THE WYOMING DEPARTMENT OF TRANSPORTATION RESEARCH CENTER GUIDELINES

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THE STATE OF WYOMING DEPARTMENT OF TRANSPORTATION
RESEARCH CENTER

The Wyoming Department of Transportation Research Center Guidelines (Guidelines) outline the research management process for reports and research documents, and other research center management processes, pursuant to Federal and state rules, regulations and statutes. The Guidelines emphasize the research and development program interaction process; the research organizational structures for WYDOT and its Federal partners; the program development process; the report writing process; the program evaluation and technology transfer process; and the data management process for digital materials and data. By following these Guidelines, WYDOT staff, stakeholders, and Principal Investigators/Contractors will be able to produce positive and meaningful results from research projects.

Authority for the administration of the Research Center and these Guidelines can be found in the following: a) *Fixing American's Surface Transportation Act (FAST Act)*, which authorizes federal surface transportation programs through fiscal year 2020; b) *Moving Ahead for Progress in the 21st Century Act (MAP-21)*, which allows for apportionment of Highway Trust funds for research and education, as well as other matters*;* c) Chapter 5 of Title 23 of the United States Code*, Research, Technology, and Education,* which provides for activities leading to technology development and transfer by local departments of transportation and for input by stakeholders; d) Section 450 of Title 23 of the Code of Federal Regulations, *Planning Assistance and Standards, Statewide Transportation Planning,* which guides statewide transportation planning and programming; and d) Section 420 of Title 23 of the Code of Federal Regulations, *Planning and Research Program Administration,* which grants WYDOT the authority to administer State Planning and Research (SP&R) funds.

Funding for the research projects and the Research Center, and requirements for the administration of those funds, can be found in the *FAST Act*, and the *Planning and Research Program Administration Federal Rules*, which require that two percent of "the sums apportioned to a State for fiscal year 1998 and each fiscal year thereafter … shall be available for expenditures by the State …" for various surveys, investigation projects, planning, development, implementation, studies, research, technology transfer activities, and training. The *FAST Act* further requires "not less than 25 percent of [the 2 percent]… be expended by the State for research, development, and technology transfer activities…" [*23 U.S.C. 505(b)(1)*] and that the federal share for SP&R shall be 80 percent. [*23 U.S.C. 505(d)*]

Other responsibilities for the Research Center are set out in the *Research, Technology, and Education* Rules, which state:

> Surface transportation research and technology development shall include all activities leading to technology development and transfer, as well as the introduction of new and innovative ideas, practices, and approaches, through such mechanisms as field applications, education and training, and technical support. (23 U.S.C. 502(a)(2))

Further, in keeping with the Federal digital data management plan guidelines and requirements, which include: the Office of Management and Budget (OMB) Memorandum, dated May 9, 2013, entitled *Open Data Policy – Management Information as an Asset – M-13-13*; the Office of Science and Technology Policy (OSTP) Memorandum, dated February 22, 2013, entitled *Increasing Access to the Results of Federally Funded Scientific Research*; the Deputy Secretary of Transportation memorandum, dated April 10, 2012, entitled *Implementation of Departmental Scientific Policy*; the *Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results;* and Wyo. Stat. §9-21-101, Data Policies, the Research Center has incorporated a data management plan (DMP) process into the Guidelines that covers how data creation, collection, documentation, analysis, preservation, security, and dissemination will be managed by the Research Center and the Principal Investigators/Contractors. The DMP process sets out transparent, evolving, and extensive policies and management structures that will assist the Research Center and WYDOT in maintaining public digital research data that are generated from research projects funded with SP&R funds.

The DMP process also sets out ways to assist Principal Investigators, Project Champions, and the Research Center in implementing a plan to archive, store, and maintain data either once the research project has been finalized or the embargo period has expired. With the assistance of the Research Advisory Committee (RAC), determinations will be made on the best practices and policies for: a) archiving, sharing, and retention of data; b) securing intellectual property; c) sharing measures; and d) preservation and formatting practices. These discussions will ensure that data that are generated from the WYDOT research projects are open and available to the public.

In all, the Guidelines will provide the Research Manager, Principal Investigators/ Contractors, Project Champions, and the RAC with a better understanding of what is expected at all stages of the research project.

Quality Assurance Statement

The Wyoming Department of Transportation (WYDOT) provides high-quality information to serve government, industry, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. WYDOT periodically reviews quality issues and adjusts its programs and processes to ensure continuous quality improvement.

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Research Center Guidelines for the Wyoming Department of Transportation Research Center	

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Abstract:
The Research Center Guidelines for the Wyoming Department of Transportation Research Center Guidelines (Guidelines) outline the research management process for reports and other research documents, and other research center management processes, pursuant to federal and state rules, regulations and statutes. The Guidelines emphasize the research and development program interaction process; the research organizational structures for WYDOT and its federal partners; the program development process; the report writing process; the program evaluation and technology transfer process; and the data management process for digital materials and data. By following these Guidelines, WYDOT staff and stakeholders and the Principal Investigators/Contractors will be able to produce positive and meaningful results for research projects

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Acronyms

AASHTO – American Association of State Highway and Transportation Officials

CRG – Communication Reference Guide

DMP – Data Management Plan

DOI – Digital Object Identifiers

GNU – General Public License

FHWA – Federal Highway Administration

IP – Intellectual Property

IRB – Institutional Review Board

LTAP – Local Technical Assistance Program

NCHRP – National Cooperative Highway Research Program

OAIS – Open Archival Information System

ORCID – Open Research and Contributor ID

NTIS – National Transportation Information Services

NTL – National Transportation Library

PDF – Portable Document Format

RAC – Research Advisory Committee

RD&T – Research Development and Technology

ROSAP – Repository and Open Science Access Portal

SCRI – AASHTO Standing Committee for Research and Innovation

SP&R – State Planning and Research

T2 – Technology Transfer Center

TPF – Transportation Pooled Fund

TRB – Transportation Research Board

TRID – Transportation Research Board

WCAG – Web Content Accessibility Guidelines

SECTION 1: ADMINISTRATION

CHAPTER 1: Purpose, Mission Statement, Goals, and Guidelines Context

1.1 Purpose

The purpose of the Guidelines is to provide a management process for the administration of the Research Center and to ensure all research reports conform with the Communication Reference Guide (updated February 2017) (CRG), the U.S. Department of Transportation Public Access Plan, and the requirements set out in the Revised Section 508 of the Rehabilitation Act of 1973. The Guidelines are drafted to increase the effectiveness of research reports received by the Wyoming Department of Transportation (WYDOT), to identify the various administrative responsibilities of the Research Center, and to provide procedural instructions for research projects. The programs, projects, and products generated by the Research Center using these Guidelines are for the benefit of WYDOT, its employees, the citizens of Wyoming, and other transportation agencies and users.

The Guidelines further set out the regulations regarding intellectual property, copyright permissions, digital data, data management, data storage, data archiving, metadata requirements, data sharing policies, and open access. The Research Center uses these guidelines to ensure that data, which are considered a state asset, are managed properly though their life cycle, to improve data collection capabilities, and to make data available to the public, when possible.

When conducting a research project, the Principal Investigators can perform either basic or applied research. Basic research involves "the study of phenomena whose specific application has not been identified…" [*23 C.F.R. 420.203*]; and applied research involves "the study of phenomena relating to a specific, known need in connection with the functional characteristics of a system...." [*23 C.F.R. 420.203*].

1.2 WYDOT Mission, Goals

To ensure that the Research Center performs in an effective and efficient manner, all research activities are aligned with the WYDOT Mission and Goals. The mission statement sets out that WYDOT shall provide a safe, high quality, and efficient transportation system. (Strategic Plan 2012-2015, Page 5). WYDOT's shared vision, mission, values, goals, and overall strategic performance measures can be found in the Strategic Plan.

1.3 Basic and Operational Policies for the Research Center

The Research Center's policies and procedures are detailed in WYDOT's Operating Policies manual at Policy Number 4-1, and all subparts thereto.

1.4 WYDOT Research Center

The core mission of the Research Center is *to provide high quality research that aligns with the mission, values, and overall goals for WYDOT*. The Research Center uses WYDOT's goals to meet strategic performance measures, chosen program goals and objectives, and the needs of the State of Wyoming.

1.5 Overview of the Manual

The Guidelines are set out in four sections and incorporates nine Appendices.

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CHAPTER 2: Stakeholders

Pursuant to Chapter 5, *Research Technology, and Education* of Title 23, United States Code:

> Federal surface transportation research and development activities shall address the needs of stakeholders. Stakeholders include States, metropolitan planning organizations, local governments, tribal governments, the private sector, researchers, research sponsors, and other affected parties, including public interest groups. (5 U.S.C. 502(a)(5)).

The success of a research program is influenced by a research manager's ability to develop strong and lasting interactive relationships with all participants and stakeholders. In fact, the goals of WYDOT and the Research Center cannot be met without involvement and interaction with stakeholders.

The Research Center hosts Research Advisory Committee (RAC) meetings each quarter, and at other times as necessary, that are open to the public. This is a way for WYDOT and stakeholders to interact, to learn more about which projects have been finalized, to learn about the progress on projects, and to review new and upcoming projects. The RAC's October meeting is held at the University of Wyoming, College of Civil and Architectural Engineering, and all other meetings are held at the WYDOT Complex, in Cheyenne Wyoming.

The Research Center is also involved with, and in support of, the activities performed by the Wyoming Technology Transfer (T^2) Center, located at the University of Wyoming. The Local Technical Assistance Program (LTAP), within the T^2 Center, transfers research findings, and new technology to Wyoming agencies and individuals, by providing information on new and developing technology, responding to direct requests, providing reference materials, and conducting T^2/LTAP workshops. The T^2/LTAP Center is sponsored by FHWA, WYDOT, and Wyoming cities/municipalities and counties. Fifty percent of the funding for the T^2/LTAP Center comes from the FHWA Technical Transfer Program. WYDOT, Wyoming cities/municipalities and counties, and the University of Wyoming provide the remaining 50 percent matching funds. [See *Wyo. Stat. §21-7-115*] The T^2/LTAP Center may also submit proposals for SP&R funded research.

CHAPTER 3: Research Center Library

A vast amount of research information is housed in the WYDOT Research Center Library (Research Library), and is available for loan to stakeholders and the public. This information is coded, catalogued, and entered into the Research Center's electronic database by title, author, abstract, etc. The Research Center Manager also has access to Federal and state databases that house research reports, syntheses, digests, and other research materials. The Research Library is housed in the Planning office on the WYDOT Headquarters Complex. Further, stakeholders, and WYDOT employees may search the web for transportation related publications.

3.1 In-House Library

Materials found in the in-house portion of the Research Library include Federal and state publications, manuals, circulars, and other reference material. The Research Center staff can assist stakeholders in accessing any publication housed in the Research Library and on the web. The Research Manager will provide electronic and/or hard copies of publications, and/or conduct research upon request.

3.2 Electronic Library

3.2.1 Internet

For publications found on the web, there are many different databases available. Under the publication link on the Transportation Research Board (TRB) website, cooperative research program series, TRB series, periodicals, annual reports, and other documents can be accessed at: http://www.trb.org/Publications/Publications.aspx.

The resources link for the Federal Highway Administration (FHWA) web page has publications, laws, policies, and a link to the resource library can be found at: http://www.fhwa.dot.gov/.

The USDOT Research Hub allows access to FMCSA (Federal Motor Carrier Safety Administration), FAA (Federal Aviation administration), MARAD (Maritime Administration), FHWA, FRA (Federal Railroad Administration), FTA (Federal Transit Administration), PHMSA (Pipeline and Hazardous Material Safety Administration), OST (Outer Space Treaty), and NHTSA (National highway Traffic Safety Administration), plus numerous other research sites: http://ntlsearch.bts.gov/researchhub/index.do.

The National Transportation Library has developed the *Repository and Open Science Access Portal* (ROSAP), which is a digital library for transportation research. Publications in this database are submitted to increase the public's access to federally funded scientific research result.

3.2.2 WYDOT Library Database

An e-library, which contains abstracts from the research materials, can be accessed by WYDOT employees, in the WYDOT intranet database.

CHAPTER 4: Annual Research and Development Work Program Cycle and Requirements

In accordance with the requirements set forth in *Title 23 of the Code of Federal Regulations, Parts 420.207(a)(b),* and *420.209(a)(b)*, the Research Center will prepare a Research and Development (R&D) Annual Research and Development Work Program report (Work Program) that will cover pertinent information for each research project conducted in a fiscal year. Information on the research projects remains in the Work Program until either the study's final report has been accepted, or the study has been terminated. The Work Program is based on WYDOT's fiscal year, which begins on October 1 and ends on September 30 of the following year. The Work Program is presented in four parts: a) the yearly budget summary; b) the FHWA Pooled Fund Projects Summary; c) the State Research Projects Summary, demonstration projects, federal aid experimental evaluation studies, and other special studies; and d) an inventory of all property/ equipment purchased by the Contractors. The Work Program includes the following for each current research project:

- State study number
- Study type
- Study title
- Budget estimate for the program year
- Estimated cost for prior years of continuing studies
- Principal Investigator's name
- Project Champion's information
- Period of study
- Scope
- Present status
- Funding levels and share (Federal, state, and other sources) for Research Development and Technology (RD&T) activities for the program year

A yearly budget summary included in the Work Program, shall contain the following:

- Revenue for the current year
- Funds carried over from previous years
- Current revenue expenditures for prior year projects, if any
- TRB and NCHRP funding obligations, and any other program funds
- T^2 Center funding for the University of Wyoming
- Administrative costs
- Total remaining Federal funding available for research studies

Finally, a certification letter attesting that the State of Wyoming is in compliance with all requirements set forth in *Title 23 of the Code of Federal Regulation §420.209(c)*, and contemplates no changes that would alter that compliance must be incorporated in the Work Program.

CHAPTER 5: Available Funds for Research Projects

The following are categories and various types of funding available for research activities in line with mandatory federal requirements.

5.1 SP&R – Federal

Highway Trust Fund tax monies are made available to the Research Center under *Title 23 of the United States Code*, and *the Planning and Research Program Administration* Federal Rules (Rules), with appropriate state matching funds, and are currently the main source of funding for the Research Center. The Rules allocate two percent of the total annual transportation disbursement to each state for State Planning and Research (SP&R) activities. The law further stipulates a minimum of 25 percent of the SP&R funds be reserved for state transportation research, development, and technology transfer efforts.

5.2 State Funds

Projects that are considered limited scope studies or local interest studies, or in cases where there is a shortage of federal funds, are financed with state funds and not submitted to the RAC. These projects are undertaken independent of the RD&T program, and are not required to follow the strict guidelines that projects that receive SP&R funds follow. This does not mean that districts or other divisions in WYDOT cannot use this document as a guide. It is recommended, however, that each branch or district notify the State Programming Engineer of any state funded project for recordkeeping purposes. State funds can also be used as matching funds for any federally funded project.

5.3 National Cooperative Highway Research Program (NCHRP)

The Research Center participates in the National Cooperative Highway Research Program (NCHRP) and provides five and one-half percent of its SP&R funds yearly to NCHRP. Studies performed with NCHRP funding do not require a state match, and are usually high cost projects that have national implications. Solicitation for NCHRP projects begin in July of each year, with FHWA and NCHRP evaluating all proposals. NCHRP also uses evaluation panels to assess the problem statements submitted in some of the more popular subject areas. Full details on the NCHRP solicitation process can be found at:
http://www.trb.org/NCHRP/NCHRPOverview.aspx.

To obtain a copy of *Information and Instructions for Preparing Proposals for the Transportation Research Boards' Cooperative Research Programs,* go to:
http://www.trb.org/NCHRP/CRPInfoProposers.aspx.

Further, the *Procedural Manual for Contractors Conducting Research in the Transportation Research Board's Cooperative Research Program* can be found at:
http://www.trb.org/NCHRP/CRPInfoContractors.aspx.

