MISSOURI
HIGHWAYS and TRANSPORTATION COMMISSION

JEFFERSON CITY, MISSOURI

REQUEST FOR BID

FOR

CONSTRUCTING OR IMPROVING

Contract I.D. 050121-411

STATE PROJECT

Job No. J4D0500G
Route 50
Johnson County

English

TABLE OF CONTENTS

*This form is only included in the blue bid book. The form is available on MoDOT's Website, www.modot.org.

NOTICE TO CONTRACTORS

Sealed bids, addressed to State of Missouri, acting by and through the Missouri Highways and Transportation Commission, Jefferson City, Missouri for the proposed work will be received by the Commission until 10:00 o'clock A.M. (prevailing local time) on **January 21, 2005**, at the office of the Secretary to the Commission in the Missouri Department of Transportation Central Office Building, 105 West Capitol Avenue, Jefferson City, Missouri, and at that time will be publicly opened and read. Bids delivered by US Mail should be mailed to: PO Box 270, Jefferson City, MO 65102. Bids delivered by parcel delivery services, (such as UPS, Fed Ex, DHL etc) should be shipped to 1320 Creek Trail Drive, Jefferson City, MO 65109.

(1) **PROPOSED WORK:** The proposed work, hereinafter called the work, includes:

Job J4D0500G, Route 50, Johnson County: Coldmilling and resurfacing with Superpave from the Jackson County line east to Route HH near Warrensburg, the total length of the improvement being 25.57 miles.

(2) **COMPLIANCE WITH CONTRACT PROVISIONS:** The bidder, having examined and being familiar with the local conditions affecting the work, and with the contract, contract documents, including the Missouri Highways and Transportation Commission's "Missouri Standard Specifications for Highway Construction, 2004," and "Missouri Standard Plans for Highway Construction, 2004", their revisions, and the request for bid, including appendices, the special provisions and plans, hereby proposes to furnish all labor, materials, equipment, services, etc., required for the performance and completion of the work. All references are to the Missouri Standard Specifications for Highway Construction, as revised, unless otherwise noted.

(3) **PERIOD OF PERFORMANCE:** If the bid is accepted, the bidder agrees that work shall be diligently prosecuted at such rate and in such manner as, in the judgment of the engineer, is necessary for the completion of the work within the time specified as follows in accordance with Sec 108:

Notice to Proceed: **March 30, 2005**
Working Days:
Completion Date: **December 01, 2005 (See Special Provisions)**

(4) **LIQUIDATED DAMAGES:** The bidder agrees that, should the bidder fail to complete the work in the time specified or such additional time as may be allowed by the engineer under the contract, the amount of liquidated damages to be recovered in accordance with Sec 108 shall be as follows:

Liquidated damages per day $ **14,825.00 (See Special Provisions)**

(5) **ACCEPTANCE OF PROVISION FOR PRICE ADJUSTMENT FOR FUEL**: Bidders have the option to accept the provision for Price Adjustment for Fuel in accordance with Sec. 109.14 . To accept this provision, a bidder must mark the box below. No price adjustments will be made, due to fuel price changes, for bidders who do not accept this provision.

☐ By marking this box, I choose to accept the provision for Price Adjustment for Fuel.

(6) **MAXIMUM MONETARY VALUE OF AWARDS ACCEPTED THIS BID OPENING**: Bidders have the option to specify the maximum monetary value of awards that they will accept for the total of all bids they have submitted in the bid opening, Sec 102.7.2. If the bidder is submitting only one bid, or if the bidder does not want to specify a maximum monetary value for submitted bids, this section should not be completed. If a submitted bid upon correction exceeds the indicated maximum monetary amount, the bid may be declared non-responsive. If a bidder's submitted bids show different values for the maximum monetary value, the lowest value will govern.

MAXIMUM MONETARY VALUE OF AWARDS ACCEPTED THIS BID OPENING

$_____

(Note: this amount should be entered in only one of the bidder's bid books for this bid opening)

(7) **COMBINATION BIDS**: (Applies only if combination bids are specified. See cover and/or notice to contractors) Combination bids will be in accordance with Sec 102.12. By marking the following box, the bidder desires to combine all projects in accordance with Sec102.12.2.1.

☐ All or None

(8) **BID GUARANTY**: The bidder shall submit and attach to this bid a bid guaranty meeting the requirements of Sec 102. The Bid guaranty will be returned as per standard specifications. The bid bond form is included in the blue bound Bid book and is also available on MoDOT's website.

(9) **CERTIFICATIONS:** The bidder certifies by signing and submitting this bid, that the bidder has reviewed Sec 102.18, 108.13 and their subsections and that the bidder has attached any necessary documents in accordance with those sections as required.

(10) **ANTIDISCRIMINATION**: The Commission hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, businesses owned and controlled by socially and economically disadvantaged individuals will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, religion, creed, sex, age, ancestry, or national origin in consideration for an award.

(11) PREFERENCE TO MISSOURI FIRMS IN AWARDING OF CONTRACTS: The bidder's attention is directed to Section 34.355 RSMo Supp 2000, et seq, which requires that preference be given in awarding contracts to firms, corporations, or individuals doing business as Missouri firms, corporations, or individuals, or which maintain Missouri offices or places of business, when the quality of performance promised is equal, or better, and the price quoted is the same, or less.

The law also requires that a contractor or bidder domiciled outside the state of Missouri shall be required, in order to be the successful bidder, to submit a bid which is the same percent less than the lowest bid submitted by a responsible contractor or bidder domiciled in Missouri as would be required for the Missouri domiciled contractor or bidder to succeed over the bidding contractor or bidder domiciled outside Missouri in a like contract or bid being let in his domiciliary state. A contractor or bidder domiciled outside Missouri shall also be required to submit an audited financial statement as would be required of a Missouri domiciled contractor or bidder on a like contract or bid being let in the domiciliary state of that contractor or bidder.

For firms, corporations or individuals domiciled outside the state of Missouri, it is requested they submit the following information:

If not a corporation, list the state of domicile

_____

List address of all Missouri offices or places of business

_____

_____

(12) SIGNATURE AND IDENTITY OF BIDDER: The undersigned states that the following provided information is correct and that (if not signing with the intention to bind themselves to become the responsible and sole bidder) they are the agent of, and they are signing and executing this, as the bid of

_____, which is the correct LEGAL NAME as stated on the contractor questionnaire.

a) The organization submitting this bid is a(n) (1) individual bidder, (2) partnership, (3)joint venturer (whether individuals or corporations, and whether doing business under a fictitious name), or (4) corporation. Indicate by marking the appropriate box below.

☐ sole individual ☐ partnership ☐ joint venture

☐corporation, incorporated under laws of state of _____.

b) If the bidder is doing business under a fictitious name, indicate below by filling in the fictitious name

_____

Executed by bidder this _____ day of _____ 20____.

_____
Signature of Bidder's Owner, Officer, Partner or Authorized Agent

_____
Please print or type name and title of person signing here

Attest:

_____
Secretary of Corporation if Bidder is a Corporation

Affix Corporate Seal (If Bidder is a Corporation)

NOTE: If bidder is doing business under a fictitious name, the bid shall be executed in the legal name of the individual, partners, joint ventures, or corporation, and registration of fictitious name filed with the secretary of state, as required by sections 417.200 to 417.230 RSMo. If the bidder is a corporation not organized under the laws of Missouri, it shall procure a certificate of authority to do business in Missouri, as required by section 351.572 et seq RSMo. A certified copy of such registration of fictitious name or certificate of authority to do business in Missouri shall be filed with the commission, as required by the standard specifications.

(13) ITEMIZED BID: The bidder should complete this section in accordance with Sec 102.7. The bidder proposes to furnish all labor, materials, equipment, services, etc. required for the performance and completion of the work, as follows:

CONTRACT ID: 050121-411 PROJECT(S): J4D0500G

CONTRACTOR : _____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
SECTION 0001 ROADWAY ITEMS - J4D0500G						
0010	4011209 BITUMINOUS PAVEMENT MIXTURE PG64-22, (BP-1)	25188.000 TONS		.		.
0020	4030103 ASPHALTIC CONCRETE MIXTURE PG 70-22 (SP125C MIX)	92923.000 TONS		.		.
0030	4071005 TACK COAT	49910.000 GAL		.		.
0040	4134000 BITUMINOUS FOG SEAL	35048.000 GAL		.		.
0050	6123000 TRUCK MOUNTED ATTENUATOR (TMA)	1.000 EA		.		.
0060	6161005 CONSTRUCTION SIGNS	288.000 SQFT		.		.
0070	6161020 CHANNELIZER (DRUM-LIKE)	10.000 EA		.		.
0080	6161025 CHANNELIZER (TRIM LINE)	260.000 EA		.		.
0090	6161040 FLASHING ARROW PANEL	1.000 EA		.		.
0100	6161120 INSTALLING "DRIVE SMART" SIGN	2.000 EA		.		.

CONTRACT ID: 050121-411 PROJECT(S): J4D0500G

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE DOLLARS	UNIT PRICE CTS	BID AMOUNT DOLLARS	BID AMOUNT CTS
0110	6161133 INSTALLING 'POINT OF PRESENCE' SIGN	2.000 EA		.		.
0120	6181000 MOBILIZATION	LUMP	LUMP			.
0130	6206210A TYPE A EPOXY PAVEMENT MARKING, LEFT/RIGHT ARROW	11.000 EA		.		.
0140	6206215A TYPE A EPOXY PAVEMENT MARKING, 24 IN., WHITE	192.000 LF		.		.
0150	6206219A TYPE A EPOXY PAVEMENT MARKING, WORD (ONLY)	2.000 EA		.		.
0160	6206308 TYPE B EPOXY PAVEMENT MARKING, 6 IN., WHITE	336884.000 LF		.		.
0170	6206309 TYPE B EPOXY PAVEMENT MARKING, 6 IN., YELLOW	269507.000 LF		.		.
0180	6206314 TYPE B EPOXY PAVEMENT MARKING, 12 IN., WHITE	1600.000 LF		.		.
0190	6221001 COLDMILLING BITUMINOUS PAVEMENT FOR REMOVAL OF SURFACING (3 IN. THICK OR LESS)	315944.000 SQYD		.		.
0200	6261000A BITUMINOUS SHOULDER RUMBLE STRIP	3156.700 STA		.		.
0210	9028500 CABLE, LOOP DETECTOR, IN DUCT	4920.000 LF		.		.

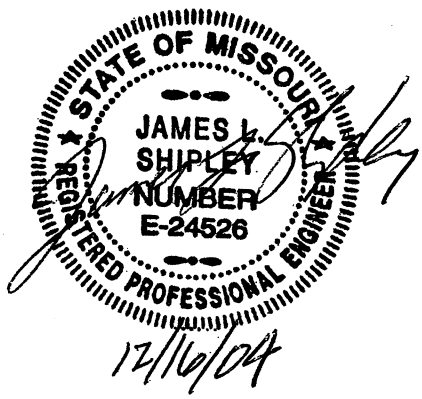
CONTRACT ID: 050121-411 PROJECT(S): J4D0500G

CONTRACTOR :_____

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
	SECTION 0001 TOTAL					.
	TOTAL BID					.

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

(Job Special Provisions shall prevail over General Special Provisions whenever in conflict herewith.)



JOB
SPECIAL PROVISION

A. GENERAL – STATE DSP-04-03D

1.0 Description. The Federal Government is not participating in the cost of construction of this project.

1.1 This contract requires payment of the prevailing hourly rate of wages for each craft or type of worker required to execute the contract as determined by the Missouri Department of Labor and Industrial Relations. The current State Wage Rates can be found on the Missouri Department of Transportation web page at www.modot.mo.gov under "Business With MoDOT". This supplemental bidding document has important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

State Wage Rates	Effective 11/01/04

1.2 The following documents are available on the Missouri Department of Transportation web page at www.modot.mo.gov under "Business With MoDOT". These supplemental bidding documents contain all current revisions to the bound printed versions and have important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

General Provisions & Supplemental Specifications	Effective 01/01/05
Supplemental Plans to July 2004 Missouri Std. Plans For Highway Construction	Effective 01/01/05

B. WORK ZONE TRAFFIC MANAGEMENT PLAN

1.0 Description. Work zone traffic management shall be in accordance with applicable portions of Division 100 and Division 600 of the Missouri Standard Specifications for Highway Construction, and specifically as follows.

2.0 Traffic Management Schedule

2.1 Traffic management schedules shall be submitted to the engineer for review prior to the start of work and prior to any revisions to the traffic management schedule. The traffic management schedule shall include the proposed traffic control measures, hours traffic control will be in place, and work hours.

2.2 The contractor shall notify the engineer 48 hours prior to lane closures, shifting traffic onto detours, or shifting traffic within roadways. The contractor shall notify the engineer 1 week prior to completely closing roadways or ramps. Weekends and holidays shall not be considered part of the advance notice period.

2.3 The engineer shall be immediately notified of any postponement due to weather, material or other circumstances. A new schedule shall be submitted to the engineer.

2.4 In order to ensure minimal traffic interference, the contractor shall schedule lane closures for the absolute minimum amount of time required to complete the work. Lanes shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

2.5 The contractor shall be responsible for maintaining the existing traffic flow through the job site during construction. If disruption of the traffic flow occurs and traffic is backed up in queues of 15 minute delays or longer, then the contractor shall review the construction operations which contributed directly to disruption of the traffic flow and make adjustments to the operations to prevent the queues from occurring again.

3.0 Work Hour Restrictions.

3.1 All lanes shall be scheduled to be open to traffic during the following holiday periods, from 12:00 noon on the last weekday preceding the holiday until 9:00 a.m. on the first weekday subsequent to the holiday:

Memorial Day
Labor Day
Independence Day

All lanes shall be scheduled to be open to traffic during the Thanksgiving holiday period, from 12:00 noon on Wednesday preceding the holiday until 12:00 midnight on Sunday subsequent to the holiday.

3.2 The contractor shall not perform any construction operation on the roadway, including the hauling of material within the project limits, during restricted periods, holiday periods or other special events specified in the contract documents.

3.3 The contractor shall not perform any construction operations on the roadbed between the hours of 2 p.m. and 9 p.m. EB lanes on Friday, and between 3 p.m. and 8 p.m. WB on Sunday. Working hours for evenings, weekends and holidays will be determined by the engineer.

3.4 The contract provides sufficient advance signing and traffic control devices for one active work zone. Additional work zones may be furnished at the contractors expense.

4.0 Detours and Lane Closures.

4.2 At least one lane of traffic in each direction on Routes 50 and 13 shall be maintained at all times except for brief intervals of time required when the movement of the contractor's equipment will seriously hinder the safe movement of traffic. The engineer will designate periods during which the contractor will be allowed to halt traffic.

5.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provisions, unless specified elsewhere in the contract document.

C. CONTRACT TIME FOR COMPLETION OF WORK

1.0 Description. Completion of this contract shall be in accordance with Sec 108.7 and will be administered on both a calendar date completion basis and by working days completion basis.

1.1 Regardless of when the work is begun on this contract, all work shall be completed on or before the date specified below. Completion by this date shall be in accordance with the requirements of Sec 108.7.1.

Completion Date: December 1, 2005.

1.2 In addition, working days for the completion of this contract have been established. The count of working days will start on the date the contractor starts any construction operations on this project and all work shall be completed within the working days specified below. Completion of the work by working days shall be in accordance with the requirements of Sec 108.7.2.

Working Days: 50

1.3 Should the contractor, or in case of default, the surety, fail to complete the work within the working days or the completion date specified, whichever occurs first, a deduction of the amount shown below will be made for each day that the contract remains uncompleted in accordance with the requirements of Sec 108.8.

Liquidated Damages Per Day: $14,825.00

D. UTILITIES

1.0 For informational purposes only the following is a list of names, addresses, and telephone numbers of the known utility companies in the area of the construction work for this improvement:

Utility Company	Known Required Adjustment	Anticipated Relocation Completion Date
Mr. Jon Harrel Missouri Gas Energy 100 NE Tudor Lee's Summit, MO 64086 (816) 969-2298 (Jon)	No	
Mr. Bruce Reed 750-3 Right of Way Administrator Aquila, Inc. P.O. Box 11739 Kansas City, MO 64138 (816) 737-7578	No	

Mr. Randy Leach
Sprint Communications
P.O. Box 615
Warrensburg, MO 64093
(660) 429-7052

No

Mr. Larry Wright
Charter Communications
2107 Plaza Dr.
Harrisonville, MO 64701
816-884-5977

No

Mr. David Sommerfeld
BP Amoco Corporation
28100 Torch Parkway
Warrenville, IL 60555
(630) 836-5000

No

Mr. Mike Wood
Missouri American Water Company
1705 Montserrat Park Road
Warrensburg, Mo. 64093
(660) 747-3192

No

Mr. Steve Long
West Central Electric
P.O. Box 452
Higginsville, MO 64037
(660) 584-2131

No

Mr. Dale Peery
Water District No. 1 of Johnson County
4 N.W. OO Highway
Warrensburg, Mo. 64093
(660) 429-2231

No

Mr. Howard Baker
Johnson County P.W.S.D. #3
106 S.E. 421
Warrensburg, Missouri 64093
(660) 429-2494

No

Mr. Bob Crumb
City of Warrensburg
Director of Public Works
102 S. Holden
Warrensburg, Mo. 64093
(660) 747-9131

Mr. Steve Grandon
Senior Right-of-Way Representative
CMS-Panhandle Eastern Pipeline Co.
6800 College Blvd.
Suite 100
Overland Park, KS 66211
(913) 906-1546

No

The Commission does not warrant that the above listing or the depiction of utility lines or facilities on other bidding documents are complete or accurately reflect either all utilities or their precise locations within or adjacent to the project limits or the status of any relocation work.

E. EMERGENCY PROVISIONS AND INCIDENT MANAGEMENT

1.0 The contractor shall have communication equipment on the construction site or immediate access to other communication systems to request assistance from the police or other emergency agencies for incident management. In case of traffic accidents or the need for police to direct or restore traffic flow through the job site, the contractor shall notify police or other emergency agencies immediately as needed. The area engineer's office shall also be notified when the contractor requests emergency assistance.

2.0 In addition to the 911 emergency telephone number for ambulance, fire or police services, the following agencies may also be notified for accident or emergency situation within the project limits.

Missouri Highway Patrol (800-525-5555)

City of Warrensburg
Fire: 660-747-9136
Police: 660-747-9133

2.1 This list is not all inclusive. Notification of the need for wrecker or tow truck services will remain the responsibility of the appropriate police agency.

2.2 The contractor shall notify enforcement and emergency agencies before the start of construction to request their cooperation and to provide coordination of services when emergencies arise during the construction at the project site. When the contractor completes this notification with enforcement and emergency agencies, a report shall be furnished to the engineer on the status of incident management.

3.0 No direct pay will be made to the contractor to recover the cost of the communication equipment, labor, materials or time required to fulfill the above provisions.

F. PROJECT CONTACT FOR CONTRACTOR/BIDDER QUESTIONS

All questions concerning this project during the bidding process shall be forwarded to the project contact listed below.

William Barrows, Project Contact
District 4
600 NE Colbern Road
Lee's Summit MO 64086

Telephone Number 816-622-0469
e-mail William.Barrows@modot.mo.gov
All questions concerning the bid document preparation can be directed to the Central Office - Design at (573)751-2876.

