



LRRB December Meeting MINUTES

December 7 and 8, 2016

University of Minnesota

Northrop Memorial Auditorium, Second Floor

Lindah! Founder's Room

84 Church Street Southeast

Minneapolis, MN 55455

LRRB Members Present:

Lyndon Robjent (Chair), Carver County
Jim Foldesi, Saint Louis County
Tim Stahl, Jackson County
Paul Oehme, City of Chanhassen
Steve Koehler, City of New Ulm
Kaye Bieniek, Olmsted County
Linda Taylor, MnDOT – Research
Laurie McGinnis, U of M - CTS
Mitch Rasmussen, MnDOT – State Aid
Tom Ravn, MnDOT – Construction
and Innovative Contracting

Others Present:

Ben Worel, MnDOT – OMRR
Kevin Western, MnDOT – Bridge (on
Day 1)
Hafiz Munir, MnDOT – Research
Debbie Sinclair, MnDOT – Research
Shannon Fiecke, MnDOT – Research
Mitch Bartelt, MnDOT – Research

Minutes prepared by Mitch Bartelt, MnDOT Research

1. Call to Order (Day 1) December 7, 2016

Chair Lyndon Robjent called the meeting to order. Lyndon welcomed the attendees and discussed the purpose of the meeting, to choose which research project proposals would receive funding in the 2018 Fiscal Year.

Next, introductions were done. Notably, Kevin Western will be taking over Tom Ravn's role beginning next year, so he attended as a non-voting member at this meeting. Mitch Bartelt is a new employee of the MnDOT Research Services Section, replacing Dan Sullivan as the staff (non-voting) member of the Local Road Research Board.

The agenda was then reviewed by the board. ***Jim Foldesi made a motion to approve the agenda, which was seconded by Kaye Bieniek. The motion was approved.***

Pending June 2016 Action Items

Linda Taylor reviewed pending LRRB action items. Action items not listed below were completed at a previous meeting.

June Action Item No. 4: Tim Stahl will check and see what level ADT for Low Volume roads will allow them to be included in the Minnesota MUTCD (Research Implementation Committee Contract Task 9). *Tim Stahl said the cutoff is 450 ADT. **Complete***

June Action Item No. 5: Debbie Sinclair will send out the updated pre-trip and post-trip processes to the Board Members when they are finalized. *Debbie Sinclair reported these processes have not been finalized and thus, have not been sent out.* **Outstanding**

June Action Item No. 10: Tim Stahl will bring the idea of having Mark Vizecky (Traffic) and Joel Ulring (Bituminous and Concrete) become official RIC members to the RIC for discussion and bring back a recommendation. *RIC recommended against expanding the voting membership but will include them as ex-officio members.* **Complete**

June Action Item No. 14: Board members interested in serving on the TAPs for any of the projects that are part of the current RIC Support Contract should contact Bruce Holdhusen (MnDOT RS) or Renae Kuehl (SRF). *Bruce Holdhusen informed Mitch Bartelt prior to the meeting that TAP members have been identified.* **Complete**

October 2016 New Action Items

Action Item 1: *Brenda Thomas is checking into use of Northrup Building for December 2017 meeting. She will get back with Debbie Sinclair.*

Brenda Thomas is no longer with CTS, as she left for a position with MnDOT. Debbie said that Northrup Auditorium is reserved for the December 2017 meeting, but that alternatives are being considered due to the high cost of reserving the space and catering. The group expressed a desire to keep this meeting on campus.

Debbie said she will check at other places around campus first. Laurie McGinnis suggested the President's room on 3rd floor of the Union. Debbie will follow-up with Mary Snyder on possible options.

