

1 **DRAFT MINUTES FOR WMTSP MEETING**

2 **July 10, 2010**

3 **Pulaski Meeting Room, Hilton Savannah DeSoto Hotel, Savannah, GA**

4 **WMTSP Attendees**

5 Rick Nelson, NV DOT, AASHTO Region 4, Chair of WMTSP

6 Mark DeVries, McHenry County, Illinois Supervisor, APWA representative

7 Bill Hoffman, NV DOT, AASHTO HSCOM Snow & Ice Task Force Leader

8 Steven Lund, MN DOT, AASHTO Region 3 representative

9 Wilfrid Nixon, U of Iowa, Chair, TRB Surface Transportation Weather Committee, AH010

10 Greg Parker, Johnson County Iowa Engineer, NACE representative

11 Max Perchanok, Ontario Ministry of Transportation, Chair, TRB Winter Maintenance Committee, AHD65

12 Gabriel Guevara, FHWA, Road Weather Management Program

13 Mark Bush, AASHTO, Program Manager for Engineering Operations

14 Lee Smithson, AASHTO, SICOP Coordinator

15 **Guest**

16 Ralph Hessian, TRB/SHRP 2, Visiting Professional

17 **Introductions and Review of Agenda**

18 Rick Nelson opened the meeting with introductions and review of the agenda. No items were added or  
19 deleted to the draft agenda distributed on July 1, 2010.

20 **Global Outreach Reports**

- 21 • **XII International Winter Road Congress reports & follow-up**—Wilf reported that the biggest  
22 gap in winter operations he found from his visits with PIARC delegates between the United  
23 States and other countries was in the equipment used. Other countries seem to have the  
24 money to spend on larger and better equipment and therefore the European equipment designs  
25 tend to be ahead of the US. European equipment is, however, starting to make its appearance  
26 in the US marketplace. Lee noted that while the US booth was much smaller and less elaborate  
27 than most other countries, we seemed to have the technology that the other countries wanted  
28 to learn about. Anti-icing, MDSS and Clarus were high interest areas for other countries and  
29 they wanted to understand the fine points of each program. Mark found that winter operations

1 in Japan and Europe tended to be more uniform than in the United States where each state and  
2 city tends to conduct operations independently. Max agreed that he found other countries  
3 seem to be more uniform. He said that in some areas of Canada they are using 10 year  
4 contracts and letting the contractor determine what standardization they want to use. The  
5 Canadian Government is focusing mostly on the outcomes. Bill felt that the Clear Roads  
6 Consortium would be interested in knowing that Europe uses a standard plow attachment, so  
7 plows and other equipment are a quick connect uniform interchange between trucks and can  
8 provide down pressure on the front plow. Wilf pointed out that the Europeans also use a  
9 performance standard that the plow had to be able to withstand hitting a 4" high obstacle in the  
10 roadway without being damaged. Lee will be attending the August Clear Roads meeting and will  
11 make sure the equipment standardization observations and the performance standard get put  
12 on the table for Clear Roads discussion.

- 13 • **SIRWEC**—Wilf presented technical papers and attended the SIRWEC meetings preceding the  
14 PIARC Congress. He observed there was high interest in the Clarus/MDSS technical sessions.  
15 Wilf had asked SIRWEC to consider having the 2012 SIRWEC meeting in Iowa City, but learned  
16 the committee had decided to hold the 2012 in Helsinki. The next World Congress will be held  
17 in Mexico City in September 2011. Abstracts for that Congress are due August 31, 2010.
- 18 • **PIARC B-5 Committee Update**—Rick reported that the next B-5 Committee meeting is coming  
19 up in two months in Andorra. That meeting will concentrate on detailed planning for the 2014  
20 XIII International Winter Road Congress and will likely also set the agenda for the next strategic  
21 planning cycle. The next strategic plan will cover the period 2012 to 2016. Wilf believes there  
22 will be a big emphasis on resilience, for example, when one gets a wrong forecast, how do you  
23 look at what is going most wrong, weigh the consequences and decide how to best approach  
24 the problem (risk based decision making).

#### 25 Domestic Outreach Reports

- 26 • **AASHTO HSCOM Strategic Plan & Reorganization Progress Report**—Bill reported that  
27 considerable effort had been put into developing and understanding the new organization and  
28 strategic plan of the HSCOM. Several conference calls have been held by the HSCOM leadership  
29 and the HSCOM Work Plan dated May 2010 reflects the challenges and needs currently faced by  
30 the maintenance community. The goals of the Highway Safety & Reliability Technical Working  
31 Group are listed on pages 4 and 5 of that HSCOM Work Plan (Attachment #1). Bill prepared a  
32 Highway Safety and Reliability Technical Working Group (HS&R TWG) Strategic Planning Matrix  
33 (Attachment #2) to provide a spread sheet analysis of potential project areas and investigative  
34 areas that the TWG might use to guide future work programs and the TWGs involvement with  
35 WMTSP, Aurora, Clear Roads and TRB. Steve pointed out that HS&R TWG is very comprehensive  
36 and the TWG and will be struggling with how to accomplish this complicated scope of work.  
37 Mark Bush agreed and since he works with most of these committees as part of his job at  
38 AASHTO will be able to assist us. Bill thought the liaisons noted in the HS&R TWG Work Plan  
39 (Attachment #3) would be a good starting place to determine how to liaison (via meeting  
40 attendance, phone calls, etc). Liaisons with organizations already working in maintenance will

1 likely be the best ones to start the process and then build from there as the need becomes  
2 apparent. Ralph Hessian discussed some of the SHRP 2 travel reliability projects and provided  
3 some insight as to the complexity of the congestion problem. Wilf believes that HS&R TWG  
4 should find a way to add SHRP 2 and FHWA to the TWG.

- 5 ○ **HS&R TWG Statement of Direction and FY 2011 Work Plan**—the Statement of Direction  
6 (Attachment #4) and Work Plan (Attachment #3) were reviewed and Steve thought that  
7 each of the emphasis areas would warrant the development of a one page white paper  
8 that would communicate the importance and thrust of each initiative. Others agreed  
9 with that approach.
- 10 ○ **Establishing Liaisons**—two teleconferences were held with the Equipment TWG  
11 leadership. The April 30, 2010 teleconference call began the discussion on how the two  
12 groups could begin working together on national issues affecting both groups. Three  
13 areas emerged: open architecture and plug-and-play formats requirements for truck  
14 and equipment manufacturers; mobile data collection; reflectivity and conspicuity  
15 needs; and implementation and use of the Tow Plow. The second teleconference call on  
16 June 4, 2010 identified the accomplishment expectations for the upcoming meeting in  
17 Savannah and identified ways to have effective information exchange through the  
18 Regional Equipment Groups.
- 19 • **SICOP Future Directions**—Rick lead a discussion on the affect “sustainability” and the  
20 reorganization of HSCOM into Technical Working Groups would have on the SICOP program and  
21 WMTSP.
  - 22 ○ **Sustainability**—Rick went through a portion of a power point presentation that was  
23 presented at the PIARC meeting in 2009 (Attachment #5). Belgium and France are  
24 leading the way in sustainable development. The concept of sustainability currently  
25 seems to be described or depicted in three circles or realms of influence, Social,  
26 Economic, and Environmental. When these three circles intersect, the concept of  
27 sustainability or durability emerges. Part of the problem maintenance operations has is  
28 that maintenance has very little influence on the size or the importance of the circles  
29 and their importance is dynamic and constantly changing. For example, different  
30 administrations can change the focus or size of the circles which then interrupts  
31 equilibrium. Steve said that an example would be that Sweden has a clear water policy  
32 and Minnesota has a clear roads policy. Rick points out that just because we have or  
33 have not achieved clear roads, other elements (i.e. driver training or condition of the  
34 car) which maintenance has no control over influence outcomes (accidents, mobility,  
35 etc.). Max returned to the previous discussion on who decides the size of the circle.  
36 Wilf believes in a social government like Canada one can go to the people and ask, then  
37 decide. Rick believes maintenance has to look at the metric that is applied in each case.  
38 An example would be Lake Tahoe where the value of the resource is very high so the  
39 people living there would say do nothing to harm the environment. Mark Bush feels  
40 that our approach needs to be that we are aware of the problem, doing something  
41 about it and not waiting until something gets mandated. Max feels that a starting place  
42 would be to look at the areas that seem to be having problems, determine the impact

1 and look for solutions and best practices. Mark DeVries believes education is essential.  
2 He feels most public agencies are doing a good job of training, but some of the smaller  
3 contractors are probably lacking the training and knowledge of what best practices are.  
4 Perhaps a certification program would help. Wilf believes WMTSP has already discussed  
5 some of the aspects of sustainability and the problems that we need to think about.  
6 Doing sustainable winter maintenance differs with the area and the environment. He  
7 feels a white paper would be a logical next step and volunteered to draft a paper for  
8 review and comment. Other starters are the proposed WIKI which could provide  
9 information on the problems, identify some possible solutions, define some best  
10 practices, and next work on the linguistic form so we use meaningful speech so folks  
11 catch on and relate to what we are trying to accomplish. Rick agreed and felt that could  
12 help guide us in raising awareness of sustainability and defining a framework for  
13 evaluation and decision making. He noted that PIARC is working on equations to do this  
14 and APWA has a “Framework for Sustainable Communities” that might assist us  
15 (Attachment #6). WMTSP needs to watch for success stories, especially from APWA  
16 since they seem to be the leader in the process and have already established an APWA  
17 Center for Sustainability and formed a 12-member leadership group from the US and  
18 Canada.

19 • **Domestic Scan Outreach Efforts**

- 20 ○ **Outreach assistance reviews**—two major achievements have been accomplished since  
21 the last WMTSP meeting. Bill Hoffman made a presentation at the APWA North  
22 American Snow Conference on April 20, 2010 entitled “Domestic Scan Results” and  
23 reported the results of the “Maryland SHA Winter Operations Review” conducted in  
24 December 2009. Tina Barbaccia, Executive Editor, Better Roads, also attended the Snow  
25 Conference and worked with Bill on writing an article entitled, “Get Ready for Winter”,  
26 which was published in the June 2010 issue of Better Roads. The article covered many  
27 of the current state of the art and practice techniques, equipment and materials in  
28 proactive winter maintenance operations. Bill and Mark DeVries have been invited to  
29 speak in several winter maintenance states to discuss what winter operations  
30 techniques they use in their operations and what they have seen others use. Visited  
31 state personnel feel they benefit greatly from having someone outside their state come  
32 in and exchange information on winter operations and make recommendations for  
33 improving their operations. Recommendations are generic and based on what appear  
34 to be best (or very good) practices being successfully used by others. So far the visited  
35 states have paid their travel expenses. WMTSP needs to decide if this Peer to Peer visit  
36 should be continued and, if so, how should expenses be covered? If the states can’t  
37 cover expenses, FHWA has a Peer to Peer Program that might be able to help.  
38 ○ **Marketing and technology transfer**—Bill lead a discussion to address whether WMTSP  
39 should market this service. Wilf thinks there might be some legal implications since the  
40 DOT ask for this visit, it might be viewed as a Process Audit. Perhaps it could be a  
41 question interview to determine what they do or don’t do. Max felt that since the DOT  
42 is asking for the review, it could be viewed as a work in progress. No decision was made

1 on marketing the service. WMTSP needs to continue evaluating the operations review  
2 process, analyzing the time and resources it would require, exploring the possible legal  
3 implications that might emerge, how best to structure such a program and weigh that  
4 with the value the visited states have expressed that they receive from a process review  
5 conducted by experienced winter maintenance personnel.  
6

- 7 • **APWA April 2010 North America Snow Conference**—Mark DeVries reported the following on  
8 APWA activities that were e-mailed to WMTSP on July 6<sup>th</sup>:

### 9 **2010 Snow Conference Survey Highlights**

- 10 • 2010 Snow attendance – 1,190 attendees plus 559 exhibit reps, for total of 1,749 people. (  
11 Attendee number is a combination of day and full registrations)
- 12 • 2010 Exhibit sales – 141 companies in 290 booths (one booth is 10’x10’, so it’s 29,000  
13 square feet)
- 14 • The majority of attendees work for City agencies  
15 ○ (City 66.0%; County 10.4%; State 12.3%; Federal 2.8% ;Engineering 2.8%;  
16 Manufacturer/Supplier 2.8% ;Private Contractor 2.8% )
- 17 • All sizes of cities were represented with the greatest majority working for mid sized cities: a  
18 total of 53.3 % work for a city with less than 100,000 people  
19 ○ (0-25,000:18.1%; 26,000-50,000:13.3%; 51,000-100,000: 21.9%; 101,000 -  
20 249,000:17.1%; 250,000-1,000,000: 14.3%; More than 1,000,000: 15.2%)
- 21 • The majority of attendees are in supervisory or management positions:  
22 ○ (Supervisor 33.0% ;Superintendent 17.0% ;Division/department head 26.6% ; PW  
23 director 8.5% ; Operator 2.1% ;Operations manager 9.6% ;Fleet manager 3.2% )
- 24 • A significant portion of attendees are new to the snow conference each year  
25 ○ (This is my first: 41.1%; 2-3: 34.8%; 4-7: 17.0%; 8-10: 1.8%; 11 or more: 5.4%)  
26 *Emphasizes the need for fundamental training*
- 27 • Attendees really like the Presenters at the Snow conference with 92.4% rating their  
28 experience as satisfied or very satisfied  
29 ○ (Very satisfied: 41.9%; Satisfied: 50.5%; somewhat satisfied: 6.5%; not satisfied  
30 1.1%)
- 31 • The attendees listed a gamut of favorite programs ( list attached)  
32 ○ They particularly liked the sessions on AVL, Weather forecasting, De-icing, Clear  
33 Roads research, Prior Lake (Winner of Excellence in Snow & Ice Removal Award),  
34 Roundtable on Fleet/ operator, anything that dealt with making due with reduced  
35 budgets and how to write a winter ops plan.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23

- The list of topics for next year’s conference ran the gamut as well
- Most popular items were: AVL/ GPS and RWIS, De-icing and the use of liquids, vehicle & equipment maintenance, weather info and how to deal with budget issues. *Need fleet topics*
- There were not many improvement comments listed
  - there was a request for more info on equipment/ vehicle maintenance sessions and for the tech tour to focus on new technologies. *Tech tour was poor*
- Attendees liked the conference - Overall 93.7% of attendees rated their experience of the conference as satisfied or very satisfied
  - (Very satisfied: 45.3%; Satisfied: 48.4%; somewhat satisfied: 4.2%; Not satisfied: 1.1%)

**2011 Snow Conference**

- Call for presentations is out for the conference in Spokane April 10 -13 2011.
- APWA/PNS joint conference is proposed. Final details being worked out.

**CBT update**

<b>Snow and Ice Control</b>		
PB.X803R	Proper Plowing Techniques – Part II: Clear Roads CBT Program	9
PB.X802R	Equipment Maintenance – Part I: Clear Roads CBT Program	6
PB.XICE	Guide for Snow and Ice Control	6
PB.X308	Salt Management Guide	2
PB.A507	Urban Snow and Ice Control	5
PB.X805R	Blowing Snow Mitigation – Part IV: Clear Roads CBT Program	1
PB.XREM	Snow Removal, in Safety!	2
PB.ASNO	Snow Business:A Contractors Guide to Profitable Snow Removal	4
	<b>TOTAL SOLD:</b>	<b>35</b>

24  
25  
26  
27  
28  
29  
30

**Winter Maintenance Agency & Consortium Reports & Liaison Efforts**

- **FHWA**—Gabe handed out and briefly discussed the following USDOT/FHWA program updates: The Road Weather Management Program focuses on stakeholder coordination, performance measuring, applied research and technology transfer, training and education. The following material summarizes current FHWA efforts.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28
- 29
- 30
- 31
- 32
- 33
- 34
- 35
- 36
- 37
- 38
- 39
- 40
- 41
- 42
- 43
- 44
- 45
- 46
- **Maintenance Decision Support System (MDSS) Deployment and Technical assistance**
    - Version 6.0 of the Federal Prototype was released in the fall, 2009. Highlights include:
      - Event playback (for post-storm evaluation)
      - GPS/AVL connection to display vehicles and mobile data
      - Includes a link to the *Clarus* System
      - Includes the METRo pavement temperature model
      - On-line download of the software
    - The electronic version of the *MDSS Deployment Guide* has been published (NTL ID 30467)
    - MDSS Deployment Evaluations and/or Benefit Cost Analyses
      - Indiana DOT completed an evaluation of their deployment and found significant savings in materials and labor (<http://www.in.gov/indot/files/MDSSReportWinter08-09.pdf>)
      - A “Lessons Learned” evaluation of MDSS deployment in Maine was published (NTL ID 30234)
      - The MDSS pooled fund study published a study, *Analysis of Maintenance Decision Support System (MDSS) Benefits & Costs* ([http://www.meridian-enviro.com/mdss/pfs/files/WTI-4W1408\\_Final\\_Report.pdf](http://www.meridian-enviro.com/mdss/pfs/files/WTI-4W1408_Final_Report.pdf))
      - The MDSS B/C study in the City/County of Denver was completed and published (EDL 33156)
    - Three (3) MDSS Product Demonstration Showcases conducted in 2010 – AK, WA (7/14), & WI
    - Leveraging and expanding upon MDSS capabilities for the Traffic Management and Non-Winter Maintenance applications. This work is being pursued under the *Clarus* Regional Demonstration
  - ***Clarus* Initiative** ([www.clarusinitiative.org](http://www.clarusinitiative.org), [www.clarus-system.com](http://www.clarus-system.com))
    - The *Clarus* System continues to grow! As of December 31, 2009, 37 States, 4 local DOTs, and 3 Canadian provinces are providing data from 2,127 ESS and 47,231 individual sensors
    - Phase 3 of the Regional Demonstrations is progressing well. Mixon/Hill, Inc. and Meridian Environmental Technology, Inc. are working with eight states and six sub-contractors to build and deploy 5 Use Cases. This Phase also includes an independent evaluation of both the *Clarus* System and the 5 *Clarus*-based services.
    - NCAR has developed improved Quality Checking algorithms for climate range, sea level pressure reduction, spatial analysis, precipitation and pavement temperature; some are being incorporated into the *Clarus* System.
    - 7 projects using *Clarus* data are soon to be awarded in response to the Broad Agency Announcement.
  - **IntelliDrive<sup>SM</sup>** (formerly known as Vehicle Infrastructure Integration (VII))
    - Several reports about mobile sensing under the IntelliDrive/VII program have been published:
      - *Weather Applications and Products Enabled Through Vehicle Infrastructure Integration (VII): Feasibility and Concept Development Study* (NTL ID 2755)
      - *Vehicles as Mobile Sensing Platforms for Meteorological Observations: Volume 2 Research during a Summer Season* (report complements Volume 1 which focused on the winter season)

- 1 – NCAR is in the process of completing version 2.0 of the Vehicle Data Translator, which turns  
2 the vehicle-based data into valid road weather observations and information.
- 3 – Mobile Observations Project: NCAR’s new task under existing contract; partnering with  
4 State DOT and other non-governmental entities to collect data from mobile data platforms,  
5 run it by *Clarus* and/or the VDT, incorporate it into a Rd Wx-based application, share the  
6 results, and develop new version of VDT.  
7
- 8 • **RWIS ESS Siting Guidelines**
    - 9 – Implementation and Evaluation of Guidelines completed. Final Report and Revised ESS  
10 Guidelines (Version 2.0) completed and posted on the web (EDL# 14447)  
11 Pursuing the development of an appendix on non-intrusive sensors
  - 12 • **Courses**
    - 13 – ***Principles and Tools for Road Weather Management***
      - 14 ▪ Classroom & web-based versions are available from the National Highway Institute and  
15 the Consortium for ITS Training and Education (CITE), respectively
    - 16 – ***Introduction to RWIS Equipment and Operations***
      - 17 ▪ CITE developed a web-based version (based on the one previously developed by ITS  
18 America & ITS Rocky Mountain); it is currently being reviewed and it is expected to be  
19 released in September.
    - 20 – **Two courses address the link between the National Weather Service (NWS) and State &  
21 local DOTs:**
      - 22 ▪ The first course is aimed at transportation professionals to educate them about NWS  
23 products and services. It’s available as a CD from FHWA or online from the Cooperative  
24 Program for Operational Meteorology, Education & Training (COMET) at  
25 [www.meted.ucar.edu/dot](http://www.meted.ucar.edu/dot).
      - 26 ▪ The second course is aimed at NWS forecasters to educate them about the needs of  
27 public safety officials working at State and local departments of transportation. It was  
28 developed by the NWS, Warning Decision Training Branch, and can be found at:  
29 <http://www.wdtb.noaa.gov/courses/RoadWeather/>
  - 30
  - 31 • **Road Weather Resource Identification Tool**
    - 32 – Version 3.0 is downloadable from the RWM website ([www.fhwa.dot.gov/weather](http://www.fhwa.dot.gov/weather)) with  
33 more resources (from existing 600+ to 900+) and improved links to the documents.  
34
  - 35 • **Weather-Responsive Transportation Management (WRTM)**
    - 36 – Final report entitled *Empirical Studies on Traffic Flow in Inclement Weather* can be  
37 downloaded from the RWMP website:  
38 <http://www.ops.fhwa.dot.gov/publications/weatherempirical/index.htm>.
    - 39 – Completed ‘Incorporating Weather Impacts in Traffic Estimation and Prediction Systems  
40 (TrEPS)’ study. Final report for this study is available (NTL ID 31419). Weather sensitive  
41 TrEPS models to be tested and evaluated in at least 4 locations.
    - 42 – Completed Phase I of ‘Microscopic Analysis of Traffic in Inclement Weather’ study. Final  
43 report for Phase I of this study is available (NTL ID 32539).
    - 44 – Completed research study on ‘Human Factors Analysis of Road Weather Advisory and  
45 Control Information’. Final report of this study is available (NTL ID 33047). Developed  
46 preliminary design guide for disseminating road weather information, to be tested and  
47 evaluated in 2010.



- 1           – Ongoing study on Phase II of ‘Microscopic Analysis of Traffic in Inclement Weather,’
- 2           which examines the effect of rain, snow, and ice on car following, lane changing and gap
- 3           acceptance behavior.
- 4           – Ongoing research study, ‘Data Mining and Gap Analysis for Weather Responsive Traffic
- 5           Management Studies,’ is gathering available weather and traffic data for WRTM
- 6           modeling and analysis.
- 7           – Ongoing research study, ‘Developments in Weather Responsive Traffic Management,’
- 8           evaluates the benefits of existing WRTM strategies, identifies new strategies, and
- 9           develops a concept of operations.
- 10          – TMC Weather Integration Self-Evaluation and Implementation Planning Guidelines were
- 11          developed. The guide is being promoted widely and deployed it in at least 4 TMC’s.
- 12          Three products are available: the guide (*Integration of Weather Information in TMC*
- 13          *Operations: Self-Evaluation and Planning Guide*, EDL# 14437), the final report (EDL#
- 14          14438), and the computer-based self-evaluation and planning tool
- 15          (<http://www.ops.fhwa.dot.gov/weather/tmctool/registration.htm>).
- 16
- 17          • **Road Weather Management Performance Measures**
- 18               – Completed the identification of the performance measures last year (*Road Weather*
- 19               *Management Performance Metrics*, EDL#14420) and then quantified the 11 measures (*Road*
- 20               *Weather Management Performance Metrics: Implementation and Assessment*, EDL#14492).
- 21               – Completed a research study to characterize the quality and availability of current road
- 22               weather information (*Baselining Current Road Weather Information*, EDL#14486). Follow-on
- 23               work to develop a database and conduct a 2010 survey is underway.
- 24
- 25          • **Upcoming Events in 2010**
- 26               – August 31-Sept 2, 2010- *Clarus* & MDSS (aka Road Weather Management)Stakeholder
- 27               Meeting
- 28               – October 6-8 – Third Lakeside Conference on Data and Mobility 2010, Klagenfurt, Austria
- 29               – October 2010 Road Weather Management Policy Forum
- 30          (Note: Documents with EDL numbers can be accessed at [www.its.dot.gov/library.htm](http://www.its.dot.gov/library.htm) then
- 31          enter the EDL # in the Search box. Documents with NTLD ID numbers can be accessed at
- 32          <http://ntlsearch.bts.gov>, then enter ID or Title into Search box.)
- 33
- 34          • **AURORA**—Bill Hoffman briefly discussed the Aurora program and project updates and referred
- 35          WMTSP to the Aurora website [www.aurora-program.org](http://www.aurora-program.org) for additional project details and
- 36          completed projects information.
- 37          • **CLEAR ROADS**—Lee Smithson also briefly discussed the Clear Roads program, handed out a
- 38          listing of the on-going projects and referred WMTSP to their website at [www.clearroads.org](http://www.clearroads.org) for
- 39          further details.
- 40
- 41          • **TRANSPORTATION RESEARCH BOARD**—Max used a power point “Applying Asset Management
- 42          Principles to Winter Maintenance” to discuss the following:

**Proposed Research Problem Statement**

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41

**I. PROBLEM NUMBER**

**II. PROBLEM TITLE**

Applying Asset Management Principles to Winter Maintenance

**III. RESEARCH PROBLEM STATEMENT**

The demand for safe and drivable road conditions during winter has increased with highway traffic levels and the growing economic importance of just-in-time delivery in the manufacturing industry. The ability of highway agencies to deliver the required service levels has been impacted by reduced resources as government funds are diverted away from winter maintenance and concentrated in hard assets that provide more visible economic benefits such as building new roads, bridges and other public infrastructure, or to non-transportation activities. This diversion of funds from winter maintenance results in a reduction in the reliability of the highway transportation system.