5.4 Pooled Fund Projects

The Transportation Pooled Fund (TPF) Program serves as a means for interested states, FHWA, and other organizations to collaborate when significant or widespread interest is shown in solving transportation related problems. Partners may use pool fund studies and other resources to solve problems through research, planning, and technology transfer activities. To qualify as a pooled fund study, more than one state transportation agency, federal agency, or other agency, such as a municipality of metropolitan planning organization, college/university, or a private company, must find the matter important enough to commit funds or other resources to conduct the research, planning, and technology transfer activity. Federal and state transportation agencies may initiate pooled fund studies. Local and regional transportation agencies, private industry, foundations, and colleges/universities may collaborate with any or all of the sponsoring agencies to conduct pooled fund projects. Pooled funds are calculated at an 80/20 split, just like SP&R projects, unless the lead state requests a waiver for the state match requirement.

Generally, FHWA, TRB, NCHRP, or a state will act as the contracting agency for the pooled fund study. An advisory committee composed of representatives of each participating state or agency will be established to provide overall project direction and permit consideration of the cooperating state's views.

5.5 Collaborative Research and Development

Collaborative Research and Development is a cost sharing process that includes states and local governments, foreign governments, colleges and universities, corporations, institutions, partnerships, sole proprietorships, and trade associations. The federal share for these projects shall not exceed 50 percent. For the non-federal share, all costs directly incurred, including personnel, travel and hardware development costs, are included.

5.6 Apportionment

Title 23 of the United States Code Section 104 *et seq.* sets out the apportionment rules of all federal funding streams.

5.7 Future Strategic Highway Research Program Funds

All programs established with Strategic Highway Research Program Funds are based on National Research Council Special Report 260, entitled *Strategic Highway Research: Saving Lives, Reducing Congestion, Improving Quality of Life*, and the results that are identified in National Cooperative Research Program Project 20-58. The purpose of this program is to promote research results and products developed under the future strategic highway research program administered by TRB. Funding may come from SHRP 2 implementation or a percentage of a state's SP&R funds. Eligible activities are based on the report submitted to Congress by the TRB on the strategies and administrative structure to be used for implementation of F-SHRP results. The federal share for this funding is 80 percent.

CHAPTER 6: National and Regional FHWA Pooled Fund Programs and Other National Research Projects

6.1 Pooled Funds

Pooled Fund projects assist Federal, state, and local agencies in combining research projects that may be beneficial nationally, regionally, or with various organizations within a state. The projects can also bring together governmental entities and academic institutions, foundations or private firms**.** See also Section 5.4 for more information on Pooled Funds.

6.1.1 National Pooled Fund Program

FHWA sponsors the National Pooled Fund Program, and when a new project becomes available, a letter describing the proposed pooled fund projects is distributed to each state research center. The Research Center solicits opinions and comments from technical staff within the agency regarding the relevancy of the pooled fund project. Notices of pooled fund studies shall be sent out to RAC members as they are received by the Research Manager or they can be reviewed on the Pooled Fund website. If the RAC determines that it would be in the best interest of WYDOT to participant in a pooled fund, the RAC shall determine the amount of financial support the project will receive and for what fiscal years. The FHWA Regional Research Engineer is responsible for executing the funding transfer documentation. As a subscriber, the state may have a representative on the project panel that meets to determine the scope of work for the project, to evaluate proposals, if the research is performed by contract, and to review the final report of the effort. The total amount of annual pooled fund financial support is a line item in the SP&R budget.

6.1.2 Regional Pooled Fund Program

FHWA sponsors a Regional Pooled Fund Program that is more of a bottom-up than top-down program. A group of states may determine there is a problem of mutual interest to them and join together to investigate the matter. The state DOT that champions the idea performs the initial and ongoing administrative duties. Each regional pooled fund effort varies in its financial protocol, which is based on the requirements of the lead state.

Although federal-aid funding of pooled fund efforts is at the traditional 80 percent level, if the project is determined to be of national interest, the FHWA Associate Administrator for Research and Technology may determine that the project is a 100 percent federal-aid funded project. Most regional projects are funded at the 100 percent level. As with national efforts, reimbursable travel funding may be included in the study funds.

6.2 NCHRP

State DOTs are the sole source of funding for NCHRP. The process for funding and proposing projects at the NCHRP level follows the following process. In July of every year, AASHTO Standing Committee for Research and Innovation (SCRI) solicits problems from: a) AASHTO member transportation departments; b) the chairs of AASHTO committees and subcommittees; and c) the Federal Highway Administrator. Problem statements are accepted in September of each year. FHWA and NCHRP evaluate the problem statements. Evaluations are sent back to the Principal Investigators in November, and the Principal Investigator has until the end of December to decide whether he/she wishes to move forward or not. A report on the new problem statements is sent to the SCRI and the AASHTO RAC with a ballot for rating the statements according to priority. The ratings are returned to the SCRI secretary and are translated into priority rankings based on the average ratings of SCRI and AASHTO RAC. A summary of this report is sent to the SCRI for review prior to its meeting in Washington, D.C. SCRI makes the final determination on which completed or ongoing projects should receive additional funding for further work, and which new problem statements should be funded. Announcements for NCHRP projects are sent out in April.

SECTION 2: OPERATING POLICIES

Chapter 7   State Planning & Research (SP&R) Administration Process Research, Development and Technology Interaction

CHAPTER 7: State Planning and Research (SP&R) Administration Process Research, Development, and Technology Interaction

The Research Center operates in accordance with the requirements found in the *FAST Act*, Wyoming Statutes, state and Federal rules and regulations, and the Wyoming Department of Transportation Operating Policies. This Chapter outlines the requirements for managing the Research Center and the duties of the RAC, the Programming Engineer, and the Research Manager, as they pertain to the Research Center.

7.1 Wyoming Department of Transportation Research Center

The core mission of the Research Center is *to provide high quality research that aligns with the mission, values, and overall goals for WYDOT*. The Research Center uses WYDOT's overall goals to meet strategic performance measures, chosen program goals and objectives, and the needs of the State of Wyoming.

The administration of the Research Center is the responsibility of the Research Manager. The Research Manager monitors SP&R research projects to ensure the projects are within the proposed budget and timeline, as set out in the research contracts. Changes in scope of work, key personnel, disengagement from a project for more than three months, transfers of funds in budget line items, and requests for additional funding, are tracked by the Project Champion and Research Manager, and brought to the attention of the Programming Engineer and/or the RAC, as necessary. Depending on the type of change, the RAC may be informed of a change during the quarterly meeting, if the change is informational in nature, or the RAC may be contacted about the change via email, if immediate action by the RAC is required. If the Principal Investigator or Contractor is found to be non-compliant with the terms of the contract, the State Programming Engineer and the Research Manager investigate the non-compliance, and if it is found that the Principal Investigator or Contractor cannot or will not become compliant, the Research Manager and the State Programming Engineer will work with the Wyoming Attorney General's office to determine if the contract can or should be terminated, and whether a new Principal Investigator should be considered.

The State Programming Engineer and the Research Manager maintain contact with other programs within WYDOT, with outside institutions, and with Federal partners to ensure the most up-to-date Federal and state rules and regulations are followed, and to determine the best research projects to bring to the RAC. They also provide advice and general guidance during formal project studies, and serve as an important conduit for the transfer of research results to stakeholders.

The Research Center houses the Research Library. See Chapter 3 for full details on the Research Library. Publications are catalogued and placed in the internal Research Library database, and finalized research projects and proposals outlining current research projects are placed on the WYDOT website. The Research Manager assists WYDOT employees in obtaining research material. It should be noted that the Research Center will not always be able to assist with fees for publications, but he/she may be able to find the publication at a lower price or in PDF format.

The Research Manager also assists individuals in obtaining information from the Wyoming State Library and the University of Wyoming libraries.

7.2 Research Advisory Committee (RAC)

The RAC reviews, evaluates, and prioritizes all research proposals and problem statements. The RAC convenes quarterly (January, April, July, and October), and at other times as deemed necessary. In order to meet or to vote on proposals, a majority quorum (51 percent, or 4 members of the sitting RAC) must be present, either in person, via video conference, via email, or via phone. A call for proposals will occur at least 45 days prior to a scheduled quarterly meeting, and is sent out to the RAC as a whole and other interested parties. During the quarterly meetings, or at other times as determined by the Research Center, the RAC shall review and vote on proposals based on their merit; review the progress of current research projects to ensure they are timely and within budget; and review all innovative research projects for possible implementation.

Proposals shall be presented to the RAC as follows:

1. The Project Champion, or other interested party, shall inform the Research Manager of a possible research proposal and/or question.
2. The Research Manager shall place the proposal on the RAC agenda, if it meets the requirements set out in the Guidelines.
3. Interim proposals are proposals that are heard by the RAC at a time other than at the quarterly meeting. Interim proposals can include but are not limited to:
    a. emergency proposals that are requested by the Executive Staff.
    b. a proposal that was heard at a RAC meeting but was tabled due to issues with the proposal.
    c. a proposal that is brought to the attention of the RAC and is deemed time-sensitive.
4. Electronic copies of the proposal shall be forwarded by the Research Manager who will then send copies to the RAC members, the executive staff, and to the FHWA representative prior to the RAC meeting.
5. The Project Champion and the Principal Investigator, and/or his/her designee, shall attend the RAC meeting, either in person or via video conference.
    a. If an interim proposal is brought to the attention of the RAC, and the RAC and the Research Manager determine the type of presentation is necessary. The proposal may be brought to the RAC. The presentation can be by either a web based meeting, a in person presentation, or a teleconference.
6. The Project Champion and the Principal Investigator, and/or his/her designee, shall have 15 minutes, or a longer time as designated by the RAC, to provide the RAC with an overview of the proposal.
7. The RAC shall have 15 minutes, or a longer time as designated by the RAC, to ask questions of the Project Champion, and the Principal Investigator, and/or his/her designee.
8. Voting on the project will occur at the end of the RAC meeting for regular proposals, and via teleconference or e-mail for interim proposals. Only sitting RAC members are allowed to vote on proposals.

9. To determine the merits for all proposals, the RAC shall use the Proposal Checklist for RAC (See Appendix 4) to score the proposal. It should be noted that the template is an example only, and the checklist will be tailored to fit each proposal.

Further, to determine whether a project has sufficient merit to warrant further study, the RAC determines:

- Whether the proposed problem is adequately understood and defined.
- Whether the proposal is important and beneficial to the Wyoming stakeholders and WYDOT.
- Whether the proposal will have a positive long-term effect on WYDOT and the stakeholders, in other words, will the proposal provide a continuing, cooperative, and comprehensive impact that can be measured by WYDOT.
- Whether the proposal meets at least one of the WYDOT goals.
- Whether the proposal sets out planned payoffs that the Project Champion intends to use from the outputs and the long term results.

The sitting RAC is composed of permanent, non-voting members, and rotating voting positions.

- Permanent positions include the Research and Development Engineer (State Programming Engineer); State Research Manager; and an FHWA representative.
  - The State Research Manager is a non-voting member of the RAC and acts as the chairperson of the RAC.
  - The Research and Development Engineer (State Programming Engineer) is a non-voting member of the RAC. This individual acts as the chairperson of the RAC in the absence of the Research Manager.
  - The FHWA representative is a non-voting member of the RAC. This individual is invited to attend the meetings by virtue of his/her office or position, and acts as a liaison between WYDOT and FHWA.
- Rotating voting members include:
  - State Bridge Engineer
  - Geographic Information System/Intelligent Transportation System Program Manager
  - State Field Operations Engineer
  - State Highway Development Engineer
  - State Highway Safety Engineer
  - State Materials Engineer
  - State Planning Engineer
  - State Traffic Engineer
  - Chief Engineering Geologist
  - Lands Management Administrator
  - District Engineers
  - District Maintenance Engineers

Because the RAC membership is in addition to the member's normal workload, the Research Center rotates membership through senior staff position. Two district staff engineers and five program managers serve on the RAC each year. Membership on the RAC is by position and not

by person. In the event a position is vacant, the new person hired for that position assumes the RAC duties for the remainder of that rotational period.

The rotation process for the RAC is as follows:
- District Engineers: District Engineers will rotate sequentially for one-year appointments according to district number, beginning with District 1.
- District Maintenance Engineers: District Maintenance Engineers will rotate sequentially for one-year appointments according to district number, beginning with District 2.
- Program Managers: The Committee's membership is broad-based and includes most program managers, who serve a two-year appointment.

7.3 Research and Development Engineer/State Programming Engineer:

The State Programming Engineer supervises the overall operations of the Research Center. This individual coordinates all WYDOT research activities with TRB and AASHTO-RAC, which includes decisions of participation, membership expenses, and correspondence.

The State Programming Engineer also has the following responsibilities concerning the Research Center:

- Manages WYDOT's participation in regional and national RD&T efforts, including TRB, NCHRP, and other cooperative projects with outside organizations.
- Makes decisions on membership expenses, correspondence, and meeting participation for the Research Center, only. All travel decisions must follow the WYDOT internal policies.
- Ensures completion of research projects and distribution of results to applicable divisions and branches, and other state DOT's.
- Sits on the AASHTO RAC.
- Meets with executive staff and/or program supervisors regarding the operation of the Research Center.
- Is the primary contact with all program supervisors regarding the operations of the Research Center.
- Approves invoices from contractors.
- Approves no-cost extensions.

7.4 State Research Manager (RAC Chairperson)

The State Research Manager is responsible for the administration and operation of the Research Center. General duties and responsibilities of the State Research Manager are as follows:

- Provides literature reviews for proposals, as needed.
- Can sit on the AASHTO RAC and any subcommittee.
- Monitors all SP&R funded research projects.
- Facilitates the exchange of research information with other agencies, researchers, state DOTs, and interested parties, and formulates strategies for technology transfer.

- Develops public and private research partnerships.
- Monitors national and international research for potential federally funded and sponsored projects.
- Prepares periodic status reports of research projects and conducts interim evaluations for the Research Center.
- Initiates requests for research proposals.
- Drafts research contracts and amendments for Attorney General's approval as to form.
- Reviews research proposals for accuracy, performance measures, and budget requirements.
- Reviews research invoices and forwards them on to the WYDOT budget office for payment.
- Monitors the yearly research-operating budget.
- Updates and publishes the yearly Work Program.
- Distributes all research documents and reports to the federal repositories, the Wyoming State Library, the RAC, and other stakeholders, as necessary.
- Maintains and archives project files from research studies.
- Monitors state and federal rules, regulations and statutes for changes, addendums and revisions in areas that affect the Research Center, research funding and research projects, including but not limited to general research, intellectual property, privacy, data management, metadata, archiving, guidelines, procurement, budgets, and evaluations.
- Writes and updates the Research Center mission statement and goals, performance measures, input and output measures, efficiency measures, and tracks all requirements and measures as set out in past evaluations for consistency.
- Maintains the publications housed in the Research Library and assures the publications are placed in the Research Center Library Database.
- Manages the Research Center web pages housed within the WYDOT website.
- Distributes transportation technology information to interested parties.
- Updates the Research in Progress (RiP) and Transportation Research Information System (TRIS) databases with Wyoming specific research information.
- Updates the Pool Fund sites for which Wyoming is the lead state.
- Catalogues all data and metadata that is generated by the research projects.
- Tracks all performance measures and evaluation recommendations for the Research Center.
- Writes and updates the Guidelines.

The Research Manager is the chairperson of the RAC. At times, and under such circumstances when the Research Manager is not available, the Research and Development Engineer shall act as chairperson of the RAC. As chairperson, the Research Manager does not vote on any proposals or other issues that affect the RAC. The duties of the Research Manager during RAC meetings are as follows:

- Call, convene, and chair the RAC meetings.
- Arrange the agenda, time, and meeting room.

- Accept problem statements and/or proposals for consideration by the RAC.
- Serves as the RAC secretary.
- Drafts and distributes RAC minutes.
- Monitor the presentations and the discussion section of the meeting.

7.5 *Project Champion*

The Project Champion is a WYDOT employee that voluntarily or by assignment, assists the Principal Investigator in assuring the research project remains within budget, that the research project remains on track, answers technical and other questions the Principal Investigator may have, and addresses any changes in scope of work, key personnel, and disengagement from a project. The Project Champion further updates the Research Manager on any changes in the project, and is tasked with assisting with the implementation process for the research project.