NOTE: This item has been resolved. The December 2017 meeting will be held in the President's Room at Coffman Memorial Union. **Complete**

Action Item 2: Shannon Fiecke will investigate and resolve LRRB website access issues. *Shannon confirmed that the website issues have been resolved.* **Complete**

Action Item 3: Debbie Sinclair, Becky Lein and Laurie McGinnis will have a follow up discussion regarding the new MnDOT closeout process of tying final payment to the evaluation process and whom at the University should receive the closeout reviews. Is this allowed under the master agreement? **Outstanding**

Action Item 4: *Mitch Rasmussen and others would like to see the board define/clarify the multiple proposal evaluation process.* **Replaced with New Action Item 1. Closed**

Laurie, Lyndon, Mitch Rasmussen, and Linda volunteered to meet prior to the March meeting and bring a recommendation to the March meeting. Hafiz Munir noted that the time for the Principal Investigator to complete the evaluation has dropped from 10 days to 3 days, in the interest of expediting payment.

New Action Item 1: Lyndon, Mitch R, and Linda will meet prior to the March 23 LRRB Meeting and develop a recommendation to present at that meeting.

Action Item 5: Alternatives to Seal Coats (TRS 16-02) – Bruce Holdhusen will follow up with the TL, Jeff Hulsether, to see if it answered or solved the problem and to see if there is a next step. *There was no discussion yesterday at the RIC meeting. People at the meeting were unaware if*

*this item has otherwise been resolved. **Outstanding***

Action Item 6: Snow and Ice Handbook and Asphalt Maintenance Field Guide were sent to RIC to determine if they should be updated or just reprinted. *Progress has been made, but this item remains **Outstanding**.*

Snow and Ice Handbook – Kathy Schaefer and Jim Foldesi will be working to update this. Jim will bring the cost associated with printing it to the March meeting.

Asphalt Maintenance Field Guide – Ann Johnson said it was last updated in 2001. It needs to be updated, then will be printed into a book. It will be released both as a book and printable pdf, but not an app. Shannon said format in which it should be disseminated will be looked into the future. Ann is beginning the process of updating. Four pages and three tables need to be updated.

New Action Item 2: Jim Foldesi will bring an update to the LRRB on the cost associated with printing an updated Snow and Ice Handbook at the March 23, 2017 meeting.

Action Item 7: Going forward, trip report action items will be sent to the indicated committee first, then to Mitch Rasmussen to identify a champion. If no champion is found, Mitch Rasmussen will bring to LRRB to discuss if there is value to the state for the investment. **Outstanding**

There was some discussion on the form. Lyndon asked if it is available online; Debbie said it is. Linda said it might need to be updated. Lyndon requested the format be changed to a fillable pdf, as Word documents don't work well on an iPad. It was agreed that the form will be changed as such.

New Action Item 3: Debbie Sinclair's unit will update and distribute the Trip Report Form so that it is in editable format, as a fillable pdf.

Action Item 8: MnDOT Materials office (Glenn Engstrom) will be invited to next RIC meeting to educate RIC on what is going on with HMA Dry Mix Pavement Performance. Joel Ulring and Jeff Brunner will confer to compile questions for Glenn Engstrom. **Complete**

Curt Turgeon attended the RIC meeting in place of Glenn. Ben updated the group. Curt gave a good history on this issue. MnDOT moved from Marshall mix design to Gyratory mix design, making it more efficient. Curt stated that when playing around with mix design, only two variables at a time should be evaluated. Ultimately, there is a challenge to balance the effects of cracking and rutting when it comes to asphalt content. The asphalt paving industry would prefer to have one mix for all projects. When every agency tweaks its mix, plants have to make numerous mixes and it costs more for everyone. Mixes have changed, calling for Class B (3/4") aggregate instead of Class A (1/2"). This has helped create stronger bituminous pavement, while also requiring less asphalt in the mix.

Then the discussion went to seal coating, and more or less ended in disagreement. Ben noted that despite the attempts at a more common specification, different aesthetic bituminous paving results are being seen around the state. This is probably due to difference in aggregate source in various locations statewide. Mitch R said that the RIC was satisfied that MnDOT Materials Office was receptive to the local agency concerns.

In outstate areas, it's a common problem for contractors to be "riding on the edge" and putting down as little asphalt as possible. He said this is less of a problem in Metro. Tom noted that the Minnesota Asphalt Paving Association often expresses concerns related to consistency in

mix design with respect to local agencies.

