


JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

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

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 <p>12/06/2023 10:43:30 AM ANDREW BOWMAN - CIVIL MO-PE-2020000011</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65102 Phone (888) 275-6636</p>
	<p>If a seal is present on this sheet, JSP's has been electronically sealed and dated.</p>
	<p>JOB NO. J713467 VARIOUS COUNTIES, MO Date Prepared: 11/29/2023</p>
<p>Only the following items of the Job Special Provisions are authenticated by this seal: ALL</p>	

JOB
SPECIAL PROVISIONS

A. General - Federal JSP-09-02J

1.0 Description. The Federal Government is participating in the cost of construction of this project. All applicable Federal laws, and the regulations made pursuant to such laws, shall be observed by the contractor, and the work will be subject to the inspection of the appropriate Federal Agency in the same manner as provided in Sec 105.10 of the Missouri Standard Specifications for Highway Construction with all revisions applicable to this bid and contract.

1.1 This contract requires payment of the prevailing hourly rate of wages for each craft or type of work required to execute the contract as determined by the Missouri Department of Labor and Industrial Relations and requires adherence to a schedule of minimum wages as determined by the United States Department of Labor. For work performed anywhere on this project, the contractor and the contractor's subcontractors shall pay the higher of these two applicable wage rates. State Wage Rates, Information on the Required Federal Aid Provisions, and the current Federal Wage Rates are available on the Missouri Department of Transportation web page at www.modot.org under "Doing Business with MoDOT", "Contractor Resources". Effective Wage Rates will be posted 10 days prior to the applicable bid opening. These supplemental bidding documents 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.

1.2 The following documents are available on the Missouri Department of Transportation web page at www.modot.org under "Doing Business with MoDOT"; "Standards and Specifications". The effective version shall be determined by the letting date of the project.

General Provisions & Supplemental Specifications

Supplemental Plans to July 2023 Missouri Standard Plans
For Highway Construction

These supplemental bidding documents contain all current revisions to the published 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.

B. Project Contact for Contractor/Bidder Questions

1.0 Any project specific questions shall be directed to the following contact:

Andrew Bowman
MoDOT – Southwest District
3025 E Kearney Street
Springfield, MO 65803
Cell: 417-292-1742
Email: Andrew.Bowman@modot.mo.gov

2.0 Upon award and execution of the contract, the successful bidder/contractor shall forward all questions and coordinate the work with the contract administrator. The contract will be administered and inspected by the engineer/contract administrator listed below:

Matt Koppitz – Resident Engineer
 MoDOT – Southwest District
 3025 E Kearney
 Springfield, MO 65803
 Office: 417-895-7600
 Cell: 417-830-8440
 Email: Matthew.Koppitz@modot.mo.gov

3.0 All questions concerning the bid document preparation can be directed to the Central Office – Design at (573) 751-2876.

C. Scope of Work

1.0 The scope of work for this project includes various types of maintenance and repair to select bridges and concrete barrier wall (non-bridge), as determined by the engineer. The work will be prescribed through individual Job Orders negotiated between the contractor and the Commission on an as needed basis at each work location. A work location shall be limited to a specific bridge, twin structures, or a series of bridges within a common complex of structures, or isolated locations of concrete barrier wall (non-bridge). The engineer reserves the right to have others (including Commission forces) perform some or all of the work at individual locations based on the needs of the Commission.

2.0 The work boundaries for the terms of the contract include all Commission owned bridge structures in Barry, Barton, Bates, Benton, Cedar, Christian, Dade, Dallas, Greene, Henry, Hickory, Jasper, Lawrence, McDonald, Newton, Polk, St. Clair, Stone, Taney, Vernon, and Webster Counties within the limits of Commission right-of-way.

2.1 Planned work and estimate quantities are anticipated at, but not limited to the following locations:

County	Bridge #	Route	Over	Amount Needed (SF)
Barton	A2700	NB I-49	US 160	95
Barton	A2870	US 160	BNSF RR	60
Henry	A2308	Rt. J	Katy Trail	265
Henry	A4073	MO 82	Broyles Br	110
Henry	A0488	SB MO 13	Deepwater Cr	50
Henry	A0489	SB MO 13	Menson Cr	50
Jasper	A2022	NB I-49	Center Cr Ovrfl	60
Jasper	A1341	SB I-49	Dry Fk Cr	90
Jasper	A2862	Rt. M	Duval Cr	105
Jasper	L0951	MO 37	Spring Rvr	125
Lawrence	A0600	Rt. O	I-44	170
Lawrence	A0872	US 60	MNA RR	100

Newton	K0764	LP 49	Thurman Br	85
Newton	L0857	WB I-44	MO 43, MO 86	100
Taney	A0590	MO 86	Table Rock Lake	500
Vernon	A1774	NB I-49	US 54, MNA RR	340
Vernon	A1774	SB I-49	US 54, MNA RR	365
Vernon	A1775	NB I-49	Rt. K	165
Vernon	A1775	SB I-49	Rt. K	300
Vernon	A1692	SB I-49	LP 49	170
Webster	A2627	EB US 60	Rt. PP	165

3.0 Job Orders for Asphaltic Concrete Overlay Repair will only be issued for work to be performed from April 1 to November 30, unless otherwise mutually agreed upon between the contractor and the engineer.

4.0 The Commission is not bound to issue a minimum or maximum number of Job Orders during the contract term. It is the intent, however, to meet the anticipated budget, as noted elsewhere within this proposal. Award of contract does not guarantee any Job Orders during the duration of the contract.

D. Job Order Contract

1.0 A Job Order Contract is an indefinite quantity contract pursuant to which the contractor shall perform the work itemized in a Job Order at individual work locations throughout the project limits. The contractor shall perform all tasks itemized in the Job Order.

2.0 The engineer will identify the required work at an individual work location in collaboration with the contractor at a Joint Scope Meeting. The engineer will provide the contractor with a draft Detailed Scope of Work which the contractor shall review. Once the detailed Scope of Work is agreed upon, the engineer will issue a Job Order to the contractor. At any given time the contractor may be performing more than one Job Order.

3.0 The contract includes a list of fixed cost pay items with fixed unit prices. Payment for the work will be determined by multiplying the fixed unit prices by the Adjustment Factor. The contractor shall bid the Adjustment Factor to be applied to the fixed unit prices. The total cost of an individual Job Order will be determined by multiplying the fixed unit price of each fixed cost pay item by the Adjustment Factor.

4.0 Definitions.

4.1. Detailed Scope of Work. A written document that sets forth the work the contractor is obligated to perform in connection with a particular Job Order.

4.2 Joint Scoping Process. Field meeting between the engineer and the contractor to review site conditions and determine job tasks to be performed within the scope of an agreed to Job Order.

4.3 Job Order Proposal. A draft document that gives an itemized listing of the job tasks to be performed by the contractor, estimated quantities, fixed cost pay items and any non-fixed cost

pay items and costs that have been determined. The Job Order must also include a proposed project schedule; a list of proposed subcontractors indicating D/M/WBE status; and any sketches, drawings, or layouts; amendments to the safety plan and an erosion and sedimentation control plan; or technical data or information on proposed materials or equipment.

4.4 Job Order. A written order from the engineer to the contractor directing the work required at an individual work location in accordance with the Detailed Scope of Work within the Job Order Completion Time.

4.5 Job Order Completion Time. The time within which the contractor must complete the Detailed Scope of Work for a particular Job Order.

4.6 Fixed Cost Pay Item. Work for which a description and fixed cost is set forth in the fixed cost pay item list.

4.7 Non-Fixed Cost Pay Item. Work for which a description and fixed cost is not set forth in the pay item list. Payment for non-fixed cost pay items will be determined in accordance with Sec 109.4.2, 109.4.3, or 109.4.4. Non-fixed cost pay items will be paid using an Adjustment Factor of 1.000.

4.7.1 Concrete Barrier Wall (non-bridge). Due to the high variability in cost to repair concrete barrier wall that is not on or attached to a structure, this work shall be compensated as a non-fixed pay item.

E. Procedures for Developing a Job Order

1.0 Initiation of a Job Order. The engineer will notify the contractor of a potential Job Order by issuing a Notice of Joint Scope Meeting. The notification will be issued by electronic mailing, unless the engineer approves other arrangements. The contractor shall confirm receipt of all job orders by the same means as issued.

1.1 The contractor shall attend the Joint Scope Meeting and be prepared to discuss, at a minimum:

- a. The general scope of the work;
- b. Existing conditions, presence of waterways, wetlands, or other natural resources,
- c. Presence of hazardous materials
- d. Methods and alternative for accomplishing the work;
- e. Access to the site;
- f. Staging area availability/location;
- g. Requirements for catalog cuts, technical data, samples and shop drawings;
- h. Requirements for professional services, including sketches, drawings, and specifications;
- i. Hours of operation;
- j. Construction duration;
- k. Liquidated damages;
- l. Specific quality requirements for equipment and material;
- m. Date on which Job Order Proposal is due.

1.2 Upon completion of the joint scoping process, the engineer will prepare a draft detailed Scope of Work referencing any sketches, drawings, photographs, and specifications required to

document accurately the work to be accomplished. The contractor shall review the proposed detailed Scope of Work and request any desired changes or modifications thereto. When an acceptable detailed Scope of Work has been completed, the engineer will issue a Draft Job Order.

1.3 The contractor does not have the right to refuse to perform any Job Order or any work identified in a Job Order. If the contractor refuses to perform any Job Order or any work identified in a Job Order, the contractor may be considered to be in default in accordance with Sec 108.

2.0 Preparation Of The Job Order. The engineer will prepare a Draft Job Order and submit the order to the contractor for final review. The contractor and the engineer will jointly review the Draft Job Order and finalize the order. Establishment of pricing for any non-fixed cost pay items shall be in accordance with Sec 109.4.2 or 109.4.3. If no agreement to pricing can be made then the work will proceed with payment for non-fixed cost items under Sec 109.4.4.

3.0 Job Order Proposal. The engineer's Job Order Proposal shall include, at a minimum:

- a. Job Order Price Proposal;
- b. Required architectural or engineering drawings or sketches;
- c. Catalog cuts, technical data or samples;
- d. List of anticipated Subcontractors and Material Suppliers indicating DBE status and anticipated price;
- e. Construction schedule;
- f. Sample warranties or guarantees for materials, equipment or systems proposed;

3.1 The engineer's Job Order Proposal shall be submitted by the date as agreed to by the contractor and the engineer at the Joint Scoping Meeting. It will be the contractor's responsibility to furnish any documentation or information as requested by the engineer in order to process the Job Order Proposal. The time allowed for preparation of the Job Order Proposal will depend on the complexity and urgency of the Job Order, but should typically be less than 7 days. On complex Job Orders allowance will be made to provide adequate time for preparation and submittal of the necessary documents.

3.2 Job Order Issuance. When the engineer and contractor have agreed to the scope of work and fixed price and non-fixed price tasks to be performed, the engineer will finalize the official Job Order and submit a signed Job Order for the contractor to review and sign. The affixed signatures by the engineer and the contractor shall bind the Job Order. The Job Order will reference the Detailed Scope of Work and set forth the amount to be paid and the time to complete the work.

3.2.1 If the contractor is not clear or in disagreement with the terms of the Job Order he shall NOT sign the Job Order, but shall work with the engineer to clear up any discrepancies in the work to be done. If the contractor fails to execute the Job Order, the contractor may be considered to be in default in accordance with Sec 108.

4.0 The Commission reserves the right to reject a Job Order Proposal or cancel a proposed work task for any reason. The Commission also reserves the right not to issue a Job Order if it is determined to be in the best interests of the Commission. The contractor shall not recover costs arising out of or related to the development of the Job Order including but not limited to the costs to attend the Joint Scope Meeting, review the Detailed Scope of Work, prepare a Proposal, subcontractor costs, and the cost to review the Job Order Proposal with the Commission.

5.0 Notice to Proceed. Each Job Order will include a notice to proceed, which will stipulate the date the contractor is expected to begin work. The notice to proceed date will normally be within 14 calendar days after the job order is issued.

5.1 The contractor shall provide 5-days notification prior to start of repair work for all Job Orders.

F. Term of Contract

1.0 The term of this contract shall be for the period commencing *February 22, 2024* and shall end *February 21, 2025*.

1.1 Any work already ordered or in progress when the contract term ends shall be completed in accordance with the provisions, price proposals and timelines established in the issued Job Order(s), or liquidated damages will be assessed against the contractor in accordance with the provisions of this contract.

2.0 The contract may be extended under the original terms and contract prices for the period commencing *February 22, 2025* and shall end *February 21, 2026* for a maximum contract term of two (2) years. If, in the sole discretion of the Commission, the Commission desires to extend the contract, the contractor will be given written notification of the extension no later than December 1 of the current contract year. The contractor shall provide written notification of acceptance or rejection of the extension of this contract no later than January 1 of the current contract year. If the option for extending the contract is exercised by MoDOT, a time adjustment change order will be issued by the Commission to extend the contract to the new term limits. The contractor shall increase the performance contract bond to an amount equal to the original contract amount plus the extended contract amount (i.e., double the original bond amount).

G. Fixed Unit Price List

1.0 Description. A fixed unit price list containing unit prices associated with bridge deck repair and traffic control is listed below. Fixed unit prices are for complete and in-place construction and include all labor, equipment and material required to complete the construction task. All labor, material, equipment and work required by a specification shall be considered part of the fixed unit price, unless otherwise stated elsewhere in this contract. Pay limits will be defined in the approved Job Order.

2.0 Fixed Unit Price List for Bridge Deck Repair and Traffic Control.

MISC. TRAFFIC CONTROL ITEMS			
<u>Item Number</u>	<u>Description</u>	<u>Unit</u>	<u>Fixed Unit Price</u>
6169902	MISC. ADDITIONAL TRUCK MOUNTED ATTENUATOR (TMA)	EA	\$750.00
6169904	MISC. ADDITIONAL CONSTRUCTION SIGNS	SF	\$3.00
6169902	MISC. ADDITIONAL CHANNELIZER (TRIMLINE)	EA	\$9.00
6169902	MISC. ADDITIONAL TYPE III MOVEABLE BARRICADE	EA	\$75.00
6169902	MISC. ADDITIONAL DIRECTIONAL INDICATOR BARRICADE	EA	\$18.75
6169902	MISC. ADDITIONAL FLASHING ARROW PANEL	EA	\$390.00
6169902	MISC. SEQUENTIAL FLASHING WARNING LIGHT	EA	\$50.00
6169902	MISC. ADDITIONAL CMS (CONTRACTOR FURNISHED/RETAINED)	EA	\$1,200.00

6169902	SINGLE LANE CLOSURE	EA	\$3,000.00
6169902	DOUBLE LANE CLOSURE	EA	\$3,900.00
6169902	INTERIOR LANE CLOSURE	EA	\$3,900.00
6169902	TRIPLE LANE CLOSURE	EA	\$4,500.00
6169902	RAMP CLOSURE	EA	\$1,800.00
6169902	TEMPORARY TRAFFIC CONTROL SINGLE LANE SHIFT	EA	\$1,000.00
6169902	MISC. 1-LANE 2-WAY OPERATION W/ FLAGGERS	EA	\$3,000.00

BRIDGE ITEMS			
<u>Item Number</u>	<u>Description</u>	<u>Unit</u>	<u>Fixed Unit Price</u>
2169903	REMOVAL OF EXISTING EXPANSION JOINT SILICONE SEALANT	LF	\$35.00
2169903	REMOVAL OF EXISTING EXPANSION JOINT COMPRESSION SEAL	LF	\$52.00
4019904	ASPHALTIC CONCRETE OVERLAY REPAIR	SF	\$12.00
4094000	SEAL COAT, GRADE A	SY	\$4.00
4094010	SEAL COAT, GRADE B	SY	\$4.00
6234000	POLYMER CONCRETE	CF	\$300.00
7040101	SUBSTRUCTURE REPAIR (FORMED)	SF	\$178.00
7040113	CLEANING AND EPOXY COATING	SF	\$8.00
7049904	BRIDGE DECK APPROACH SLAB REPAIR (PARTIAL DEPTH) (OVER 200 SF)	SF	\$40.00
7049904	BRIDGE DECK APPROACH SLAB REPAIR (PARTIAL DEPTH) (0-200 SF)	SF	\$80.00
7049904	BRIDGE DECK APPROACH SLAB REPAIR (FULL DEPTH)	SF	\$90.00
7049904	REPAIRING CONCRETE DECK (HALF-SOLING) (OVER 600 SF)	SF	\$35.00
7049904	REPAIRING CONCRETE DECK (HALF-SOLING) (200-600 SF)	SF	\$50.00
7049904	REPAIRING CONCRETE DECK (HALF-SOLING) (UNDER 200 SF)	SF	\$60.00
7049904	DECK REPAIR W/ VOID TUBE REPLACEMENT (OVER 80 SF)	SF	\$90.00
7049904	DECK REPAIR W/ VOID TUBE REPLACEMENT (0-80 SF)	SF	\$130.00
7049904	FULL DEPTH REPAIR (OVER 600 SF)	SF	\$60.00
7049904	FULL DEPTH REPAIR (200-600 SF)	SF	\$80.00
7049904	FULL DEPTH REPAIR (UNDER 200 SF)	SF	\$100.00
7049904	DENSE CONCRETE OVERLAY REPAIR (OVER 600 SF)	SF	\$20.00
7049904	DENSE CONCRETE OVERLAY REPAIR (200-600 SF)	SF	\$30.00
7049904	DENSE CONCRETE OVERLAY REPAIR (UNDER 200 SF)	SF	\$40.00
7049904	EPOXY POLYMER OVERLAY REPAIR, CONCRETE DECK (OVER 600 SF)	SF	\$8.00
7049904	EPOXY POLYMER OVERLAY REPAIR, CONCRETE DECK (200-600 SF)	SF	\$12.00
7049904	EPOXY POLYMER OVERLAY REPAIR, CONCRETE DECK (UNDER 200 SF)	SF	\$14.00
7049904	VERTICAL SUBSTRUCTURE REPAIR (UNFORMED)	SF	\$128.00
7049904	VERTICAL SUPERSTRUCTURE REPAIR (UNFORMED)	SF	\$128.00
7049904	OVERHEARD SUBSTRUCTURE REPAIR (UNFORMED)	SF	\$137.00
7049904	OVERHEARD SUPERSTRUCTURE REPAIR (UNFORMED)	SF	\$137.00
7119905	CONCRETE & MASONRY PROTECTION SYSTEM	SY	\$4.00
7033013	PENETRATING CONCRETE SEALER	SY	\$4.20
7049905	CONCRETE CRACK FILLER – HIGH MOLECULAR WEIGHT METHACRYLATE	SY	\$15.00

BRIDGE ITEMS			
<u>Item Number</u>	<u>Description</u>	<u>Unit</u>	<u>Fixed Unit Price</u>
7179903	SILICONE EXPANSION JOINT SEALANT (<2.5" WIDTH)	LF	\$50.00
7179903	PREFORMED SILICONE OR EPDM EXPANSION JOINT SEAL (2.5"- 4.5" WIDTH)	LF	\$100.00

H. Adjustment Factor

1.0 Description. The Adjustment Factor includes business and construction related costs as defined in this specification. It is the responsibility of the contractor to verify the unit prices provided in this contract and to modify their Adjustment Factor accordingly.

