



POLK COUNTY MN

Hot-in-place Recycle Projects

LEARNING ABOUT HIR

First learned about it in 2019 at the NACE Annual Conference in Wichita, KS.

Chisago County MN did a research project thru the MN Local Road Research Board as well and presented at the MCEA Annual Conference in Brainerd, MN.

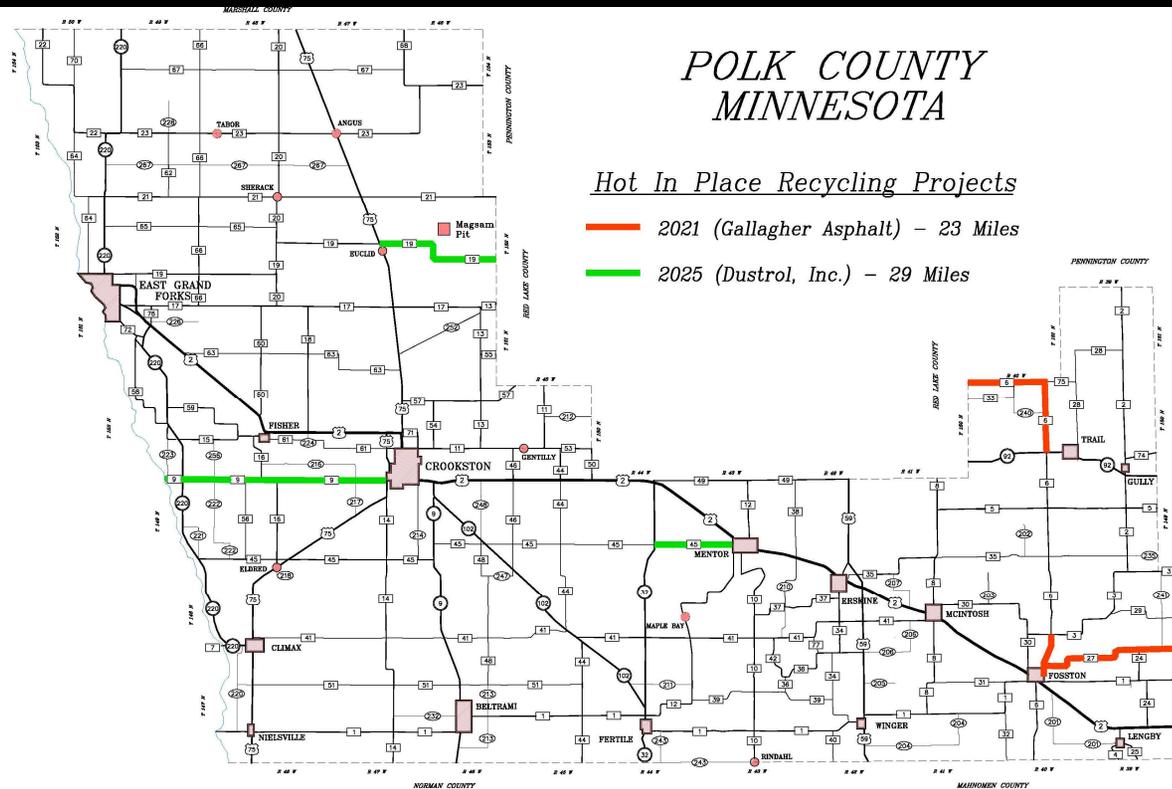
NEEDED TO DO HIR

In order to get an HIR Company to your county you will need at least 20 miles of roadway to make it cost effective.