Mitch R responded that he understands the need for consistency in specifications, but knows that local agencies need to have the ability to put teeth into specifications to ensure quality work. He noted that State Aid will not heavy-hand counties or cities with how product is put on the road. He felt more of a burden needs to be placed on industry, and that industry should work to ensure that contractors are incentivized to do good work and not take shortcuts. Mitch R will advise local agencies to work with MnDOT Materials Office when tweaking the design.

Lyndon asked if this will be covered at the January Minnesota County Engineers Association meeting. The members of the panel were unaware if it would.

Action Item 9: Lyndon Robjent will develop a proposal for the next phase of Modernizing Construction Plans for the board to consider for funding at a future meeting. **Outstanding**

Action Item 10: Forward questions regarding ADA compliance to Renae Kuehl to be addressed in the RIC task on ADA training. *ADA Compliance Training is moving forward.* **Complete**

A motion to approved minutes was made by Jim Foldesi and seconded by Tom Ravn. The motion was approved.

2. Budget and Administration

Budget Status Report

Debbie Sinclair led the budget discussion. She indicated that the following projects are completed as indicated in green on the large budget spreadsheet:

- INV 968
- INV 969

INV 998 OPERA work plan is going through the contracting process.

FY18 LRRB allotment amount of \$3.6 M is just a placeholder and will be updated in January/February timeframe once the appropriation is determined.

There is currently a balance of \$1.7 million available in FY17 that will roll over into FY18. LRRB has \$2.5 million available for FY18. Ideas generated to address budget surplus included:

- **Accelerating projects:** Debbie asked to move projects up when possible to spend some of that balance.
- **Strategic Plan:** Lyndon said the strategic plan would be an ideal conduit to address how to deal with the rollover funds.
- **RIC Needs:** RIC should identify additional funding needs.
- **Knowledge building priorities** were also another option. Knowledge building will be discussed at the March meeting. Laurie requested two hours for knowledge building exercise.
- **OPERA Program:** Mitch R will meet with Jim Grothaus and Mindy Carlson at the CTS regarding projects. Mitch R said it was an obstacle for maintenance folks to write a report afterwards and fill out funding requests. Tim noted that if CTS can do the write-up and video afterward, that would be a great service to local agencies.
- **State Aid Projects/Priorities:** Mitch R explained that Greg Coughlin is mobility in State Aid on special projects. Greg is currently working on a cooperative agreements streamlining project and updating the master maintenance agreement. After those two projects are complete, online training for technical certification is the next priority. There was a discussion on whether this work could be accelerated.

2017 LRRB Summer Meeting

Debbie reported that no vendors put in bids for the LRRB Summer meeting. RS staff were reaching out to possible vendors and will be reissuing the RFP.

RIC meetings are scheduled for rest of the year. The remaining two meetings will be held on Wednesday, September 27 and Monday, November 20, both at MnDOT St Cloud Training Center. (The previous two meetings are already set to occur on Monday, March 13 at MnRoad, and June 28-29 in Grand Rapids.)

Debbie reminded members to submit any outstanding expense reports as soon as possible.

Everyone going to the Transportation Research Board Annual meeting should register and secure their hotel room, if they haven't already. Ben suggested staying at the Embassy Suites for those who don't have hotel reservations yet.

2017 Conferences

The AAPT Pavement Technologies Conference will be held in Newport Beach, California from March 19-22. This conference will occur prior to the next LRRB meeting.

There are also conferences in Sweden and Greece this summer. The International Conference on Timber Bridges will be held in Skelleftea, Sweden from June 26-29. The Conference on the Bearing Capacity of Roads, Railways, and Airfields will be held in Athens, Greece from June 28-30. The committee will need to know as soon as possible if someone is interested in attending either conference.

New Action Item 4: Debbie will send out a reminder e-mail to RIC and LRRB members about upcoming LRB conference open slots.