1.1 Business Costs. Business related costs consist of profit, overhead costs, subcontractor profit and overhead, taxes, finance costs, and other costs including but not limited to;

- (a) insurance, bonds and indemnification
- (b) project meetings, training, management and supervision
- (c) project office staff and equipment
- (d) employee or subcontractor wage rates that exceed prevailing wages
- (e) fringe benefits, payroll taxes, worker's compensation, insurance costs and any other payment mandated by law in connection with labor that exceeds the labor rate allowances
- (f) Business risks such as the risk of low than expected volumes of work, smaller than anticipated Job Orders, poor subcontractor performance, and inflation or material cost fluctuations

1.2 Construction Costs. Construction related costs include but are not limited to;

- (a) personnel safety equipment
- (b) security requirements
- (c) excess material waste
- (d) daily and final clean-up
- (e) costs resulting from inadequate supply of materials, fuel, electricity, or skilled labor
- (f) costs resulting from productivity loss
- (g) working in extreme and adverse weather conditions
- (h) any other discreet items of work required to complete a particular Job Order

1.3 Mobilization Costs. All costs in accordance with Sec 618 shall be included in the contractor's Adjustment Factor as defined in the contract except as otherwise noted in this contract.

1.4 General Costs. The above lists are not exhaustive and are intended to provide general examples of cost items to be included in the contractor's Adjustment Factor as defined in the contract.

2.0 Adjustment Factor. The Adjustment Factor may include daytime, nighttime, and/or weekend hours as identified by the Engineer.

2.1 Daytime hours are defined as ½ hour after sunrise to ½ hour before sunset. If the contractor works outside of the defined daytime hours, the contractor shall provide lighting equipment at no additional cost to the Commission.

3.0 Nighttime Work. If the engineer determines traffic volumes are such that work cannot be performed during the daytime, without significant traffic impacts, the Job Order will specify nighttime repair operations.

4.0 Weekend Work. If the Engineer determines traffic volumes are such that work cannot be performed Monday through Friday without significant traffic impacts, the Job Order will specify weekend repair operations.

I. Bidding the Adjustment Factor

1.0 The bidder shall complete the bid form by writing in the Adjustment Factor. The Adjustment Factor shall be specified to three decimal places. Note that this is a contract pay item for contractor payment, not work items.

EXAMPLE: The Adjustment Factor shall be entered as the following example illustrates.

$$\begin{array}{r} \hline 1 \quad . \quad 1 \quad 9 \quad 8 \\ \hline \end{array}$$

OR

$$\begin{array}{r} \hline 0 \quad . \quad 9 \quad 8 \quad 7 \\ \hline \end{array}$$

Note: The Adjustment Factors used are for example purposes only and is not an indication of factors being bid by the contractor.

J. Contract Award

1.0 The Commission will evaluate the bids with the intent of awarding the contract to the lowest responsible bidder. The anticipated budget for this project is \$1,000,000. If the contract is extended in accordance with the TERM OF CONTRACT JSP, the anticipated budget will be two times the amount.

2.0 The lowest bid will be determined by multiplying the Adjustment Factor by the anticipated budget for the adjustment factor. For purposes of bidding this contract, the estimated percentage of work performed during Daytime hours is 60%, Nighttime hours is 35%, and Weekend hours is 5%. The dollar quantities provided in the bid form are anticipated budgets and are not intended to represent the actual value of work that will be assigned.

K. Bonds

1.0 The amount of the Bid Bond shall be 5% of the anticipated budget for this project.

2.0 The amount of the Performance Bond shall be 100% of the anticipated budget for this project.

L. Notice to Proceed

108.2 Notice to Proceed. For each Job Order, the engineer will include a notice to proceed, which will stipulate the date the contractor is expected to begin work. The notice to proceed date will normally be 14 calendar days after the job order is issued.

M. Accelerated Repair

1.0 Should the engineer deem an expedited Notice to Proceed is necessary in order to avoid detours or significant traffic congestion due to a bridge or lane closure, the Job Order shall be designated as an Accelerated Repair. Commission forces or others will initially respond to the location and perform such work as necessary to reduce the immediate impact to traffic.

2.0 The contractor will be notified by phone of the location of the accelerated repair and extent of work needed. Written confirmation of the required work will be provided by email or personal delivery immediately after notification. The contractor shall provide a means for the engineer to contact the contractor 24 hours a day for such emergencies. The Job Order will be negotiated and issued by the Commission within 48 hours of notification to the contractor. It is estimated that an accelerated repair could occur up to three times during the term of this contract.

3.0 The contractor shall respond to the work location and begin the accelerated repair work within five (5) calendar days of execution of the Job Order. After beginning the accelerated repair work, the contractor shall continuously and diligently pursue the work according to the mutually agreed upon schedule in the Job Order until all of the repairs described in the Job Order are complete, unless otherwise approved by the engineer.

4.0 No additional payment will be made for an accelerated repair Job Order that includes a Notice to Proceed date of five (5) or more days from issuance of the Job Order. Should a Notice to Proceed date of less than five (5) calendar days be requested by the engineer, additional costs due to accelerating the work will be reimbursed, as agreed upon by both parties prior to execution of the Job Order. The Adjustment Factor will not be applied to any agreed payment for accelerated repair. All other items necessary to complete the repair work will be paid for at the fixed unit price multiplied by the Normal Work or Nighttime Work Adjustment Factor, as mutually agreed upon in the Job Order.

N. Completing the Work

1.0 The contractor shall perform any task in the fixed unit price list for the fixed unit price multiplied by the quantity, multiplied by the Adjustment Factor. The contractor shall perform the Detailed Scope of Work for the Job Order Price as calculated in accordance with the procedure for developing Job Orders set forth herein.

2.0 When installed quantities differ from the estimated quantities in the issued Job Order, the as built quantities in the final Job Order will address the quantity variation(s) for final payment. When quantities are not specified in the Detailed Scope of Work, the Job Order Price will be deemed to be lump sum for such work.

3.0 The contractor shall employ and supply a sufficient force of workers, materials and equipment and shall progress the work with such diligence so as to ensure completion of the Detailed Scope of Work within the Job Order completion Time or within such extended time for completion as may be granted by the engineer.

4.0 In order to assist in reviewing the Job Order Price Proposal, the contractor shall as part of the Job Order Proposal prepare and submit to the engineer for approval, a progress schedule showing the order in which the contractor proposes to carry on the work, the date of which it will start the major items of work (including but not limited to excavation, drainage, paving, structures, mobilization, soil erosion and sediment control, etc.) and the critical features (including procurement of materials, plant and equipment) and the contemplated dates for completing the same.

O. Final Inspection and Acceptance of the Work

105.10.7 Final Inspection. Upon completion of the required work for each Job Order, the contractor shall notify the engineer by phone or electronic mailing, and the engineer will perform an inspection. If the engineer determines all work required by the contract has been satisfactorily completed, the engineer will make the acceptance for maintenance and notify the contractor in writing of the date of acceptance for maintenance.

105.10.7.1 Work determined to be unsatisfactory by the engineer and not accepted shall be corrected to acceptable standards at the contractor's sole cost. All items that are unsatisfactory shall be corrected within the specified working days for each job order. If needed for correction of unsatisfactory work, the contractor will be given an extension of contract time in an amount equal to the number of working days remaining in the job order at the time the engineer was notified for inspection. No contract time extension will be made for notification made prior to completion of the work. Any time extension given will be considered a noncompensable delay. Upon completion of the corrections, the contractor shall notify the engineer for a reinspection.

105.10.7.2 Following a Job Order final inspection, the contractor, subcontractors, and suppliers are relieved of any new or additional liability to third parties for personal injury, death, or property damages which may be alleged to result from the performance of the work required by that job order, unless additional work on the right of way is required by the engineer.

105.10.7.3 Nothing in this section shall be deemed to excuse the contractor of liability or responsibility for any personal injury, death, or property damages which may arise from acts or the failure to act prior to the final inspection of the work required by the Job Order.

P. Liquidated Damages for Failure or Delay in Beginning Work and/or Completing Work on Time

1.0 Description. If the contractor, or in case of default, the surety fails to begin or complete the work required in a job order within the time specified, or within such extra time as may be allowed by the contract, the contractor shall be charged with liquidated damages in the amount of **\$250 per day** for each day or partial day that the job order remains incomplete in excess of the specified time. The amount specified is agreed upon, not as a penalty, but as liquidated damages for loss to the Commission and the public. This amount will be deducted from any amount due under the contract. These damages will apply to each individual job order for which the contractor fails to complete the work on time. The contractor and surety shall be liable for all liquidated damages. Permitting the contractor to continue the work after the expiration of the specified time or any extension of time will not constitute a waiver by the Commission of any contractual rights. It shall be the responsibility of the engineer to determine the quantity of excess time.

2.0 Sec 108.8.1 through 108.8.1.3 shall not apply to this contract.

3.0 These liquidated damages will not be charged for Saturdays, Sundays, national, and state holidays established by law.

Q. Contract Payments

1.0 The contractor shall request payment by submitting an invoice to the engineer. The invoice shall be for the job orders completed and shall be itemized by job order number. A summary of all contract items used, contract unit prices, and total cost shall be included with the invoice.

1.1 The engineer will make payment estimates for the Job Orders completed and final inspected and the value thereof at the price established in the Job Order, including any necessary adjustments. The payment estimates will include deductions from the contractor's invoice for any liquidated damages applicable to any of the Job Orders.

1.2 Material Allowance. No material allowance will be made for this contract.

R. Work Zone Traffic Management

1.0 Description. The contractor may be responsible for the work zone traffic management as mutually agreed upon by the contractor and engineer for each individual Job Order. Work zone traffic management shall be in accordance with applicable portions of Division 100 and Division 600 of the Standard Specifications, and specifically as follows.

2.0 Traffic Management Schedule.

2.1 The contractor shall notify the engineer at least 48 hours prior to performing any work at each work site. The notification shall include all information needed to identify traffic impacts such as work location, anticipated work hours, traffic control plan type, required lane or shoulder closures, anticipated duration of the work, etc. The contractor shall designate a contact person who is available for the duration of the work to resolve any traffic impact issues resulting from the contractor's operations. The engineer will make appropriate notification to the public, MoDOT customer service, and MoDOT work crews of the contractor's operations. The contractor shall notify the engineer as soon as practical any postponement due to weather, material, or other circumstances and shall notify the engineer when the work has been rescheduled.

2.2 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 reopened to traffic.

3.0 Maintenance of Traffic.

3.1 Traffic shall be maintained through the work zone using the existing pavement in accordance with the traffic control plans. No detours or lane shifts onto shoulders will be allowed unless otherwise approved by the engineer.

3.2 Provisions shall be made to allow the movement of emergency vehicles through the limits of construction at all times.

3.3 During non-working hours the contractor shall have all lanes of traffic open for all routes, ramps, and side roads. All channelizers and other traffic control devices shall be removed from the roadway during non-working hours unless otherwise approved by the engineer.

4.0 Traffic Congestion and Delay. The contractor shall, upon approval of the engineer, take proactive measures to reduce traffic congestion in the work zone. The contractor shall be responsible for maintaining the existing traffic flow through the job site during the work. 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 queues from occurring again.

5.0 Traffic Safety.

5.1 Where traffic queues routinely extend to within 1000 feet (300 m) of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet (150 m) of the ROAD WORK AHEAD, or similar, sign on an undivided highway, the contractor shall extend the advance warning area, as approved by the engineer.

5.2 When a traffic queue extends to within 1000 feet (300 m) of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet (150 m) of the ROAD WORK AHEAD, or similar, sign on an undivided highway due to non-recurring congestion, the contractor shall deploy a means of providing advance warning of the traffic congestion, as approved by the engineer. The warning location shall be no less than 1000 feet (300 m) and no more than 0.5 mile (0.8 km) in advance of the end of the traffic queue on divided highways and no less than 500 feet (150 m) and no more than 0.5 mile (0.8 km) in advance of the end of the traffic queue on undivided highways.

6.0 Work Hour Restrictions.

6.1 All work shall be scheduled to avoid major sporting events, conventions, concerts, and similar special events as specified by the engineer. During the term of this contract, there are six major holiday weekends: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. All lanes shall be scheduled to be open to traffic during these holiday periods, from 12:00 noon on the last working day preceding the holiday until 9:00 a.m. on the first working day subsequent to the holiday, unless otherwise designated by the engineer.

6.2 During non-working hours the contractor shall have all lanes of traffic open for all routes, ramps, and side roads. Working hours for weekends and holidays shall be determined by the engineer.

6.3 Due to the wide variance in traffic volumes throughout the contract area, it is not possible to give specific work hours for the term of the contract. Each Job Order will specify work hours or work hour restrictions based on the repair location, this may include peak hour restrictions. The following table provides general guidance as to the most restrictive schedule for when work on or adjacent to the roadway may be allowed.

<u>Traffic Control Plan Type</u>	<u>Work Hours (Monday thru Friday)</u>	
Single Lane Closure	7:30 p.m.	to 4:30 a.m.
Double Lane Closure	9:30 p.m.	to 4:30 a.m.
Triple Lane Closure	10:00 p.m.	to 4:30 a.m.
Interior Lane Closure	9:30 p.m.	to 4:30 a.m.

Ramp Closure
One Lane Two Way Operation
Flagger

Hours and days as approved by the engineer
Hours and days as approved by the engineer with

Specific work hours for an individual work location shall be according to the mutually agreed upon schedule in the Job Order.

7.0 Weekend Bridge Work. Some bridges will need full weekend lane closures. The contractor is required to give at least one week notice prior to any weekend lane closures.

8.0 Work Within Another Work Zone. The engineer may determine it is in the best interest of the Commission and the traveling public to have the work designated in the job order performed within another contractor's work zone or within a MoDOT work zone. If the work is designated to be performed within another work zone, the contractor shall coordinate and perform the work in accordance with Sec 105.6.

9.0 Ramp Closure. Ramp closures shall be minimized and shall be approved by the engineer a minimum of five days prior to the closure. Only one ramp closure will be permitted in a particular interchange or complex at one time. Work on acceleration / deceleration lanes will not require ramp closure unless approved by the engineer. Detour traffic handling details will be as specified by the engineer. Major ramp closures may require detour signing with other ramp closures only requiring use of changeable message signs (CMS) for detours. If the engineer determines detour signing is required, all necessary detour trailblazing placards will be furnished, installed, and covered by others. The contractor shall furnish all CMS required by the engineer. The contractor shall be responsible for uncovering and covering the trailblazing placards as work progresses.

10.0 Changeable Message Signs. The contractor shall provide changeable message signs notifying motorists of future traffic disruption and possible traffic slow down one week before traffic is shifted to a detour. The changeable message sign installation shall be placed at a location as approved or directed by the engineer.

11.0 Basis of Payment. All items necessary to complete the traffic control will be paid for at the fixed unit price multiplied by the Adjustment Factor, as mutually agreed upon in the Job Order.

S. Traffic Control Plan Types

1.0 Description. The following traffic control plan types shall be used for the work. The contract provides an estimated number of traffic control items required for single lane closures, double lane closures, triple-lane closures, and ramp closures. The engineer may determine that the contractor shall perform work on more than one bridge within a lane closure when the bridges are within close proximity to each other.

2.0 Plan Types.

2.1 Single Lane Closure. A single lane closure shall be performed by furnishing, installing, and removing the following set of traffic control devices.

- | | |
|--------|------------------------------------|
| 2 each | Bridge Work Ahead |
| 2 each | Right (Left) Lane Closed Ahead |
| 2 each | Reduced Speed Limit Ahead (Symbol) |
| 1 each | Right (Left) Lane Closed |

1 each	Merge with Right (Left) Arrow
2 each	Speed Limit XX MPH
2 each	Work Zone (Plaque)
14 each	Directional Indicator Barricade
30 each	Channelizer (Trim Line)
2 each	Flashing Arrow Panel (One Truck Mount for TMA)
1 each	Truck Mounted Attenuator
1 each	Changeable Message Sign (Contractor Furnished / Retained)

2.2 Double Lane Closure. The contractor shall obtain approval from the engineer prior to any double lane closure. A double lane closure shall be performed by furnishing, installing, and removing the following set of traffic control devices.

2 each	Bridge Work Ahead
2 each	2 Right (Left) Lanes Closed Ahead
2 each	Reduced Speed Limit Ahead (Symbol)
2each	Right (Left) Lane Closed
2 each	Merge with Right (Left) Arrow
4 each	Speed Limit XX MPH
4 each	Work Zone (Plaque)
2 each	Speed Limit XX (Normal Speed)
28 each	Directional Indicator Barricade
100 each	Channelizer (Trim Line)
3 each	Flashing Arrow Panel (One Truck Mount for TMA)
1 each	Truck Mounted Attenuator
1 each	Changeable Message Sign (Contractor Furnished / Retained)

2.3 Interior Lane Closure. The contractor shall obtain approval from the engineer prior to any interior lane closure. An interior lane closure shall be performed by furnishing, installing, and removing the following set of traffic control devices.

