Salt Management Strategy (SaMS)
2nd Traditional BMPs Workgroup Meeting

March 14, 2019

The second meeting of the Traditional Best Management Practices (BMPs) Workgroup for the Salt Management Strategy (SaMS) was held from 9:30 am – 12:30 pm on March 14, 2019 at Fairfax Water's Griffith Water Treatment Plant (9600 Ox Road, Lorton, Virginia).

Attendance

Twenty-two (22) individuals, including four Virginia Department of Environmental Quality (DEQ) staff members and one staff member from the Interstate Commission on the Potomac River Basin (ICPRB; DEQ's contractual support), participated in the meeting. Five participants joined the meeting via teleconference.

Christina Alexander, City of Fairfax
John Burke, Fairfax County
Scott Crafton, VDOT†
Dave Evans, DEQ*
Camila Goncalves Dias, Fort Belvoir
Jeremy Hassan, Arlington County
Herb Holmes, City of Alexandria
Marty Hurd, Fairfax County†i
Will Isenberg, DEQ*
Raven Jarvis, VDH
Max Kuker, GKY
Neely Law, Center for Watershed Protection
Tony Migliaccio, National Park Service
Heidi Moltz, ICPRB*
Jonathan Murray, Fairfax County
Edward Rodrigues, Washington REIT
Phill Sexton, WIT Advisers†i
Anna Tuthill, DEQi
Kevin Utt, City of Fredericksburg†
Greg Waters, Snow and Ice Mgmt Co.
Niffy Saji, Fairfax Wateri
Ruth Minich-Hobson, DEQ†i

*Facilitator
†Participated via teleconference
iNon-member of the Traditional BMPs Workgroup

Meeting Highlights

At this meeting, the workgroup members followed-up on action items from the first Traditional BMPs Workgroup meeting, considered what final workgroup recommendations may look like, and discussed workgroup member participation in the upcoming Stakeholder Advisory Committee and Steering Committee meetings. The main take-away from this meeting are below:

- For the most part, there is similarity in application rates used by public organizations (primarily for transportation) according to the research of workgroup members. Alternatively, there is less consistency among recommended application rates used by private sector winter maintenance professionals (primarily for parking lots and sidewalks), and when measured, rates are found to be higher than recommended.
- The universe of BMPs used in operations is generally consistent among the literature. However, when considering BMPs for a specific operation, special

consideration needs to be given to whether or not it is a public or private operation in addition to the unique characteristics of each operation.
- The workgroup agreed that recommendations will focus on outlining BMPs in terms of the pros and cons in addition to developing processes for improving application rates and for integrating BMPs into operations. The workgroup decided to make these process recommendations rather than recommending specific application rates or specific BMPs.

Notes for Other Workgroups / Potential Areas of Overlap:

- The Non-Traditional BMPs workgroup may want to consider Seasonal Variance contract models in their evaluation of contract models.
- The relationship between levels of service and application rates may have a messaging/communication aspect through the Education and Outreach Workgroup.

Follow-up Action Items

The following action items were identified during this meeting:

1. BMP Implementation and Winter Maintenance Planning Process: Working towards the development of a process for winter maintenance planning that identifies 1st priority BMPs that can be implemented with available resources, and 2nd priority BMPs that require additional resources to implement. Camila Goncalves Dias will propose a draft process starting with the BMPs list presented at this meeting by DEQ. This draft will be shared with workgroup members for review and comment.
2. Application Rate Evaluation Process: As a first step in developing a process for adopting application rates and strategies for evaluating and adjusting practices to meet application rates over time, DEQ and/or ICPRB staff will prepare a draft process. This process, which is based on the idea of continual improvement, will be shared with workgroup members for review and comment.
3. BMP Pros and Cons: DEQ staff will refine the existing BMP document (available in long and short form) to include pros and cons for each BMP for workgroup member review and comment.
4. Application Rates Survey for Public Operations Follow-up: John Burke and Camila Goncalves Dias will follow up on the survey they developed for this meeting that asked public snow and ice management operations about application rates by asking questions related to equipment used to meet application rates, the use of brine as a deicer, and how surface temperatures are measured.

Meeting Summary

Introductions

The meeting opened with brief introductory remarks from DEQ and a round of introductions by participants. The main objective for this meeting was to discuss what the final recommendations from this workgroup will look like for application rates and BMPs.

DEQ also noted two administrative items:

- The 3rd SAC meeting is scheduled for May 29, 2019. DEQ asked for volunteers to present the developing recommendations for this workgroup to the SAC.
- DEQ asked for 1-2 volunteers to represent this workgroup on a steering committee that will review the final recommendations document.