G. LIQUIDATED DAMAGES FOR WINTER MONTHS

1.0 Description. Revise Sec 108.8.1.2 (a) and (b) and substitute the following for the project:

(a) Liquidated damages will be assessed from December 15 to March 15
(b) Liquidated damages will be assessed for Saturdays, Sundays and Holidays.

2.0 Permanent Pavement Marking The contractor shall make every practical effort to install permanent pavement marking prior to December 1, 2005. If weather limitations prevent proper installation of permanent pavement marking, the contractor shall install and maintain temporary waterborne pavement marking paint in accordance with Section 620.50 at the contractor's expense. Temporary pavement markings shall be standard 4-inch line and 8-inch gore markings. Any temporary pavement marking damaged, displaced or missing before the final pavement marking is installed shall be replaced at the contractor's expense. All temporary paint is to be removed, at the contractor's expense, prior to installation of the permanent markings.

After December 1, 2005, and satisfactory installation of the temporary marking, liquidated damage assessments will be suspended pending application of the permanent pavement marking. In no case will the suspension extend past May 25, 2006. Liquidated damage assessments will resume on May 25, 2006 and continue until all permanent pavement markings are in place.

H. RECYCLED ASPHALT PAVEMENT FOR SUPERPAVE MSP 04-07

Insert Sec 403.2.6 as follows:

403.2.6 Recycled Asphalt Pavement. Recycled Asphalt Pavement (RAP) may be used in any mixture, except SP125xSM. A maximum of 10 percent may be used in surface mixtures and a maximum of 20 percent may be used in subsurface mixtures. All RAP material, except as noted below, shall be tested in accordance with AASHTO TP 58, Method for Resistance of Coarse Aggregate Degradation by Abrasion in the Micro-Deval Apparatus. Aggregate shall have the asphalt coating removed either by extraction or binder ignition. The material shall be tested in the Micro-Deval apparatus at a frequency of once per 1500 tons (Mg). The percent loss shall not exceed the Micro-Deval loss of the combined virgin material by more than five percent. Micro-Deval testing will be waived for RAP material obtained from MoDOT roadways. All RAP material shall be in accordance with Sec 1002 for deleterious and other foreign material.

Delete Sec 403.5.1 in its entirety and insert Sec 403.5.1 as follows:

403.5.1 Gradation Control. The gradation of the aggregate shall be determined from samples taken from the hot bins on batch-type or continuous mixing plants or from the composite cold feed belt on drum mix plants. The RAP shall be sampled from the RAP feeding system on the asphalt plant. The contractor shall determine on a daily basis at minimum, the gradation on the aggregate reclaimed from the RAP by either extraction or binder ignition. The results shall be used to determine the daily specification compliance for the combined gradation.

Delete the table in Sec 403.19.3 in its entirety and insert the table as follows:

Tested Property	**Pay Factor**	**Test Method**	**Contractor Frequency**	**Engineer Frequency**
Mixture temperature	No	----	1/Sublot	1/day
Temperature of base and air	No	----	As needed	As needed
Mat Density (% of theoretical maximum density) by contractor	Yes	MoDOT Test Method TM-41 or AASHTO T 166	1 Sample[b]/Sublot As needed for joints & shldrs.	1 Sample/Lot
Unconfined Joint Density	No	MoDOT Test Method TM-41 or AASHTO T 166	1 Sample[b]/Sublot	1 Sample/Lot
Cold feed or hot bin gradation	No	AASHTO T 27 and AASHTO T 11	2/Lot	1/day
FAA, CAA, Clay Content and Thin, Elongated Particles from material sampled from the cold feed or hot bin	No	AASHTO T 304, ASTM D 5821, AASHTO T 176 and ASTM D 4791	1/10,000 tons with a minimum of 1/project/mix type	1/project
Asphalt content	Yes	AASHTO T 164, or MoDOT Test Method TM-54, or AASHTO T 287, or AASHTO T 308	1/Sublot	1/day
Asphalt content of RAP	No	AASHTO T 164[d]	1/Lot	1/project
VMA @ N_{des} gyrations	Yes[a]	AASHTO T 312 and PP 28	1/Sublot	1/day
V_a @ N_{des} gyrations	Yes[a]	AASHTO T 312 and PP 28	1/Sublot	1/day
VFA @ N_{des} gyrations	No[a]	AASHTO T 312 and PP 28	1/Sublot	1/day
Theo. max SG of the mixture	No	AASHTO T 209	1/Sublot	1/day
TSR of the in place mixture	No[c]	AASHTO T 283	1/10,000 Tons or fraction thereof	1/50,000 Tons or 1/project

[a]Based on the average of a minimum of two compacted specimens.
[b]Core samples shall consist of one core. Up to two additional cores, as stated in the QC Plan, may be obtained at the same offset within one foot (0.3 m) of the randomly selected location. If more than one core is obtained, all cores shall be combined into one sample.
[c]Payment will be based on the table in Sec 403.23.5.
[d]Other methods may be approved by establishing correction factors for RAP from the same source.

Delete Sec 403.19.3.1.1 in its entirety and insert Sec 403.19.3.1.1 as follows:

403.19.3.1.1 Binder Ignition Modification. Asphalt content determination in accordance with AASHTO T 308, Section 6.9.1 shall be modified by adding the following: If the calibration factor exceeds 1.0 percent, lower the test temperature to 427 ± 5 C (800 ± 8 F) and repeat test. Use the calibration factor obtained at 427 C (800 F) even if it exceeds 1.0 percent. If RAP is used, the binder ignition oven shall be calibrated in accordance with MoDOT Test Method TM 77. At the engineer's discretion, testing may be waived when production does not exceed 200 tons (200 Mg) per day. The contractor shall certify the proper proportions of a previously proven mixture were used.

I. RECYCLED ASPHALT PAVEMENT FOR BITUMINOUS PAVEMENTS

Delete Sec 401.2.2 in its entirety and insert Sec 401.2.2 as follows:

401.2.2 Recycled Asphalt Pavement. Recycled Asphalt Pavement (RAP) may be used in any mixture. A maximum of 20 percent RAP may be substituted in lieu of mineral aggregate. All RAP material, except as noted below, shall be tested in accordance with AASHTO TP 58, *Method for Resistance of Coarse Aggregate Degradation by Abrasion in the Micro-Deval Apparatus*. Aggregate shall have the asphalt coating removed either by extraction or binder ignition. The material shall be tested in the Micro-Deval apparatus at a frequency of once per 1500 tons (Mg). The percent loss shall not exceed the Micro-Deval loss of the combined virgin material by more than five percent. Micro-Deval testing will be waived for RAP material obtained from MoDOT roadways. All RAP material shall be in accordance with Sec 1002 for deleterious and other foreign material.

Delete Sec 401.3 and subsections in their entirety and insert Sec 401.3 as follows:

401.3 Composition of Mixtures. Aggregate sources shall be from the specific ledge or combination of ledges within a quarry, or processed aggregate from a particular product, as submitted in the mix design. The total aggregate prior to mixing with asphalt binder shall be in accordance with the following gradation requirements:

Sieve Size	Percent Passing by Weight (Mass)		
	Base	BP-1	BP-2
1 inch (25.0 mm)	100	100	100
3/4 inch (19.0 mm)	85-100	100	100
1/2 inch (12.5 mm)	60-90	85-100	95-100
No. 4 (4.75 mm)	35-65	50-70	60-90
No. 8 (2.36 mm)	25-50	30-55	40-70

No. 30 (600 µm)	10-35	10-30	15-35
No. 200 (75 µm)	5-12	4-12	4-12

Delete Sec 402.2.3 and Sec 402.3.3 in their entirety and insert Sec 402.2.3 as follows:

402.2.3 Recycled Asphalt Pavement. Recycled Asphalt Pavement (RAP) may be used in any mixture. A maximum of 20 percent RAP may be substituted in lieu of mineral aggregate. All RAP material, except as noted below, shall be tested in accordance with AASHTO TP 58, *Method for Resistance of Coarse Aggregate Degradation by Abrasion in the Micro-Deval Apparatus*. Aggregate shall have the asphalt coating removed either by extraction or binder ignition. The material shall be tested in the Micro-Deval apparatus at a frequency of once per 1500 tons (Mg). The percent loss shall not exceed the Micro-Deval loss of the combined virgin material by more than five percent. Micro-Deval testing will be waived for RAP material obtained from MoDOT roadways. All RAP material shall be in accordance with Sec 1002 for deleterious and other foreign material.

J. EPOXY PAVEMENT MARKING MSP-04-09

1.0 Description. This specification covers the furnishing and placing of an epoxy pavement marking system on Portland cement concrete and bituminous pavements.

2.0 Material.

2.1 Epoxy Pavement Marking Material. Epoxy pavement marking material shall meet the requirements of Sec. 1048.90.

2.1.1 Type A Epoxy Marking. Type A epoxy pavement marking shall be a slow-cure material suitable for all applications of pavement marking. When epoxy pavement marking is specified, Type A shall be used on all new pavements not open to traffic and on pavements open to traffic where adequate traffic control can be provided during the curing period as specified in Sec 620.2.1.4.

2.1.2 Type B Epoxy Marking. Type B epoxy pavement marking material shall be a fast-cure material suitable for line applications of pavement marking. Type B epoxy shall be used on bituminous pavement open to traffic where adequate traffic control cannot be provided. Type B epoxy pavement marking material shall not be used on concrete pavement.

2.2 Drop-on Glass Beads. Type P moisture-resistant glass beads shall be in accordance with Sec 1048.50.5 Type P Drop-On Glass Beads.

3.0 Sampling, Testing and Acceptance. The inspector shall have free access to the material and all facilities for purpose of inspection. The engineer reserves the right to sample at the point of manufacture, at intermediate points, or at destination. Each batch or lot shall be sampled and approved prior to use. The contractor shall provide the necessary tools to adequately mix all shipping containers prior to obtaining samples or transferring partial containers of material to tanks on the striping equipment.

3.1 The material, at the time of use, shall comply with all provisions of this specification, and be capable of being dispersed with a paddle to a smooth, uniform consistency. Any material that cannot be remixed to a smooth, uniform consistency shall be disposed of and immediately replaced with acceptable material. Both components of epoxy pavement marking material may

be prone to separation and settling in the shipping container. Samples shall only be obtained from well-mixed containers.

4.0 Certification. The contractor shall furnish a manufacturer's certification to the engineer for each lot furnished, certifying that the material supplied conform to all requirements specified. The certification shall include or have attached typical results of all required tests. Acceptance of the material will be based on the manufacturer's certification and upon results of such tests as may be performed by the engineer. The certification shall show the quantity and lot number it represents.

5.0 Packing. The pavement marking material shall be shipped to the job site in strong, substantial containers. The manufacturer shall include the MSDS with each shipment. The manufacturer's name and address, name of the product, lot number and/or batch number, color, tare weight, manufacturing date, date of expiration, mixing proportions and if it is Part A or B shall be contained on a label and/or painted on the containers.

6.0 Construction Requirements.

6.1 Equipment. The application equipment shall have a system capable of spraying both yellow and white epoxy pavement marking material in the proportions recommended by the manufacturer. The application equipment shall include the following features:

(a) Individual material reservoirs, or space, for storage of Part A and Part B of the epoxy material, equipped with the necessary stirring or blending equipment to ensure delivery of uniformly mixed components to the mixing unit.

(b) Heating equipment of sufficient capacity to maintain the individual components at the manufacturer's recommended temperature and capable of producing the required amount of heat at the mixing head and gun tip to maintain those temperatures within the tolerances recommended by the manufacturer for spray application.

(c) Drop-on glass beads shall be mechanically applied to the wet epoxy paint directly behind the spray guns at a rate required to meet the provisions of Sec. 620.2.4.1. Glass beads shall be applied evenly and shall completely cover the painted area. If beads do not embed properly in the paint, all marking operations shall cease until corrections are made.

(d) Each proportioning unit shall have individual metering devices or pressure gauges and stroke counters to monitor gallon (L) usage. All such devices shall be visible to the engineer.

(e) A minimum 24-inch (600 mm) long static mixer shall be used for proper mixing of the two components.

6.2 Transfer of Material. The contractor shall provide all necessary equipment to adequately mix each shipping container. At any time that partial shipping containers are transferred to the reservoirs on the striping equipment, complete mixing of that container shall be performed prior to beginning transfer.

6.3 Surface Preparation. The pavement surface on which the pavement marking is placed shall be free of all debris, laitance and any other contaminants that may hinder the adhesion of the system to the surface. Whenever grinding, scarifying, sandblasting, shot blasting or other

operations are performed, the debris generated must be contained through vacuum type equipment or equivalent. The pavement surface is not left scarred with an image that might mislead traffic. Any excess damage or scarring of the pavement shall be repaired by the contractor, at the contractor's expense.

6.3.1 Removal and cleaning work shall be conducted in such a manner as to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owners.

6.3.2 Care shall be taken on bituminous and Portland cement concrete surface when performing removal and cleaning work to prevent damage to transverse and longitudinal joints.

6.3.3 After all cleaning operations are completed, the pavement surface shall be power broomed and then blown with compressed air to remove residue and debris resulting from the cleaning work. All such debris must be properly contained and disposed of as approved by the engineer.

6.3.4 Limits of Work. Cleaning and surface preparation work shall be confined to the area specified for the application of the pavement marking materials; or the surface area of existing pavement markings that are specified for removal on the plans, or to the area specified by the engineer.

6.3.4.1 Surface preparation work includes cleaning for lines.

6.3.4.2 The area of preparation shall be the width of the new pavement marking, or existing line, plus one inch (25 mm) on each side of the line.

6.3.5 Removal of Concrete Curing Compound. On new Portland cement concrete pavements, cleaning operations shall not begin until the concrete has attained the minimum design compressive strength, as determined by MoDOT test methods. The extent of the curing compound removal work shall be to clean and prepare the concrete surface such that there shall be no visible evidence of curing compound and the extent of the removal shall ensure that any laitance is removed on both old as well as new concrete.

6.3.6 Surface Preparation on Asphalt Surfaces. On new bituminous pavement containing polymer modified asphalts, cleaning operations shall not begin until after the asphalt mat has reached ambient temperature. The extent of cleaning on new asphalt shall be such that 75 percent of the stone substrate is exposed.

6.3.7 Removal of Existing Pavement Marking. All existing pavement markings, except epoxy pavement markings, shall be removed to the extent that 95 to 100 percent of the existing marking is removed. Existing epoxy pavement markings that are in good condition and that will not interfere with or otherwise conflict with newly applied markings, as determined by the engineer, may be allowed to remain. Removal operations shall be conducted in such a manner that no more than moderate color or surface texture change results on the surrounding pavement surface. The engineer will make the determination of acceptable removal.

6.4 Application. The pavement marking material shall be applied to the road surface at 25 mils (0.625 mm) on concrete or asphalt pavements through the use of equipment designed to precisely meter the two components in the ratio recommended by the material manufacturer.

6.4.1 Traffic Control. Under controlled traffic conditions, Type A epoxy marking may be used

but coning will be required and flagging may be as directed by the engineer. Under ideal conditions, Type B epoxy marking may not require coning.

6.4.2 Atmospheric Conditions. The pavement marking shall only be applied during dry weather and on dry pavement surfaces. At the time of installation, the pavement surface temperature and ambient temperature shall be above 45 F (7 C).

6.4.3 Application Temperatures for the Material. Both components shall be brought to the temperature recommended by the manufacturer, prior to mixing and spraying and shall remain at that temperature throughout the operation.

6.5 Verification of Application Rates. The engineer will check application rates at convenient intervals by comparing the amount of material used to the lengths of pavement marking placed. For initial application and occasionally during the course of the work, the engineer may also check application rates by use of a wet film thickness gauge. Glass beads shall not be applied for testing application rates when using a wet film thickness gauge. The application rates for the glass beads shall be verified by means approved by the glass bead manufacturer.

6.6 Minimum Retroreflection. The pavement marking shall provide effective delineation on concrete and bituminous pavements and provide retroreflection requirements in accordance with Sec 620.2.4.

7.0 Method of Measurement. Where required, measurement of linear pavement marking will be made to the nearest linear foot (0.5 m). Where intermittent lines are specified, deductions will be made for the gaps in pavement marking. Measurement of arrows, words and symbols will be made per each.

8.0 Basis of Payment. The accepted quantity of epoxy pavement marking will be paid for at the contract unit price for each of the pay items included in the contract.

K. SUPPLEMENTAL REVISIONS DSP-04-01C1

SECTION 106 – CONTROL OF MATERIAL

Amend Sec 106 to include the following:

106.14 Proprietary Items. In the event a proprietary item included in a contract becomes unavailable during the term of the contract, the contractor shall promptly provide documentation to the engineer substantiating that the proprietary item is unavailable. Price or credit terms demanded of the contractor by the supplier will not constitute sufficient reason to substitute for the specified proprietary item. As part of the documentation, the contractor shall propose an alternative source or item that meets the performance requirements of the original proprietary item included in the contract. Any adjustment in the contract unit price shall be made in accordance with Sec 109.4. If an acceptable alternative item cannot be located, the proprietary item and any associated work may be underrun from the contract.

SECTION 403 – ASPHALTIC CONCRETE PAVEMENT

Delete Sec 403.2.5.1 and substitute the following:

403.2.5.1 Filler Restriction. Rigden void content determined in accordance with MoDOT Test Method TM-73 shall be no greater than 50 percent.

SECTION 505 – BRIDGE DECK CONCRETE WEARING SURFACE

Amend Sec 505.10 to include the following:

505.10.2.1.1 Gradation D may be used when the plan thickness of the bridge deck overlay is 3 inches or greater.

Delete Sec. 505.10.8.13 and substitute the following:

505.10.8.13 After texturing the concrete surface, but before applying the wet cure, all vertical joints with the adjacent concrete shall be sealed by painting with thinned grout consisting of equal parts cement, sand and sufficient water for the mixture to be the consistence of paint.

Delete Sec. 505.10.8.15 and substitute the following:

505.10.8.15 The wet cure shall be applied within 30 minutes after the concrete has been placed on the deck, except when the surface will be excessively marred by so doing, as determined by the engineer. If the concrete requires refinishing because of failure to meet density requirements, the time will be extended 15 minutes. Failure to apply wet cure within the required time shall be cause for rejecting the work affected. Surface concrete in the rejected area shall be removed and replaced by the contractor at the contractor's expense.

Delete Sec. 505.10.8.16 and substitute the following:

505.10.8.16 The surface shall receive a wet cure of at least 72 hours.

Delete Sec. 505.20.8.3 and substitute the following:

505.20.8.3 Texturing shall occur immediately after finishing and before the plastic film forms on the surface. Texturing shall be performed in a manner to prevent pulling the concrete away from an existing vertical face. Care shall be taken not to texture too deep and not to tear the surface.

Delete Sec. 505.20.8.6 and substitute the following:

505.20.8.6 The wet cure shall be applied promptly after the concrete has been placed on the deck without deforming the finished surface.

Delete Sec. 505.20.8.7 and substitute the following:

505.20.8.7 The surface shall receive a wet cure for at least 48 hours.

Delete Sec. 505.20.9.2 and substitute the following:

505.20.9.2 No latex modified concrete shall be placed at ambient or deck surface temperatures below 45 F (7 C). Latex modified concrete shall be protected to maintain a minimum specified curing temperature of 45 F (7 C). Any concrete damaged by freezing or which is exposed to a temperature of less than 45 F (7 C) during the first 8 hours after placement shall be removed and replaced at the contractor's expense.

