



MINUTES

Clear Roads 2018 Technical Advisory Committee Spring Meeting:

Pooled Fund Project #TPF-5(353)

**Tuesday – Thursday, April 24-26, 2017
Crowne Plaza Phoenix Airport, Phoenix, Arizona**

Attendees:

- | | | |
|---------------------------------|---------------------------------|-----------------------------------|
| Tom Renninger, Alaska DOT | Brian Burne, Maine DOT | Joe Bucci, Rhode Island, DOT |
| Mark Trennepohl, Arizona DOT | Melissa Longworth, Michigan DOT | Dan Varilek, South Dakota DOT |
| Kevin Duby, Arizona DOT | Tom Peters, Minnesota DOT | James Stevenson, Texas DOT |
| Russell Modrell, California DOT | Todd Miller, Missouri DOT | Ryan Ferrin, Utah DOT |
| Kyle Lester, Colorado DOT | Doug McBroom, Montana DOT | Todd Law, Vermont AOT |
| John DeCastro, Connecticut DOT | Ty Barger, Nebraska DOT | Allen Williams, Virginia DOT |
| Alastair Probert Delaware DOT | Brad Burge, Nevada DOT | James Morin, Washington State DOT |
| Steve Spoor, Idaho TD | David Gray, New Hampshire DOT | Jeff Pifer, West Virginia DOT |
| Frank Sharpe, Illinois DOT | Jan Niclas, New Mexico DOT | Jim Hughes, Wisconsin DOT |
| Mark Anderson, Indiana DOT | Larry Gangl, North Dakota DOT | Cliff Spoonemore, Wyoming DOT |
| Tony McClellan, Indiana DOT | Scott Lucas, Ohio DOT | Rick Nelson, AASHTO |
| Craig Bargfrede, Iowa DOT | Patti Caswell, Oregon DOT | Kevin Hensley, APWA |
| Clay Adams, Kansas DOT | Jon Fleming, Pennsylvania DOT | Greg Waidley, CTC & Associates |

Materials Distributed

- | | |
|-------------------------------|---------------------------------------|
| Agenda | Research Ranking Sheets |
| Attendees List | Project Mgmt – Roles/Responsibilities |
| Clear Roads Budget Overview | Project Subcommittee Members |
| TAC Contact List | MnDOT RFP Development Process |
| 2018 Research Proposals/Table | Research In-Progress |
| 2018 Synthesis Proposal | PDH certificates |

Tuesday, April 24, 2018

Welcome

Dallas Hammit, State Engineer and Deputy Director, Arizona DOT, provided opening remarks and a welcome to Alaska.

Introductions and Meeting Objectives

Chairperson Brian Burne kicked off the day with introductions of all the attendees, a brief re-cap of the updates to TAC membership since the fall meeting, and a review of the objectives for day 1.

Updates to TAC membership:

States Added

- Nevada, Brad Burge
- Texas, James Stevenson

Invited State

- New Mexico, Jan Niclas

TAC Members Replaced

- Mark Anderson – Indiana
- Ryan Ferrin – Utah
- Steve Spoor – Idaho
- Jim Hughes – Wisconsin (attends spring meetings)
- Mark Goldstein – Massachusetts (not in attendance)

Other Items of Note

- Sandi Sauter – Maryland (not in attendance)
- Mike Lashmet – New York (not in attendance)
- Kevin Hensley – APWA (replaces John Scharffbillig, retired)
- Gabe Guevara – FHWA (not in attendance)

Discussion and Ranking of Research Proposals

Seventeen (17) research proposals were presented and discussed by TAC members. After all the proposals were presented, each voting member of the TAC submitted rankings for each proposal, based on each project's own merit, using a 1-5 scale (5 being the greatest need). Those votes were tallied after day 1 of the meeting and presented at the beginning of day 2. The list of research proposals submitted and brief notes on each are included at the end of the minutes.

Although the goal is to focus on larger projects, combining projects as able, there was an abundance of funds for 2018 due to the cancellation of a \$250,000 project from 2017. Discussions took place to ensure adequate funding was available for any modifications to the project scopes.

Modifications to the Ranking Sheet:

- #2 (PNS, QPL) s going to be voted on separately as an initiative of Clear Roads. Though it is still listed with the other research projects that were funded.
- #3 (Liquid Deicer Performance Testing Protocol and Handbook) is now a part of #10 (Improved Metrics and Scoring Criteria for Winter Maintenance Materials).

Scope changes:

- #1 (Automated Snowplow Route Optimization Project) will be 2 parts (total budget now \$75,000) – 1) synthesis of the components of states' specifications for developing an optimization, and 2) development of the specification.
- #12 (High Performance Blade Evaluation) has received an additional \$50k (total budget now \$100k) to allow for testing and development of a testing protocol to evaluate future products.

Discussion of Synthesis Projects

The group presented and discussed two synthesis project proposals. This includes the 4th year of funding for the Winter Maintenance Data Statistics project, which was not represented using a proposal form – only a

verbal discussion. The other synthesis proposal was for year two of funding for the Subject-based Web Pages project, which was presented as part of an update on the year one of funding near the end of day 2.