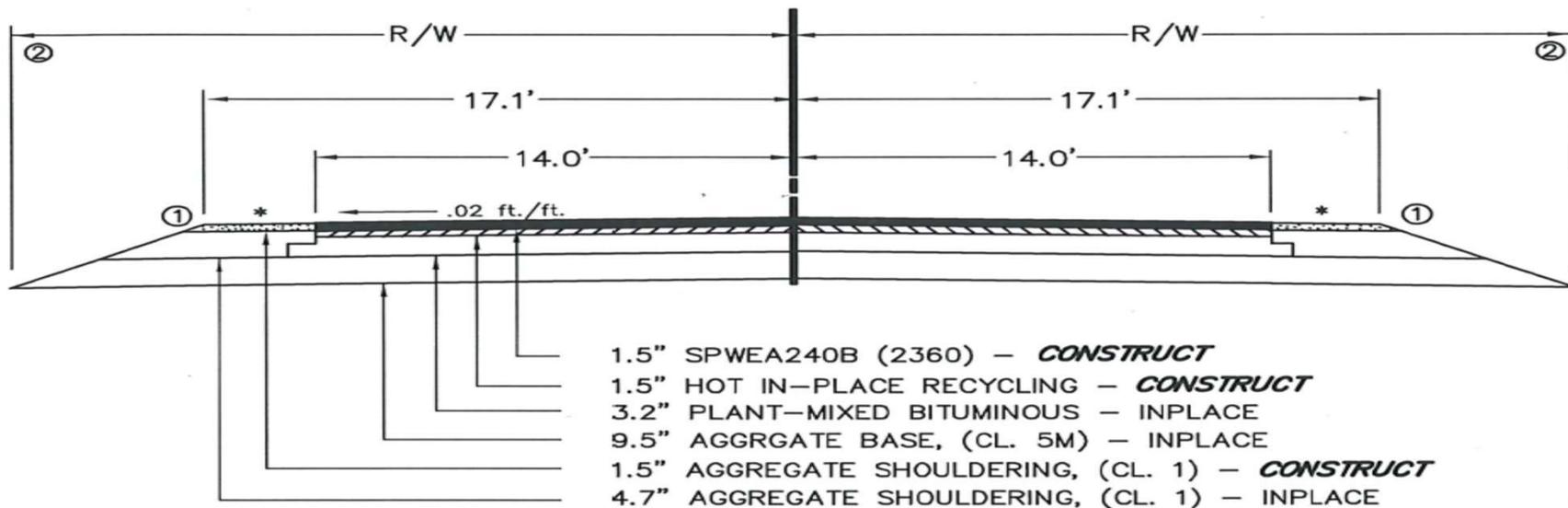
They may review the roads selected and depending on HIR process may cut cores to determine if the roadway meets the minimum requirements to provide their services.

After the bid process they may take samples from the roadway in order to run a mix design to determine the amount of emulsion and rejuvenator to prevent future rutting and cracking (Dustrol Copies in back)

MAP OF PROJECTS



2021 TYPICAL SECTION



SPECIAL PROVISIONS

S-20 (2331) HOT IN PLACE RECYCLING (HIR)

S-20.1 **2331.1 Description**

A. This shall be part of a multi-stage process of asphalt surface rehabilitation as well as a variable depth leveling course. This process consists of softening the existing flexible pavement with heat and thoroughly stirring, and/or auguring the mixture, applying asphalt rejuvenator and re-compacting the Hot In-place recycled surface. Installing HMA overlay is a separate function.

S-20.2 **2331.2 Materials**

- A. Rejuvenating agent shall be applied at an approximate rate of 0.1 gallons per square yard.
- B. Rejuvenating agent shall be an oil or emulsion capable of increasing the existing penetration to a value of ten (10) or above.

CONT

S-20.3 2331.3 Equipment Requirements

- A. The total equipment length of the pre-heater, Heater-Scarifier, and roller shall not exceed 150 feet, unless an additional preheater is required.
 - 1. Preheater
 - a. The preheating machine shall be a self-contained unit capable of operating at speeds from ten (10') feet to twenty five (25') feet per minute while uniformly heating the existing surface of the asphalt.
 - b. The entire burner assembly shall contain the ability to be hydraulically raised or lowered.
 - c. Hand hoses will be placed on unit to allow for pre-wetting of specific plants or objects.
 - d. The burner assembly shall be adjustable in width from eight (8') feet to fourteen (14') feet.
 - 2. Heater-Scarifier & Spraying Unit
 - a. The Heater-Scarifier machine shall be one self-contained machine specifically designed to reprocess surface layers of existing asphalt pavements. The Heater-Scarifier machine shall be a self-propelled and completely self-contained unit capable of operating at speeds of ten (10') feet to twenty five (25') feet per minute.
 - b. The entire burner assembly shall contain the ability to be hydraulically raised or lowered.
 - c. The burner assembly shall be adjustable in width from either eight (8') feet to fourteen (14') feet.
 - d. The scarifying unit consist of no less than two rows of spring loaded, carbon steel capped bolts.
 - e. Immediately in front of the tines of the scarifying unit, the prescribed application of rejuvenating agent shall be applied.
 - f. Rejuvenating agent must be administered by the means of either a spray bar or spinner system.