The Project Champion must:

- Agree to act as the liaison between the Principal Investigator, and the Research Center.
- Keep the scope of the research within the project's intent.
- Answer technical questions when they arise.
- Monitor financial expenditures and progress reporting.
- Proofread the final report for technical accuracy.
- Assist in assuring that the outcome based performance measures set out for the project are being implemented.
- Assist in implementing the data management plan.
- Assist in implementation of the project findings, if necessary.
- Provide the RAC with an implementation report at the end of the project.

SECTION 3: PROPOSALS AND REPORTS

CHAPTER 8: Research Project Development Flow Chart

8.1 Authorization to Proceed with Research

Once the contract or agreement has been fully executed, and the budget office has obligated funding, a notice authorizing work to begin is sent to the contractor and the Principal Investigator. No Principal Investigator, or subcontractor may begin work until the contractor and Principal Investigators have received a "Notice to Proceed" from the research center.

8.2 Research Conduct/Deliverables

Contractors and/or Principal Investigators must keep the Project Champion and Research Manager informed of all aspects of the research project. Principal Investigators must inform the Research Manager and the Project Champion when there are changes in the scope of work; changes in key personnel; disengagement from the project for more than three months; a transfer of funds; when transferring or contracting out work; and the need for additional funding. Further, the Project Champion and the research manager shall monitor, and if necessary, perform site inspections. Deliverables for each project are tailored to meet the needs of the Principal Investigator, contractor, WYDOT, and any Federal, state or other requirements specific to the research project.

8.3 Recommendations for Implementation of Projects

The implementation process is dependent on the exchange of information, which begins with clear, concise, and complete project reports. Though the Research Center does not normally fund implementation, it can assist in formulating working plans for implementation. This may include a proof of concept project, assistance in funding a part of implementation activities, etc. Parts of the implementation process may occur during the research process. Funding for the research project my include funding for partial implementation, if approved by the RAC. The Research Center is required to document benefits from implementation of research projects and track the percentage of projects implemented, or document why a project was not implemented. At this time, recommendations to WYDOT on changes as set out in the research report can come from the Research Center, but actual implementation is the responsibility of WYDOT. Appendix 5, Research Project Feedback Form Template; Appendix 6, WYDOT Research Project Evaluation Phase 1; and Appendix 7, WYDOT Research Project Evaluation Phase 2 are used by the Research Center to better track and improve the implementation processes for research projects.

8.4 Reports

Principal Investigators are required to provide the Research Center with various types of reports during the contract period. Reports will outline the progress and success of each project. See Chapter 10 for details on all reports.

8.5. *Data Management Plan*

Data management plans (DMP), metadata tracking, and data cataloging are required for all research contracts. Principal Investigators are required to maintain, archive, and share the data and/or datasets that are generated from the research project. Following completion of the research project, and within a reasonable amount of time, the Principal Investigators shall provide the data and datasets to WYDOT. For further information on Data Management Plans and Metadata Schemas, see Section 4, and Appendix 2 and 3.

8.6 *Overall Project Performance*

The expenditure of SP&R funds for research and development purposes is carefully scrutinized. The use of these funds must add value to and must improve the efficiency of operations of WYDOT. The Research Center tracks the progress of all research studies to ensure that performance measures, outcomes, outputs, and cost benefit analysis measures are included in each project. Further, all projects financed using SP&R funds are required to submit quarterly progress reports. See Appendix 1, Progress Report Template.

8.7 *Property (Tangible and Intangible) and Equipment Purchased, and Disposal of the Property and Equipment*

The following requirements must be followed after purchasing equipment and property with research funds.

- Contractor must provide the Research Center with the serial number, license number, or other descriptive information regarding the equipment/property purchased during the time of the project.
- Contractor must carry equivalent insurance coverage for the property and/or equipment acquired during the time of the contract, unless and until such time that the title is transferred to WYDOT. (2 C.F.R. 200.310)
- Contractor shall maintain records and provide WYDOT with an inventory of all equipment purchased with the contract funds.

When the equipment is no longer needed for the original project, the following steps shall be taken:

1. Determine if any program(s) within WYDOT has a need for the equipment.
2. If no WYDOT Program has a need for the equipment, determine if any state, Federal, city, county, or municipality has a need for the equipment.
3. If no state, Federal, city, county, or municipality has a need or a use for the equipment, dispose of the equipment pursuant to the *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards,* 2

C.F.R. 200.313(e). This may include, but not be limited to, disposal with the State Property Warehouse.

WYDOT may loan, lease, or give research equipment that is in excess to an educational institution or nonprofit organization for the conduct of technical and scientific education, and research activities. Title of ownership shall transfer as a gift under this section.

CHAPTER 9: Research Problem Statements and Proposals

Drafting, submitting and presenting a proposal to the RAC is a multi-step process. Below are guidelines and steps that should be used when submitting proposals. Like final reports, all proposals must meet Section 508 of the Rehabilitation Act, (See Section 4, Chapter 14), and the requirements set out in the CRG.

9.1 Problem Statements

Two weeks prior to the submittal of a proposal, the Principal Investigator and/or Project Champion should submit a problem statement to the Research Center so a literature search can be conducted. This is a Federal requirement to ensure that no research is duplicated causing Federal funds to be unnecessarily wasted. The Research Manager shall review the problem statement prior to the literature review. Problem statements normally range from just a few sentences to a couple of paragraphs and must describe the problem in enough detail to allow a thorough literature search. Problem statements should not be long, complex, or hard to understand and should lay out the following: a) aspects of the problem that are especially significant; b) how the problem adversely affects transportation facilities or services; and c) a summary of the most pertinent findings from the literature review.

9.2 Literature Review

All proposals must have a literature review performed by the Principal Investigator and/or the Research Center. This step may take time, especially if the Research Center has to order research articles from another library. Research articles are intended to help the Principal Investigator narrow the problem statement; additionally, the literature search results and the Principal Investigator's subsequent investigation are an integral part of any future research proposal. After reviewing the articles, the Principal Investigator will decide whether he/she wants to proceed, since it may be found that the research articles answers all questions and no further research is necessary. If the Principal Investigator's review does not answer the question, the Principal Investigator can request a time slot on the RAC's meeting agenda. The written request must be accompanied by a copy of the problem statement and any supporting material.

9.3 Proposals

The research proposal should be a well-prepared document that defines the research problem and objectives, provides a detailed work plan for achieving the objectives, and indicates how the research findings are expected to be used. Additionally, proposals should simply and economically provide a straightforward description of the Principal Investigator's ability to meet the requirements of the research.

Proposals for pooled fund projects must include the pooled fund solicitation number, lead agency information, funding request, estimated period, information on the study objectives and scope of work, the acceptance memorandum, service request forms, and any federal funding waiver documents. Pooled fund studies should follow the same requirements as other proposals.

NOTE: **Unless there is a written agreement between the Contractor/Principal Investigator and WYDOT, all proposals shall be considered open access and shall be placed on the WYDOT, Research Center webpage.**
http://www.dot.state.wy.us/home/planning_projects/research-center/current-research-projects.html

9.3.1   Pre-Proposal

The pre-proposal is a process through which the stakeholder presents their research question to the RAC in an abbreviated format. The pre-proposal must be in line with the WYDOT mission and goals, which are outlined in Chapter 1. The intent of the pre-proposal process is to predetermine whether the project has sufficient merit without consuming a large amount of time or effort. The pre-proposal is submitted in a one to two page document that briefly describes the matter that motivated the research suggestion, and assesses the topic's importance and urgency. The report must provide enough information to allow the RAC to appreciate the significance of the matter, but does not require elaborate details. If the RAC feels that the pre-proposal has merit and warrants further study, it will request that a formal research proposal be prepared. The formal proposal may be heard either at the next RAC meeting or at a time designated by the RAC.

9.3.2   Formal Proposal

The formal proposal (proposal) is a request for support and funding. The proposal should address, in detail, what the Principal Investigator hopes to accomplish, how much the project will cost, and how long the project will take. The proposal must be in line with the WYDOT mission and goals. Failure to follow the instructions set out in this Chapter could jeopardize the Principal Investigator's chances of selection. The Research Center will attempt to help the Principal Investigator address specific weaknesses in a proposal, if there are any, and the Research Center reserves the right to reject any proposal submitted that fails to conform to these guidelines. Neither the Research Center nor WYDOT is responsible for any costs incurred by the Project Champion or the Principal Investigator, including proposal preparation, prior to the execution of a contract and funding approval by the WYDOT financial office. The Principal Investigator must submit a Section 508 complaint electronic copy of the proposal to the Research Center for distribution to the RAC.

NOTE: The following subsections are intended to help Project Champions and Principal Investigators prepare a formal proposal.

9.4 Title Page

The title page must contain the following information:
- Project title: The title should be brief and should immediately convey to the reader what the proposed study will cover.
- Name and address of the WYDOT Project Champion: Every research project must be sponsored by a WYDOT employee. The Project Champion, and/or his/her

designee, acts as the research project's technical contact responsible for overseeing most of the research services being provided. Research project administration and payment tracking will be the responsibility of the research manager.
- Name and address of Principal Investigator: Provide the complete name, phone number, email address, and physical address of the Principal Investigator(s).
- Date: Date the proposal is sent to the Research Center.

9.5 Problem Statement

The problem statement should set out all circumstances surrounding the current problem or issue that gives rise to the needs. If the problem statement is different than the one provided to the Research Center in the literature request, the Principal Investigator should set out what the differences are and why the two are different. The problem statement should emphasize how the problem or issue affects operations of WYDOT, stakeholders, and Wyoming highways. The problem statement should tie the problem or issue to the WYDOT mission and goals. It is important that as much detail as possible be included in the problem statement, and an explanation of the inadequacy of a technique, material, or specification can help define the extent of the problem better.

9.6 Background Statement

The background statement should provide the RAC more information and history on the problem or issue to be studied. An explanation of the literature search and an explanation of how the issue affects WYDOT's current policies, rules and/or regulations should also be included in the background section.

9.7 Objectives

The objectives section defines what the Principal Investigator hopes to accomplish at the completion of the project, and sets out the goals that provide the optimum technique, material, or specification from a financial, operational, environmental, or social viewpoint. The objectives section must include the following:

- Output measures: The direct or indirect link between the proposal and the WYDOT goals and/or TRB strategic plans.
- Outcome measures: The end result of the project. Outcome measures should explain how an action will improve efficiency, safety, or another measure while at the same time lower costs, accident rates or another measure.
- Goals: What will be accomplished by the proposed project.
- Performance measures: How to manage and/or improve a service or process, by what unit of measure, and by when. The performance measures should provide effectiveness, efficiency, quality, and/or timeliness of the project.

9.8 Benefits

To the extent possible, qualitative benefits from the proposed project should be stated. These could include one or more of the following:

- Estimated cost savings or cost avoidance.
- Estimated reduction in crashes and fatalities. (*For those studies involving cost savings or avoidance and reductions in crashes and fatalities, a cost-benefit analysis is highly recommended.*)
- How operational methods will be improved.
- How safety and mobility will be improved.
- What percentage of increased public user support will be realized.
- What specifications will be revised.
- What public relations should improve, and if so, how.
- The expected reduction in energy consumed, and how practices will be improved or simplified.
- Whether WYDOT's policies will be impacted, and if so, how.

9.9 Applicable Question

Project Champion and Principal Investigator should also address the following in their proposal, if applicable:
- Are there any potential barriers to implementation (e.g. material, technology, vendors, legal/regulatory, public perception). For each potential barrier, identify strategies to mitigate these potential barriers.
- What is the expected time frame for implementation.
- Does the project involve action on Federal lands or other conditions that will require National Environmental Policy Act (NEPA) documentation (e.g. Categorical Exclusion or Environmental Assessment), and/or forest service or other permits.
- What are the major uncontrollable factors and/or unknowns in the project such as weather, wildlife, material properties, traffic, etc. For each uncontrollable factor, address whether there could be additional costs or delays.
- Should the project be segmented into phases with go/no-go decision points based on known unknowns (e.g. technology, partnerships, regulatory).
- If the project involves evolution of one or more technologies, is a technology road map provided showing how these technologies fit together.
- Will a [Buy American Waiver](#) be necessary.
- Will any data produced by this project be considered confidential or sensitive.
- Will the data and/or report from the final project be copyrighted, patented, or trademarked.

9.10 Statement of Work

The statement of work section should set out how the Principal Investigator plans to fulfill all deliverables for the research project. The statement of work area must include a work plan/scope and a work schedule.

9.10.1   Work Plan/Scope

The work plan/scope area should demonstrate an understanding of the techniques and methods to be used to resolve the problem, and should contain all components necessary for the successful completion of the research. The work plan/scope section should set out the tasks to be performed, and whether future phases will be necessary to reach the ultimate goal. The work plan should allow the reviewers an opportunity to judge the potential success and cost of the research.

All projects that include the building of databases, software, or other computer type projects must include information on designs, computer programs needed or to be used, and storage capabilities.

9.10.2   Work Schedule

The work schedule and work plan are interrelated, and the work schedule should set out a calendar that reflects the time to accomplish each plan component. Milestones, decision points, and deadlines must be included in the work schedule. A bar chart or other graphical representation can be used to accomplish this item. Requests for extensions of time to this schedule must be received no later than 60 days prior to the contract end date.

Any changes in the duration of the contract, in the work plan/scope, work schedule, or cost of the project must be in writing and may need approval by the RAC. The RAC has authorized the Research Center to grant all no cost funding requests. If a proposal is approved, the Principal Investigator should provide the Project Champion and Research Manager with changes to the work plan/scope 30 days prior to the change, if possible. Changes that must be set out in writing include:

- Scope of work or objectives of the project.
- Changes in key persons.
- Disengagement from the project for more than 3 months, or a 25 percent reduction in time devoted to the project.
- The inclusion of costs that require prior approval.
- The transfer of funds between line items.
- The subawarding, transferring or contracting out of work.
- Changes in the approved cost sharing or matching.
- The need for additional Federal funds.

9.11 Budget

The budget for the project should be laid out in a format similar to that found in Figure 1. The budget is nothing more than cost estimation, which should be the best guess on what costs will be. Each component of the work plan represents estimates of salary, equipment, travel, and other costs. The work schedule and the cost estimate are interrelated. Again, the best cost estimates correspond to the work plan components describing the costs of each task in terms of salary, equipment, travel, etc. The cost estimate must include all monies requested for work that will be performed, whether that work will be billed against the SP&R funds or not. Additionally, the

Research Center and the RAC require the costs be broken into fiscal year totals. All funding sources must be reflected in the budget.

Description	Budgeted Amount	Explanatory Note
Direct Cost		
Total Personnel Costs		
Principal Investigator		
Other Personnel		
Fringe Benefits		
Research Travel		
Report Generation		
Equipment		
Other		
Technical Transfer		
Conferences/Report Presentation		
Miscellaneous Travel		
Indirect Costs		
Project Administration		
Overhead		
Indirect Costs		
In-Kind Match		
TOTAL		

Source: Adapted from Appendix G, Final Report 1202F, Evaluating Department of Transportation Research Program: A Methodology and Case Study

Figure 1. Example of the Research Project Budget Analysis

NOTE on request for additional funding: Requests for additional funding must be received from the Contractor and Project Champion as soon as the need is known, but no later than 60 days prior to the end of the contract term.

NOTE on invoicing: FHWA requires that all projects funded with SP&R funds shall be invoiced no later than 120 days after a cost occurs. Principal Investigators/Contractors that do not provide an invoice to the Research Center at a minimum of every 4 months run the risk of their project being closed by FHWA. Pursuant to 2 C.F.R. 200.343 – 345, at the end of the term of the contract/agreement, Principal Investigators/Contracts must send a final invoice to the Research Center no later than 45 calendar days after the project's termination date. Invoices must include receipts for all equipment and supplies purchased, and all travel costs billed on the invoice.