Winter Data Statistics

Motion (Brian Burne) – To fund a 4th year of the Winter Data Statistics project. Second by James Morin. Motion passes.

Subject-based Web Pages

Motion (Brian Burne) – To fund a 2nd year of this project which will include six more subject-based pages and a gap analysis of all completed Clear Roads projects. Second by James Morin. Motion passes.

Clear Roads Budget

Greg Waidley provided an overview of the Clear Roads budget, including amounts committed and transferred by the states, as well as the expenses from research, meetings, and administration. Clear Roads has approximately \$820,000 to spend on new research projects from TPF-5(353).

Motion (Brian Burne) – Clear Roads will accept the lead state’s annual contribution through in-kind match and updating the operating procedures to reflect this change. Patti Caswell seconds motion. Motion passes.

ACTION ITEM: Greg Waidley will update the Operating Procedures to reflect this change in the lead state’s contribution.

Disseminating Results of Clear Roads Research

Scott Lucas asked if Clear Roads should include travel funding in the project funds for the researcher to attend and present research findings? Things to consider:

- Fairly common practice in academia.
- Not applicable to all research projects.
- If put in the project budget, researcher will use it, regardless of appropriateness. We may also consider designating funds from the general pooled fund account for travel by researchers and/or TAC members to present, as appropriate.
- TAC would want to control the kinds of conferences targeted. Perhaps less academic in nature.

Tom Peters noted that we have done this on several occasions such as Ron Wright speaking at the 2017 Minnesota Salt Symposium.

As each project wraps up, discuss how to disseminate the findings.

- Where do we do this? At the face-to-face meetings? In project closeout form?
- Each project might have a communication plan, similar to the dissemination plans done for NCHRP’s Domestic Scan program.
- Best to have PI and project champion at the conferences identified in the plan.

James Bryant will reserve a spot at the TRB annual meeting for Clear Roads to do poster session.

State Reports

Clear Roads representative presented initiatives/projects that have a potential impact on practice. The complete presentations are available on the Clear Roads website on the members only page.

- West Virginia: Jeff Pifer
- Minnesota (Ice Breakers): Tom Peters

Wednesday, April 25, 2018

Selection of FY 2018 Research Projects

Based on the rankings received, the TAC approved the following 8 research projects with total funding estimated at \$695,000. Subcommittee members were assigned. The names underlined below will serve as co-chairs for the subcommittees. A '*' denotes that a subcommittee member is a non-voting member.

Motion (Brian Burne) – Clear Roads fund the following eight projects (excluding the PNS project, which was approved later in the agenda, so listed here for clarity). Second by Allen Williams. Motion passes.

ACTION ITEMS: CTC will send list to three states not in attendance for their interest in serving on subcommittees. CTC will also move forward with the literature searches in advance of project scoping.

Mechanic/Operator Training for Upkeep of Winter Maintenance Equipment

- Subcommittee: Larry Gangl-Brad Darr, Jeff Pifer, Alastair Probert, Kyle Lester, Steve Spoor, Brad Burge
- Funding: \$100,000

Improved Metrics and Scoring Criteria for Winter Maintenance Materials

- Subcommittee: Ty Barger, Jeff Pifer, Doug McBroom, Patti Caswell, Scott Lucas, Jan Niclas*, Mark Anderson
- Funding: \$100,000

Defensive Driving for Snowplow Operators

- Subcommittee: Doug McBroom, Clay Adams, James Stevenson, Frank Sharpe, Brian Burne, Allen Williams
- Funding: \$70,000

High Performance Blade Evaluation

- Subcommittee: Craig Bargfrede, James Morin, Joe Bucci, Scott Lucas, Melissa Longworth, John DeCastro, Tom Renninger, David Gray
- Funding: \$100,000

Evaluation of SSI and WSI Variables

- Subcommittee: Allen Williams, Todd Miller, Mark Anderson, Ryan Ferrin, James Stevenson, Todd Law, Frank Sharpe, David Gray, Mark Goldstein (Loop in Russell M/advocate after project start)
- Funding: \$75,000

Review and Summary of Pre-wet Methods and Procedures

- Subcommittee: James Morin, Patti Caswell, Russell Modrell, Todd Law, Alastair Probert, (absent), Cliff Spoonemore
- Funding: \$75,000

Specifications for Snowplow Route Optimization

- Subcommittee: Scott Lucas, Kyle Lester, Melissa Longworth, Clay Adams, Alastair Probert, Craig Bargfrede, Jon Fleming, Al Johnson, Sandi Sauter, Mike Lashmet, Mark Goldstein
- Funding: \$75,000

Alternative Methods for De-icing

- Subcommittee: Russell Modrell, Joe Bucci, Jon Fleming, Rick Nelson, John DeCastro, Patti Caswell, Jan Niclas*, Mike Lashmet
- Funding: \$100,000

Pacific Northwest Snowfighters, Qualified Products List

- Subcommittee: James Morin, Patti Caswell, Doug McBroom, Kyle Lester, Steve Spoor, Ty Barger, David Gray, Tom Peters
- Funding: \$60,000 for 5 years

Selection of Spring 2018 Synthesis Projects

The TAC approved the following synthesis projects, by a “yes/no” vote, to be completed by CTC & Associates. The subcommittees will work with CTC & Associates to scope and complete the projects. A ‘*’ denotes that a subcommittee member is a non-voting member.

