



SEE SHEETS 5-6

LOCATION MAP

LATITUDE: 39° 57' 06" LONGITUDE: 82° 24' 41"

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

D05-PM-FY2023(C)

RECESSED WET-REFLECTIVE

LICKING AND MUSKINGUM COUNTIES

FEDERAL PROJECT NUMBER
NON-FEDERAL

RAILROAD INVOLVEMENT
NONE

PROJECT DESCRIPTION

DISTRICT WIDE RECESSED-WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING PROJECT AT VARIOUS LOCATIONS IN LICKING AND MUSKINGUM COUNTIES

PROJECT EARTH DISTURBED AREA = N/A (MAINTENANCE)
ESTIMATED CONTRACTOR EARTH DISTURBED AREA = N/A
NOTICE OF INTENT EARTH DISTURBED AREA = N/A

LIMITED ACCESS

THIS IMPROVEMENT IS ESPECIALLY DESIGNED FOR THROUGH TRAFFIC AND HAS BEEN DECLARED A LIMITED ACCESS HIGHWAY OR FREEWAY BY ACTION OF THE DIRECTOR IN ACCORDANCE WITH THE PROVISIONS OF SECTION 5511.02 OF THE OHIO REVISED CODE.

2023 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

DESIGN EXCEPTIONS

NONE

ADA DESIGN WAIVER

NONE REQUIRED

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UNDERGROUND UTILITIES
Contact Two Working Days Before You Dig

OHIO811.org
Before You Dig

OHIO811. 8-1-1. or 1-800-362-2764
(Non-members must be called directly)

PLAN PREPARED BY:
OHIO DEPARTMENT OF TRANSPORTATION
DISTRICT 5 ENGINEERING

ENGINEER'S SEAL	STANDARD CONSTRUCTION DRAWINGS				SUPPLEMENTAL SPECIFICATIONS	
	MT-95.30	7/19/19	TC-41.10	7/19/13	800	4/21/23
	MT-95.31	7/19/19	TC-41.20	10/18/13	807	1/21/22
	MT-95.32	4/19/19	TC-52.10	10/18/13	821	4/20/12
	MT-95.45	1/17/20	TC-52.20	1/15/21	832	7/15/22
	MT-98.11	1/17/20	TC-72.20	7/20/18	850	4/15/22
	MT-98.20	4/19/19			905	4/17/20
	MT-98.22	4/19/19			921	4/20/12
	MT-98.28	1/17/20				
	MT-99.20	4/19/19				
	MT-105.10	1/17/20				

DISTRICT DEPUTY DIRECTOR

Jason L. Sturgeon
Jason L. Sturgeon, P.E.
05

DIRECTOR, DEPARTMENT OF TRANSPORTATION

Jack Mahan

TITLE SHEET

DESIGN AGENCY



DESIGNER
RMA

REVIEWER
JSL 01/27/23

PROJECT ID
113445

SHEET TOTAL
1 8

GENERAL

THE INTENT OF THIS PLAN IS TO REPLACE MAINLINE EXISTING LONG LINE FAST DRY PAVEMENT MARKINGS WITH RECESSED WET REFLECTIVE THERMOPLASTIC MARKINGS. THE PROPOSED MARKING SHALL MATCH THE SIZE AND COLOR OF THE EXISTING MARKING. IF NO EXISTING MARKING IS PRESENT FOR THE QUANTITY GIVEN IN THE PLANS, THEN EITHER A PROPOSED MARKING SHALL BE PLACED, OR THE MARKING SHALL BE NON-PERFORMED, AS DIRECTED BY THE ENGINEER. ADJACENT ROADWAY MARKINGS SHALL NOT BE DISTURBED.

THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER A MINIMUM OF 24 HOURS PRIOR TO APPLYING PAVEMENT MARKING MATERIALS ON ANY ROUTES SO THAT ODOT PERSONNEL MAY BE PRESENT DURING PAVEMENT MARKING OPERATIONS.

PER **CMS 641.04**, THE CONTRACTOR SHALL PROVIDE ODOT PERSONNEL A COPY OF THE DLS SHORT REPORT AT THE END OF EVERY WORKDAY THROUGH **CLOUD BASED REPORTING**. THE CONTRACTOR SHALL NOT RECEIVE PAYMENT FOR ANY WORK DONE WITHOUT NOTIFICATION AS STATED ABOVE OR IF DSL SHORT REPORTS ARE NOT PROVIDED DAILY. SEPARATE DLS REPORTS SHALL BE PROVIDED FOR EVERY RUN OF LONG LINE MARKING PLACED. COMBINED DLS REPORTS (I.E. CENTER LINE AND EDGE LINE) WILL NOT BE ACCEPTED OR PAID BY THE DEPARTMENT.

