Research Stage 1 Problem Statement

PROPOSED TITLE: Reducing RRFB Maintenance and Capital Costs

1. Concisely describe the transportation issue (including problems, improvements, or untested solutions) that Oregon needs to research.

An estimated $4 billion dollars is needed to meet our Strategic Action Plan goal to bring our ODOT walking and biking facilities up to standard, and rectangular rapid flashing beacons (RRFB) are a critical tool for meeting our marked crossing target distance spacing. RRFBs are required for marked pedestrian crossings of higher-volume and higher speed roadways and are intended to improve pedestrian crossings but designed on breakaway poles so as to reduce the potential crash risk to errant vehicles, allowing them to easily drive off safely but with the unfortunate consequence of ODOT Maintenance being stuck with repair bill and people crossing the roadway with a closed crossing while parts are ordered - RRFBs are so frequently destroyed (with an estimated cost of $10,000/unit to repair) that ODOT Regions are now scoping and building overhead mast arm RRFBs at nearly a 10x cost the cost of roadside and/or median sign posts (roughly $2m+ compared to $250k per installation), greatly reducing our ability build new pedestrian crossings.

Currently the default on ODOT projects is to remove or not build anything that might potentially injury drivers in a crash, regardless of speed, volume, urban context, or pedestrian needs: this clear/forgiving space unfortunately promotes riskier driving behavior, higher speeds, and damaged RRFBs. Objects in the clear zone is not new to ODOT: retaining walls are built, utility poles are not moved in every project, and rail crossings typically require protecting those assets: there needs to be some balance between maintaining clear zones to prevent driver injuries compared to other benefits such as reduced damage to ODOT infrastructure, vertical friction to reduce speeds, livability, and other factors.

2. What final product or information needs to be produced to enable this research to be implemented?

This project will produce:

1) an environmental screening of ODOT Regions and local jurisdictions to determine the statistics on how often RRFBs are being hit, the amount of time and cost spent repairing them, the average downtime until repaired, and any other cost and maintenance factors.

2) a report with considerations and cost/benefit analysis of engineering treatments that may balance the risk reduction from errant vehicles hitting RRFB installations compared to potential vehicle crash risk (based on factors like speed limits or volumes) such as taller curbs along where RRFB poles are located such as curbside or in the median island, potential fixed objects such as bollards, barriers of other sorts like boulders or jersey Barrier, or deflection tools like Toronto barrier (small Jersey barrier).

3. (Optional) Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.

Name	Title	Email	Phone

4. Other comments:

5. State of Oregon Decision Making Lenses

State decision making lenses are a part of the state of Oregon's policy structure. State policy and federal policy are not always aligned. The state will prioritize research according to state policy, however ODOT may be required to skip prioritized proposals based on constraints placed on the use of federal funds. If state funds are available ODOT will attempt to fund prioritized research that is deemed ineligible for federal funding.

Please complete the following three sections. Your answers to these questions will be applied on a programmatic basis to support agency decisions. Answering yes to the questions below is not required. Resolving a narrowly focused technical research problem may meet agency needs without answering yes to any of the following questions. The ODOT Research Section will seek a balanced portfolio some projects will answer yes to one of the three categories below (e.g. climate, equity, and/ or safety) and other projects in a different category.

We are looking for an overall program balance and no one project is expected to balance all categories. Generally, a research problem statement is expected to be able to answer yes with clear and verifiable information in only one of the three categories below, some projects may be able to answer yes in two or even three categories. Some projects (i.e. needs focused on specific elements of infrastructure design), may have no 'yes' answers but may still be a high value research need.

Climate

Oregon recognizes the climate crisis and makes systemic changes to reduce emissions caused by travel. To that end, we seek research that reduces carbon emissions from construction activities and materials, and from maintenance equipment and operations. Oregon envisions a transportation system that is resilient, this means a system that is durable in the face of seismic events and extreme weather to avoid negative impacts, withstand them or bounce back quickly to resume system function. We seek research that improves the ability of the transportation system to adapt or cope with more frequent and extreme weather events. This may include innovations in data and data sharing, construction materials and project design, communication, emergency planning and response, and more. Similarly, we seek research that avoids negative impacts on key habitats and ecosystems that can buffer or reduce damage to infrastructure and improve environmental conditions for wildlife and native vegetation. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

5a. Will addressing the transportation issue identified as a need in Question 1 develop, or **validate methods for the estimation, measurement, or monitoring** of transportation generated greenhouse gases (GHG)?

☐Yes ☒No ☐Unsure

5b. If climate or GHG is not the focus of this **transportation issue** identified in this problem statement, will the research apply a GHG analysis to transportation infrastructure, planning, operations, maintenance, or materials?