Winter Maintenance Data Statistics (year 4)

- Subcommittee: Scott Lucas, Brian Burne, Allen Williams, James Morin, Tom Peters, Jay Wells, Pat Casey, Melissa Longworth
- Funding: TBD

Subject-Based Web Pages (year 2)

- Subcommittee: Brian Burne, Jon Fleming, Patti Caswell, Todd Law, David Gray
- Funding: TBD

Role of Project Champion and Subcommittee Members

Per the document entitled Project Management – Roles and Responsibilities, Brian Burne emphasized the important role of a project champion and a co-champion in terms of keeping the project on track and the importance of selecting 5-7 committee members that are highly interested and fully engaged in the project. If a TAC member rotates off of Clear Roads, his or her replacement should fill the exiting member’s role on the project subcommittee. Champions and subcommittee members are also responsible to complete project closeout forms and Research Use surveys.

Next Steps in the Project Development Process

Greg Waidley briefly reviewed the next steps involved in developing the RFPs, including project scoping; posting RFPs; receiving, reviewing, and voting on the proposals submitted; and awarding the projects.

Arizona DOT Discussion

Due to our ability to move swiftly through the agenda, an open discussion took place where Arizona DOT was asked if they had any pressing issues they wanted to discuss. Discussion primarily focused around staffing / human resources.

Research In-Progress Project Updates

For each active project, the TAC reviewed subcommittee members and assigned new members as necessary. Non-TAC members will be kept on the list, but names will include an asterisk. They will still receive project communications at their DOT emails, as appropriate.

- **12-03 Understanding the Chemical and Mechanical Performance of S&I Control Agents on Porous or Permeable Pavements**
 - Contractor: WTI
 - Subcommittee members: Mike Lashmet, Paul Brown*, Tim Croze*, Cliff Spoonmore, Clay Adams
 - End Date: January 2018
 - Status: The research team submitted a revised White Paper (Task 6), Synthesis of Best Practices (Task 7), and Field Testing Recommendations (Task 8). The contract end date (5 years from the start of the project) has expired and cannot be amended for more time, so the work on the project has stopped. The PI has moved to Washington State University. The project subcommittee will meet on April 20th to discuss the deliverables and recommend next steps.

- **13-05 Test Bed Software**
 - Contractor: Parsons
 - Subcommittee members: Allen Williams, Paul Brown*, Craig Bargfrede, Scott Lucas, Melissa Longworth, Mark Trennepohl, John Scharffbillig*, Clark Moe*, Tim Leister*, Rick Meyer*, and Larry Christianson*, Gabe Guevara*
 - End Date: June 2019
 - Status: A great deal of time has passed since the project was funded until the contract was signed – during which technology has changed a great deal. The vendor is working to update standards/data parameters to make it more current to today's standards.
 - Kevin Hensley and Brian Burne will be added to committee.
 - Steve Spoor asked if this was still an issue. The vendor that provides ITD's controller box is compatible with other components. Has time (2013-2018) resolved this issue? May need to speak with vendors before we continue with this project.
 - Fall meeting – we need to figure out the issue of long term maintenance.
 - **ACTION ITEM:** subcommittee will conference call with vendors to discuss the state of the industry and the need for this project.

- **14-03 Developing a Training Video and Manual for Best Practices and Techniques in Clearing Different Interchange Configurations and Other Geometric Layouts**
 - Contractor: Southern Illinois University, Edwardsville
 - Subcommittee members: Justin Droste, Jeff Pifer, Scott Lucas, Paul Brown*
 - End Date: May 2018 (amendment in progress)
 - Status: corrections needed to be made, which caused the research team to have to re-do animations and voice overs prior finishing project. Should have the project complete by the end of the summer.

- **15-01 Synthesis of Material Application Methodologies for Winter Operations**
 - Contractor: Washington State University
 - Subcommittee members: Paul Brown*, Jeff Pifer, John DeCastro, James Morin, Monty Mills*, Rick Nelson*, Max Perchanok*, Mark DeVries*, Wilf Nixon*
 - End Date: November 2018