MATERIALS

R-WR PAVEMENT MARKINGS ARE DEFINED AS A PAVEMENT MARKING SYSTEM COMPRISED OF A GROOVE AND EITHER A WET REFLECTIVE (WR) PREFORMED MARKING OR A LIQUID PAVEMENT MARKING BINDER WITH ADDED WR OPTICS AND, AS NEEDED, STANDARD GLASS BEADS. THE R-WR PAVEMENT MARKING IS RECESSED INSIDE THE GROOVE AND THE TWO TOGETHER ARE CONSIDERED TO BE THE R-WR PAVEMENT MARKING.

FURNISH PAVEMENT MARKING BINDER, GLASS BEADS AND WR OPTICS APPROVED BY THE DEPARTMENT AND LISTED ON THE DEPARTMENT'S QUALIFIED PRODUCT LIST (QPL).

AT THE PRECONSTRUCTION MEETING, THE CONTRACTOR SHALL PROVIDE THE WR OPTIC MANUFACTURER'S RECOMMENDATIONS FOR DROP RATE OF WR OPTICS, TYPE AND DROP RATE FOR STANDARD GLASS BEADS, BINDER MATERIAL THICKNESS, AND GROOVE DEPTH IF THESE RECOMMENDATIONS ARE DIFFERENT THAN THE RECOMMENDATIONS PROVIDED ON THE QPL

R-WR PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE WR OPTIC MANUFACTURER'S RECOMMENDATIONS, EXCEPT THAT THE MINIMUM REQUIREMENTS STATED HEREIN SHALL ALSO APPLY. GROOVE AND CLEAN PAVEMENT AS PER **SS 850** AND WR OPTIC MANUFACTURER'S RECOMMENDATIONS FOR GROOVE DEPTH AND FINISHED GROOVE SURFACE. **ENSURE THE DEPTH OF THE GROOVE IS AT LEAST 5 MILS GREATER THAN THE THICKNESS OF THE MARKING MATERIAL INCLUDING PROPERLY EMBEDDED WR OPTICS.**

MOISTURE TEST

THE EXISTING PAVEMENT SURFACE SHALL RECEIVE A MOISTURE TEST WHEN RAINFALL HAS OCCURRED WITHIN **24 HOURS** PRIOR TO THE START OF THE CONTRACTOR'S SHIFT. THE TEST SHALL BE PERFORMED PER **CMS 641.05** AND IN THE PRESENCE OF THE ENGINEER. THE MOISURE TEST MAY BE WAIVED BY THE ENGINEER BUT MUST BE GIVEN TO THE CONTRACTOR IN WRITTEN FORM. **R-WR PAVEMENT MARKINGS SHALL NOT BE APPLIED UNTIL APPROVAL HAS BEEN GRANTED BY THE ENGINEER.**

WINTER PERFORMANCE OBSERVATION PERIOD

R-WR PAVEMENT MARKINGS SHALL UNDERGO A **WINTER PERFORMANCE OBSERVATION PERIOD THAT EXTENDS THROUGH APRIL 15 OF THE CALENDAR YEAR FOLLOWING INSTALLATION**. AFTER APRIL 15, R-WR PAVEMENT MARKINGS SHALL BE EVALUATED IN ACCORDANCE WITH THE FOLLOWING PERFORMANCE MEASUREMENT REQUIREMENTS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DEFECTS IN MATERIALS AND WORKMANSHIP OF THE R-WR MARKINGS INCLUDING RETRO-REFLECTIVITY, COLOR, AND DURABILITY UNTIL FINAL ACCEPTANCE OF THE R-WR MARKINGS.

PERFORMANCE MEASUREMENT REQUIREMENTS

THE PERFORMANCE OF ALL LONGITUDINAL R-WR PAVEMENT MARKINGS SHALL BE MEASURED FOR DRY AND WET RECOVERY RETROREFLECTIVITY.

PERFORMANCE MEASUREMENTS SHALL BE CONDUCTED BY BECK ENTERPRISES, INC., APPLIED RESEARCH ASSOCIATES, INC. (ARA), OR APPROVED EQUAL AS AN INDEPENDENT THIRD-PARTY SUB-CONTRACTOR CAPABLE OF PERFORMING THE REQUIRED RETROREFLECTIVITY MEASUREMENTS.