Long-term funding for hard assets of the highway system uses an asset management approach to help set priorities among competing needs that balance the relative costs and benefits of pavement and bridge construction, maintenance and rehabilitation at various life-cycle stages.

This approach has not been applied to snow and ice control and as result winter maintenance may not receive the funding priority that it warrants in relation to other types of maintenance and rehabilitation. This may be explained in part because the winter maintenance process is not generally conceived as maintaining a highway asset.

Asset management is conventionally applied to infrastructure where the asset condition declines slowly and progressively over periods of years in response to traffic or environmental exposure. This model does not apply directly to winter maintenance where the road surface condition varies over cycles of a few hours that are repeated many times over a single winter and over the pavement life.

The pavement condition during winter storms is affected by the availability of equipment, road weather information technology, materials and personnel for snow fighting. The reliability of the highway network can be improved if an asset management approach is used to define the maintenance activities and long-term funding levels that are needed.

**IV. LITERATURE SEARCH SUMMARY**

1 The objectives, benefits and specific methodologies of an asset management approach to highway  
2 infrastructure ownership are summarized by Kimani (2000). They involve the planning, designing,  
3 construction and maintenance of transportation assets to provide service at a level acceptable to the  
4 public, at the lowest cost over the life-cycle of the transportation need. The approach requires an  
5 understanding of road user needs and road user costs and their relation to maintenance standards or asset  
6 condition, and an understanding of time-related changes in the asset condition. This requires consistent  
7 and long-term data on the asset condition, and models to predict changes in the condition in response to  
8 environmental and traffic inputs, and to maintenance actions and expenditures. The literature considers  
9 various possible categories of maintenance such as routine, programmed, rehabilitation and resurfacing  
10 and procedures for selecting and optimizing them, including specific procedures and software tools for  
11 evaluation and optimization. Models are implemented using a variety of metrics depending on the asset  
12 type and life cycle (FHWA (2010)).

13  
14 Shi (2005) proposed key factors for an asset management framework for snow and ice control, and other  
15 factors have been explored implicitly in other winter maintenance research. For example:

- 16 • Short-term, weather-related changes in bare pavement condition resulting from weather and  
17 maintenance inputs are predicted by Maintenance Decision Support Systems,
- 18 • Safety and mobility analyses predict the financial benefits associated with winter maintenance  
19 service levels (ref NTRNS; Nixon; Fu), and
- 20 • Winter friction monitoring characterizes the time scale over which safe conditions are lost and  
21 regained under winter conditions (Perchanok, AURORA).

## 22 23 **V. RESEARCH OBJECTIVE**

24  
25 The objective of this research is to provide a conceptual understanding and analysis tool that can be  
26 implemented by road maintenance agencies to establish appropriate levels of investment in winter  
27 maintenance using an asset management framework. The understanding should focus on restoring a  
28 bare pavement asset during or following winter storms, accommodating a variety of climate conditions,  
29 maintenance approaches and traffic levels.

30  
31 The model should provide calibrations for existing or proposed winter maintenance materials, processes  
32 and technologies such as RWIS, MDSS, alternative winter liquids, anti-icing, pre-wetting, alternative  
33 plows and salt distribution approaches, and staff training. The study should determine a suitable time  
34 scale for model development and implementation that communicates funding needs and options in a  
35 format compatible with other highway assets.

36  
37 The project deliverables should provide a thorough understanding of the technical and financial basis for  
38 the model, a transparent understanding of the software tool and any calibrations, assumptions,  
39 constants, defaults or user input values. The report should include validation or verification of any  
40 predictive models developed for or applied in the study. The report should provide an understanding of  
41 model sensitivity and reliability so that users will understand the significance of model results that  
42 compare the benefits of alternative investments.

## 43 44 45 46 **VI. ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD**

47  
48 **Recommended Funding: \$400,000**

**Research Period: 30 months**

1  
2  
3 **VII. URGENCY, PAYOFF POTENTIAL, AND IMPLEMENTATION**  
4

5 **VIII. PERSON(S) DEVELOPING THE PROBLEM**

Max Perchanok TRB AHD65 Richard Balgowan AHD65 Dave Bergner AHD65 Wilf Nixon AHD65 Young Lee AHD65	John Burkhardt, AHD65 Xianming Shi, AHD65 Liping Fu, Professor of Civil Engineering Waterloo University, Canada
--	--

6  
7  
8 **IX. PROBLEM MONITOR**  
9

10  
11 **X. DATE AND SUBMITTED BY:**  
12

13 July 5, 2010  
14 Max Perchanok, Chair, AHD65  
15

16 Max closed by stressing that the importance of considering winter maintenance as maintaining the  
17 asset. He is submitting this problem statement to WMTSP and to the AASHTO HSCOM Safety and  
18 Reliability TWG and if it is approved by the TWG Bill will submit it for consideration by the HSCOM.  
19 WMTSP discussed other projects that need to be acknowledged in an asset management focus. The  
20 American Highway Users Alliance commissioned a study which was carried out by Global Insight which  
21 quantified in 2009 the economic impact of a one-day snow-related shutdown in sixteen states and two  
22 Canadian provinces. Aurora has a project underway which among other things looks at the  
23 development of tools to analyze the relation between alternative winter maintenance performance  
24 standards, and outcomes of safety and mobility. NCHRP 20-07, Task 300, Synthesis of Economic Benefits  
25 for Winter Maintenance and Operations, is programmed for 2010. The research objective is "...to  
26 perform a comprehensive literature review and agency surveys to document the current and recent  
27 work being performed on the economic benefits of winter maintenance and operations so that clear and  
28 effective communication materials can be developed to convey the need for continued efforts of DOTs  
29 to compete for dwindling operating dollars across the country.". Clear Roads has a proposed project  
30 entitled "Understanding the True Costs of Snow and Ice Control Operations". The project will look at  
31 the direct and indirect costs for various states using different methods i.e. state owned or leased  
32 equipment, comparative costs between using private contractors or state resources, different levels of  
33 service, etc. Max will wrap this discussion into a revised research problem statement and give that to  
34 Bill to present at the HSCOM meeting on Thursday morning, July 15<sup>th</sup>. Max and Wilf discussed that 2012  
35 is the year for the next National Conference on Surface Transportation Weather and International  
36 Symposium on Snow Removal and Ice Control Technology. Their two committees have been issuing a  
37 joint call for papers for this quadrennial symposium. Details have yet to be worked out. Since the 13<sup>th</sup>  
38 AASHTO-TRB Maintenance Management Conference is being considered for July 2012 and would  
39 typically have a winter operations and surface weather component in the call for papers, it may be  
40 necessary to move their symposium to another year.  
41

- 42
- **American Public Works Association**—see Mark DeVries report on page 5 of these minutes

- 1 • **National Association of County Engineers**—Greg reported that the CBTs are not getting to the  
2 county engineers. Anthony Giancola, NACE Executive Director, copied Lee on an e-mail to the  
3 LTAPP Distribution Center confirming NACE had sent them the CBTs, but so far no further  
4 communications have been received. Lee will follow up in an effort to see where the problem  
5 exists. (Note, on July 23, 2010, Lee talked to Lisa McCousky who is working with the LTAP  
6 Distribution Center and found that the LTAP Distribution Center distributed the CBT to 396 LTAP  
7 Centers but in checking several of the Centers can no longer find their copies. She will follow up  
8 with each Center and send them a copy which they will duplicate and send to the NACE  
9 members in their area.
- 10 • **Development of NTIP in Canada**—Lee reported that he had followed up with Melody Miller and  
11 Pierre of Transport Canada after Melody made a presentation at the WMTSP February 2010  
12 meeting in Quebec City. Pierre sent Lee the following e-mail on May 14, 2010:

13  
14 Hello Lee,

15  
16 sorry I missed your call. To answer your questions, I offer the following:

- 17 • 511: Transport Canada (TC) was an instrumental player in obtaining the 511 number assigned by  
18 the CRTC (our FCC equivalent) throughout Canada for Weather and Traveller Information  
19 services. Since then, the following provinces have launched 511 to disseminate mainly  
20 provincial road-related information: Nova Scotia, Yukon, Quebec, New Brunswick and  
21 Ontario (still in soft launch). We are expecting Alberta and BC to come online next. There is no  
22 integration between these systems, you cannot get information from one jurisdiction while in  
23 another. We are struggling with a national governance issue: we had a 511 Task Force reporting  
24 to a Planning and Policy sub-committee of the Council of Deputy Ministers of transportation  
25 (representation from each provincial DOT and TC) looking into policy matters but the 511  
26 situation has now evolved beyond the scope of that task force, mainly because 511 issues and  
27 governance should also involve municipal and regional governments (these levels of authorities  
28 disseminate urban road, transit, para-transit related information). We are looking for a new  
29 champion for the 511 cause; at this time, we are preparing a request to the council of Chief  
30 Engineers of TAC (Transportation Association of Canada) as we believe this body can represent  
31 all levels of government in Canada and even includes some private and para-public  
32 organizations. The intent is to get TAC to establish a standing committee on 511.
- 33 • NTIP: I was not successful in obtaining TC's Central R&D funds to develop NTIP. However, we  
34 are still planning on trying to tap into an alternate source of funding and build a prototype of  
35 NTIP. While the prototype is being developed, we also attempt to find an entity to champion its  
36 subsequent full development, operation and maintenance. I have just started working on the  
37 technical requirements for the prototype.

38 Best regards,

39  
40 Pierre Bolduc  
41 ITS Policy - Transport Canada  
42

43 Lee will follow up with Pierre and Melody at the TAC meeting in September 2010 and  
44 report back to WMTSP.  
45

- 46 • **I-80 Coalition Update**—see I-80 Coalition update on page 18, lines 14-27 of these minutes.  
47

#### 48 Project Review of SICOP Program

- 1 • **CBT Revisions**—Lee reported the AI/RWIS CBT was completed and distributed in 2004. The CBT  
2 was revised and expanded in 2007 to include NCHRP 6-17, “Selecting Snow and Ice Control  
3 Materials to Mitigate Environmental Impacts”. The revised AI/RWIS CBT and a new companion  
4 CBT “Selecting Snow and Ice Control Materials to Mitigate Environmental Impacts” were  
5 distributed in July 2007. Five maintenance operations CBTs were then developed in  
6 cooperation with the Clear Roads consortium and were distributed in 2008. A web application  
7 for the five maintenance operations CBT has been provided to state that have requested it.  
8 Each state has a few students enrolled, but most have only visited the site likely to see if it  
9 works, but no noteworthy progress is showing on the administrators tracking tool. Seven states  
10 (CO, IA, KA, ME, MN, NE, and ND) have tried the web base versions.

11 Current work—a sixth CBT based on NCHRP Project 6-17, “Performance Measures for Snow and  
12 Ice Control Operations” was started in 2009 as soon as NCHRP released the final report. A  
13 Technical Working Group was formed and reviewed the 133 storyboards developed for the CBT.  
14 Then volunteers were selected to perform the beta test of the CBT. Results of the April 2009  
15 beta test from the contractor are listed below:

16 *The beta test has been completed. 17 testers from 6 agencies participated. We received feedback forms*  
17 *from eight of the testers. Job roles of testers varied from training personnel, facility supervisors, district*  
18 *managers, and others.*

19 *Overall, the feedback was very positive! This is due to all the effort each and everyone of the TWG put*  
20 *forth on this project.*

21 *A couple of key take-aways from the feedback received:*

22  
23  
24 *1. Testers generally felt that the course could best serve those at the mid-level manager position and*  
25 *above, rather than facility supervisors. Some testers indicated that while the information was interesting*  
26 *and good to know, since they have no control over performance measure implementation, they wouldn't*  
27 *be able to use it.*

28  
29 *2. Students appear to need 3-4 hours to complete the course rather than just 2 hours.*

30  
31 *3. The intermittent review questions and exercises were deemed very helpful in maintaining interest; even*  
32 *more such activities were requested by some.*

33  
34 *4. The testers found the course very easy to use with very few functionality issues.*  
35  
36

37 The CBT was finished and distributed on June 9, 2010 to the ten states that had paid their  
38 \$2,000 contribution to the CBT pooled fund. More states have advised they will be joining the  
39 pooled fund and when they do, the CBT will be sent to them.

