

Research Stage 1 Problem Statement

PROPOSED TITLE: Implementation of Project Visualization for Project Delivery

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

Transportation projects both simple and complex can have significant impacts on diverse communities within Oregon. Providing information that is accessible and visually intuitive to the public helps project teams transition conversation past basic understanding of what the project will accomplish and fosters constructive discussion for how the proposed design impacts these partners. This visual method of presenting data also enables a more comprehensive understanding for technical design staff during project delivery to assess impacts and conflicts. While ODOT's Project Visualization Group currently provides deliverables that have made valuable improvements for concept analysis from planning through final design for select pilot efforts, the framework and methodology for full integration of these valuable products into ODOT's standard project delivery process has not been developed.

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

This project would produce a proposed methodology for including project visualizations as a standard item for consideration in the project delivery process. This would be accomplished through: qualitative analysis of previous successes; documenting the wide range of products that can be produced with currently available software applications and data; exploring where training can enable project development staff to contribute to the deliverables; identifying where in the project delivery life cycle visualization products have the most impact; create accurate cost estimating tools; quantitative and qualitative cost benefit analysis; identify when products should be created in house vs using a consultant.

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
David Kim	Project Delivery Manager	David.KIM@odot.oregon.gov	503.580.8403
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4. Other comments:

This effort began through the FHWA Every Day Counts 5 initiative, Virtual Public Involvement. ODOT's Engineering Technology Advancement Unit has improved and expanded our capabilities leveraging 2D and 3D data to help project teams gain internal and external consensus, evaluate technical considerations, and bolster grant applications. We also participate in a national group sponsored by FHWA, that focuses on developing and promoting project visualization. Other states have found that even with significant success using these products, there has been a reluctance to include them as a standard part of project delivery. We believe there is a misconception that this work is time consuming and expensive, which is not always the case. Previous experience with contracting this work likely led to these misconceptions, but having these services in house provides significant cost savings and flexibility.

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:

Project Visualizations can be applied to almost every transportation infrastructure project that is delivered at ODOT which includes modeling impacts, prevention of climate impacts and mitigation/recovery after an impact. These products have also been used for wildlife crossing planning and preliminary design.

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:

Project Visualizations are a cornerstone for making transportation design communication equitable. "A picture is worth a thousand words in a thousand languages." These graphical depictions provide a communication method that is understandable by all levels of technical comprehension, in any language.

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

Using 2D and 3D project visualizations can provide the necessary data to evaluate technical details that previously required field evaluation. Reducing the need for staff to visit the field improves safety for both ODOT staff and the travelling public.

The products also improve community understanding which leads to more productive discussion of design elements resulting in context sensitive solutions that meet the needs of the users.

Project visualizations use advanced technology in: field collection which includes photogrammetry using unmanned aircraft systems, lidar scanning (aerial, mobile and terrestrial); advanced design, modeling, and animation techniques and software; communication methods through cloud hosting, immersive interactions such as 360 degree environments and augmented reality.

The focus of project visualization is to foster effective and efficient communication and collaboration to provide the best possible transportation solutions to serve Oregon communities.

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.