



Montana Department of Transportation
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Helena, MT 59620-1001

MEMORANDUM

To: Kevin Christensen, PE
Construction Engineer

From: Paul Jagoda, PE
Construction Engineering Services Engineer

Date: 05 July 2011

Subject: Construction Review Report – Great Falls District
STPS 218-1(10)19
East of Conrad - East
Control Number: 6977
Contract Number: 10710

Please find the attached Construction Review Report for the subject project. If you have any questions or require additional information, please contact me or Terry W. Wickman.

PJ/TW/tww

cc: Dwane Kailey, PE	Suzy Price	Christie McOmber, PE
Jim Walther, PE	Tim Conway, PE	Jeania Cereck
Mick Johnson, DA	Tom Martin, PE	Stan Kuntz, DMS
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Michael Kulbacki, PE-FHWA	Lee Grosch, PE	Jon Swartz
Alan Woodmansey, PE-FHWA	Dustin Rouse, PE	Stephanie Smith, DEO
Dan Smith, PE-FHWA	Tom Atkins	Construction Reviewers
Lisa Durbin, PE	Steve Prinzing, PE	Joe Nye
DCEs	DCEs	Devin Roberts
		DMSs

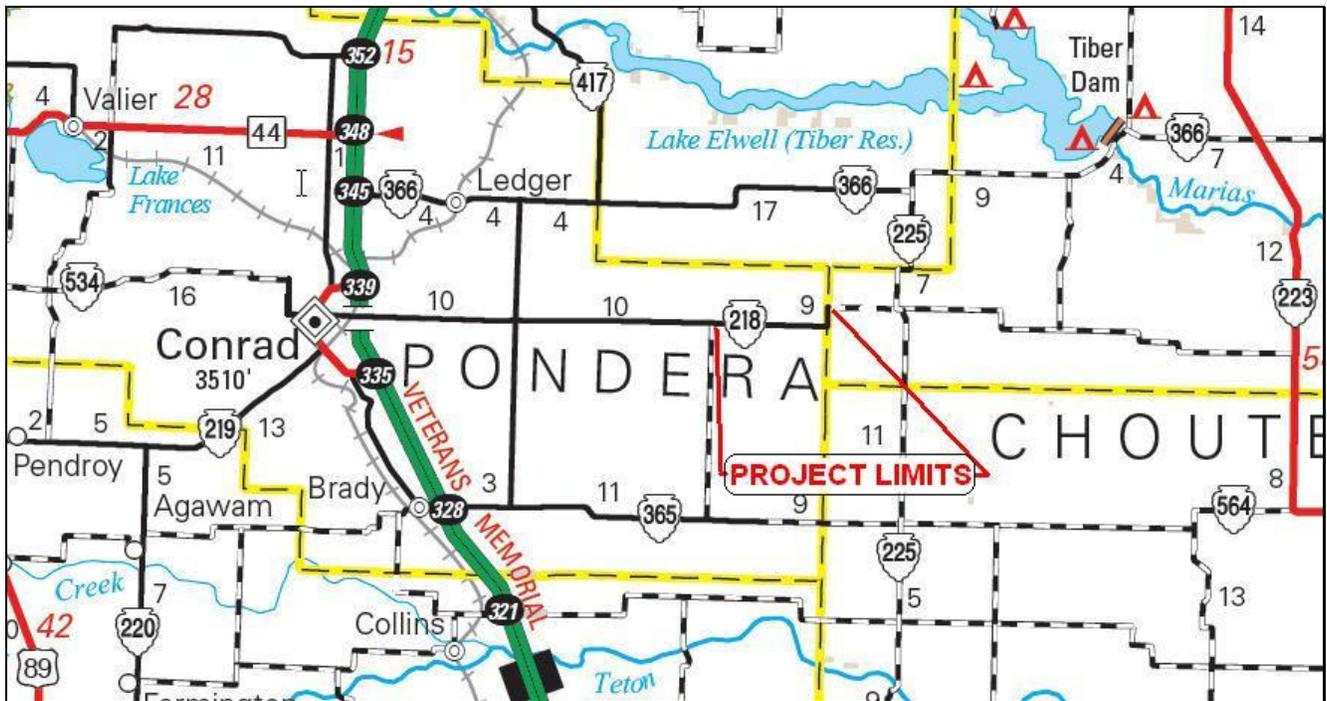


CONSTRUCTION ENGINEERING SERVICES PROJECT REVIEW REPORT

Project Number:	STPS 218-1(10)19	Letting Date:	29 July 2010
Project Description:	East of Conrad – East	MDT District:	Great Falls
Control Number:	6977	EPM:	Mike Klette
Contract Number:	10710		
Review Date:	16 June 2011		
Reviewed By:	Terry W. Wickman	In Company With:	Mike Klette, EPM Dan Ferestad, CET 5
Project Description:	<p>The project is located on State Secondary Route 218 in Pondera and Liberty Counties, beginning at RP 18.8 east of Conrad and extending east and north approximately 6.9 miles to RP 25.9.</p> <p>The work consists of either a cold in-place recycling paving option, or cold milling and Grade S Plant Mix Surfacing option. Other improvements consist of guardrail and bridge rail improvements, seal and cover, and other miscellaneous improvements.</p>		
