

NEVADA DEPARTMENT OF TRANSPORTATION FFY 20## RESEARCH PROPOSAL GUIDELINES

Proposals should not exceed 10 pages font size 12
Page limit does not include cover page, CVs, resumes, or budget

1. **TITLE (Required):** State the title of the research study that highlights the focus of the proposed research in response to the corresponding Nevada Department of Transportation (NDOT) problem statement.
2. **PRINCIPAL INVESTIGATOR (Required):** Provide the name and title of the Principal Investigator (PI). Include an address, email, and telephone number for the PI. Additional investigators' details may also be included.
3. **PROBLEM DESCRIPTION (5 Points):** Define the specific problem the proposed research will address. Describe the importance of researching the proposed problem (e.g., how the existing research, if available, does not fully solve the problem for NDOT).
4. **BACKGROUND SUMMARY (15 Points):** Include background information on the research topic using the following outline:
 - a. Summarize NDOT'S current practice related to this problem.
 - b. Summarize the finding of a preliminary literature search and describe how this research is leveraging and not duplicating prior research.
 - c. Address why this research is needed by NDOT beyond the existing research.
5. **PROPOSED RESEARCH (20 Points):** Provide a detailed research plan including research methodologies and justification for the selected methodologies.

The research plan should have a list of specific tasks that will detail all research activities along with clear deliverables for each task.

- a. Define the technical objectives.
- b. Describe the research methodology in detail:
 - i. Specify a set of tasks and describe how these tasks will directly address the identified problem.
 - ii. A separate task to produce a final report should be included.
- c. Clearly identify all anticipated NDOT staffing and equipment resources that will be needed to accomplish the proposed research.

List all deliverables for each task of the proposed research including, but not limited to:

- a. Interim reports, synthesis documents, and final report.
- b. Any programming codes, databases, and other tools to be developed.
- c. Models to be developed using proprietary and other programs.

Comprehensive details should be provided regarding data collection plans, data sample sizes, statistical analysis methods, use of existing models or development of new models, expected survey techniques, etc.

6. **URGENCY AND ANTICIPATED BENEFITS (10 Points each, total of 20 Points):** Include a statement on the importance of this research.

Quantify the potential payoff from successful achievement of the project objectives.

- a. Provide a preliminary analysis of specific benefits anticipated as a result of this research.
- b. Provide the cost of implementation of the research results and the operations and maintenance when implemented.
- c. Include an estimate of the savings in terms of time, money, increased safety, improved service, and/or improved NDOT processes.
- d. Include a specific explanation of anticipated environmental impacts, either positive or negative, that performance and/or implementation of this research may have.

7. **IMPLEMENTATION PLAN (15 Points):** Identify the stage at which the proposed research is of the Five Stages of Research Deployment, included herein, and clearly identify if the proposed research will result in deliverables that are ready for implementation. Any institutional, political, or socio-economic barriers to implementation of the anticipated research results/products should also be identified.

Address the following in this section:

- a. Identify all tasks and stages needed for full implementation of research results. Include an estimate of costs beyond the proposed research, if applicable, including the cost of implementation.
- b. If the proposed research will result in deliverables that are ready for implementation, include a task to develop a detailed implementation plan for NDOT.

8. **PROJECT SCHEDULE (5 Points):** Provide a detailed project schedule. Consider the seasonal effects on data collection and other tasks in determining the overall schedule. (Schedule is not included in the page limit).

9. **FACILITIES AND EXPERTISE (5 Points):** Describe the research team's expertise and the facilities available to accomplish the proposed research.

Indicate whether equipment necessary for completion of this research is already available and on-hand for use by the proposer. Specify any equipment which is necessary but not currently on-hand.

"Equipment" as defined by the Nevada State Administrative Manual, is any item that must have an anticipated useful life extending beyond one year, must not be consumed in use, must not be attached permanently as a non-movable fixture, and must cost \$5,000 or more.

Explain how the expertise of the proposed research team will aid this research. Include CVs and resumes as needed (CVs and resumes are not included in page limit).

10. **BUDGET (10 Points):** Include an overall budget using the attached format (see [Standard Budget Itemization for Department Research Projects](#)). Categories can be added and, with the exception of personnel and fringe, removed as best fits the proposed research. Once a proposal is selected, the total project cost cannot be increased. Funds can be moved within categories as necessary, through budget revision requests.

11. **NDOT CHAMPION, COORDINATION AND INVOLVEMENT (5 Points):** Describe the level of effort and resource commitment anticipated from NDOT, including but not limited to personnel, equipment, and time. Include identification of stakeholders, both internal and external to NDOT, and their respective involvement. Briefly describe a communication plan to capture and utilize NDOT champions' and technical advisory committee's input.

FIVE STAGES OF RESEARCH DEPLOYMENT

Based on Caltrans Research and Innovation Stages

1. Concept Stage

- First steps following Problem Statement and Proposal Development
- Includes detailed literature search
- Involves experimental design, data collection, analysis, and reporting
- Assesses results of research
- Defines barriers to implementation (e.g., policies, specifications, standards)
- Submits a Final Report and outlines a recommended implementation plan
- Includes collaboration with outside agencies or other state DOTs and US DOT (Applies to all Stages of Deployment)

2. Laboratory Prototype Stage

- Develops breadboard circuit or computer system modeling
- Demonstrates operation in laboratory setting
- May incorporate customized or one-of-a kind components
- Assesses results
- Submits Final Report and recommends design of full-scale demonstration
- Potential end users are enlisted to support the field pilot stage

3. Controlled Field Demonstration Stage

- Prepares for full scale testing of demonstration project
- Controlled tests at specialized facilities are observed and supported by cooperating agencies, industry, and technical associations
- Potential end users are enlisted to support the field pilot stage
- Assesses results
- Submits Final Report and recommends site/conditions for first application pilot stage

4. First Application (Contract) Field Pilot Stage

- Works with potential end users to select site and to conduct pilot testing under real world operating conditions
- Test specifications and standards are developed
- Research assistance given to assure proper installation and operation
- Problems are corrected and adjustments made, as necessary, to complete pilot testing
- To the extent possible, potential end users operate the project under careful research surveillance
- Assesses results
- Submits Final Report and recommends initial sites for full corporate deployment
- Potential end users are enlisted to support the field pilot stage

5. Specification & Standards with Full Corporate Deployment Stage

- End users select site(s) and deploy the method/process/equipment using resident management, supervision, staff, and contracting forces (where applicable)
- Deployment is without research supervision or direction
- On call assistance is available upon request
- Assesses results