Oregon Department of Transportation

Research Stage 1 Problem Statement

Number 26-33 – "Identification of pedestrian navigation aids that are most relevant for people with visual impairments"

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

The highway and roadway system are designed to be navigated primarily visually, creating an incredibly difficult environment for people with visual impairments to navigate while walking and rolling along our transportation network - audible push-buttons, canes, assistance dogs, and other assistive tools such as adaptive vision apps make it less difficult to navigate, but each intersection (especially roundabouts) is difficult to learn as they are all unique and has different features in different locations at different orientations. People with visual impairments often rely on Orientation and Mobility (O&M) specialists to learn to travel safely and independently in their environment, including navigating our roadway facilities, and there is no uniform practice for translating our roadway specification sheets into a tactile format that would allow blind users to understand our roadway layouts (aside from visiting in person and having in-person assistance, which is very time and cost intensive).

This project will create a process for translating existing specifications sheets into a tactile format (hopefully 3d printing?) so that people with visual impairments can 1) print tactile maps for intersections and roadway paths to learn specific travel routes to help people safely, comfortably, and independently navigate their environment, and 2) potentially create permanent 3D monumentation at complicated roadway intersections that allow users to gain an understanding of the layout and how to navigate it.

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

This project would develop identify which transportation elements are most relevant for people with visual impairments to have on a tactile map, develop a uniform symbology for identifying those features, identify a uniform 3d printing file format, and develop procedures to integrate the development of these files as part of the Project Development lifecycle to create tactile maps.

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
Nancy Stevens and Sharlene Willis	Blind citizens		
Oregon Commission for the Blind			

4. Decision making lenses

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 high value research need.

Climate

Oregon recognizes the climate crisis and makes systemic changes to reduce emissions caused by travel. Every mile driven in Oregon is powered by a clean source of fuel. We seek research that supports construction and maintenance operations are carbon neutral and investments in mobility that support travel by low and no emission modes. While every research project may not result in a reduction in emissions, transportation investments overall support emission reductions to achieve state goals. Oregon envisions a transportation system that is resilient in the face of seismic and climate events and impacts to the degradation of the natural environment are reduced. Our vision includes a transportation infrastructure is built in a way that avoids impacts on key habitat and results in better 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.

4f. 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 gasses (GHG)?

☐Yes ☒No ☐Unsure

4g. 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

4h. Will the 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

4i. Will the 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

4j. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, monitor, transportation system resilience in response to expected climate events, effects, or natural disasters in general?

☐Yes ☒No ☐Unsure

4k. Will the 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

4l. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

Enabling people with visual impairments to safely, comfortably, and **independently** navigate our transportation system will reduce vehicle-miles-traveled from dial-a-ride and other transportation services as they will no longer be reliant on those services to get around.

Equity

Equity can have many dimensions and impacts relating to communities, and transportation. It is important that problem statement proposals clearly explain in what capacities are equity dimensions or impacts being examined within problem statements. It is a goal of the OTP 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". Proposed research may have the intent of studying elements of this goal or apply analysis to specific transportation topics to ensure the resulting research recommendations is consistent with our equity goals. For definitions and details please review the equity vision, goals, and objectives of the ODOT Strategic Action Plan and Oregon Transportation Plan.

4a Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

☒Yes ☐No ☐Unsure

4b 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

4c 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

4d 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

4e 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 is exclusively focused on making the transportation system more accessible for people with visual impairments, working directly with and for the people most impacted. The idea comes directly from several years of discussion with the Central Oregon Coalition for Access, multiple in-person events where we highlighted the difficulties of navigating roundabouts, and discussions at trainings in Central Oregon and Corvallis.

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.

4m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

☒Yes ☐No ☐Unsure

4n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

☒Yes ☐No ☐Unsure

4o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

☒Yes ☐No ☐Unsure

4p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

☒Yes ☐No ☐Unsure

4q. Will the solving the **transportation issue** support improving safety through **investing strategically**?

☒Yes ☐No ☐Unsure

4r. 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 help enable people with visual impairments to navigate the transportation system safely, comfortably, and independently. Central Oregon has been a leader in implementing roundabouts but these have caused new safety concerns for people with blindness, making the transportation system even less inaccessible than it was previously – this project emerged from community conversations on what needs to be done with the affected users to make navigating roundabouts without vision safer, showing our

5. Other comments:

6. Corresponding Submitter's Contact Information:

Name:	Chris Cheng
Title:	Active Transportation Liaison, R4
Affiliation:	ODOT
Telephone:	541.408.1387
Email:	chris.cheng@odot.oregon.gov

This form is not a grant application or contract document.