Delete Sec. 505.30.3.1 and substitute the following:

505.30.3.1 The contractor shall submit a mix design to Construction and Materials with the following properties:

Property	Requirement
Air Content, percent, minimum	5.0
Slump, inches (mm), maximum	6 (150)
Cement Content, sacks/cubic yard (kg/m^3), minimum	6.4 (363)
Water/Cementitous Ratio, lbs. (kg) water/lbs. (kg) cementitous materials, max.	0.37
Silica Fume, % solids by weight (mass) of cement	6 - 8
Percent Fine Aggregate (as percent of total fine and coarse aggregate by absolute volume)	50 – 55
High Range Water Reducer	As required

Delete Sec. 505.30.8.3 and substitute the following:

505.30.8.3 The surface shall receive a wet cure for at least 7 days. Time when the ambient temperature is below 45 F (7 C) will not be counted as cure time. Cure shall be continued if 3000 psi (21 MPa) compressive strength has not been attained.

SECTION 506 – CONCRETE OVERLAYS FOR PAVEMENTS

Delete Sec 506.20.3.3.3 and substitute the following:

506.20.3.3.3 New transverse joints will not be required to match existing transverse joints, except new transverse expansion joints shall be cut or placed to match the underlying joint configuration.

SECTION 612 – IMPACT ATTENUATORS

Delete Sec 612.4.1 and substitute the following:

612.4.1 Truck Mounted Attenuator. A truck mounted attenuator (TMA) shall be used for all moving operations conducted under traffic and as specified in the contract. Each TMA shall consist of a TMA unit, a support vehicle, and truck-mounted flashing arrow panel. Any damaged TMA shall be removed from service and either repaired or replaced to the satisfaction of the engineer.

SECTION 613 – PAVEMENT REPAIR

Delete Sec 613.20.2.1.1 and substitute the following:

613.20.2.1.1 Concrete shall be in accordance with the following requirements. Compressive strength specimens shall be prepared in accordance with current MoDOT methods and cured to simulate actual field conditions. Testing of compressive specimens shall be performed by methods and at facilities acceptable to the engineer. A new trial mix may be required if the engineer determines the field conditions vary substantially from trial mix conditions. The coarse

aggregate for the concrete shall be Gradation F in accordance with Sec 1005 or an optimized aggregate gradation approved by the engineer. The optimized aggregate gradation shall have 100 percent passing the 1/2 inch (12.5 mm) sieve and no more than five percent retained on the 3/8 inch (9.5 mm) sieve.

Property	Requirement
Compressive Strength in 4 hours [a]	1600 psi (11 MPa), min.
Compressive Strength in 24 hours	4000 psi (28 MPa), min.
Air Content	4 percent, min.
Slump	1 inch (25 mm), max.

[a]The cure time shall be the time determined to reach this compressive strength. The roadway may be opened to traffic when this compressive strength has been attained.

Delete Sec 613.20.3.1.2 and substitute the following:

613.20.3.1.2 Milling. Milling equipment shall be in accordance with Sec 622.10. The equipment shall be equipped with a device for stopping at a preset depth. Milling may be performed either across lanes or parallel to the pavement centerline. After milling, the bottom of the repair area shall be checked by sounding to ensure all unsound material has been removed. Any unsound material remaining shall be chipped free. When milling is performed, light pneumatic tools shall be used to form a vertical face where the milling machine started and ended. The repair boundaries and edges shall be uniform. The maximum allowable pneumatic hammer weight (mass) for chipping shall be 15 pounds (7kg). If excessive concrete is removed, or if dowel bars or reinforcement are damaged to the extent to require full depth pavement repair, the cost for the repair shall be at the contractor's expense.

Delete Sec 613.20.3.7 and substitute the following:

613.20.3.7 Acceptance. All pavement repairs will be sounded by the engineer prior to acceptance. Sounding will not be performed until the repair material has reached design compressive strength and the repair has been open to traffic for a minimum of 30 days. If sounding indicates unsound material, the entire pavement repair shall be removed to the limits designated by the engineer and replaced by the contractor at the contractor's expense.

Delete Sec 613.20.4.1 and substitute the following:

613.20.4.1 Measurement for repairing spalled areas, cracks or joints will be made to the nearest 1/10 square yard (0.1 m^2). Any material removed beyond the repair area designated by the engineer due to the removal methods used by the contractor will not be included in the measurement for pavement repair. Measurement of all concrete material furnished and placed in the repair of spalled areas, cracks or joints will be made to the nearest 1/10 cubic yard (0.1 m^3). Measurement for the saw cut to re-establish the joint or crack will be made to the nearest linear foot (0.5 m).

SECTION 614 – DRAINAGE FITTINGS

Delete Sec 614.10.4 – 614.10.5 and substitute the following:

614.10.4 Basis of Payment. The accepted quantity of parallel bar grates and bearing plates, and curved vane grates and frames will be paid for at the contract unit price for each of the items included in the contract.

SECTION 616 – TEMPORARY TRAFFIC CONTROL

Delete Section 616.2 and replace with the following:

616.2 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Temporary Traffic Control Devices	1063

SECTION 805 – SEEDING

Amend Sec 805 to include the following:

805.3.3 All seeded areas shall be mulched in accordance with Sec 802.

SECTION 1002 – AGGREGATE FOR ASPHALTIC CONCRETE

Delete Sec 1002.4 and substitute the following:

1002.4 Mineral Filler. Mineral filler shall be in accordance with AASHTO M 17. Prior to approval and use of mineral filler for SMA mixtures, the manufacturer shall submit to Construction and Materials a certified test report from an approved independent testing laboratory showing specific test results when tested in accordance with applicable sections of AASHTO M17 and MoDOT Test Method TM-73. The certified test report shall contain the manufacturer's name, product, date tested and date of manufacture. In addition, the manufacturer shall submit to Construction and Materials a sample representing the mineral filler tested by the independent testing laboratory and accompanied by a material data sheet and an MSDS showing the product and composition or description of the product. The manufacturer shall guarantee that as long as the material is furnished under that brand and designation, the material will be of the same composition as originally approved and will in no way be altered or changed. Upon approval of the mineral filler, the manufacturer and product will be placed on a list of qualified SMA mineral fillers.

SECTION 1015 – BITUMINOUS MATERIAL

Delete Sec 1015 and substitute the following:

SECTION 1015

BITUMINOUS MATERIAL

1015.1 Scope. This specification covers bituminous material to be used in highway construction.

1015.2 Approval of Source. The contractor shall obtain approval of the source of bituminous material from the engineer before any shipments to the work site are made.

1015.3 Sampling, Testing and Acceptance Procedures. The supplier shall certify that the bituminous material complies with the specification requirements.

1015.3.1 Certification. The supplier shall furnish the truck driver a copy of the bill of lading, manifest or truck ticket to be available to MoDOT at the destination prior to unloading. The engineer at the source shall be furnished a copy. The bill of lading, manifest or truck ticket shall provide the following information regarding the shipment: type and grade of material, specific gravity at 60° F (15.6° C), net gallons (L), consignee, truck number, identification number, weight (mass) of truck before and after loading, destination, date loaded, name and location of the source, and a certification statement. The certification statement shall be signed by an authorized representative of the supplier and shall be substantially as follows:

"This certifies that the bituminous material in this shipment is in accordance with MoDOT specifications for the grade specified and the weights (masses) shown hereon were obtained on MoDOT approved scales and are correct within the specified scale requirements."

1015.3.2 Sampling. The engineer will at random observe the sampling and testing of truck shipments and tanks, and will select representative samples of the material being supplied for testing in the field or in the Central Laboratory. When test results certified by the supplier are not representative of the material being shipped, the source approval will be withdrawn. A source may be reinstated when proof is furnished that the deficiency has been corrected and adequate controls are in effect to guarantee delivery of material meeting specifications. Sampling and test methods for asphalt shall be as follows:

Property	Method	RC	MC	PG
Sampling	AASHTO T 40	X	X	X
Water	AASHTO T 55	X	X	X
Flash Point (Tag Open Cup)	AASHTO T 79	X	X	
Flash Point (Cleveland Open Cup)	AASHTO T 48			X
Viscosity, Centistokes	AASHTO T 201	X	X	
Distillation	AASHTO T 78	X	X	
Penetration	AASHTO T 49	X	X	
Ductility	AASHTO T 51	X	X	
Solubility in Trichlorethylene	AASHTO T 44	X	X	X
Ash in Bituminous Material	AASHTO T 111			
Viscosity (Rotational)	ASTM D 4402			X
Dynamic Shear	AASHTO 315			X
Rolling Thin Film Oven Test	AASHTO T 240			X
Pressure Aging Test	AASHTO R28			X
Creep Stiffness	AASHTO T 313			X
Direct Tension	AASHTO T 314			X

1015.3.3 Sampling Equipment. The supplier shall furnish the required sampling equipment and shall sample the contents of the truck under the direction of the engineer. The supplier shall keep all sampling equipment clean and in good condition. Sampling devices on truck transports will be approved provided an adequately insulated valve is used with a pipe or nipple inserted a suitable distance into the tank.

1015.3.4 Truck Log. Each truck transport shall carry a log showing types of material and the dates hauled with respect to previous shipments, or the supplier shall furnish to the engineer such information with respect to the previous load.

1015.3.5 Intermediate Storage. Intermediate storage tanks for storage and transfer of material between the refinery or terminal and the point of acceptance shall be equipped for sealing and shall be reserved exclusively for MoDOT work. Use of any material from unsealed tanks will be subject to delay until material can be sampled, tested and approved.

1015.3.6 Other Transportation. At sources from which liquid bituminous material is being accepted by certification, the applicable requirements of the foregoing sections shall be followed for shipments of material in transportation units other than trucks. The certification and all information regarding each shipment shall be furnished to the engineer at the source.

1015.3.7 Railroad Shipments. For railroad shipments from refineries where inspection is not maintained by MoDOT, the supplier shall sample each car load at the source and submit the sample promptly to the Central Laboratory. A bill of lading or identification sheet shall accompany each sample and contain the following information: car number, type and grade of material, quantity represented, including gross gallons (L), temperature and net gallons (L) at 60° F (15.6° C), destination of shipment, project number and consignee. A certification statement as specified in Sec 1015.3.1 shall accompany each sample. Approval of the source may be withdrawn if samples submitted are not representative of the material shipped in the car.

1015.4 Proportioning and Blending Bituminous Material Constituents. All material shall be properly proportioned and thoroughly blended in suitable tanks prior to delivery to transportation equipment, or material may be proportioned and blended by use of automatic proportioning equipment. All automatic-proportioning blenders shall meet the approval of the engineer and shall be equipped with precision instruments, including electrically interlocked motors and automatic meters. Blending quantities of less than 8000 gallons (30,000 L) in tanks or in tank trucks will not be permitted.

1015.5 Application Temperatures for Bituminous Material.

Bituminous Material	Temperature, Degrees Fahrenheit (Celsius)			
	Spraying		Mixing	
	Min	Max	Min	Max
Asphalt Binder				
PG 46-28	260 (125)	325 (165)	----	----
All Other Grades	285 (140)	350 (175)	275 (135)	350 (175)
Liquid Asphalt RC-MC Grade				
30	70 (20)	150 (65)	50 (10)	110 (45)
70	100 (40)	180 (80)	90 (30)	140 (60)
250	150 (65)	220 (105)	130 (55)	170 (75)
800	180 (80)	260 (125)	170 (75)	210 (100)
3000	210 (100)	290 (145)	200 (95)	240 (115)
Asphalt Emulsions				
RS-1	70 (20)	140 (60)	----	----
RS-2	125 (50)	185 (85)	----	----
SS-1	70 (20)	160 (70)	70 (20)	160 (70)
SS-1h	70 (20)	160 (70)	70 (20)	160 (70)

CRS-1	125 (50)	185 (85)	----	----
CRS-2	125 (50)	185 (85)	----	----
CSS-1	70 (20)	160 (70)	70 (20)	160 (70)
CSS-1h	70 (20)	160 (70)	70 (20)	160 (70)
EA-90P	130 (55)	180 (80)	----	----
CRS-2P	130 (55)	180 (80)	----	----

1015.5.1 Application temperatures of other grades of emulsions shall be as specified in the contract.

1015.5.2 The spraying temperature for non-modified PG 46-28 asphalt binder shall be 260 - 325° F (125 - 165° C), and for all other higher temperature non-modified performance grades, the spraying temperature shall be 285 - 350° F (140 - 175° C). The mixing and compaction temperatures for performance graded asphalt binder shall be determined by rotational viscosity testing as defined in ASTM D 4402.

1015.5.3 When material to be applied by pressure distributor is, due to refining or blending procedures, delivered at a temperature above the specified limits, the material may be applied at the higher temperature provided satisfactory application can be obtained at the specified rate and provided sufficient precaution is exercised with respect to the fire hazard.

1015.6 Measurement of Bituminous Material. Field weight (mass) or field volumetric determinations of the material actually incorporated into the work will be used for measurement of the quantity of bituminous material for payment. The volume of material supplied from intermediate storage tanks will be determined from the net weight (mass) of the material. The net weight (mass) will be determined from the gross weight (mass) of the loaded transport vehicle used to deliver the material to the project less the empty transport vehicle weight (mass). The volume correction methods specified below will be used for determining the volume of bituminous material. Scales for determining the weight (mass) of bituminous material shall be in accordance with Sec 310.

1015.6.1 Liquid Bituminous Material and Asphalt Binder - Volumetric Determination. Measurement of the material will be based on the volume at 60° F (15.6° C). The volume correction factors of ASTM D 1250, Table 24b, will be used for converting the material from the volume at the observed temperature to the volume at 60° F (15.6° C). The volume of uncalibrated distributors and tank trucks will be determined from the net weight (mass) of the material. The net weight (mass) will be determined from the gross weight (mass) of the loaded delivery vehicle less the empty delivery vehicle weight (mass). For computing the volume in gallons (l) from weight (mass), the following formula will be used:

ENGLISH

$$G = \frac{W}{SG \times 8.328}$$

where:

G = Volume in gallons at 60° F.
W = Weight of material in pounds.
SG = Specific Gravity of material at 60° F.

METRIC

$$L = \frac{M}{SG \times 997.914}$$

where:

L	=	Volume in liters at 15.6° C.
M	=	Mass of material in kilograms
SG	=	Specific Gravity of material at 15.6° C.

1015.6.2 Emulsified Asphalt. Measurement of the material will be based on the volume at 60° F (15.6° C) using a coefficient of expansion of 0.0003 per degree F (0.00054 per degree C) for converting the material from the volume at the observed temperature to the volume at 60° F (15.6° C).

SECTION 1015.10 PEFORMANCE GRADED ASPHALT BINDER

1015.10.1 General. Performance graded asphalt binder shall be an asphalt-based binder produced from petroleum residue either with or without the addition of non-particulate organic modifiers. The grade shall be as specified in the contract.

1015.10.2 Basis of Acceptance. Suppliers furnishing performance graded asphalt binders to MoDOT projects by certification shall be in accordance with AASHTO R 26, except as noted herein. To become pre-qualified to furnish material, a written request shall be sent to Construction and Materials, along with a copy of the supplier's QC plan. Split samples may be required. Changes in formulation, base stock or methods of manufacture of qualified performance graded binders shall be noted and may require requalification.

1015.10.2.1 Quality Control Plan Requirements. The QC plan shall be in accordance with AASHTO R 26 with the following exceptions and modifications:

(a) The plan shall be written to cover multiple terminals or shipping facilities, in addition to the primary manufacturing facility, provided specific requirements for each location are clearly stated.

(b) The plan shall state the lot size used to designate the frequency of QC and specification compliance testing for each performance grade to be supplied. The lot size will depend upon the method of manufacture and may be designated on a tank basis, or on a time basis in the case of binders that are blended into trucks or tanks or that are continually blended into "live" tanks.

(c) For terminals or manufacturing facilities, the minimum reduced frequency of testing for QC or specification compliance shall be one series of tests every two weeks for "live" tanks or blenders and one series of tests every four weeks for "static" tanks that have had no material added between testing, per lot per grade of binder shipped.

(d) Quality Control testing may be used to determine that binders being shipped from terminals or manufacturing facilities have not been contaminated, provided that such testing is shown to be of sufficient accuracy to detect contamination and to assure that material meets required specifications. Surrogate tests may be used for QC testing of non-modified performance graded binders.

(e) Terminals or shipping facilities that blend performance graded binders from different sources, that blend to produce a different performance grade, or that blend to modify the properties of an existing performance grade shall perform complete AASHTO M 320 specification compliance testing.

(f) The shipping facility shall document that each transport vessel was inspected prior to loading and was found to be acceptable for the material being shipped. The inspection shall be documented by a statement on the bill of lading or truck ticket, or by maintaining a record of transport vessel inspections at the shipping facility, which shall be available for review by MoDOT.

1015.10.2.2 Quality Control Plan Test Data. The facility shall retain test data of specification compliance and QC testing for five years. At a minimum, the name of the facility, the dates of testing activity, results of individual specification compliance and QC tests identified by blender or tank number, and the mean, minimum and maximum test result for each specification compliance and QC test performed shall be readily available to MoDOT upon request.

1015.10.2.3 Approval of Laboratories. The supplier's primary testing laboratory shall be approved by MoDOT. The approval process will include split sample testing, and may include an on-site visit by department personnel. The primary testing laboratory shall be regularly inspected by the AASHTO Materials Reference Laboratory (AMRL). Any satellite testing laboratory operated by a supplier shall be inspected at the same frequency by the supplier's primary AMRL inspected laboratory staff, and a copy of the inspection report shall be forwarded to MoDOT.

1015.10.2.4 Failure to Comply. Failure to fulfill any of these requirements may result in disqualification of the performance graded binder supplier. If a primary manufacturing facility is disqualified, all terminals shipping performance graded binder manufactured at the primary facility and who are not performing AASHTO M 320 specification compliance testing will automatically be disqualified. In cases of dispute, test results obtained by MoDOT will be considered final.

1015.10.3 Characteristics. Performance graded asphalt binder shall be in accordance with AASHTO M 320 for the grade specified, except as follows. AASHTO T 111, *Inorganic Matter or Ash in Bituminous Materials*, may be substituted for AASHTO T 44, *Solubility of Bituminous Materials*, at the specification value indicated. The direct tension test will be waived. The following additional requirements will apply:

Binder Characteristics		
Absolute Temperature Spread Between Upper and Lower Temperature for PG Binder Grade[a]	Elastic Recovery[b], Percent, Minimum, AASHTO T 301	Separation Test[c], Percent Difference, Maximum, ASTM D 5976
86 C	-	-
92 C	55	10
98 C	65	10
104 C	75	10

[a]Temperature Spread = Upper PG Temperature minus Lower PG Temperature.
[b]Elastic recovery test to be performed on the residue from the Rolling Thin Film Oven Test at 25 C and 10 cm elongation.
[c]Separation test to be performed in accordance with ASTM D 5976, except test upper and lower portions as original binder for G* value according to AASHTO T 315.

1015.10.4 Storage. Performance graded asphalt binder shall be furnished as a uniform mixture shipped directly to the project site from the asphalt binder supplier's permanent plant address or intermediate storage facility, suitable for direct use. Asphalt binder shall be capable of being stored at the project site without separation or settling. Automatic blending will be allowed, except no intermediate blending of asphalt binder and any other modifiers will be allowed at the project site.