COSTS

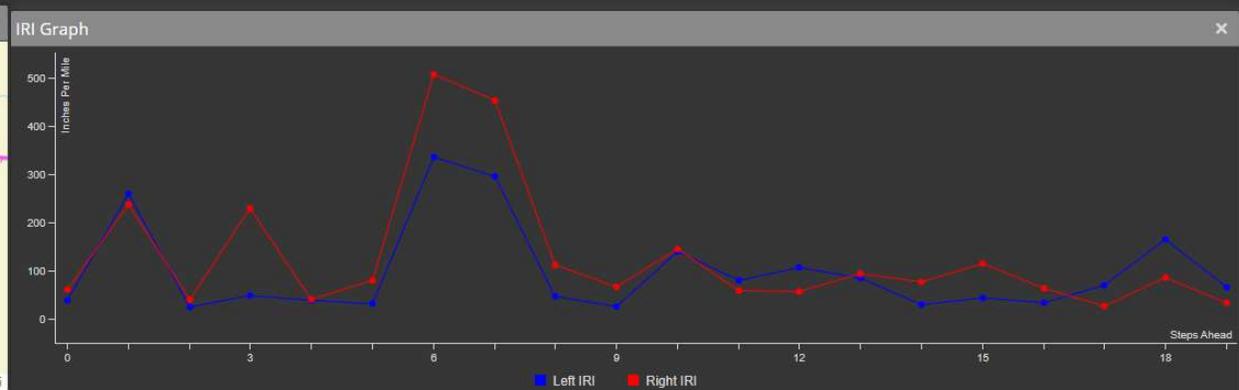
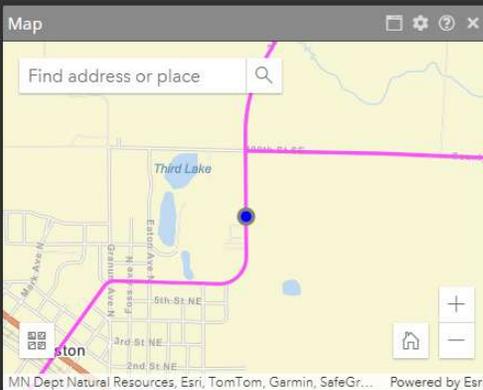
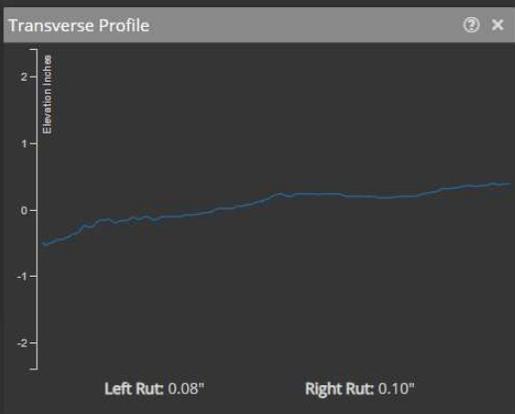
SAP 060-606-029 CSAH 6