9.12 Implementation

The primary purpose and objective of the research project is to improve the operational responsiveness of WYDOT. Because the implementation process is lengthy and involved, assurances of a high probability of actual operational improvements assists in advancing a proposal. A broad and descriptive outline of the implementation process should be included in the body of the proposal. The proposal should also state who will logically be responsible for applying the research results, and specific standards or practices that might be affected by the

research findings. See Appendices 5, 6, and 7 for how the Research Center tracks implementation of projects.

9.13 Technology Transfer

Another goal of conducting research is to improve or enhance transportation practices. In order for research results to be useful, transfer of knowledge from the researcher must be made to new or potential users. This transfer can be seen as a process encompassing the dissemination of the research results and knowledge regarding any new processes, methods, and products that increases the technical quality. Like the implementation process, a broad but descriptive technology transfer outline should be written.

9.14 Data Management Plan

A Data Management Plan (DMP) shall be attached to the proposal and must set out how the data and/or datasets from the project will be maintained, archived, and shared. The DMP should be revised during the course of the research project, if there are changes, and the DMP must contain information on maintaining data and/or datasets both during and when the project is completed. Changes to the DMP should be submitted to the Research Center 30 days prior to the change so that the Research Manager and the Principal Investigator can discuss the change prior to implementation. The final DMP must be provided to WYDOT within 90 days of the conclusion of the project. (See Appendix 2, Data Management Plan). The Principal Investigator shall provide to WYDOT, within a reasonable time after the conclusion of this project, a copy of the non-confidential research data and/or datasets derived from the research project with the understanding that the data and/or datasets will be considered open access after a 12-month embargo period.

When drafting the DMP, the Principal Investigator and Project Champion shall jointly determine:

- Which data and/or datasets shall be linked to the final report.
- Where the data and/or datasets shall be archived.
- The retention period for archived data and/or datasets.
- What file format will be used to archive the data and/or datasets.
- How the data and/or datasets shall be labeled.
- How the data and/or datasets will be cataloged.
- What metadata shall be attached to the data and/or datasets.
- What written consents, licenses, or other tools will need to be attached to the data and/or datasets to ensure privacy and intellectual property.
- The procedure for accessing the data and/or datasets at the end of the project.

CHAPTER 10: Research Reports and Formatting

There are various reports that must be submitted after funding is approved. Below is a list of the reports, and the requirements for each report. This chapter also lays out the information that must be included in each report. For questions on any of the steps or for assistance in writing any of the reports, please contact the Research Center at 307-777-4182.   All reports must adhere to the standards set out in the CRG, [Section 508 of the Rehabilitation Act](#) (Section 508) and the [Web Content Accessibility Guidelines (WCAG) 2.1](#).

10.1 Internal Report Types

Below is a list of the types of reports and the overall requirements for each report.

10.1.1 Progress Reports

The Principal Investigators must submit progress reports to the RAC every three months, until completion of the project. The information provided in the progress reports should allow a reviewer to determine whether the project is progressing satisfactorily or whether project revisions may be necessary. Progress reports will be due on or before the final calendar day in February, May, August, and October. To ease the effort of writing progress reports, a form has been developed and all areas of the form must be completed. Appendix 1, Progress Report Template. Progress Reports will be submitted to WYDOT's Research Manager electronically. In general, progress reports should be simple and brief, usually three or four pages, but the length of progress reports depends on the amount of activity that occurred during the reporting period, the nature of the topic, and the amount of interaction between the Principal Investigator and the Project Champion. Each task should be identified and discussed within the context of what was completed before the reporting period, what was accomplished during the reporting period, and what remains to be done. Problems that were encountered should also be explained, as should their solutions. Any changes in time or cost for the fiscal year, whether an increase or decrease, must be noted, and an explanation for the change must be provided. When there has been no progress during the quarter, the progress report must explain why. As set out in Chapter 9, subpart 9.10.2, above, the progress report must also include any changes to the work plan/schedule.

10.1.2 Interim Reports

Presentations to the RAC are required for projects lasting more than one year and must cover the accomplishments for the research project during the preceding year. Principal Investigators shall submit interim reports and make RAC presentations each year that the project is open. Interim presentations are normally heard during the January RAC meeting, with time permitting. The Interim Report and the RAC presentation should cover the accomplishments for the project to date. Interim reports rarely exceed 20 pages in length and must cover much the same material found in the progress reports. The interim report shall advise the Research Center and the RAC of preliminary findings and recommendations that will influence the direction of the remainder of the project, or report findings that can be adopted prior to project completion. The front section and body of an interim report should be prepared in the same manner as a final report.

The purpose of the interim report should be clearly stated and should focus on the work performed to date, and should include sufficient background to establish context within the entire project. The interim report should explain how the findings were developed, how they relate to the study's original objectives, and how they will affect the remainder of the project. Interim reports shall be afforded the same protections as those found in the Final Report.

10.1.3 Final Report

At least **six weeks** prior to the termination of the contract, Principal Investigators shall submit an electronic version of the final report to the Research Center. **All reports must adhere to the standards for preparation and publication of scientific and technical reports as outlined in the *Turner Fairbanks* *Communications Reference Guide* (updated February 24, 2017) (CRG),** supplemented by the U.S. Government Printing Office Style (GPO) Manual, or in a format approved by the Research Center, and the information set out in the Revised Section 508 of the Rehabilitation Act. Formatting guidelines for the research reports can be found in Chapters 4 and 5 of the CRG. All graphics, tables, figures, and photographs must be embedded within the body of the report in such a manner that will allow alternative text to be assigned to each. (See the Web Accessibility Guidelines from the University of Wyoming or Colorado State University ACCESS to post-Secondary Education through Universal Design for Learning for tips on inserting alternative text.) The technical page, Form DOT F 1700.7, for the final report shall include the Open Researcher and Contributor ID (ORCID) number for all authors named in the final report. Digital Object Identifiers (DOI) may be assigned to the final report by the National Transportation Library (NTL). The Research Manger will ensure final report printing, and final report distribution.

The final reports must be submitted to the Research Manager in an electronic format. The electronic version must either be submitted on CD in PDF format and Word format, or electronically via email, or other document-sharing site.

The Principal Investigator shall insure that that the appendices, software codes, and databases attached to the final report shall be 508 Compliant. Authors should contact the Research Manager for assistance in this process.

The Research Center will coordinate the review of the draft report with the Project Champion and an outside proofreader. The Project Champion shall review the draft report for content and accuracy. The draft report will be reviewed by the outside proofreader for grammar and formatting, only. Once both reviews are completed, and all changes have been implemented, the Research Center shall submit the final report for publication and distribute the report to the Wyoming State Library, the University of Wyoming library systems, the University of Wyoming Technology Transfer Center, the Transportation Research Board (TRB) TRID Database, the National Transportation Information Services (NTIS) database, the NTL ROSAP database, FHWA, and Turner Fairbanks.

The final report will be considered open access. This means that readers are able to share and use the content from the report pursuant to any license requirements. Further, the final report must:

- Be freely available to the public.
- Be virus free.
- Be written in a clear, concise style, suitable for web format.
- Be proofread and edited in advance of submission.
- Be imprinted with meta tags. See the Metadata Schema, Appendix 3.
- Have attributes for all figures, graphs, tables, images and other artwork.
- Meet the requirements set out in the Revised Section 508 of the Rehabilitation Act of 1973, as amended.
- Be written in compliance with the CRG.

10.2 Adapted Reports and Publications Derived from the Research

WYDOT encourages Principal Investigators/Contractors and/or graduate students associated with the project to author publications in journals using the research from the funded project. To ensure that there is no conflict between the requirements from the outside publisher and those set out by the Research Center, Principal Investigators/ Contractor should adhere to the following:

- Principal Investigators, and others who write adapted reports and publications derived from the research sponsored by WYDOT, must provide the publisher of that publication with a copy of the WYDOT Copyright Permission that is provided to the Contractor at the beginning of the research process. (Appendix 8)
- All tables, figures, illustrations, equations, photographs, charts, etc., embedded in the body of the adapted report or other publication that are based on the data from the research project must include a source credit line that gives credit to the Principal Investigator/Contractor, State of Wyoming, WYDOT, and/or the originator.
- All data, e-components, encoding, software, enhanced graphical, illustrative, video, and audio materials gathered for the research project are considered open access materials, and must include an applicable Creative Commons License or other similar license type agreement. Proper licenses must be executed to ensure that proper ownership is retained by the Principal Investigator/ Contractor, the State of Wyoming, and WYDOT.
- The Principal Investigator/Contractor with the outside publisher must ensure that the adapted report is substantially different from the WYDOT report.
- The embargo period set out in the contract between the Principal Investigator/ Contractor and WYDOT shall supersede and replace any embargo period set out by any publisher.
- Data may be shared with outside publishers with minimal restrictions.
- Principal Investigator/Contractor shall name WYDOT and FHWA as the funders for the project in the acknowledgement of the adaptive report.

10.3 Special Provisions for Final Reports

10.3.1 Intellectual Property

Intellectual property (IP) refers to creations of the mind, and is categorized as property, and as such, is an asset. IP is covered by numerous state and Federal statutes, codes, state administrative policies, FHWA policies, and secondary authorities, like the National Cooperative Highway Research Program (NCHRP) 799 and Legal Research Digest (LRD) 73. IP rights allow the creator or the owner to enjoy, sell and/or prevent others from stealing their assets. WYDOT requires that IP rights are secure and it is the responsibility of the Principal Investigator to do the same. Further, Principal Investigators must know what IP needs are required for their research project and how to manage the rights. It should be noted that research projects may have copyright, trademark issues, and patent rights at the same time.

Principal Investigators/Contractors must keep in mind that all rights in works, including but not limited to databases, works of authorship, software (including web viewers), data, and inventions created or developed in the performance of the research project shall be jointly owned by WYDOT and the Principal Investigator/Contractor. When preparing the final report, Principal Investigator/Contractor must ensure that the proper attribution is attached to all adaptations of the final report. (Attribution is the giving of appropriate credit for the work and includes copyrights.)

In research, information from other sources can be used under the Fair Use Doctrine (Title 17 U.S. Code 107). Principal Investigators must insure that they are only using small segments of the original work and that all portions borrowed give proper attribution to the author(s). This is specifically true if the portion borrowed is the heart of the work.

Principal Investigators must make sure that any information or data that is used in the research report does not breach the intellectual property rights of others. It is the responsibility of the Principal Investigator to ensure that any work cited in the final research report has proper attribution for outside authors, and that they have proper permission to use copyright rights and/or orphan works from other authors.

If required, Principal Investigator shall obtain all permissions and license agreements to use any copyrighted materials in the final report, shall include proper authorizations in the body of the final report for all copyrighted materials used, and shall provide to WYDOT information on its due diligence search for all orphan copyright material. Principal Investigator shall also provide WYDOT with any permission necessary for use of patent or patented schematics used in the final report.

10.3.2 Patents

A patent is a document issued, upon application by a government office that describes an invention and creates a legal situation in which the patented invention can normally only be exploited (manufactured, used, sold, imported) with the authorization of the owner of the patent. If the Principal Investigator or Project Champion believes that a patent is warranted for the

research project, they must contact the Research Manager, and discuss the steps that will need to be taken. Principal Investigator/Contractor must consult with WYDOT regarding any patent rights that arise from, or are purchased with, funds awarded under the contract.

Key points Principal Investigators must keep in mind where patents are concerned:

- Patent rights go to the Contractor when the contract is with the state and not the federal government, unless state law dictates otherwise.
- State agencies may draft a license with the Contractor so that the state is allowed to use or improve the invention on behalf of the state agency.
- Contractors may patent any invention made with FHWA planning and research funds.

As a note, FHWA requires that Contractors must reserve a license for the state DOT to "use an invention or discovery resulting from activities funded by FHWA planning and research funds". (23 C.F.R. pt. 420; 73 Legal Research Digest, page 15).

10.3.3 Copyright

Under the Federal Rules set out in Subpart A, administration of FHWA Planning and Research Funds, 23 C.F.R. 420.121, State DOTs and their subrecipients may copyright material developed in the course of the FHWA planning and research funded project. Principal Investigators and WYDOT have certain exclusive right when it comes to reproducing, preparing derivatives, distributing copies, performing work publicly, and displaying the work performed in the research projects. This is to ensure that work placed in the public domain without any thought to copyright or creative commons cannot be used by others without permission. The contract between WYDOT and the Contractor sets out the copyright in the work being performed shall be owned jointly between WYDOT and the Contractor. All agreements for copyrights between the Contractor and the Principal Investigator are set out in employment agreements.

Contracts, Principal Investigators, and WYDOT have the following rights under the copyright rules, as long as copyright permissions are generated:

- Reproduce the work in copies or phonorecords
- Prepare derivative works based upon the work
- Distribute copies or phonorecords of the work to the public by sale or other transfer of ownership or by rental, lease, or lending
- Perform the work publicly if it is a literary, musical, dramatic, or choreographic work; a pantomime; or a motion picture or other audiovisual work
- Display the work publicly if it is a literary, musical, dramatic, or choreographic work; a pantomime; or a pictorial, graphic, or sculptural work. This right also applies to the individual images of a motion picture or other audiovisual work.
- Perform the work publicly by means of a digital audio transmission if the work is a sound recording Copyright also provides the owner of copyright the right to authorize others to exercise these exclusive rights, subject to certain statutory limitations.

10.3.4 Data Ownership

Data is an important part of all research projects. WYDOT considers all data and data compilations as copyrighted assets. The State of Wyoming, WYDOT, and Principal Investigator/Contractor jointly own all documents, data compilations, reports, photographs, data and other work provided to or produced by the Principal Investigator/Contractor in the performance of research project. Further, the State of Wyoming, WYDOT, and Principal Investigator/Contractor jointly own all data that may reside within the Principal Investigator/Contractor's hosting environment and/or equipment/media that relates to the research project.

Compilations and databases are collections of work and preexisting material, and data that is used in the research project. Principal Investigators should remember that the copyright in a compilation and database extends only to the compilation/database itself, and not to the underlying materials or data, and the compilation/database must contain a minimum level of creativity in order to be protected. In addition, if a compilation/database is not protected by copyright law as an original work, it will not be protect against others from extracting factual data from the database (short of copying the selection and arrangement of the database as a whole).

It is imperative that Principal Investigators protect their compilations/databases in the form of a user license that prohibits the end user from extracting data from the compilation/database for uses other than those intended by the compilation/database owner. Principal Investigators must work with the Research Center to discuss the end user agreements for the research data.

10.3.5 Work for Hire.

Title 17 of the *U.S. Code* , Section 101 of the Copyright Act defines a "work made for hire" in two parts: a) work prepared by an employee within the scope of his or her employment *or* b) a work specially ordered or commissioned for use   Work for hire situations are determined by the relationship the Principal Investigator has with the Contractor and the employment contract between the two. Principal Investigators must know if they are an employee of the Contractor, or if they are considered an independent contractor to determine their rights. Employees generally fall under the work for hire guidelines, which means, the Contractor generally owns the copyright, unless there is a rule, regulation, or employment contract language to the contrary. Independent contractors are those persons or entities who contract with an entity. Independent contractors pay their own social security and Medicare taxes, insurance, etc. Independent contractors own the work that they generate during the research project. Keep in mind that an independent contractor's work is only considered work for hire if there is an express written agreement signed by them stating that the work is indeed a work made for hire.

10.3.6 Software and Copyrights

Every once in a while a research project will have a software or programming element. There are numerous components to software, programming and the end product. In the past the generally accepted principle has been that computer programs should be protected by copyright, whereas apparatuses using computer software or software-related inventions should be protected

by patent. WYDOT requires that Principal Investigators and Contractors determine which combination of IP to use to protect their software. It should be noted that each IP right provides different protections for software: a patent protects an innovative idea such as a method, algorithm, function, and/or system; a copyright protects the expression of an idea; and a trade secret protects information that is not commonly known and is maintained secret by its owner.

Remember, software can always be covered under copyright laws, and this is why it is in the best interest to register the software produced in the research project. Principal Investigators must create a record of the ownership of software, and all separate versions of the work must be registered as a separate copyright. Further, software and programs must have end user license agreements and General Public License (GNUs) before either can be released in the research report, or in any derivative or adaptive report.