SECTION 1015.20 LIQUID BITUMINOUS MATERIAL

1015.20.1 Basis of Acceptance. Suppliers electing to furnish liquid bituminous material to MoDOT projects by QC/QA certification shall furnish material in accordance with Sec 1015.20.2. To become pre-qualified to furnish material, a written request shall be submitted to Construction and Materials, along with a copy of the supplier's QC plan. For source approval for any supplier of liquid bituminous material, split samples and an on-site laboratory inspection may be required. A manufacturer may forgo a formal QC plan and elect to perform full compliance testing, and certify each batch of material. If a manufacturer elects to forgo a formal QC Plan, all truck shipments shall be loaded from approved storage tanks that have been sampled, tested and certified by the supplier. If a manufacturer so elects, and automatic blending equipment is used, blender material will be approved for use provided the finished product is in accordance with this specification. At least one complete specification compliance test shall be conducted every two weeks on each grade of material furnished for MoDOT work from the blender. A certified copy of the test results shall be furnished to the engineer. For all liquid bituminous material, AASHTO T 111, *Inorganic Matter or Ash in Bituminous Materials*, may be substituted for AASHTO T 44, *Solubility of Bituminous Materials*, at the specification value indicated.

1015.20.2 Quality Control Plan Requirements. The QC plan shall be in accordance with the following:

(a) The plan may be written to cover multiple terminals, shipping facilities, blending or manufacturing facilities.

(b) The plan shall state the location, organization and responsible personnel for each facility, including the physical address and telephone contact information. In general, following the guidelines in AASHTO R 26 will be acceptable.

(c) The plan shall state the minimum testing frequency for all material supplied. At a minimum, each grade of material supplied to MoDOT shall have complete specification compliance testing conducted monthly. Polymer modified material shall have complete specification compliance testing conducted every two weeks. The manufacturer's internal QC testing frequency shall be approved by MoDOT prior to implementation. The manufacturer shall perform sufficient tests and at a frequency to ensure specification compliant material is being supplied to MoDOT at all times. For emulsified asphalt, QC testing on each batch, at a minimum, shall consist of viscosity, sieve test, determination of residue by either distillation or evaporation and an identifier test, if applicable, for that particular grade, either cement mixing, particle charge or demusibility. The manufacturer may elect to perform additional QC tests. For cutback material, QC testing shall be a minimum of the viscosity on a daily basis when material is being shipped to MoDOT work.

(d) In the event of a failing sample, the manufacturer shall follow the steps outlined in AASHTO R 26, Sec. 9.2. If a sample fails to comply with any specification requirement at the Central Laboratory, the manufacturer may only ship new material of that grade after full

specification compliance testing. After the manufacturer has certified through specification compliance testing that three consecutive batches are in accordance with the material specification, the manufacturer may return to the testing frequency outlined in the QC/QA plan. If a second sample of the same grade from the same facility fails to comply with any specification requirement within the same calendar year, approval of that facility to supply that grade under QC/QA may be withdrawn. If approval for a grade is withdrawn, that material may only be supplied to MoDOT work after full certification compliance testing has been performed at the Central Laboratory. Re-approval to supply under the supplier's QC/QA Plan will occur only after three consecutive batches meet specifications after testing at the Central Laboratory. Failure of multiple grades from a single facility tested at the Central Laboratory may result in that facility being removed from approval to supply material to MoDOT. Reinstatement will occur only after all materials in question have been tested at the Central Laboratory and have met all specifications, and documentation from the supplier outlining the reason for the failures and what corrective measures have been taken are to the satisfaction of MoDOT.

(e) The shipping facility shall document that each transport vessel was inspected prior to loading and was found to be acceptable for the material shipped. The inspection shall be documented by a statement on the bill of lading or truck ticket, or by maintaining a record of transport vessel inspections at the shipping facility, which shall be available for review by MoDOT.

The results of QC/QA testing shall be retained by the supplier for a period of three years. A report containing all test results for any material shall be available to MoDOT upon request.

1015.20.3 Type RC Liquid Asphalt. Type RC liquid asphalt shall be produced by fluxing an asphaltic base with suitable petroleum distillates. The material shall show no separation or curdling prior to use and shall not foam when heated to the application temperature. The material shall be in accordance with AASHTO M 81, invoking Note 3 using penetration in lieu of viscosity for the grade specified in the contract.

1015.20.4 Type MC Liquid Asphalt. Type MC liquid asphalt shall be produced by fluxing an asphaltic base with suitable petroleum distillates. The material shall show no separation or curdling prior to use and shall not foam when heated to the application temperature. The material shall be in accordance with AASHTO M 82, invoking Note 4 using penetration in lieu of viscosity for the grade specified in the contract.

1015.20.5 Emulsified Asphalt. Emulsified asphalt shall be in accordance with AASHTO M 140 or AASHTO M 208, for the type and grade specified in the contract.

1015.20.5.1 Polymer Modified Asphalt Emulsion. Bituminous material for polymer modified asphalt shall be in accordance with the following:

Polymer Modified Asphalt Emulsion				
Test [a]	CRS-2P		EA-90P	
	Min	Max	Min	Max
Viscosity, SSF @ 50 C	100	400	100	400
Storage Stability Test[b], 24 hour, percent	----	1	----	1
Classification Test	Pass	----	----	----
Particle Charge Test	Positive	----	----	----
Sieve Test, 850 µm mesh, percent	----	0.3	----	0.3
Demulsibility, 0.02 N $CaC1_2$, percent	----	----	30	----

Distillation:				
Oil distillate by volume of emulsion, percent	----	3	----	3
Residue from distillation[c] , percent	65	----	65	----
Tests on Residue from Distillation:				
Penetration, 25 C, 100 g, 5 sec	100	200	100	200
Ductility, 4 C, 5 cm/minute, cm	30	----	25	----
Ash[d] , percent	----	1	----	1
Float Test at 60 C, sec	----	----	1200	----
Elastic Recovery[e] , percent	58	----	58	----

[a]All tests shall be performed in accordance with AASHTO T 59 except as noted.
[b]In addition to AASHTO T 59, upon examination of the test cylinder, and after standing undisturbed for 24 hours, the surface shall show no appreciable white, milky colored substance and shall be a homogeneous brown color throughout.
[c]AASHTO T 59 shall be modified to maintain a 204° C ± 5° C maximum temperature for 15 minutes.
[d]Percent ash shall be determined in accordance with AASHTO T 111, *Ash in Bituminous Material.*
[e]Elastic recovery shall be determined as follows. Condition the ductilometer and samples to be treated at 10 C. Prepare the brass plate, mold and briquet specimen in accordance with AASHTO T 51. Keep the specimen at the specified test temperature of 10° C for 85 to 95 minutes. Immediately after conditioning, place the specimen in the ductilometer and proceed to elongate the sample to 20 cm at a rate of pull of 5 cm/min. After the 20 cm elongation has been reached, stop the ductilometer and hold the sample in the elongated position for 5 minutes. After 5 minutes, clip the sample approximately in half by means of scissors or other suitable cutting devices. Let the sample remain in the ductilometer in an undisturbed condition for one hour. At the end of this time period, retract the half sample specimen until the two broken ends touch. At this point note the elongation (x) in cm. Calculate the percent recovery by the following formula:

$$\% \text{ Recovery} = \frac{20 - X}{20} \times 100$$

1015.20.5.2 Asphalt Emulsion for Micro-Surfacing. Bituminous material for micro-surfacing shall be a polymer modified asphalt emulsion, grade CSS-lh, in accordance with the following table. The bituminous material shall show no separation after mixing. A minimum of 3.0 percent polymer content, by mass, of an approved polymer shall be milled into the asphalt emulsion at the time of manufacture of the emulsion. The emulsion shall be sampled in accordance with AASHTO T 40.

Micro-Surfacing Emulsion (MSE-1)			
	Min.	Max.	Test Method
Viscosity, Saybolt Furol at 25 C, s	20	100	AASHTO T 59
Storage stability test, 24 hr, percent	- -	1[a]	AASHTO T 59
Particle charge test positive[b]			AASHTO T 59
Sieve test, percent	- -	0.50	AASHTO T 59
Residue, percent	62	- -	AASHTO T 59
Tests on Residue from Distillation	Min.	Max.	Test Method
Penetration, 25 C, 100 g, 5 s,	40	90	AASHTO T49
Ductility, 25 C, 5cm/min, cm,	40	- -	AASHTO T 51
Solubility in Trichloroethylene, %	97.50	- -	AASHTO T 44

[a]The storage stability test may be waived provided the asphalt emulsion storage tank at the project site has adequate provisions for circulating the entire contents of the tank, and provided satisfactory field results are obtained.
[b]If the particle charge test is inconclusive, material having a maximum pH value of 6.7 will be acceptable.

1015.20.5.3 Scrub Seal Emulsion. Scrub seal emulsion shall be smooth and homogeneous, polymer modified, shall contain an asphalt rejuvenator and shall be in accordance with the following:

Scrub Seal Emulsion (SSE-1)			
	Min.	Max.	Test Method
Saybolt Furol Viscosity, SFS @ 25 C	30	100	AASHTO T 59
Storage Stability Test [a], 24 hr., %	--	1[a]	AASHTO T 59
Demulsibility, 35 ml of 0.02N, $CACl_2$, %	--	60	AASHTO T 59
Sieve Test [b], percent	--	0.3	AASHTO T 59
Residue by Distillation [(c)] @ 205 ± 5 C, %	60	--	AASHTO T 59
Oil Distillate by Volume, percent	--	3	AASHTO T 59
Tests on Residue from Distillation	Min.	Max.	Test Method
Penetration @ 25 C, 5 s, 100 g, dmm	100	300	AASHTO T 49
Float Test @ 60 C, s	1200	--	AASHTO T 50
Ash, percent	--	1	AASHTO T 111
Elastic Recovery, 10 C, 200 mm elongation, 60 min. recovery, percent	30	--	ASTM D 5976
Saturates [d], percent	- -	20	ASTM D 4124

[a]Upon examination of the test cylinder after standing undisturbed for 24 hours, the surface shall show no white, milky colored substance and shall be a homogeneous brown color throughout.
[b]A percentage of 0.30 will be acceptable for samples taken at the point of use or shipped to the Central Laboratory for testing.
[c]ASTM D 244 shall be modified to include a 205 ± 5° C maximum temperature to be held for 15 minutes.
[d]ASTM D 4124 shall be modified to use Alumina, CG - 20 Grade, available from Aluminum Company of America, Pittsburgh, PA.

1015.20.6 Ultrathin Bonded Wearing Surface. Bituminous material for ultrathin bonded wearing surface shall be in accordance with the following.

1015.20.6.1 Asphalt Binder. The asphalt binder shall be in accordance with Sec 1015.10, and specifically as follows:

Tests	Method	Min.	Max.
Separation Test, %	AASHTO PP-5		10
Elastic Recovery Test, %	ASTM D 6084	65	

1015.20.6.2 Polymer Modified Emulsion Membrane. The anionic or cationic emulsion shall be polymer modified and shall be in accordance with one of the following:

Anionic Polymer Modified Emulsion Membrane (PEM-1)			
Tests on Emulsion	Method	Min.	Max.
Viscosity, Saybolt Furol @122° F (50° C), s	AASHTO T 59	25	125

Storage Stability Test[a], 24 h, percent		AASHTO T 59		1
Sieve Test[b], percent		AASHTO T 59		0.3
Residue by Distillation[c], percent		AASHTO T 59	63	
Oil Distillate by Distillation, percent		AASHTO T 59		2
Demulsibilty, %	35 ml, 0.02 N $CaCl_2$	AASHTO T 59	60	
Tests on Residue From Distillation				
Penetration		AASHTO T 49	90	150
Elastic Recovery, percent		AASHTO T 301	60	

Cationic Polymer Modified Emulsion Membrane (CPEM-1)				
Tests on Emulsion		Method	Min.	Max.
Viscosity, Saybolt Furol @122°F (50° C), s		AASHTO T 59	25	125
Storage Stability Test[a], 24 h, percent		AASHTO T 59		1
Sieve Test[b], percent		AASHTO T 59		0.3
Residue by Distillation[c], percent		AASHTO T 59	63	
Oil Distillate by Distillation, percent		AASHTO T 59		2
Demulsibility, %	35 ml, 0.8% dioctyl sodium sulfosuccinate	AASHTO T 59	60	
Tests on Residue From Distillation				
Penetration		AASHTO T 49	90	150
Elastic Recovery, %		AASHTO T 301	60	

[a]After standing undisturbed for 24 hours, the surface shall show no white, milky colored substance, but shall be a smooth homogeneous color throughout.
[b]The sieve test will be waived if successful application of the material has been achieved in the field.
[c]AASHTO T 59 shall be modified to include a 400° F ± 10° F (205° C ± 5° C) maximum temperature to be held for a period of 15 minutes.

SECTION 1081 – COATING OF STRUCTURAL STEEL

Delete Sec 1081.2 and substitute the following:

1081.2 Systems of Coatings. The required system and color or choice of systems and color will be specified on the plans. Each coat of the specified system shall be applied to all structural steel, unless the contract specifically delineates otherwise. The system and color of coating to be shop-applied shall be shown on the shop drawings. All coatings shall comply with local VOC (Volatile Organic Compound) regulations where the paint is applied. The system and color shall not vary for any portion of the entire structure, including material for field repairs, and shall be compatible products of a single manufacturer. The contractor shall coordinate the various items of work to ensure compliance with the requirements of this section. Approved material specification and dry film thickness for the coating systems shall be as indicated in the following table:

PAINT SYSTEMS FOR STRUCTURAL STEEL		
SYSTEM G (HIGH SOLIDS, INORGANIC ZINC SILICATE-EPOXY-POLYURETHANE)		
Coating	Specification	Dry Film Thickness mils (µm)
Prime Coat	Sec 1045.3	3.0 (75) min.-6 (150) max.
Epoxy Intermediate Coat	Sec 1045.4	3.0 (75) min.-5 (125) max.
Polyurethane Finish Coat, Gray or Brown	Sec 1045.5	2.0 (50) min.-4 (100) max.

SYSTEM H (HIGH SOLIDS, INORGANIC ZINC SILICATE-WATERBORNE ACRYLIC INTERMEDIATE-WATERBORNE ACRYLIC FINISH)		
Coating	Specification	Dry Film Thickness mils (µm)
Prime Coat	Sec 1045.3	3.0 (75) min.-6 (150) max.
Waterborne Acrylic, Intermediate Coat	Sec 1045.6	2.0 (50) min.-4 (100) max.
Waterborne Acrylic, Finish Coat, Gray or Brown	Sec 1045.6	2.0 (50) min.-4 (100) max.
CALCIUM SULFONATE SYSTEM		
Coating	Specification	Dry Film Thickness mils (µm)
Calcium Sulfonate Rust Penetrating Sealer	Sec 1045.9.2	1.0 (25) min.
Calcium Sulfonate Primer	Sec 1045.9.3	4.0 (100) min.
Calcium Sulfonate Topcoat	Sec 1045.9.4	5.0 (125) min.
ALUMINUM & GRAY EPOXY-MASTIC PRIMER		
Coating	Specification	Dry Film Thickness mils (µm)
Aluminum Epoxy-Mastic Primer	Sec 1045.7	5.0 (125) min.
Gray Epoxy-Mastic Primer	Sec 1045.8	5.0 (125) min.

Amend Sec 1081 to include the following:

1081.7 Aluminum & Gray Epoxy-Mastic Primer.

1081.7.1 Scope. This specification covers the application of other approved primer coatings for touch-up and other repair applications.

1081.7.2 Surface Preparation. The epoxy-mastic shall be applied over an SSPC-SP2, SSPC-SP3 or SSPC-SP6 surface preparation, including removal of all rust scale, loose rust, loose mill scale and loose or non-adherent paint. Oil and grease shall be removed in accordance with SSPC-SP1 Solvent Cleaning. Areas adjacent to required areas will not be required to be masked to prevent overspray.

1081.7.3 Application. Material application methods, air and surface temperatures and relative humidity shall be in accordance with the manufacturer's written instructions and Sec 1081.3. The most restrictive application and environmental requirements for the epoxy-mastic shall be used when applying the primer to the steel.

L. COLDMILLING REQUIREMENTS

1.0 Description. The contractor will only be allowed to coldmill an area in which the first lift of bituminous material can be constructed in the same day's operation.

1.0 Basis of Payment No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provision.

TITLE SHEET
ROUTE 50
JOB NO. J4D0500G
CONTRACT ID
PROJECT NO.
COUNTY JOHNSON
PROJECT LOCATION RTE. 13
COLDMILL AND RESURFACE
Log Mile 174.227
Log Mile 174.797
Log Mile 54.048
Log Mile 28.475
WARRENSBURG
PITTSVILLE
Jackson Co. Line
STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER
12/16/04
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REV.

LENGTH OF PROJECT

RTE. 50

	EASTBOUND	WESTBOUND
BEGIN AT LOG MILE	28.475	208.551
END AT LOG MILE	54.048	234.021
APPARENT LENGTH	25.573 MI.	25.470 MI.
EXCEPTIONS		
NET LENGTH	25.573 MI.	25.470 MI.

RTE. 13

	NORTHBOUND	SOUTHBOUND
BEGIN AT LOG MILE	174.227	116.028
END AT LOG MILE	174.797	115.458
APPARENT LENGTH	00.57 MI.	00.57 MI.
EXCEPTIONS		
BR. A0143	-0.04	-0.04
NET LENGTH	0.53 MI.	0.53 MI.

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

12/16/04

(2)

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

REV.

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RTE. 50

	LOG MILE	LOG MILE	NET LENGTH (MILES)	SURFACE WIDTH (FEET)	1 3/4" SP125C (TONS)	1"ASPH.CONC.MIX LEVEL COURSE * (TONS)	1 3/4" BP-1 (TONS)	TACK (GALLONS)
EASTBOUND	28.475	33.783	5.308	24	7128	4073		5917
	SHOULDERS		5.308	14	1867	Incl.in ML	4922	
	40.595	42.781	2.186	24	2936			2437
	SHOULDERS		2.186	14	629		1658	
	48.199	54.048	5.849	24	7855			6520
	SHOULDERS		5.849	14	1683		4437	
WESTBOUND	208.551	209.360	0.807	24	1084			900
	SHOULDERS		0.807	14	232		612	
	209.360	212.560	3.198	24	4295			3565
	SHOULDERS		3.198	14	920		2426	
	215.12	218.06	2.941	24	3949			3278
	SHOULDERS		2.941	14	846		2231	
	224.22	234.02	9.601	24	12893	7367		10702
	SHOULDERS		9.601	14	3377	Incl.in ML	8902	
	229.751	@ 58 HWY.	264 FEET	12	33	19		
				TOTALS	49727	11459	25188	33319

RTE. 50

	LOG MILE	LOG MILE	NET LENGTH (MILES)	SURFACE WIDTH (FEET)	COLDMILL (S.Y.)	1 3/4"SP125C (TONS)	FOG SEAL (GAL)	TACK (GALLONS)
EASTBOUND	33.783	40.595	6.812	24	95913	9148		4796
	SHOULDERS		6.812	14			11190	
	42.781	48.199	5.418	24	76285	7276		3814
	45.675	@ 58 HWY.	600 FEET	12	78	153		40
	SHOULDERS		5.418	14			8900	
WESTBOUND	212.56	215.12	2.562	24	36073	3441		1804
	SHOULDERS		2.562	14			4209	
	218.06	224.22	6.159	24	86719	8271		4336
	SHOULDERS		6.159	14			10117	
				TOTALS	295068	28289	34416	14790

RAMPS AT RTE. 13

RTE. 13 RAMPS	NET LENGTH (FEET)	SURFACE WIDTH (FEET)	COLDMILL (S.Y.)	1 3/4" SP125C (TONS)	TACK (GALLONS)
EB OFF RAMP	800	32	2844	271	142
EB ON RAMP	800	32	2844	271	142
WB OFF RAMP	700	32	2489	237	124
WB ON RAMP	700	32	2489	237	124
		TOTALS	10666	1016	532

* INCLULDED IN SP125C QUANTITY

FACTORS:

ASPHALTIC CONCRETE MIX
SP125C BASED ON 1.962 TONS/C.Y.