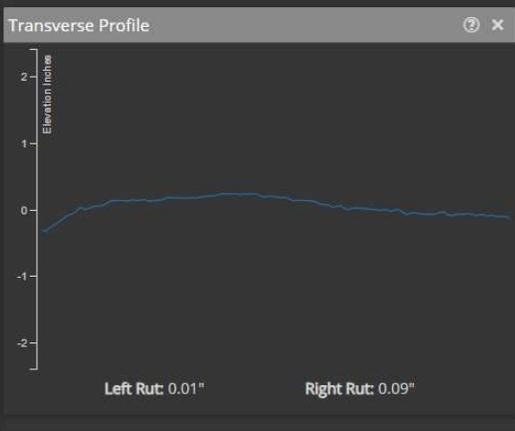
Base Bid

		Knife River Materials-Northern Minnesota				
Line	Number	Description	Unit	Quantity	Bid Amount	Total Amount
1	2221.51	SHOULDER BASE AGGREGATE CLASS 1	TON	1,400	\$10.32	\$14,448.00
2	2331.6	HOT INPLACE RECYCLE OF BITUMINOUS MATERIAL (1.5")	SQ YD	28,048	\$5.11	\$143,325.28
3	2331.61	BITUMINOUS MATERIAL FOR HOT INPLACE RECYCLING	GAL	2,805	\$0.01	\$28.05
4	2360.51	TYPE SP 9.5 WEARING COURSE MIX (2,B)	TON	2,700	\$47.30	\$127,710.00
5	2563.6	TRAFFIC CONTROL	LS	0.34	\$2,941.18	\$1,000.00
6	2580.5	INTERIM PAVEMENT MARKING (P)	L F	845	\$1.22	\$1,030.90
7	2582.5	6" SOLID LINE PAINT	L F	21,200	\$0.09	\$1,908.00
8	2582.5	4" BROKEN LINE PAINT	L F	2,150	\$0.07	\$150.50
						Total: \$289,600.73

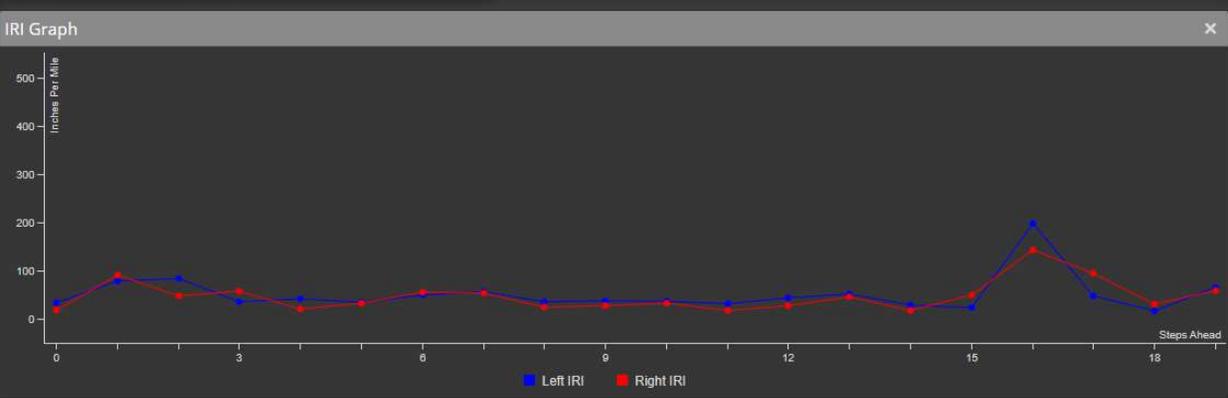
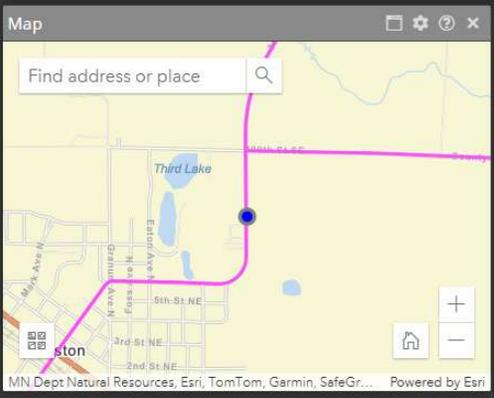
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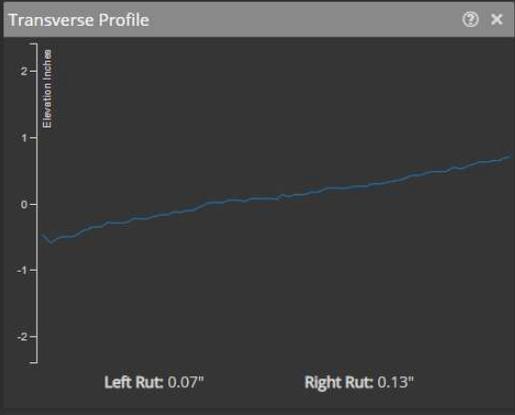