2 each	Bridge Work Ahead
2 each	Right (Left) Lane Closed Ahead
2 each	Reduced Speed Limit Ahead (Symbol)
1 each	Right (Left) Lane Closed
1 each	Merge with Right (Left) Arrow
2 each	Speed Limit XX MPH
2 each	Work Zone (Plaque)
1 each	Center Lane Closed Ahead
1 each	Right (Left) Reverse Curve (Symbol)
2 each	Speed Limit XX (Normal Speed)
14 each	Directional Indicator Barricade
100 each	Channelizer (Trim Line)
3 each	Flashing Arrow Panel (One Truck Mount for TMA)
1 each	Truck Mounted Attenuator
1 each	Changeable Message Sign (Contractor Furnished / Retained)

2.4 Triple Lane Closure. The contractor shall obtain approval from the engineer prior to any triple lane closure. A triple lane closure shall be performed by furnishing, installing, and removing the following set of traffic control devices.

2 each	Bridge Work Ahead
2 each	3 Right (Left) Lanes Closed Ahead
2 each	Reduced Speed Limit Ahead (Symbol)
3 each	Right (Left) Lane Closed
3 each	Merge with Right (Left) Arrow
6 each	Speed Limit XX MPH
6 each	Work Zone (Plaque)
2 each	Speed Limit XX (Normal Speed)
42 each	Directional Indicator Barricade
70 each	Channelizer (Trim Line)
4 each	Flashing Arrow Panel (One Truck Mount for TMA)
1 each	Truck Mounted Attenuator
1 each	Changeable Message Sign (Contractor Furnished / Retained)

2.5 Ramp Closure. The contractor shall obtain approval from the engineer a minimum of five days prior to any ramp closure. A ramp closure shall be performed by furnishing, installing, and removing the following set of traffic control devices. Uncovering and covering any detour trailblazing placards furnished and installed by others is included in the work.

2 each	Bridge Work Ahead
2 each	Ramp Closed Ahead
2 each	Reduced Speed Limit Ahead (Symbol)
2 each	Detour Ahead
2 each	Speed Limit XX MPH
2 each	Work Zone (Plaque)
1 each	Road Closed
2 each	Speed Limit XX (Normal Speed)
14 each	Directional Indicator Barricade
40 each	Channelizer (Trim Line)
2 each	Flashing Arrow Panel (One Truck Mount for TMA)
1 each	Truck Mounted Attenuator
2 each	Changeable Message Sign (Contractor Furnished / Retained)
3 each	Type III Movable Barricade

2.6 One-Lane Two-Way Operation with Flaggers. A minimum of two flaggers will be required to direct traffic. Additional flaggers may be required when working at intersecting streets or ramps as directed by the engineer. No direct payment will be made for flaggers. "One-Lane Two-Way Operation with Flaggers", shall include furnishing, installing, and removing the following set of traffic control devices as shown on the plans:

2 each	Road Work Ahead
2 each	One Lane Road Ahead
2 each	Be Prepared To Stop
2 each	Flagger (Symbol)

3.0 Additional Traffic Control Devices. The engineer may determine that signs, channelizers, and Type III Movable Barricades in addition to those devices shown in the plans are necessary to safely accommodate traffic. These additional devices may be needed for merging ramp traffic, detours, multiple bridges, or other special cases to supplement the specified lane closure devices. The contract provides a fixed cost for any additional traffic control items.

4.0 Flaggers. Flaggers may be required when working at intersecting streets or ramps as

directed by the engineer. No direct payment will be made for flaggers.

5.0 Temporary Traffic Control Single Lane Shift. When a Single Lane Closure is used for work on a divided highway, and repairs are necessary in both the right and left lanes within the same log mile range and direction, payment for the Temporary Traffic Control Single Lane Shift shall be paid for at the fixed unit price.

6.0 Method of Measurement and Basis of Payment.

6.1 Measurement of lane closures will be made per each set-up made within the term of the Job Order. A set-up is defined as each installation and removal of traffic control devices at a specific work site. If a set-up is switched to a different lane (i.e., from a left lane closure to a right lane closure), the contractor will be paid per each set-up. If the duration of a lane closure exceeds one week, the contractor will be paid an additional fixed unit cost for the Changeable Message Sign (Contractor Furnished/Retained) and the Flashing Arrow Panel (One Truck Mount for TMA) per week. If the engineer determines that a lane closure is needed both on the bridge and under the bridge to accommodate the work, each lane closure type will be paid for at the work site per the fixed unit price established for each type lane closure. Payment will not be made for any lane closure that does not result in productive deck repair work as determined by the engineer. Additional lane closures may be installed by the contractor at his expense. The accepted quantity of each lane closure will be paid for at the fixed unit price for:

Item 616-99.02	Single Lane Closure	Each
Item 616-99.02	Double Lane Closure	Each
Item 616-99.02	Interior Lane Closure	Each
Item 616-99.02	Triple Lane Closure	Each
Item 616-99.02	Ramp Closure	Each
Item 616-99.02	Temporary Traffic Control Single Lane Shift	Each
Item 616-99.02	One-Lane Two-Way Operation with Flaggers	Each

multiplied by the Adjustment Factor, as mutually agreed upon in the Job Order.

6.2 Measurement of additional traffic control devices will be made per each set-up made within the term of the Job Order. Payment for the devices shall include furnishing, installing, and removing the additional devices at a specific work site. No payment will be made for additional devices used by the contractor without prior approval of the engineer. The accepted quantity of additional traffic control devices will be paid for in accordance with the fixed unit price list, multiplied by the Adjustment Factor, as mutually agreed upon in the Job Order.

T. Work Plan and Schedule for Accomplishing Work

108.4 Work Plan and Schedule. Prior to or at the preconstruction conference, the contractor shall provide a proposed work plan and typical schedule for accomplishing work. The work plan shall include a written list of equipment and personnel that the contractor intends to use in executing the work.

108.4.1 The work plan will be reviewed by the engineer to determine in general if adequate personnel and equipment appear to be available to complete the work within the required number of calendar days. If the engineer determines the work plan is inadequate, the engineer and contractor shall meet for a joint review of the plan to correct and adjust the plan and schedule as necessary. A revised work plan and schedule shall be provided by the contractor prior to

commencing the work.

108.4.2 If multiple job orders are issued with overlapping completion periods, the priority of the work will be jointly determined by the engineer and the contractor, with final approval of the work plan by the engineer. The work schedule and work priorities will be determined by the needs of the Commission and not the contractor's convenience of work location.

108.4.3 No direct payment will be made for furnishing the work plan or revisions.

108.4.4 The contractor shall determine the most feasible work plan and schedule consistent with the requirements of the contract. The engineer's approval of contractor's work plan is not intended to be acknowledgment or representation that it is reasonable or will accomplish the work within a particular time or at a particular cost.

U. 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 engineer shall also be notified when the contractor requests emergency assistance.

Matt Koppitz, Resident Engineer, Construction and Materials: 417-830-8440

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 Troop A	417-622-0800
Missouri Highway Patrol Troop D	417-895-6868
MoDOT Incident Response (4:00 PM – 7:30 AM CST)	417-766-3265
Barry County Sheriff	417-847-6556
Barton County Sheriff	417-214-0714
Bates County Sheriff	660-679-3232
Benton County Sheriff	606-438-3053
Cedar County Sheriff	417-276-5133
Christian County Sheriff	417-581-5133
Dade County Sheriff	417-637-2312
Dallas County Sheriff	417-345-2441
Greene County Sheriff	417-868-4040
Henry County Sheriff	660-885-7021
Hickory County Sheriff	417-745-6415
Jasper County Sheriff	417-624-1600
Lawrence County Sheriff	417-466-2131
McDonald County Sheriff	417-223-4319
Newton County Sheriff	417-451-8300
Polk County Sheriff	417-777-9020
St. Clair County Sheriff	417-646-2522

Stone County Sheriff	417-357-6116
Taney County Sheriff	417-546-7250
Vernon County Sheriff	417-448-5555
Webster County Sheriff	417-859-2247

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 payment will be made to the contractor to recover the cost of the communication equipment, labor, materials or time required to fulfill the above provisions.

V. Utilities

1.0 It is the inherent risk of the work under this contract that the contractor may encounter utilities above and/or below the ground or in the vicinity of any given job order which may interfere with their operations. The contractor expressly acknowledges and assumes this risk even though the nature and extent is unknown to both the contractor and the Commission at the time of bidding and award of the contract. The effect in cost or time of the presence of utilities above, below or in the vicinity of the contractor's work under this contract shall not be compensable.

W. Delay Provisions

1.0 If the contractor is delayed in the commencement, prosecution or completion of the work by any act of the Commission, or by any cause beyond the contractor's control, then the contractor will be entitled to an extension of time. If the contractor is delayed or prevented from working on a particular date as a result of a delay, error or omission of the Commission, and the contractor incurs unavoidable labor costs as a direct result thereof because the contractor did not have enough time to cancel or divert its labor force, then the contractor will be reimbursed for such costs. For each worker so paid, the contractor will be reimbursed the amount paid the worker. Also, the contractor will be reimbursed for construction tasks required as a direct result of such delay, error or omission, such as closing off areas of work. No other costs shall be paid as a result of a delay or late cancellation.

1.1 If the contractor fails to provide 5-days notification for all Job Orders, this provision will not apply.

X. Eliminated Materials

1.0 Materials required by the Detailed Scope of Work and not incorporated into the work due to changes caused by field conditions or revisions to the design by the Commission after the material was ordered or purchased will be reimbursed at the material portion of the Pre-priced Task, or if there is no Pre-priced Task, then its material cost minus salvage value, or the material cost plus delivery costs.

Y. Sample Job Orders

1.0 Description. The following are example Job Orders intended to be illustrations that may be used as a guide for formulating the bid of the Adjustment Factor. For each example Job Order, the appropriate items that would be used and the quantities are computed based upon the sample work that would be completed in the Job Order. The contractor shall be reminded these are Job Order samples and the quantity totals in actual Job Orders, if issued, may be more or less than that depicted below or be totally different from the samples illustrated.

1.1 Job Order Sample 1: Bridge deck repair for Bridge No. A1234 on Interstate or Major Route requiring night work.

Item Description	Fixed Unit Price	Quantity	Price
Repairing Concrete Deck (Half-Soling) (Under 200 SF)	\$60.00	150 SF	\$9,000.00
Full Depth Repair (Under 200 SF)	\$100.00	50 SF	\$5,000.00
Dense Concrete Overlay Repair (Under 200 SF)	\$40.00	180 SF	\$7,200.00
Double Lane Closure	\$1,300.00	1 Each	\$1,300.00
		Subtotal	\$22,500.00
		:	
Adjustment Factor	1.200		
		TOTAL:	\$27,000.00

1.2 Job Order Sample 2: Bridge deck and epoxy polymer overlay repair for Bridge No. A1501 on Interstate requiring night work. Includes closing WB entrance ramp from Broadway.

Item Description	Fixed Unit Price	Quantity	Price
Construction Signs	\$1.00	480 SF	\$480.00
Type III Moveable Barricade	\$25.00	10 Each	\$250.00
Single Lane Closure	\$1000.00	10 Each	\$10,000.00
Repairing Concrete Deck (Half-soling) (Over 600 SF)	\$35.00	1000 SF	\$35,000.00
Epoxy Polymer Overlay Repair, Concrete Deck (Over 600 SF)	\$8.00	1200 SF	\$9,600.00
		Subtotal:	\$55,330.00
Adjustment Factor	1.171		
		TOTAL	\$64,791.43

1.3 Job Order Sample 3: Bridge deck repair in center lane eastbound on Manchester Trafficway Bridge No. L0967 requiring nighttime work.

Item Description	Fixed Unit Price	Quantity	Price
Single Lane Closure	\$1,000.00	6 Each	\$6,000.00
Double Lane Closure	\$1,300.00	8 Each	\$10,400.00

Item Description	Fixed Unit Price	Quantity	Price
Repairing Concrete Deck (Half-soling) (Over 600 SF)	\$35.00	2500 SF	\$87,500.00
Full Depth Repair (Under 200 SF)	\$100.00	100 SF	\$10,000.00
		Subtotal:	\$113,900.00
Adjustment Factor	1.218		
		TOTAL:	\$138,730.20

Z. Supplemental Revisions JSP-18-01AA

Compliance with [2 CFR 200.216 – Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment](#).

The Missouri Highways and Transportation Commission shall not enter into a contract (or extend or renew a contract) using federal funds to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as substantial or as critical technology as part of any system where the video surveillance and telecommunications equipment was produced by Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).

Stormwater Compliance Requirements

1.0 Description. This provision requires the contractor to provide a Water Pollution Control Manager (WPCM) for any project that includes land disturbance on the project site and the total area of land disturbance, both on the project site, and all Off-site support areas, is one (1) acre or more. Regardless of the area of Off-site disturbance, if no land disturbance occurs on the project site, these provisions do not apply. When a WPCM is required, all sections within this provision shall be applicable, including assessment of specified Liquidated Damages for failure to correct Stormwater Deficiencies, as specified herein. This provision is in addition to any other stormwater, environmental, and land disturbance requirements specified elsewhere in the contract.

1.1 Definitions. The project site is defined as all areas designated on the plans, including temporary and permanent easements. The project site is equivalent to the “permitted site”, as defined in MoDOT’s State Operating Permit. An Off-site area is defined as any location off the project site the contractor utilizes for a dedicated project support function, such as, but not limited to, staging area, plant site, borrow area, or waste area.

1.2 Reporting of Off-Site Land Disturbance. If the project includes any planned land disturbance on the project site, prior to the start of work, the contractor shall submit a written report to the engineer that discloses all Off-site support areas where land disturbance is planned, the total acreage of anticipated land disturbance on those sites, and the land disturbance permit number(s). Upon request by the engineer, the contractor shall submit a copy of its land disturbance permit(s) for Off-site locations. Based on the total acreage of land disturbance, both on and Off-site, the engineer shall determine if these Stormwater Compliance Requirements shall apply. The Contractor shall immediately report any changes to the planned area of Off-site land disturbance. The Contractor is responsible for obtaining its own separate land disturbance permit for Off-site areas.

2.0 Water Pollution Control Manager (WPCM). The Contractor shall designate a competent person to serve as the Water Pollution Control Manager (WPCM) for projects meeting the description in Section 1.0. The Contractor shall ensure the WPCM completes all duties listed in Section 2.1.

2.1 Duties of the WPCM:

- (a) Be familiar with the stormwater requirements including the current MoDOT State Operating Permit for construction stormwater discharges/land disturbance activities; MoDOT's statewide Stormwater Pollution Prevention Plan (SWPPP); the Corps of Engineers Section 404 Permit, when applicable; the project specific SWPPP, the Project's Erosion & Sediment Control Plan; all applicable special provisions, specifications, and standard drawings; and this provision;
- (b) Successfully complete the MoDOT Stormwater Training Course within the last 4 years. The MoDOT Stormwater Training is a free online course available at MoDOT.org;
- (c) Attend the Pre-Activity Meeting for Grading and Land Disturbance and all subsequent Weekly Meetings in which grading activities are discussed;
- (d) Oversee and ensure all work is performed in accordance with the Project-specific SWPPP and all updates thereto, or as designated by the engineer;
- (e) Review the project site for compliance with the Project SWPPP, as needed, from the start of any grading operations until final stabilization is achieved, and take necessary actions to correct any known deficiencies to prevent pollution of the waters of the state or adjacent property owners prior to the engineer's weekly inspections;
- (f) Review and acknowledge receipt of each MoDOT Inspection Report (Land Disturbance Inspection Record) for the Project within forty eight (48) hours of receiving the report and ensure that all Stormwater Deficiencies noted on the report are corrected as soon as possible, but no later than stated in Section 5.0.

3.0 Pre-Activity Meeting for Grading/Land Disturbance and Required Hold Point. A Pre-Activity meeting for grading/land disturbance shall be held prior to the start of any land disturbance operations. No land disturbance operations shall commence prior to the Pre-Activity meeting except work necessary to install perimeter controls and entrances. Discussion items at the pre-activity meeting shall include a review of the Project SWPPP, the planned order of grading operations, proposed areas of initial disturbance, identification of all necessary BMPs that shall be installed prior to commencement of grading operations, and any issues relating to compliance with the Stormwater requirements that could arise in the course of construction activity at the project.

3.1 Hold Point. Following the pre-activity meeting for grading/land disturbance and subsequent installation of the initial BMPs identified at the pre-activity meeting, a Hold Point shall occur prior to the start of any land disturbance operations to allow the engineer and WPCM the time needed to perform an on-site review of the installation of the BMPs to ensure compliance with the SWPPP is met. Land disturbance operations shall not begin until authorization is given by the engineer.

4.0 Inspection Reports. Weekly and post run-off inspections will be performed by the engineer and each Inspection Report (Land Disturbance Inspection Record) will be entered into a web-

based Stormwater Compliance database. The WPCM will be granted access to this database and shall promptly review all reports, including any noted deficiencies, and shall acknowledge receipt of the report as required in Section 2.1 (f.).

5.0 Stormwater Deficiency Corrections. All stormwater deficiencies identified in the Inspection Report shall be corrected by the contractor within 7 days of the inspection date or any extended period granted by the engineer when weather or field conditions prohibit the corrective work. If the contractor does not initiate corrective measures within 5 calendar days of the inspection date or any extended period granted by the engineer, all work shall cease on the project except for work to correct these deficiencies, unless otherwise allowed by the engineer. All impact costs related to this halting of work, including, but not limited to stand-by time for equipment, shall be borne by the Contractor. Work shall not resume until the engineer approves the corrective work.

5.1 Liquidated Damages. If the Contractor fails to complete the correction of all Stormwater Deficiencies listed on the MoDOT Inspection Report within the specified time limit, the Commission will be damaged in various ways, including but not limited to, potential liability, required mitigation, environmental clean-up, fines, and penalties. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of \$2,000 per day for failure to correct one or more of the Stormwater Deficiencies listed on the Inspection Report within the specified time limit. In addition to the stipulated damages, the stoppage of work shall remain in effect until all corrections are complete.