- Status: research team submitted draft guidebook and final report. The guidebook did not meet expectations. The subcommittee provided guidance to the research team, who made revisions and resubmitted a second draft of the guidebook. That second draft of the guidebook and the draft of the final report are currently being reviewed.
- **16-01 Utilization of AVL/GPS Technology: Case Studies**
 - Contractor: AECOM
 - Subcommittee members: Patti Caswell, Todd Miller, Mindy Heinkel, Craig Bargrede, Mike Lashmet, Mark Trennepohl, David Gray, Scott Lucas, Todd Hanley*
 - End Date: September 2018
 - Status: The research team worked through January to complete extensive interviews/case studies with the following six states: Colorado, Michigan, Nebraska, Utah, Washington State, and Wisconsin. Based on those case studies, the research team has developed a set of recommendations, which is currently with the subcommittee for review until early May. Patti reviewed the recommendations, which are also available on the Clear Roads website.
- **16-02 AWSSI Enhancements**
 - Contractor: University of Illinois, Midwest Regional Climate Center
 - Subcommittee members: Brian Burne, Jon Fleming, Melissa Longworth, Mark Trennepohl, Tina Greenfield*, Neal Hawkins*
 - End Date: February 2019
 - Status: Brian reviewed the work plan. Discussed tools ability to provide a historical analysis as well as projections based on average weather trends from the past. The data is based on existing weather stations. Will be expanding the data input to include another two sites per state. These locations will be based on preference and weather station availability.
 - **ACTION ITEM:** Reach out to Aurora, who needs to send their \$20k to Clear Roads.
- **16-03 Standards and Guidance for Using Mobile Sensor Technology to Assess Winter Road Conditions**
 - Contractor: SRF Consulting
 - Subcommittee members: Kyle Lester, Cliff Spoonemore, Frank Sharpe, James Morin, Allen Williams, Dan Varilek, Jakin Koll*
 - End Date: April 2019
 - Status: The final test plan was approved last fall, which Kyle Lester reviewed. Phase 1 of benchmark testing is complete. Completed core Phase 2 of live traffic testing. Began data analysis. A draft of the guidance will be submitted next quarter for review.
- **16-04 Emergency Operations Methodology for Extreme Winter Storm Events**
 - Contractor: University of Vermont
 - Subcommittee members: Mike Lashmet, John DeCastro, Joe Bucci, Jon Fleming, Mike Sproul, Todd Law, Rick Nelson*
 - End Date: June 2018
 - Status: Conducted case studies of South Dakota, Colorado, Pennsylvania, Georgia, New York, and Michigan. Submitted a technical memo providing recommendations based on those case studies. The draft final report will be submitted after the spring meeting. Project focused on transportation corridors that cross state lines as opposed to state-only jurisdictions.

- **16-05 Weather Event Reconstruction & Analysis Tool**
 - Contractor: The Narwhal Group
 - Subcommittee members: Brian Burne, Patti Caswell, Alastair Probert, Todd Miller, Tom Renninger, Jeff Pifer, Joe Bucci
 - End Date: January 2019
 - Status: Part 1 of this project (now complete) was to identify sources of data and develop a proposal for the tool. Part 2 is to develop the tool itself. In meetings with the subcommittee leading into Part 2, it was discovered that the funds initially budgeted to develop the tool were not enough. Therefore, the research team has submitted an amendment for the TAC's consideration. The amendment requests an additional \$35,673.36 to build the tool with the added features. A vote is needed.
 - **Motion** (Brian Burne) – To amend the contract \$35,675. Patti Caswell seconds. Vote passes.
- **16-06 Training Video for the Implementation of Liquid-Only Plow Routes**
 - Contractor: Stonebrooke Engineering
 - Subcommittee members: Jeff Pifer, Scott Lucas, Tony McClellan, Brandon Klenk, Clay Adams, Paul Brown*, Anne Brown*
 - End Date: April 2018
 - Status: The research team has completed both videos (short for decision-makers; long for technical-staff) and they have been approved. The final report will be submitted soon and the final webinar is scheduled for May 23. A viewing of the entire long video will take place later in the agenda today.
- **17-01 Integrating Advanced Technologies into Winter Operations Decisions**
 - Contractor: SRF Consulting
 - Subcommittee members: Kyle Lester, Jon Fleming, Sandi Sauter, Todd Law, John DeCastro, Melissa Longworth, Anita Bush
 - End Date: Eighteen months from contract execution.
 - Status: Contracting.
- **17-02 Standard Specifications for Carbide Insert Blades**
 - Contractor: SRF Consulting
 - Subcommittee members: Cliff Spoonemore, Brian Burne, Ron Wright, Allen Williams, Tony McClellan, Clay Adams, Dan Varilek, Mindy Heinkel
 - End Date: January 2019
 - Status: Contract recently executed. Awaiting project kickoff meeting.
- **17-03 Aftermarket Cameras in Winter Maintenance Vehicles**
 - Contractor: SRF Consulting
 - Subcommittee members: Todd Miller, Russell Modrell, Dan Varilek, Alastair Probert, Craig Bargfrede,
 - End Date: Eighteen months from contract execution.
 - Status: Contracting.
- **17-S1 Accuracy of Deicer and Abrasive Material Application Equipment**
 - Subcommittee members: Scott Lucas, Allen Williams, David Gray, Cliff Spoonemore, Tom Renninger
 - Status: About half of those surveyed are not experiencing issues. Initial findings is that the equipment is not the primary issue. Frequency of calibration is very important.
- **17-S2 Use of Prewetted Solid Materials for Roadway Anti-icing**
 - Subcommittee members: James Morin, Patti Caswell, Brandon Klenk, David Gray, Jeff Pifer
 - Status: Collecting the last of the survey results. Will be drafting final report in May.