Review Type:	<input type="checkbox"/> Constructability <input type="checkbox"/> Investigatory <input checked="" type="checkbox"/> Oversight <input type="checkbox"/> Post Construction <input type="checkbox"/> Subject Specific- <input type="checkbox"/> Training		

CONTRACT INFORMATION

Contractor:	Riverside Contracting Inc. – Msla
Contract Amount:	\$1,104,619.97
Contract Payments To-Date	\$ 159,879.62 (through 10 June 11 [Est. No. 3])
Contract Time/Completion Date:	40 Working Days
Contract Time Used to-Date:	7 Working Days
Award Date:	10 August 2010
Notice to Proceed Date:	16 May 2011 (Original) / 04 November 2010 (C.O. No. 1)
Date Work Began:	11 November 2010



Project Location

General:

As noted in the Project Description above, this contract provided options for either cold in-place recycling paving or cold milling with a Grade S Plant Mix Surfacing overlay. Both options included quantities for seal and cover.

The Contractor bid the cold in-place recycling paving option. Special Provision No. 2 stipulated a Notice to Proceed (NTP) date of 16 May 2011 in the contract. Change Order No. 1 changed the NTP date to 04 November 2010 for purposes of extracting samples for the mix design and for stockpiling materials. Once this work was completed, contract time was suspended until the original NTP date of 16 May 2011.

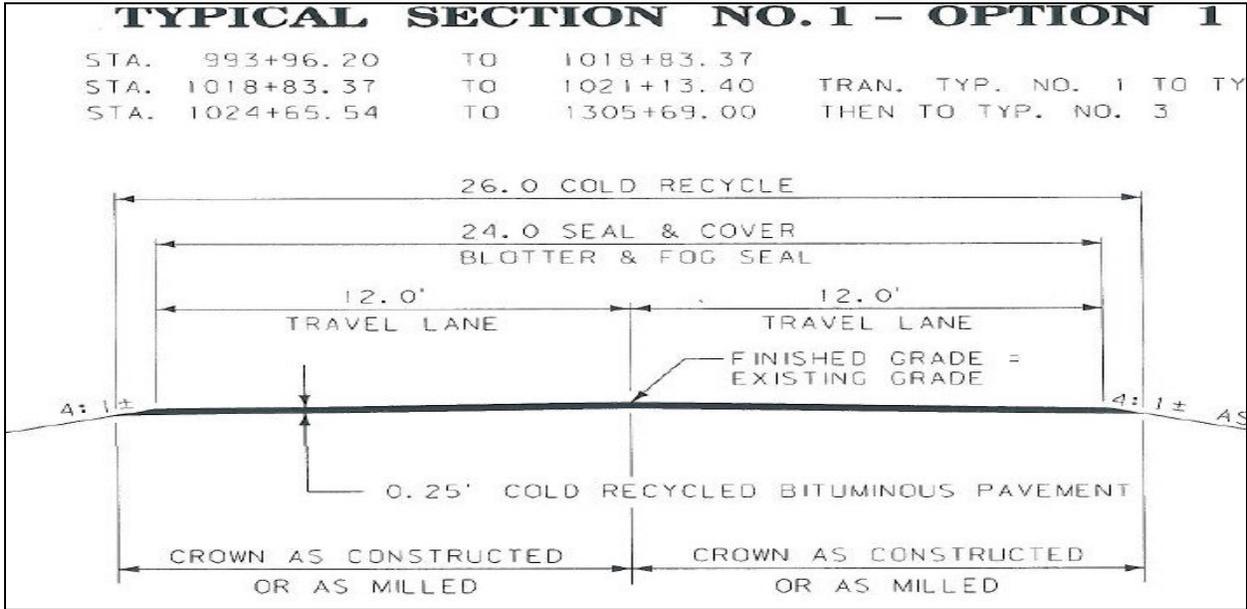
The plans called for the existing plant mix to be milled and recycled to a depth of 0.25' over the full-width of the roadway (26.0' to 26.6' per Typical Sections). The Contractor submitted a proposal to mill to an overall width of 25.0', which would leave an approximately 6" wedge of existing plant mix along each edge of pavement. Their rationale was that the remaining wedge of material would provide lateral constraint to minimize rollout and shoving during compaction, as well as reduce the risk of the mat breaking after the work is completed.