DEQ reviewed the highlights, action items, and notes from the other SaMS workgroup meetings in the form of a flowchart. DEQ sent the flowchart to workgroup members on February 15, 2019.

The summary for the first Traditional BMPs Workgroup meeting is available online. Highlights of the first meeting included identifying the following needs:

- Develop a target(s) for tailoring BMPs (i.e. application rates),
- Develop a resource that weighs the pros and cons of various BMPs, and
- Consider specific audiences including public and private as well as three tiers of audiences (decision-makers, supervisors, and operators).

There is considerable overlap between the discussions of this and other workgroups. Examples of overlap include:

- Education and Outreach Workgroup: consistent, coordinated messages are important regarding Level of Service and what a cleared road should look like,
- Salt Tracking and Reporting Workgroup and Water Quality Monitoring and Research Workgroup: appropriate metrics for application rates, and
- Non-Traditional BMPs Workgroup: providing application rate guidance would be helpful, certification/training programs should overlap with BMPs from the Traditional BMPs Workgroup, alternative deicing compounds should be handled by the Non-Traditional BMPs Workgroup.

Additionally, notes from other workgroups directed to the Traditional BMPs workgroup included a desire for a phased approach to BMP implementation and to consider a list of modest BMPs to begin with.

Action Item Presentations

Volunteers presented on the two action item categories, application rates and BMPs.

Action Item: Application Rates (Camila Goncalves Dias, John Burke, and Will Isenberg)

John Burke presented on the results of a survey he and Camila Goncalves Dias administered on application rates. The survey focused on public operations including state and federal departments of transportation. Nine responses were received. Public facing publications were also researched. Southern and mid-Atlantic states had limited public facing information, whereas northern states had publicly available, detailed application rates. In these northern states, a common application rate table was presented. Application rates are available for brine and salt use. Units are typically pounds per lane mile or gallons per lane mile. For smaller areas, units were in pounds (or gallons) per 1,000 square feet or per acre. The northern states recommended the best practice of pre-wetting nearly universally and typically provide yearly estimates of salt use with the goal of trying to reduce each year.

Discussion:

- A workgroup member asked if there were temperature ranges recommended for brine use. Based on the research to date, that information was not readily available.

- When asked about the comparability between the application rates used at different temperatures, it was noted that this information was similar among all of the survey responses and all of the organizations researched.
- A workgroup member stated that information from the northern states might not always be applicable to this region because it gets cold and stays cold in the north, but local weather is more variable during the winter (freezing, melting, re-freezing, etc.). It is possible for this region to have several kinds of conditions over a short period of time. Northern DOTs may also be responsible for smaller road networks. VDOT is responsible for the majority of the roads in Virginia, which represents the third largest road network in the nation. Maintaining road safety in a financially/economically responsible way is essential.
- Workgroup members discussed the importance of understanding the capabilities of different equipment to see what's possible with regards to application rates and BMPs. A workgroup member stated that this could be a part of what is considered in the pros and cons that will frame the BMPs.
- Lastly, the workgroup agreed that follow-up actions on the survey should include looking into how equipment used effects application rates. Later in the meeting it was also agreed that the survey should ask a question about using brine as a deicer and how surface temperatures are measured.

Will Isenberg presented slides on other application rate materials including thoughts from the Salt Institute and Phill Sexton's thesis summary.

Thoughts from the Salt Institute include looking at application rates like a process, not a number because several variables can influence appropriate rates at any given place/time. The result should, therefore, not be prescriptive (e.g. this is exactly what is needed), but a process of identifying an application rate, evaluating whether or not that rate was met, and if not, figuring out how to improve.

The summary of Phill Sexton's thesis focused on his analysis of application rates in the private winter service industry. By comparing application rate guidelines to measured application rates, the study concluded that current rates of salt application for parking lots and private roadways are higher than the majority of the recommended guidelines. These rates and frequencies of application increase when contracted Levels of Service or perceived levels of quality for snow and ice controls are increased. The study concluded that higher salt application rates are primarily driven by contract types that promote more material use and profit potential. As a result, the study proposes industry lead application rate guidelines, seasonal variance contract models, and liability reform as potential solutions.

Discussion (thoughts from the Salt Institute):

- A workgroup member asked if the operators understand the relationship between application rates and Levels of Service? A workgroup member from the private winter maintenance industry explained how the contracts explicitly state the Level of Service. Private contracts are typically based on bare, wet pavement and application rates are determined based on what it would take to meet that.
- A follow up question asked whether or not any Levels of Service were related to application rates during the survey? The closest example of this was the Tennessee rates, which are not prescriptive, but use a visual representation of what are acceptable rates using pictures.
- The frequency of salt application was highlighted as an important consideration. Higher than necessary frequencies of salt application may be the bigger driver of excess salt as contractors go back to sites per the request of the contracting business or per a perceived need to provide the extra quality of service.