- **17-S3 Effective Snow and Ice Personnel and Equipment Management for Storm Activation**
 - Subcommittee members: John DeCastro, Clay Adams, Joe Bucci, Sam Salfity, Todd Miller
 - Status: Revising the draft survey questions now. Will be distributing the survey in May.
- **17-S4 Subject-based Web Pages**
 - Subcommittee members: Brian Burne, Jon Fleming, Patti Caswell, Todd Law, David Gray
 - Status: Will cover the status of this project as next item on the agenda.
- **17-S5 Winter Preparedness Website**
 - Subcommittee members: Brian Burne, Cliff Spoonemore, Jeff Pifer, Todd Miller, Frank Sharpe, Tom Renninger
 - Status: Submitted the draft deliverable for Task 2 (Proposed Topics and Site Structure). Subcommittee is reviewing.

Clear Roads Subject-based Web Pages

Brian Burne and Greg Waidley reviewed the format and content of the subject-based web pages. Brian proposed a second phase of this project to include,

- To dig back through all past Clear Roads projects to compile, categorize, and summarize which items are ready to be brought into the Subject-Based Web Pages and which may need further development, and
- To combine the “Safety and Training” topics, and add an “Environmental” topic. The following subject pages will also be added:
 - Administration (10-03, 11-01, 13-03, 14-02, and 15-03),
 - Spreaders & Spreader Controls (05-02, 11-03, 12-05, 17-S1),
 - Liquid Materials and the PNS (09-02, 16-06, PNS’s QPL),
 - Plug & Play (08-02, 12-06, 13-05, and 14-04), and
 - Add in the promotional materials from the “Ice & Snow, Take it Slow” campaign into a Safety subject page.

By the fall meeting, we will have the results of the completed research / knowledge gap analysis to assist the TAC in developing the CR research agenda moving forward.

SICOP and Report

Rick Nelson provided an update on AASHTO’s SICOP activities. Presentation can also be viewed on Clear Roads website.

- Website additions include corrosion survey based on CR 13-04 and a roster of Winter Maintenance Organizations.
- National Strategic Winter Maintenance Plan, 2018-2020.
- SICOP’s Facebook page
- SICOP Talks Winter Ops – now 9 episodes
- 2017 Joint Annual Meeting of AASHTO Subcommittee on Transportation Systems Management and Operations and Special Committee on Wireless Communications Technology.
- NCHRP approved research
- Opportunity for collaboration between the National Winter Maintenance Peer Exchange and the Quadrennial TRB International Winter Maintenance and Surface Transportation Weather Committee meetings in 2020. Next NWMPE is scheduled for 2019. Should we push it to 2020 and collaborate with TRB? Arora was presented this opportunity as well but deferred to Clear Roads, which will give this consideration. The Clear Roads planning committee will include Kyle Lester, Tom Renninger, Allen Williams, James Morin, and Mark Trennepohl.

CR 16-06 Liquid-Only Plow Routes (full video presentation)

The full 24-minute video – one of the deliverables of the project – was viewed.

APWA Report

Kevin Hensley provided updates on APWA's activities. Presentation can also be viewed of Clear Roads website.

- Winter Maintenance Subcommittee, of which he is the vice-chair.
- Future APWA conferences, which are:
 - North American Snow Conference
 - 2018 – Indianapolis, IN; May 6-9.
 - 2019 – Salt Lake City, UT; May 19-22.
 - Public Works Expo
 - 2018 – Kansas City, MO; August 26-29.
 - 2019 – Seattle, WA; September 8-11.

Kevin also updated the TAC on:

- Trainings, including the Winter Maintenance Supervisor Certificate.
- He (Kevin Hensley) will be the Clear Roads representative moving forward. Bryan Beitzel will be his alternate.

State Reports

Clear Roads representatives presented initiatives/projects that have a potential impact on practice. The complete presentations are available on the Clear Roads website on the members only page.

- Texas: James Stevenson

Thursday, April 26, 2018

Future Meetings

Fall 2018

Location: Des Moines, Iowa (Sheraton West Des Moines)

Dates: September 11-12th. TAC is interested in extending the fall meeting to three days. Greg will check with MnDOT to see if it's possible for this fall.

- State Reports – likely to include Illinois, Massachusetts, Vermont, Nevada, and New Mexico.
- **Motion** (Brian Burne) – That Clear Roads invite Norway to fall 2018 meeting. Clay Adams seconds. Vote passes.
- Nominated states for invitation (and those extending the invitation) – North Carolina (TBD), Kentucky (TBD), Tennessee (Todd Miller), Oklahoma (Kyle Lester).

Spring 2019

Nominations: Texas (San Antonio – River Walk) but CA can't travel. Reno, Nevada is primary and Indianapolis, IN is backup.

Fall 2019: Burlington, Vermont with back up as Maryland.

Spring 2020: Primary is Indianapolis.

TRB/NWMPE 2020: date and location to be left up to the planning committee. Brian Burne – renew offer to be brought back to fall 2018 in Des Moines with the same terms and conditions.

Clear Roads Operator and Supervisor Training / AASHTO's TC3

Kyle Lester led the discussion of collaborating with AASHTO's TCS to provide Clear Roads training.