6.0 Basis of Payment. No direct payment will be made for compliance with this provision.

Anti-Discrimination Against Israel Certification

By signing this contract, the Company certifies it is not currently engaged in and shall not, for the duration of the contract, engage in a boycott of goods or services from the State of Israel, companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel, or persons or entities doing business in the State of Israel as defined by Section 34.600 RSMo. This certification shall not apply to contracts with a total potential value of less than One Hundred Thousand Dollars (\$100,000) or to contractors with fewer than ten (10) employees.

Ground Tire Rubber (GTR) Dry Process Modification of Bituminous Pavement Material

1.0 Description. This work shall consist of the dry process of adding ground tire rubber (GTR) to modify bituminous material to be used in highway construction. Existing GTR requirements in Section 1015 pertain to the wet process method of GTR modification that blends GTR with the asphalt binder (terminal blending or blending at HMA plant). The following requirements shall govern for dry process GTR modification. The dry process method adds GTR as a fine aggregate or mineral filler during mix production. All GTR modified asphalt mixtures shall be in accordance with Secs 401, 402, or 403 as specified in the contract; except as revised by this specification.

2.0 Materials. The contractor shall furnish a manufacturer's certification to the engineer for each shipment of GTR furnished stating the name of the manufacturer, the chemical composition, workability additives, and certifying that the GTR supplied is in accordance with this specification.

2.1 Product Approval. The GTR product shall contain a Trans-Polyoctenamer (TOR) added at 4.5 % of the weight of the crumb rubber or an engineered crumb rubber (ECR) workability additive that has proven performance in Missouri. Other GTR additives shall be demonstrated and proven prior to use such as a five-year field performance history in other states or performance on a federal or state-sanctioned accelerated loading facility.

2.2 General. GTR shall be produced from processing automobile or truck tires by ambient or cryogenic grinding methods. Heavy equipment tires, uncured or de-vulcanized rubber will not be permitted. GTR shall also meet the following material requirements:

Table 1 – GTR Material Properties		
Property	Test Method	Criteria
Specific Gravity	ASTM D1817	1.02 to 1.20
Metal Contaminates	ASTM D5603	≤ 0.01%
Fiber Content	ASTM D5603	≤ 0.5%
Moisture Content	ASTM D1509	≤ 1.0%*
Mineral Filler	AASHTO M17	≤ 4.0%

*Moisture content of the GTR shall not cause foaming when combined with asphalt binder and aggregate during mix production

2.3 Gradation. The GTR material prior to TOR or ECR workability additives shall meet the following gradation and shall be tested in accordance with ASTM D5603 and ASTM D5644.

Table 2 – GTR Gradation	
Sieve	Percent Passing by Weight
No. 20	100
No. 30	98-100
No. 40	50-70
No. 100	5-15

3.0 Delivery, Storage, and Handling. The GTR shall be supplied in moisture-proof packaging or other appropriate bulk containers. GTR shall be stored in a dry location protected from rain before use. Each bag or container shall be properly labeled with the manufacturer’s designation for the GTR and specific type, mesh size, weight and manufacturer’s batch or Lot designation.

4.0 Feeder System. Dry Process GTR shall be controlled with a feeder system using a proportioning device that is accurate to within ± 3 percent of the amount required. The system shall automatically adjust the feed rate to always maintain the material within this tolerance and shall have a convenient and accurate means of calibration. The system shall provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds per minute, to verify feed rate. The supply system shall report the feed in 1-pound increments using load cells that will enable the user to monitor the depletion of the GTR. Monitoring the system volumetrically will not be allowed. The feeder shall interlock with the aggregate weight system and asphalt binder pump to maintain correct mixture proportions at all production rates.

Flow indicators or sensing devices for the system shall be interlocked with the plant controls to interrupt mixture production if GTR introduction rate is not within ± 3 percent. This interlock will

immediately notify the operator if GTR introduction rate exceeds introduction tolerances. All plant production will cease if the introduction rate is not brought back within tolerance after 30 seconds. When the interlock system interrupts production and the plant has to be restarted, upon restarting operations; the modifier system shall run until a uniform feed can be observed on the output display. All mix produced prior to obtaining a uniform feed shall be rejected.

4.1 Batch Plants. GTR shall be added to aggregate in the weigh hopper. Mixing times shall be increased per GTR manufacturer recommendations.

4.2 Drum Plants. The feeder system shall add GTR to aggregate and liquid binder during mixing and provide sufficient mixing time to produce a uniform mixture. The feeder system shall ensure GTR does not become entrained in the exhaust system of the drier or plant and is not exposed to the drier flame at any point after introduction.

5.0 Testing During Mixture Production. Testing of asphalt mixes containing GTR shall not begin until at least 30 minutes after production or per additive supplier's recommendation.

6.0 Construction Requirements. Mixes containing GTR shall have a target mixing temperature of 325 F or as directed by the GTR additive supplier. The additive supplier's recommendations shall be followed to allow for GTR binder absorption/reaction. This may include holding mix in the silo to allow time for binder to absorb into the GTR. Rolling operations may need to be modified.

7.0 Mix Design Test Method Modification. A formal mixing procedure from the additive supplier shall be provided to the contractor and engineer that details the proper sample preparation, including blending GTR with the binder or other additives. Samples shall be prepared and fabricated in accordance with this procedure by the engineer and contractor throughout the duration of the project.

8.0 Mix design Volumetrics. Mix design volumetric equations shall be modified as follows:

8.1 Additional virgin binder added to offset GTR absorption of binder shall be counted as part of the mix virgin binder

8.2 GTR shall be included as part of the aggregate when calculating VMA of the mix.

8.2.1 GTR SPG shall be 1.15

8.3 Mix G_{sb} used to determine VMA shall be calculated as follows:

$$G_{sb (JMF)} = \frac{(100 - P_{bmv})}{\left(\frac{P_s}{G_{sb}} + \frac{P_{GTR}}{G_{GTR}}\right)}$$

where:

- $G_{sb (JMF)}$ = bulk specific gravity of the combined aggregate including GTR
- P_{bmv} = percent virgin binder by total mixture weight
- P_s = percent aggregate by total mixture weight (not including GTR)
- P_{GTR} = percent GTR by total mixture weight
- G_{sb} = bulk specific gravity of the combined aggregate (not including GTR)
- G_{GTR} = GTR specific gravity

8.4 G_{se} shall be calculated as follows:

$$G_{se} = \frac{(100 - P_b - P_{GTR})}{\left(\frac{100}{G_{mm}} - \frac{P_b}{G_b} - \frac{P_{GTR}}{G_{GTR}}\right)}$$

8.5 P_{be} shall be calculated as follows:

$$P_{be} = P_b - \frac{P_{ba}}{100} * (P_s + P_{GTR})$$

9.0 Minimum GTR Amount. The minimum dosage rate for GTR shall be 5 % by weight of total binder for an acceptable one bump grade or 10 % by weight of total binder for an acceptable two bump grade as detailed in the following table. Varying percentage blends of GTR and approved additives may be used as approved by the engineer with proven performance and meeting the specified requirements of the contract grade.

Contract Binder Grade	Percent Effective Virgin Binder Replacement Limits	Required Virgin Binder Grade	Minimum GTR Dosage Rate
PG 76-22	0 - 20	PG 70-22	5 %
		PG 64-22	10 %
PG 70-22	0 - 30	PG 64-22	5 %
		PG 58-28	10 %
PG 64-22	0 - 40*	PG 58-28	5 %
		PG 52-34	10 %
PG 58-28	0 - 40*	PG 52-34	5 %
		PG 46-34	10 %

* Reclaimed Asphalt Shingles (RAS) may be used when the contract grade is PG 64-22 or PG 58-28. RAS replacement shall follow the 2 x RAS criteria when calculating percent effective binder replacement in accordance Sec 401.

Delete Sec 403.19.2 and substitute the following:

403.19.2 Lots. The lot size shall be designated in the contractor's QC Plan. Each lot shall contain no less than four sublots and the maximum sublot size shall be 1,000 tons. The maximum lot size shall be 4,000 tons for determination of pay factors. Sublots from incomplete lots shall be combined with the previous complete lot for determination of pay factors. When no previous lot exists, the mixture shall be treated in accordance with [Sec 403.23.7.4.1](#). A new lot shall begin when the asphalt content of a mixture is adjusted in accordance with [Sec 403.11](#).

Delete Sec 106.9 and substitute the following:

106.9 Buy America Requirements

Buy America Requirements are waived if the total amount of Federal financial assistance applied to the project, through awards or subawards, is below \$500,000.

106.9.1 Buy America Requirements for Iron and Steel.

On all federal-aid projects, the contractor's attention is directed to Title 23 CFR 635.410 *Buy America Requirements*. Where steel or iron products are to be permanently incorporated into the contract work, steel and iron material shall be manufactured, from the initial melting stage through the application of coatings, in the USA except for "minimal use" as described herein. Furthermore, any coating process of the steel or iron shall be performed in the USA. Under a general waiver from FHWA the use of pig iron and processed, pelletized, and reduced iron ore manufactured outside of the USA will be permitted in the domestic manufacturing process for steel or iron material.

106.9.2 Buy America Requirements for Iron and Steel for Manufactured items.

A manufactured item will be considered iron and steel if it is "predominantly" iron or steel. Predominantly iron or steel means that the cost of iron or steel content of a product is more than 50 percent of the total cost of all its components.

106.9.2 Any sources other than the USA as defined will be considered foreign. The required domestic manufacturing process shall include formation of ingots and any subsequent process. Coatings shall include any surface finish that protects or adds value to the product.

106.9.3 "Minimal use" of foreign steel, iron or coating processes will be permitted, provided the cost of such products does not exceed 1/10 of one percent (0.1 percent) of the total contract cost or \$2,500.00, whichever is greater. If foreign steel, iron, or coating processes are used, invoices to document the cost of the foreign portion, as delivered to the project, shall be provided and the engineer's written approval obtained prior to placing the material in any work.

106.9.4 Buy America requirements include a step certification for all fabrication processes of all steel or iron materials that are accepted per Sec 1000. The AASHTO Product Evaluation and Audit Solutions compliance program verifies that all steel and iron products fabrication processes conform to 23 CFR 635.410 Buy America Requirements and is an acceptable standard per 23 CFR 635.410(d). AASHTO Product Evaluation and Audit Solutions compliant suppliers will not be required to submit step certification documentation with the shipment for some selected steel and iron materials. The AASHTO Product Evaluation and Audit Solutions compliant supplier shall maintain the step certification documentation on file and shall provide this documentation to the engineer upon request.

106.9.4.1 Items designated as Category 1 will consist of steel girders, piling, and reinforcing steel installed on site. Category 1 items require supporting documentation prior to incorporation into the project showing all steps of manufacturing, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements. This includes the Mill Test Report from the original producing steel mill and certifications documenting the manufacturing process for all subsequent fabrication, including coatings. The certification shall include language that certifies the following. That all steel and iron materials permanently incorporated in this project was procured and processed domestically and all manufacturing processes, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410.

106.9.4.2 Items designated as Category 2 will include all other steel or iron products not in Category 1 and permanently incorporated in the project. Category 2 items shall consist of, but not be limited to items such as fencing, guardrail, signing, lighting and signal supports. The prime contractor is required to submit a material of origin form certification prior to incorporation into the project from the fabricator for each item that the product is domestic. The Certificate of Materials Origin form ([link to certificate form](#)) from the fabricator must show all steps of manufacturing, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements and be signed by a fabricator representative. The engineer reserves the right to request additional information and documentation to verify that all Buy America requirements have been satisfied. These documents shall be submitted upon request by the engineer and retained for a period of 3 years after the last reimbursement of the material.

106.9.4.3 Any minor miscellaneous steel or iron items that are not included in the materials specifications shall be certified by the prime contractor as being procured domestically. Examples of these items would be bolts for sign posts, anchorage inserts, etc. The certification shall read "I certify that all steel and iron materials permanently incorporated in this project during all manufacturing processes, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements procured and processed domestically in accordance with CFR Title 23 Section 635.410 Buy America Requirements. Any foreign steel used was submitted and accepted under minor usage". The certification shall be signed by an authorized representative of the prime contractor.

106.9.5 When permitted in the contract, alternate bids may be submitted for foreign steel and iron products. The award of the contract when alternate bids are permitted will be based on the lowest total bid of the contract based on furnishing domestic steel or iron products or 125 percent of the lowest total bid based on furnishing foreign steel or iron products. If foreign steel or iron products are awarded the contract, domestic steel or iron products may be used; however, payment will be at the contract unit price for foreign steel or iron products.

106.9.6 Buy America Requirements for Construction Materials other than iron and steel materials. Construction materials means articles, materials, or supplies that consist of only one of the items listed. Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material. Upon request by the engineer, the contractor shall submit a domestic certification for all construction materials listed that are incorporated into the project.

- (a) Non-ferrous metals
- (b) Plastic and Polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables)
- (c) Glass (including optic glass)

- (d) Fiber optic cable (including drop cable)
- (e) Optical fiber
- (f) Lumber
- (g) Engineered wood
- (h) Drywall

106.9.6.1 Minimal Use allowance for Construction Materials other than iron or steel.

“The total value of the non-compliant products is no more than the lesser of \$1,000,000 or 5% of total applicable costs for the project.” The contractor shall submit to the engineer any non-domestic materials and their total material cost to the engineer. The contractor and the engineer will both track these totals to assure that the minimal usage allowance is not exceeded.

106.9.7 Buy America Requirements for Manufactured Products.

Manufactured products means:

- (a) Articles, materials, or supplies that have been:
 - (i) Processed into a specific form and shape; or
 - (ii) Combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.
- (b) If an item is classified as an iron or steel product, a construction material, or a section 70917(c) material under § 184.4(e) and the definitions set forth in this section, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under § 184.4(e) and paragraph (1) of this definition may include components that are construction materials, iron or steel products, or section 70917(c) materials.

106.9.7.1 Manufactured products are exempt from Buy America requirements. To qualify as a manufactured product, items that consist of two or more of the listed construction materials that have been combined together through a manufacturing process, and items that include at least one of the listed materials combined with a material that is not listed through a manufacturing process, should be treated as manufactured products, rather than as construction materials.

106.9.7.2 Manufactured items are covered under a general waiver to exclude them from Buy America Requirements. To qualify for the exemption the components must comprise of 55% of the value of materials in the item. The final assembly must also be performed domestically.

AA. Previous Job Order Information

1.0 Previous Job orders. Job order information, consisting of quantities and pay items that were issued for past contracts will be available from the Project Contact upon the bidder’s written request. This information does not constitute part of the bid or contract documents. It is provided for the bidder’s use during bid preparation, and shall not be considered a representation of actual job orders to be issued during construction for this contract. Furnishing this information does not relieve a bidder or contractor from the responsibility of estimating the number and types of job orders that will be issued for future contracts. The bidder or contractor shall assume the risk of error if the information is used for any purposes for which the information was not intended. The Commission makes no representation as to the accuracy or reliability of the information, since the information may not be representative of the sealed contract documents. Any assumption the bidder or contractor may make from this information is at the bidder or contractor’s risk; none are

intended by the Missouri Highways and Transportation Commission. The bidder or contractor assumes the sole risk of liability or loss if the bidder or contractor does rely on this information to its detriment, delay or loss.

BB. Railroad Requirements

1.0 The right of way of various Railroads, herein called "Railroad", are located within the limits of this project. However, this project has been developed with the specific intention that no involvement with the Railroad's facilities, traffic or right of way is required for the performance of the contractual work herein. The work to be performed over the Railroad's right of way shall not interfere with the Railroad's operations or facilities. Under these circumstances, the requirements of Sec 104.12.3, Sec 104.12.8 through 104.12.10.5 (inclusive), and Sec 107.13.4 shall not apply.

2.0 Should the contractor violate this condition of no railroad involvement, all terms and conditions of the interaction with the Railroad shall be solely between the Railroad and the contractor.

CC. Environmental Guidance for Job Order Contracting Projects

1.0 Description. This Job Special Provision provides notes on a variety of environmental protection measures required for various job order contracting activities. Please follow EPG guidance on recommended work practices, as well as the specific notes provided in this document. These notes apply throughout the entire state, except for the T&E Species Guidance – Cave Recharge Areas section, which applies to cave recharge areas in nine counties across southern Missouri (Greene, Jasper, Lawrence, Newton, Christian, Barry, Stone, Perry, and Taney Counties).

2.0 Restrictions. The following restrictions will ensure that MoDOT adheres to all environmental regulations as required by federal law.

2.1 Tree Clearing. Due to bat tree management requirements, no tree clearing is permitted for any activity, without prior coordination with MoDOT Environmental Section.

2.2 Work Near Water Bodies. Personnel shall plug all bridge drains, and implement any other measures necessary, to prevent any construction materials/debris or overspray/liquid from getting into the waterways. Work shall not be allowed below the ordinary high water elevation of any stream or lake. No work will be allowed in any wetlands. Personnel shall not drive or place any equipment in any waterway. Coordination with the Design - Environmental Section, and permitting and consultation with regulatory agencies, is required prior to any proposed activity below ordinary high water elevation or within a wetland.

3.0 Basis of Payment. No direct pay shall be provided for any labor, equipment, time, or materials necessary to complete this work. The contractor shall have no claim, or basis for any claim or suit whatsoever, resulting from compliance with this provision.

DD. Restrictions for Migratory Birds

1.0 Description. Swallows or other bird species protected by the Migratory Bird Treaty Act may be nesting under the bridge or bridges that will be repaired under this contract.

2.0 Restrictions. To comply with the Migratory Bird Treaty Act, nests of protected species cannot be disturbed when active (eggs or young are present). Generally, nests are active between April 1 and July 31, but active nests can be present outside of these dates.