This proposal was reviewed by the MDT Pavement Analysis Section. They expressed concern that, if more than 6" of existing plant mix were to remain on the edges, it could lead to sympathy cracking from the existing

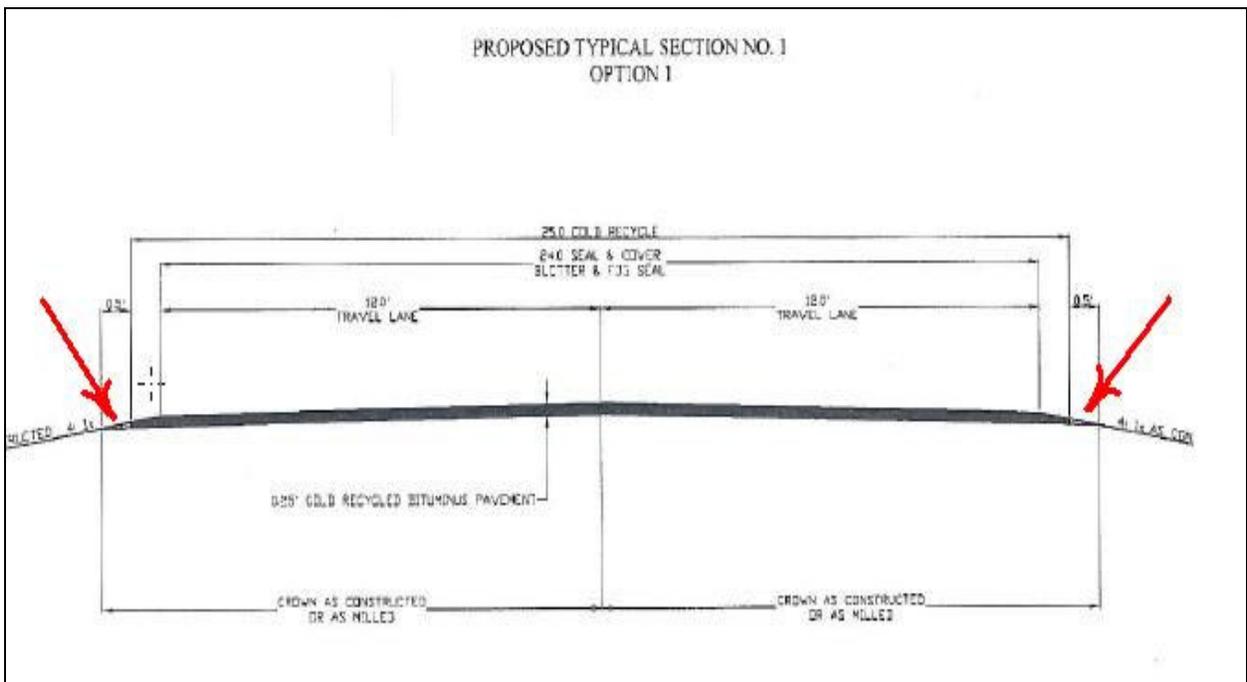


transverse cracks. While it was not discussed specifically during this review, it should also be noted that with the plan design requiring only a partial depth of the plant mix be milled (i.e., 0.25'), the recycled mat may also be subject to premature reflective cracking from the existing plant mix remaining after milling.

The District was receptive to this proposal and issued Change Order No. 2 for this change.



Plan Typical Section



Cold Recycle Width of 25.0' Proposed by Contractor – Leaving 6" +/- “Wedge” of Existing Plant Mix @ Each Edge



Phases Inspected: Cold in-place recycling paving operation; Temporary Traffic Control.

Work In Progress: The actual cold in-place recycling paving process began on 10 June 2011. The Contractor started work in the westbound lane, near the east end of the project (EOP) @ RP 24.7±, and proceeded until they reached the beginning of the project (BOP) @ RP 18.8±. The operation was then turned around and continued in the eastbound lane.

