

Proposed Changes to Allow Roadway Milling and Alternative Delineation in Wet Conditions

April, 2023

*Approved April 24, 2023
by Ann L. Gammell, Chief Engineer*
ANN L. GAMMELL

Prepared by the:
State of Vermont
Agency of Transportation



Contents

Background.....	3
What Is the Current State.....	4
Why the Agency Wants to Make a Change	5
The Proposed Change in Language and Process	5
Concerns and Concurrence from Agency Stakeholders	7

Background

During the 2022 construction season Resident Engineer (RE) Staff emphasized the current General Special Provision's (GSP's) of the 2018 Standard Construction Specifications prior to beginning roadway milling operations on highway resurfacing projects:

Section 646.04 GENERAL APPLICATION OF MARKINGS.

"All temporary pavement markings, including line striping targets when used, shall be applied so that at the end of each working day, all centerlines, edge-line, island markings, gore markings, lane lines, special markings, etc. are in place on all paved surfaces where traffic will be maintained. During paving and milling, work shall be scheduled so that the pavement markings are complete immediately after the paving and milling operations cease for the day."

Section 646.12 (c) Line Striping Targets.

"Line striping targets shall be installed in accordance with the manufacturer's requirements. Line striping targets shall not be nailed to the surface."

Upholding these specifications lead RE's to shut down milling operations due to forecasted rain and when wet road surfaces were expected at the time of temporary pavement marking application. Previous construction seasons, prior to upholding these specifications and shutting down operations, the decision to perform milling in the rain was made in the field between RE and Contractor, with an agreed upon delineation plan deployed at the end of the shift until conditions allowed for temporary pavement markings to be applied. Examples of temporary delineation were nailing down LST's at an agreed upon spacing, using cones or barrels to delineate the edge of pavement, using signs or PCMS's to inform traffic of the limited or no pavement markings ahead. These methods did not conform with specification or MUTCD but was best engineered judgement given the situation at hand and the resources available.

Shutting down milling operations last season due to a potential wet road surface at the end of the milling shift led to disagreement between the Agency and industry. This situation was brought up statewide during construction season and led RE's to shut down all milling operations when rain was in the daily forecast during milling operations. Industry tried to get ahead of this situation by taking pre-emptive measures, including painting double markings on centerline to mill half roadway width in the rain, milled ramps during rain and deployed alternative delineation measures until markings could be applied, and submitted RFI's describing pre-emptive plans to maintain markings and delineations after milling in the rain. The Agency allowed these measures to continue milling in the rain, including approval of the following RFI - Milling in Rain on 6/23/22.

Peckham Road Corp. is requesting to perform the Fine Milling continuously on rainy days with adequate visibility and while still working safely and with equivalent quality as opposed to stopping due to rain. Peckham Road Corp. is proposing milling 1 lane of the roadway, milling a "flush transition joint" on centerline to allow traffic to cross over easily when needed, as well as painting an additional third yellow center line the previous day to ensure that the temporary paint dries, and traffic is maintained safely the following day when one of the yellow line's is removed during milling. Additionally, Peckham Road Corp. would place cones along the shoulder to increase the safety of the traveling public.

Agency Note: Please ensure that "Uneven Lanes" signs are utilized, as per MUTCD.

Looking back on how long these specifications have been in place and now being highlighted and upheld statewide. Section 646.04 GENERAL APPLICATION OF MARKINGS has been in place since the 2011 Standard Specifications Book as:

Section 646.04(a) Placement of Markings.

“All interim pavement markings, including line striping targets when used, shall be applied so that at the end of each working day all centerlines, island markings, gore markings, lane lines, special markings, etc. are in place on all paved surfaces where traffic will be maintained. During paving and cold planing, work shall be scheduled so that the pavement markings are complete immediately after the paving and cold planing operations cease for the day. All required markings shall be completely placed before dusk.”

Section 646.12 (c) Line Striping Targets was implemented in the 2018 Standard Specifications book with the addition of.

“...Line striping targets shall not be nailed to the surface.”

This past winter, Tech Pave discussed this issue and what could be changed to allow milling in the rain and on wet surfaces and alternative delineation plans. Industry described the delay from last season as significant, as delaying the first critical path operation on a paving project schedule, that only a few crews statewide can perform, had a compounding effect on project schedules and delayed subcontracted work as well. Delaying the beginning operations on paving projects does not allow Contractors to finish contracts on time or within seasonal limitations, given the short window to perform milling ahead of subsequent operations. Significant delays to project schedules statewide occurred in conjunction with project completion dates not being met and operating outside of seasonal limitations.