3. Research Proposal Presentations for FY18 Funding – Day 1

Ten presentations were given on Day 1. All of the presenters were given instructions that they had fifteen minutes to present, with five minutes afterward for questions. The following presentations were given today:

Need Statement	Project Title	Principal Investigator	
452f	Pavement Markings- Wet Retroreflectivity Standards	Adam Pike (via telephone)	Texas A&M
455a	Experimental and Computational Investigations of High Density Asphalt Mixtures	Mihai Marasteanu	UMN
463a	Cost/Benefit Analysis of the Effectiveness of Crack Sealing Techniques	Manik Barman	UMD
KB-13	Adaptive Management to Improve Deicing Operations	Lawrence Baker	UMN
461a	Characterization of Runoff Quality from Paved Low Volume Roads and Optimization of Treatment Methods	John Gulliver	UMN
461c	Stormwater Contaminant Data Collection and Cost-Effective Treatments for Low-Volume Roads	Chris Rehmann	UMD

452b	Pavement Markings - Wet Retroreflectivity Standards	Magdy Abdelrahman	NDSU
465a	Examining Optimal Sight Distances at Rural Intersections	Nichole Morris	UMN
467a	Investigating Inductive Loop Signature Technology for Statewide Vehicle Classification Counts	Chen-Fu Liao	UMN
457a	Pavement Thickness Evaluation using 3D Ground Penetrating Radar	Lev Khazanovich	UMN

Two corrections of note:

- The presenter for NS-461a, Chris Rehmann is employed by Iowa State and not UMD. There was an error in the spreadsheet given to the LRRB panel.
- Tracey Von Barga, Grant County Engineer, is the Project Champion for NS-465a, not Melissa Barnes. There was an error in the spreadsheet to the LRRB panel.

Preliminary discussion took place after the ten projects that were presented. No choices were made on which projects would be funded.

4. Other items

- Linda Taylor: This year the LRRB will be having a Knowledge Building exercise, but still needs to generate research ideas. There is still a need for focus group session. The LRRB Focus group location and date need to be determined. The Focus group will held in the Metro area this year.
- Mitch Rasmussen: Mitch R forwarded a request, asking members if they supported LRRB sponsoring Tom Wood's travel costs (airfare only) to the National Association of County Engineers conference to make presentation on seal coating. Tom Wood has left MnDOT and is now working at WSB. Tom's conference registration and hotel room would be comped by NACE. LRRB members did not support sponsoring travel for a non-state or local agency employee.

5. Adjournment

The meeting was adjourned for the day at 3:35 p by Chair Robjent.

6. Research Proposal Presentations for FY18 Funding – Day 2

Ten more presentations were given on Day 2.

Need Statement	Project Title	Principal Investigator	
475f	Personal Warning Sensor for Road Construction Workers	Jerry Ullman (via telephone)	Texas A&M
471f	Truck Station Location Optimization	William Holik (via telephone)	Texas A&M
462d	Is Seal Coating Counterproductive or Not?	Zhanping You	Michigan Tech

459c	Prepare Local Agencies for Future of V2V/V2I and Connected Vehicle Technologies	Shauna Hallmark	Iowa State
459a	How Locals Need To Prepare for the Future of V2V/V2I Connected Vehicles	John Hourdos	UMN
458a	Evaluation of the Effectiveness of Stop Lines in Increasing the Safety of Stop-Controlled Intersections	John Hourdos	UMN
458c	How Stop Lines Affect Vehicle Position, Approach Speed, and Driver Attentiveness	Nicole Oneyear	Iowa State
485	Cloud-Based Dynamic Warning System	Brad Wentz	NDSU
460b	Transportation Workforce Recruitment and Retention Strategies	Todd Sirotiak	NDSU
460e	Transportation Workforce Recruitment and Retention Strategies	Natalie Villwock-Witte	Montana State

7. Research Proposal Presentations for FY18 Funding

LRRB decided to shortlist the multiple proposals by first discussing the merits of each proposal and deciding which proposal should move forward for funding consideration. The following proposals were recommended for funding:

452f	Pavement Markings- Wet Retroreflectivity Standards	Adam Pike	Texas A&M
455a	Experimental and Computational Investigations of High Density Asphalt Mixtures	Mihai Marasteanu	UMN
458a	Evaluation of the Effectiveness of Stop Lines in Increasing the Safety of Stop-Controlled Intersections	John Hourdos	UMN
459a	How Locals Need To Prepare for the Future of V2V/V2I Connected Vehicles	John Hourdos	UMN
459c	Prepare Local Agencies for Future of V2V/V2I and Connected Vehicle Technologies	Shauna Hallmark	Iowa State
461a	Characterization of Runoff Quality from Paved Low Volume Roads and Optimization of Treatment Methods	John Gulliver	UMN
462d	Is Seal Coating Counterproductive or Not?	Zhanping You	Michigan Tech
463a	Cost/Benefit Analysis of the Effectiveness of Crack Sealing Techniques	Manik Barman	UMD
465a	Examining Optimal Sight Distances at Rural Intersections	Nichole Morris	UMN
467a	Investigating Inductive Loop Signature Technology for Statewide Vehicle Classification Counts	Chen-Fu Liao	UMN
475f	Personal Warning Sensor for Road Construction Workers	Jerry Ullman	Texas A&M

485	Cloud-Based Dynamic Warning System	Brad Wentz	NDSU
KB-13	Adaptive Management to Improve Deicing Operations	Lawrence Baker	UMN

*** Need statements highlighted in **BOLD** indicate LRRB/TRIG cost sharing

Agreement on a cost share could not be reached on the following project:

460e	Transportation Workforce Recruitment and Retention Strategies	Natalie Villwock-Witte	Montana State
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This project was the preferred alternative of the two *Transportation Workforce Recruitment and Retention Strategies* proposals. This presentation was also heard at the MnDOT TRIG meeting last week. LRRB is willing to cost share with TRIG on this project. However, the share each group is willing to commit isn't enough to fully fund the project.

The decision was made to bring this project back to TRIG to see if they are willing to increase their share of the cost. Otherwise, the project will not be funded in this cycle.

New Action Item 5: Linda will bring the Transportation Workforce Recruitment and Retention Strategies project back to TRIG to see if they are willing to increase cost share on this project.

NOTE: This action item has been resolved. There was no will to fund this at 100%. This project will not go forward. **Complete**

A motion was made by Laurie to approve the projects. Paul seconded the motion. The motion was approved unanimously.

8. Round Robin

Every member expressed his or her thanks to Tom Ravn for having served on the LRRB for the past six years. Tom also stated that he enjoyed it a great deal.

Linda Taylor

- Focus groups: She said there needs to be a way of generating needs statements to encourage more research. Linda also stated there needs to be a county represent for the focus group. Lyndon volunteered to be the county representative on the TAP.

New Action Item 6: Linda will work with Dan Erickson, Metro State Aid Engineer, to try and secure a focus group meeting date that aligns with State Aid prescreening meeting.

- Knowledge building: Laurie will take the lead on planning the knowledge building exercise at the March meeting. Laurie requested two-hour meeting timeslot and will take care of inviting professors. The question came up whether to include the RIC in this discussion. Laurie and Linda will take that decision off-line.
- NCHRP ballot: Linda will discuss this offline with Mitch R.
- TRB Annual meeting: Linda encouraged the members attending the Transportation Research meeting to stop by High Value Research poster sessions:
 - Poster sessions 354 DOT High Value Research Projects
 - Unmanned Aerial Vehicles Enable Safe and Cost-Effective Bridge Inspection
 - Next Generation Bridge Management Tools and Inspection
 - Minnesota Department of Transportation Metro Barrier Extraction and LiDAR Project

- LRRB Strategic plan Quick call process was sent out to consultant, with proposals due January 9th, 2017.

Laurie McGinnis

- LRRB members attending the TRB Annual Meeting are encouraged to stop by the CTS reception on Sunday night from 5:30 to 7:00 in Washington.
- On December 9, there is a grand opening of an exhibit on importance of retroreflective clothing at The Works Museum, an interactive children's museum in Bloomington. The address is 9740 Grand Avenue in Bloomington. The grand opening occurs from 11-12:30, and lunch will be served.