PERFORM ALL RETROREFLECTIVITY MEASUREMENTS FOLLOWING THE ASTM METHOD E3320 (MOBILE RETROREFLECTIVITY UNIT (MRU)) FOR DRY CONDITIONS, AND ASTM E2177 (BUCKET METHOD) OR APPROVED EQUIVALENT FOR WET RECOVERY CONDITIONS. DRY AND WET RECOVERY MEASUREMENTS SHALL BE TAKEN FOR EACH R-WR PAVEMENT MARKING LINE IN EACH DIRECTION.

FOR MAINLINE, A LINE SEGMENT IS DEFINED AS BEING A PORTION OF THE ENTIRE LINE LENGTH AND BEING TYPICALLY A HALF MILE LONG. IF THE LAST PORTION OF THE LINE IS LESS THAN A HALF MILE, THEN IT SHALL BE ADDED TO THE PREVIOUS ADJACENT LINE SEGMENT.

FOR RAMPS, A LINE SEGMENT IS DEFINED AS THE ENTIRE LENGTH OF THE LINE ON THE RAMP, IF THE ENTIRE LENGTH IS GREATER THAN 200 FEET.

FOR DRY MEASUREMENTS, TAKE CONTINUOUS READINGS FOR EACH LINE SEGMENT. FOR WET RECOVERY MEASUREMENTS, TAKE A MINIMUM OF TWO (2) READINGS SPACED AT LEAST 60 FEET APART BUT NO FURTHER THAN 400 FEET APART, AND CENTERED ON THE MIDPOINT OF THE LINE SEGMENT.

FOR THE ACCEPTANCE OF EACH LINE SEGMENT, THE AVERAGE OF ALL THE DRY MEASUREMENT READINGS AND THE AVERAGE OF ALL THE WET RECOVERY READINGS SHALL MEET OR EXCEED THE DRY AND WET RECOVERY RETROREFLECTIVITY LEVELS RESPECTIVELY FOR EACH COLOR AS SHOWN IN TABLE 1.

TWO PERFORMANCE MEASUREMENT TEST CYCLES, INITIAL AND RETAINED, SHALL BE PERFORMED FOR FINAL ACCEPTANCE. **THE INITIAL TEST CYCLE SHALL OCCUR 15 TO 45 CALENDAR DAYS FOLLOWING INSTALLATION AND UNDER TRAFFIC**. THE RETAINED TEST CYCLE SHALL OCCUR NO EARLIER THAN THE END OF THE WINTER PERFORMANCE OBSERVATION PERIOD.

BOTH TEST CYCLES SHALL MEET OR EXCEED THE DRY AND WET RECOVERY RETROREFLECTIVITY VALUES IN TABLE 1.

PERFORMANCE MEASUREMENT REQUIREMENTS (CONT'D)

TABLE 1: MINIMUM INITIAL AND RETAINED AVERAGE RETROREFLECTIVITY LEVELS¹ FOR R-WR PAVEMENT MARKINGS

TEST METHOD	WHITE		YELLOW	
	INITIAL	RETAINED	INITIAL	RETAINED
DRY (ASTM E 3320)	700	500	500	350
WET RECOVERY (ASTM E 2177)	250	175	200	125

1. MEASURED AT STANDARD 30-METER GEOMETRY IN UNITS OF MCD/M²/LUX

FOLLOWING COMPLETION OF THE RETAINED RETROREFLECTIVITY TEST CYCLE, THE ENGINEER SHALL RATE THE R-WR PAVEMENT MARKINGS ON DAYTIME COLOR AND DURABILITY IN ACCORDANCE WITH SUPPLEMENT 1047, APPENDIX C AND E RESPECTIVELY.

THE DEPARTMENT WILL CONSIDER THE R-WR PAVEMENT MARKINGS DEFICIENT, IF AVERAGE VALUES FROM EITHER TEST CYCLE FAIL TO MEET OR EXCEED THE VALUES IN TABLE 1.