On the day of this review, work was approximately 2 miles from the EOP terminus in the eastbound lane. Barring anything unforeseen, the Contractor was anticipating finishing this operation the following day (17 June 2011), as they were completing about 2.1 lane miles per shift.

The mechanically-coupled equipment “train” extended some 185’ (±) and consisted of the following equipment: 1-water tender truck; 1-lime slurry tanker trailer; 1-cold milling machine (w/12.5’ cutting head); 1-vibratory screen deck/crusher combination unit; 1-pugmill-type reclaimer/blending unit; 1-asphalt emulsion tanker (pup); 1-paver w/pickup attachment; 2-tandem, steel drum rollers and 1- rubber-tire roller. The length of the “train” does not include the paver or rollers.



Cold In-Place Recycling Paving (CIPR) Equipment “Train” – Approximately 185’ in Length



Water Tender Truck Followed by Lime Slurry Tanker Trailer



Cold Milling Unit w/12.5' Cutting Head



Discharge Chute for Oversize Crack Sealant

Vibrating Screen Deck w/Crushing Unit

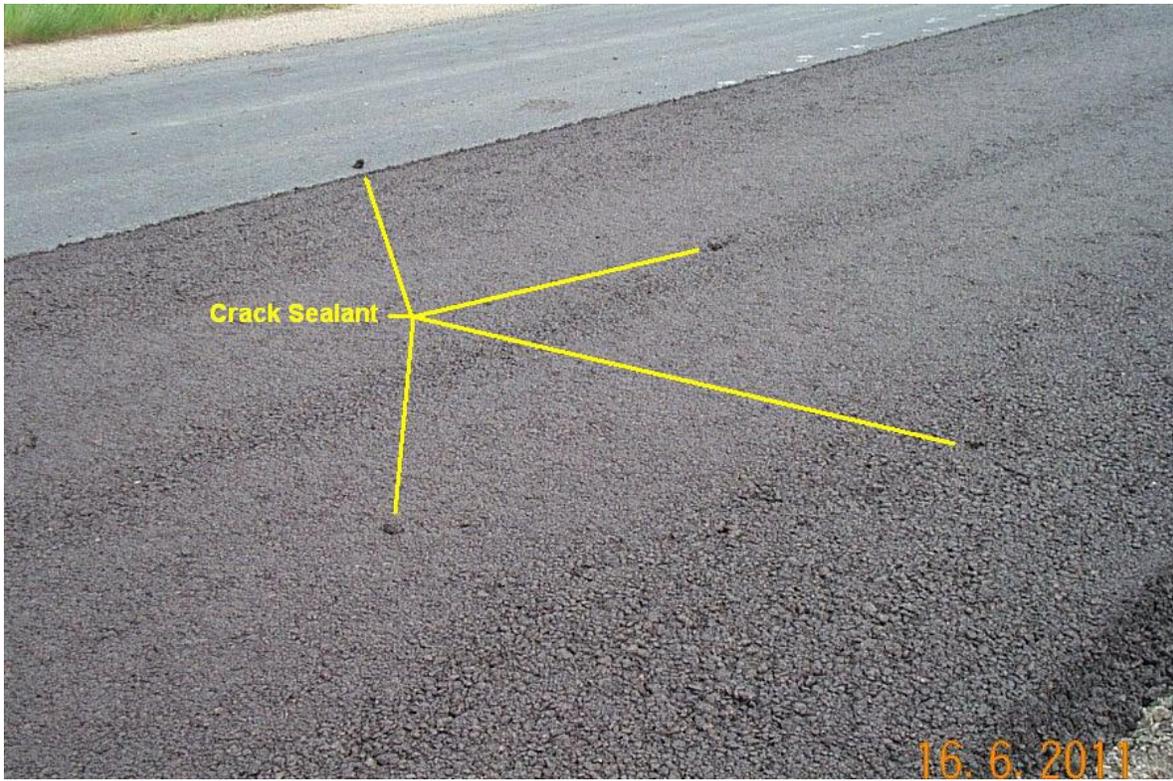


Pugmill-Type Mixer Unit – Combines Recycled Asphalt Pavement/Lime Slurry/Emulsified Asphalt



**Processed Windrow of Recycled Asphalt Pavement/Lime Slurry/Emulsified Asphalt
Emulsified Asphalt Trailer (Pup) – Left**