- Will provide the training on the free portion of the page.
- Will adapt the training to meet the national level.
- Will make sure that TC-3 will provide analytics to Clear Roads.
- Insert a disclaimer that if the user would like to download the generic version for their organization, they can go to the Clear Roads site to obtain the info for free.

FHWA Report

Paul Pisano remotely provided an update on the following FHWA activities. Presentation can also be viewed of Clear Roads website.

- Weather-Savvy Roads, including Pathfinder and Integrated Mobile Observations (IMO)
- Automation and Adverse Weather
- Integrated Modeling for Road Condition Prediction
- Road Weather Management (RWM) Performance Measures
- RWM Capability Maturity Framework workshops
- Upcoming events:
 - CV-WRTM Implementation Projects Webinar (April 30, 2018)
 - TSMO and Extreme Weather Webinar (June 7, 2018; hosted by AASHTO National Operations and Environment Centers of Excellence and FHWA)
 - Pathfinder Summit Meeting (June 26-27, 2018; Salt Lake City, UT)
 - IMO Peer Exchange (Iowa and Missouri co-leading in August)
 - RWM Stakeholder Meeting (September 18-20, 2018; Louisville, KY)

Planning for the Future of the PNS

- PNS conference is separate from the QPL in terms of funding, as the PNS conference is managed as a non-profit.
- Information related to how a vendor would go about getting one of their products on the QPL is on the PNS website (vendor pays).
- A number of the products on the QPL need to be removed and they're working on a process to do this as well as for submitting products.
- Proposal:
 - Establish a diversified TAC by adding two additional members from outside of the Pacific Northwest.
 - Update the website and tie to Clear Roads site.
 - Update processes and procedures.
 - Update spec sheets
 - Maintenance of QPL
 - Provide an annual report and budget report (or at each meeting) – implied here is that the TAC would be authorized to carry out all QPL work in the name of Clear Roads.
 - One trip per year for a chemist to attend a Clear Roads meeting. The chemist won't be a voting member but serve as a technical advisor.
 - Budget - \$60k for 5 years. Once the program has been started up (about \$30k in year one), the annual cost will likely only come in at about \$7-8k.

- Discussion:
 - Suggestion that there be a fee paid by the vendor for being on the QPL.
 - Need to certify that products on the QPL haven't changed since the submittal.
 - Budget allocation (after first five years) should be an annual decision.
 - Need to decide on a name. The subcommittee will provide suggested names for the TAC decision. Once decided, all new contracts will include this name.
 - How do we contract the services from MnDOT? Need to discuss with MnDOT contracting personnel. How does MnDOT take in funds from a vendor?
 - Pennsylvania noted they have a large lab for testing, which might offset some of the financing. Montana and Idaho are absorbing the costs of the testing they do. Independent lab work (in Boise, ID) was done if testing equipment were not available or if test results did not line up between Ron and vendor.
 - Observation – the QPL is not the most important work, most important work is the development of standard limits and test procedures.
 - Should include a dissemination/communication plan component.
- **Motion** (Patti Caswell) – That Clear Roads formally adopts responsibility for the PNS QPL and the maintenance of the PNS website. Clay Adams seconds. Vote passes.
- Subcommittee will include additions of David Gray (New Hampshire), Ty Barger (Nebraska), and Tom Peters (Minnesota).
- James is asking states to forward the funds returned to them from the de-obligation of PNS pooled fund (in excess of \$84,000) to the Clear Roads Pooled fund.

Outcomes of Recently Completed Projects

- **Quantifying the Impact that New Capital Projects will have on Roadway Snow and Ice Control Operations** (Todd Law)
 - Provided overview of the features of the tool, which quantifies the impact construction has on winter maintenance budgets.
 - This tool estimates cost and time needed for additional maintenance including additional time to plow and/or treat roadway.
 - Need to make sure that the cost of a new truck is not annual but shows the initial cost plus the annual cost.
 - When downloading from Clear Roads website, need to save as Macro Excel Spreadsheet.
 - A phase 2 could include diverging diamonds and interchanges with increasing complexity.
- **Identification of Recommendations for Correction of Equipment Factors Causing Fatigue in Snowplow Operators** (Allen Williams)
 - Provided an overview of the project which included,
 - Basis for project need and definition and causes of fatigue
 - Objectives of the project and tasks
 - Survey participants (23 states and over 2,000 operators)
 - Key findings related to shift work, vehicle vibration, noise, visibility, impact from in-cab equipment
 - Final recommendations on equipment and non-equipment.
 - Comments on the PPT - no indication of Clear Roads, need a snowplow at bottom and not a semi; need to correct that operators need to follow the rules of their department as related to use of mobile phones and radio equipment.