THE DEPARTMENT WILL CONSIDER R-WR PAVEMENT MARKINGS UNSATISFACTORY IF AT LEAST ONE OF THE FOLLOWING CONDITIONS ARE MET FOLLOWING THE WINTER PERFORMANCE OBSERVATION PERIOD:

- A. AVERAGE DRY OR WET RETROREFLECTIVITY VALUES FROM EITHER TEST CYCLE ARE DEFICIENT BY 20 PERCENT OR MORE
- B. NUMERICAL RATING OF 8 OR LOWER FOR DAYTIME COLOR (SUPPLEMENT 1047, APPENDIX C)
- C. NUMERICAL RATING OF 9 OR LOWER FOR DURABILITY (SUPPLEMENT 1047, APPENDIX E)

NO LATER THAN FIVE (5) DAYS AFTER COMPLETION OF EACH TEST CYCLE THE CONTRACTOR SHALL EMAIL TO THE PROJECT ENGINEER ALL DOCUMENTS PROVIDED BY THE INDEPENDENT THIRD-PARTY SUB-CONTRACTOR INCLUDING ORIGINAL RAW PERFORMANCE DATA IN CSV FORMAT AND A SUMMARY REPORT IN PDF FORMAT THAT SHOWS THE AVERAGE DRY AND AVERAGE WET RETROREFLECTIVITY READINGS FOR EACH LINE SEGMENT.

FINAL ACCEPTANCE

AFTER RECEIVING RESULTS OF THE INITIAL AND RETAINED R-WR PAVEMENT MARKING PERFORMANCE MEASUREMENTS, THE ODOT FINAL INSPECTOR WILL ISSUE A WRITTEN PUNCHLIST TO THE CONTRACTOR INCLUDING ANY R-WR PAVEMENT MARKING WORK REQUIRED, AS A CONDITION OF PROJECT ACCEPTANCE, AND A REASONABLE TIME TO COMPLETE THE WORK.

METHODS OF ADDRESSING DEFICIENT R-WR PAVEMENT MARKINGS COULD INCLUDE DEDUCTION IN PAYMENT. THE DEPARTMENT WILL REDUCE THE CONTRACT PRICE FOR EACH ROUTE SECTION IN DIRECT PROPORTION TO THE PERCENT OF DEFICIENCY OF INITIAL OR RETAINED RETROREFLECTIVITY. THE DEPARTMENT WILL USE THE GREATER DEFICIENCY OF INITIAL OR RETAINED RETROREFLECTIVITY TO COMPUTE THE DEDUCTION.

METHODS OF ADDRESSING UNSATISFACTORY R-WR PAVEMENT MARKINGS COULD INCLUDE (BUT ARE NOT LIMITED TO) COMPLETE REMOVAL AND RESTRIPIING OF THE UNSATISFACTORY SEGMENT AT NO ADDITIONAL COST TO THE DEPARTMENT.

DESIGN AGENCY



DESIGNER
LME

REVIEWER
JSL 01/27/23

PROJECT ID
113445

SHEET	TOTAL
2	8

FINAL ACCEPTANCE (CONT'D)

IF UNSATISFACTORY SEGMENTS REQUIRE REMOVAL AND RESTRIPING OF R-WR PAVEMENT MARKINGS, THE REPLACEMENT R-WR PAVEMENT MARKINGS WILL NOT BE ACCEPTED UNTIL THEY SUCCESSFULLY COMPLETE AN ADDITIONAL TWO PERFORMANCE MEASUREMENT TEST CYCLE. **THE INITIAL RETESTING SHALL OCCUR 15 TO 30 CALENDAR DAYS FOLLOWING THE INSTALLATION AND UNDER TRAFFIC. THE RETAINED RETESTING SHALL OCCUR NO EARLIER THAN 90 DAYS FOLLOWING THE INSTALLATION AND UNDER TRAFFIC.**

PROJECT FINALIZATION WILL PROCEED IN ACCORDANCE WITH THE ODOT C&MS. A WRITTEN PARTIAL ACCEPTANCE FOR THE PORTION OF WORK, OTHER THAN R-WR PAVEMENT MARKINGS, MAY BE REQUESTED BY THE CONTRACTOR IN ACCORDANCE WITH ODOT C&MS.

PAYMENT

ALL THIRD-PARTY TESTING FOR DRY AND WET RECOVERY RETROREFLECTIVITY PERFORMANCE SHALL BE INCLUDED IN THE **LUMP SUM** BID FOR **ITEM SPECIAL, FINAL ACCEPTANCE TESTING.**

ALL OTHER COSTS SHALL BE INCIDENTAL TO THE R-WR PAVEMENT MARKING.