The Tech Pave Construction Working Group drafted specification revisions by reaching out to NHDOT and Maine DOT to determine how they currently manage milling in the rain and subsequent delineation once the work was complete. The response from both states was similar. Their specifications do not state that milling is allowed in the rain, but state that roadway markings need to be in place after operations are complete. If rain occurs during milling, the Engineer and Contractor use engineering judgement to create alternative delineation measures, such as nailing down LST's, milling half the road width to maintain CL markings, using traffic control devices along edge of pavement, and alternative measures are described in the traffic control plan for Maine DOT when milling half road width. The Construction Working Group also outlined both Agency and Industry needs in a specification that would allow milling in the rain and discussed specification options that would prevent the shutdown of work while keeping the Agency's needs in mind of completing projects on time and providing temporary roadway delineation for the motoring public until all temporary pavement markings could be applied.

What Is the Current State

For the 2023 construction season, RE's are upholding the current specifications in Section 646 and requiring that temporary pavement markings be applied immediately after milling operations are complete and are not allowing nailing of LST's if temporary pavement markings cannot be

applied. Milling operations have been shut down if it is raining or forecasted to rain during milling and subsequent marking operations by Written Order from the RE.

Contractors have submitted multiple RFI's on a project-by-project basis in which they would like to propose an alternative roadway delineation plan if temporary markings cannot be applied after the milling shift and would be applied once conditions allow. These RFI's have been rejected until the Agency has concurrence on a plan and process that would allow milling in wet conditions.

Why the Agency Wants to Make a Change

Upholding the current specifications has led to statewide shutdown of milling operations if the road surface was wet or rain was in the forecast, which has led to delays in project schedules which have had negative effects on the overall project schedule and for the project stakeholders. Delaying the first critical path operation on a project schedule has a compounding effect on project schedules statewide. Additionally, operations following milling are delayed. With the short seasonal window to perform roadway resurfacing projects in Vermont. These shutdowns have caused statewide schedule delays for the Contractors performing the work.

Feedback provided by our tri-state partners notes that they do not have specific language regarding milling in the rain, or any specific alternative roadway delineation methods even though this work is being performed on a project-by-project basis. Both states understand the need to keep contractors working as much as possible given the large amount of work to be performed in a short season, so they work with their industry partners to allow alternative means of delineation if temporary markings cannot be applied at the end of the milling shift. The Agency has reached out to other states, National work zone committees, and FHWA as well. Hearing back from a few DOT's that milling in the rain is not allowed, with Washington DOT allowing milling in the rain. No response back from FHWA.

Current Agency specification reference traffic control plans and devices conform to the MUTCD. Regarding this situation, MUTCD (6F.78) states that "Warning signs, channelizing devices and delineation shall be used to indicate required road user paths in the TTC where it is not possible to provide clear a clear path by pavement markings."

Knowing that temporary alternative forms of delineation are being used regionally and have been used on Agency projects up until last season, it is the Agency's obligation to consider and agree what safe and uniform applications are for alternative delineation methods that will assist with limiting the number projects required to be shut down due to precipitation. These specifications that are limiting work have been in place for over 5 years, therefore safe alternative ways to delineate the roadway after milling is attainable to provide safe travel until temporary pavement markings can be applied.

The Proposed Change in Language and Process

There are two phases to the proposed change in specification language and process, including a current change in process that will affect construction projects this season and a future change in specification language and process that will affect the following construction seasons.

the change in process will be to allow Contractors, per their request, to submit an addendum to their traffic control plan that details alternative roadway delineation if temporary pavement markings cannot be applied. This will also address how to delineate the work zone if events occur that are not anticipated by the contractor and pavement markings cannot be applied at the end of a work shift. The review team and acceptance process for the traffic control plan will be the same for this addendum. The addendum shall address the following conditions as a minimum.