2.1 MoDOT to Maintain Prior to the Notice to Proceed. The bridge, or bridges, associated with the work for this contract have been evaluated and any inactive nests found have been removed by MoDOT staff. MoDOT staff will maintain the structures to be free of nests until the Notice to Proceed date. At the notice to proceed, the contractor shall be responsible to maintain the structures to be free of nests until the work on the applicable bridge, or bridges, is complete.

3.0 Avoidance Measures. The contractor shall not disturb active nests or destroy adults, eggs or young birds. In an effort to comply with the Migratory Bird Treaty Act, the contractor operations will be limited to the options established in the following sections.

3.1 Inactive or Partially Constructed Nests. If nests are present and MoDOT determines that the nests are inactive or partially constructed, the contractor may remove the nests provided that the colony's inactive or partially constructed nests are completely removed by March 15 and the contractor maintains a nest free condition until the bridge work is complete. Dry removal methods shall be used when practicable. If dry removal is not practicable, hydro cleaning may be used if approved by the Engineer and only if water is free of blasting grit, chemicals, or detergents, and applied using pressure less than 5,000 PSI. Clean water such as that from municipal water treatment plants or wells shall be used. Use of source water from Waters of the State (i.e., streams or lakes), is allowable, if the appropriate methods to prevent the possible spread of invasive aquatic species are implemented.

3.2 Water and Equipment Used for Hydro cleaning. Aquatic invasives such as zebra mussels and some algae species have infested several bodies of water in the United States and can be transported by vessels (barges, boats, tugs, tankers, etc.) and equipment (tanks, tubing, pumps, etc.) that have been used in areas that contain these invasive species. If equipment is not properly inspected and treated to prevent the spread of invasives, these species can be introduced into areas not currently known to have a population. These invasive species are detrimental to existing ecosystems and can outcompete native species. To assist in preventing the introduction and spread of aquatic invasive species through MoDOT projects in Missouri streams and lakes, the following precautions shall be followed.

3.2.1 Use of Water from Streams, Lakes or Ponds. Contractors shall not use water for nest removal from streams, lakes or ponds, unless they have implemented appropriate methods to prevent the possible spread of invasive aquatic species. Water sources from municipal water treatment plants or wells may be used without following these measures provided the equipment to be used has not previously contained waters from streams, lakes or ponds. If the equipment has previously contained waters from other streams or lakes, the following measures must be implemented prior to use.

3.2.1.1 Equipment Washing. Prior to the use or re-use of equipment following any use with water from streams, lakes or ponds, all equipment shall be washed and rinsed thoroughly with hard spray (power wash) and hot (minimum 120° F) water, for at least one minute.

3.2.1.2 Equipment Treating or Drying. Equipment shall be treated or dried in one of the following manners.

3.2.1.2.1 Equipment interior and/or other surfaces shall be treated with a 10% bleach solution to kill any aquatic nuisance species. This solution must also be run through all intake lines and

hoses, to sterilize interior components. When chlorine treatment is used, all chlorine runoff from equipment washing must be collected and properly treated and/or disposed of in accordance with Sec 806.

3.2.1.2.2 Equipment interior and/or other surfaces shall be treated with 140° F water for a minimum of 10 seconds contact on all surfaces. 140 ° F water must also be run through all intake lines and hoses, to purge any standing water.

3.2.1.2.3 Equipment shall be flushed of all non-municipal water, and dried thoroughly, in the sun before using in or transporting between streams and lakes. Dry times will depend on the season the equipment is being used. Equipment must dry a minimum of 7 days for June-September, 18 days for March-May; 18 days for October-November, and 30 days for December-February. The drying method should be reserved as a last resort option.

3.2.2 Prior to use of equipment, contractors shall provide the MoDOT inspector written documentation of the equipment's geographic origin (including the water body it was last used in), as well as defining the specified treatment method used to adequately ensure protection against invasive species. The written documentation will include a statement indicating the contractor is aware of these provisions and will also treat the equipment appropriately after completion of the project.

3.3 Active Nests. The contractor may work on the bridge if active nests are present, as long as the work does not impact or disturb the birds and/or nests. At a minimum, work shall not be performed within 10 feet of an active nest; however, the contractor is responsible for ensuring their activities do not impact the nests, eggs, or young.

4.0 Additional Responsibilities. If active bird nests remain after all reasonable avoidance measures have been taken, or if bird nests are observed during project construction, the contractor shall notify the Engineer and the Engineer shall contact the MoDOT Environmental Section (573-526-4778) to determine if there are other allowable options.

EE. Bat Roosting on Bridges

1.0 Description. Federally listed bat species are known to roost on some bridges.

1.1 Bridges included in this project have not been inspected by a qualified MoDOT biologist to determine if bats have roosted or are currently roosting on the structure.

1.2 If bats are observed roosting on the structure at any time during the project, the contractor shall notify the Engineer and the Engineer shall contact the MoDOT Environmental Section (573) 526-4778.

1.3 Bats shall not be disturbed in any manner. Work must stop and shall not commence until approved by the Engineer after consultation with a qualified MoDOT biologist.

2.0 Basis of Payment. No direct pay shall be provided for any labor, equipment, time, or materials necessary to complete this work. The contractor shall have no claim, or basis for any claim or suit whatsoever, resulting from compliance with this provision.

FF. Construction Requirements

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. Plans for the existing structure(s) will be available to the successful bidder as directed by the engineer.

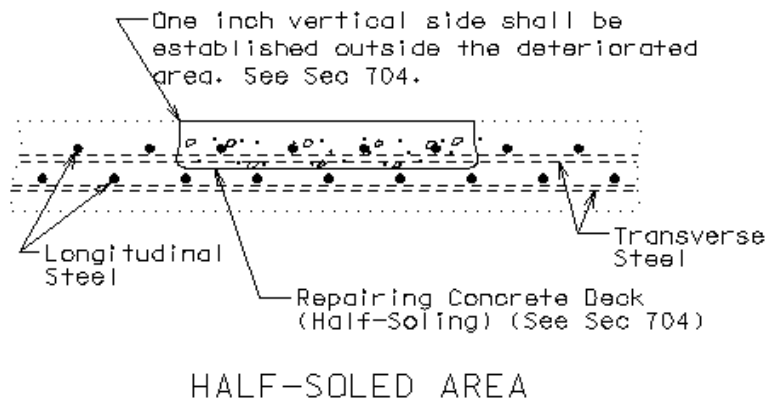
2.1 In order to assure the least traffic interference, the work shall be scheduled so that a lane closure is for the absolute minimum amount of time required to complete the work. A lane shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

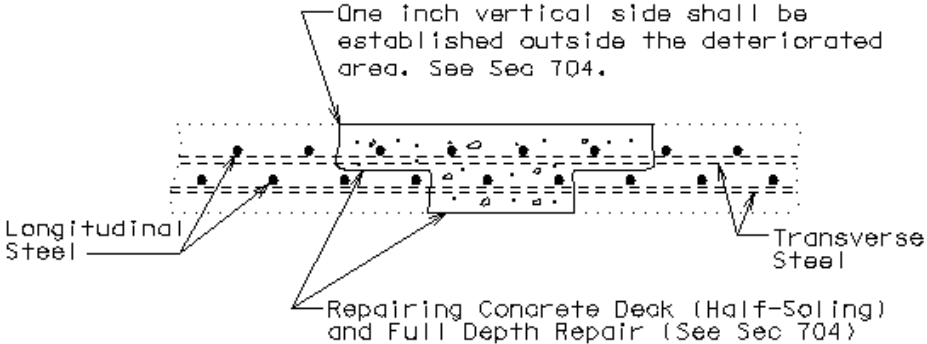
2.2 Provisions shall be made to prevent any debris and materials from falling into the stream, lake or onto the roadway. Any debris and materials that falls below the bridge outside the limits mentioned previously and if determined necessary by the engineer, the debris shall be removed as approved by the engineer at the contractor's expense. Traffic under the bridge shall be maintained in accordance with the contract documents.

2.3 Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

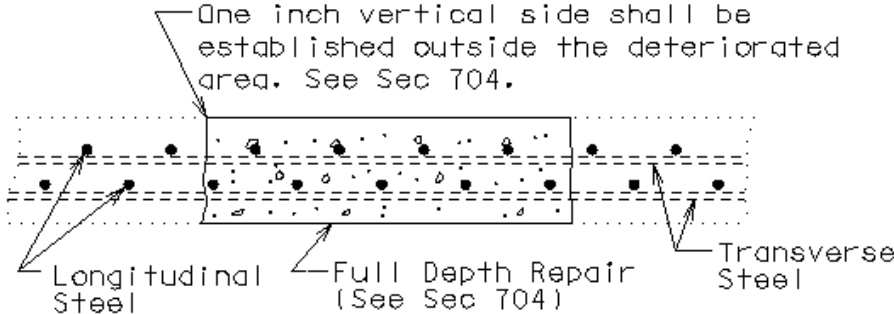
2.4 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

3.0 Bridge Deck Repairs.

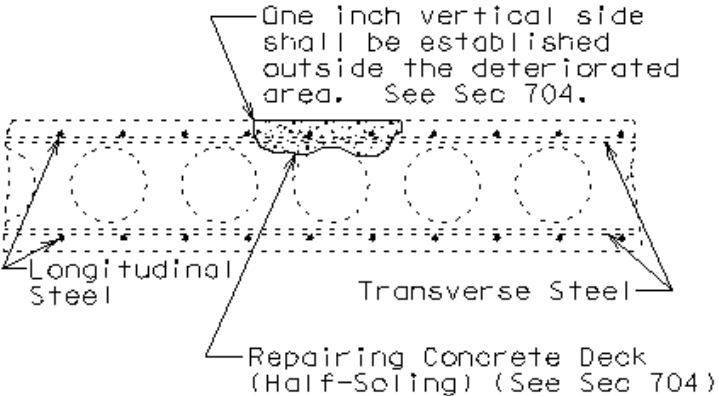




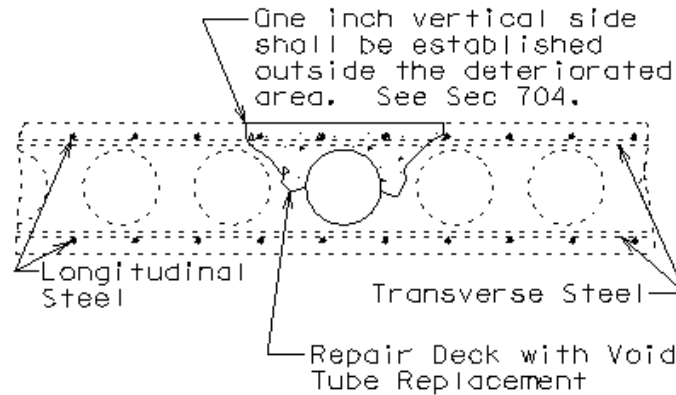
FULL DEPTH REPAIR
IN HALF-SOLED AREA



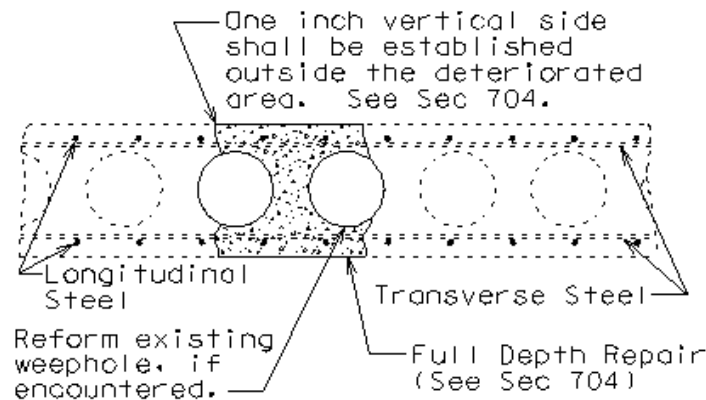
FULL DEPTH REPAIR



HALF-SOLED REPAIR



DECK REPAIR WITH VOID TUBE REPLACEMENT



FULL DEPTH REPAIR

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

GG. Concrete Masonry Repair

Delete paragraphs 704.4.1.6.2 and substitute the following:

704.4.1.6.2 Deck Repairs. The minimum depth of repair for repairing concrete deck (half-soling), approach slab repair or modified deck repair shall expose the upper layer of the top mat of reinforcing steel. All repair areas shall completely expose 100 percent of the reinforcing steel providing one inch (25 mm) clearance around all bars, regardless of observed bond or condition.

Delete paragraph 704.5.1 and substitute the following:

704.5.1 Repairing concrete deck (half-soling), approach slab repair, deck repair with void tube replacement, full depth repair, modified deck repair, superstructure repair (unformed) and substructure repair (formed and unformed) will be measured to the nearest square foot (0.1 m²).

Amend Sec 704 to include the following:

704.3.10 Approach Slab Repair. This work shall consist of partial removal and replacement of approach slab concrete in the required areas.

704.4.1.9 Zone Requirements. Bridges with steel girder superstructures like plate girders and I-beams or wide flange girders may have unlimited repair quantities per span unless otherwise shown on the plans or as designated by the engineer. Bridges with concrete superstructures like voided slabs, solid slabs, deck girders, rigid frame and box girders always have special repair zones.

704.4.1.9.1 Special Repair Zones. Any half-soling required in the areas designated as special repair zones shall be completed in alphabetical sequence. The contractor shall make a request to the engineer for the special repair zones areas before commencing work on bridges that always have special repair zones. Any repair in the remainder of the bridge that is adjacent to Zone A and not designated as a special repair zone shall be completed prior to work in Zone A. Removal and repair shall be completed in one special repair zone and concrete shall have attained a compressive strength of 3200 psi (22 MPa) before work can be started in the next special repair zone. Before placing concrete in areas adjacent to areas of subsequent repair, the concrete shall be separated with a material such as polyethylene sheets to aid in removal of old concrete.

704.4.1.9.2 Multiple Column Bents. Zones with the same letter designation may be repaired at the same time.

704.4.1.9.3 Single Column Bents. Zones with the same letter designation may be repaired at the same time except for the zones directly adjacent to the centerline of bent. If either of the zones adjacent to centerline of bent has a single repair area of over 10 square feet (0.9 m²) or a total repair area of over 20 square feet (1.9 m²), that zone shall be repaired before removing concrete in the other zone of the same designation at that bent.

704.4.1.9.4 Voided or Solid Slab Structures. If any single repair area does not exceed 4 square feet (0.35 m²) in size and the total repair within a special repair zone does not exceed 12 square feet (1.1 m²), the special repair zone requirement does not apply for that zone. An exposed void in the deck of a voided slab bridge shall be patched as approved by the engineer in a manner that shall maintain the void area completely free of concrete. Cost of patching an exposed void will be considered completely covered by the contract unit price of other items included in the contract.

704.4.1.9.5 Box and Deck Girder Structures. Total width of full depth repair shall not exceed 1/3 of the deck width at one time. For any area of deck repair that extends over a concrete girder and is more than 18 inches (460 mm) in length along the girder, the concrete removal shall stop at the centerline of girder and repair completed in this area. Prior to continuing work in this area, the concrete shall have attained a compressive strength of 3200 psi (22 MPa). No traffic shall be permitted over the girder that is undergoing repair. When the full depth repair extends over a diaphragm or girder and the deteriorated concrete extends into the diaphragm or girder, all deteriorated concrete shall be removed and replaced as full depth repair. Concrete in girders shall not be removed below the deck haunch of the girder without prior review and approval from the engineer.

704.4.1.9.6 Box Girder Structures. Interior falsework installed by the contractor resting on the bottom slab shall be removed where entry access is available. If any single repair area does not exceed 9 square feet (0.8 m²) in size and the total repair within a special repair zone does not exceed 27 square feet (2.5 m²), the special repair zone requirement does not apply for that zone. Half-soling repair in the special repair zone, on either side of the intermediate bents, shall be to a

depth that will not expose half the diameter of the longitudinal reinforcing bar. Full depth repair shall be made when removal of deteriorated concrete exposes half or more of the diameter of the longitudinal reinforcing bar.

HH. Rapid Set Concrete Patching Material – Vertical and Overhead Repairs JSP-02-01

1.0 Description. This specification covers cementitious concrete, polymer-modified concrete and polymer concrete that are suitable for repairing concrete surfaces on bridges or concrete structures, particularly under fast setting or special conditions. The repairs would involve vertical or overhead applications. The work shall consist of removing, furnishing, preparing, and placing materials at locations as shown on the plans or as directed by the engineer.

2.0 Material. All materials shall be in accordance with MoDOT specifications and as noted herein.

2.1 Aggregate For Extending Commercial Mixture. Coarse and fine aggregates shall be in accordance with [Sec 1005](#), except the requirements for gradation and percent passing the No. 200 sieve shall not apply. Coarse aggregate meeting Gradation E requirements shall be used for repairs greater than one inch (25 mm) in depth. Fine aggregate will be allowed for repairs less than one inch (25 mm). Aggregate specified, bagged, labeled and furnished by the rapid set concrete patching material manufacturer may also be used for mortar extension.

2.2 Material Applications. The contractor shall select and use the product most suitable for the work and field conditions in accordance with these specifications.

2.3 Curing. Rapid set concrete patching material shall be cured until the minimum compressive strength 1500 psi is attained using standard curing specifications, unless otherwise specified by the manufacturer.

2.4 Qualification and Project Acceptance.

2.4.1 Inspection. All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required to conduct inspection and sampling.

2.4.2 Qualification. Prior to use, rapid set concrete patching materials need to be qualified.

2.4.2.1 Requested Information. The manufacturer shall submit with samples of the materials, a written request to Construction and Materials with the following information:

- (a) New Products Evaluation Form
- (b) Brand name of the product.
- (c) Certification that the material meets this specification.
- (d) Certified test results from an independent laboratory showing compliance with this specification.
- (e) Specific preparation instructions of repair area.
- (f) Specific mixing, handling and curing instructions.
- (g) Application type (i.e., vertical or overhead).

2.4.2.2 Field Evaluation. Final approval will be granted when the following requirements are met:

- (a) MoDOT report documenting two years of field performance on MoDOT system. The report will contain the placement date, field observations (semiannual), description of field performance and photographs of in-place material.
- (b) A manufacturer's representative shall be present during placement of the material to provide technical expertise.