☐Yes ☒No ☐Unsure

5c. Will addressing the **transportation issue** include development or testing of construction practices, methods, or materials to establish potential reductions in greenhouse gas emissions?

☒Yes ☐No ☐Unsure

5d. Will solving the **transportation issue** in question 1 study or support the reduction of vehicle miles traveled and single occupancy vehicle travel or support transition to electric vehicles (or other types of zero emission vehicles) or low-carbon alternative fuels?

☒Yes ☐No ☐Unsure

5e. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, or monitor, transportation system resilience in response to expected climate events, effects, or natural disasters in general?

☒Yes ☐No ☐Unsure

5f. Will solving the **transportation issue** in question 1 lead to work that may result in better environmental conditions for wildlife and native vegetation?

☐Yes ☒No ☐Unsure

5g. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

This work project will hopefully lead to the development of new practices that will reduce potential greenhouse gas emissions from reducing the downtime from damaged RRFBs (increasing pedestrian usage by improving reliability and operations) and reducing the cost and environmental impacts from replacing costly electronic equipment.

It will support the reduction of VMT and SOV travel by making the highway system more accessible and comfortable for people walking and biking by better allowing us to meet our SAP and KPM goals of marked pedestrian crossing spacing, encouraging modal shifts away from single occupancy vehicles to active modes like walking, rolling, and transit.

A more complete pedestrian and bicycling network is a more resilient network, as it provides for the most basic of human movements in climate events and natural disasters.

Equity

Equity can have many dimensions and impacts relating to communities and transportation. It is important that problem statement proposals clearly explain the equity dimensions or impacts being examined. Oregon commits to social equity in the OTP, specifically to *improve access to safe and affordable transportation for all, recognizing the unmet mobility needs of people who have been systemically excluded and underserved. Create an equitable and transparent engagement and communications decision-making structure that builds public trust*. We seek research that studies elements of this goal or applies analysis to specific transportation topics to ensure the resulting research recommendation is consistent with agency equity goals. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

5h. Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

☒Yes ☐No ☐Unsure

5i. If the **transportation issue** is not focused on transportation equity, will the primary topic be assessed for equity benefits or impacts within the research project?

☐Yes ☐No ☐Unsure

5j. Is the implementation of potential findings from this research likely to directly involve participation from an identified group that would benefit from an equitable process or outcome?

☐Yes ☐No ☐Unsure

5k. Is the intended final product or information expected to support ODOT's equity efforts (Including but not limited to supporting one of the equity related objectives of the ODOT's Strategic Action Plan or Oregon Transportation Plan) ?

☒Yes ☐No ☐Unsure

5l. If you answered yes to any of the equity questions above or can provide alternative details related to equity, please provide additional information:

This project will help meet the OTP vision and values and all three goals from the ODOT SAP of equity (marked crossings address highways being systemic barriers for historically underserved by ODOT such as people walking, biking, and rolling), modernizing our transportation system to make it more multimodal and better serve all users, and helping improve the fiscal situation by reducing both the capital and future maintenance burden of infrastructure.

Safety

Research outcomes may include interventions and countermeasures to prevent or reduce the frequency of crashes or other causes of transportation-related injury or death; or may include measures to reduce severity of injury (including prevention of death) after a crash or other injurious event. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan, Oregon Transportation Safety Action Plan and Oregon Transportation Plan.

5m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

☐Yes ☒No ☐Unsure

5n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

☒Yes ☐No ☐Unsure

5o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

☒Yes ☐No ☐Unsure

5p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

☐Yes ☒No ☐Unsure

5q. Will solving the **transportation issue** support improving safety through **investing strategically**?

☒Yes ☐No ☐Unsure

5r. If you answered yes to any of the safety questions above or can provide alternative details related to safety, please provide additional information:

This project will improve safety through healthy and livable communities by finding techniques to prevent damage to critical pedestrian crossing infrastructure, which better allows people to safely walk and bike in their communities which greatly increases health outcomes and promotes livable communities.

RRFBs are currently the best available recommended engineering treatment required to build new marked crosswalks at many ODOT highway locations based on the speed, volume, and lanes: this project will reduce the cost of building and maintenance and improve safety for people crossing highways.

6. Corresponding Submitter's Contact Information:

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7. ODOT Sponsor Contact Information (Required if Submitter is not an ODOT employee)

Name:	
Title:	
Crew Number:	
Telephone:	
Email:	

This form is not a grant application or contract document. Please do not include proprietary information on this form. Once this form is received ODOT may revise and publish the problem statement. If selected, ODOT will assign investigator(s) of the department's choosing to conduct research.