NEVADA DEPRTMENT OF TRANSPORTATION

FFY 2013 RESEARCH PROBLEM STATEMENTS

Internal Submission Form (Not to exceed 3 pages with font size 12)

I. PROBLEM TITLE (Required): State the title of the research study that highlights the focus of the proposed research problem statement.

II. PROBLEM DESCRIPTION (10 Points if 2012 Critical Area is addressed): Define the specific problem the proposed research will address in no more than three paragraphs. Include a clear description on why NDOT needs to research the proposed problem (i.e., how the existing research nationally and internationally does not fully solve the problem for NDOT).

III. OBJECTIVE (Required): Include clearly defined objectives (anticipated deliverables including products) for the proposed research.

IV. CUREENT PRACTICE and RELATED RESEARCH (Required): Provide a clear description on the state of the practice in addressing the problem within NDOT and provide a brief summary of literature related to the proposed problem.

V. RESEARCH METHODOLOGY (10 Points): Provide a detailed research plan including the methodologies and the justification for the specific methodology selected.

- Describe how the study will directly address the problem described above.

VI. IMPLEMENTATION POTENTIAL (10 Points): Identify what stage of the research deployment (pages 2 and 3) the proposed research falls under and **also** 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.

VII. URGENCY AND PAYOFF POTENTIAL (20 Points): Include a statement on the importance of this particular research in this fiscal year. **Identify and quantify the potential payoff** from successful achievement of the project objective.

VIII. DATE AND SUBMITTED BY (Required): Provide the specifics (i.e., name, title, address, telephone #, fax # and e-mail address) for the person(s) who developed/submitted the problem**. Identify all Stakeholders including NDOT Sections/Divisions that needs to be involved in the proposed research.**

Five Stages of Research Deployment (Based on Caltrans Research and Innovation Stages)

1. Concept Stage (Stage I)

- 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 (Stage II)

- 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 (Stage III)

- 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 (Stage IV)

- 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 Deployment Stage (Stage V)

- 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