Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: RRC Members
Mike Bousliman, Administrator/Information Services Division
Kevin Christensen/Chief Operations Officer
Larry Flynn, Administrator/Administration Division
David Kack, Director/WTI
Dwane Kailey, Administrator/Highways and Engineering Division
Shane Mintz, Administrator/Glendive District
Bob Seliskar/FHWA
Jon Swartz, Administrator/Maintenance Division
Mike Tooley/Director
Eric Belford, Acting Administrator/Motor Carrier Services Division
Pat Wise/Deputy Director
Lynn Zanto, Administrator/Rail, Transit, and Planning Division

From: Susan C. Sillick, Manager
Research Programs

Date: January 27, 2021

Subject: October 28, 2020 RRC Meeting Notes

Action items are in red.

RRC Members Present: Mike Bousliman, Kevin Christensen, David Kack, Dwane Kailey, Sue Sillick, Pat Wise and Lynn Zanto

Others Present: Eric Belford, D.J. Berg, Stephanie Brandenberger, Vaneza Callejas, Kevin Christensen, Bobbi deMontigny, Jeff Jackson, Matt Ulberg, Joe Wiegand and Jeremy Wilde

1. **Budget Report:** Attached

No discussion.

2. **Research Projects – current listing**

   a. Projects On-Hold
      i. Economic Benefits of Improving Montana's Transportation Infrastructure

Lynn Zanto explained that the project hold was due to panel uncertainty during the scoping phase. The technical panel felt that they needed to stop and rethink whether to advance the research or not. After the current session they will convene to make a decision.

ii. Use of Fluorescent Orange Delineators in Temporary Traffic Control Work Zones

Jeremy Wilde, as chair of the technical panel, explained that the project hold was due to Covid-19 restrictions lowering normal traffic counts. Non-commercial traffic volumes were down 50% and commercial traffic down 30% (Hwy 12). Best case scenario to restart the project would be construction season 2021.

3. **Reports:** Available (except progress reports) on Research website

a. Activity Sequence Logics Using Daily Report Data (15-013) – Final Report, Construction Activity Sequence Logics, Poster
b. Alkali-Silica Reactivity in the State of Montana (18-018) – Quarterly Progress Report
c. Bridge Deck Cracking Evaluation (19-019) – Monthly Progress Reports
d. Concrete-Filled Steel Tube to Concrete Pile Cap Connection – further Evaluation/Improvement of analysis/Design Methodologies (18-017) – Quarterly Progress Report
e. Consultant Research Project Managers – Monthly Progress Reports
f. Developing a Methodology for Safety Improvements on Low-Volume Roads in Montana (19-005) – Tasks 5, 6 and Quarterly Progress Reports
g. Development of Deterioration Curves for Bridge Elements in Montana (20-011) – Task 1 and Quarterly Progress Reports
h. Effectiveness of Highway Safety Public Education at Montana Motor Vehicle Division and Vehicle Registration Stations by Streaming a Variety of Safety Content (19-001) - Quarterly Progress Report
i. Evaluation of Thin Polymer Overlays for Bridge Decks (19-017) – Monthly Progress Reports
j. Feasibility of Non-Proprietary Ultra-High Performance Concrete (UHPC) for Use in Highway Bridges in Montana – Phase 2: Field Application (18-016) – Task 1 and Quarterly Progress Reports
k. A Feasibility Study of Road Culvert Bridge Deck Deicing Using Geothermal Energy (20-008) – Kick-Off Meeting Notes
l. Guidelines for Chemically Stabilizing Problematic Soils (15-008) - Final Report, Technical Manual, Project Summary Report, Fact Sheet, Implementation Report, Performance Measures Report
m. Icy Road Forecast and Alert (IcyRoad): Validation and Refinement Using MDT RWIS Data - Kick-Off Meeting Notes
n. Large-Scale Laboratory Testing of Geosynthetics in Roadway Applications (18-007) - Annual Meeting Presentation and Quarterly Progress Report
o. LTAP – Quarterly Progress Reports
p. Monitoring Streamflow Using Video Equipment (19-011) - Quarterly Progress Report
q. Traffic Safety Culture Pooled Fund – Quarterly Progress Reports

No discussion on reports.

4. **Proposed Research Projects (attached):**
   a. Analyze Business Models for Implementation and Operation of a Statewide GNSS RTN

Mike Degenstein, as chair of the technical panel, attended this meeting to present this proposal, which is recommended by the project technical panel for funding.

The GNSS-RTN or real time networks is a satellite-based positioning system using a network of ground receivers (also called base stations, reference stations or CORS) to improve the precision of geospatial positioning through real-time corrections sent from a central processing center to a roving user. Real time GNSS networks have been increasingly used in the US for the many benefits and applications where high-precision geospatial location data is needed.

The rapid economic growth in the state of Montana makes it critical for the state to have adequate up-to-date geographic information infrastructure. Such infrastructure would increase the accuracy of geographic information and maps that are needed by multiple users from private and public entities. The Montana Department of Transportation (MDT) and the State Library are leading an effort to develop a Statewide Global Navigation Satellite System (GNSS) Real-Time Network (RTN).

The objective of this project is to perform an assessment of the various alternative business models and to recommend the most appropriate business model(s) to pursue in the planning and development of a statewide GNSS-RTN system. The prospective statewide GNSS-RTN should cover all or most of Montana geographical area and follow a fiscally sustainable business operation. More specifically, this project will gain understanding of and document the state of the art and practice related to GNSS-RTN existing systems, analyze the advantages and limitations of using various business models in the context of the state of Montana, and develop implementation recommendations to guide the planning efforts by MDT and other partners regarding the development and operation of statewide GNSS-RTN.

