis:	Recently, the MASH compliant Short Radius Guardrail System (SRGS) research project was completed by NCHRP (NCHRP Project 15-53, NCHRP Research Report 1013-Dec. 2022). While providing a MASH compliant intersection guardrail system, there are still several design/implementation questions associated with the SRGS which need research, computer modeling, and/or crash testing. Some of those design/implementation questions include: 1) Currently, the SRGS is MASH TL-3 compliant on flat ground and MASH TL-2 compliant with a 2:1 or flatter slope behind it (tested at 50-mph). Can the SRGS with a 2:1 slope behind it successfully pass MASH TL-3 crash testing? 2) The SRGS was successfully crash tested (MASH TL-2) in front of a 2:1 slope. Can the SRGS be placed in front of a 1:1 slope and be MASH compliant? Many states have intersection areas with steep fill slope constraints. 3) The SRGS has been MASH crash tested having a 90-degree intersection angle with an 8-foot radius. Also, computer modeling has been completed at a 90-degree intersection angle with different radii of 16- and 24-feet. Can the SRGS be installed at greater or lesser radii than 90 degrees and still be MASH compliant? If yes, what is the range of angles? Not all roads intersect at a 90-degree angle. 4) Can the tested transition length of 18’-9” long be shortened any further, and/or can the overall length of 33-feet from concrete barrier end to face of guardrail of perpendicular running guardrail be shortened any further and still be MASH compliant? Most, if not all, states have locations with bridges/structures having intersecting roadways closer than 33-feet. 5) The SRGS uses 10-Gauge rail. Can the SRGS use standard 12-gauge rail and still be MASH compliant? 6) The SRGS uses steel guardrail posts. Can the SRGS use wood guardrail posts and still be MASH compliant? 7) Any other?

	
Project Goal(s):	1.) Conduct further research of possible enhancements/modifications to the Short Radius Guardrail System (SRGS) originally developed under the NCHRP 15-53 project which will provide states with more intersection locations that the system can be used and more cost-effective construction. The additional research will inform states on if certain variations/modifications to the original system are still MASH compliant.
Project Background:	States have a long-standing problem when trying to provide crashworthy barrier systems at intersection locations where a bridge/structure on a major road is intersected by a side road or driveway in close proximity to the bridge/structure end. Often, the close proximity does not allow enough room to properly install barrier that can shield both the bridge/structure end and the slope immediately adjacent to it. As a result of this issue, NCHRP recently developed the MASH compliant Short Radius Guardrail System (SRGS) which provides an excellent barrier option for states. However, there are still many opportunities to explore and improve upon this system to make the system more effective and available for use at a higher number of locations (i.e. slope grades, intersection radii, length from bridge/structure end, etc.), and easier/more cost-effective to construct (i.e. 12-gauge steel, wood posts, etc.).

Proposed Work Plan:	1.) Task 1 – Literature review and State survey • Perform literature review of past barrier intersection systems and the SRGS. • Develop a list of options for possible modifications/enhancements to the SRGS system which can allow it to be a more effective and widely used system (in addition to initial list provided by this problem statement). Also, determine what level of effort will be needed (simulation analysis, crash testing, other) and an estimated cost to conduct the research for each option. • Send out a poll to member states with the list of research options and their cost. Member states will vote to select the top option(s) for research/crash testing under this project. 2.) Task 2 – Design and Simulation Analysis • Perform any necessary FE simulations with pickup truck and/or small car models to the modified/enhanced SRGS system option(s) chosen by the TAC, if necessary. • Identify critical tests and critical impact points for the modified/enhanced SRGS system option(s) chosen by the TAC, if crash testing is deemed necessary. 3.) Task 3 – MASH Crash Testing (TL-2 or TL-3) on selected option(s), if needed 4.) Task 4 – Reporting • Prepare Final Report • Recommend top options for next phase of project to evaluate the SRGS any further.
Deliverables:	Final report documenting the background, research effort, computer simulations, crash tests, engineering drawings, and implementation guidance for the selected options to modify/enhance the SRGS system.
Urgency and Expected Benefit:	A successful research project for modifying/enhancing the SRGS system will provide a better understanding of this intersection system and allow it to be used at a greater number of intersections with varying conditions, and more construction options.
Problem Funding and Research Period:	**Total Cost and Schedule = $171,026**
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