2.4.2.2.3 Disqualification. If during the two year observation period the repair area(s) fails the product will not be added to the qualified list.

2.5 Qualified List. The listing of qualified products are available from Construction and Materials or on MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed. The material will be subject to removal from the qualified list if there is evidence of unsatisfactory performance or a change in manufacturing process or formulation, or when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

2.6 Certification. The contractor shall supply a manufacturer's certification to the engineer for each lot of material furnished. The certification shall include the name of the manufacturer, a manufacturer certification statement that the material supplied is the same as that qualified and listing the date of qualification.

2.7 Acceptance. Acceptance of the material will be based on the use of a qualified product, the manufacturer's certification that the material supplied is the same as that approved and upon the results of such tests as may be performed by the engineer.

3.0 Mixture. Unless otherwise specified, rapid set concrete patching material shall be approved commercial mixtures meeting Sections 3.1 – 3.1.3. Rapid set concrete patching materials shall be specifically designed for the application needed.

3.1 Commercial Mixtures. Rapid set concrete patching material in its sacked form and mixtures when properly prepared in accordance with the manufacturer's specifications, shall meet the minimum test requirements given in Table 1. Mixtures may be supplied, as required, as a patching mortar or as a patching mortar with aggregate extension. If the material is to be supplied with extender aggregate, this shall also pass the required tests in Table 1 using the maximum allowed amount of extender aggregate.

3.1.1 Mixture Requirements. Rapid set concrete patching material shall be single packaged dry mix requiring the addition of water or other liquid component just prior to mixing. The material shall not contain soluble chlorides as an ingredient of manufacture. The material shall be placed in accordance to the manufacturer's recommendations.

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Bond Strength by Slant Shear	ASTM C882/C928 ²	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days	n/a	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Linear Coefficient of Thermal Expansion ¹ (for bagged mortar only, without extension aggregate)	ASTM C531	n/a	n/a	4 – 8 X 10 ⁻⁶ in/in/deg F
Resistance to Rapid Freezing & Thawing	AASHTO T161 or ASTM C666	80% min. using Procedure B ³ (300 Cycles)	80% min. using Procedure B ³ (300 Cycles)	n/a
Compressive Strength	AASHTO T22 or ASTM C39	1500 psi @ 3 hr & 3000 psi @ 24 hr	1500 psi @ 3 hr & 3000 psi @ 24 hr	n/a
Rapid Chloride Permeability	AASHTO T277 or ASTM C1202	1000 coulombs @ 28 days	1000 coulombs @ 28 days	1000 coulombs @ 28 days
Length Change	AASHTO T 160 or ASTM C157	In water Storage (+0.15) In air storage (-0.15)	In water storage (+0.15) In air storage (-0.15)	n/a
Color		gray	gray	gray

¹ Not required for extended mixtures if the mortar passes this requirement.

² ASTM C882 shall be performed on non-water based materials. ASTM C928 shall be performed on water-based materials.

³ Procedure A may be used in lieu of Procedure B

3.1.2 Construction Requirements. The manufacturer shall provide with the bagged mixture, specifications for the mixing procedure, amount and kind of liquid to be added, and the amount of aggregate extension allowed, if any. All mixing, handling and curing practices recommended by the manufacturer shall be followed and will be considered a part of these specifications.

3.1.3 Removal from Qualified List. All mixtures shall be approved before use. Reoccurring failures of any mixture for any reason will be cause for removal from the qualified list.

3.2 Vertical Repair.. A qualified rapid set concrete patching material approved for vertical use may be used when specified on the plans and as approved by the engineer. The engineer will make field cylinders to verify the 1500 psi (10 MPa) minimum strength. The material shall adhere to the concrete surface without sagging.

3.3 Overhead Repair. A qualified rapid set concrete patching material approved for overhead use may be used when specified on the plans and as approved by the engineer. The material shall be placeable in layers of at least 1 inch on overhead applications without the use of formwork or anchoring devices. The material shall adhere to the concrete surface without sagging. The engineer will make field cylinders to verify the 1500 psi (10 MPa) minimum strength.

4.0 Construction Requirements.

4.1 Mixing. Rapid set concrete patching material shall be mixed and finished according to the manufacturer's recommendation.

4.2 Preparation of Repair Area. Deteriorated, damaged or defective concrete as shown on the plans, required by the specifications or as directed by the engineer, shall be removed. All exposed reinforcement shall be thoroughly cleaned as shown on the plans, required by the specifications or as directed by the engineer. Unless otherwise specified by the commercial mixture manufacturer, the existing surface shall be damp and all free water shall be removed prior to placement of the required material.

4.3 Bonding Agent. A bonding agent may be used if recommended by the rapid set concrete patching material manufacturer.

5.0 Method of Measurement. No measurement will be made for rapid set concrete patching material.

6.0 Basis of Payment. Rapid set concrete patching material will be paid for at the contract unit price for other items and will be considered full compensation for all labor, equipment and material to complete the described work.

II. Rapid Set Concrete Patching Material – Horizontal Repairs JSP-02-10

1.0 Description. This specification covers cementitious concrete, polymer-modified concrete and polymer concrete that are suitable for repairing concrete surfaces on bridges or roadways, particularly under fast setting or special conditions. The repairs would involve horizontal applications. The work shall consist of removing, furnishing, preparing, and placing materials at locations as shown on the plans or as directed by the engineer.

2.0 Material. All materials shall be in accordance with MoDOT specifications and as noted herein.

2.1 Aggregate For Extending Commercial Mixture. Coarse and fine aggregates shall be in accordance with [Sec 1005](#), except the requirements for gradation and percent passing the No. 200 sieve shall not apply. Coarse aggregate meeting Gradation E requirements shall be used for repairs greater than one inch (25 mm) in depth. Fine aggregate will be allowed for repairs less than one inch (25 mm). Aggregate specified, bagged, labeled and furnished by the rapid set concrete patching material manufacturer may also be used for mortar extension.

2.2 Material Applications. The contractor shall select and use the product most suitable for the work and field conditions in accordance with these specifications.

2.3 Curing. Rapid set concrete patching material shall be cured until the minimum compressive strength 3200 psi is attained using standard curing specifications, unless otherwise specified by the manufacturer.

2.4 Qualification and Project Acceptance.

2.4.1 Inspection. All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required to conduct inspection and sampling.

2.4.2 Qualification. Prior to use, rapid set concrete patching material shall be qualified. In order to become qualified, a material shall have completed testing through AASHTO's National

Transportation Product Evaluation Program (NTPEP). The manufacturer shall contact the AASHTO/NTPEP coordinator to obtain the testing location for the rapid setting concrete patching material.

2.4.2.1 Requested Information. The manufacturer shall submit with samples of the materials, a written request to Construction and Materials with the following information:

- (a) Brand name of the product.
- (b) Certification that the material meets this specification.
- (c) NTPEP test results showing compliance with this special provision.
- (d) Specific mixing, handling and curing instructions.
- (e) Application type (i.e., bridge or roadway).

2.4.2.2 Qualified List. Upon approval by the engineer, the brand name and manufacturer will be placed on a qualified list of rapid set concrete patching materials. The listing of qualified materials is available from Construction and Materials or on MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed. The material will be subject to removal from the qualified list if there is evidence of unsatisfactory performance or a change in manufacturing process or formulation, or when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

2.4.3 Provisional Approval. Provisional approval may be granted provided the following requirements have been met:

- (c) New Products Evaluation Form
- (d) Certified test results from an independent laboratory showing compliance with this special provision.
- (e) Documentation prepared by MoDOT covering two years of field performance on MoDOT's system. MoDOT will need to approve the location of the test site. Documentation will contain the placement date, field observations (semi annual), description of field performance and photographs of in-place material.
- (f) During placement the manufacturer's representative shall be present on the project to provide technical expertise.

2.4.3.1 Disqualification. If during the two year observation period the repair area(s) fails provisional approval will not be granted. Repair area(s) experiencing any cracking, debonding or spalling will be considered a failure.

2.4.3.2 Length of Provisional Approval. Provisional approval will be granted for three years or until NTPEP testing is completed.

2.5 Certification. The contractor shall supply a manufacturer's certification to the engineer for each lot of material furnished. The certification shall include the name of the manufacturer, a

manufacturer certification statement that the material supplied is the same as that qualified and listing the date of qualification.

2.6 Acceptance. Acceptance of the material will be based on the use of a qualified or provisionally approved material, the manufacturer's certification that the material supplied is the same as that approved and upon the results of such tests as may be performed by the engineer.

3.0 Mixture. Unless otherwise specified, rapid set concrete patching material shall be approved commercial mixtures meeting [Sections 3.1 – 3.1.3](#) or deck repair cementitious mortar meeting [Section 3.2](#). Rapid set concrete patching materials shall be specifically designed for the application needed.

3.1 Commercial Mixtures. Rapid set concrete patching material in its sacked form and mixtures when properly prepared in accordance with the manufacturer's specifications, shall meet the minimum test requirements given in Table 1. Mixtures may be supplied, as required, as a patching mortar or as a patching mortar with aggregate extension. If the material is to be supplied with extender aggregate, this shall also pass the required tests in Table 1 using the maximum allowed amount of extender aggregate.

3.1.2 Mixture Requirements. Rapid set concrete patching material shall be single packaged dry mix requiring the addition of water or other liquid component just prior to mixing. The material shall be capable of ½ inch (13 mm) to full depth repair and require no bonding agent. The material shall not contain soluble chlorides as an ingredient of manufacture. The material shall be placed in accordance to the manufacturer's recommendations.

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Bond Strength by Slant Shear ¹	ASTM C882/C928 ³	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days	n/a	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days
Linear Coefficient of Thermal Expansion ^{1, 2} (for bagged mortar only, without extension aggregate)	ASTM C531	n/a	n/a	4 – 8 X 10-6 in/in/deg F
Resistance to Rapid Freezing & Thawing ¹	AASHTO T161 or ASTM C666	80% min. using Procedure B ⁵ (300 Cycles)	80% min. using Procedure B ⁵ (300 Cycles)	n/a
Compressive Strength ¹	AASHTO T22 or ASTM C39	3200 psi @ 3 hr & 4000 psi @ 7 days	3200 psi @ 3 hr & 4000 psi @ 7 days	n/a
Rapid Chloride Permeability ¹	AASHTO T277 or ASTM C1202	<u>Bridge Decks</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days	<u>Bridge Deck</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days	<u>Bridge Deck</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days

Length Change ^{1, 4}	AASHTO T 160 or ASTM C157	In water Storage (+0.15) In air storage (-0.15)	In water storage (+0.15) In air storage (-0.15)	n/a
Color		gray	gray	gray

¹The commercial mix test values can be located in the AASHTO's National Transportation Product Evaluation Program (NTPEP) reports for Laboratory Evaluations of Rapid Set Concrete Patching Materials. Data for provisionally approved materials is located at the Construction and Materials Division.

²Not required for extended mixtures if the mortar passes this requirement.

³ ASTM C882 shall be performed on non-water based materials. ASTM C928 shall be performed on water-based materials.

⁴ As modified by ASTM C928.

⁵ Procedure A may be used in lieu of Procedure B

3.1.2 Construction Requirements. The manufacturer shall provide with the bagged mixture, specifications for the mixing procedure, amount and kind of liquid to be added, and the amount of aggregate extension allowed, if any. All mixing, handling and curing practices recommended by the manufacturer shall be followed and will be considered a part of these specifications.

3.1.3 Removal from Qualified List. All mixtures shall be approved before use. Reoccurring failures of any mixture for any reason will be cause for removal from the qualified list.

3.2 Deck Repair Concrete. A qualified rapid set concrete patching material indicated for horizontal use and intended for patching concrete bridge decks may be used when specified on the plans and as approved by the engineer. If this option is selected, the contractor shall provide a trial mix to determine the total cure time needed to achieve a compressive strength of 3200 psi (22 MPa). Compressive specimens shall be prepared in accordance with current MoDOT test methods and cured to simulate actual field conditions. Testing of compressive specimens shall be performed by methods and at facilities acceptable to the engineer. The repaired deck shall not be opened to traffic until at least 4 hours after the last placement of deck repair concrete, the established cure time has elapsed and until such concrete has achieved a compressive strength of 3200 psi (22 MPa). A new trial mix may be required if the engineer determines the field conditions vary substantially from trial mix conditions. The engineer will make field cylinders to verify the 3200 psi (22 MPa) minimum strength.

4.0 Construction Requirements.

4.1 Mixing. Rapid set concrete patching material shall be mixed and finished according to the manufacturer's recommendation.

4.2 Preparation of Repair Area. Deteriorated, damaged or defective concrete as shown on the plans, required by the specifications or as directed by the engineer, shall be removed. All exposed reinforcement shall be thoroughly cleaned as shown on the plans, required by the specifications or as directed by the engineer. Unless otherwise specified by the commercial mixture manufacturer, the existing surface shall be damp and all free water shall be removed prior to placement of the required material.

4.3 Bonding Agent. A bonding agent may be used if recommended by the rapid set concrete patching material manufacturer.

5.0 Method of Measurement. No measurement will be made for rapid set concrete patching material.

6.0 Basis of Payment. Rapid set concrete patching material will be paid for at the contract unit price for other items and will be considered full compensation for all labor, equipment and material to complete the described work.

JJ. Dense Concrete Overlay Repair

1.0 Description. This work shall consist of repairing designated areas of bridge decks with an existing dense concrete overlay (low slump, latex modified, or silica fume concrete). All work shall be in accordance with Sec 704 and the job special provision "Concrete Masonry Repair" except as herein modified.

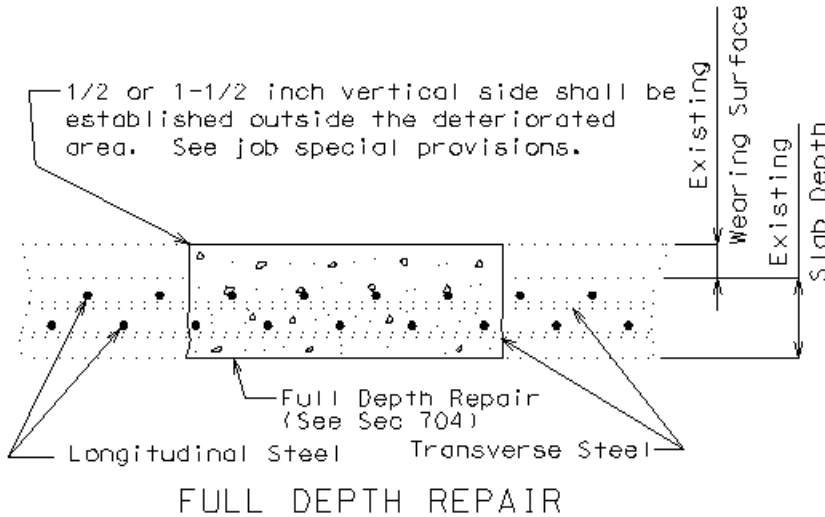
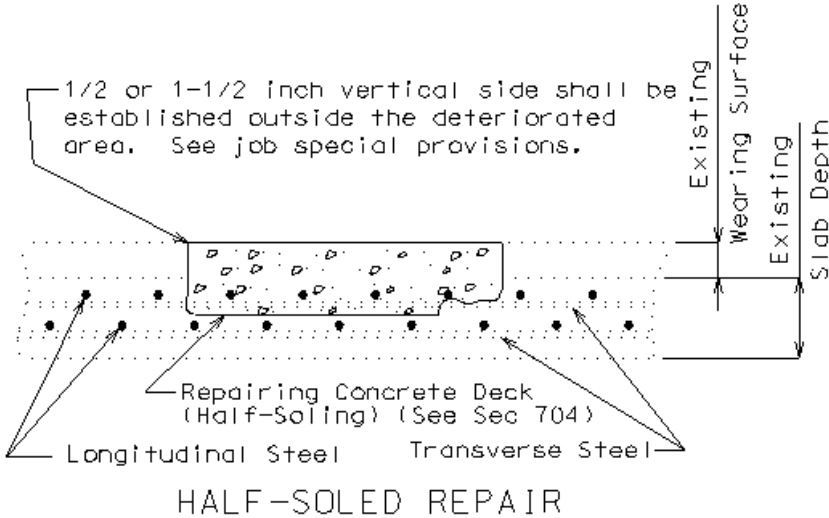
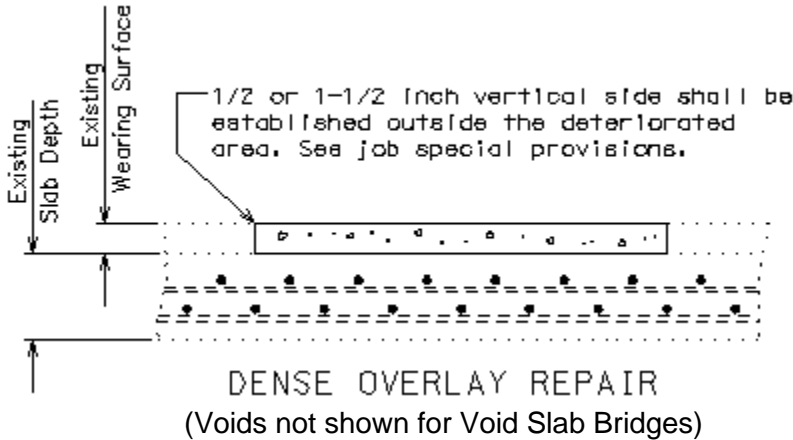
2.0 Construction Requirements.