40  
41 Proposed work—the original AI/RWIS CBT was designed in 2002. At that time, high-speed  
42 Internet connections were not widely available. The AASHTO AI/RWIS CBT Technical Working  
43 Group elected not to have the program architected for web deployment because it would have  
44 meant limiting the type and quality of the media (photographs, video, narration, etc.) in the  
45 course. Today, high-speed Internet connections are common place. Moreover, development  
46 tools and media formats have evolved to permit more efficient transmission of media-rich  
47 applications on the Internet. The CBT was developed using a multimedia course authoring tool  
48 called Authorware. Authorware includes an Internet browser plug-in called the Authorware  
49 Web Player that enables a course to play using contemporary web browser technology. The  
50 Authorware Web Player is not widely distributed so it is unlikely that most users will have it

1 already installed. Further, Adobe, the company that sells Authorware, announced they will no  
2 longer be making another version of Authorware. This means that the Authorware Web Player  
3 may one day no longer function on the standard Windows operating systems and browsers.  
4 Since future operating systems and browsers may eventually no longer support the technology  
5 that the AI/RWIS CBT is currently built on, it is recommended switching to an Adobe Flash-based  
6 technology which would ensure that the course will operate for years to come on future  
7 versions of Windows and even on Apple Macintosh computers. The cost of recreating the CBT is  
8 estimated to cost \$100,000 to \$150,000 and take about a year to complete. Both the Aurora  
9 Consortium and the Clear Roads Consortium have voted to support the recreating of the CBT to  
10 a web based application. Aurora approved \$50,000 and Clear Roads \$25,000. It is anticipated  
11 that the AASHTO HSCOM Highway Safety and Reliability Technical Working Group will  
12 recommend the remaining \$75,000 be raised through a voluntary contributions from the state  
13 DOTs.

- 14 • **ESS Guidelines & Implementation**—see page 8, lines 6-9 for Gabe’s report.
- 15 • **Update on Anti-drifting Measures with Proactive Road Design Considerations (SNOWMAN)**—  
16 Lee reported SNOWMAN project was a cooperative development with New York State DOT and  
17 the State University of New York at Buffalo using the SHRP research work of Ron Tabler.  
18 SNOWMAN software was installed on NYSDOT CAD MicroStations and engineered drifting and  
19 blowing snow mitigation techniques were used to solve drifting problems on a state highway  
20 that had been a problem for maintenance forces. The design was tested in the 2008-2009  
21 winter with heavy snowfall and 2009-2010 winter with average snowfall. The snow fences  
22 captured and stored the snowfall during each winter, resulting in greatly improved visibility and  
23 considerable overtime savings. The Iowa DOT signed an agreement with NYSDOT to install the  
24 software on their CAD MicroStations but have not installed the software. Montana DOT and  
25 McHenry County, Illinois are in the process of signing a similar agreement and will then install  
26 the software. A technical paper about SNOWMAN entitled “Implementing Passive Snow and Ice  
27 Control Measures” was presented at the XII International Winter Road Congress in Quebec City  
28 at both a technical paper session and during the poster sessions. WMTSP needs to continue  
29 promoting this environmentally friendly design concept. This concept should be considered in  
30 the NCHRP Project “A Roadmap for Winter Maintenance Research”. It would involve being  
31 environmentally friendly and would overlap into other US and State government agencies such  
32 as Soil Conservation Service and Natural Resources Conservation Services.
- 33 • **Integrated ITS Corridor**—Lee reported WMTSP is not actively involved in this project but is very  
34 interested in staying current because maintenance operations are extremely important to  
35 integrated ITS corridor operations. WMTSP depends on FHWA to remain actively involved and  
36 report any progress at WMTSP meetings and at other appropriate times as progress is made  
37 that does involve maintenance operations or maintenance data needs. Since other areas of the  
38 world are very advanced in integrated ITS corridor management, it would be beneficial if  
39 WMTSP would submit a request to partner with other disciplines and propose an international  
40 technology scan to review their operations and the roles maintenance has in integrated  
41 operations decision making. WMTSP should consider submitting a Scan Proposal Form for the  
42 International Technology Scanning Program (FY 2011). The purpose of the scan would be to  
43 examine and document advanced surface transportation weather technologies and their  
44 integration into system operations and management techniques being utilized by the host  
45 countries and determine their sustainability and impact on surface transportation safety and  
46 mobility. The following AASHTO Committees would have interest in this scan: Subcommittee on  
47 Maintenance, Subcommittee on Systems Operations and Management, and Special Committee  
48 on Wireless Technology. Probably the best example of advanced systems integration that

1 would enhance the vision and application of Intellidrive can be found on E-18 as it extends  
2 through Norway, Sweden and Finland.

3 • **Update on 2007 National Winter Maintenance Peer Exchange Projects**

- 4 • **Guidelines for A/I & Deicing #1**—the following italicized material comes from the 2007  
5 National Winter Maintenance Peer Exchange Final Report: (*Peer Exchange Steering*  
6 *Committee Recommendations—This was a discussion on determining when and*  
7 *at what rates deicing materials should be applied to the roadway to maximize*  
8 *effectiveness. Items such as product type, pavement temperature, pavement*  
9 *type, relative humidity, precipitation rate and type, etc. The discussion also*  
10 *recommended a guide for when and how much deicer should be used for*  
11 *reapplication of materials. The group felt there was a need to develop a standard*  
12 *set of guidelines or “best practices” that covered anti-icing, deicing and*  
13 *prewetting.*)

14  
15 In 1994, the TE-28 project provided guidelines for eight winter storms. Since then state  
16 DOTs have made slight changes in the TE-28 recommendations and have developed various  
17 methods of presenting those guidelines to their field forces, i.e. laminated guidelines in  
18 plow trucks, etc. Research, some completed and some underway, is examining various  
19 components that need to be included in the development of new guidelines. Three of those  
20 projects are listed below:

21  
22 The first is a Clear Roads project “Development of Standardized Test Procedures for  
23 Evaluating Deicing Chemicals”. This Clear Roads project is finished and the final report has  
24 been posted on the Clear Roads website. The conclusions and recommendations from the  
25 project appear below:

26  
27 ***“Two test methods were identified, developed, and refined to screen potential deicers,***  
28 ***additives, and blends. The tests should not be used to predict actual field performance or***  
29 ***application rates because they lack consideration of traffic, humidity, active precipitation,***  
30 ***ultraviolet radiation, and other elements. Instead, the tests provide only general trends or***  
31 ***an assessment of relative performance. The tests were developed with the expectation***  
32 ***that they will be performed by independent testing laboratories on any deicing chemical,***  
33 ***additive or mixture. The two test protocols are:***

- 34 • DSC Thermogram Test  
35 • Modified SHRP Ice Melting Test

36 ***The DSC Thermogram Test provides the thermal properties of deicers in an aqueous state.***  
37 ***Solid deicers can be tested by preparing an aqueous eutectic solution prior to the dilution***  
38 ***required by the test protocol. The DSC-based test is highly reproducible and suitable for***  
39 ***quality assurance of deicers, which can also provide an estimate of characteristic***  
40 ***temperature and ice melting capacity for liquid deicers.***

41 ***The Modified SHRP Ice Melting Test is an improved version of the SHRP Ice Melting Test***  
42 ***because it incorporates two mechanisms to ensure acceptance of the test. One mechanism***  
43 ***is a control in which 23% NaCl is tested side-by-side with the three test deicers.***  
44 ***Acceptance bounds were determined for brine volumes collected in the control sample. If***  
45 ***the test is acceptable based on the control, a separate mechanism is in place to ensure the***  
46 ***variability is acceptable by checking the CoV values.***

47 ***All tests were performed at the same facility. Two different operators were involved in***  
48 ***conducting the Modified SHRP Ice Melting Test, while one operator conducted the DSC***  
49 ***Thermogram Tests. While not essential, a round robin test is recommended to ascertain***  
50 ***the variability between laboratories before full implementation of the test protocols. This***  
51 ***is particularly important for the DSC thermogram test because its application in deicer***  
52 ***evaluation is a novel use of this equipment commonly available in materials testing***  
53 ***laboratories. The Modified SHRP Ice Melting Test should also be performed by other***  
54 ***laboratories because the survey results suggested limited confidence in the repeatability of***  
55 ***this test method.”***



1 The second Clear Roads project “Correlating Lab Testing and Field Performance for Deicing  
2 and Anti-icing Chemicals” is currently underway. Monthly progress calls are being  
3 conducted. A third Clear Roads project “Identifying the Parameters for Effective  
4 Implementation of Liquid-only Plow Routes” is in the process of letting a contract. WMTSP  
5 needs information from these projects to be able to determine if new material can be  
6 included in the guidelines or if knowledge gaps still exist. WMTSP needs to realize the  
7 results from research completed so far and the scope of research underway does not  
8 penetrate into the environmental, societal and economic issues of sustainability. Deicing  
9 and Anti-icing chemicals and their use need to be considered in the NCHRP “A Roadmap for  
10 Winter Maintenance Research” project 20-07(287).

- 11 • **LOS Determination #3**—the italicized material comes from the 2007 Final Report (*Steering*  
12 *Committee Recommendations—Is there a defensive way to determine or*  
13 *establish LOS nationwide (corridor management and seamless LOS across state*  
14 *boundaries)? Consistency across state lines is a challenge. This would document*  
15 *successful practices some state have worked out which would help other states*  
16 *gain from these experiences*) NCHRP Project 20-74A “Development of Service Levels for  
17 the Interstate Highway System is under contract with a contract period completion  
18 scheduled for September 30, 2010. The objectives of this research are to develop a  
19 standard way to describe the service level of Interstate Highway System assets and a  
20 process that agencies can use to prepare a template for describing service levels. Service  
21 levels and their indicators would be uniformly defined for the Interstate System as a whole,  
22 but service-level measures (how indicators are consistently assessed) could vary from one  
23 state to another. WMTSP needs to evaluate the results of the research when it gets  
24 completed and published and determine how those results might be utilized by agencies for  
25 assessing and benchmarking the performance of their Interstate Highways and how that  
26 might guide development of winter maintenance LOS.

- 27 • **Communication Public/Legislators #5**—the italicized material comes from the 2007 Final  
28 Report (*Steering Committee Recommendations—DOTs need tools to be developed*  
29 *to assist them in managing and communicating with motorists, management,*  
30 *politicians, stakeholders, etc. Need effective ways to communicate and explain*  
31 *level of service, expectations, and costs on various roadway systems. What are*  
32 *the best practices for communicating to legislators the need to establish*  
33 *performance measure and then provide the staffing and funding necessary to*  
34 *meet those measures. There is also a need to communicate performance metrics*  
35 *to field crews so they understand their importance. Legislators and upper*  
36 *management need to understand the ramifications of not funding maintenance*  
37 *activities and the long term impacts on the infrastructure.) This is an important*  
38 *project as indicated by its high ranking from the Peer Review. It is important not*  
39 *only to winter maintenance operations, but to transportation in general. The*  
40 *HSCOM HS&R TWG Work Plan for 2011, second bullet, begins to address this*  
41 *research with its focus on “...reliable all weather mobility...” and establishing an*  
42 *effective liaison and collaboration with “...the Subcommittee on Public Affairs as*  
43 *they work on informing the public about the importance of transportation to our*

1 social and economic well-being and the need for adequate funding.” WMTSP  
2 needs to work closely with HSCOM HS&R TWG offering assistance as they  
3 address this project in 2011 and also to aid in the technology transfer process  
4 when the project is completed.