10.3.2 *SECTION 508 OF THE REHABILITATION ACT of 1973, as amended (29 U.S.C. 794d)*, and the Web Content Accessibility Guidelines (WCAG) 2.1

Since the final report will be accessible on various state and Federal websites in electronic formats, all reports must be written in compliance with Section 508 and WCAG. This Act states that all electronic products produced by government agencies must be accessible to persons with disabilities, including those persons with vision, hearing, cognitive, and mobility impairments. For further information regarding Section 508, see the Web-based Intranet and Internet Information and Applications on the United States Access Board (Access Board).

It should be noted that if the requirements in the Revised 508 Standards impose an undue burden on the Principal Investigator/Contractor, they shall set out how conformance would impose significant difficulty or expense considering the resources available. (36 C.F.R. appendix D Part 1194.4 and appendix E Part 202.6)

Below is a list of requirements to ensure all reports are in compliance with Section 508 and WCAG.

- Structural tags must be used for headings, tables, figures, equations, and footnotes. This allows individuals with disabilities to navigate the report. Using structural tags also allows the author of the report to build and generate a table of contents, table of figures, etc. To ensure structural tags are working properly:
  o Use Microsoft Word® bullet and numbering format to embed structural tags when creating a list.
- Create the hierarchical system for headings using Microsoft Word® style elements found on the "home" tab. Do not manually type headings into the report.
- Underline text only for hyperlinks to WebPages. Do not underline for emphasis added.
- URLs must be complete web addresses. Do not use "click here" or "read more", and hyperlinks must be associated with all URLs.
- The advanced/document properties section of the report must be filled out.
- The figures in the report must comply with the (CRG), page 37-43, and must be created using the caption tab in Microsoft word.

- All images, art, diagrams, logos, photographs, screenshots, graphs, tables, equations, figures must be associated with alternative text/text equivalent.
  - To insert "alternative text" in the report, review the support document from Microsoft®.
  - Equations should be inserted into the report as an image.
  - For descriptive text for complex images, graphs, tables, etc., if there is no complete description in a paragraph immediately above or below, insert a complex description in the alternative text box.
  - Charts and graphs must have a title, legend, and axis labels where applicable.
  - According to the Access Board, text equivalent/alternative text means:

    …adding words to represent the purpose of a nontext element. This provision requires that when an image indicates a navigational action such as "move to the next screen" or "go back to the top of the page," the image must be accompanied by actual text that states the purpose of the image. This provision also requires that when an image is used to represent page content, the image must have a text description accompanying it that explains the meaning of the image.

    ***

    The text information associated with a nontext element should communicate the same information as its associated element. For example, when an image indicates an action, the action must be described in the text. The types of nontext elements requiring actual text descriptions are limited to those elements that provide information required for comprehension of content or those used to facilitate navigation.

    ***

    A non-text element is an image, graphic, audio clip, or other feature that conveys meaning through a picture or sound.

- Tables should be created in such a manner to ensure compliance. The following will help ensure table compliance.
  - All tables should be created using Microsoft ® Word style.
  - Tables must comply with the CRG, page 37-43.
  - The header row should be marked as repeating rows. To confirm compliance, select shift+F1, and check the table tab.
  - Check the table for readability. (Place cursor in the first cell of the table. Tab across. Make sure the tab order matches. Also, click shift+F10, select table properties/text wrapping.)
  - Ensure there are no blank cells in the table, especially in the header.
  - For compound tables, those with merged cells, please work with the Research Center. All complex data tables must be converted to PDF document remediation for accessibility.
- If a word or phrase has a unique meaning provide the definition of a word or phrase. A specific definition must be used in order to understand the content.

10.4 Front Cover for Internal Reports

Parts of the front cover include:

- Sponsoring Agency(ies): The names and logos of sponsoring agencies are shown in the upper left corner of the front cover. Do not include a FHWA logo on any reports without permission from the Research Center.
- WYDOT Logo: A copy of the WYDOT Logo can be obtained from the Research Center. See Page 48 above for instructions on linking "alternative text" to the logo.
- Report Number: The report number is the WYDOT assigned number followed by the letter designation "F" and is assigned by the Research Center. If the report consists of more than one volume, all volumes will have the same number.
- Illustration or Photograph: A relevant photograph or illustration may be used to communicate the subject of the study. See Page 48 above for instructions on linking "alternative text" to the photo. All photos of individuals must be taken and published with the permission of the individual via a signed Model Release Form, and a redacted form should be provided to the Research Center with the final report. See Appendixes M and N of the CRG, Pages 115 and 117 for release forms.
- Study Title: The report title is usually the study name used throughout the duration of the study. If the title in the report is different from that used in the proposal, the Principal Investigator should alert the Research Manager to such changes.
- Report Type: The phrase "Final Report" identifies the report as a final report. If the report is a draft, the phrase "DRAFT Final Report" must be used.
- Principal Investigator: The name, address, phone number and email address of the contractor and/or the Principal Investigator. See Page 48 above for instructions on linking "alternative text" to the email address.
- Report Date: The publication month and year.

Figure 2: Example of Front Cover

10.5 Front Matter for Internal Final Report

The front matter section helps identify the report and describes its content and format. Front matter consists of the following elements:

10.5.1 Forward: Information regarding the forward section can be found on page 32 of the CRG.

10.5.2 *Disclaimer Notice*: A disclaimer notice, which matches that found on page 33, and Appendix B, page 79, of the CRG, must appear on the inside of the front cover of all reports with the following changes:

<p align="center">Notice</p>

This document is disseminated under the sponsorship of the Wyoming Department of Transportation (WYDOT) in the interest of information exchange. WYDOT assumes no liability for the use of the information contained in this document. WYDOT does not endorse products or manufacturers. Trademarks or manufacturers' names appear in this report only because they are considered essential to the objective of the document.

<p align="center">Quality Assurance Statement</p>

WYDOT provides high-quality information to serve Government, industry, and the public in a manner that promotes public understanding. Standards and policies are used to ensure and maximize the quality, objectivity, utility, and integrity of its information. WYDOT periodically reviews quality issues and adjusts its programs and processes to ensure continuous quality improvement.

The following language shall be placed in the disclaimer section of all final reports:

No copyrighted material, except that which falls under the "fair use" clause, may be incorporated into a report without permission from the copyright owner, if the copyright owner requires such. Prior use of the material in a WYDOT or governmental publication does not necessarily constitute permission to use it in a later publication.

Courtesy — Acknowledgment or credit will be given by footnote, bibliographic reference, or a statement in the text for use of material contributed or assistance provided, even when a copyright notice is not applicable.

Caveat for Unpublished Work —Some material may be protected under common law or equity even though no copyright notice is displayed on the material. Credit will be given and permission will be obtained as appropriate.

Proprietary Information — To avoid restrictions on the availability of reports, proprietary information will not be included in reports, unless it is critical to the understanding of a report and prior approval is received from WYDOT. Reports containing such proprietary information will contain a statement on the Technical Report Documentation Page

restricting availability of the report.

The following language must also be included on the disclaimer page:

The report is covered under a Creative Commons, CC-BY-SA license. When drafting an adaptive report or when using information from this report, ensure you adhere to the following:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original.
No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.
You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation.

No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material.

Further, if the report contains either confidential information or if any information in the report is subject to copyright, patent, or trademark requirements, the report must contain additional disclaimers that may be obtained through the Research Center.

10.5.3 Technical Report: The Standard Technical Report Title Page [Form DOT F1700.7] lists key study information in a tabular format used by FHWA and other agencies. It should be a single page numbered "i". A sample of the standard technical title page can be found at Appendix C, page 81, CRG. All Principal Investigators/authors shall ensure that their ORCID number is inserted in the Technical Report next to their name.

In Box 18 of the Technical Report Documentation Page, insert the following language:

This document is available through the National Transportation Library and the Wyoming State Library. Copyright ©YEAR. All rights reserved, State of Wyoming, Wyoming Department of Transportation, and CONTRACTOR/AUTHOR'S NAME.

In Box 15 of the Technical Report Documentation Page, insert all Creative Common Licensing links and other attributions, where necessary. Contact the Research Manager or go to https://creativecommons.org/licenses/ for further information on Creative Common Licenses.

10.5.4 Metric Conversion Chart: Metric measurements are now optional, but a conversion chart must be placed in the report. The American Society for Testing and Materials publication, *Standard Practice for Use of the SI International System of Units: The Modernized*

Metric System (ASTM E380-89a or later) should be used. Reports prepared under research grants may contain dual units with metric units being listed first and English units in parentheses next to the metric unit. The metric conversion chart should be numbered page "ii," in the final report. An electronic version of the chart is available from the Research Center and a sample of the metric conversion chart can be found in Appendix D, page 83, CRG.

     10.5.5   **Table of Contents***: The table of contents lists the chapters, sections, and subsections of the report with page references. The table of contents should begin on page "iii" in the final report. See detailed instructions on pages 35-36 of CRG, and a sample of the table of contents can be found in Appendix E, page 85 of the CRG.   Table of Contents must be generated from the heading tab in the style area of Word.

     10.5.6 **List of Figures***: The list of figures show figure numbers, captions, and page numbers. The list of figures should begin on a separate page following the table of contents. See pages 37-43 of the CRG. A sample of the list of figures can be found in Appendix F, page 87, CRG.   Lists of figures must be generated from the heading tab in the style area of Word.

     10.5.7   **List of Tables, Equations, and Formulas:** The list of tables shows table numbers, captions, and page numbers. The list of tables should begin on a separate page following the list of figures, unless the lists of figures and list of tables both fit completely on one page. See pages 44 of the CRG. A sample of the list of tables can be found in Appendix G, page 89, CRG. Information on the list of equations and formulas can be found on pages 45-46 of the CRG. The list of tables must be generated from the heading tab in the style area of Word.

     10.5.8   **List of Acronyms**: The list of acronyms shall be placed on a separate page following the list of tables, equations and formulas.

     10.6 **Report Body**

The intellectual content of the report should be set out in a logically organized manner. In separate chapters, the report body should contain the following elements: Executive Summary, Problem Description, Objectives, Task Description, Findings and Conclusions, and Implementation Recommendations. Keep in mind that each chapter should begin on an odd-numbered (right-hand) page to aid location.

     10.6.1 ***Executive Summary/Introduction****: The executive summary/introduction (summary) should encapsulate the study's purpose, general approach, significant findings, conclusions, and recommendations. The summary should concisely express the most important information about the project, without depending on references to other material in the final report. For consistency, conclusions and recommendations offered within the executive summary should match exactly those presented later in the body of the report.

     10.6.2 ***Problem Statement Description****: The problem description should be set out in a separate chapter. This chapter should describe the problem that motivated the work, gaps in existing knowledge in the field being studied, and any literature review performed. The researcher should supplement the description presented in the project's proposal with his/her own

insights gained from the research. Often the discussion offered in the researcher's proposal or work plan, when updated to reflect insights gained during the investigation, comprises a good description of the problem.

10.6.3 *Objectives*: One or multiple chapters should be dedicated to the project's objectives. The chapter(s) should lay out the relationship of the research objectives to the problem stated in the proposal. If the researcher has added objectives, they should also be stated and explained. The degree to which the objectives were accomplished should be summarized in this chapter(s) and should include the output measures, outcome measures, goals, and performance measures. See Chapter 9, subsection 7 for an outline on objectives.

10.6.4 *Task Description*: One or multiple chapters should state the project's defined tasks and explain how they were accomplished. Usually, a task-by-task discussion is easiest to follow but it is up to the Principal Investigator as to how to write the report. The discussion must be sufficiently complete and clearly written to allow the study's sponsor and the public to determine whether the project's tasks were accomplished fully, partially, or not at all, and to appreciate the technical significance of the work. Experimental plans should be clearly explained. Deviations from the defined tasks, either planned or to overcome problems, should be justified, explained and evaluated. The discussion should also explain the tasks' relationship to the study's objectives.

10.6.5 *Findings and Conclusion*: One or multiple chapters should explain what was learned from the study and assess the reliability of the findings. Results of surveys, tests, analyses, and other experimental techniques should be stated along with explanations of their significance. Any limitations to the validity or applicability of the observations or analyses should be clearly stated.

10.6.6 *Implementation and Other Recommendations*: The researcher should state, explain, and justify any recommendations for implementation of the research. This can include specific changes in current processes, policy changes, training recommendations, procedural changes, and future research. To ensure that recommendations are correctly identified and properly stated, they should be numbered. The recommendation itself should consist of one to three concise sentences clearly stating what should be done, by whom and, if applicable, when. Recommendations should be sufficiently clear and complete to permit their understanding when quoted later outside of the context of the final report. After each recommendation is stated, it should be more fully explained and suitably supported by reference to the findings and conclusions provided earlier in the report. Any limitations on the recommendation's applicability should be plainly stated.

10.7 Back Matter (Reference Material) for Internal Final

Back matter may consist of the following elements: Appendices, Glossary, Bibliography, References, Index, the Data Management Plan, and Back Cover. Not all elements are required. See page 24 of the [CRG](CRG) for more detail.

10.7.1   Appendices*:* Appendices should be reserved for material that is either lengthy or related to the research by reference. Appendices may contain voluminous tables or graphs, samples of survey or analysis forms, standards, or other pertinent documents referenced in the report body. The Principal Investigators should refrain from including marginally related material in appendices, and should instead limit their use to pertinent information. Data spreadsheets or tables may be placed as appendices in the report. All data spreadsheets and/or tables should be listed on the DMP and should contain proper attributions.

10.7.1.1 Internal Appendices: If appendices are short enough to include in the same volume of the final report, they should appear after the report body in alphabetical order, and should be titled according to their content. Appendix title and letter, should be listed in the report's table of contents, with the pagination continued consecutively from the report (do not use A-1, etc).

10.7.1.2   External Appendices*:* When appendices are too long to include in the final report, they should appear as supplemental, sequentially numbered volumes of the final report.

10.7.2 Glossary: The Glossary is an alphabetized list of uncommon or specialized words used in the text, and their definitions. Inclusion of a glossary is strongly encouraged but not required.

10.7.3 Bibliography and References*:* Every report that makes use of other sources either by direct quotation or by reference must list those sources. All data that generates from an outside source shall be listed in this section. Each listed source must be accurate and complete enough for the reader to find in a library. References to unpublished sources must clearly indicate where the material may be found. References, or some other equivalent title, are used for a list that contains only those items that are actually referenced in the text. Bibliographies must include digital object identifiers (DOI), when available. See pages 34-35 and Appendix P, page 125 of the CRG for further information. Apply hyperlinks to reference material, when possible.

10.7.4   Index: An Index is an alphabetized list of key words representing information to be found in the text, and page number(s) where it may be found. An index is optional unless the document is unusually long or complex.

10.7.5 Back Cover*:* A back cover must be provided with both sides being blank.

10.7.6   Photos of Nonpublic Figures: All photos of individuals must be taken and published with the permission of the individual via a signed Model Release Form, and a redacted form should be provided to the Research Center with the final report. See Appendixes M and N of the CRG, Pages 115 and 117.

10.7.7 Graphics: Information on graphics can be found on page 20 of the CRG.

10.7.8 Miscellaneous material that pertains to the report

10.7.8.1 Copyright*:* Information on Copyrights can be found on pages 20

through 24 of the [CRG]. Specific information on copyrighting for figures can be found at Pages 22 and 24 of the [CRG]. Appendix O, Pages 119-124.

> **10.7.8.2 Inventory**: The contractor shall provide an inventory of all supplies and equipment purchased for this project as a separate document at the same time as the final report.

10.8 Original and Adapted Information/Documents.

The Principal Investigator and/or the Contractor shall return all original and adapted information/documents, original state owned data, and any adapted work to WYDOT in a useable format, and as set out in the contract between WYDOT and the contractor.

The contractors who work on our projects write more than just the report for us. Some of the papers' may be considered derivative and some may be considered compilations. Only the owner of copyright in a work has the right to prepare, or to authorize someone else to create, an adaptation of that work. In any case where a copyrighted work is used without the permission of the copyright owner, copyright protection will not extend to any part of the work in which such material has been used unlawfully. The unauthorized adaption of a work may constitute a copyright infringement.