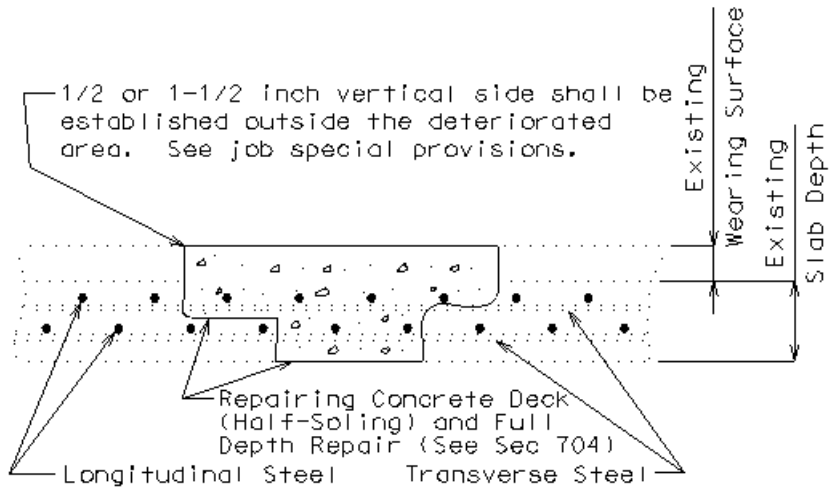
2.1 Bridges without Cathodic Protection Systems. A boundary perimeter with vertical sides shall be established outside the delaminated and deteriorated dense concrete overlay repair areas by saw cutting 1 ½ inch minimum in depth. The contractor shall use caution to not saw into the underlying bridge deck. The remaining overlay around the perimeter of the saw cut shall be chipped vertically and all overlay material within the perimeter removed. Upon removal of the deteriorated overlay, the engineer will sound the underlying bridge deck to determine areas of deteriorated concrete. The engineer may require removal of additional areas of dense overlay to determine the extent of deteriorated underlying bridge deck.

2.2 Bridges with Cathodic Protection Systems. Cathodic protection system shall be turned off before operations of repairing the dense overlay starts. A boundary perimeter with vertical sides shall be established outside the delaminated and deteriorated dense concrete overlay repair areas by saw cutting ½ inch minimum in depth and not cutting the cathodic protection system. The remaining overlay around the perimeter of the saw cut shall be chipped vertically and all overlay material within the perimeter removed. Upon removal of the deteriorated overlay, the engineer will sound the underlying bridge deck to determine areas of deteriorated concrete. The engineer may require removal of additional areas of dense overlay to determine the extent of deteriorated underlying bridge deck. The cathodic protection system shall be repaired before the concrete for the dense overlay is poured. Cathodic protection system shall be turned on after the dense overlay repair areas are opened to traffic.

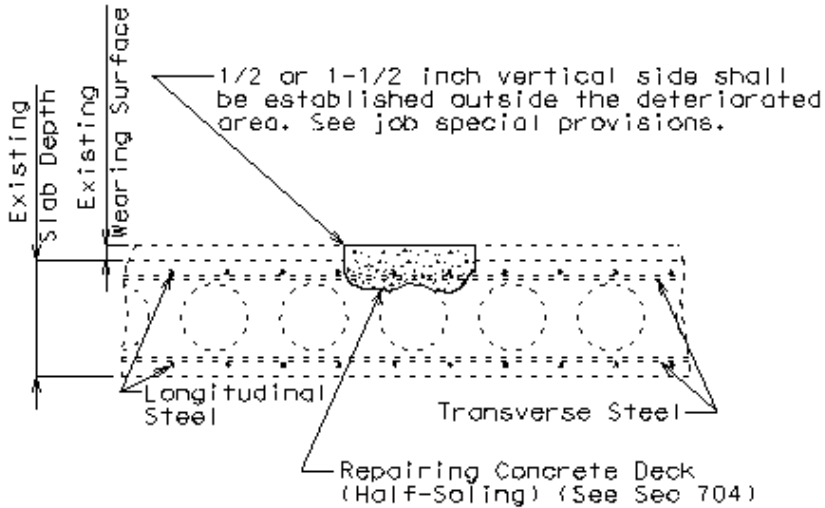
2.2 Dense overlay repairs shall be performed the same as deck repairs except no exposed reinforcing steel is required. Deck repairs shall be in accordance with Sec 704. Concrete to replace the dense overlay repair with or without deck repairs shall be the same as that required for the deck repairs. Concrete for the dense concrete overlay repairs with deck repairs shall be placed monolithically up to the top surface of the dense overlay. Finishing and curing the repair area shall be in accordance with Sec 704.

2.3 Dense Concrete Overlay Repair With or Without Underlying Bridge Deck Repair.

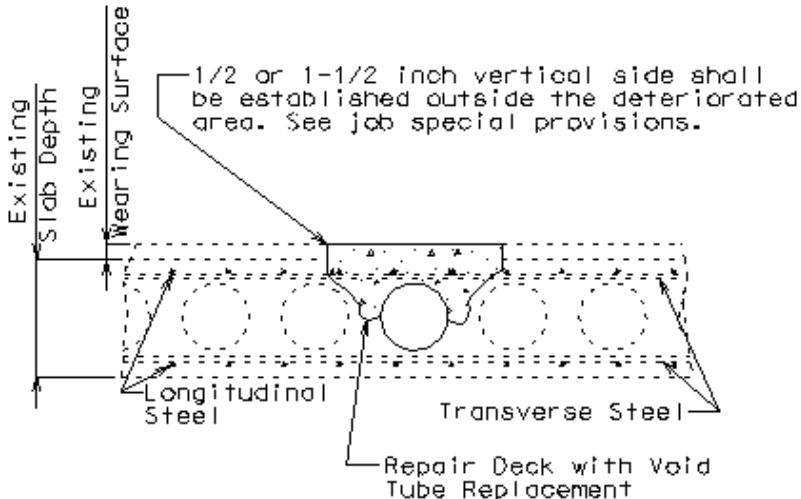




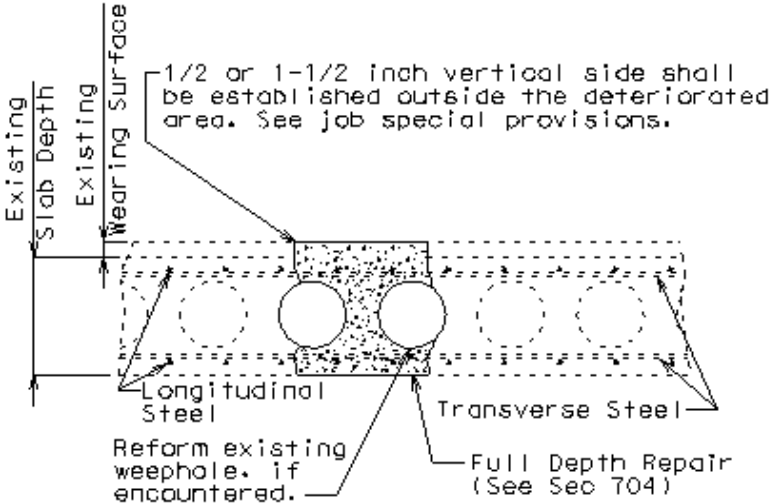
FULL DEPTH REPAIR
WITH HALF-SOLED REPAIR



HALF-SOLED REPAIR



DECK REPAIR WITH VOID
 TUBE REPLACEMENT



FULL DEPTH REPAIR

3.0 Method of Measurement. The depth of repair may vary but the contract unit price shall prevail regardless of the variation. No duplication of measurement will be made for full depth repair, repairing concrete deck (half-soling), deck repair with void tube replacement or dense concrete overlay repair. Areas of dense concrete overlay repair will be measured to the nearest square foot. Deck repairs will be measured and paid for in accordance with Sec 704.

4.0 Basis of Payment. The accepted quantity of dense concrete overlay repair will be paid for at the contract unit price for:

Item 704-99.04	Dense Concrete Overlay Repair	Square Foot
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KK. Asphalt Wearing Surface Repair

1.0 Description. This work shall consist of repairing designated areas of bridge deck with an existing asphaltic concrete. All work shall be in accordance with Sec 704 and the job special provision “Concrete Masonry Repair” except as herein modified.

2.0 Materials.

2.1 All material shall be in accordance with Division 1000, Materials Details, and specifically as follows:

Item	Section
Asphaltic Concrete	401.5.3
Tack Coat	407

2.2 Patching material for repairing asphaltic concrete overlays shall be an approved asphaltic concrete surface mix that meets or exceeds the requirements of Sec 401.5.3 and is sufficiently stable enough to withstand axle loads of interstate highway traffic.

3.0 Construction Requirements.

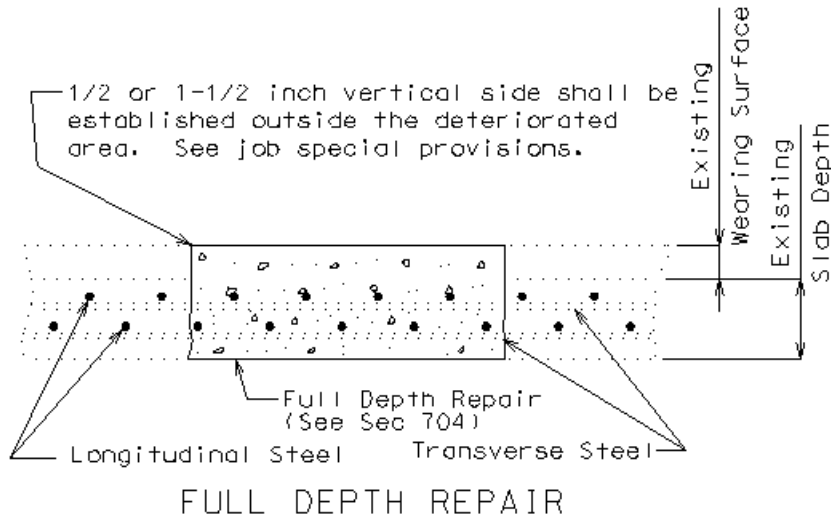
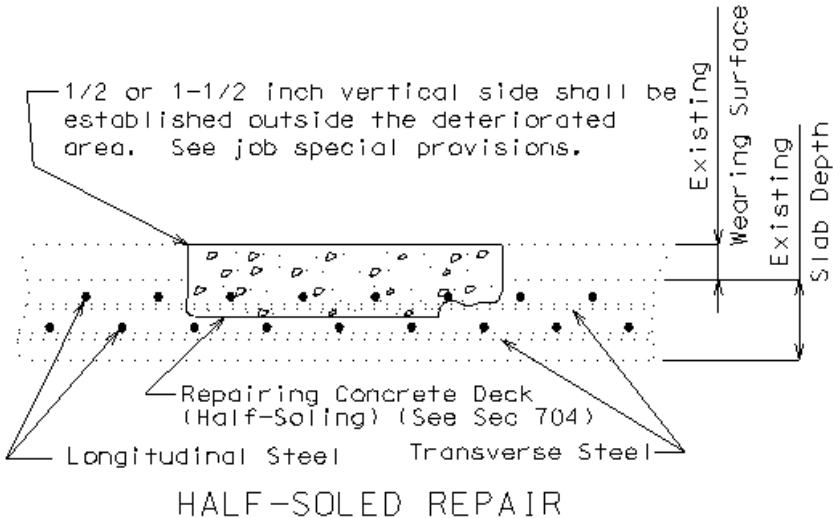
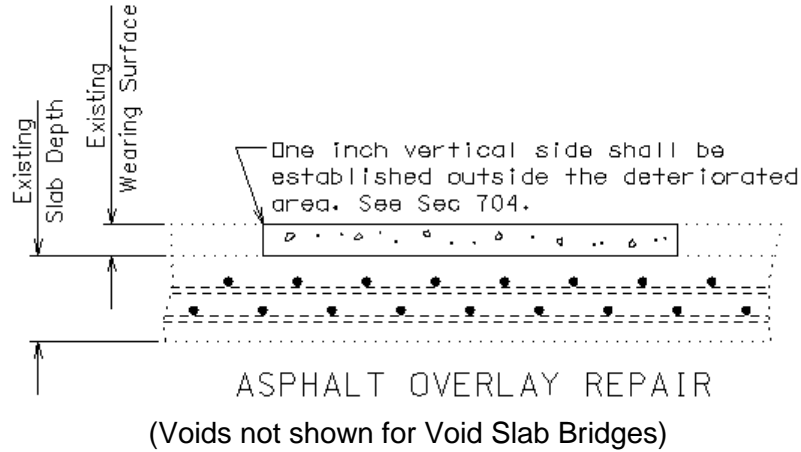
3.1 A boundary perimeter with vertical sides shall be established outside the delaminated and deteriorated asphalt overlay area by saw cutting. The contractor shall use caution to not saw into the underlying bridge deck. All overlay material within the perimeter shall be removed. The contractor may, with approval of the engineer, remove the asphalt wearing surface by cold milling so long as satisfactory results are obtained and there is minimal disturbance to the underlying bridge deck. Upon removal of the deteriorated overlay, the engineer will sound the underlying bridge deck to determine areas of deteriorated concrete. The engineer may require removal of additional areas of asphalt overlay to determine the extent of deteriorated underlying bridge deck.

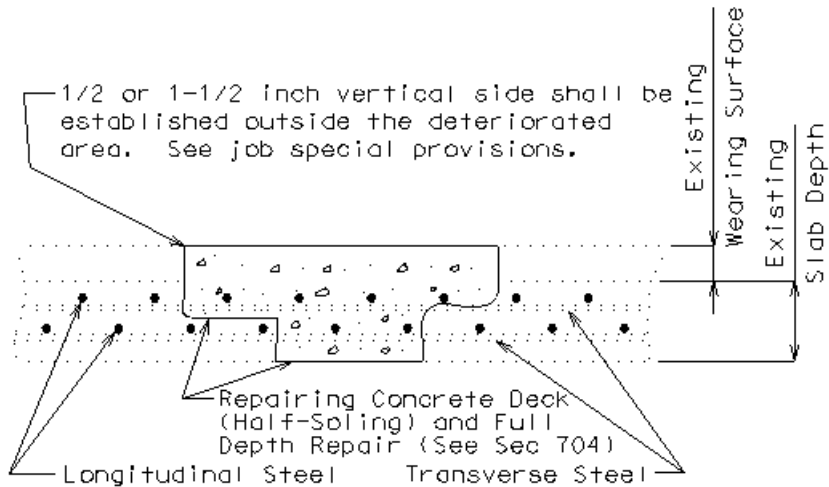
3.2 Deck repairs shall be in accordance with Sec 704. Concrete for the deck repairs shall be placed up to the top of the driving surface unless otherwise directed by the engineer. Finishing and curing the repair area shall be in accordance with Sec 704.

3.3 The asphalt overlay repair area shall be prepared for patching by uniformly applying tack coat to the bottom and sides of the repair area in accordance with Sec 407. Asphaltic concrete patching material shall be placed in the repair area and thoroughly compacted with a minimum 1 1/4 ton roller. The finished repair shall be smooth and level with the existing asphalt wearing surface. The lane shall not be opened to traffic until the patch has sufficiently cooled. All asphaltic concrete overlay repairs shall be complete before traffic is restored to the lane.

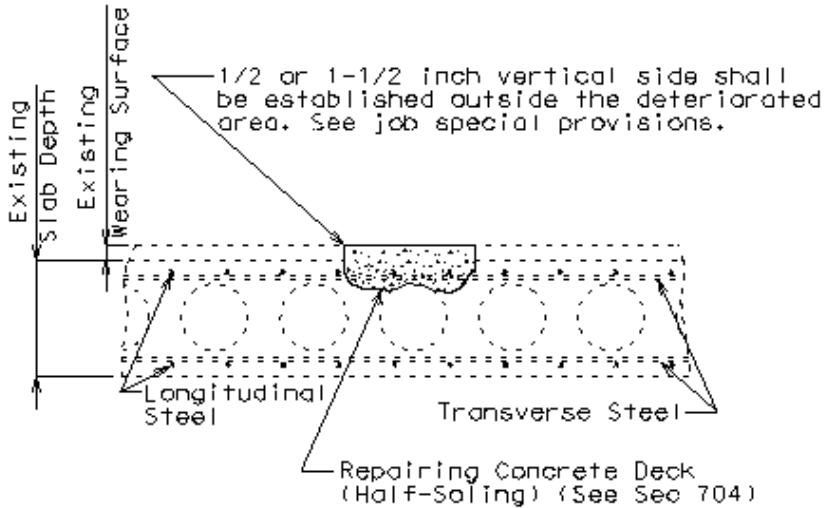
3.4 Before opening to traffic, the contractor shall seal all edges of the repaired area with a rapid setting polymer modified liquid asphalt emulsion. The sealed edges shall be coated with a black colored sand to prevent tracking and to blend in with the existing asphalt surface. There will be no direct payment for furnishing or placing the asphalt emulsion or sand.

3.5 Asphalt Overlay Repair With or Without Underlying Bridge Deck Repair. If an asphalt wearing surface has been placed on top of a dense concrete overlay, the dense concrete overlay and bridge deck repair shall be performed the same as shown in job special provision “Dense Concrete Overlay Repair”. If the dense concrete overlay needs repaired but the bridge deck does not require repair, the dense concrete overlay shall be repaired monolithically with the asphalt wearing surface.