- 5 • **National Winter Test Facility #13**—the italicized material comes from the 2007 Final Report.  
6 *(Steering Committee Recommendations—Build a test facility to provide objective*  
7 *data regarding the effectiveness of various winter maintenance treatments. The*  
8 *group felt there was a strong need for a national test facility that could be used*  
9 *for testing materials, methods and equipment used in winter maintenance.*  
10 *Having a national test center would establish a rigid set of research guidelines,*  
11 *protocols and procedure which should make the results more accurate. Can also*  
12 *test RWIS sensors and MDSS logic at this facility.)* The Aurora Consortium has  
13 developed a WIKI process which can be used to help researchers find appropriate facilities.  
14 Also the Western Transportation Institute has developed a winter maintenance testing  
15 facility at Lewiston, Montana. If the 2011 National Winter Maintenance Peer Exchange is  
16 held in Montana WTI has offered to give the attendees a tour of the facility. (See pages 18-  
17 19 of these minutes for further details on the 2011 Peer Exchange)

- 18 • **Consistent Descriptions/Road Conditions #15**—the italicized material comes from the 2007  
19 Final Report. *(Steering Committee Recommendations—Road condition reports vary*  
20 *greatly from one area to another. Also, the interpretation of a given road*  
21 *condition is different to different people. Need to develop standard ratings and*  
22 *descriptors for road conditions. Also need to develop acceptable, common,*  
23 *consistent and uniform snow and ice dynamic messages that avoid confusion and*  
24 *liability issues.)* The I-80 Corridor Coalition has had two meetings (Kick off January 26-27,  
25 2010 and a webinar June 8, 2010) and is currently surveying many of the Western States to  
26 see what information is currently being used so that an agreement among coalition states  
27 can be made as to LOS and Road Descriptor to be used. Their website,  
28 [www.i80coalition.com](http://www.i80coalition.com) , contains a summary of the webinar and kick off meeting, a draft  
29 strategic plan and other related material. A Coalition Workshop is being planned for Fall  
30 2010. The importance of 511 and consistent descriptions for road conditions were  
31 discussed at the February 6, 2010 WMTSP meeting in Quebec City when WMTSP met with  
32 Transport Canada (see minutes of that meeting, page 5 beginning with line 22 and ending on  
33 page 6, line 18 and these minutes page 13, lines 13-33 for details). WMTSP should consider  
34 presenting a “511 for North America” as part of the upcoming NCHRP Project 20-7(287) “A  
35 Roadmap for Winter Maintenance Research” meeting in Irvine.

- 36 • **Future National Peer Exchanges #18**

- 37 ○ **Feedback from Clear Roads/Aurora/PNS**—several teleconferences have been held with  
38 PNS and APWA representatives and the chairs of Aurora and Clear Roads. APWA would

1 like to have the next Peer Exchange be held either preceding or following their Snow  
2 Conference in 2011 or 2012. The difficulty in doing that is the Peer Exchange would  
3 need to be held on Saturday and Sunday or on the Wednesday and Thursday following  
4 the conference. Aurora and Clear Roads discussed this with their membership and  
5 found the weekend would not be acceptable. If the Peer Exchange were held on  
6 Wednesday and Thursday following their snow conference, the vendors would be  
7 packed up and gone so would not be able to meet with Peer Exchange attendees. PNS  
8 is uncertain when their next conference will be.

- 9 ○ **Other communications**—Western Transportation Institute (WTI), Steve Albert, director  
10 has written and offered to host the next Peer Exchange. WTI would be willing to help  
11 organize and provide some support for the Peer Exchange. The Peer Exchange would be  
12 held in Bozeman and would include a bus trip to Lewistown to look at the winter  
13 maintenance testing facility WTI has constructed. Discussions have been held with  
14 Aurora and Clear Roads and now with WMTSP and the option to hold the next Peer  
15 Exchange at WTI appears to be the best solution. Lee will talk to the Chairs of Aurora  
16 and Clear Roads and finalize their recommendations so the process can begin to get the  
17 next Peer Exchange organized.

- 18 • **Boiler Plate Legal Language #26**—the italicized material comes from the 2007 Final Report.  
19 *Steering Committee Recommendation—Concerns over litigation have slowed down*  
20 *the ability of states to share data. This project would develop some standard*  
21 *language that could serve as a starting point for states to address legal issues that*  
22 *may be involved with data sharing. Need examples of language that is out there and*  
23 *how it has worked.* This project was discussed at the last WMTSP meeting and decided  
24 that the language used for the Clarus project probably would be adequate to guide agencies  
25 needing boiler plate legal language, “The Clarus System is an experimental product and is  
26 being used for evaluation and demonstration purposes only. This is provided as a public  
27 service. No warranties on accuracy of data are intended or provided. See link to  
28 contributor’s data disclaimer in metadata file contrib.csv.” WMTSP felt this satisfies the  
29 intent of the recommendation so Lee will post this language on the National Peer Exchange  
30 Website, “Progress to Date” and consider the project complete.

- 31
- 32 • **Update on 2009 National Winter Maintenance Peer Exchange Project**
- 33

- 34 • **Presentation of New Projects, 2009 Peer Exchange Projects**

- 35 ○ **Develop Level of Service Based Application Anti-icing & Deicing Guidelines**

36 **##1.** WMTSP discussed this new project and concluded it was not clear what is  
37 needed. It is very interrelated to the 2007 Peer Exchange Priority #1 “Guidelines  
38 for A/I & Deicing. Clear Roads is working to finalize two projects, “Determining  
39 Effectiveness of Deicing Materials and Procedures’ and “Development of  
40 Standardized Test Procedures for Evaluating Deicing Chemicals”; has let another  
41 project “Deicing Chemicals Testing Phase I”; and is working on a contract for

1 another project entitled “Identifying the Parameters for Effective  
2 Implementation of Liquid Only Plow Routes”. These four projects all have  
3 outcomes that interrelate to project ##1 above and probably need to be  
4 completed before undertaking the Level of Service portion of this new project.  
5 WMTSP needs to monitor progress on the Clear Roads projects and look at  
6 outcomes from those projects to bring more clarity to this new project. Lee will  
7 discuss this at the August 10-12, 2010 Clear Roads meeting and share the results  
8 of that discussion with WMTSP.

- 9 ○ **Develop a synthesis to Guide Outreach Program for Benefits of a Proactive**  
10 **Snow and Ice Control Program Using Anti-icing and Prewetting ##6**—the  
11 outreach program would address benefits of increased operational efficiency  
12 and effectiveness, improved mobility and safety, and environment and global  
13 sustainability. Notes from the 2009 Peer Exchange indicate the synthesis should  
14 address equipment and training costs of gearing up for liquids and should  
15 address three audiences; 1) Upper management and the institutional issues  
16 they face, 2) Field operations personnel who address work environment and  
17 cultural issues, and 3) Traveling public who need to understand how proactive  
18 snow and ice control operations are conducted. The synthesis should also  
19 provide recommendations for technology transfer such as webinar program  
20 outline, power point for a speaker bureau, etc. There are two projects that need  
21 to be considered in the synthesis. Clear Roads has an on-going project 08-02,  
22 “Cost-benefit Analysis Toolkit” to develop a practical tool such as a spreadsheet  
23 or computer program that can be used to calculate the benefit/cost and justify  
24 expenditure for specific new practices, equipment and operations used in  
25 winter maintenance activities. Project completion is scheduled for July 2010.  
26 They are also developing a Request for Proposal for a project entitled “Snow  
27 and Ice Control Operations True Cost”. The two phases of this project are:  
28 Phase 1, with a goal of determining snow and ice control costs via a variety of  
29 different methods using internal or external resources, and Phase 2, with a goal  
30 to validate and update the Salt Institutes research that documented the costs to  
31 and impact on society when roads are not accessible. Other works include  
32 TRB’s Research Pays Off on “Implementing a Winter Maintenance Decision  
33 support System: Indiana Department of Transportation’s Process, Success and  
34 Savings”, Richard Balgowan’s success stories in the Township of Hamilton, New  
35 Jersey, and snow and ice feature Washington State DOT had on the Discovery  
36 Channel. The AASHTO Standing Committee on Highways at their 2010 Spring  
37 meeting approved \$50,000 for NCHRP 20-7 project “Synthesis of Economic  
38 Benefits for Winter Maintenance and Operations”. WMTSP needs to review the  
39 outcomes from the Clear Roads project 08-02 and other work mentioned above  
40 to avoid duplication in the synthesis project. Lee will participate in this Clear  
41 Roads discussion and share the results with WMTSP.

1 ○ **Develop BMP for Salt Shed Construction Siting and Leachate Management**

2 **##10**—this project started with a brief literature search to see what was  
3 available. Two resources that have for many years served the winter  
4 maintenance community well are the Salt Institute’s “The Salt Storage  
5 Handbook” which can be downloaded from their website at  
6 [www.saltinstitute.org/content/download/478/2972](http://www.saltinstitute.org/content/download/478/2972) . This handbook provides  
7 guidance on estimating capacity needed, site selection, space requirements, and  
8 general safety rules. Another excellent resource is Transportation Association  
9 of Canada’s “Synthesis of Best Practices Road Salt Management”, September  
10 2003, which can be downloaded at [www.tac-](http://www.tac-atc.ca/english/resourcecentre/readingroom/pdf/roadsalt-7.pdf)  
11 [atc.ca/english/resourcecentre/readingroom/pdf/roadsalt-7.pdf](http://www.tac-atc.ca/english/resourcecentre/readingroom/pdf/roadsalt-7.pdf) . These best  
12 practices include planning, site selection, designing a functional facility, storage  
13 and handling, site drainage, site operation and maintenance, record keeping,  
14 salt vulnerable areas, vehicle washing, and training. The Salt Institute  
15 Newsletter, Second Quarter 2010, lists best method practices for salt storage  
16 and leachate management complete with contact information for additional  
17 follow-up at [www.saltinstitute.org/Articles-references/References-on-salt-](http://www.saltinstitute.org/Articles-references/References-on-salt-use/SI-references-on-salt-use/SI-references-on-road-salt)  
18 [use/SI-references-on-salt-use/SI-references-on-road-salt](http://www.saltinstitute.org/Articles-references/References-on-salt-use/SI-references-on-salt-use/SI-references-on-road-salt) . The article also  
19 includes a section on TRB’s best methods practices for environmental  
20 stewardship at maintenance facilities. The November 2009 *Compendium of best*  
21 *management practices for environmental compliance and stewardship at*  
22 *highway transportation maintenance facilities* can be found at  
23 <http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2373> .  
24 WMTSP felt these resources met the intent of this project. Lee will post these  
25 to the National Peer Exchange Website in the “Progress to Date” column and  
26 consider the project complete.

27 ○ Develop a Multidisciplinary/Interactive Process to Monitor Hiring and Retention  
28 Problems **##23**—there are two NCHRP reports “NCHRP Synthesis 323, Recruiting  
29 and Retaining Individuals in State Transportation Agencies” (September 2003)  
30 and “NCHRP Report 636 Tools to Aid State DOTs in Responding to Workforce  
31 Challenges” (2009) that should be reviewed for their applicability to addressing  
32 this research needs statement. Max needs to collaborate with TRB Winter  
33 Maintenance Committee (AHD65), TRB Maintenance and Operations `Personnel  
34 (AHD15), and HSCOM Strategic Focus Area “Workforce Development” to  
35 identify useful tools for maintenance operations that seem appropriate and  
36 make a recommendation to WMTSP on how to achieve technology transfer and  
37 implementation of research results.

38 • Practice Ready Papers

39 ○ TRB Circular E-126 has been published in paper form and distributed to the state  
40 DOTs as part of TRBs standard distribution. To make the practice ready papers  
41 more accessible, WMTSP would like to make them available in electronic form  
42 and post a link on the SICOP List Serve so the 800+ people on the list serve could

1 have easy access to them. Max and Wilf, since they are the chairs of the two  
2 TRB committees that sponsored E-126, will contact Frank Lisle and see if the  
3 practice ready papers can be posted to their committee’s website and then post  
4 a link on the SICOP list serve that would let a person go directly to the web site  
5 and download a copy of the practice ready paper.