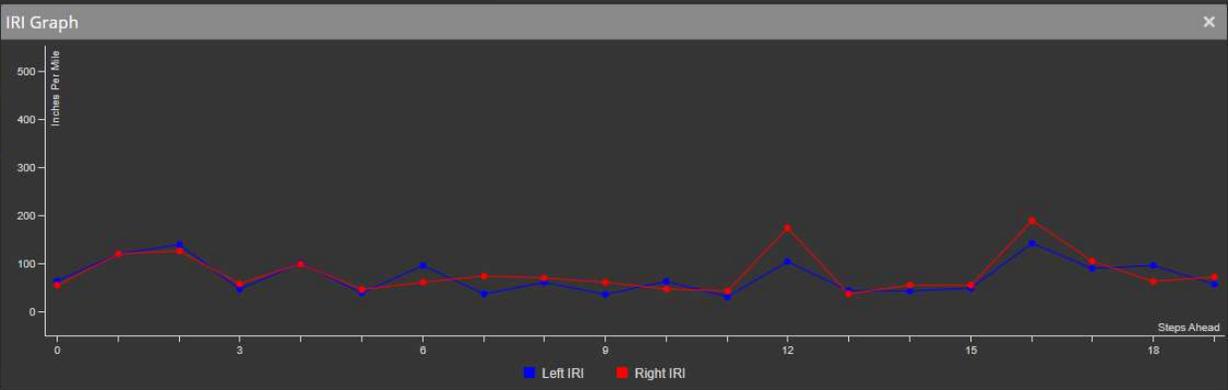
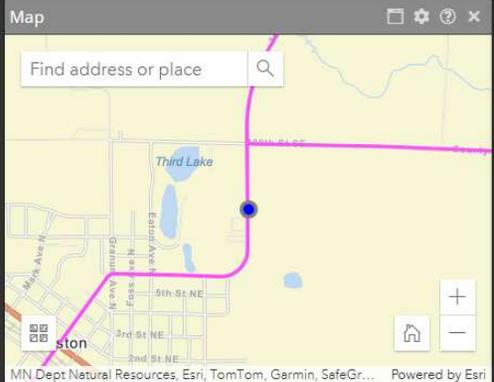


County: Polk Route: CS6 Mile Post: 6.642 Direction: Increasing Date: 07/20/2022 Coordinate: 47.583296, -95.736792





County: Polk Route: CS6 Mile Post: 6.469 Direction: Increasing Date: 07/29/2024 Coordinate: 47.583315, -95.736784



PROS

Rejuvenate's old pavement and helps eliminate reflective cracking

Less shouldering needed than 2-layer overlay

No waste at the end of the day

Equivalent to a 1" overlay in price

CONS

irregular pavement which requires another riding surface to be applied
(Calls from the public)

