Research Problem Statement

ODOT Research Section
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I. TITLE

17-012 Leveraging the Entire Transportation Network for Natural Hazards Resilience

II. PROBLEM

The Oregon Coast Highway (U.S. 101) is a critical economic and emergency services lifeline for dozens of coastal communities. This route is extremely vulnerable to a wide range of natural hazards, including extreme storms, landslides, rising sea levels, and a Cascadia Subduction Zone earthquake which would unleash a seismic/tsunami event with potentially catastrophic impacts. These threats pose significant and growing risks to the safety, reliability, and effectiveness of ODOT's assets and operations. A redundant roadway network is essential to building resilience to these natural hazards. Research is needed that would establish and test new methods to review, assess, classify, and map potential and viable detours. There is also a need to identify and document existing agreements between ODOT and partner agencies, understand best practices for route planning and partnering arrangements, and provide support for a standardized approach to agreements that can formalize detour routes. The importance of detour routes as "least cost alternatives… to bypass critical seismic vulnerabilities" is noted in ODOT's Seismic Lifelines Identification Study (CH2MHill, 2012) but was not fully addressed. The need to plan for redundancy is recommended in the Oregon Resilience Plan (Report to the State Legislature, 2013), and in ODOT's Climate Change Vulnerability Assessment and Adaptation Options Study (2014).

III. PROPOSED RESEARCH, DEVELOPMENT, OR TECHNICAL TRANSFER ACTIVITY

This research will develop and test a methodology to identify, classify, and prioritize potential detour routes for U.S. 101. A literature review and case studies of detour plans and agreements from other state DOTs and MPOs will provide important context for the "state of the practice" and key elements for success. This research would also involve records review, data analysis, GIS mapping, and potential field work. Research would assess and classify where viable alternate routes exist that can support State Highway traffic, where routes exist but would require some level of upgrades to meet standards, and where no viable detours exist at all. Alternate corridors could be assessed for function, condition, clearance, roadway geometry, mobility, and other factors, through the lens of providing connectivity under full and long-term closure conditions. The research would outline a template detour agreement that could be used to formalize routes, outline roles and responsibilities, and other key elements. A small number of local maps and ancillary data prepared as part of the Oregon Seismic Lifeline Routes Identification Study could be used as starting point.

IV. POTENTIAL BENEFITS

This research would greatly improve the safety and reliability of Oregon's transportation system during natural disasters, and will support long-term system efficiencies, cost savings and cost avoidance. A detour route assessment and gaps analysis would help ODOT leverage all available roadways to enhance system resilience and adaptive capacity. This research would enable a comprehensive series of alternate routes to be planned and formalized along U.S. 101 to consider state, federal and locally-owned and managed facilities. New route data, maps, and guidance can be used to make more strategic project and funding decisions, and can assist in development of mitigation strategies that enhance mobility and access. Results would help inform hazards planning, risk assessments, and project scoping in highly vulnerable corridors. Research products would identify gaps in viable travel alternatives, and will help in prioritizing corridors for future improvements. Results would also highlight where additional coordination is needed between ODOT and partner agencies. Having information on viable detour routes and gaps can help justify strategic investments (or disinvestments) in vulnerable corridors, or when seeking potential exceptions to land use goals and other required

approvals when pursuing seismic retrofits or construction projects to protect transportation infrastructure. The benefits would not be limited to U.S. 101, as new methods to assess and plan detours could also be applied across the state.

V. IMPLEMENTATION

This research will produce data, maps, and best practices for use in route planning, project selection, and agreement development. These products will help inform project funding priorities, scoping, and risk management. Results would benefit ODOT's Maintenance Districts, Region planners, and project scoping teams. A GIS map layer with route assessment results would be useful for Planning and Maintenance Districts alike. A route agreements inventory could be used by Region to prioritize engagement with local jurisdictions. These products could be used by the Bridge Program to help rank and program bridge retrofits on Seismic Lifeline Routes. Regions could better plan for future effects of climate change, such as landslide mitigation, or planned coastal retreat from rising seas. Use of these products would demonstrate ODOT's leadership role to implement the Oregon Resilience Plan, and would be in conformance with the Oregon Highway Plan, Lifelines Policy 1E.

VI. LIST OF REFERENCES *(optional)*

Oregon Seismic Lifelines Study-
http://www.oregon.gov/ODOT/TD/TP/Reports/Lifeline%20Selection%20Summary%20Report.pdf

Oregon Resilience Plan- http://www.oregon.gov/OMD/OEM/osspac/docs/Oregon_Resilience_Plan_Final.pdf

ODOT Climate Change Vulnerability Assessment and Adaptation Options Study -
http://www.oregon.gov/ODOT/TD/CLIMATECHANGE/docs/AdaptationPilot.pdf

FHWA Alternate Route Handbook - http://ops.fhwa.dot.gov/publications/ar_handbook/index.htm

VII. CONTACT INFORMATION

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