BITUMINOUS PAVEMENT
BP-1 BASED ON 2.069 TON/C.Y.

TACK COAT AT 0.05 GALLONS/S.Y.

FOG SEAL AT 0.2 GALLONS/S.Y.

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STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER
12/16/04

2B QUANTITY SHEET

SHEET 1 OF 4

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

12/30/2004

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RTE. 13

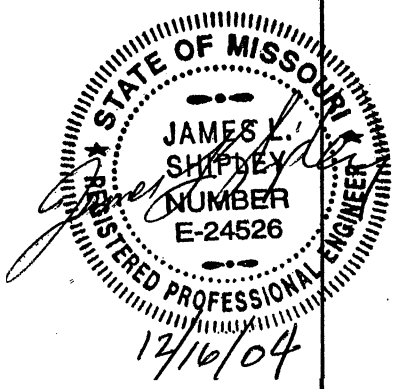
	LOG MILE	LOG MILE	NET LENGTH (MILES)	SURFACE WIDTH (FEET)	COLDMILL (S.Y.)	1 3/4" SP125C (TONS)	FOG SEAL (S.Y.)	TACK (GAL)
RTE. 13	174.2	174.379	0.179	48	735	481		252
	SHOULDERS		0.179	10			210	
	174.379	174.479	0.1	36	2112	227		106
	SHOULDERS		0.1	12			422	
	174.479	174.498	0.02	100	1111	106		59
	174.56	174.782	.222	48	6252	596		313
				TOTALS	10210	1410	632	730

RTE. 13

CABLE, LOOP DETECTOR, IN DUCT

	LOCATION	QUANTITY	LOG MI. **	6'X 6'	6'X 30'
RTE. 13	AT BU. RTE. 50 SB	2	174.2		600'
	AT RUSSEL RD. NB	1	174.3	120'	
	AT RUSSEL RD. NB	2	174.3		600'
	AT RUSSEL RD. SB	2	174.3		600'
	AT RAMPS NB	2	174.4		600'
	AT RAMPS SB	2	174.4		600'
	AT RAMPS NB	2	174.4		600'
	AT RAMPS SB	2	174.4		600'
	AT COOPER AVE. NB	2	174.7		600'
			TOTALS	120'	4800'

** LOOP PLACEMENT SHALL BE DIRECTED BY ENGINEER



CROSSOVERS

	AVERAGE LENGTH (FEET)	SURFACE WIDTH (FEET)	1 3/4" SP125C (TONS)	TACK (GAL)
41 CROSSOVERS	98	24	1022	536

FACTORS:

ASPHALTIC CONCRETE MIX
SP125C BASED ON 1.962 TONS/C.Y.

FOG SEAL AT 0.2 GALLONS/S.Y.

TACK COAT AT 0.05 GALLONS/S.Y.

-NO S.E. CORRECTION

-PLACEMENT BY ONE PASS PER LANE

2B QUANTITY SHEET
SHEET 2 OF 4

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

50 RTE PAVEMENT MARKING		
	LOG MI.	
EPOXY PAVEMENT MARKING 6 IN., WHITE	28.475 to 54.048 EB	135025 LF
	208.551 to 234.021 WB	134482 LF
EPOXY PAVEMENT MARKING 6 IN., WHITE	28.475 to 54.048 EB	33756 LF
INTERMITTENT WHITE 6"	208.551 to 234.021 WB	33621 LF
	TOTAL	336884 LF
EPOXY PAVEMENT MARKING 6 IN., YELLOW	28.475 to 54.048 EB	135025 LF
	208.551 to 234.021 WB	134482 LF
	TOTAL	269507 LF
GORE EPOXY PAVEMENT MARKING 12", WHITE		
EB 50 HWY OFF RAMP AT RTE. 13	51.384	400 LF
EB 50 HWY ON RAMP AT RTE. 13	51.62	400 LF
WB 50 HWY OFF RAMP AT RTE. 13	210.999	400 LF
WB 50 HWY ON RAMP AT RTE. 13	211.234	400 LF
	TOTAL	1600 LF

RAMPS AT RTE. 13		
EPOXY PAVEMENT MARKING		
	6" WHITE	6" YELLOW
	LF	LF
EB OFF RAMP	800	800
EB ON RAMP	800	800
WB OFF RAMP	700	700
WB ON RAMP	700	700
TOTAL	3000	3000

SHOULDER RUMBLE STRIPS		
28.475 to 33.783	EB	56052
40.595 to 42.781	EB	23084
48.199 to 54.048	EB	61765
208.55 to 209.36	WB	8554
209.36 to 212.56	WB	33792
215.12 to 218.06	WB	31046
224.42 to 234.02	WB	101376
	TOTAL	3156.7 STA.

MOBILIZATION	
EACH	1

TEMPORARY PAVEMENT MARKING
NO DIRECT PAYMENT

SEE SPEC. 620.2.5
STD. PLAN 620.10

STATE OF MISSOURI
JAMES M. SHIPLEY
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2B QUANTITY SHEET
SHEET 3 OF 4

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

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RTE. 13 PAVEMENT MARKING			
LOCATION	LOG MILE	NUMBER LANE LINES	QUANTITY
EPOXY PAVEMENT MARKING 6 IN., WHITE			
Betwn. Bu. 50 and Russel Ave. SB	174.227 - 174.360	3	2107
Betwn.Russel Ave. and RP RTE 13 to RTE 50E SB	174.360 - 174.456	3	1521
On Br. A0143	213 ft.	4	852
RTE 50 E/RTE 50 W Ramps to Cooper St.	174.58 - 174.80	2	2374
RTE 50 E/RTE 50 W Ramps to Cooper St.	174.58 - 174.80	2-Intermit.	581
		TOTAL	7435 LF
EPOXY PVMN'T MARKING 6 IN., YELLOW			
Bu. 50 and Russel Ave. SB	174.227 - 174.360	2.5-Lines	1756
Russel Ave.and RP RTE13 to RTE 50E SB	174.360 - 174.456	2.5-Lines	1268
Slanted markings betwn double yellow			75
On Br. A0143	213	2 Lines	426
RTE 50 E/RTE 50 W Ramps to Cooper St.	174.58 - 174.80	5 lines	5810
		TOTAL	9335 LF
The word "ONLY"	174.58 - 174.80		2 EA
RIGHT TURN ARROWS			
Bu. 50 and Russel Ave. SB	174.227 - 174.360		4
Russel Ave.and RP RTE13 to RTE 50E SB	174.360 - 174.456		3
On Br. A0143			
RTE 50 E/RTE 50 W Ramps to Cooper St.	174.58 - 174.80		4
		TOTAL	11 EA
STOP BARS - 24" WHITE			
Bu. 50 SB	174.239	2-12'	24
Russel Ave. NB	174.36	2-12'	24
Russel Ave. SB	174.36	2-12'	24
RP M013 to US50E NB	174.456	2-12'	24
Br. A0143 SB		2-12'	24
Br. A0143 NB		2-12'	24
RTE 50 E/RTE 50 W Rps to Cooper St.NB		4-12'	48
		TOTAL	192 LF

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER
12/28/04

6

2B QUANTITY SHEET

SHEET 4 OF 4

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

12/28/2004

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D2BS (SHORT FORM)

SUMMARY OF QUANTITIES

SIGN	SIZE (IN.)	AREA (SQ. FT.)	QTY	TOTAL AREA	QTY RELOC	TOTAL RELOC AREA	DESCRIPTION
				GUIDE SIGNS			
E05-1	60X48	20.00	3	60			EXIT CLOSED
G020-1	60X24	10.00	2	20			ROAD WORK NEXT 25 MILES
G020-2	48X24	8.00	2	16			END ROAD WORK
G023-1	36X12	3.00	4	12			WORK ZONE (PLAQUE)
				REGULATORY SIGNS			
R1-2	48 TRI.	6.93					YIELD
R2-1	36X48	12.00	4	48			SPEED LIMIT 2-55; 2-65
R2-5a	36X48	12.00	2	24			REDUCED SPEED AHEAD
R3-7L	30X30	6.25					LEFT LANE MUST TURN LEFT
R3-7R	30X30	6.25					RIGHT LANE MUST TURN RIGHT
R4-7aL	36X48	12.00					KEEP LEFT (HORIZONTAL ARROW)
R4-7a	36X48	12.00					KEEP RIGHT (HORIZONTAL ARROW)
				WARNING SIGNS			
W01-3L	48X48	16.00					REVERSE TURN (SYMBOL LEFT ARROW)
W01-3R	48X48	16.00					REVERSE TURN (SYMBOL RIGHT ARROW)
W01-4L	48X48	16.00					REVERSE CURVE (SYMBOL LEFT ARROW)
W01-4R	48X48	16.00					REVERSE CURVE (SYMBOL RIGHT ARROW)
W03-2a	48X48	16.00					YIELD AHEAD (SYMBOL)
W04-1L	48X48	16.00					MERGE (SYMBOL FROM LEFT)
W04-1R	48X48	16.00					MERGE (SYMBOL FROM RIGHT)
W05-1	48X48	16.00					ROAD/BRIDGE/RAMP NARROWS
W08-9	48X48	16.00					LOW SHOULDER
W08-9a	48X48	16.00					SHOULDER DROP-OFF
W08-11	48X48	16.00					UNEVEN LANES
W08-12	36X36	9.00					NO CENTER STRIPE
W08-12	48X48	16.00					NO CENTER STRIPE
W09-3	48X48	16.00	2	32			RIGHT/CENTER/LEFT LANE CLOSED AHEAD
W012-1	24X24	4.00					DOUBLE DOWN ARROW (SYMBOL)
W013-1	24X24	4.00					ADVISORY SPEED (PLAQUE)
W020-1	48X48	16.00	2	32			ROAD/BRIDGE/RAMP WORK AHEAD
W020-4	48X48	16.00					ONE LANE ROAD AHEAD
W020-4	36X36	9.00					ONE LANE ROAD AHEAD
W020-5	48X48	16.00					RIGHT/CENTER/LEFT LANE CLOSED
W020-5a	48X48	16.00					RIGHT/CENTER/LEFT TWO LANES CLOSED AHEAD
W020-6a	48X48	16.00	2	32			RIGHT/CENTER/LEFT LANE CLOSED
W020-6a	36X36	9.00					RIGHT/CENTER/LEFT LANE CLOSED
W020-7a	48X48	16.00					FLAGGER (SYMBOL)
W022-6e	21X15	2.19					WET PAINT (ARROW PIVOTS)
616-10.05 CONSTRUCTION SIGNS TOTAL					288		
616-10.10 RELOCATED SIGNS TOTAL							

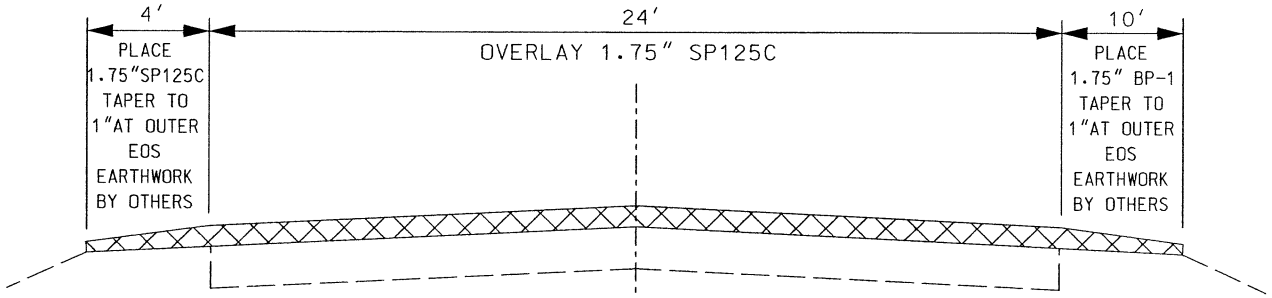
ITEM NUMBER	TOTAL QTY	DESCRIPTION
612-30.00	1	TRUCK MOUNTED ATTENUATOR (TMA)
616-10.20	10	CHANNELIZER (DRUM-LIKE)
616-10.25	260	CHANNELIZER (TRIM-LINE)
616-10.40	1	FLASHING ARROW PANEL
616-10.96		CHANGEABLE MESSAGE SIGN, COMMISSION FURNISHED/RETAINED
616-10.98		CHANGEABLE MESSAGE SIGN, CONTRACTOR
		FURNISHED/RETAINED
616-11.00		CHANGEABLE MESSAGE SIGN, CONTRACTOR FURNISHED/COMMISSION RETAINED
616-11.20	2	INSTALLING "DRIVE SMART", 48 IN. X 48 IN. SIGN
616-11.33	2	INSTALLING "POINT OF PRESENCE" SIGN

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

12/16/04

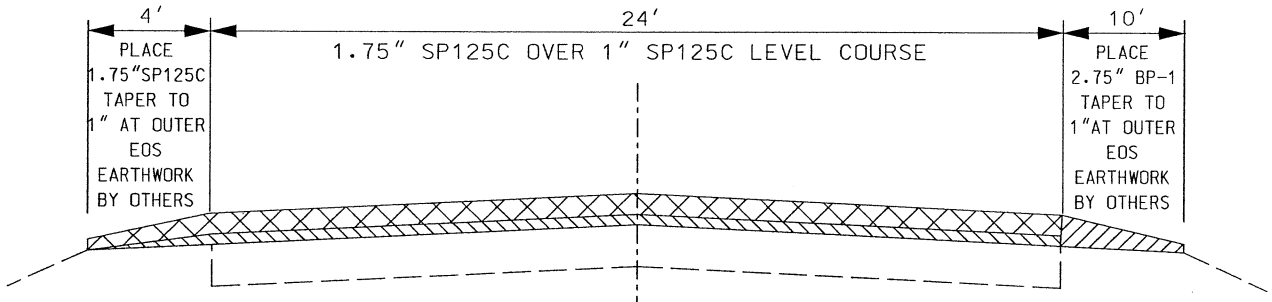
DATE: _____

ROUTE	50
JOB NO.	J4D0500C
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON



RTE. 50

LOG MI. 40.595 TO 42.781 EB
LOG MI. 48.199 TO 54.048 EB
LOG MI. 208.551 TO 209.360 WB
LOG MI. 209.360 TO 212.560 WB
LOG MI. 215.120 TO 218.060 WB
LOG MI. 229.751 AT RTE. 58 WB



RTE. 50

LOG MI. 28.475 TO 33.783 EB
LOG MI. 224.22 TO 234.02 WB

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

12/16/04

TYPICAL SECTION

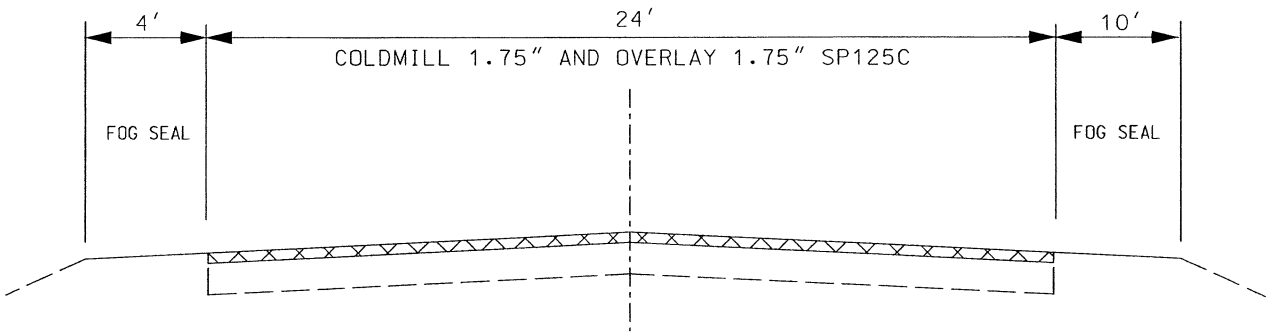
SHEET 1 OF 4

NOTE:
-NO S.E. CORRECTION

-PLACEMENT BY ONE PASS PER LANE

8

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON



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RTE. 50

LOG MI. 33.783 TO 40.595 EB
LOG MI. 42.781 TO 48.199 EB
LOG MI. 45.675 AT RTE. 58 EB
LOG MI. 212.56 TO 215.12 WB
LOG MI. 218.06 TO 224.22 WB

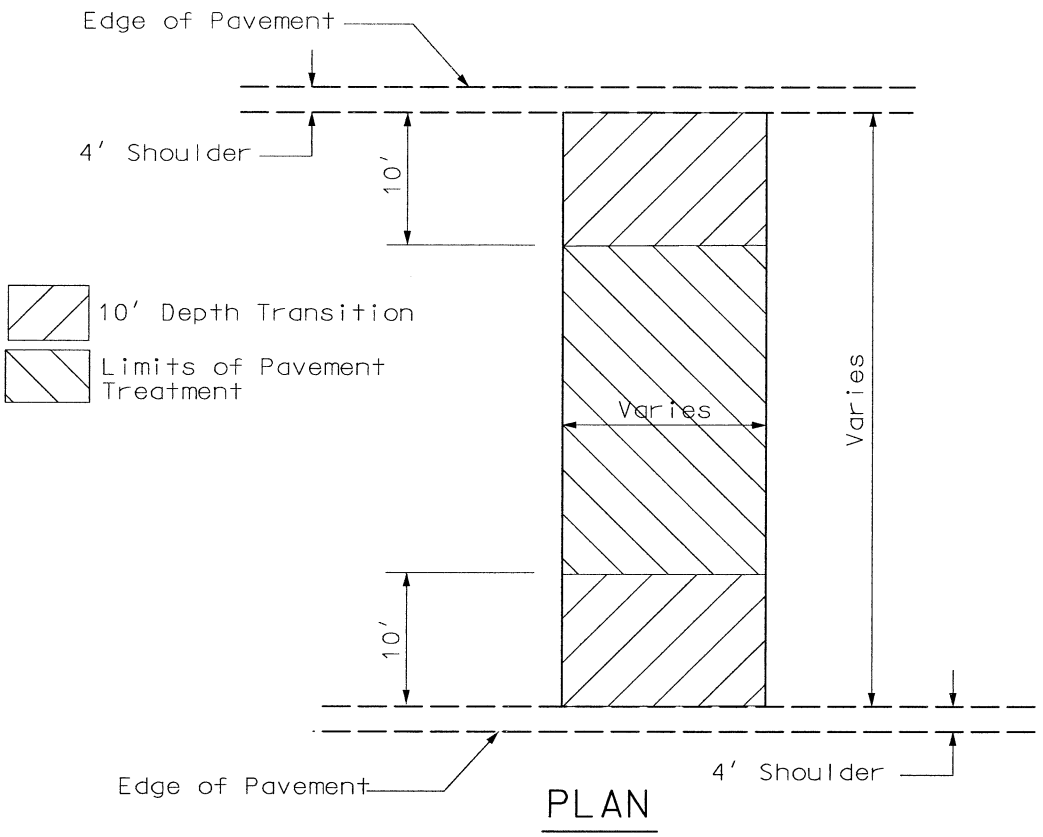
STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER
12/16/04