Discussion (Phill Sexton's thesis summary):

- Phill Sexton elaborated on his thesis results by confirming the previous workgroup member's statement about private property Levels of Service aiming for bare, wet pavement. Since the primary contract model in Virginia is time and materials, providers are being paid by the amount of salt used. People expect to see the salt and hear the sound of its crunch. With this contract model in place, there is no reason to be efficient with salt use. Also, there is a lot of $MgCl_2$ and $CaCl_2$ (double the chloride) being used in the NoVA region.
- A workgroup member asked, how do you encourage people to get away from the time and materials standard contract model? The seasonal variance contract model was discussed as an option. Since this contract model comes with a predetermined cost for the season, it acknowledges that to provide this service, there are preparation costs (e.g., training, equipment, etc.) that will get you more prepared and knowledgeable providers. The fire department was used as an analogy. The expectation is that the fire department will show up. If the fire department was paid by the fire, the result may be different. Snow plows are paid by the storm and only get paid when plowing. In a seasonal variance contract model, operators get paid whether it snows or not.
- Asking whether or not the local market is ready to segue from time and materials contracts to a seasonal variance model, Phill explained that time and materials contracts are typically seen as good because money is saved if it's a light season. However, over the long-term, there really are no cost savings as there can also be years with lots of snow. The seasonal variance contract model is developed as a win-win model because there is a floor to ceiling model that accounts for a variance if it was a light or heavy snow year. In other words, there is a built in mechanism that gives back a percentage of the contracted costs to either the customer or the contractor, depending on the amount of service actually provided (i.e., the number and severity of storms). A workgroup member mentioned that this was similar to a lump sum contract model.
- It was mentioned that the Non-Traditional BMPs workgroup may want to consider Seasonal Variance contract models in their evaluation of contract models.

Action Item: Traditional BMPs (Tony Migliaccio, Greg Waters, and Will Isenberg)

Tony Migliaccio discussed BMPs currently used on the George Washington Memorial Parkway. The Parkway includes 195 lane miles, all draining to the Potomac River. Given this circumstance, The Parkway wanted to reduce salt use even though they had a limited budget. Tony stated that they adopted their Salt Management Plan from the Maryland Highway Safety Administration's Salt Management Plan. The plan addresses Level of Service expectations and BMPs. Tony mentioned various deicing products used by the George Washington Memorial Parkway and the costs associated with those products. Training (e.g. snow college) is used to promote common sense winter operations with the goal to use no more salt than is needed. Drivers use 23% brine solution and measure road temperatures with laser thermometers. A BMP that has worked really well is to keep snow/ice from adhering to the roadway – limiting/preventing any snowpack from forming. A tool that they use to accomplish plowing more quickly is the use of side-wing plows, which uses one truck to get two lanes clear in one pass.

Discussion:

- There was a request to share the Maryland BMP manual.

Greg Waters discussed BMP resources shared by Snow and Ice Management Company including Best Practice Guidelines for Sustainable Salt Use, Snow and Ice Control for Parking Lots, Platforms, and Sidewalks, and Smart about Salt Self-Assessment Forms. Three aspects were highlighted including the anti-icing policy and process (from SIMA) and the importance of including 1) anti-icing (i.e., pre-treatment of surfaces) as part of the recommended BMPs, 2) the importance of using the appropriate chemicals at the appropriate temperature, and 3) the importance of pre-season inspections of the property, especially for the private sector.

Will Isenberg presented slides to overview available BMPs and noted that the categories used in the summaries do not need to be the final categories – they just seemed appropriate for this purpose. After reviewing a number of BMP manuals and other technical resources, he concluded that the list of BMPs developed in a short and detailed form likely represent the universe of available BMPs for snow and ice management operations.

Recommendations Scoping

During the break, workgroup members contributed additional thoughts on the developing recommendations. Those included:

- What information do operators/supervisors need to determine the best application rate? Is this information available, and how should it be communicated?
- The Salt Institute Award Survey should serve as a baseline of where we are and where we need to go.
- A summary of application rates should include reasons/factors that need to be considered in order to choose an application rate.

After sharing the contributions outlined above, the question was then raised of how to take all of this information and frame it for the workgroup's two categories of final recommendations (application rates and BMPs).