Weather temps have large impacts on daily production

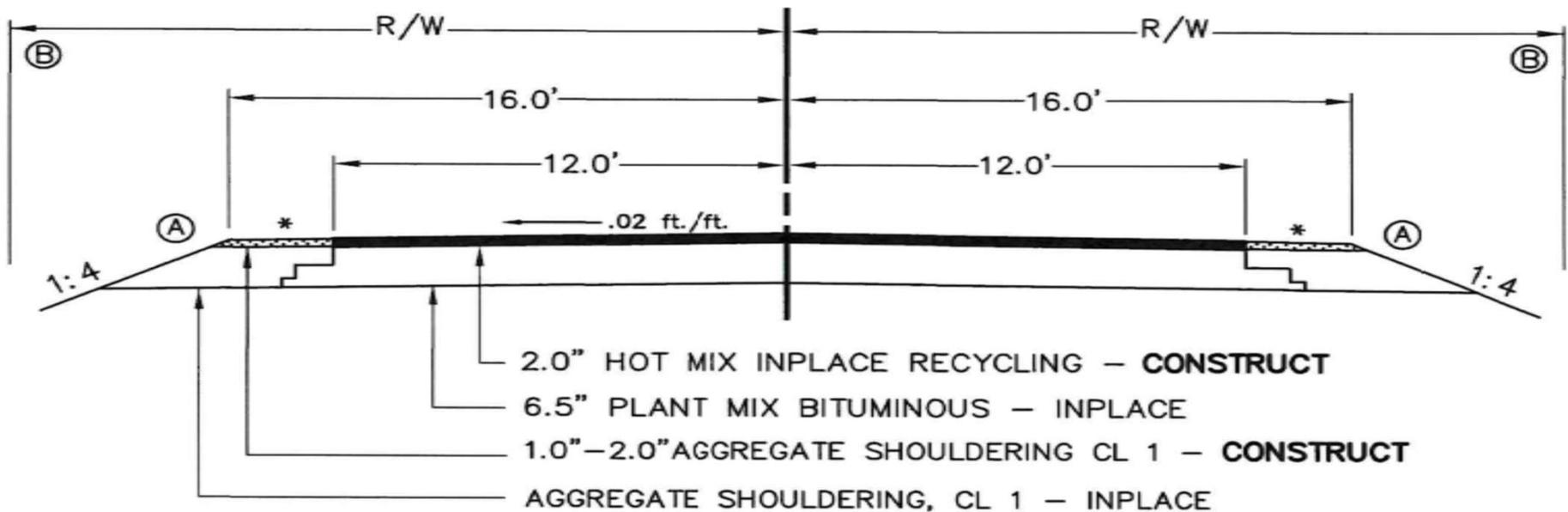
Difficult to control ride on HIR layer but can improve ride on final product

Lack of Construction Specifications related to HIR

Very few contractors with same equipment

Older Crack Fill material can cause issues with the tinning process

2025 TYPICAL SECTION



SPECIAL PROVISIONS

- C **Equipment**
Provide equipment that is capable of a continuous single pass, multi-step operation, including heating; milling/scarifying, introducing recycling agent, mixing the reclaimed material, redistributing the recycled material, placing the mix and leveling and compacting.
- C.1 **Heating Milling Unit**
Use a self-propelled unit capable of milling, heating the pavement and windrowing the asphalt pavement that is being processed. In addition, equip this unit with automatic grade controls to mill the desired depth of material to be processed.
- C.2 **Heating Scarifying Unit**
Use a self-propelled unit capable of heating the pavement and scarifying the asphalt pavement that is processed.
- C.3 **Tunnel Heater**
Use a self-propelled unit capable of heating the underlying pavement or the previously milled material, preventing the material from being scorched or catching on fire. The tunnel heater may be equipped with a milling unit.
- C.4 **Distributor – Paving Unit**
Use a single unit that uniformly distributes the asphalt rejuvenating agent at the stipulated rate onto the scarified or milled material and mixes them together using a minimum of 2 telescopic milling heads. The equipment also screeds and finishes the scarified or milled material.
- C.5 **Milling-Mixture-Paving Unit**
Add the asphalt rejuvenating agent uniformly at the stipulated rate onto the scarified or milled material and with a minimum of 2 telescopic milling heads. Alternatively, the asphalt rejuvenating agent may be added directly to the milling heads provided the applied rate is uniform across the width of the HIR material. Screed and finish the scarified or milled material. Alternatively, a self-propelled independent paver complying with the asphalt paver specifications in 2360.3B.2.a may be used after the mixing operation.