NOTE:
-NO S.E. CORRECTION
-PLACEMENT BY ONE PASS PER LANE

TYPICAL SECTION
SHEET 2 OF 4

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

9



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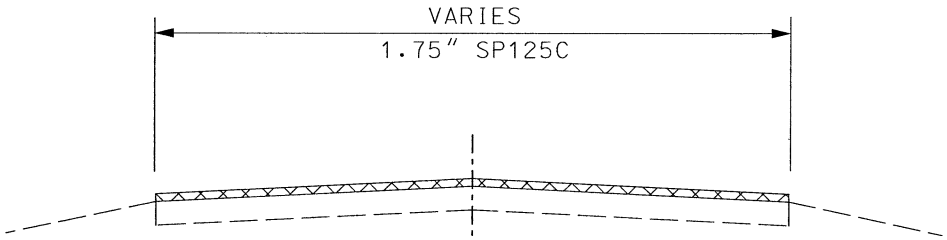

RESURFACING

CROSSOVERS

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER
12/28/04

TYPICAL SECTION

SHEET 3 OF 4

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

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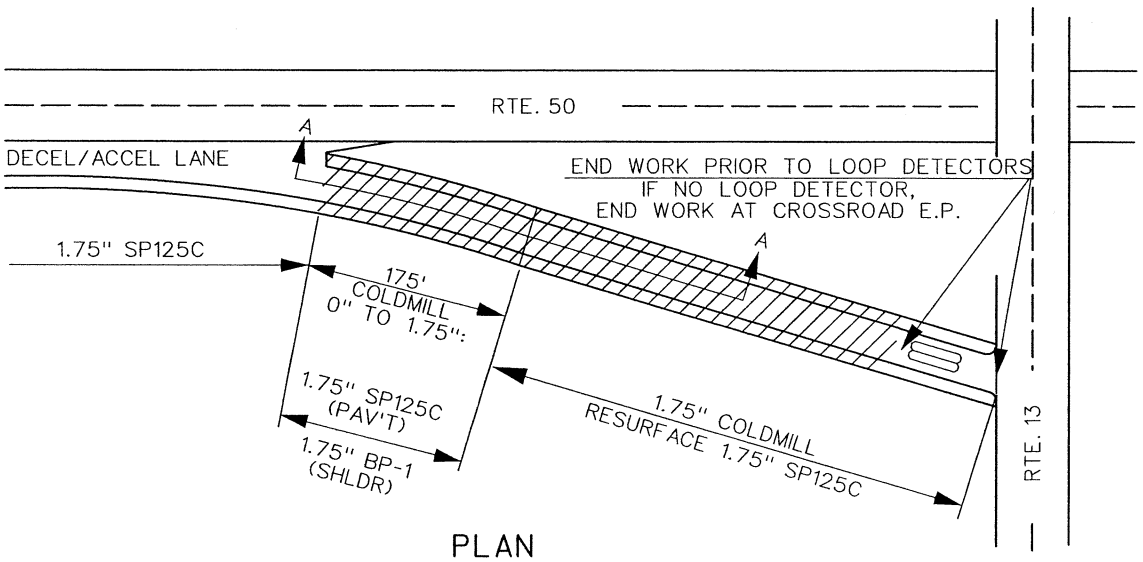

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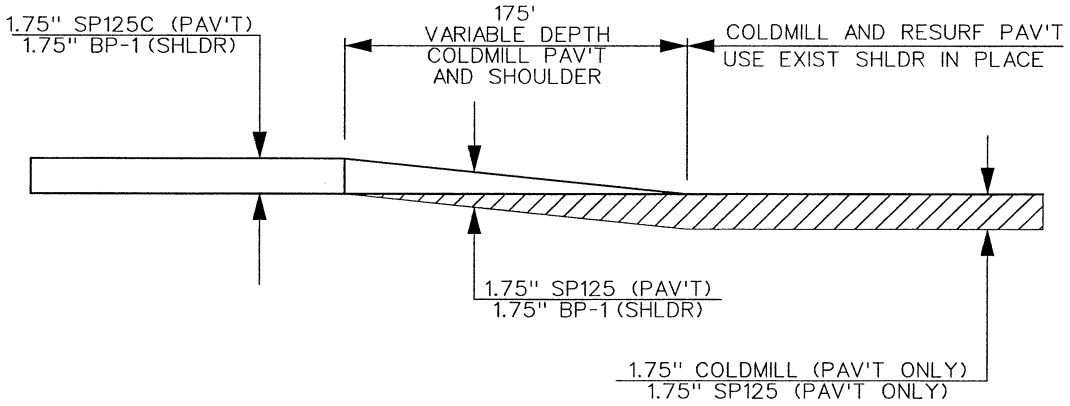

SECTION A-A

AT RTE.50 AND RTE.13

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

12/16/04

TYPICAL SECTION
SHEET 4 OF 4

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

11

12/14/2004

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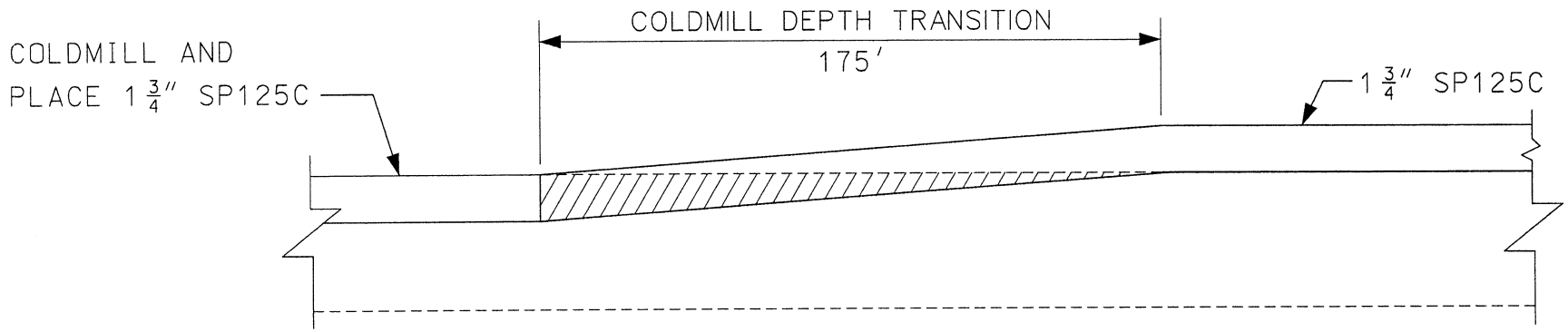

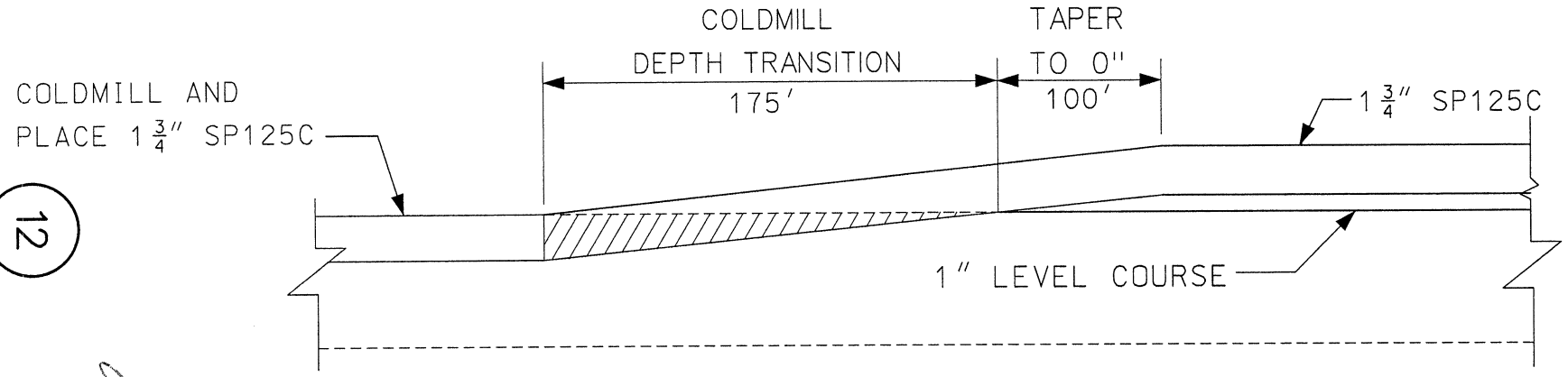

12

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

12/14/04

DEPTH TRANSITION

SPECIAL SHEET 1 OF 3

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

REV.

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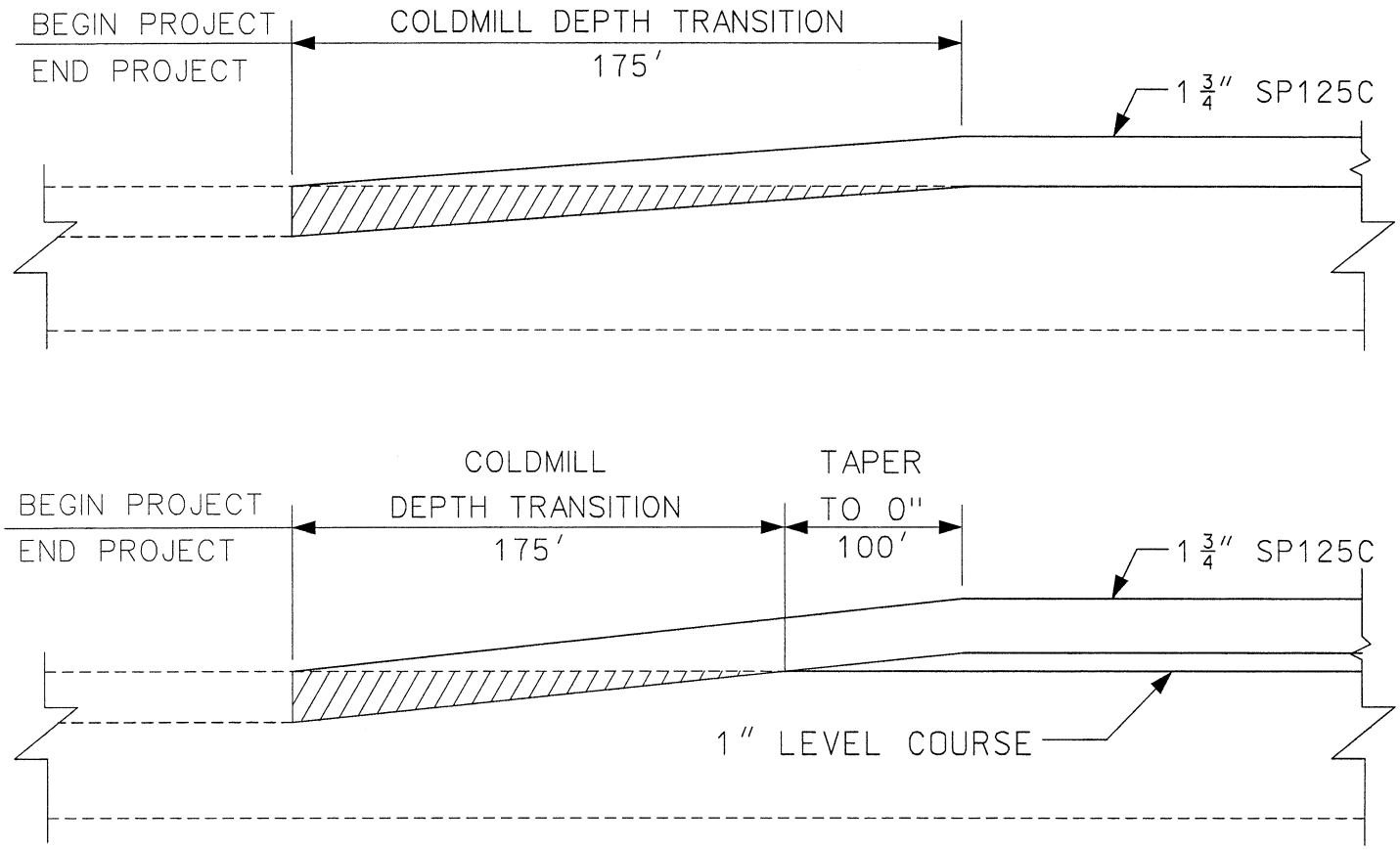

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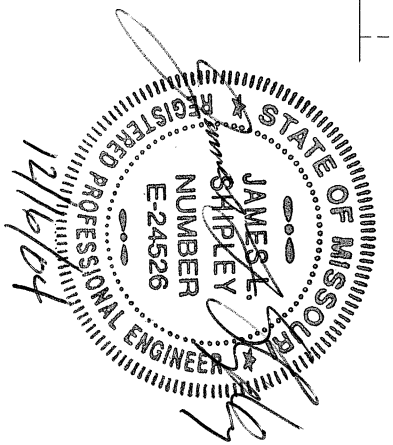

12/9/04

DEPTH TRANSITION

SPECIAL SHEET 2 OF 3

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

REV.

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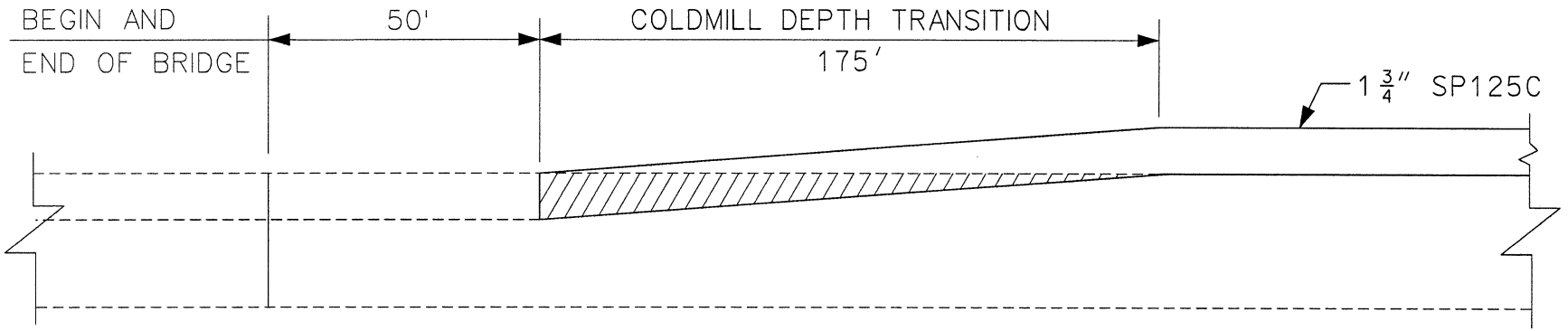

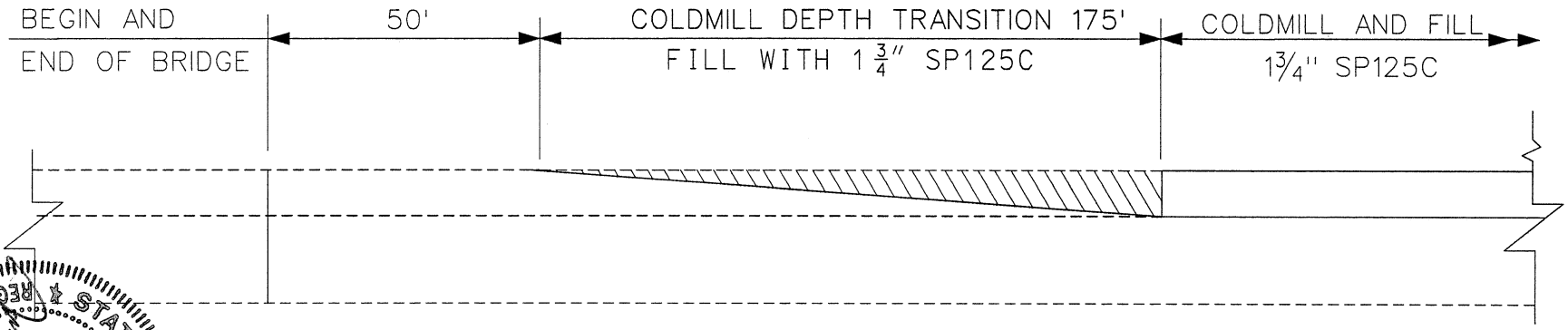

14

12/14/04

BRIDGE DEPTH TRANSITION

SPECIAL SHEET 3 OF 3

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

REV.

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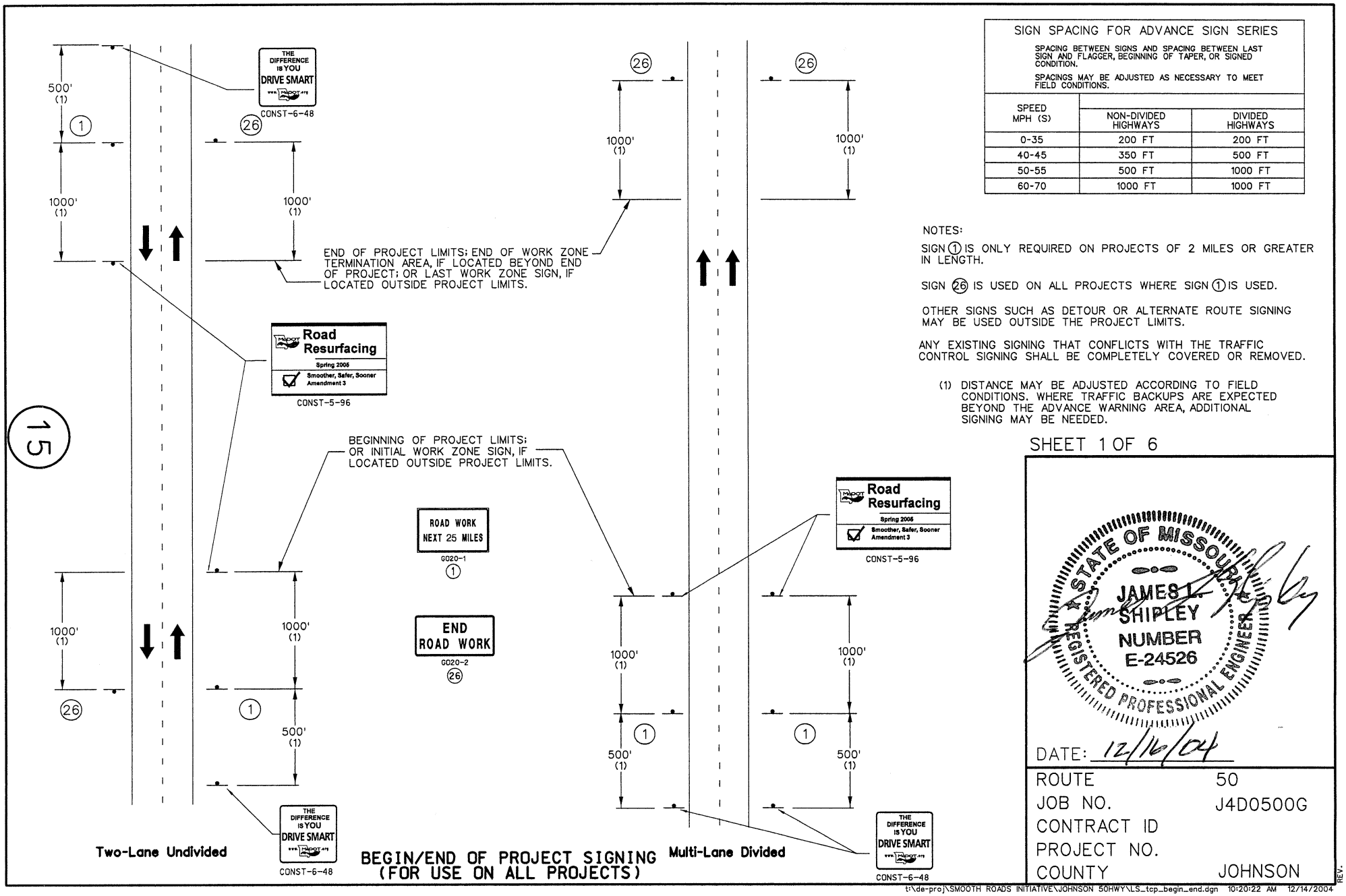

SIGN SPACING FOR ADVANCE SIGN SERIES SPACING BETWEEN SIGNS AND SPACING BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER, OR SIGNED CONDITION. SPACINGS MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.		
SPEED MPH (S)	NON-DIVIDED HIGHWAYS	DIVIDED HIGHWAYS
0-35	200 FT	200 FT
40-45	350 FT	500 FT
50-55	500 FT	1000 FT
60-70	1000 FT	1000 FT

NOTES:

SIGN (1) IS ONLY REQUIRED ON PROJECTS OF 2 MILES OR GREATER IN LENGTH.