10.9 Embargo Periods

Principal Investigator and/or the Contractor shall be allowed to implement a 12-month embargo period for data produced in the research project. Unless there is written approval from WYDOT, reports shall not be embargoed and shall be published immediately.

SECTION 4: ANCILLARY DOCUMENTS

Chapter 11   Data Management Plan

CHAPTER 11: Data Management Plan Policies for the WYDOT Research Center

Data is considered an asset and is valuable to Principal Investigators, WYDOT, stakeholders, and the public. As such, Principal Investigators, Project Champions, and WYDOT become accountable for the quality of the data generated and they must ensure the data is accompanied with enough metadata to assist the public in accessing the data. Managing the data in a formal manner ensures that duplication of the data does not occur and that the research dollars are spent wisely.

This Chapter outlines the policies and procedures the Principal Investigator and/or the Contractor, and Project Champion will follow when establishing their Data Management Plan (DMP). In developing the DMP and the policies, the Research Center balanced ensuring that the data was open to the public, the needs of the Principal Investigators and WYDOT, and ensuring confidentiality and privacy. The Research Center is implementing the following policies and guidelines to be used for all research projects funded by the Research Center.

11.1 Steps for data management

All research projects shall follow the below timeline.

11.1.1 Prior to beginning a research project

A kickoff meeting shall be set up prior to or just as the contract is initiated. The kickoff meeting shall include a review of the proposed DMP, and the necessary metadata to ensure all required data is archived. The kickoff meeting will also ensure that the Principal Investigator(s) understands the deliverables set out in the contract. At this time, the parties will determine whether there needs to be disclosures or legal protection for the report and the data (PHI, PII, and/or sensitive data), and whether data needs to be scrubbed and/or deidentified. At this meeting, all rights to the data and/or datasets shall be determined. See Appendix 2, Template for Data Management Plan.

11.1.2 During the research project

During the research project, the Principal Investigator shall ensure that the data is maintained and backed up in a secure manner, and it shall be the Principal Investigator's responsibility to determine storage requirements. The Principal Investigator shall update the Metadata Schema (Appendix 3) during the life of the research project, as needed. The Principal Investigator shall also apply for an open research contributor ID (ORCID) number. Prior to providing the final report or publishing any publication based on the contracted research, the Principal Investigator shall discuss with the Research Center the need of a digital object identifier (DOI) for the report and/or data, and what DOIs have already been attached to adapted reports.

11.1.3 After the final report is written

The Principal Investigator and/or Contractor, Project Champion, and WYDOT shall:

- Set the embargo period for the data.
- Appraise the data inventory.
- Organize the data and content files.
- Process the data.
- Ensure the Metadata Schema is complete.
- Determine who will manage the data once the project is complete.
- Determine what the retention period will be.
- Determine who will budget for the retention of data.
- Set out how to name the files and datasets.
- Determine whether there are any outliers.
- Determine how to cite the data and/or datasets.
- Determine what the data parameters and/or units of measure will be.

If the data is sensitive, privileged, or confidential, the Principal Investigator and the Research Center shall determine who can access the data, who can reuse the data, and how to ensure confidentiality. It should be kept in mind that data formats may be different during the submission, distribution, and preservation phases.

11.2 *What Data Are Archived*

For purposes of these Guidelines, the Research Center will use the following primary definition for data:

> The recorded factual material commonly accepted in the scientific community as necessary to validate research findings.[1]

The Principal Investigator and/or Contractor, Project Champion, and WYDOT shall jointly determine:

- What data and/or datasets shall be linked to the final report.
- Where the data and/or datasets shall be archived.
- The retention period for archived data and/or datasets.
- What file format will be used to archive the data and/or datasets.
- How the data and/or datasets shall be labeled.
- How the data and/or datasets will be cataloged.
- What metadata shall be attached to the data and/or datasets.
- What written consents, licenses, or other tools will need to be attached to the data and/or datasets to ensure privacy and intellectual property.
- The procedure for accessing the data and/or datasets at the end of the project.

The Principal Investigator and/or Contractor shall provide WYDOT, within a reasonable time after the conclusion of the research project, a copy of the non-confidential research data and/or datasets derived from this project with the understanding that the data and/or datasets will be made available to the public.

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[1] http://guides.libraries.psu.edu/dmptoolkit/describing-data

The Principal Investigator and/or Contractor shall complete an electronic version of the Data Management Plan (DMP) that is found in the Guidelines, no later than 90 days after the signing of the Contract. Any changes to the DMP shall be submitted to the WYDOT Research Manager and the Project Champions within 30 days of the change.

Except as specified in the contract between WYDOT and the Principal Investigator, the State of Wyoming, WYDOT, and the Principal Investigator and/or Contractor shall jointly own all documents, data compilations, reports, photographs, data and other work provided to or produced by the Principal Investigator and/or Contractor. Further, the State of Wyoming, WYDOT, and the Principal Investigator and/or Contractor shall jointly own all data that may reside within the Principal Investigator and/or Contractor's hosting environment and/or equipment/media that relates to the research project.

When determining what data should be archived, and what data should be linked to the final report, the Research Center, Project Champion, and the Principal Investigator and/or Contractor shall review the data available, and determine what data and datasets to archive and link. Determining factors of what data to archive include:

- Will there be a demand for the data.
- How difficult will the data be to replicate.
- Are there barriers to future use.
- Is the data stored or archived somewhere that cannot guarantee long-term storage.
- Is the data the only copy.

The following forms of data/datasets should be reviewed when determining what data should be archived:

- Primary data used in the production of the report: Raw, verified data that has been obtained directly from a source. It can be captured through experimental, surveys, interviews, focus groups, or other direct interactions with individuals in the field. Does not include analysis data.
- Unpublished datasets: Materials and methods; clear description of the variables presented; supported by unpublished reports; and any other relevant material.
- Secondary Data: Pre-existing data not gathered or collected by the authors. Usually collected by another organizations or source.
- Metadata: Set of data that describes and gives information about the dataset – cataloging information.
- Dataset description document: Describes all variables in the dataset and the measurement units used.
- Codebook: A list of variable names, variable labels, and label values. Should specify the data position of each variable, describe the contents of each variable, and identify the range of possible codes and the meanings of the codes.
- Questionnaires: An unused copy of the questionnaire.
- Handbooks, guides, and manuals derived from research.

When determining what counts as data and what should be archived, it will depend on the Principal Investigator's knowledge of the data, and what he/she believes is valuable.

NOTE: It should be noted that data gathered and/or archived will be determined on a case-by-case basis for each research project.

11.3 What Data Are Not Included

Data that does not need to be archived or saved includes preliminary analyses of a project, drafts, and plans for future research, peer reviews, interoffice communications, emails, letters, or other forms of correspondence when looking at what data to archive. The Principal Investigator and/or Contractor, and the Project Champion will have the opportunity to discuss what data and/or other digital material should be excluded prior to finalizing the project.

11.4 Data Management Plan Template for Research Projects

Principal Investigators are required to complete a DMP prior to beginning a research project, and update the DMP throughout the life of the project. A final DMP must be submitted with the final report. See Appendix 2, Data Management Plan.

11.5 Metadata Format and Content Template

All datasets, data, and reports may need a Metadata Schema. Determination of what data will need a complete Metadata Schema will be determined on a case-by-case basis. The requirement from the National Transportation Library (NTL) can be found at http://ntl.bts.gov/publicaccess/index.html. The Research Center Metadata Schema can be found in Appendix 3, Metadata Schema.

11.6 Data Sharing Agreements

The Research Center and the Principal Investigator and/or Contractor will execute a data sharing agreement, if one is required, or for intellectual property reasons. The data sharing agreement may include clauses on cleaning the data; data sharing requirements; forms for sharing; formats of data; software requirement; and metadata requirements. Templates for data sharing during the time of the research project, and after completion of the project are available at the Research Center.

11.7 Locating and Accessing Digital Data Materials, Data, and Databases

For research projects that were completed prior to October 1, 2014, the Research Center shall link digital materials, data, and/or databases, if possible. If the data has not been turned over to the Research Center, and the Principal Investigator and/or Project Champion still has access to the data/datasets, the Research Center may ask for a copy for its files.

For research projects completed after October 1, 2014, the Research Manager shall work with the Principal Investigator and the Project Champion to ensure the Research Center receives an

inventory of digital material, data, and/or datasets that are relevant to the research project. All digital material, data, and datasets will be copyrighted, if necessary. From the inventory, the Project Champion, Principal Investigator, and the Research Center will determine what data will be linked to the report.

11.8 *Ensure the Public Can Read, Access, Download and Analyze Digital Data*

Pursuant to the *Freedom of Information Act,* the *Wyoming Public Records Act*, and the numerous State of Wyoming digital data management rules and regulations, the Research Center is required to ensure that the public can read, access, download, and analyze digital data. The goal of the Research Center is thus to work with the Principal Investigator, stakeholders, the Project Champion, and the RAC to determine the best ways to accomplish this goal.

The Research Center shall archive data in a repository chosen by the Research Center, and link the data to the report that is stored in electronic form in the Wyoming State Library or though the NTL site. This will ensure the report and data are available to the public immediately. The Research Center does not wish to duplicate storage efforts, and if data will be stored by the Principal Investigator or the Project Champion for the duration of its life cycle, the Research Center proposes to leave the data in those databases until such time as it is determined that the data should be either deleted or archived in a predetermined repository. The storage facility will be publicly accessible and will allow for linkage between the report and the data/dataset.

11.9 *Data Formats and Dissemination*

Before data is archived, the Principal Investigator, Project Champion, and Research Center shall determine what the best format for archiving the data is. It must be kept in mind that formatting may change from collection to archiving, and as such, the Principal Investigator should be prepared to adjust the formatting where necessary. A plan for formatting and archiving should be set up either prior to or during the research process.

11.10 *Storage, Archiving and Backup*

All data gathered from research projects should be considered "open." This means that the data and/or datasets should be available to the public, unless there is a compelling reason not to release the information. Archiving will begin in the early stages of the research process and shall continue throughout the course of the project. When storing data, a backup must always be kept, security for the data must be incorporated during the project phase, and data must be organized in such a manner that it is easily accessible.

Archiving of the data could be a time-specific endeavor or could be long term. Data must remain available for a minimum of three years after a project is complete, and it may be necessary to retain the data indefinitely. To ensure the availability of data, each set of data and the final report must have persistent identifiers or DOI. Data must also be formatted in such a manner that it can be stored and retrieved easily.

If the Principal Investigator/Project Champion will be archiving and/or storing data, the DMP shall describe physical and cyber resources, and facilities that will be used for the effective preservation and storage of research data. In collaborative proposals or proposals involving sub-awards, the lead Principal Investigator is responsible for assuring data storage and access for data gathered by the subrecipient.

If there is sensitive and/or confidential data gathered, the Principal Investigator is tasked with ensuring that the storage, backup, and security systems meet all Health Insurance Portability and Accountability Act (HIPAA) and Health Information Technology for Economic and Clinical Health Act (HITECH) requirements. When archiving sensitive and/or confidential data, please provide the following:

- A brief description of the data.
- Whether the data was original or was gathered from an existing database.
- Security and privacy information.
- Intellectual property rights for any data that comes from an existing database.
- How the data were managed during the project, with information about versions.
- What outliers are present in the data.

11.11 Intellectual Property Rights

The Research Center wants to ensure that we are able to collect data while at the same time protecting intellectual property rights of agencies and the private sector. The Research Manager, in conjunction with the Attorney General's office, will set out guidelines on who owns the intellectual property rights and proprietary interests for data, datasets, and other documents. The major questions to be kept in mind are:

- Who owns or has a valid license to the intellectual property?
- What steps should be taken to protect the intellectual property?
- When sharing data, how will the intellectual property rights be protected?

Issues such as disclaimers, open licenses, and copyrights will be reviewed to ensure all data, datasets, etc. contain the proper coverage. All contracts for research projects will have specific language on respective rights and the obligations of all parties regarding the use, reproduction, and disclosure of the data, and will set out what data will be delivered to the Research Center. The type, quantity, or quality of the data to be delivered will be set out in the DMP.

Data, which is first produced in the performance of the contract is automatically copyrighted. The copyright will list the contractor, the State of Wyoming and WYDOT as right owners, with all rights reserved. WYDOT retains an "unlimited, and irrevocable license to reproduce, publish, or otherwise use and to authorize others to use, for federal and state purposes: a) the copyright in any work developed during the contract period; and b) any rights of copyright to which the Principal Investigator and/or contractor purchases ownership using funds awarded". (Wyoming Contract Template)

The Programming Engineer and the Research Manager, or his/her designee, shall be responsible for handling intellectual property issues within the Research Center determine what intellectual property will be released to the public, if there is an issue with confidentiality, trade secrets, etc. The Research Center and Principal Investigator shall monitor and audit any agreements (e.g. Cooperative Research and Development Agreement (CRADA)) as well as any licensing compliance issues to identify intellectual property assets that are produced, used, or purchased because of the project. This shall include a review of any licenses and agreements with third parties to ensure that sufficient agreements are in place.

The Research Center will set up an intellectual property catalog for all research reports. This will provide a comprehensive assessment of all forms of intellectual property owned by WYDOT, and shall include expiration dates, maintenance fee due dates, license agreements with licensees, conception data, and potential intellectual property.

The Research Center will work with the Attorney General's office to determine if the intellectual property needs to be registered. The Attorney General's office will have the final say on registration of any intellectual property.

The Principal Investigator and the Research Center will make all determinations on whether the intellectual property should be excluded from use by others, if there is a need to control future use, licensing agreements, and how to keep the intellectual property in the public domain. As a note, if the report or data is released to the public domain without claiming intellectual property rights, the Principal Investigator and WYDOT could forfeit their rights.

Management decisions on any source codes will be made by the Wyoming ETS Department, the Principal Investigator, and the Research Center.

11.12 Disclaimer

When necessary, a disclaimer form will be provided to the RAC with the proposal and updated forms will be attached to the progress reports. Disclaimer forms will provide an overview and description of any inventions, concepts, works, or ideas proposed in the research project or set out in the research report with sufficient information to decide appropriately whether to pursue intellectual property protection. The disclaimer form shall include:

- A description of the technology, invention, or creative work.
- What does it do. Key features and benefits.
- Are there any national security concerns.
- What is the funding source.
- The technology, invention, or creative work to be protected by Intellectual Property.

Principal Investigator, Project Champion, the Research Manager will determine which data and/or datasets will require disclaimers. Disclaimers may be required for confidentiality issues, intellectual property rights, or other issues. Examples of Disclaimers can be obtained from the Research Center.

11.13 Selection and Retention Periods

Data from research projects can be large and cumbersome. The Research Center and Principal Investigator shall collaborate to determine what data should be retained and what data should be linked to the research report. All data collected during the research process shall be retained until the Principal Investigator, Project Champion, and the Research Manager have an opportunity to discuss the data available and what will be needed for the final report. Any data that is archived should be machine-readable and in an open format. The Principal Investigator shall provide the Research Center with a data inventory, and if the data is not housed by the Research Center, the location and the custodian of the data should be provided to the Research Center. Further, the formatting of the data will be determined by the Principal Investigator, WYDOT, and/or the chosen data repository.

Retention periods for data shall be on a case-by-case basis. The minimum retention period is three years after the conclusion of the award or three years after public release, whichever is later. Exceptions requiring longer retention periods may happen when data supports patents, when questions arise from inquiries or investigations with respect to research, or when a postgraduate student is involved. Research data that supports patents shall be retained for the entire term of the patent. The Federal Government, State of Wyoming, and ETS all require that data, records, and other items be made available to the public pursuant to *Section 508 of the Rehabilitation Act of 1973*.

When determining data retention, data quality should be a major factor. The data should: accurately represent the research project; have consistently defined data elements; be within acceptable ranges defined by the project; be provided to WYDOT in a timely manner; and be easily accessible, understandable and usable. The Principal Investigator will be required to provide clean data and data logs for any outliers.