Application Rates

- A workgroup member stated that there is no need to reinvent the wheel for recommended application rates due to the large amount of existing work completed by others.
- The workgroup expressed a desire to focus on the process of improving application rates, rather than prescribing specific rates. Start with target numbers, then measure application rates and identify areas for continual improvement.
- The workgroup agreed that every operation is different and therefore there needs to be a focus on process. Example application rates from the literature should be available as a resource to frame continual improvement.
- It is difficult to have pavement temperature information to vary application rates. It could be helpful to assist folks in finding road temperature information in order to identify the appropriate application rates.
- A workgroup member emphasized the need to tie Levels of Service to application rates. Since Levels of Service vary for different operations, the workgroup agreed they should assume that rates are tied to Levels of Service and find a way to discuss the Levels of Service in relation to application rates. It was recommended that there be a messaging/communication aspect considered in the Education and Outreach Workgroup.
- When workgroup members discussed changing expectations for Levels of Service, some members identified this as a long-term goal, but nothing to consider at this point in time.

- The workgroup agreed that a primary recommendation of this workgroup should be a decision-making process to identify an appropriate application rate, evaluate whether or not it was achieved, and when it was not achieved, identify reasons for exceeding the rate in addition to opportunities for improvement.
- As a part of this discussion, workgroup members discussed the industry need for good ways to measure salt usage and to calibrate equipment.
- Workgroup members also discussed factors that may present challenges for meeting identified application rates. One challenge identified was the need to prevent snow and ice from bonding. A workgroup member estimated that without this type of prevention, 4-5 times more salt is needed. Other challenges identified by workgroup members included temperature changes that cause re-freeze and therefore reapplication, changes in precipitation type throughout the storm, different types of equipment and their limitations, and the drastic variation in pavement temperatures due to local conditions (e.g., topography, tall buildings blocking the sun, etc.). As a result, workgroup members agreed that the proposed process should include considerations for these reasons and opportunities for improvement in the evaluation process.
- Outcome of this discussion: ICPRB or DEQ will develop a draft process for adopting application rates that includes strategies for evaluating and adjusting practices to meet application rates over time. After this draft process is prepared, it will be shared with workgroup members for their review and comment. The process will be based on the idea of continual improvement.

BMPs

- The workgroup discussed the desire to recommend priority BMPs that all operations should incorporate in their practices.
- It was suggested that the workgroup consider highlighting BMPs with the greatest possibility to reduce salt. Other suggestions for priority BMPs that may work for all operations included post-storm or post-season operations evaluations, training programs, anti-icing and calibration.
- Discussions around the proposed priority BMPs returned to the acknowledgement that every operation experiences different barriers to BMP implementation in addition to different opportunities for BMP implementation. Therefore it was agreed that proposing explicit priority BMPs may set unrealistic expectations.
- It was recommended that the workgroup recommendations consider short-term BMPs (i.e., BMPs that can be implemented by an operation with existing resources) and long-term BMPs (i.e., BMPs that require additional investments to implement).
- With this concept in mind, the workgroup decided to recommend a process for winter maintenance planning that identifies 1st priority BMPs (i.e., the short-term BMPs), and 2nd priority BMPs (i.e., the long-term BMPs). As a part of this winter maintenance planning process, resource needs would have to be identified for 2nd priority BMPs.
- It was noted that this policy process is similar to that of the Sustainable Winter Management (SWiM) Certification audit guidelines.
- Outcome #1 of this discussion: Camila Goncalves Dias (Ft. Belvoir) agreed to draft this process. Once it is drafted, it will be shared with the workgroup for review and comment.
- Outcome #2 of this discussion: DEQ will update the BMP list with pros and cons and share it with the workgroup for review and comment.

Meeting Wrap-up and Next Steps

DEQ requested at least one volunteer to present on the developing recommendations of the Traditional BMPs Workgroup at the 3rd Stakeholder Advisory Committee meeting (to be held on May 29, 2019).

DEQ also requested volunteers from this workgroup for the Steering Committee, which will be responsible for the initial reviews of the SaMS recommendations document.

DEQ sent out a follow-up survey on March 14, 2019, to obtain additional feedback from workgroup members. In the survey, members could also volunteer for the steering committee or to present at the 3rd Stakeholder Advisory Committee meeting.

Handouts from the meeting are available on the SaMS Meeting Materials website.

All information, questions, additional resources, etc. should be emailed to Will Isenberg (william.isenberg@deq.virginia.gov) and Dave Evans (David.Evans@deq.virginia.gov) to reduce email traffic among workgroup members.

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Meeting notes were prepared and submitted by the Interstate Commission on the Potomac River Basin.

Additional Feedback Contributed to the Follow Up Survey:

No additional feedback was received.