SIGN (26) IS USED ON ALL PROJECTS WHERE SIGN (1) IS USED.

OTHER SIGNS SUCH AS DETOUR OR ALTERNATE ROUTE SIGNING MAY BE USED OUTSIDE THE PROJECT LIMITS.

ANY EXISTING SIGNING THAT CONFLICTS WITH THE TRAFFIC CONTROL SIGNING SHALL BE COMPLETELY COVERED OR REMOVED.

(1) DISTANCE MAY BE ADJUSTED ACCORDING TO FIELD CONDITIONS. WHERE TRAFFIC BACKUPS ARE EXPECTED BEYOND THE ADVANCE WARNING AREA, ADDITIONAL SIGNING MAY BE NEEDED.

SHEET 1 OF 6

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

DATE: 12/16/04

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

REV.

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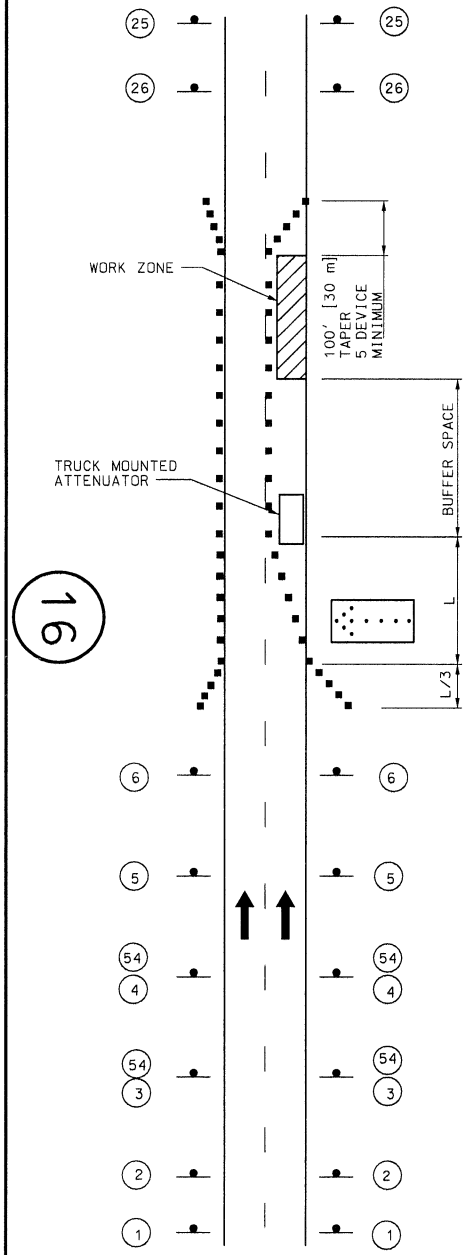

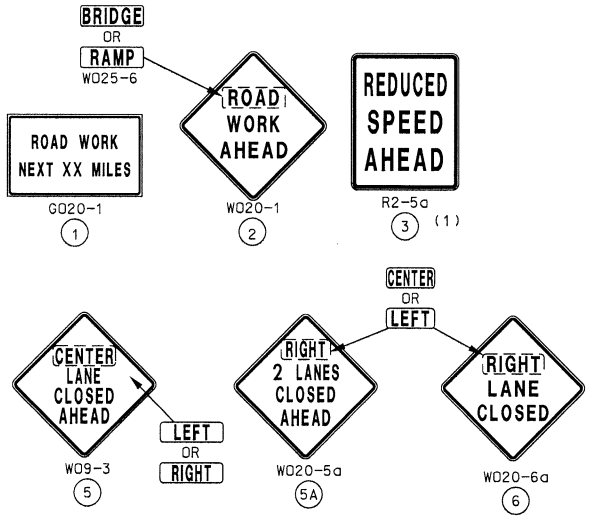

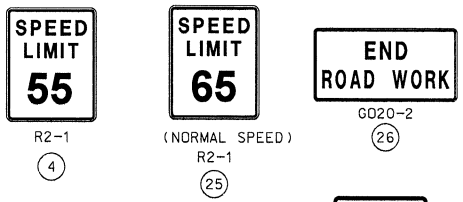

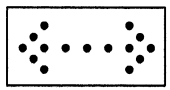

CHANNELIZERS (11)

(11) CONES ALLOWABLE FOR DAYLIGHT OPERATIONS ONLY.

SIGN (1) IS ONLY REQUIRED ON PROJECTS OF 2 MILES OR GREATER IN LENGTH.

SIGN (26) IS USED ON ALL PROJECTS WHERE SIGN (1) IS USED.

TAPER LENGTHS AND SPACING OF CHANNELIZING DEVICES					
SPEED MPH (S)	MINIMUM TAPER LENGTHS (L) FOR LATERAL SHIFTS (W)			MAXIMUM CHANNELIZER SPACING	
	10 FT	11 FT	12 FT	THROUGH TAPER	THROUGH WORK AREA
0-35	205FT	225FT	245FT	35FT	50FT
40-45	450FT	495FT	540FT	40FT	100FT
50-55	550FT	605FT	660FT	50FT	100FT
60-70	700FT	770FT	840FT	60FT	100FT

SIGN SPACING FOR ADVANCE SIGN SERIES		
SPACING BETWEEN SIGNS AND SPACING BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER, OR SIGNED CONDITION. SPACINGS MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.		
SPEED MPH (S)	NON-DIVIDED HIGHWAYS	DIVIDED HIGHWAYS
0-35	200 FT	200 FT
40-45	350 FT	500 FT
50-55	500 FT	1000 FT
60-70	1000 FT	1000 FT

TAPER LENGTH (L)

$L = W \times S$ FOR 45 MPH OR MORE

$L = \frac{WS^2}{60}$ FOR 40 MPH OR LESS

L = TAPER LENGTH IN FEET

W = LATERAL SHIFT IN FEET

S = POSTED SPEED PRIOR TO ROAD WORK IN MPH

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

DATE: 12/16/04

Two-Lane Divided Highway

SHEET 2 OF 6

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

REV.

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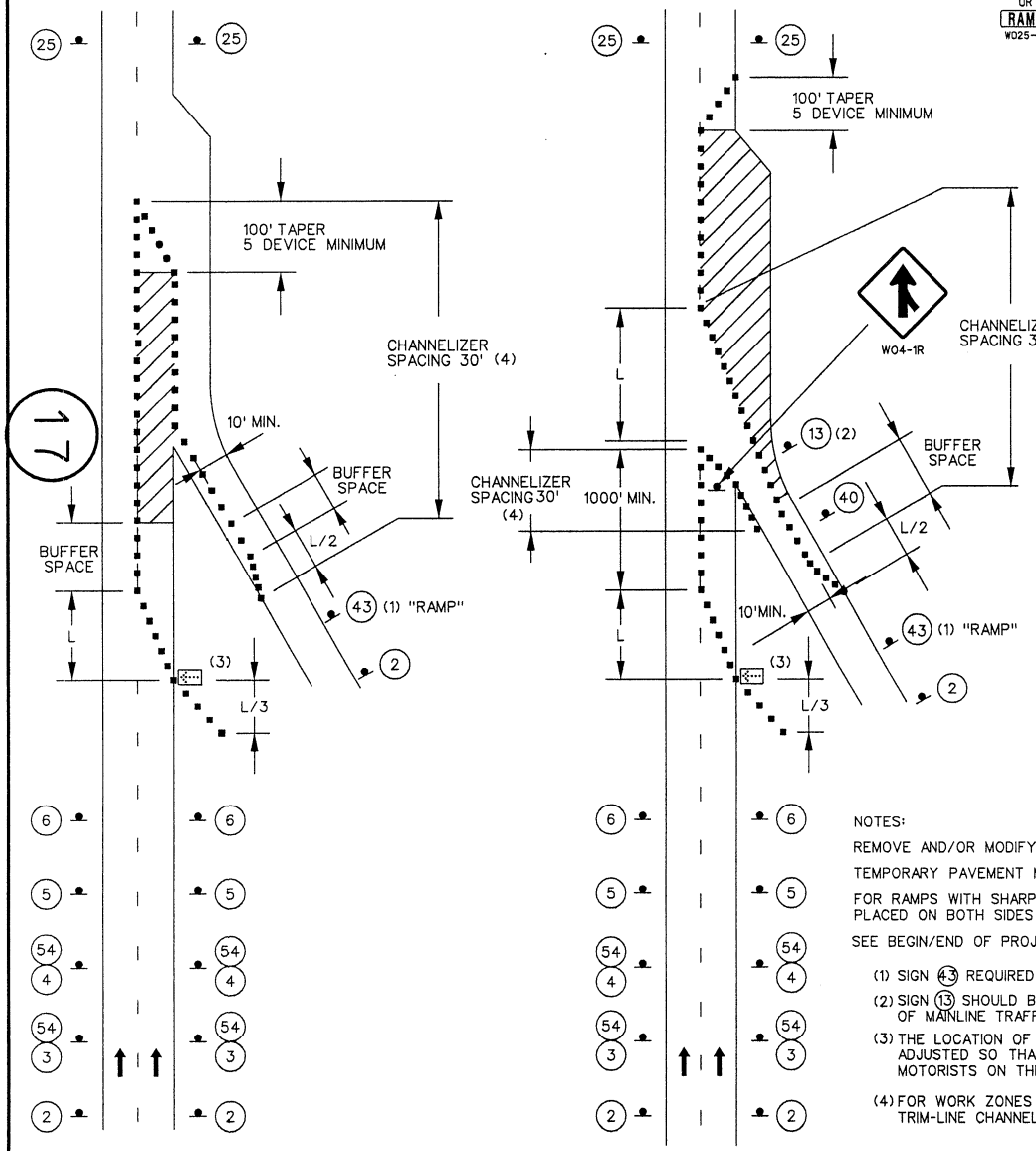

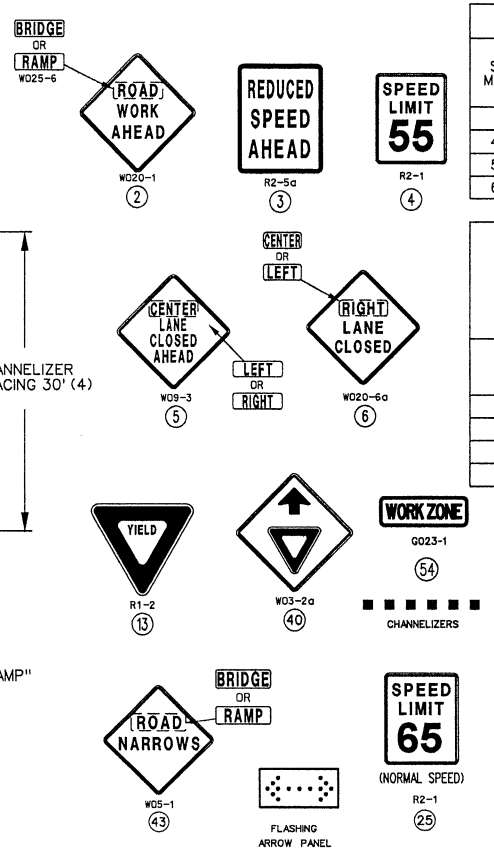

TAPER LENGTHS AND SPACING OF CHANNELIZING DEVICES					
SPEED MPH (S)	MINIMUM TAPER LENGTHS (L) FOR LATERAL SHIFTS (W)			MAXIMUM CHANNELIZER SPACING	
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SIGN SPACING FOR ADVANCE SIGN SERIES		
SPACING BETWEEN SIGNS AND SPACING BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER, OR SIGNED CONDITION. SPACINGS MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.		
SPEED MPH (S)	NON-DIVIDED HIGHWAYS	DIVIDED HIGHWAYS
0-35	200 FT	200 FT
40-45	350 FT	500 FT
50-55	500 FT	1000 FT
60-70	1000 FT	1000 FT

TAPER LENGTH (L)

L = W x S FOR 45 MPH OR MORE

L = $\frac{WS^2}{60}$ FOR 40 MPH OR LESS

L = TAPER LENGTH IN FEET

W = LATERAL SHIFT IN FEET

S = POSTED SPEED PRIOR TO ROAD WORK IN MPH

NOTES:

REMOVE AND/OR MODIFY EXISTING PAVEMENT MARKING AS NEEDED.

TEMPORARY PAVEMENT MARKING REQUIRED WITH LONG TERM LANE CLOSURES.

FOR RAMPS WITH SHARP CURVES OR MULTIPLE LANES, RAMP SIGNS MAY BE PLACED ON BOTH SIDES OF THE RAMP.

SEE BEGIN/END OF PROJECT SIGNING SHEET FOR ADDITIONAL SIGNS.

(1) SIGN (43) REQUIRED WHEN RAMP WIDTH IS REDUCED.

(2) SIGN (13) SHOULD BE PLACED ON THE RAMP TO PROVIDE ADEQUATE VISIBILITY OF MAINLINE TRAFFIC.

(3) THE LOCATION OF THE SIGN SEQUENCE AND MERGE TAPER SHOULD BE ADJUSTED SO THAT THE ARROW PANEL LOCATION IS NOT CONFUSING TO MOTORISTS ON THE RAMP.

(4) FOR WORK ZONES WHERE DEVICES ARE IN PLACE OVERNIGHT, USE TRIM-LINE CHANNELIZERS.

Lane Closure
Entrance Ramp Areas

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

DATE: 12/16/04

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

SHEET 3 OF 6

REV.

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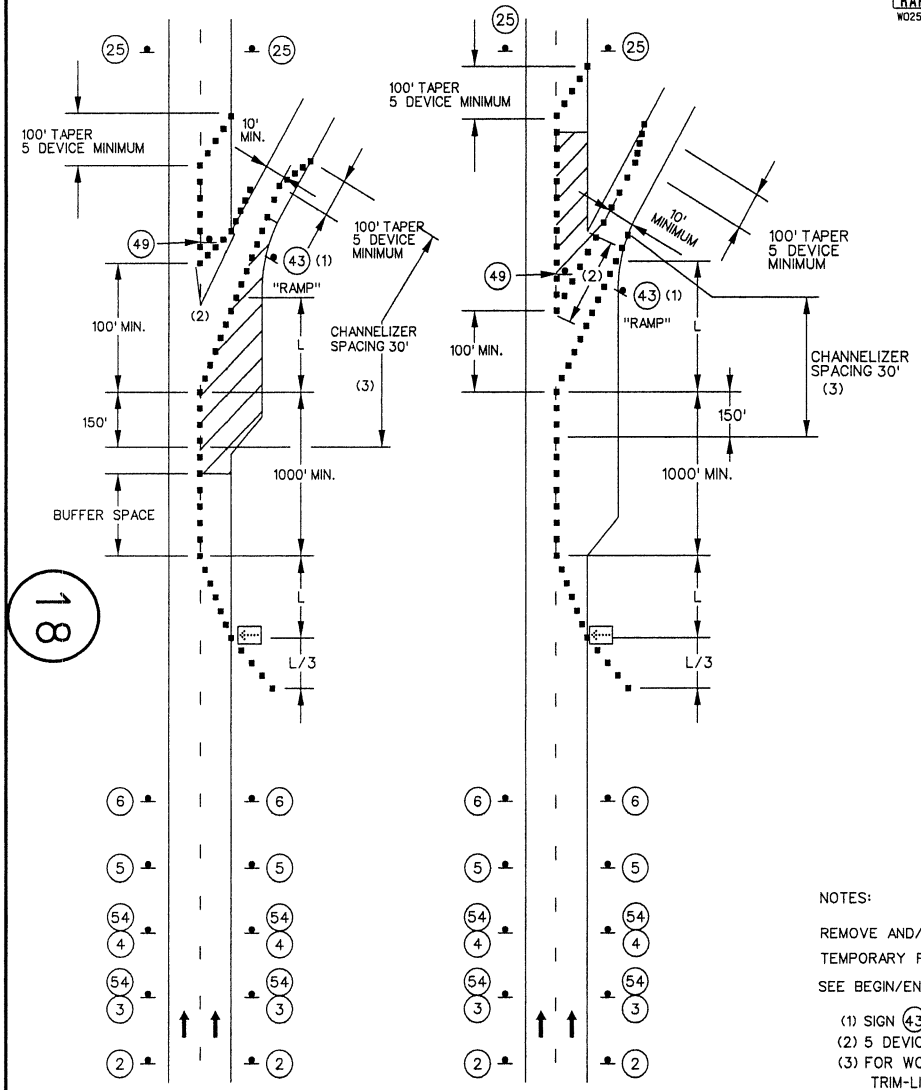

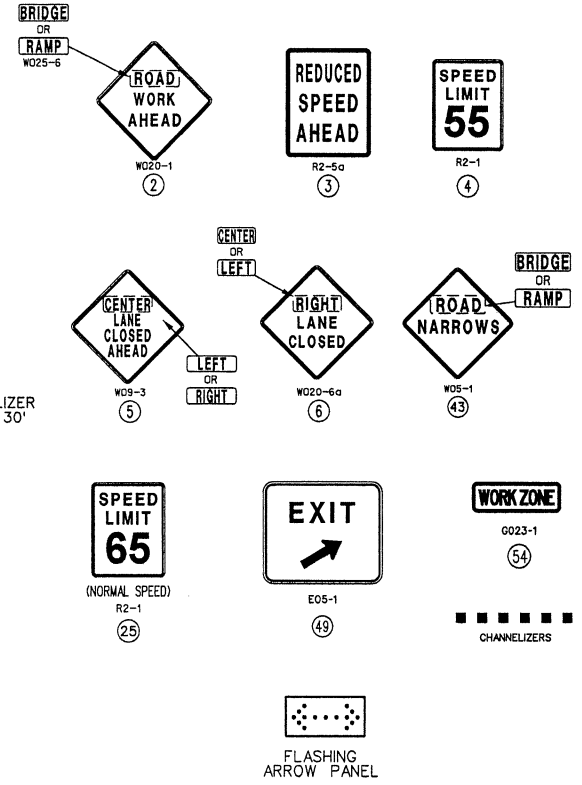

TAPER LENGTHS AND SPACING OF CHANNELIZING DEVICES					
SPEED MPH (S)	MINIMUM TAPER LENGTHS (L) FOR LATERAL SHIFTS (W)			MAXIMUM CHANNELIZER SPACING	
	10 FT	11 FT	12 FT	THROUGH TAPER	THROUGH WORK AREA
0-35	205 FT	225 FT	245 FT	35 FT	50 FT
40-45	450 FT	495 FT	540 FT	40 FT	100 FT
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SIGN SPACING FOR ADVANCE SIGN SERIES		
SPACING BETWEEN SIGNS AND SPACING BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER, OR SIGNED CONDITION. SPACINGS MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.		
SPEED MPH (S)	NON-DIVIDED HIGHWAYS	DIVIDED HIGHWAYS
0-35	200 FT	200 FT
40-45	350 FT	500 FT
50-55	500 FT	1000 FT
60-70	1000 FT	1000 FT

TAPER LENGTH (L)

L = W x S FOR 45 MPH OR MORE

L = $\frac{WS^2}{60}$ FOR 40 MPH OR LESS

L = TAPER LENGTH IN FEET

W = LATERAL SHIFT IN FEET

S = POSTED SPEED PRIOR TO ROAD WORK IN MPH

NOTES:

REMOVE AND/OR MODIFY EXISTING PAVEMENT MARKING AS NEEDED.