- 6 • SICOP 4 Year Program—WMTSP developed a work program for 2011-2014 prior to the  
7 meeting and then made several revisions as the program was reviewed in detail and  
8 coordinated with the HSCOM Safety and Reliability TWG Future Directions and Work  
9 Plan (see Attachment #7 for yellow highlighted revision details). Rick wants to make  
10 sure we are doing what is listed in the 4 year program. He believes white paper  
11 positions might be effective way to communicate progress. WMTSP has put much effort  
12 into the CBTs, we should be asking the states if they are using them, are they useful,  
13 could they be made more effective, are employees able to finish the CBT in the time we  
14 have estimated for completion, are a few of the questions that could determine how  
15 effective WMTSP has been. Also, best practices are being promoted, but are they being  
16 implemented? Since the Peer Exchange brings in representation from nearly all the  
17 state DOTs, it may be a good audience to survey and find out these details. Perhaps the  
18 same question could be used over a period of time to measure progress and changing  
19 needs. Max feels WMTSP is a service and coordinating committee so we should be in  
20 the business of determining what is needed, making sure needs are met and promoting  
21 the results. WMTSP should be promoting the Aurora and Clear Roads programs help get  
22 their research implemented.
- 23 • SICOP Funding Resolution for updating and converting AI/RWIS from an Executable  
24 Format to Internet Browser Format and make all eight Maintenance Operators CBTs  
25 SCORM-compliant (Sharable Content Object Reference Model)—this resolution was  
26 developed and approved by WMTSP and presented at the Thursday, July 15, 2010  
27 meeting for approval. (see attachment #8 for details)

28  
29 ○ **Other Discussion**

- 30 ○ Steve had just returned from Sweden as part of a Swedish National Road  
31 Administration/Minnesota DOT exchange relationship. He was impressed with the  
32 improvements he found in their equipment. He made a presentation on the in-house  
33 operations Minnesota DOT uses. This is a rarity in Europe, since most maintenance  
34 operations are contracted out to the private enterprise.
- 35 ○ Rick closed the meeting by tentatively scheduling a teleconference sometime in  
36 October. Items to be discussed include updates on Aurora and Clear Roads meetings,  
37 Clarus/MDSS Stakeholders meeting, preliminary outcomes from the NCHRP Project 20-  
38 07/Task 287, “Challenges and Opportunities: A Strategic Plan for Winter Maintenance  
39 Research”, and progress on the WMTSP 4 Year Program.

40 **Draft minutes as of July 23, 2010**

# Attachment #1

## HSCOM Work Plan

### Highways Subcommittee on Maintenance

#### WORK PLAN — May 2010

##### Officers:

- Chair: Carlos Braceras, UDOT
- Vice Chair: Lacy Love, NCDOT
- Vice Chair: Chris Christopher, WSDOT
- Secretary: Celso Gatchalian, FHWA (acting)
- Liaison: Ken Kobetsky, AASHTO
- Past Vice Chair: Russell Yurek, MdSHA

##### Review of Subcommittee charge statement

- The Subcommittee's Strategic Plan was updated to better align with SCOH and to reflect the challenges and needs faced by the maintenance community today.
- The Subcommittee's eleven areas of emphasis was restructured, replacing the Task Forces and Focus Groups with new Technical Working Groups
- The Subcommittee's Vision, Mission, and Goals were revised.

##### Proposed Schedule

##### • New or Updated Publications

- The Maintenance Manager (a quarterly newsletter for Subcommittee members)
- 2010 AASHTO Equipment Reference Book (posted on Subcommittee website)
- Subcommittee on Maintenance Roster (updated annually)
- The Subcommittee website was revised to reflect the recent changes as a result of the restructuring of the Subcommittee.

##### • Other Activities For The Coming Year

- Finalize "Statement of Direction" for each Technical Working Group.
- The Subcommittee Summer Meeting is scheduled July 11– 15, 2010 in Savannah, Georgia. Details and future additional information are to be posted on this website, <http://www.dot.ga.gov/informationcenter/publicinformation/Pages/SCOM2010.aspx>
- Marketing and rollout of the new NHI training course "Maintenance Leadership Academy". Contacts: Jim Feda – SCDOT, Chris Newman – FHWA
- Development of the 2010 AASHTO Equipment Reference Book in electronic format to be posted on the AASHTO Subcommittee on Maintenance website.
- Marketing and rollout of the NHI Training Course, "Performance-based Contracting for Maintenance" Contacts: Jennifer Brandenburg – NCDOT, Celso Gatchalian – FHWA.
- Coordinate with the Subcommittee on Asset Management in the deployment of Volume 2 of the Asset Management Guide

##### GOALS

##### Bridge Technical Working Group

The Bridge Technical Working Group will be focusing on the areas listed below in the upcoming year. . Each focus area listed below is linked to the strategic focus areas outlined in the SCOH and SCOM Strategic Plans.

- Promote the sharing of expertise and state-of-the-practice for preserving and improving the health/condition of bridges and structures by establishing regional bridge working groups and conducting bridge preservation workshops.
- Support research to advance the practice of preserving and improving bridges and structures by working closely with SCOB and TRB subcommittees.
- Promote the reliability and safety of bridges by focusing on innovative maintenance practices,

- 1 timely inspections and repair and worker safety.
- 2 • Develop national clearinghouse for bridge preservation information in coordination with the
- 3 AASHTO TSP-2 Program.
- 4 • Promote accountability and transparency through performance management of bridges and
- 5 structures in conjunction with the other technical working groups with a focus on an accurate and
- 6 efficient bridge inventory system, appropriate performance measures, clear measurable goals
- 7 which can be attained, and innovative reporting techniques using common terminology.
- 8 • Identify, develop, and promote workforce development activities for bridges and structures which
- 9 could strengthen the maintenance workforce including inspection, preservation and activity
- 10 specific training. This includes coordinating with appropriate TCCC and TSP2 efforts.
- 11 • Promote sustainability of the highway bridge environment with a special focus on climate change
- 12 mitigation strategies and pollution prevention.

13 **Pavement Technical Working Group**

14 The purpose of the Pavement Technical Working Group is to promote the preservation of pavements.

15 The PTWG will attempt to accomplish this purpose by the following activities:

- 16 • Promote the Transportation Systems Preservation Technical Services Program. (TSP<sub>2</sub>)
- 17 • Sustain a high level of maintenance interest and involvement in the area of System Preservation.
- 18 • Work with the Joint Technical Committee on Pavements on the possibility of developing a
- 19 Pavement Preservation chapter that can be included in the new AASHTO Mechanistic-Empirical
- 20 Pavement Design Guide.
- 21 • Support the development and expansion of Regional Pavement Preservation Partnerships.
- 22 • Assist in the implementation of the Pavement Preservation Roadmap.
- 23 • Promote the utilization of the National Center for Pavement Preservation for research
- 24 management
- 25 • Coordinate and support the development of guidelines, specifications, terminology and best
- 26 management practices relative to pavement preservation and maintenance;
- 27 • Support and participate in development of pavement preservation projects and the use of
- 28 innovative pavement materials;
- 29 • Develop partnerships and coordinate task force activities with other pavement groups (such as
- 30 FPP, FHWA, TRB AHD18 and AHD20 Committees, etc.);
- 31 • Identify research needs, support development of problem statements and identify potential
- 32 funding sources;
- 33 • Support the development of new technology that leads to the extension of pavement life in a
- 34 costeffective
- 35 manner, and identify and promote the implementation and usage of products and
- 36 processes which achieve this goal.

37 **Roadway/Roadside Technical Working Group**

38 The Highway Roadway/Roadside Technical Working Group will be focusing on the areas listed below in

39 the upcoming year.. Each focus area listed below is linked to the strategic focus areas outlined in the

40 SCOH and SCOM Strategic Plans.

- 41 • Promote the sharing of expertise and state-of-the-practice for improving the health/condition of
- 42 roadway/roadside features as it relates to the highway system.
- 43 • Support research in safety devices, signing, pavement marking, lighting, etc. to improve highway
- 44 safety and reduce risk to travelers and workers.
- 45 • Elevate the reliability and safety of traffic flow by focusing on innovative work zone practices
- 46 which minimize the impact on traffic, increase efficiency for the workforce, and remain focused on
- 47 safety.
- 48 • Promote accountability and transparency through performance management of roadway/roadside
- 49 features in conjunction with the other technical working groups with a focus on an accurate and
- 50 efficient feature inventory system, appropriate levels of service for various regions, clear
- 51 measurable goals which can be attained, and innovative reporting techniques using common
- 52 terminology.
- 53 • Identify, develop, and promote workforce development activities for roadway/roadsides which
- 54 could strengthen the maintenance workforce including sign and pavement marking retroreflectivity,
- 55 vegetation management, storm water management plans, and activity specific



- 1 training.
- 2 • Promote sustainability of the roadside environment with a special focus on climate change
- 3 mitigation strategies and pollution prevention
- 4 **Equipment Technical Working Group**
- 5 The purpose of the Equipment Technical Working Group is to interface with each of the Subcommittee on
- 6 Maintenance TWGs, identify equipment issues and champion equipment management. To accomplish
- 7 this purpose the TWG shall:
- 8 • Coordinate the activities of the Equipment Management Technical Services Program (EMTSP)
- 9 and report progress and accomplishments of the program
- 10 • Promote the use of the Subcommittee website for information and technology sharing and as a
- 11 clearinghouse for the technical working groups
- 12 • Continue participation in NCHRP Project 13-03A, Decision Making for Outsourcing and
- 13 Privatization of Vehicle and Equipment Fleet Maintenance
- 14 • Continue collaboration with TRB Committee, AHD60, Maintenance Equipment, in planning the
- 15 16<sup>th</sup> Equipment Management Workshop.
- 16 • Update the AASHTO Equipment Reference Book for 2010
- 17 • Provide for the effective exchange of equipment information and issues among members
- 18 • Identify current critical equipment needs
- 19 • Promote equipment acquisition procedures that include functionality and life cycle costs
- 20 • Promote demonstration forums to display innovative equipment and ideas
- 21 • Develop research study and synthesis report problem statements
- 22 • Support the national Transportation Research Board biennial Equipment Management Workshop
- 23 and promote regional equipment manager meetings
- 24 • Promote the incorporation of effective equipment management principles, and the development
- 25 of dedicated equipment funds
- 26 • Support Environmentally Sensitive Considerations in equipment acquisition and operation issues
- 27 • Support equipment personnel training, development, and retention practices
- 28 • Identify and develop strategies to address emerging issues (such as climate change and
- 29 homeland security)
- 30 • Institutionalize Performance Management by incorporating Performance Measures where they
- 31 may be appropriately applied during the implementation of Equipment Fleet Management
- 32 Systems and Equipment Maintenance Contracts
- 33 • Establish, monitor, and adjust strategic plans, organization structures and resource options to
- 34 meet a dynamic environment
- 35 **Highway Safety & Reliability Technical Working Group**
- 36 The Highway Safety & Reliability Technical Working will be focusing on the areas listed below in the
- 37 upcoming year. . Each focus area listed below is linked to the strategic focus areas outlined in the
- 38 SCOH and SCOM Strategic Plans.
- 39 • Promote safe and efficient work areas for maintenance stationary and mobile activities by:
- 40 1) utilizing effective liaison and collaboration with the AASHTO Standing Committee on Highway
- 41 Traffic Safety (SCOHTS); 2) evaluating highway safety needs in maintenance work zones and
- 42 snow and ice control operations and communicating those needs to SCOHTS as they work on
- 43 developing the comprehensive long-term AASHTO Highway Safety Strategy and Plan; 3)
- 44 implementing the research results in NCHRP Report 500, Volume 17 “A Guide for Reducing
- 45 Work Zone Collisions”; 4) collaborating with and assisting Federal Highway Administration in
- 46 promoting their “Work Zone Safety and Mobility Peer-to-Peer Program”; and, 5) posting
- 47 successes and best method practices on the AASHTO Center for Excellence website.
- 48 • Develop performance measures that will increase focus and awareness of the importance of safe
- 49 work zones, reliable all weather mobility, etc., through effective liaison and collaboration with: 1)
- 50 the AASHTO Standing Committee on Performance Management in their focus to maximize the
- 51 performance of transportation systems using performance based, results-driven management;
- 52 and 2) the Subcommittee on Public Affairs as they work on informing the public about the
- 53 importance of transportation to our social and economic well-being and the need for adequate
- 54 funding.
- 55 • Promote the findings of NCHRP studies such as, “Performance Measures for Snow and Ice

1 Control Operations”, Synthesis 389 “Performance-Based Contracting for Maintenance”, NCHRP  
2 20-68A “US Domestic Scan Best Practices in Winter Maintenance”, etc. with conference  
3 presentations, technical field reviews, and whatever techniques result in efficient and effective  
4 technology transfer.