2018 Clear Roads Project Proposals – Notes from TAC Discussion

Research Projects

1	Automated Snowplow Route Optimization Project	\$75,000 - \$400,000	18 months	<p>The goal of this project is to develop a program that will automate snow & ice route optimization giving the DOT's the ability to analyze routes quickly and provide a tool for administrators to not only plan snow & ice routes but also assist in choosing new facility locations, optimize fleet size and select the best routes for street sweeping, storm sewer cleaning, mowing, herbicide spraying, lane line striping and other route specific tasks.</p> <p><u>Notes:</u> Is this web-based? – yes.</p> <p>Need to competitively bid to determine the vendor who will become the Clear Roads vendor.</p> <p>For the additional costs, there would need to be a negotiated agreement, so that each state doesn't need to negotiate their own.</p> <p>Not every company would want to take on a project of this size/scope.</p> <p>Larger cost for vendor building a "Clear Roads" network.</p> <p>Third option – is the business case/requirements for bid. Develop a standard bid package for Clear Roads states. Procurement process could be difficult for multiple states.</p> <p>Can we get this out in an AASHTOWare environment?</p> <p>Automated Snowplow Route Optimization will be 2 parts – 1) synthesis of the components of states' specifications for developing an optimization, and 2) development of the specification.</p>	Group 1 Scott Lucas, Ohio DOT

2018 Clear Roads Project Proposals – Notes from TAC Discussion

2	Pacific Northwest Snowfighters QPL	\$60,000	5 years	<p>The goal of this project is: a) the formation of a formal CR Technical Advisory Committee for the PNS, b) update/overhaul of the website, specification sheets, c) support for chemist to attend the spring CR meeting, d) maintenance of the QPL.</p> <p><u>Notes:</u> Project pulled from list and will be voted on separately as a Clear Roads initiative. See notes at the end of the minutes (pg. 11-12).</p>	<p>Group 1 James Morin, Washington DOT Doug McBroom, Montana DOT Patti Caswell, Oregon DOT</p>
3	Liquid Deicer Performance Testing Protocol and Handbook	\$100,000	12 months	<p>The goal of this project is to identify currently available scientific testing and results, and determine the most effective brine blends.</p> <p><u>Notes:</u> Primarily lab testing as field testing is too hard to re-produce.</p> <p>Develops a testing protocol and findings of different deicers – similar to PNS. However, PNS doesn't determine performance.</p> <p>What if a state mixes at different percent concentration (different from PNS)? Then how do they perform?</p> <p>See also 07-01: Development of Standardized Test Procedures for Evaluating Deicing Chemicals.</p>	<p>Group 1 Jeff Pifer, West Virginia DOH</p>
4	Pre-wetting Solid Materials for the Pre-Treatment of Roadways	\$75,000	12 months	<p>The goal of this project is to: a) reduce bounce and scatter, b) activate salt, c) inhibit corrosion.</p> <p><u>Notes:</u> High level synthesis effort – not CTC.</p>	<p>Group 1 James Morin, Washington State DOT</p>

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5	Effectiveness of Residual Salt on the Roadway	\$150,000	18 months	<p>It is not unusual to expect to see residual salt on the road surface when it dries out after a storm. The purpose of this project is to quantify how much residual salt is left after the pavement dries. This will assist in making decisions on pretreating and on initial applications.</p> <p><u>Notes:</u> Might use the updated guidebook developed through CR 12-02 as a basis for application rates.</p> <p>No known salinity sensors for determining the amount of dry salt on the road.</p>	<p>Group 2 John DeCastro, Connecticut DOT Patti Caswell, Oregon DOT</p>
6	Mechanic/Operator Training for Upkeep of Winter Maintenance Equipment	\$100,000	12 months	<p>The goal of this research is to improve the competencies of winter maintenance mechanics related to maintenance and repair of snow fighting equipment's mechanical systems and the simple troubleshooting and repair of electronic systems, therefore resulting in better overall maintenance programs and improving the service life of snow fighting equipment.</p> <p><u>Notes:</u> South Dakota has training.</p> <p>Will focus on electronics and other mechanical peripherals.</p> <p>Web-based operator training. Image and video training. Many vendors have “walk around videos” of their trucks.</p> <p>Would include a synthesis of different states “circle checks” prior to operation.</p>	<p>Group 2 Larry Gangl, Brad Darr, North Dakota DOT</p>

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7	Evaluation of Storm Severity Indexes (SSI) and Winter Severity (WSI) Indexes and Most Reliable Variables for Those Indexes	\$125,000	12 months	<p>The goal of this research is to find all agencies (national and international) utilizing SSI and/or WSI, determine their variables with measurement methods, statistically analyze each variable for consistency and variability, and recommend the most reliable variables for developing SSI and WSI.</p> <p><u>Notes:</u> Implement a winter/storm severity index for each state.</p>	Group 2 Allen Williams, Virginia DOT
8	Reducing Snow Plow Driver Fatigue by Modifying Human Behavior	\$200,000	18 months	<p>This project would confirm or reject the link between drivers' quality of rest and driver fatigue. If confirmed, the investigator would develop a series of training materials for managers and drivers to help improve the quality of rest for drivers as well as practices managers can use during operations to identify and relieve the fatigue in drivers.</p> <p><u>Notes:</u> Once we understand more about fatigue, how to we better combat that with quality rest?</p>	Group 2 Allen Williams, Virginia DOT
9	Using Reclaimed Water and Excess Retention Pond Water for Salt Brine Production	\$100,000	18 months	<p>The potential to use reclaimed water from various sources in the production of salt brine should be researched. The results of this research could provide winter maintenance managers, as well as public and private parties responsible for planning the disposal of wastewater, valuable information on the opportunities and challenges of using reclaimed water in the production of salt brine.</p> <p><u>Notes:</u> Good confirmation of current activities of brine production as well.</p>	Group 3 Ryan Ferrin, Utah DOT Sandi Sauter, Maryland DOT Michael Lashmet, New York State DOT