TEMPORARY PAVEMENT MARKING REQUIRED WITH LONG TERM LANE CLOSURES.

SEE BEGIN/END OF PROJECT SIGNING SHEET FOR ADDITIONAL SIGNS.

(1) SIGN (43) REQUIRED WHEN RAMP WIDTH IS REDUCED.
(2) 5 DEVICE MINIMUM.
(3) FOR WORK ZONES WHERE DEVICES ARE IN PLACE OVERNIGHT, USE TRIM-LINE CHANNELIZERS.

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER

DATE: 12/16/04

Lane Closure
Exit Ramp Areas

SHEET 4 OF 6

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

REV.

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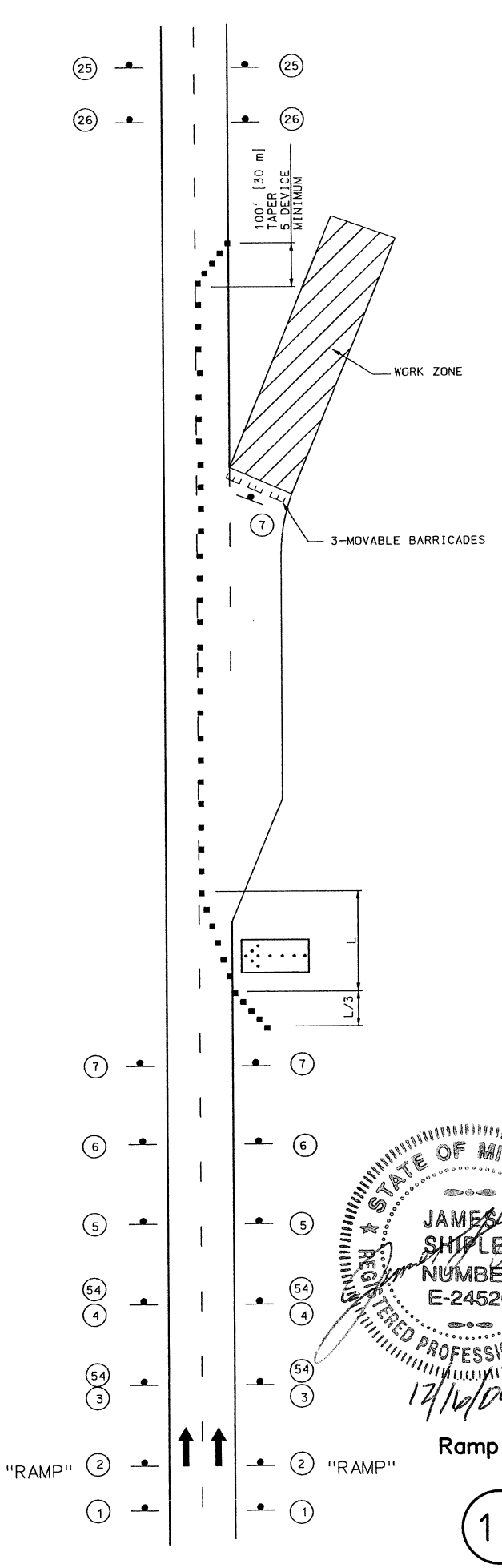

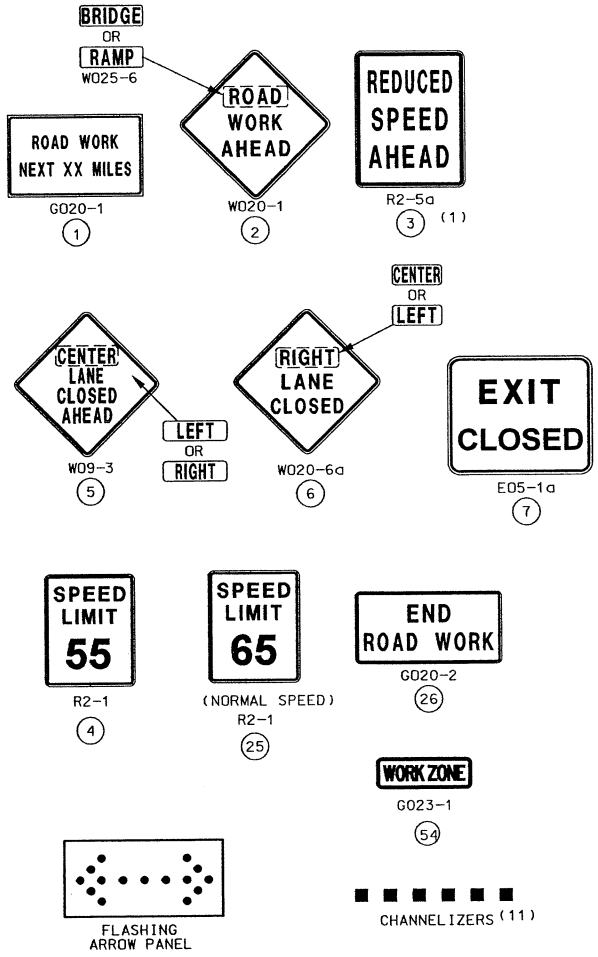

(11) CONES ALLOWABLE FOR DAYLIGHT OPERATIONS ONLY.

SIGN (1) IS ONLY REQUIRED ON PROJECTS OF 2 MILES OR GREATER IN LENGTH.

SIGN (26) IS USED ON ALL PROJECTS WHERE SIGN (1) IS USED.

TAPER LENGTHS AND SPACING OF CHANNELIZING DEVICES					
SPEED MPH (S)	MINIMUM TAPER LENGTHS (L) FOR LATERAL SHIFTS (W)			MAXIMUM CHANNELIZER SPACING	
	10 FT	11 FT	12 FT	THROUGH TAPER	THROUGH WORK AREA
0-35	205FT	225FT	245FT	35FT	50FT
40-45	450FT	495FT	540FT	40FT	100FT
50-55	550FT	605FT	660FT	50FT	100FT
60-70	700FT	770FT	840FT	60FT	100FT

SIGN SPACING FOR ADVANCE SIGN SERIES		
SPACING BETWEEN SIGNS AND SPACING BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER, OR SIGNED CONDITION. SPACINGS MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.		
SPEED MPH (S)	NON-DIVIDED HIGHWAYS	DIVIDED HIGHWAYS
0-35	200 FT	200 FT
40-45	350 FT	500 FT
50-55	500 FT	1000 FT
60-70	1000 FT	1000 FT

TAPER LENGTH (L)

$L = W \times S$ FOR 45 MPH OR MORE

$L = \frac{WS^2}{60}$ FOR 40 MPH OR LESS

L = TAPER LENGTH IN FEET

W = LATERAL SHIFT IN FEET

S = POSTED SPEED PRIOR TO ROAD WORK IN MPH

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER
12/16/04

Ramp Closed

19

SHEET 5 OF 6

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

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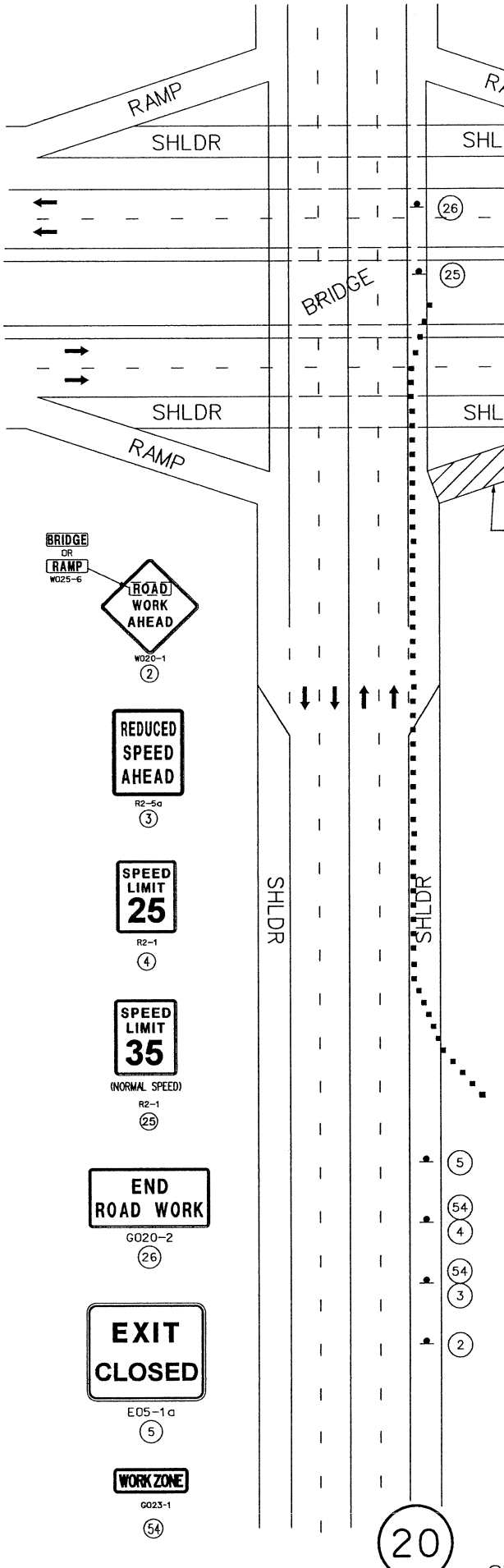

NOTE:
SEE SHEET 3 OF 6 FOR LANE CLOSURE, ENTRANCE RAMP

TAPER LENGTHS AND SPACING OF CHANNELIZING DEVICES					
SPEED MPH (S)	MINIMUM TAPER LENGTHS (L) FOR LATERAL SHIFTS (W)			MAXIMUM CHANNELIZER SPACING	
	10 FT	11 FT	12 FT	THROUGH TAPER	THROUGH WORK AREA
0-35	205 FT	225 FT	245 FT	35 FT	50 FT
40-45	450 FT	495 FT	540 FT	40 FT	100 FT
50-55	550 FT	605 FT	660 FT	50 FT	100 FT
60-70	700 FT	770 FT	840 FT	60 FT	100 FT

SIGN SPACING FOR ADVANCE SIGN SERIES		
SPACING BETWEEN SIGNS AND SPACING BETWEEN LAST SIGN AND FLAGGER, BEGINNING OF TAPER, OR SIGNED CONDITION. SPACINGS MAY BE ADJUSTED AS NECESSARY TO MEET FIELD CONDITIONS.		
SPEED MPH (S)	NON-DIVIDED HIGHWAYS	DIVIDED HIGHWAYS
0-35	200 FT	200 FT
40-45	350 FT	500 FT
50-55	500 FT	1000 FT
60-70	1000 FT	1000 FT

TAPER LENGTH (L)

L = W x S FOR 45 MPH OR MORE

L = $\frac{WS^2}{60}$ FOR 40 MPH OR LESS

L = TAPER LENGTH IN FEET
W = LATERAL SHIFT IN FEET
S = POSTED SPEED PRIOR TO ROAD WORK IN MPH

BRIDGE OR RAMP W025-6

ROAD WORK AHEAD
W020-1
(2)

REDUCED SPEED AHEAD
R2-5a
(3)

SPEED LIMIT 25
R2-1
(4)

SPEED LIMIT 35
(NORMAL SPEED)
R2-1
(25)

END ROAD WORK
G020-2
(26)

EXIT CLOSED
E05-1a
(5)

WORK ZONE
G023-1
(54)

NOTES:

REMOVE AND/OR MODIFY EXISTING PAVEMENT MARKING AS NEEDED.

TEMPORARY PAVEMENT MARKING REQUIRED WITH LONG TERM LANE CLOSURES.

FOR RAMPS WITH SHARP CURVES OR MULTIPLE LANES, RAMP SIGNS MAY BE PLACED ON BOTH SIDES OF THE RAMP.

SEE BEGIN/END OF PROJECT SIGNING SHEET FOR ADDITIONAL SIGNS.

(1) SIGN (43) REQUIRED WHEN RAMP WIDTH IS REDUCED.

(2) SIGN (13) SHOULD BE PLACED ON THE RAMP TO PROVIDE ADEQUATE VISIBILITY OF MAINLINE TRAFFIC.

(3) THE LOCATION OF THE SIGN SEQUENCE AND MERGE TAPER SHOULD BE ADJUSTED SO THAT THE ARROW PANEL LOCATION IS NOT CONFUSING TO MOTORISTS ON THE RAMP.

(4) FOR WORK ZONES WHERE DEVICES ARE IN PLACE OVERNIGHT, USE TRIM-LINE CHANNELIZERS.

STATE OF MISSOURI
JAMES L. SHIPLEY
NUMBER E-24526
REGISTERED PROFESSIONAL ENGINEER
12/16/04

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Ramp Closure

SHEET 6 OF 6

ROUTE	50
JOB NO.	J4D0500G
CONTRACT ID	
PROJECT NO.	
COUNTY	JOHNSON

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REV.

REVISED JAN 1 4 2005

Contract I.D. 050121-411

REVISED JAN 1 4 2005

NOTICE TO CONTRACTORS

Sealed bids, addressed to State of Missouri, acting by and through the Missouri Highways and Transportation Commission, Jefferson City, Missouri for the proposed work will be received by the Commission until 10:00 o'clock A.M. (prevailing local time) on **January 21, 2005**, at the office of the Secretary to the Commission in the Missouri Department of Transportation Central Office Building, 105 West Capitol Avenue, Jefferson City, Missouri, and at that time will be publicly opened and read. Bids delivered by US Mail should be mailed to: PO Box 270, Jefferson City, MO 65102. Bids delivered by parcel delivery services, (such as UPS, Fed Ex, DHL etc) should be shipped to 1320 Creek Trail Drive, Jefferson City, MO 65109.

(1) **PROPOSED WORK:** The proposed work, hereinafter called the work, includes:

Job J4D0500G, Route 50, Johnson County: Coldmilling and resurfacing with Superpave from the Jackson County line east to Route HH near Warrensburg, the total length of the improvement being 25.57 miles.

(2) **COMPLIANCE WITH CONTRACT PROVISIONS:** The bidder, having examined and being familiar with the local conditions affecting the work, and with the contract, contract documents, including the Missouri Highways and Transportation Commission's "Missouri Standard Specifications for Highway Construction, 2004," and "Missouri Standard Plans for Highway Construction, 2004", their revisions, and the request for bid, including appendices, the special provisions and plans, hereby proposes to furnish all labor, materials, equipment, services, etc., required for the performance and completion of the work. All references are to the Missouri Standard Specifications for Highway Construction, as revised, unless otherwise noted.

(3) **PERIOD OF PERFORMANCE:** If the bid is accepted, the bidder agrees that work shall be diligently prosecuted at such rate and in such manner as, in the judgment of the engineer, is necessary for the completion of the work within the time specified as follows in accordance with Sec 108:

Notice to Proceed: **May 02, 2005 (See Special Provisions)**
Working Days:
Completion Date: **December 01, 2005 (See Special Provisions)**

(4) **LIQUIDATED DAMAGES:** The bidder agrees that, should the bidder fail to complete the work in the time specified or such additional time as may be allowed by the engineer under the contract, the amount of liquidated damages to be recovered in accordance with Sec 108 shall be as follows:

Liquidated damages per day $ **14,825.00 (See Special Provisions)**

REVISED JAN 1 4 2005

REVISED JAN 1 4 2005

SYSTEM H (HIGH SOLIDS, INORGANIC ZINC SILICATE-WATERBORNE ACRYLIC INTERMEDIATE-WATERBORNE ACRYLIC FINISH)		
Coating	Specification	Dry Film Thickness mils (µm)
Prime Coat	Sec 1045.3	3.0 (75) min.-6 (150) max.
Waterborne Acrylic, Intermediate Coat	Sec 1045.6	2.0 (50) min.-4 (100) max.
Waterborne Acrylic, Finish Coat, Gray or Brown	Sec 1045.6	2.0 (50) min.-4 (100) max.
CALCIUM SULFONATE SYSTEM		
Coating	Specification	Dry Film Thickness mils (µm)
Calcium Sulfonate Rust Penetrating Sealer	Sec 1045.9.2	1.0 (25) min.
Calcium Sulfonate Primer	Sec 1045.9.3	4.0 (100) min.
Calcium Sulfonate Topcoat	Sec 1045.9.4	5.0 (125) min.
ALUMINUM & GRAY EPOXY-MASTIC PRIMER		
Coating	Specification	Dry Film Thickness mils (µm)
Aluminum Epoxy-Mastic Primer	Sec 1045.7	5.0 (125) min.
Gray Epoxy-Mastic Primer	Sec 1045.8	5.0 (125) min.

Amend Sec 1081 to include the following:

1081.7 Aluminum & Gray Epoxy-Mastic Primer.

1081.7.1 Scope. This specification covers the application of other approved primer coatings for touch-up and other repair applications.

1081.7.2 Surface Preparation. The epoxy-mastic shall be applied over an SSPC-SP2, SSPC-SP3 or SSPC-SP6 surface preparation, including removal of all rust scale, loose rust, loose mill scale and loose or non-adherent paint. Oil and grease shall be removed in accordance with SSPC-SP1 Solvent Cleaning. Areas adjacent to required areas will not be required to be masked to prevent overspray.

1081.7.3 Application. Material application methods, air and surface temperatures and relative humidity shall be in accordance with the manufacturer's written instructions and Sec 1081.3. The most restrictive application and environmental requirements for the epoxy-mastic shall be used when applying the primer to the steel.

L. COLDMILLING REQUIREMENTS

1.0 Description. The contractor will only be allowed to coldmill an area in which the first lift of bituminous material can be constructed in the same day's operation.

2.0 Basis of Payment No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provision.

REVISED JAN 14 2005

M. ORDER OF WORK

1.0 The contractor's notice to proceed will be delayed until May 2, 2005. Construction activities shall not start until this date.

2.0 No direct payment will be made to the contractor for any reason of their compliance with this provision. The contractor shall have no claim, or basis for any claim or suit whatsoever, resulting from this delayed notice to proceed. The contractor's sole remedy shall be, a commensurate delay in the commencement of the work day count until the notice to proceed is actually issued.

REVISED JAN 14 2005

REVISED JAN 14 2005