Mitch Bartelt

- Now that projects have been chosen, the research unit will need people to be on Technical Advisory Panels. Mitch vowed to do his best to use technology to accommodate people at locations far away from Saint Paul. Research projects will be most successful if the entire state is represented and has input, not just areas close to the Twin Cities. Mitch encouraged those present either to volunteer to be on a TAP, or to encourage those who work for their agencies be included in their areas of expertise.
- Mitch asked for feedback on the format of this year's meeting. The group would prefer to have a longer meeting on the first day and an earlier getaway on day two.
 - The group felt that limiting the presentations to twenty minutes total was great to keep people moving.

Shannon Fiecke

- Shannon is working with Mitch R on the FY2016 At-A-Glance, which will be available in early in 2017.
- MnDOT Research Services will be releasing a new research report format in 2017 that incorporates the new MnDOT logo.
- The most recent copy of the *Accelerator* is in every attendee's binder. Highlighted projects include the new sinusoidal rumble strip design that MnDOT will be adopting as a standard.

Ben Worel

- Ben thanked everyone for welcoming him to the meeting.

Debbie Sinclair

- Debbie clarified that a \$720,000 portion of FY18 funding has already been determined how it will be spent. About \$1.8 million for the fiscal year remains unallocated at this point.

Hafiz Munir

- Hafiz thanked all of the LRRB members for their contributions, and noted that he appreciates all of their help.

Lyndon Robjent

- He asked if there is a way to accelerate projects that need more money, or accelerate them to get quicker answers provided by research. This is a common issue discussed by the RIC.

Tim Stahl

- Tim suggested that the board utilize more consultants to perform research for the LRRB.

9. Adjournment

The meeting was adjourned by Chair Robjent at 2:40 p.

Summary of Action Items

Action Items from the December 2016 LRRB Meeting:

New Action Item 1: Laurie, Lyndon, Mitch R, and Linda will meet prior to the March 23 LRRB Meeting and develop a recommendation to present at that meeting.

New Action Item 2: Jim Foldesi will bring an update to the LRRB on the cost associated with printing an updated Snow and Ice Handbook at the March 23, 2017 meeting.

New Action Item 3: Make the Trip Report Form into a fillable pdf.

New Action Item 4: Debbie Sinclair will send out a message to make sure the conference slots are filled appropriately.

New Action Item 5: Linda will bring the Transportation Workforce Recruitment and Retention Strategies project back to TRIG to see if they are willing to fund 50% of the project so that it can be fully-funded as presented. –

RESOLVED

New Action Item 6: Linda will work with Dan Erickson, Metro State Aid Engineer, to try and secure a focus group meeting date that aligns with State Aid prescreening meeting.

Unresolved Action Items from prior meetings:

June 2016 Action Item 5: Debbie Sinclair will send out the updated pre-trip and post-trip processes to the Board Members when they are finalized.

October 2016 Action Item 1: ~~Brenda Thomas~~ Debbie Sinclair will check into use of Northrup Building for December 2017 meeting. - **RESOLVED**

October 2016 Action Item 3: Debbie Sinclair, Becky Lein and Laurie McGinnis will have a follow up discussion regarding the new MnDOT closeout process of tying final payment to the evaluation process and who at the University should receive the closeout reviews. Is this allowed under the master agreement?

October 2016 Action Item 5: Alternatives to Seal Coats (TRS 16-02) – Bruce Holdhusen will follow up with the TL, Jeff Hulsether, to see if it answered or solved the problem and to see if there is a next step.

October 2016 Action Item 6: Snow and Ice Handbook and Asphalt Maintenance Field Guide was sent to RIC to determine if they should be updated or just reprinted. *This is not complete, but will be covered in part by New Action Item 2.*

October 2016 Action Item 7: Going forward, trip report action items will be sent to the indicated committee first, then to Mitch Rasmussen to identify a champion. If no champion is found, Mitch Rasmussen will bring to LRRB to discuss if there is value to the state for the investment.