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10	Improved Metrics and Scoring Criteria for Winter Maintenance Materials	\$100,000	6 months	<p>Meet our winter maintenance material requirements with the lowest cost by objectively weighing quality and performance, and increasing opportunities for competition.</p> <p><u>Notes:</u> Captures the scope of #3 (Evaluating Deicers). Goes beyond the capabilities of the PNS QPL in terms of ice melting capacity. Will develop a test procedure for measuring ice melting capacity. Would move this procedure (developed in Nebraska) transferred to AASHTO’s committee on Materials and Pavements. Could break out (into a separate effort) the sucrose additive portion of the project.</p>	Group 3 Ty Barger, Nebraska DOT
11	Better Retention and Recruitment for Highway Maintenance Workers	\$100,000	12 months	<p>To inform decision-makers, negotiators, and legislative bodies of the pay disparity between highway maintenance workers in the public and private sector, and in many instances, the disparity between highway maintenance workers and other similar job classifications within the state systems. Convince decision-makers of the need for better pay for government highway workers. Recruit and keep trained and licensed personnel. Long term goal: better retention and recruitment of a more qualified workforce.</p> <p><u>Notes:</u> Could be a good way to educate decision-makers and unions. See also the AASHTO Salary Survey.</p>	Group 4 Russell Modrell, CALTRANS Tom Renninger, Alaska DOT&PF

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12	High Performance Blade Evaluation	\$50,000	12 months (This could potentially be an ongoing synthesis project.)	<p>To better understand the amount of life we are achieving with high-performance blades on the various road surface types. This information can then be used to perform a cost/benefit to assist states in making more informed decisions in blade procurement.</p> <p><u>Notes:</u> Wyoming did a study of four blade manufacturers. A testing standard would need to be vigorously developed and monitored to ensure the operators are properly testing them. Therefore, increase funds to \$100,000.</p> <p>Factors affecting blade life; standard testing protocol to accommodate new blades hitting the market.</p>	Group 4 Craig Bargfrede, Iowa DOT
13	Alternative Methods for De-icing Materials	\$100,000	12 months (Two consecutive six month winter periods.)	<p>The goal of this project is To develop a list of best practices focused on alternative materials/methods to meet performance level expectations for maintaining roads clear of snow/ice while keeping environmental concerns and costs in check.</p> <p><u>Notes:</u> Not just alternative products but also methods. Because of the methods part, this is separate from #3 and #10.</p>	Group 4 Russell Modrell, CALTRANS Joe Bucci, Rhode Island DOT
14	Quantifying the Considerations Associated with Urban and Rural Snow and Ice Control	\$70,000	12 months	<p>There are a lot of informal observations and anecdotal opinions about how traffic impacts snow and ice control activities, including chemical applications. The goal of this project would be to capture those items and try to prove or disprove, and quantify them. Additionally, the project would synthesize state DOTs' guidelines related to urban vs rural tactics.</p> <p><u>Notes:</u> Can the scope be narrowed by addressing specific aspects of snow and ice control?</p>	Group 5 Brian Burne, Marine DOT Mike Lashmet, New York State DOT

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15	<p>Determining Impacts of Chloride-based Deicers on the Environment</p> <p>Alternate title: Determining the Fate of Chloride Ions in Various Soil Types</p>	\$100,000	18 months	<p>To determine the environmental impacts of several chloride-based deicers used by most of the Clear Road states. The research should include no more than three different chloride-based deicers; take samples from the road at different distances in different environments to determine the concentrations of the substrates in those deicers. From those concentrations determine the potential impact to the environment.</p> <p><u>Notes:</u> Considering soil impacts but not so much for water. Hard to do this as there are many different soil compositions, application rates, etc. Lots of research on this topic – do we know what the gaps in knowledge are? Synthesis?</p>	<p>Group 5 Doug McBroom, Montana DOT</p>
16	<p>Defensive Driving for Snowplow Operators</p>	\$70,000	12 months	<p>Determine the root cause of different types of accidents and determine if there are any defensive driving skills, strategies, or changes in operations to prevent accidents and decrease risk to our plow drivers and traveling public alike.</p> <p><u>Notes:</u> Building competencies that would be used in the development of a training course. Understanding the contributing factors behind crashes with plow vehicles.</p>	<p>Group 5 Doug McBroom, Montana DOT</p>
17	<p>Vehicle Corrosion Ratings</p>	\$100,000	12 months	<p>The goal of this project is to better understand which vehicle makes and models have issues in which areas of the vehicle. This project will also have a geographical component where the data can be sorted or mapped by zip code.</p> <p><u>Notes:</u> Could we collaborate with the Salt Institute on this one? Or AAA?</p>	<p>Group 5 Brian Burne, Maine DOT</p>