Special Provision No. 30.C.3) specifically requires that 100% of the cold milled plant mix material is to pass a 1.25” screen. And, that all crack sealant retained on the 1.25” screen is to be rejected and wasted. However, the Special Provision does not address what is to be done with the pieces of crack sealant passing the 1.25” screen. The two photos on page 9 illustrate those 1.25” minus pieces that typically made it through the screen deck and ended up in (or on) the reclaimed mix behind the paver. While the pieces on the surface can be easily seen and removed, those that can still be seen but end up being partially embedded in the mix are another matter. If those partially embedded pieces are removed, they would end up leaving “divots” in the new pavement surface. In addition, there is undoubtedly an unknown amount of crack sealant that is fully embedded in the new mix that cannot be seen. Since the Special Provision didn’t address this issue, the EPM doesn’t have much in the way of any “teeth” to hold the Contractor to under the contract, as far as requiring any corrective action is concerned. It is recognized that 100% removal of all strings or pieces of crack sealant from within the new mat may not be practical or cost effective. But, for future projects with significant amounts of crack sealant (such as this one), it is recommended that consideration be given to addressing any corrective action that may be needed to remove and repair the “divot” areas, especially if the recycled mat is to only receive a seal and cover application afterward (such as this project).



Remnants of Crack Sealant Visible on Surface or Partially Embedded in Reclaimed Mix Directly Behind Paver



Remnants of Crack Sealant on Surface of Reclaimed Mat



Example of Transverse Crack Within Remaining “Wedge” of Existing Plant Mix After CIPR Paving That May Lead to Sympathy Cracking (See Discussion on Page 3)



Changing Worn Teeth on Cutting Drum – Teeth Needed to be Changed Twice per Day with this Material



Traffic Control: With this roadway being, essentially, a farm to market route, traffic is extremely light this time of year. Consequently, a flag station at each end of the anticipated run for the day was adequate for this operation. But, because of the equipment and workers necessarily having to be on the narrow PTW, a single pilot car was added to guide traffic through the Work Zone. Traffic was flowing smoothly through the Work Zone at the time of this review.

Erosion Control and Environmental Issues: Work is limited to the PTW only. Consequently, the need for Temporary Erosion Control BMPs is essentially non-existent.

Change Orders: Three Change Orders have been issued to date:

- C.O. No. 1 – Changes the Notice to Proceed date to 04 November 2010 to allow for securing of samples for mix design purposes and for stockpiling of materials only. A no cost change.
- C.O. No. 2 – Modifies the Typical Section to leave a 6” (±) “wedge of existing plant mix on each edge of the PTW pavement. Cost savings to the Cold Recycled Plant Mix item of \$9,526.00.
- C.O. No. 3 – Changes the Emulsified Asphalt CRS-2P to meet the new polymer requirements. Additional cost to contract of \$3,542.00.

Claims: None to date.

EPM Diaries: Did not review.

Questions from Project Staff: None.

Issues Discussed and Resolved: A number of isolated and small areas within the newly completed mat have been breaking up under wheel traffic. The Contractor-furnished mix design for determining the emulsified content (i.e. cold in-place recycling-engineered emulsion [CIR-EE] procedure) indicated that 3.0% emulsified asphalt was needed. However, once operations got underway on the roadway, actual field conditions made it necessary to adjust the asphalt content down to 2.0% in order to achieve optimum levels. While all density tests taken on the completed mat met, or exceeded, the minimum control strip target density of 97%, it is suspected that the underlying materials (i.e., surfacing gravel (if any) and subgrade) may have been, and is, contributing to the surfacing distress. Upon further inquiry, this Reviewer learned that a conventional centerline soil survey was not conducted for this project. Due to the programmed scope of work, only a few cores to determine



pavement depths were deemed sufficient. In hindsight, a full centerline soil survey would have likely provided useful information in determining how stable these materials are and whether this project was, in fact, a worthy candidate for cold in-place recycling.

To correct the “blow out” areas in the compacted mat, the Contractor has cleaned out the areas to sound material and placed hot mix asphalt in each.

Issues Discussed and Follow-Up Needed: See “Issues Discussed and Resolved” - above.

Areas of Good Practice/Positive Aspects: At the present time, the EPM is charged with administering contracts ranging from east of Tiber Dam (approximately 65 miles east of Conrad) to Duck Lake (approximately 104 miles NW of Conrad) to Marias Pass (approximately 95 miles WNW of Conrad). And, with a limited staff, Mike and his crew have done a commendable job of staffing their project to ensure proper inspection of the work.

Other Follow-Up Items: None.

-End of Report-