October 2016 Action Item 9: Lyndon Robjent will develop a proposal for the next phase of Modernizing Construction Plans for the board to consider for funding at a future meeting.

Research Proposals for FY2018 - LRRB Funding Decisions						
NS #	Project Title	PI	Univ.	Total Budget	LRRB Amount	Notes
452 f	Pavement Markings- Wet Retroreflectivity Standards	Adam Pike	Texas A&M	\$96,062	\$48,031	Cost share: 50% LRRB, 50% TRIG
455 a	Experimental & Computational Investigations of High Density Asphalt Mixtures	Mihai Marasteanu	UMN	\$148,075	\$111,056	Cost share: 75% LRRB, 25% TRIG
458 a	Evaluation of the Effectiveness of Stop Lines in Increasing the Safety of Stop-Controlled Intersections	John Hourdos	UMN	\$146,528	\$146,528	100% LRRB
459 a	How Locals Need To Prepare for the Future of V2V/V2I Connected Vehicles	John Hourdos	UMN	\$75,374	\$75,374	100% LRRB
459 c	Prepare Local Agencies for Future of V2V/V2I and Connected Vehicle Technologies	Shauna Hallmark	Iowa State	\$47,503	\$47,503	100% LRRB
461 a	Characterization of Runoff Quality from Paved Low Volume Roads & Optimization of Treatment Methods	John Gulliver	UMN	\$202,916	\$202,916	100% LRRB
462 d	Is Seal Coating Counterproductive or Not?	Zhanping You	Mich Tech	\$136,508	\$136,508	100% LRRB
463 a	Cost/Benefit Analysis of the Effectiveness of Crack Sealing Techniques	Manik Barman	UMD	\$104,504	\$104,504	100% LRRB
465 a	Examining Optimal Sight Distances at Rural Intersections	Nichole Morris	UMN	\$166,549	\$166,549	100% LRRB
467 a	Investigating Inductive Loop Signature Technology for Statewide Vehicle Classification Counts	Chen-Fu Liao	UMN	\$88,820	\$44,410	Cost share: 50% LRRB, 50% TRIG
475 f	Personal Warning Sensor for Road Construction Workers	Jerry Ullman	Texas A&M	\$112,154	\$28,038	Cost share: 25% LRRB, 75% TRIG
485	Cloud-Based Dynamic Warning System	Brad Wentz	NDSU	\$78,130	\$78,130	100% LRRB
KB-13	Adaptive Management to Improve Deicing Operations	Lawrence Baker	UMN	\$262,060	\$200,000	Yes, but with a revised scope down to \$200k.
457 a	Pavement Thickness Evaluation using 3D Ground Penetrating Radar	Lev Khazanovich	UMN	\$109,879		Funded 100% by TRIG. LRRB heard this proposal but chose not to fund it.
471 f	Truck Station Location Optimization	William Holik	Texas A&M	\$156,712		Funded 100% by TRIG. LRRB heard this proposal but chose not to fund it.
452 b	Pavement Markings - Wet Retroreflectivity Standards	Magdy Abdelrahman	NDSU	\$99,972		NS-451a was preferred by LRRB
458 c	How Stop Lines Affect Vehicle Position, Approach Speed, and Driver Attentiveness	Nicole Oneyear	Iowa State	\$83,706		NS-458a was preferred by LRRB
460 b	Transportation Workforce Recruitment and Retention Strategies	Todd Sirotiak	NDSU	\$129,050		NS-460e was preferred by LRRB
460 e	Transportation Workforce Recruitment and Retention Strategies	Natalie Villwock-Witte	Mont State	\$184,567		A cost share agreement could not be reached. This project will not be funded.
461 c	Stormwater Contaminant Data Collection and Cost-Effective Treatments for Low-Volume Roads	Chris Rehmann	Iowa State	\$237,065		NS-461a was preferred by LRRB