COSTS

Bid Abstract

Report Date Bid Release Bid Opening
3/21/2025 2/19/2025 2025-03-21T15:00:00.000Z

SAP 060-609-023 Hot In-Place Recycle & Aggregate Shouldering Hot In-Place Recycle & Aggregate Shouldering - SAP 060-609-023

Line	Number	Description	Unit	Quantity	Price	Dustrol Inc	
						Total	
1	2221.509	SHOULDER BASE AGGREGATE CLASS 1	TON	7,000	\$25.00	\$175,000.00	
2	2232.603	MILLED RUMBLE STRIPS	LIN FT	130,000	\$0.22	\$28,600.00	
3	2331.604	HOT INPLACE RECYCLING	SQ YD	232,000	\$8.90	\$2,064,800	
4	2563.601	TRAFFIC CONTROL	LUMP SUM	1	\$30,000.00	\$30,000.00	
5	2580.503	INTERIM PAVEMENT MARKING	LIN FT	5,900	\$3.40	\$20,060.00	
6	2582.503	4" SOLID LINE PAINT GR IN (WR)	LF	15,500	\$0.60	\$9,300.00	
7	2582.503	4" BROKEN LINE PAINT GR IN (WR)	LF	14,000	\$0.60	\$8,400.00	
8	2582.503	6" SOLID LINE PAINT GR IN (WR)	LF	147,000	\$0.75	\$110,250.00	
Total						\$2,446,410.00	

<https://www.facebook.com/share/v/1CHUoKwDKE/>

PROS

Because of our Bituminous Wear Specs, We didn't need another wearing course applied and therefor no extra haul traffic impacting roadways

No plant inspection needed.

Finished product looked like HMA Pavement

Ability to correct/improve ride without HMA Overlay

No shouldering required if existing matches existing pavement

CONS

Need to dispose of material at end of each day (loss of existing material)

Skewed joint are an issue at bridges and R/R

Weather temps have large impact on daily production

Struggle to match bumpers/approaches/previous days joint

Lack of construction specs for HIR

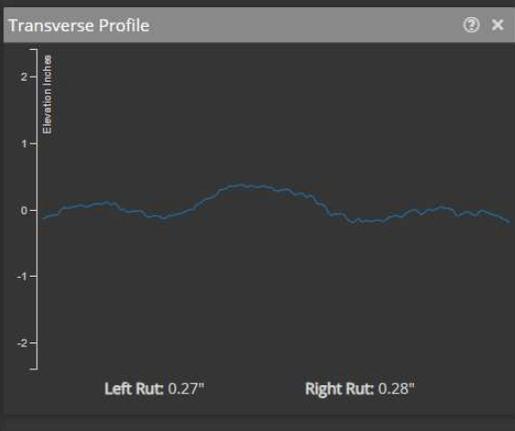
Very few contractors with same equipment

PICTURES

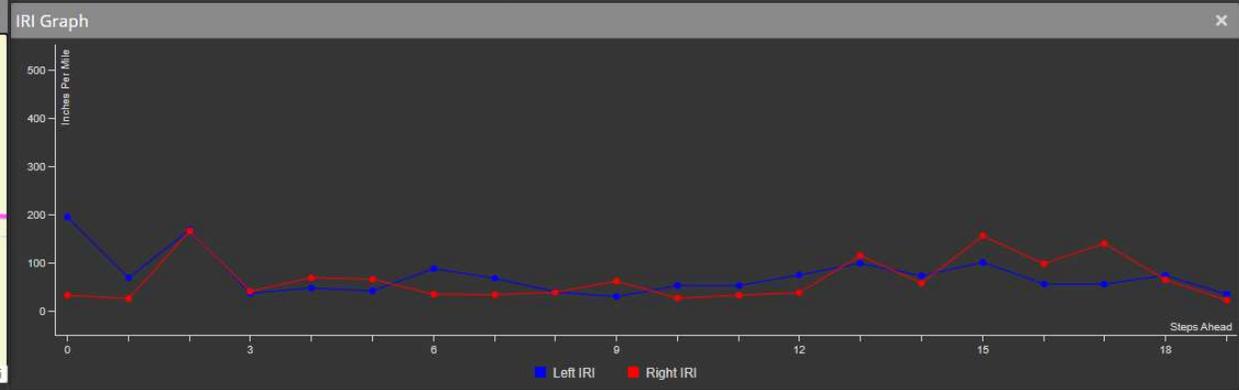
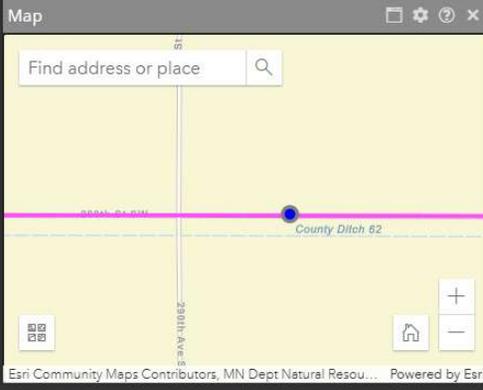