- 5 • Increase collaboration between maintenance, traffic and other organizations (law enforcement,  
6 fire & rescue, etc.) for effective incident management and emergency management response  
7 utilizing effective liaison and collaboration with AASHTO Special Committee on Transportation  
8 Security and Emergency Management, Standing Committee on Highway Traffic Safety, Special  
9 Committee on Wireless Technology and Subcommittee on Systems Operation and Management;
- 10 • Develop and conduct forums, exchanges, and symposiums building on the successes of the past,  
11 i.e, the 2007 and the 2009 Winter Maintenance Peer Exchanges and the 2008 TRB/AASHTO  
12 Transportation Weather & Snow/Ice Symposium for the interchange of information and identifying  
13 environmental concerns and operational research needs among all groups with shared safety,  
14 reliability, sustainability and winter maintenance interests; and
- 15 • Strengthen workforce development by: 1) providing to the maintenance workforce effective  
16 training, exposure to the latest innovations in equipment, materials and operational/managerial  
17 techniques and best method practices; 2) establishing an effective liaison and collaboration with  
18 the AASHTO Subcommittee on Human Resources as they implement the findings of the recently  
19 completed NCHRP Report 636, “Tools to Aid State DOTs in Responding to Workforce  
20 Challenges” (specifically assist them as they populate the Toolkit, “Current Workforce Scenarios  
21 and Associated Resource Needs” to insure it reflects the needs of the maintenance community);  
22 3) developing web-based applications for existing computer-based training programs; 4) finishing  
23 the development of a Computer-base training program “Performance Measures for Snow and Ice  
24 Control Operations”; and 5) investigating other Safety & Reliability technology transfer needs  
25 using interactive CBT self paced applications

1

2

**Attachment #2**

3

**HS&R TWG Strategic Planning Matrix**

4

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38

**Attachment #3**

**HIGHWAY SAFETY & RELIABILITY  
TECHNICAL WORKING GROUP  
FY 2011 Work Plan**

The purpose of the Highway Safety & Reliability Technical Working Group Work Plan is to engage a broad group of state and local government practitioners, industry, and academia to provide clear direction on what the TWG will be focusing in on during the coming year. Each focus area listed below is linked to the strategic focus areas outlined in the SCOH and SCOM Strategic Plans.

- Promote safe and efficient work areas for maintenance stationary and mobile activities by: 1) utilizing effective liaison and collaboration with the AASHTO Standing Committee on Highway Traffic Safety (SCOHTS); 2) evaluating highway safety needs in maintenance work zones and snow and ice control operations and communicating those needs to SCOHTS as they work on developing the comprehensive long-term AASHTO Highway Safety Strategy and Plan; 3) implementing the research results in NCHRP Report 500, Volume 17 “A Guide for Reducing Work Zone Collisions”; 4) collaborating with and assisting Federal Highway Administration in promoting their “Work Zone Safety and Mobility Peer-to-Peer Program”; and, 5) posting successes and best method practices on the AASHTO Center for Excellence website.
- Develop performance measures that will increase focus and awareness of the importance of safe work zones, reliable all weather mobility, etc., through effective liaison and collaboration with: 1) the AASHTO Standing Committee on Performance Management in their focus to maximize the performance of transportation systems using performance based, results-driven management; and 2) the Subcommittee on Public Affairs as they work on informing the public about the importance of transportation to our social and economic well-being and the need for adequate funding.
- Promote the findings of NCHRP studies such as, “Performance Measures for Snow and Ice Control Operations”, Synthesis 389 “Performance-Based Contracting for Maintenance”, NCHRP 20-68A “US Domestic Scan Best Practices in Winter Maintenance”, etc. with conference presentations,

1 technical field reviews, and whatever techniques result in efficient and  
2 effective technology transfer.

- 3
- 4 • Increase collaboration between maintenance, traffic and other organizations  
5 (law enforcement, fire & rescue, etc.) for effective incident management and  
6 emergency management response utilizing effective liaison and collaboration  
7 with AASHTO Special Committee on Transportation Security and Emergency  
8 Management, Standing Committee on Highway Traffic Safety, Subcommitte  
9 on Traffic Engineering and Subcommittee on Systems Operation and  
10 Management;
- 11
- 12 • Develop and conduct forums, exchanges, and symposiums building on the  
13 successes of the past, ie, the 2007 and the 2009 Winter Maintenance Peer  
14 Exchanges and the 2008 TRB/AASHTO Transportation Weather & Snow/Ice  
15 Symposium for the interchange of information and identifying environmental  
16 concerns and operational research needs among all groups with shared  
17 safety, reliability, sustainability and winter maintenance interests; and  
18
- 19 • Strengthen workforce development by: 1) providing to the maintenance  
20 workforce effective training, exposure to the latest innovations in equipment,  
21 materials and operational/managerial techniques and best method practices;  
22 2) establishing an effective liaison and collaboration with the AASHTO  
23 Subcommittee on Human Resources as they implement the findings of the  
24 recently completed NCHRP Report 636, "Tools to Aid State DOTs in  
25 Responding to Workforce Challenges" (specifically assist them as they  
26 populate the Toolkit, "Current Workforce Scenarios and Associated Resource  
27 Needs" to insure it reflects the needs of the maintenance community); 3)  
28 developing web-based applications for existing computer-based training  
29 programs; 4) finishing the development of a Computer-base training program  
30 "Performance Measures for Snow and Ice Control Operations"; and 5)  
31 investigating other Safety & Reliability technology transfer needs using  
32 interactive CBT self paced applications.
- 33 • Explore and facilitate opportunities to promote environmental awareness and  
34 best method practices in sustainable maintenance operations through liaison  
35 with the Standing Committee on Environment and posting appropriate results  
36 on the AASHTO Center for Environmental Excellence website.
- 37
- 38

39 July 14, 2010

40

41

1 Attachment #4

2 **HIGHWAY SAFETY & RELIABILITY**  
3 **TECHNICAL WORKING GROUP**  
4 STATEMENT OF DIRECTION  
5  
6

7 The purpose of the Highway Safety & Reliability Technical Working Group is to  
8 serve as liaison between the State Highway and Transportation Departments and  
9 Administrations. The TWG shall:

- 10  
11
- 12 • Promote safe and efficient work areas for maintenance stationary and mobile  
13 activities;
  - 14 • Encourage focus and increased awareness of winter operations related  
15 issues and concerns;
  - 16 • Increase collaboration between maintenance, traffic and other organizations  
17 (law enforcement, fire & rescue, etc.) for effective incident management and  
18 emergency management response;
  - 19 • Promote forums for the interchange of information among the Subcommittee  
20 members and all groups with shared safety, reliability, sustainability and  
21 winter maintenance interests; and
  - 22 • Promote communication and cooperation with the Standing Committee on  
23 Environment, Traffic Engineering, Advanced Transportation Systems and  
24 other AASHTO Subcommittees, TRB Committees and others.
- 25  
26  
27  
28  
29  
30

31 July 14, 2010  
32  
33

1

**Attachment #5**

2

3

**PIARC Power Point**

4

1

**Attachment #6**

2

3

**APWA “Framework for Sustainable Communities”**

4



1 **Attachment #7**

2

3 **Proposed Four Year Program (2011-2014)**

4 **Winter Maintenance Technical Service Program (WMTSP)**

5 (as revised on July 14, 2010)

6 **2011**

7

8 Support the new mission and vision of the AASHTO Highway Subcommittee on Maintenance in  
9 being the leader for preserving and maintaining a world class highway system by providing to the  
10 winter maintenance workforce: 1) effective and efficient training programs and technology transfer  
11 processes; 2) exposure to the latest innovations in equipment, materials, and  
12 operational/managerial techniques, and; 3) best method practices, that will improve winter  
13 operations “...to preserve and maintain a healthy and reliable highway infrastructure that meets the  
14 performance expectations of its customers” by performing the following:

- 15
- 16 • **Develop and promote performance management & performance measurement**
    - 17 ○ Develop performance measures that will increase focus and awareness of the  
18 importance of safe winter maintenance operations and reliable all weather mobility  
19 through effective liaison and collaboration with:
      - 20 ▪ The AASHTO Standing Committee on Performance Management in their focus  
21 to maximize the performance of transportation systems using performance  
22 based, results-driven management; and
      - 23 ▪ The Subcommittee on Public Affairs as they work on informing the public about  
24 the importance of transportation to our social and economic well-being and the  
25 need for adequate funding.
    - 26 ○ Promote the findings of NCHRP 6-17, “Performance Measures for Snow and Ice Control  
27 Operations”, NCHRP Synthesis 389, “Performance-Based Contracting for Maintenance”  
28 and NCHRP 20-68A with conference presentations, technical field reviews and whatever  
29 techniques result in efficient and effective technology transfer.
    - 30 ○ Develop metrics to assess the effectiveness of the WMTSP in educating and promoting  
31 performance management in winter operations
    - 32 ○ Work with related groups to determine how the activities listed above improve the  
33 safety and reliability of the highway system
  - 34 • **Provide comprehensive training that will strengthen workforce development** for winter  
35 maintenance personnel by promoting Computer-Based Training Programs:

- 1           ○ Anti-icing/Road Weather Information Systems Computer Based Training
  - 2                 ▪ Monitor state and local government snow and ice control practices and research
  - 3                 programs for material to update Anti-icing/RWIS Version 2 CBT that was
  - 4                 distributed on July 9, 2007.
  - 5                 ▪ Evaluate completed NCHRP winter maintenance research projects for either
  - 6                 updating the existing CBT or producing a separate CBT to achieve technology
  - 7                 transfer.
  - 8                 ▪ Work with state DOTs on refining CBTs for use in an interactive computerized
  - 9                 classroom.
  - 10                ▪ Develop an Internet Browser Format and SCORM-compliant version of the CBT
  - 11                to enhance its deliverability and compatibility with agency learning
  - 12                management systems.
- 13           ○ Maintenance Operations Training (Six CBTs developed in collaboration with the Clear
- 14           Roads Consortium).
  - 15                ▪ Obtain user feedback on their successes and problems in implementing the
  - 16                “Equipment Maintenance”, “Proper Plowing Techniques”, “Deicing”, “Blowing
  - 17                Snow Mitigation”, “Winter Maintenance Management” CBTs distributed in 2007
  - 18                and 2008 and “Performance Measures for Snow and Ice Control Operations”
  - 19                being distributed in 2010. Investigate ways to improve this method of training
  - 20                delivery to state and local governments.
  - 21                ▪ Evaluate completed NCHRP winter maintenance research projects for either
  - 22                updating the existing CBTs or producing a separate CBT to achieve technology
  - 23                transfer.
  - 24                ▪ Work with state DOTs on refining CBTs for use in an interactive computerized
  - 25                classroom.
  - 26                ▪ Rework CBTs to make them SCORM-compliant to enhance their deliverability
  - 27                and compatibility with agency learning management systems.
- 28           ○ Establish an effective liaison and collaboration with the AASHTO Subcommittee on
- 29           Human Resources to assist in implementing the findings of the recently completed
- 30           NCHRP Report 636, “Tools to Aid State DOTs in Responding to Workforce Challenges”
- 31           and specifically assist as they populate the Toolkit, “Current Workforce Scenarios and
- 32           Associated Resource Needs” to insure it reflects the needs of the winter maintenance
- 33           community.
- 34           • **Promote technology transfer:**
  - 35                ○ Provide technical program development and logistical support for the proposed 2011
  - 36                National Winter Maintenance Peer Exchange.
    - 37                    ▪ Recruit future host State DOTs
    - 38                    ▪ Arrange and contract for facilities
    - 39                    ▪ Assist with technical program development
    - 40                    ▪ Provide other assistance as required by the AASHTO, Program Director for
    - 41                    Engineering
  - 42                ○ Provide continuing technology transfer and research support for the 2007 National
  - 43                Winter Maintenance Peer Exchange held in Columbus, Ohio and the 2009 National
  - 44                Winter Maintenance Peer Exchange held August 25-26, 2009 in Madison, Wisconsin.
    - 45                    ▪ Work with FHWA, TRB, Aurora, Clear Roads and Pacific Northwest Snowfighters
    - 46                    in identifying research and technology gaps
    - 47                    ▪ Insure research needs and technology gaps are submitted to appropriate groups
    - 48                    or agencies for action and assist with appropriate technology transfer methods