Retention policies for all data, datasets, and other documents are approved by the WYDOT Records Department and the Attorney General's office, with recommendations from the Principal Investigator and the Research Center. At a minimum, all data, datasets, and documents generated from the project must be retained for three years. All other time limits shall be jointly determined by the Research Center and Principal Investigator.

If any data is deemed confidential or sensitive, it shall be retained in a secure storage center which adheres to the guidelines set out in HITECH Act and/or HIPAA, and shall only be retained as long as necessary. All sensitive and confidential data shall be disposed of in a manner that complies with either HIPAA or HITECH.

11.14 Embargo Periods

The Principal Investigator shall be allowed to maintain the data without releasing it to the public for a stated period not to exceed 1 year. This is known as an embargo period. On a case-by-case basis, the Research Center and Principal Investigator will entertain requests from outside sources for the release of data within the embargo period. Clear and convincing evidence of the need for

the data must be presented to the Research Center in order to request copies of the data during the embargo period. Unless there are extenuating circumstances, the report and all associated documents will be released to the public at a suitable time. There is no embargo period for reports, which shall be published immediately.

11.15 Ethics and Privacy

Principal Investigator, Project Champion, and the Research Center must ensure ethical requirements, and data privacy rules and regulations are followed when working on research projects. All information gathering rules regarding date, datasets, software, etc must be followed. Though data gathered for these research projects should be transparent, this does not mean the rules for confidentiality and privacy should be ignored. If the project gathers data that is considered personal health information (PHI), personally identifiable information (PII), or sensitive material, precautions must be in place prior to beginning the project, and HIPAA and HITECH guidelines must be followed. Further, all legal permissions must be obtained and property storage must be acquired. Informed consent forms must be retained for the life of the data. Internal Review Boards may be necessary for any project where protected health information (PHI), personally identifiable information (PII) or sensitive materials are involved.

All individuals who will have access to any confidential and/or sensitive information must receive training on privacy, security, safeguards, encryption, breach notifications and mitigation procedures. Safeguards must be in place to ensure unauthorized users do not have access to the data, and authorized users must use secure passwords to access confidential and sensitive data. The Principal Investigator must set out policies on how to identify the identity of all users.

11.16 Budgets For Data Retention

Data storage shall be determined on a case-by-case basis. Data may be stored by the Principal Investigator, Project Champion, the Research Center, or an approved outside repository. The length of time for retention, the need for the data on a daily basis, and the type of data will dictate where the data is retained, and as such, the cost of storing the data. The entity which stores the data shall be responsible to keep the data operational and available, and for the cost of storage.

11.17 Digital Object Identifier (DOI), and Open Access, and Contributor ID (ORCID)

Prior to publishing any paper or report using data or conclusions drawn from a research project, the Principal Investigator(s) must work with the Research Center to ensure that there is no duplication or conflicts with digital object identifiers. Adaptive copies of reports from funded research projects must be provided to the Research Center with the reports DOI.

Principal Investigator and authors named on any report or paper must register for an ORCID number at http://orcid.org/ prior to publishing any work that is derived from a research project. This number helps distinguish researchers who have similar names and allows Principal Investigator to attach their work to other works. The ORCID registry is available free.

11.18 Data Citation Index

Principal Investigators are required to provide the Research Center with a data citation index (Index). The Index should include all data gathered and datasets built during the life of the project. This will enable the Principal Investigator, Program Champion(s) and the Research Manager to access the data and/or datasets. It will also enable the Research Center to better archive the data. The Index should include an attribution for the data object to the persons and/or Institutes creating the data, and a standard form of citation for each piece of data.

11.19 Annual review of data management plan template

During the October RAC meeting, the Research Center will provide the RAC with an updated DMP to be reviewed. Changes and comments to the plan will be discussed during the January RAC meeting each year.

11.20 Annual Review of Project Specific Data Management Plans, Data Clean Up, Scrubbing

The Principal Investigator and Project Champion shall meet yearly to discuss changes in the original and any revised DMPs. If there are any changes to the DMP, the Principal Investigator shall provide the Research Center with a copy of the revisions. The Principal Investigator shall be responsible for detecting, removing, and/or correcting dirty data (i.e. data that is incorrect, out of data, redundant, incomplete, or formatted incorrectly). Data cleansing allows for consistency in the data and can include data auditing, workflow specification, workflow execution, and post-processing and control.

11.21 Licensing

Terms and conditions for software, codes, and data are essential to ensure ownership and rights. All research projects, which are funded specifically for building or the maintenance of software, codes and some other types of database, must have a license attached to the report before the software is made publically available. All licenses must:

- Have full attribution for the Principal Investigator, and WYDOT.
- Must be open source.
- Must be considered copyleft.
- Must be for non-commercial purposes.
- Must be approved by WYDOT prior to finalizing.

The best form of license to use is a General Public License (GNU). When attaching the license, a copy must be attached to the research report as an appendix. For all electronic copies of the data and/or software, there must be a rights statement that appears prior to the stakeholder obtaining the data and/or software. Rights statements are very short and usually state that the database and/or software is made available under the license number "X", which text can be found at (specific location).

APPENDICES

APPENDIX 1 PROGRESS REPORT TEMPLATE

WYOMING DEPARTMENT OF TRANSPORTATION
PROGRESS REPORT

Project title:

Project Number:

Progress period:

Principal Investigator and all others who have worked on the project (provide name and ORCID number):

1. Please state whether the project is ahead of schedule, on time, or behind schedule:
2. Percentage of overall work completed.
3. Activities and Accomplishments: The information provided in this section allows WYDOT to assess whether satisfactory progress has been made during the reporting period. Please be as detailed as possible, but try to keep your report to three to four pages in length, if possible.

     a.   What are the major goals and objectives of the project? List major goals, milestones, target dates for important activities or phases of the project. Show actual completion dates or the percentage of completion. If goals have been revised from the last reporting period, list the revised goals and objectives.

     b.   Describe what was accomplished under these goals.

         i.   Major activities.
         ii.   Specific objectives.
         iii. Significant results (both positive and negative).
         iv. Key outcomes and other achievements.
         v.   Goals not met.

     c.   What opportunities for training and professional development has the project provided? If the research is not intended to provide training and professional development, state "Nothing to Report".   Otherwise, describe opportunities for training and professional development, training activities, and professional development.

     d.   How have the results been disseminated to communities of interest? Describe what results have been disseminated and in what manner, including publications, conference papers, and presentation. Please list ALL derivative reports/publications which were generated from this project, and provide an electronic copy of the report/publication.

     e.   What do you plan to do during the next reporting period to accomplish the goals and objectives? Describe briefly what you plan to do during the next reporting period to accomplish the goals and objectives.

     f.   List any products resulting from the project during the reporting period. Include in this list:

         1.   Publications, conference papers, and presentations.

2. Website(s) or other internet sites (List the URL).
3. Technologies or techniques.
4. Inventions, patent applications, and/or licenses.
5. Other products, such as data or databases, physical collections, audio or video products, software or NetWare, models, educational aids or curricula, instruments or equipment.

g. Impact:
1. How will this project impact WYDOT?
2. How will this project impact other agencies?

h. Changes to Scope of Work. Provide the following changes, if applicable:
1. Scope of work or objectives of the project.
2. Changes in key persons.
3. Disengagement from the project for more than three (3) months, or a twenty five (25) percent reduction in time devoted to the project.
4. The inclusion of costs that require prior approval.
5. The transfer of funds between line items in the budget.
6. The subawarding, transferring or contracting of work.
7. Changes in the approved cost-sharing or match.

APPENDIX 2 DATA MANAGEMENT PLAN

Name of Contractor:
Name of the Project:
Project Duration: Start Date: End Date:
DMP Version:
Date Amended, if any:
Name of all authors, and ORCID number for each:
WYDOT Project Number:

- **Name of all peer reviewed publications, which have been generated using data from this project to include:**

- **Any Digital Object Identifier (DOI), assigned to any peer reviewed publication or data generated by this project:**

- **URLs for all peer reviewed publications which have been generated using data from this project:**

- **Dataset URL, if available:**

What constitutes data will be determined by the Principal Investigator, Project Champion, and the Research Manager. In general, your plan should address final research data. This includes recorded factual material commonly accepted in the scientific community as necessary to validate research findings. Final research data do not include laboratory notebooks, partial datasets, preliminary analyses, drafts of scientific papers, plans for future research, peer review reports, communication with colleagues, or physical objects, such as gels or laboratory specimens. See Chapter 12, subsections 12.2 and 12.3 for full details on what data to retain. As part of your research, you may also generate unique data, which are data that cannot be readily replicated. Your DMP should also address unique data that may arise from your research.

WYDOT expects the timely release and sharing of data to be no later than the acceptance for publication of the main findings from the final dataset, unless the Principal Investigator will be embargoing the data. In such a case, the data cannot be embargoed for a period longer than 12 months. See Chapter 12, subsection 12.13 and 12.14 for information on retention and embargos.

1.   Introduction
The purpose of this research project is to: (insert information here)

2.   **Definitions**

   a.   Code or scripts include code used in the collection, manipulation, processing, analysis or visualization of data, but may also include software developed for other purposes.

b.   Copyright is a set of legal rights extended to copyright owners that govern such activities as reproducing, distributing, adapting, or exhibiting original works fixed in tangible forms.

c.   Data means the recorded factual material commonly accepted in the scientific community as necessary to validate research findings, but not any of the following: preliminary analyses, drafts of scientific papers, plans for future research, peer reviews, communications with colleagues. Recorded material excludes physical objects (e.g. laboratory samples). Research data also does not include trade secrets, commercial information, materials necessary to be held confidential; and personnel and medical information and similar information the disclosure of which would constitute a clearly unwarranted invasion of personal privacy.

d.   Data Archive is a site where machine-readable materials are stored, preserved or possibly redistributed to individuals interested in the materials.

e.   Data Management Plan is a document that specifies your plans for managing your data and files for a research project.

f.   Dataset means collection of data.

g.   Metadata refers to structured data about data that helps define administrative, technical, or structural characteristics of the digital content.

3.   Data Types and Storage

The types of data and/or datasets generated and/or used in this project include … (insert information here)

Provide a description of the data that you will be gathering in the course of your project. You should address the nature, scope, and scale of the data that will be collected. Describe the characteristics of the data, their relationship to other data, and provide sufficient detail so that reviewers will understand any disclosure risks that may apply. Discuss value of the data over the long-term. Please provide the name of all repositories where the data will be housed during the lifetime of the project.

Checklist

- What type of data will be produced?
- How will data be collected? In what formats?
- How will the data collection be documented?
- Will it be reproducible? What would happen if it got lost or became unusable later?
- How much data will it be, and at what growth rate? How often will it change?
- Are there tools or software needed to create/process/visualize the data?
- Will you use pre-existing data? From where?
- Storage and backup strategy?

4.   Data Organization, Documentation, and Metadata

The plan for organizing, documenting, and using descriptive metadata to assure quality control and reproducibility of these data include …

Your DMP should describe the anticipated formats that your data and related files will use. To the maximum extent practicable, and in accordance with generally accepted practices in your field, your DMP should address how you will use platform-independent and non-proprietary formats to ensure maximum utility of the data in the future. If you are unable to use platform-independent and non-proprietary formats, you should specify the standards and formats that will be used and the rationale for using those standards and formats.

NOTE: Attach the Metadata Schema, URL for data generated, and all peer reviewed publications from this project.

Checklist

- What standards will be used for documentation and metadata?
- Is there good project and data documentation format/standard?
- What directory and file naming convention will be used?
- What project and data identifiers will be assigned?
- Is there a community standard for metadata sharing/integration?

5.   Data and/or Database Access and Intellectual Property

What access and ownership concerns are there…? (Insert information here)

Protecting research participants and guarding against the disclosure of identities and/or confidential business information is an essential norm in scientific research. Your DMP should address these issues and outline the efforts you will take to provide informed consent statements to participants, the steps you will take to protect privacy and confidentiality prior to archiving your data, and any additional concerns. If necessary, describe any division of responsibilities for stewarding and protecting the data among Principal Investigators.

If you will not be able to DE identify the data in a manner that protects the privacy and confidentiality while maintaining the utility of the dataset, you should describe the necessary restrictions on access and use. In general, in matters of human subject research, your DMP should describe how your informed consent forms will permit sharing with the research community and whether additional steps, such as an Institutional Review Board (IRB), may be used to protect the privacy and confidentiality.

Checklist

- What steps will be taken to protect privacy, security, confidentiality, intellectual property or other rights?
- Does your data have any access concerns? Describe the process someone would take to access your data.
- Who controls it (e.g., PI, student, lab, University, funder)?

- Any special privacy or security requirements (e.g., personal data, high-security data)?
- Any embargo periods to uphold?

6. Data Sharing and Reuse

The data will be released for sharing in the following way … (insert information here)

Describe who will hold the intellectual property rights for the data created by your project. Describe whether you will transfer those rights to a data archive, if appropriate. Identify whether any copyrights apply to the data, as might be the case when using copyrighted instruments. If you will be enforcing terms of use or a requirement for data citation through a license, indicate as much in your DMP. Describe any other legal requirements that might need to be addressed.

Checklist

- If you allow others to reuse your data, how will the data be discovered and shared?
- Any sharing requirements (e.g., funder data sharing policy)?
- Audience for reuse? Who will use it now? Who will use it later?
- When will I publish it and where?
- Tools/software needed to work with data?

7. Data Preservation and Archiving

The data will be preserved and archived in the following ways … (insert information here)

Describe how you intend to archive your data and why you have chosen that particular option. You may select from a variety of options including, but not limited to:

- Use of an institutional repository.
- Use of an archive or other community-accepted data storage facility.
- Self-dissemination.

You must describe the dataset that is being archived with a minimum amount of metadata that ensures its discoverability. Whatever archive option you choose, that archive must support the capture and provision of the National Transportation Library metadata requirements. In addition, the archive you choose must support the creation and maintenance of persistent identifiers and must provide for maintenance of those identifiers throughout the preservation lifecycle of the data. Your plan should address how your archiving and preservation choices meet these requirements.

Checklist

- How will the data be archived for preservation and long-term access?
- How long should it be retained (e.g., 3-5 years, 10-20 years, permanently)?
- What file formats? Are they long-lived?
- Are there data archives that my data is appropriate for (subject-based? Or institutional)?

- Who will maintain my data for the long-term?

NOTE:

Researchers evaluating data repositories as the option(s) for storing and preserving their data should examine evidence demonstrating that the repository:

a. Promotes an explicit mission of digital data archiving.
b. Ensures compliance with legal regulations, and maintains all applicable licenses covering data access and use, including, if applicable, mechanisms to protect the privacy rights and maintain the confidentiality of respondents.
c. Has a documented plan for long-term preservation of its holdings.
d. Applies documented processes and procedures in managing data storage.
e. Performs archiving according to explicit workflows across the data life cycle.
f. Enables the users to discover and use the data, and refer to them in a persistent way through proper citation.
g. Enables reuse of data, ensuring appropriate formats and application of metadata.
h. Ensures the integrity and authenticity of the data.
i. Is adequately funded and staffed, and has a system of governance in place to support its mission.
j. Possesses a technical infrastructure that explicitly supports the tasks and functions described in internationally accepted archival standards like Open Archival Information System (OAIS).

NOTE: This DMP is created as a derivative from the DMP belonging to the University of Minnesota and can be found at https://www.lib.umn.edu/datamanagement/DMP

REV: 6-2019

APPENDIX 3 METADATA SCHEMA

Elements	Example of what is expected for each element
Title[2]	Human-readable name of the asset. Should be in plain English and include sufficient detail to facilitate search and discovery. A name given to the publication or data element. All substitute or alternative titles must have a different Metadata Transmittal Schema.
Creator/contact point	An entity/person(s) primarily responsible for making the content of the resource. Contact person's name, ORCID number, and email for the asset.
Publication Date(s)	The date associated with the final report/dataset.
Description/Abstract	Human-readable description (e.g., an abstract) with sufficient detail to enable a user to quickly understand whether the asset is of interest. May include an abstract, table of contents, reference to a graphical representation of content or a free text account of the content.
Subject and Keywords	The topic of the content of the resource. Tags (or keywords) help users discover your dataset; please include terms that would be used by technical and non-technical users.
Identifier[3] and/or source	A unique identifier for the dataset/publication. Examples: URI, URL, DOI, ISNB, ISSN.
Collection and Related Documents	If there is a secondary dataset, cite source. The collection of which the dataset is a subset should be listed. Include all identifiers and/or sources.
Edition	Most recent date on which the dataset was changed, updated or modified.
Related Documents	Related documents such as technical information about a dataset, developer documentation, etc.
Coverage	Spatial location, temporal period, jurisdiction.