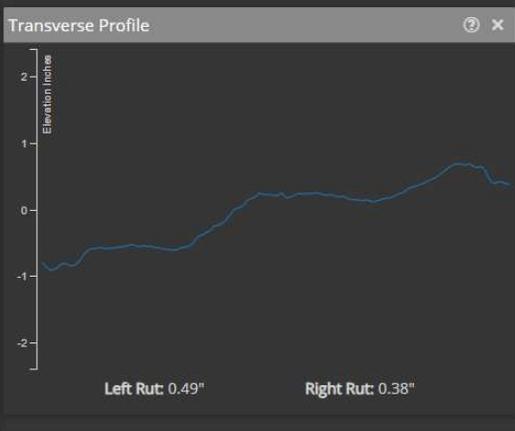
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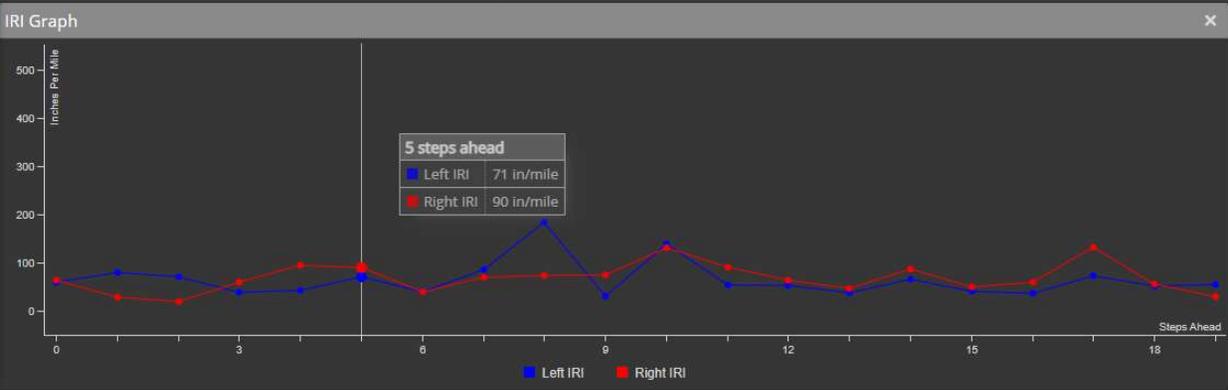
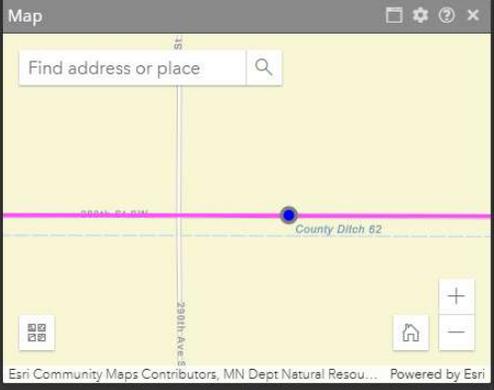


County: Polk Route: CS9 Mile Post: 12.623 Direction: Decreasing Date: 07/13/2022 Coordinate: 47.760431, -96.670603





County: Polk Route: CS9 Mile Post: 12.490 Direction: Decreasing Date: 07/31/2024 Coordinate: 47.760427, -96.670627



CONCLUSION

Polk County is going to continue using HIR where it fits.

HIR is another tool in the toolbox. Its not for every road so be selective in which roads you apply it to and which process you use.

Polk County will have Braun, Intertec complete FWD Testing on 2025 roadways and compare to last FWD Tests that were completed after last overlay.

MNDOT will drive all of Polk Counties paved roads this summer with Pavetec Van and Polk County will be able to compare ride/rutting to 2024 analysis.