Mike Boulsiman asked who on the technical panel will be able to address the financial components of the project, especially with regards to funding. Mike has noted this and will discuss this with the panel.

Sue Sillick noted that we can solicit input from others, outside of the panel, to help with business requirements and for review of the state of the art and practice survey. New panel members can also be added at any point.

The project budget is $74,991 in MDT funds and $69,510 in SURTCOM funds (WTI University Transportation Center).

Sue Sillick - Jon Swartz couldn't attend the meeting but supports this proposal.

Dwane Kailey made a motion to approve funding for this project. The motion was seconded by Mike Bousliman and all RRC members present voted in favor. The motion passed.

Research staff will program the project and write and execute the contract.

b. Electrified Barriers for Carnivore Species and Lowered Jump-Outs for Deer along US Hwy 93N, Montana

Joe Weigand, as chair of the technical panel, attended this meeting to present this proposal, which is recommended by the project technical panel for funding.

The reconstruction of sections of US Hwy 93N on the Flathead Indian Reservation included the installation of wildlife crossing structures and exclusion fence. Wildlife guards (similar to cattle guards) at access roads have proven to be an effective barrier to deer species but they are quite permeable to carnivore species, including bear species.

The research focuses on how to better keep these species out of fenced road corridors through electrified barriers at access roads, and on how to improve wildlife use, specifically deer, of jump-outs, should the animals still end up inside the fenced road corridor.

The MDT Maintenance support has been secured. Liability issues have been addressed. WTI will absorb TERO (Tribal Employment Rights Ordinance) costs.

Sue Sillick - Jon Swartz couldn't attend the meeting but supports this proposal with the caveat that MDT Maintenance does not pay for any of the materials.

The project budget is $62,000.

Dwane Kailey made a motion to approve funding for this project. The motion was seconded by Lynn Zanto and all RRC members present voted in favor. The motion passed.

Research staff will program the project and write and execute the contract.

c. Numerical Modeling of the Test Pit for Falling Weight Deflectometer Calibration

Jeff Jackson, as chair of the technical panel, attended this meeting to present this proposal, which is recommended by the project technical panel for funding.

Evaluation of pavements is commonly conducted using the deflection data from Falling Weight Deflectometers (FWDs) tests. The reliability of these evaluations is highly dependent on the accuracy of the measured deflections. Therefore, to ensure the desired accuracy of measured deflections, FWDs undergo annual calibration and monthly relative calibrations.

The calibration facility operated by the Montana Department of Transportation (MDT) has used a 12 ft wide, 15 ft long, and 5 in thick slab overlying a 6-in sandy base and a 4-ft thick clay subgrade (R32 design). The measured deflections during calibration tests conducted by MDT on this test pit met the deflection requirements laid out by AASHTO R32-11 for a few years, after which the test area needed to be replaced.

The main objective of this study is to better understand the dynamic responses of the FWD calibration test pits. The dynamic response can then be used to examine the possibility of using geofoam instead of the clay layer as the relatively weak subgrade in the traditional R32 design. If successful, the new FWD calibration test pit would last longer under serviceable conditions which can save a noteworthy amount of time, effort, and cost. Numerical modeling will be conducted to gain a better understanding of the dynamic behavior of the test pit and to simulate the behavior of both traditional R32 and the new geofoam design. The results will then be used to first determine whether or not the geofoam can be used in place of the clay layer. If geofoam is proven to be applicable, the second objective of the study would be to modify the design of the current geofoam test pit. The modified design will provide practical suggestions regarding the required geometry (e.g., the thickness of each layer) and the mechanical properties of different layers of the test pit so that the new test pit can perform in accordance with AASHTO R32-11 requirements.

The project is phased. The panel will be able to stop or continue the research at each stage.

The project budget is $26,569 in MDT funds and $6,641 in Montana Technological University (MT) funds.

Dwane Kailey made a motion to approve funding for this project. The motion was seconded by Lynn Zanto and all RRC members present voted in favor. The motion passed.

Research staff will program the project and write and execute the contract.

5. **Implementation/Performance Measures/Technology Transfer:** None

6. **Department/Division Hot Topics – RRC Members Roundtable Discussion**
   - ★ Mike Bousliman asked about TRB conference participation and attendance.
     - Lynn Zanto is undecided and mentioned that she does not normally participate in an election year. She will probably have staff that will be participating.
     - Matt Ulberg will be participating but is undecided on which sessions he will attend.
     - Sue Sillick noted that the full agenda will be available in November.
   - ★ David Kack noted that WTI has allocated $325,000 of SURTCOM and UTC funds towards research funding of various projects, including GNSS RTN and MVD Safety Content.
   - ★ Pat Wise said she is eager to see the research move forward on the GNSS RTN project.

Copies: Craig Abernathy/Research Section
Stephanie Brandenberger, P.E./Bridge Bureau
Vaneza Callejas/Consultant Research Project Manager
Ryan Dahlke/Consultant Design Bureau
Jim Davies/Materials Bureau Chief
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Lisa Durbin/Engineering Operations Bureau
Ed Ereth/Data and Statistics Bureau
Bill Fogarty/District Administrator-Butte District
Jake Goettle/ Highways and Engineering Division
Jeff Jackson/Geotech and Pavements Bureau
Paul Jagoda/Construction Engineering Services Bureau
Janet Kenny/Grants Bureau
Damian Krings/Highways Bureau
Tom Martin/Environmental Services Bureau
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Gabe Priebe/Traffic & Safety Bureau
Darin Reynolds/Construction Contracting Bureau
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