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[2] *To include alternate title; conference title; and journal title, if they are different.*

[3] *To include record numbers; report numbers; NTIS number; TRIS Accession Number; OCLC Number; ISBN; ISSN; contract number; and DOI if available .*

Language	The language of the dataset/publication.
Publisher/Distributor	FHWA and Wyoming Department of Transportation List all other publishing companies that this publication has been sent to.
Funding agency	FHWA and Wyoming Department of Transportation
Access Restrictions	The degree to which this dataset could be made publicly available, *regardless of whether it has been made available*. Choices: public (Data asset is or could be made publicly available to all without restrictions), restricted public (Data asset is available under certain use restrictions), or non-public (Data asset is not available to members of the public).
Intellectual Property and Other Rights	This may include information regarding access or restrictions based on privacy, security, or other policies. This should also serve as an explanation for the selected "accessLevel" including instructions for how to access a restricted file, if applicable, or explanation for why a "non-public" or "restricted public" data asset is not "public," if applicable.
License	The license or non-license (i.e. Public Domain) status with which the dataset or API has been published.
Code and software needs	List all code specific information. Is there specific software needed to run the database or data.
Format	The machine-readable file format. May include media type or dimensions. Used to determine the software, hardware or other equipment needed to display or operate the resources.
Choice of Repository	If you have a preference, list the repository where you will archive your data/datasets.

NOTE: Each separate report, dataset, collection, existing collection, and software developed must have its own table. All fields in this Schema must be completed at the time of the final report.

NOTE: This Metadata Schema is created as a derivative from the Common Core required fields which can be found at https://project-open-data.cio.gov/schema/.

APPENDIX 4 PROPOSAL CHECKLIST FOR RAC

The proposal checklist will be completed by each sitting RAC member after review of the proposals and after hearing the presentation by the principal investigator. The below checklist is an example only. Checklist will be tailored to each proposal.

Proposal Checklist for RAC Members
Proposal Name: _____
Amount Requested: _____
Number of Years Proposed: _____
Approval: ☐ Yes ☐ No

      Proposal type:
      Full: _____
      Partial: _____
      Literature Review: _____
      Pooled Fund: _____
      Extension Time/Funds: _____
      NCHRP: _____
      Proposal Score: _____
      Proposal Ranking: _____
      RAC Member: _____

PART I.
1. Is the proposed problem adequately defined and outlined? ☐ Yes ☐ No
2. Is the proposal important and beneficial to the Wyoming stakeholders and WYDOT? ☐ Yes ☐ No
3. Will the proposal have a positive long-term effect on WYDOT and the stakeholders, in other words, will the proposal provide a continuing, cooperative and comprehensive impact? ☐ Yes ☐ No
4. Can all significant barriers to implementation be overcome? ☐ Yes ☐ No
5. Is there a clearly defined and sufficient budget for the proposal? ☐ Yes ☐ No

If your answer to all questions above is no, do not continue forward.

PART II.

Criteria/ Output	Details	Points	Score Range Definitions			Total Points and Comments
			1-6	6 to 12	12 to 20	
Scoring	Details – What are the expected outcome measures, goals and performance measures for this project?					
Cost Benefit/Savings (cost savings or cost avoidance)	Significant cost or performance savings or avoidance by implementing the research. EXAMPLE: Outcome measure: Cost and performance savings which are a direct result of the research project. Goal: Reduce costs and improve performance for WYDOT by implementing this research. Performance Measure: Cut costs by ___% by ____; improve performance by ___% by _____.	20	Minimal productivity/ savings/ improve-ment	Division wide productivity/ savings/ improve-ment	Statewide productivity/ savings/ improve-ment	
Safety	Will enhance, benefit, or improve safety (which could include avoiding hurt, injury or loss; risk; and manners in which to keep the public safe). EXAMPLE: Outcome measure: Reduction in transportation-related fatalities and injuries. Goal: To reduce	20	Increase safety in one area	Increase safety in multiple areas	Increase safety across WYDOT and the State	

	roadway fatalities or rate of roadway fatalities – which can include passenger vehicle, commercial vehicle, motorcycle, aviation, transit, boat, pedestrian and bicycle, hazardous material, rail - per miles traveled from _____ per ____ million to ____ per _____ million. <u>Performance Measure:</u> Reduce roadway fatalities or rate of roadway fatalities – which can include passenger vehicle, commercial vehicle, motorcycle, aviation, transit, boat, pedestrian and bicycle, hazardous material, rail - per miles traveled from _____ per ____ million to ____ per _____ million.					
New engineering knowledge or methodology implemented	Will this project provide new engineering knowledge or implement a new methodology?	20	Does not propose new engineering knowledge or methodol-ogies	Moderately changes existing knowledge or methodol-ogies	Changes existing knowledge or methodol-ogies	
State of Good Repair	Ensure WYDOT Proactively Maintains Critical Transportation Infrastructure in a State of Good Repair.	20	Does not provide for maintenance of critical transport infrastructure.	Moderately provides for maintenance of critical transport infrastruct	Significantly assists WYDOT in the mainten-ance of critical transporta	

				ure..	tion infrastruct ure.	
Positive Impact on Environment/E nvironmental Sustainability	To what extent does this project have a positive impact on the environment?	20	Does not impact	Improves some relations	Totally improves relations	
TOTALS						

PART III. Implementation

1. Could the results from this project be implemented immediately?
2. Whose responsibility would it be to implement this project?

PART IV. Contractor/Principal Investigator Audit Information

1. Is the contractor financially stable: Yes No
2. Quality of management systems: Yes No
3. History of performance:
4. Are there any findings from any audits: Yes No
5. Is the applicant able to effectively implement statutory, or regulatory requirements: Yes No
6. Other requirements:

REV: 6-2019

APPENDIX 5 WYDOT RESEARCH FEEDBACK FORM

Principal Investigator:
Contracting Agent:
Project Title:
Project Champion:

	Rate your satisfaction with the proposal process:	☐ Very Satisfied
PROPOSAL PROCESS		☐ Satisfied
		☐ Dissatisfied
	What did you like about the proposal process?	
	What did you dislike about the proposal process?	

	Rate your satisfaction with the Research Program Staff:	☐ Very Satisfied
RESEARCH PROGRAM STAFF		☐ Satisfied
		☐ Dissatisfied
	As a researcher, what suggestions can you provide to improve the management and administration of the program?	

	Rate your satisfaction with the Project Sponsor:	☐ Very Satisfied
PROJECT SPONSOR **To be answered by Principal Investigator only**		☐ Satisfied
		☐ Dissatisfied
	What suggestions can you provide to improve the interaction with the program sponsor?	

	Rate your satisfaction with the Principal Investigator:	☐ Very Satisfied
PRINCIPAL INVESTIGATOR **To be answered by Project Champion only**		☐ Satisfied
		☐ Dissatisfied
	What suggestions can you provide to improve the interaction with the Principal Investigator?	

	Please provide other suggestions to improve the Research Program.
CONTINUOUS IMPROVEMENT	

LESSONS LEARNED	Briefly, what are the most important and transferable lessons learned from this project:
To be answered by Project Champions only	Rate the Usefulness of the Project Findings: _____ A: Major Impact-Enhanced Operations (specification, standard, policy, method, etc) _____ B: Significant Impact – Improved Operations. _____ C: Contributed to state-of-the-practice. _____ D: Unclear or contradicting findings – More study needed. _____ E: Major tasks not completed – Objectives not met. Explain why gave grade.
	In this area, insert the major tasks from the project, and whether the tasks were completed or if any fell short. Please also provide an explanation as to why the task was not completed. Remember that negative results or incomplete tasks may be a success for your project.

FOLLOW-UP RESEARCH	Is follow-up research warranted?	☐ Yes ☐ No
	If yes, please explain:	
	What research do you plan on pursuing?	
	When do you plan to propose this follow-up research?	

REALIZABLE BENEFITS **To be answered by Project Champions only**	Please outline the benefits that WYDOT will receive from this project if the results are implemented.
BENEFIT CATEGORY **To be answered by Project Champions only**	
	Asset Management This project has contributed to the management of WYDOT's asset. Financial Benefit: $_____.
	User Impact This project has reduced the impacts of the traveling public. Financial Benefit: $_____.

	Safety This project has or will improve the safety of the traveling public, WYDOT and/or contractor employees. Financial Benefit: $_____.
	Quality of Life This project has improved the quality of life of residents and visitors to the state, including aesthetic beauty, convenience, comfort and security. Financial Benefit: $_____.
	Environmental This project has improved the quality of the natural environment. Financial Benefit: $_____.
	Level of Knowledge This project has expanded the level of knowledge in this research area. Financial Benefit: $_____.
	Administration and Policy This project has provided for improved administrative, management, and policy decisions. Financial Benefit: $_____.
IMPLEMENTATION **To be answered by Project Champions only**	Please provide information on whether the results from this project have been implemented, whether you plan on implementing the results, and if not, why the results will not be implemented.
EVALUATION MEASURES	**The Research Center is required to evaluate research reports. Your project has been placed under the following evaluation measure. Please review and let us know if you do not agree with the ranking.**
	Strategic Intent (1 most relevant to 6 least relevant): Infrastructure Upgrade: _____ Preservation: ____ Public Affairs: _____ Safety: _____ Shared Knowledge: _____ Wildlife Study: _____
	Outcome areas: Knowledge: _____ (specification, design guidelines, product performance, product evaluation, etc.)

	Product: _____ (software design or implementation, ITS, monitoring devices, etc.) Standards: _____ (materials, methods for treatment of highways/bridges/etc., safety standards/evaluation.)
	<u>Project type:</u> _____ <u>Engineering standards, data and new knowledge:</u> (projects in the realm of applied science and engineering Principals. These projects result in new knowledge, know-how and standards. These projects are normally executed in the lab but may also include field testing and are not normally location-specific.) <u>Systems engineering and engineering analysis:</u> _____ (projects span the continuum from application of engineering principles to system and product development. These projects result in application of new engineering solutions, process improvements, new tools or instrumentation, improved materials and new policies or strategic initiatives. These projects are normally applicable to one or more locations or situations.) <u>Technology transfer:</u> _____ (projects are present all along the continuum from publications of research results to commercial products. However, technology transfer projects are defined as those projects that enable the diffusion and subsequent adoption of safety practices, new products, new and enhanced systems or process innovations.) <u>Public affairs:</u> _____ (projects focus on public policy and socio-economic issues and often result in policy recommendations or address a public request or concern and are not directly related to furthering science, technology or engineering.)

NOTE: This Research Feedback Form is created as a derivative from the Research Feedback Form that can be found in the research report entitled *Evaluation of WYDOT's Research Center and Research Program*, P. 125,
https://ntl.bts.gov/lib/51000/51900/51955/EVAULATION_OF_WYDOTS_RESEARCH.PDF

**APPENDIX 6 WYDOT RESEARCH PROJECT EVALUATION TEMPLATE PHASE 1
PROGRAM PERFORMANCE EVALUATION**

PHASE I

Project Name:

Project ID Number:

Start Date: Completion Date:

Principal Investigator:

WYDOT Sponsor:

This form is to be completed nine months after the research report is published.

Select one corresponding box for each question.

1. **Were all of the proposed objectives of the research project fulfilled?**
   ☐   All objectives were fulfilled
   ☐   Some objectives were fulfilled
   ☐   No objectives were fulfilled

2. **Expected future level of implementation within WYDOT.**
   ☐   Full Implementation
   ☐   Partial Implementation
   ☐   No Implementation
   ☐   Results do not recommend implementation

3. **External technology transfer.**
   ☐   Any national, regional, or local presentations, publications, etc.
   ☐   No external technology transfer
4. **Internal technology transfer.**

   ☐   Presentation created and used by the Research Center or relevant departments within WYDOT
   ☐   No internal technology transfer

5. **Was a research report created?**
   ☐   A professional and concise research report was created, meeting WYDOT's expectations
   ☐   No research report was created or an inadequate research report was submitted

6. **Was the research project completed within its proposed timeline?**
   ☐   The project was completed within its proposed timeline or within approved extension
   ☐   The project was completed within one month of its proposed timeline
   ☐   The project was completed after one month of its proposed timeline
   ☐   The project was not completed

7. **Was the research project completed within its proposed budget?**
☐   The project was completed within its proposed budget or within an approved funding increase
☐   The project was not completed within its budget

NOTE: This Research Feedback Form is created as a derivative from the Project Evaluation Form that can be found in the research report entitled *Evaluation Department of Transportation's Research Program: A Methodology and Case Study*, P. 104,
http://ntl.bts.gov/lib/51000/51800/51882/FHWA_1202F_RS_03211_Evaluating_DOT_REsearch_Programs.pdf

REV: 8-2017

APPENDIX 7 WYDOT RESEARCH PROJECT EVALUATION TEMPLATE PHASE 2

PROGRAM PERFORMANCE EVALUATION
PHASE 2

Project Name:

Project ID Number:

Start Date: Completion Date:

Principal Investigator:

WYDOT Sponsor:

This form is to be completed at a minimum 2 years after a research project has been completed.

Select one corresponding box for each question or fill in application question.

1. Have the results of this research project contributed to WYDOT's Mission and/or Goals?

☐   Yes
☐   No

If yes, briefly describe which aspects of WYDOT's Mission and/or goal have been advanced or affected by the results of the research project:

_____
_____

2. Have the results of this research project been implemented within WYDOT?

☐   Full Implementation

☐   Partial Implementation

☐   No Implementation

3. **What is the cost/benefit associated with this project?**

☐   Benefits associated with the results of project exceeds costs of project
☐   Benefits associated with the results of project do not exceed the costs of project

4. **Have the results of the project had any impacts on nations, regional or local organizations or agencies?**

☐   Yes
☐   No

If yes, briefly identify the organization or agency that was impacted, and what affect the research project had on them:

_____

_____

5. **Has additional research been pursued or conducted as a result of this project within WYDOT?**

☐   Yes, additional research has been approved

☐   No, additional research has not been approved.

If yes, identify the project.

_____

_____

NOTE: This Research Feedback Form is created as a derivative from the Project Evaluation Form, which can be found in the research report entitled _Evaluation Department of Transportation's Research Program: A Methodology and Case Study_, P. 106,
http://ntl.bts.gov/lib/51000/51800/51882/FHWA_1202F_RS_03211_Evaluating_DOT_REsearch_Programs.pdf

REV: 8-2017

APPENDIX 8: COPYRIGHT PERMISSION
TEMPLATE

COPYRIGHT PERMISSION FROM WYDOT TO *[NAME OF CONTRACTOR]* FOR THE RESEARCH
PROJECT, *[TITLE OF PROJECT]*
[WYDOT PROJECT NUMBER]

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Prior to the publication of any data or other material derived from the above-mentioned research report, [PRINCIPLE INVESTIGATOR(S)] shall ensure that the subject matter, and all figures, tables, equations, photos, and other supplemental materials are cite as work in progress, if the work has not yet been published by WYDOT, or in a manner that meets the requirement of the outside journal for references, if the final report has been published WYDOT.

To the extent that any right now or in the future existing under copyright is not specifically granted by the terms of this Agreement, WYDOT shall retain those rights. The omitted rights shall be brought to the attention of WYDOT as soon as possible.

AGENCY:
Wyoming Department of Transportation

_____   _____
Keith R. Fulton, P.E.   Date
Assistant Chief Engineer for Engineering and Planning

ATTORNEY GENERAL'S OFFICE

_____   _____
Alysia Goldman, Assistant Attorney General   Date
Representing WYDOT