- 1) The addendum shall be a Contractor generated narrative describing how traffic markings and delineation will be in place after milling in wet conditions and prior to opening to traffic.
- 2) Include how CL markings and edge of the travel lane or roadway will be maintained or delineated after milling in the rain? Include use of temporary paint, barrels, cones, use of existing delineation devices, for example existing guardrail, and spacing of devices and markings along edge of pavement.
- 3) What signage or messages will be in place to inform the travelers of limited pavement markings ahead?
- 4) If ramps or other areas off mainline are milled in the rain, how will these areas be delineated?
- 5) Indicate how the contracted temporary markings shall be applied, and temporary delineation devices removed as soon as conditions allow.
- 6) How will extended time and length of double roadway markings be prevented?
- 7) What considerations will be made if the forecast indicates several days of wet weather?

Future construction seasons will be affected by revisions in specification language in the 2024 Standard Specification Book including a change in process. Understanding this is a novel specification, the revised Sections 641.02 General Construction Requirements and Section 646.04(a) Placement of markings will be introduced as a notice to bidders until the Agency is confident in this change. The notice to bidders will require the Contractor's traffic control plan to include a roadway delineation plan that will describe and illustrate the alternative delineation methods that will be in place following the milling operations when conditions do not allow for the application of temporary pavement markings. Traffic control plans are approved by the Project Manager before construction takes place on a project. The draft language is as follows.

"The submitted alternate or site-specific traffic control plan shall also include a contingency plan, hereafter referred to as the Roadway Delineation Plan, to maintain traffic when temporary pavement markings cannot be applied immediately after operations cease. The Contractor shall operate in accordance with the approved Roadway Delineation Plan, and as directed by the Engineer, when temporary pavement markings cannot be applied due to wet roadway surfaces, or events that could not be anticipated by the Contractor. The plan shall include a narrative description of the proposed plan, along with a layout of the proposed lane configurations, sequence of operations to maintain delineation, proposed traffic control devices and locations, for example signs, barrels, and cones. All pertinent dimensions, temporary traffic control device spacing, temporary lane widths, and distances from existing traffic control devices shall be labeled. Temporary pavement markings shall be applied as soon as roadway conditions allow.

The Contractor shall have on project all necessary materials, equipment, and labor to deploy the Roadway Delineation Plan. Payment for roadway delineation, except for temporary pavement markings, will be considered incidental to the appropriate Section 641 pay item in the Contract. If the Contractor elects to use temporary pavement markings, payment shall be made under the appropriate Section 646 pay item in the Contract.”

Additional language to Section 646.04(a) Placement of markings will allow the roadway delineation plan to serve in place of temporary pavement markings until markings can be applied.

“...During paving and milling, work shall be scheduled so that the pavement markings are complete immediately after the paving and milling operations cease for the day. If traffic is to be maintained and temporary pavement markings cannot be applied, the Contractor shall adhere to the approved Roadway Delineation Plan in accordance with Subsection 641.02.”

Concerns and Concurrence from Agency Stakeholders

Multiple Sections of the Agency, including the Construction, Pre-Contract and Specification, Traffic Operations/Mobility, Pavement Design, and Maintenance held a meeting to discuss concerns and seek Agency consensus, prior to an executive decision on this proposal.

The Agency has allowed milling in the rain and field determined alternative forms of roadway delineation until the 2022 Construction season where a strict conformance to specifications led to statewide shutdown of milling operations in the rain. The Agency is on board to continue allowing milling during wet conditions knowing that temporary pavement markings cannot be applied afterwards. The Contractor will adhere to their amended traffic control plan, accepted by the Agency, that provides alternative delineation methods for safe travel as necessary.

There are many variations that can be applied to this situation that may not allow for alternative forms of roadway delineation and milling in the rain, such as classification of roadway, geographic location, traffic level, severity of rain, time of year, scope of work, etc. These variations will be examined during the traffic control plan amendment review and if accepted, the RE will consider these factors when deciding to mill in the rain on a project. Performing roadwork in other forms of inclement weather, such as snow or fog will not be permitted for the safety of the workers and the traveling public.

Without a decision, the Agency will be required to shut down all milling in wet conditions moving forward, and pose a significant delay in construction, as milling in wet conditions and not applying subsequent temporary pavement markings is non-compliant with current specifications.

The Agency’s overall concern is the safety of all those involved, workers and the traveling public for all modes of transportation (bicyclist, motorcycles, pedestrians, drivers). The need of specificity and concurrence should not be taken lightly. If milling is performed in wet conditions and there are no predetermined alternative means of roadway delineation, this could result in increased accidents with significant and legal consequences.