- 1                   ▪ Assist with program development and contract support for lodging and meeting
- 2                   facilities.
- 3                   ▪ Maintain the National Winter Maintenance Peer Exchange website in
- 4                   cooperation with the Western Transportation Institute and update Research
- 5                   Needs Spreadsheet and “Progress Scorecard” as needed.
- 6                   ○ Promote findings from the World Road Association (formerly PIARC) 13<sup>th</sup> Winter Road
- 7                   Congress, held on February 8-11, 2010, Quebec City.
- 8                   ○ Assist the Aurora Consortium in developing a WIKI site for sharing of individual winter
- 9                   maintenance research efforts underway
- 10                  ○ Evaluate NCHRP 6-17, *Performance Measures for Snow and Ice Control Operations*,
- 11                  NCHRP Synthesis 389 *Performance-Based Contracting for Maintenance*, and NCHRP 20-
- 12                  68A US Domestic Scan *Best Practices in Winter Maintenance* to identify best method
- 13                  practices for posting on the AASHTO Center for Excellence website.
- 14                  ○ Assist the FHWA Road Weather Management Program (RWMP) with technology
- 15                  transfer, implementation, and performance measures for:
- 16                  ▪ Clarus
- 17                      • Participate in the 8<sup>th</sup> Clarus Stakeholder meeting (August 31 to
- 18                      September 2, 2010)
- 19                      • Monitor progress and performance in the Multi-state Regional
- 20                      Demonstrations and assist whenever possible and appropriate
- 21                      • Encourage development of multi-agency partnerships
- 22                      • Promote Clarus successes by writing and presenting technical papers at
- 23                      conferences and workshops
- 24                  ▪ MDSS
- 25                      • Participate in the 12<sup>th</sup> MDSS Stakeholders Meeting (August 31 to
- 26                      September 2, 2010)
- 27                      • Evaluate needs to assist FHWA to deepen the science and improve the
- 28                      performance of MDSS.
- 29                      • Liaison with the Pooled Fund MDSS group and AASHTO TIG
- 30                      • Promote the implementation of MDSS to state and local agencies.
- 31                      • Monitor performance of MDSS in state and local agencies where MDSS
- 32                      has been implemented
- 33                      • Promote MDSS successes by writing and presenting technical papers at
- 34                      conferences and workshops
- 35                  ▪ MODSS
- 36                      • Participate in MODSS Stakeholders Meetings
- 37                      • Assist with identifying barriers or technology issues and how to
- 38                      overcome these shortfalls
- 39                      • Promote MODSS success by writing and presenting technical papers at
- 40                      conferences and workshops
- 41                  • **Promote Winter Maintenance International and Domestic Best Method Practices Scan:**
- 42                      ○ Collaborate with SSOM to organize and evaluate best method practices for winter
- 43                      maintenance operations (operations, equipment, and material selection, storage,
- 44                      blending, performance, etc.) and IntelliDrive™ for potential sites to conduct
- 45                      international and domestic technology scans.
- 46                      ○ Develop Winter Maintenance Best Practices Speakers Bureau to make presentations at
- 47                      national, state and local winter conferences and snow roadeos

- 1 • **Promote research and development:**
  - 2 ○ Collaborate with Aurora and Clear Roads Consortiums, FHWA, APWA, NACE, PNS, LTAP,
  - 3 and TRB’s Winter Maintenance Committee and the Surface Transportation Weather
  - 4 Committee to shape the various research efforts to insure it meets the needs of the
  - 5 winter maintenance community.
  - 6 ○ Collaborate with NOAA’s Office of the Federal Coordinator for Meteorology (OFCM) and
  - 7 FHWA’s Weather Team to explore partnering opportunities for the purpose of building
  - 8 synergy with weather products between transportation sectors.
- 9 • **Provide technical assistance to:**
  - 10 ○ State DOTs
    - 11 ▪ Maintain contact with research consortiums, state DOT research programs, and
    - 12 TRB to stay current with research underway, proposed or identified in unfunded
    - 13 research problem statements associated with winter maintenance.
    - 14 ▪ Maintain a current SICOP website containing useful and current winter
    - 15 maintenance material.
    - 16 ▪ Assist in locating experienced operational problem solvers
      - 17 • SICOP List-serve
      - 18 • Archive message strings
    - 19 ▪ Develop a Speaker Resource Bank
  - 20 ○ Local Agencies and LTAP
    - 21 ▪ Assist by locating experts in their problem areas
    - 22 ▪ Maintain a current SICOP website containing useful and current winter
    - 23 maintenance material.
    - 24 ▪ Develop a Speaker Resource Bank
  - 25 ○ NCHRP
    - 26 ▪ Provide technical assistance in maintaining best method practices on Center for
    - 27 Environmental Excellence by AASHTO website following guidance in NCHRP 25-
    - 28 25(4)
    - 29 ▪ Maintain a listing on the SICOP website of AVL and FAST users to keep the
    - 30 findings of NCHRP 20-07(200), *Synthesis of Vehicle Based Winter Maintenance*
    - 31 *Technologies* current.
- 32
- 33 • **Explore opportunities to integrate sustainability into winter maintenance operations**
  - 34 ○ Draft a white paper discussing sustainability as applied to winter maintenance
  - 35 operations
  - 36 ○ Support a proposed NCHRP Problem statement to investigate financial sustainability
  - 37 through asset management principals
  - 38 ○ Seek out examples of winter maintenance practices and programs that demonstrate
  - 39 sustainability
  - 40

41 **2012-2014**

- 42
- 43 • Promote implementation of performance management & performance measurement

- 1           ○ Promote activities by related groups that support performance measurement
- 2           ○ Deploy and encourage state and local agencies to use the AASHTO performance
- 3           management computer based training course material developed in 2010
- 4           ○ Develop metrics to assess the effectiveness of the WMTSP in educating and promoting
- 5           performance management in winter operations
- 6           ○ Work with related groups to determine how the activities listed above improve the
- 7           safety and reliability of the highway system
- 8           • Promote comprehensive training and professional development for winter maintenance
- 9           personnel:
  - 10           ○ Anti-icing/Road Weather Information Systems Computer Based Training
    - 11           ▪ Update as required to educate winter maintenance personnel on new materials,
    - 12           methods and equipment
    - 13           ▪ Evaluate completed NCHRP winter maintenance research for either updating
    - 14           existing CBTs or producing a separate CBT to achieve technology transfer
  - 15           ○ Winter Operations Computer Based Training
    - 16           ▪ Work with Aurora to assist them with technology transfer for completed RWIS
    - 17           research
    - 18           ▪ Work with Clear Roads to assist them with technology transfer for operations
    - 19           training needs
    - 20           ▪ Work with APWA on establishing equipment operator certification programs
  - 21           ○ Performance Management Computer Based Training (finish development and
  - 22           implementation)
  - 23           ○ Identify Unmet Maintenance Training Needs and Develop Appropriate Training
  - 24           Programs
- 25           • Promote technology transfer:
  - 26           ○ Promote technology transfer for practice ready TRB papers
  - 27           ○ Promote technology transfer for practice ready papers from PIARC 2010, TRB, and other
  - 28           appropriate sources
  - 29           ○ Provide support for FHWA Road Weather Management Program
  - 30           ○ Assist the FHWA with technology transfer and implementation support for:
    - 31           ▪ Clarus
    - 32           ▪ MDSS
    - 33           ▪ MODSS
- 34           • Provide technical assistance to:
  - 35           ○ Transportation Research Board
    - 36           ▪ Provide Peer Review for winter maintenance papers for the proposed 2011
    - 37           National Conference on Surface Transportation Weather and International
    - 38           Symposium on Snow Removal and Ice Control Technology
  - 39           ○ State DOTs
    - 40           ▪ Maintain SICOP website and List-Serve
    - 41           ▪ Provide message archiving
    - 42           ▪ Offer Speaker Bureau assistance
  - 43           ○ Local Agencies and LTAP
    - 44           ▪ Maintain SICOP website and List-Serve
    - 45           ▪ Provide message archiving
    - 46           ▪ Offer Speaker Bureau assistance
  - 47           ○ NCHRP

- 1                   ▪ Provide technical assistance in maintaining best method practices following the
- 2                    guidance from NCHRP 25-25(4)
- 3                   ▪ Evaluate completed research and develop appropriate technology transfer
- 4                    methods
- 5                   • Identify and implement methods to integrate sustainability into winter maintenance operations
- 6                    ○ Identify training needs and develop training for using sustainability practices as applied
- 7                    to winter maintenance operations
- 8                    ○ Identify unmet research needs for using sustainable practices in winter maintenance
- 9                    operations
- 10                  ○ Seek out examples of winter maintenance practices and programs that demonstrate
- 11                  sustainability
- 12                  • Promote research and development:
- 13                   ○ Follow up on the progress being made on research needs and technology gaps identified
- 14                   in the 2007 and 2009 National Winter Maintenance Peer Exchange Final Reports,
- 15                   [http://www.westerntransportationinstitute.org/professionaldevelopment/peer-](http://www.westerntransportationinstitute.org/professionaldevelopment/peer-exchange)
- 16                   [exchange](http://www.westerntransportationinstitute.org/professionaldevelopment/peer-exchange) and promote technology transfer and implementation.
- 17                   ○ Collaborate with Aurora and Clear Roads Consortiums, APWA, NACE, PNS, LTAP, and
- 18                   TRB's Winter Maintenance Committee and the Surface Transportation Weather Task
- 19                   Force to shape the research effort to insure it meets the winter maintenance
- 20                   community needs.
- 21                   ○ Participate with PIARC B-5 Winter Services Committee by coordinating U.S. participation
- 22                   in topics that overlap strategic agenda items for Clear Roads, Aurora, SICOP and other
- 23                   projects.
- 24
- 25                  • Collaborate with SSOM to organize and conduct ITS and Winter Maintenance Domestic and
- 26                  International Technology Scans as deemed appropriate.
- 27                   ○ Best method practices in selected state DOTs and local governments in US
- 28                   ○ Best method practices in salt management and outsourcing in Canada and other
- 29                   countries in the World
- 30

31 July 11, 2010

32 Revised July 14, 2010

33

34

1 **Attachment #8**

2  
3 **Resolution 10-xx**

4 **AASHTO Highway Subcommittee on Maintenance**

5  
6 **RESOLUTION FOR A VOLUNTARY SICOP ASSESSMENT**

7 **for**

8 **Conversion of the AASHTO Anti-icing/Road Weather Information**  
9 **System (AI/RWIS) Computer-Based Training (CBT) Program from an**  
10 **Executable Format to an Internet Browser Format**

11 **and**

12 **Making all Eight CBTs Training Suites SCORM-Compliant (Sharable  
13 Content Object Reference Model)**

14  
15 WHEREAS, Administrative Resolution AR3-94 approved by the AASHTO  
16 Board of Directors on November 13, 1994 provided for the establishment of  
17 a Winter Maintenance Program, and

18 WHEREAS, the Standing Committee on Highways was to provide oversight  
19 of the Program and was given authority to establish and manage the  
20 AASHTO Snow and Ice Control Pooled Fund Cooperative Program  
21 (SICOP), and

22 WHEREAS, the Winter Maintenance Program working through the  
23 AASHTO Winter Maintenance Technical Service Program (WMTSP) has  
24 developed a four year WMTSP program that emphasizes the need to  
25 promote comprehensive training and professional development for winter  
26 maintenance personnel with Computer-Based Training Programs, and

1 WHEREAS, the first of those CBTs were designed in 2002 and distributed  
2 in 2003, at a time when high-speed Internet connections were not widely  
3 available and web deployment would have meant limiting the type and  
4 quality of media (photographs, video, narration, etc.) in the course, and

5 WHEREAS, today, high-speed Internet connections are common place and  
6 development tools and media formats have evolved to permit more efficient  
7 transmission of media-rich applications on the Internet, and

8 WHEREAS, SCORM-compliance is a globally recognized online training  
9 administration standard and many agencies are now implementing  
10 SCORM-compliant learning management systems (LMS), and

11 WHEREAS, several state DOTs have requested the eight CBTs suites be  
12 made SCORM-compliant so they could install the CBTs on their own LMS,  
13 and

14 WHEREAS, the cost for conversion of the AI/RWIS CBT to an Internet  
15 Browser Format and making the eight CBTs SCORM-compliant is  
16 estimated to be \$170,000, and

17 WHEREAS, the Clear Roads Consortium has approved \$25,000 and the  
18 Aurora Consortium has approved \$50,000 for the proposed project,

19 THEREFORE, BE IT RESOLVED that the AASHTO Highway  
20 Subcommittee on Maintenance requests the Standing Committee on  
21 Highways **approve, and forward on to the Board of Directors for final**  
22 **approval, to ask member Departments, NACE and APWA for a voluntary,**  
23 **one-time assessment** of \$3,750 each to support the conversion of the  
24 AI/RWIS CBT to an Internet Browser Format and make all eight CBTs  
25 SCORM-complaint.

26 July 15, 2010

27 Savannah, Georgia

28 Championed by: William Hoffman, Chair, Highway Safety and Reliability  
29 Technical Working Group, Highway Subcommittee on Maintenance