GENERAL NOTES

DESIGN AGENCY



DESIGNER
LME

REVIEWER
JSL 01/27/23

PROJECT ID
113445

SHEET TOTAL
2A 8

WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS (PERFORMANCE-BASED)													
C O U N T Y	C O U N T Y	R O U T E	D E S C R I P T I O N	L E N G T H	807				850			R E M A R K S	
					E D G E L I N E, 6"		L A N E L I N E, 6"	C H A N N E L I Z I N G L I N E, 12"	D O T T E D L I N E, 6"	G R O O V I N G F O R 6" R E C E S S E D P A V E M E N T M A R K I N G, A S P H A L T	G R O O V I N G F O R 6" R E C E S S E D P A V E M E N T M A R K I N G, A S P H A L T		G R O O V I N G F O R 12" R E C E S S E D P A V E M E N T M A R K I N G, A S P H A L T
					W H I T E	Y E L L O							
				M I L E	M I L E	M I L E	M I L E	F T	F T	M I L E	F T	F T	
1	LIC	I.R. 70	24.20-28.93	4.73	9.46	9.46	9.46			28.38			BRIDGE LIC-70-2421 L/R TO MUSKINGUM CO.
			S.W. RAMP TO S.R. 668	0.13	0.13	0.13		655	979	0.26	979	655	
			N.W. RAMP FROM S.R. 668	0.15	0.15	0.15		850	956	0.30	956	850	
LICKING COUNTY TOTALS (CARRIED TO GENERAL SUMMARY)					19.48		9.46	1,505	1,935	28.94	1,935	1,505	
2	MUS	I.R. 70	0.00-0.76	0.76	1.52	1.52	1.52			4.56			LICKING CO. TO SLM
3	MUS	I.R. 70	21.37-27.35 (EASTBOUND)	5.98	5.98	5.98	5.98			17.94			BRIDGE LIC-70-2142R TO GUERNSEY CO.
			21.56-27.35 (WESTBOUND)	5.79	5.79	5.79	5.79			17.37			BRIDGE LIC-70-2151L TO GUERNSEY CO.
			N.E. RAMP TO U.S. 22	0.15	0.15	0.15		584	495	0.30	495	584	
			S.E. RAMP FROM U.S. 22	0.34	0.34	0.34		971	992	0.68	992	971	
			N.W. RAMP FROM S.R. 83	0.21	0.21	0.21		1,023	1,039	0.42	1,039	1,023	
			N.E. RAMP TO S.R. 83	0.20	0.20	0.20		531	201	0.40	201	531	
			S.W. RAMP TO S.R. 83	0.23	0.23	0.23		497	516	0.46	516	497	
			S.E. RAMP FROM S.R. 83	0.13	0.13	0.13		986	345	0.26	345	986	
MUSKINGUM COUNTY TOTALS (CARRIED TO GENERAL SUMMARY)					29.10		13.29	4,592	3,588	42.39	3,588	4,592	



TOTALS			PLAN SPLIT	ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET
NOTES	LIC	MUS	01/IMS/21						
								TRAFFIC CONTROL	
			LS	SPECIAL	69098400		LS	FINAL ACCEPTANCE TESTING	2
	19.48	29.10	48.58	807	14010	48.58	MILE	WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, EDGE LINE, 6" (PERFORMANCE-BASED)	2
	9.46	13.29	22.75	807	14110	22.75	MILE	WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, LANE LINE, 6" (PERFORMANCE-BASED)	2
	1,505	4,592	6,097	807	14310	6,097	FT	WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, CHANNELIZING LINE, 12" (PERFORMANCE-BASED)	2
	1,935	3,588	5,523	807	14410	5,523	FT	WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, DOTTED LINE, 6" (PERFORMANCE-BASED)	2
	28.94	42.39	71.33	850	10010	71.33	MILE	GROOVING FOR 6" RECESSED PAVEMENT MARKING, (ASPHALT)	
	1,935	3,588	5,523	850	10110	5,523	FT	GROOVING FOR 6" RECESSED PAVEMENT MARKING, (ASPHALT)	
	1,505	4,592	6,097	850	10130	6,097	FT	GROOVING FOR 12" RECESSED PAVEMENT MARKING, (ASPHALT)	
								MAINTENANCE OF TRAFFIC	
250			250	614	11110	250	hour	LAW ENFORCEMENT OFFICER WITH PATROL CAR FOR ASSISTANCE	4
8			8	614	18601	8	SNMT	PORTABLE CHANGEABLE MESSAGE SIGN, AS PER PLAN	4
								INCIDENTALS	
			LS	614	11000		LS	MAINTAINING TRAFFIC	
			LS	624	10000		LS	MOBILIZATION	

GENERAL SUMMARY

DESIGN AGENCY



DESIGNER

RMA

REVIEWER

JSL 01/27/23

PROJECT ID

113445

SHEET

8

TOTAL

8