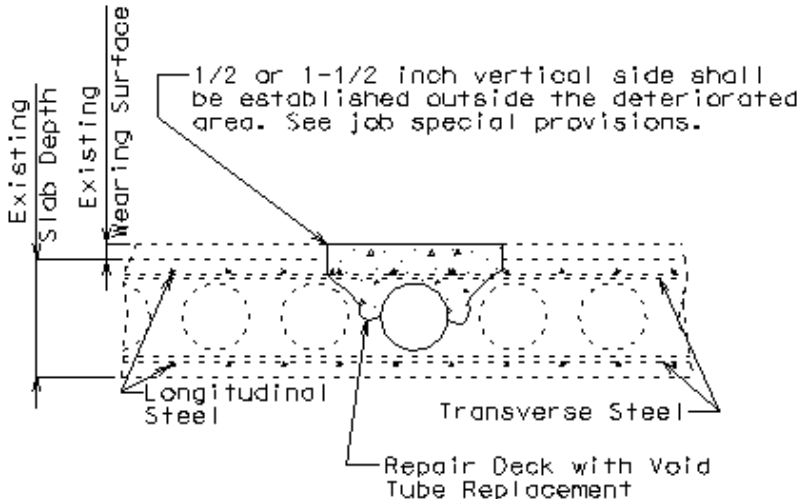




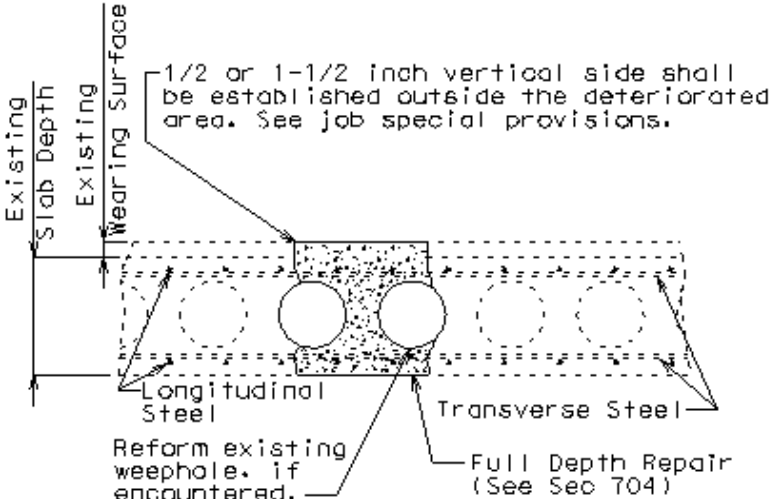
FULL DEPTH REPAIR
WITH HALF-SOLED REPAIR



HALF-SOLED REPAIR



DECK REPAIR WITH VOID
 TUBE REPLACEMENT



FULL DEPTH REPAIR

4.0 Method of Measurement. The depth of repair may vary but the contract unit price shall prevail regardless of the variation. No duplication of measurement will be made for full depth repair, repairing concrete deck (half-soling), deck repair with void tube replacement or asphaltic concrete overlay repair. Areas of asphaltic concrete overlay repair will be measured to the nearest square foot. Deck repairs will be measured and paid for in accordance with Sec 704.

5.0 Basis of Payment. Accepted quantity of asphaltic concrete overlay repair will be paid for at the contract unit price for:

Item 401-99.04	Asphaltic Concrete Overlay Repair	Square Feet
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LL. Concrete and Masonry Protection System

1.0 Description. This work shall consist of installing a protective coating that shall consist of a clear penetrating siloxane or silane based sealer. The surface preparation and application shall be in accordance with the manufacturer's recommendations.

2.0 Material. All material shall be in accordance with division 1000, materials division, specifically Sec 1059 protective coating material.

3.0 Construction Requirements. The preparation and application of the concrete and masonry protection system shall follow specification 711.3.3.

4.0 Method of Measurement. Final measurement will be made to the nearest square yard.

5.0 Basis of Payment. The accepted quantity of concrete and masonry protection system will be paid for at the contract unit price for:

Item No.	Unit	Description
711-99.05	Square Yard	Concrete and Masonry Protection System.

MM. Concrete Crack Filler - High Molecular Weight Methacrylate

1.0 Description. This work shall consist of preparing and treating Portland cement concrete bridge deck and bridge approach slab surfaces with a high molecular weight methacrylate crack filler meeting this specification.

2.0 Material. The material used shall be a low viscosity, non-fuming, and high molecular weight methacrylate resin in accordance with the following:

Property	Test Method	Requirement
Viscosity	Brookfield RVT 100 RPM @ 72°F (22°C)	25 cps maximum
Pot Life	Application life before curing begins [@ 68°F (20°C) air temperature]	15 minutes minimum
Curing Time	On site at 50°F (10°C)	6 hours Maximum

3.0 Construction Requirements.

3.1 Equipment. Application equipment shall be as recommended by the manufacturer. The spray equipment, tanks, hoses, brooms, rollers, coaters, squeegees, etc. shall be thoroughly clean, free of foreign matter, oil residue and water prior to applying the treatment.

3.2 Cleaning and Surface Preparation. Surfaces, which are to be treated, shall meet the approved product's requirements for surface condition. Sealing shall not be done until all concrete repairs and any corrective actions needed have been completed and cured. The contractor shall furnish the engineer with written instructions for surface preparation requirements and a representative of the manufacturer shall be present to assure that the surface condition meets the manufacturer's requirements.

3.2.1 Sealing shall be done after the bridge deck and bridge approach slabs have been textured.

3.2.2 At a minimum, the surface shall be thoroughly cleaned to remove dust, dirt, oil, wax, curing components, efflorescence, laitance, coatings and other foreign materials. The manufacturer or manufacturer's representative shall approve the use of chemicals and other cleaning compounds to facilitate the removal of these foreign materials before use. The treatment shall be applied within 48 hours following surface preparation.

3.2.3 Cleaning equipment shall be fitted with suitable traps, filters, drip pans and other devices to prevent oil and other foreign material from being deposited on the surface.

3.3 Test Application. Prior to final application, the contractor shall treat a measured test coverage area on horizontal and vertical surfaces of the different components of the structure to be treated for the purpose of demonstrating the desired physical and visual effect on an application or of obtaining a visual illustration of the absorption necessary to achieve the specified coverage rate. In the latter case, the applicator shall use at least ½ gallon (1.9 liter) of treatment following the manufacturer's recommended method of application for the total of the test surfaces. Horizontal test surfaces shall be located on the deck and on the curb or sidewalk, and vertical test surfaces shall be located on a parapet or safety barrier curb so that the different textures are displayed.

3.4 Application. The concrete treatment shall be applied to concrete surfaces as designated on the plans or per the manufacturer's specification. The penetrating sealer shall be applied by thoroughly saturating the concrete surfaces at an application rate specified by the manufacturer and as shown in the approved certified test data.

3.4.1 The concrete surface temperature shall be above 35°F (2°C).

3.4.2 The treatment shall be spread from puddles to dry areas.

3.4.3 If the applicator is unable to complete the entire application continuously, the location where the application was stopped shall be noted and clearly marked.

3.5 Protection of Adjoining Surfaces and the Public.

3.5.1 When applying a treatment, the contractor shall protect adjoining surfaces of the structure that are not to be sealed by masking off or by other means. The contractor shall also make provision to protect the public when treating the fascia of a bridge that spans an area used by the public.

3.5.2 Asphalt and mastic type surfaces shall be protected from spillage and heavy overspray. Joint sealants, traffic paints and asphalt overlays may be applied to the treated surfaces 48 hours after the treatment has been applied. Adjoining and nearby surfaces of aluminum or glass shall be covered where there is possibility of the treatment being deposited on the surfaces. Plants and vegetation shall be protected from overspray by covering with drop cloths. Precautions shall be followed as indicated on the manufacturer's material and safety data sheet.

3.6 Opening to Traffic. Traffic shall be allowed on a deck only after a treated area does not track.

4.0 Method of Measurement. Measurement will be made to the nearest square yard (m²) measured longitudinally from end of the bridge approach slab to end of the bridge approach slab and transversely from roadway face of curb to roadway face of curb extended to end of the approach slabs. No deduction will be made for gaps to avoid, raised pavement markers, manholes or other obstructions. Material placed on curb faces will not be measured. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for "Penetrating Sealers".

NN. Seal Coat for Bridge Decks Prior to Asphalt Overlay

1.0 Description. This work shall consist of placing bituminous material followed by placing cover aggregate on bridge decks. All work shall be in accordance with Sec 409 except as herein modified.

2.0 Material.

2.1 Bituminous material shall be polymer modified liquid asphalt emulsion in accordance with Sec 1015.

2.2 Cover aggregate shall be Grade A in accordance with Sec 1003, unless otherwise approved by the engineer.

3.0 Construction Requirements.

3.1 Bridge Deck Repairs. Bridge sealing shall not begin until bridge deck repair operations are complete and repaired areas have adequately cured. For bridge decks repaired using a qualified special mortar in accordance with Sec 704, the repaired areas shall have adequately cured in compliance with the patching material manufacturer's recommendations.

3.2 Seal Coat. Seal coat shall be applied, rolled and then shall be allowed to cure as recommended by the manufacturer. After curing, all loose aggregate shall be removed prior to opening to traffic. Any seal coat that is pulled up or damaged during the operation shall be repaired by the contractor at the contractor's expense.

4.0 Traffic Control. Delete Sec 409.6.2. Temporary striping with tape shall be incidental to the operation.

5.0 Basis of Payment. Payment for the above described work, including all materials, equipment, labor and any other incidental work necessary to complete this work, will be considered completely covered by the contract unit price. The accepted quantity of seal coat and any temporary striping will be paid for at the contract unit price for:

Item 409-40.00	Seal Coat, Grade A	Square Yard
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OO. Removal of Existing Expansion Joint Silicone Sealant or Compression Seal

1.0 Description. This work shall consist of removing and disposing of existing expansion joints compression seals or silicone sealant as directed by the engineer.

2.0 Removal Requirements. The existing compression seal or silicone sealant shall be cleanly removed and disposed of in accordance with Sec 202.

3.0 Method of Measurement. Final measurement of removal of existing expansion joint compression seal or silicone sealant will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Removal of the existing expansion joint compression seal and silicone sealant will be measured to the nearest linear foot based on measurement from roadway face of curb to roadway face of curb along centerline of the existing joint. Portions of the joint extending past the roadway face of curbs will not be measured for payment.

4.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item, will be based on the Job Order quantities and will be considered completely covered by the contract unit price for "Removal of Existing Expansion Joint Silicone Sealant" or "Removal of Existing Expansion Joint Compression Seal". Any change in the job order quantities, based on approved change orders, will be paid for at the contract unit price.

PP. Epoxy Polymer Concrete Resurfacing Over and Near Streams and Wetlands

1.0 Description. In general, because of the process for epoxy polymer application, that being the use of an epoxy spray for adhesion or fluid epoxy polymer mix, care must be taken to avoid overspray or runoff that will enter bodies of water. For use on bridges, all drains must be adequately blocked until the mixture is set up permanently. This includes the cleanup process for loose material/aggregate. No spray, runoff, or materials shall be allowed to enter the drains or the stream or wetland.

QQ. Removal Of Bridge Debris

1.0 Description. Environmental surveys of the Missouri and Mississippi Rivers for pallid sturgeon and Meramec River for mussels and endangered fish species were not conducted at the project location because debris is not anticipated to fall into the water. If debris including, but not limited to, sand from sandblasting, water from hydroblasting, paint chips, runoff from painting/sealing processes, etc. falls into the water, the project will be required to shut down while biologists determine if there are any threatened or endangered species at the site and while MoDOT's environmental section reassesses impacts to those species.

1.1 The contractor shall make provisions to prevent debris and materials from falling below the bridges. If this does occur and if deemed necessary by the engineer, it shall be removed as directed by the engineer at the contractor's expense.

1.2 The contractor shall prevent any debris and materials from falling into the river, stream, lake, or wetland below the bridges.

1.3 Any damage sustained by the remaining structures as a result of the contractor's operations shall be repaired or the material replaced as determined by the engineer at the contractor's expense.

1.4 If the contractor's operation requires work below the deck, directly above the river, stream, lake or wetland below the bridge, the contractor shall notify the engineer who will then contact MoDOT's Environmental Section for further review.

2.0 Basis of Payment. No direct payment will be made for any expense incurred by the contractor by reason of compliance with the specific requirements of the provision, including any delay, inconvenience, or extra work except for those items for which payment is included in the contract.

RR. Preformed Silicone or EPDM Expansion Joint Seal

1.0 Description. This work shall consist of furnishing and installing the preformed silicone or EPDM expansion joint seal for joints as shown on the plans or as directed by the engineer.

2.0 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows. All necessary components, materials and equipment required for the installation shall be obtained through an approved supplier. All components of each respective joint system shall come from the same manufacturer and cannot be substitutes for others.

2.1 Joint Seal.

2.1.1 The gland material shall meet or exceed the following physical requirements:

Joint Seal		
Property	Specification	Requirement
Durometer (Shore A)	ASTM D 2240	55 ±5 min.
Tensile Strength	ASTM D 412	550 psi min.
Elongation	ASTM D 412	350% min.
Tear Strength (Die B)	ASTM D 624	100 ppi min.
Compression Set At 350° F 22 hrs	ASTM D 395	30% max.
Operating Temperature Range		-60° F to 350° F
Specific Gravity		1.51 ±0.10

2.1.2 The joint seal shall be pre-qualified by undergoing and passing a cyclic loading test. Any rips, tears or bond failure will be cause for rejection. Manufacturer shall provide documentation to verify testing meetings these minimum requirements.

Cyclic Loading Test	
Property	Requirement
Test Sample Length	2 feet min.
Joint Skew	45°
Number of Cycles	200 min.
Joint Opening	2 inches
Movement	±1 inch
Temperature	-20° F

2.2 Epoxy Primer. Epoxy primer shall be as specified by the manufacturer to insure the appropriate bond of the joint sealing system and shall meet the following physical requirements:

Epoxy Primer		
Property	Specification	Requirement
Viscosity (centipoises)	ASTM D 2196	44
Solids	ASTM D 4209	41
Specific Gravity	ASTM D 1217	0.92
Flashpoint	ASTM D 56	48
VOC	ASTM D 3960	520

2.3 Locking Adhesive. The adhesive material shall cure quickly and shall be as recommended by the manufacturer. The material shall adhere to concrete, elastomeric concrete, polymer concrete and steel and shall meet the following physical requirements:

Locking Adhesive		
Property	Specification	Requirement
Sag/Flow	ASTM C 639	3/16 inch max.
Hardness	ASTM C 661	20-30
Tack Free Time	ASTM C 679	30 minute max.
Cure Through To ¼ inch thickness	At 75°F/50% Relative Humidity	24 hours max.
Skin over time (Tooling Time)	At 75°F/50% Relative Humidity	5 minute max.
Resistance to U.V.	ASTM C 793	No cracking, Ozone Chalking or Degradation
Tensile Strength	ASTM D 412	200 psi min.
Elongation	ASTM D 412	450% min.

2.4 Certification. The contractor shall furnish a manufacturer's certification for all material specified in this job special provision. The certification shall show representative test results of the material and certify that the material supplied is in accordance with this job special provision.

3.0 Construction Requirements. The contractor shall furnish to the engineer the manufacturer's written product information, installation procedures and instructional information at least two weeks prior to installation. The contractor shall obtain the services of a qualified technical representative approved by the manufacturer of the expansion joint seal and acceptable to the engineer, to assist during the installation. The contractor, the technical representative and

the engineer shall meet to review and clarify installation procedures and requirements prior to starting the work. The start of surface preparations and seal installation shall not occur without the technical representative being present. The technical representative shall be present for at least one day at the start of surface preparations and seal installation.

3.1 Surface Preparation. The concrete or steel surface shall be prepared for priming and seal placement. New Portland cement concrete shall be fully cured and allowed to dry a minimum of seven days. The joint shall be cleaned of all gravel, loose material and other contaminants before sand blasting. Areas that will be in contact with the sealant shall be sand blasted with a clean, hard aggregate that will leave little to no dust residue. Sand blasted concrete surfaces will be considered acceptable when areas that will be in contact with the sealant have a roughened surface with clean, exposed aggregate. The surface shall be free of foreign matter or plastic residue. Sand blasted steel surfaces will be considered acceptable when the steel surfaces have been cleaned to an SSPC-SP10 degree of cleanliness. After sand blasting is completed, the joint shall be cleaned of debris using oil-free and water-free compressed air or a vacuum, either being at least 90 psi. Using a rag saturated in denatured alcohol, wipe clean both vertical faces of the expansion joint opening.

3.2 Priming. Priming shall immediately follow sand blasting and cleaning and will only be permitted to proceed when the air and substrate temperatures are at least 40° F and rising. Sand blasting, priming and installing the seal shall be performed on the same day. The entire sand blasted surface shall be primed. Application and drying times for primers shall be in accordance with the manufacturer's recommendations. All leftover primer shall be properly disposed.

3.3 Installation. The preformed silicone or EPDM expansion joint seal shall be installed in joints in one continuous piece without field splices. The locking adhesive and seal shall be applied in accordance with the manufacturer's recommendations, in a manner that prevents the seal from being damaged and from being in tension. Twisting, curling and nicking the seal will be prohibited. Unless the installation tool is capable of installing the seal without elongation prior to placement, the seal shall be pre-cut to the exact length for the joint plus ends as shown in the contract documents or as directed by the engineer. The pre-cut seal shall be installed and measured for stretch. The seal shall be removed and reinstalled if the seal stretch length exceeds five percent of the pre-cut length at the contractor's expense.

4.0 Method of Measurement. The preformed silicone or EPDM expansion joint seal will be measured to the nearest linear foot based on measurement from the roadway face of curb to roadway face of curb along the centerline of the joint. Final measurement will not be made except for authorized changes during construction, or if appreciable errors are found in the contract quantity. Portions of the joint that extend past the roadway face of curbs will not be measured for payment.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor, technical assistance and any other incidental work necessary to complete this item, will be based on the contract plan quantities and will be considered completely covered by the contract unit price for "Preformed Silicone or EPDM Expansion Joint Seal". Any change in the contract plan quantities, based on approved change orders, will be paid for at the contract unit price.

SS. Epoxy Polymer Concrete Overlay Repair

1.0 Description. This work shall consist of repairing designated areas of bridge decks with an existing epoxy polymer concrete overlay. All work shall be in accordance with Sec 623, Sec 704

and the job special provisions "Concrete Masonry Repair" except as herein modified.

2.0 Construction Requirements.

2.1 Epoxy Polymer Overlay Thickness. The total thickness of the overlay repair will vary and shall match the existing overlay thickness but shall not be greater than ½ inch.

2.2 Concrete Deck.

2.2.1 A boundary perimeter with vertical sides shall be established outside the delaminated and deteriorated epoxy polymer concrete overlay repair areas by saw cutting. The contractor shall use caution to not saw into the underlying bridge deck. All overlay material within the perimeter shall be removed. Upon removal of the deteriorated overlay, the engineer will sound the underlying bridge deck to determine areas of deteriorated concrete. The engineer may require removal of additional areas of epoxy polymer overlay to determine the extent of deteriorated underlying bridge deck.

2.2.2 Deck repairs shall be in accordance with Sec 704. Concrete for the deck repairs shall be placed up to the top surface of the original deck unless otherwise directed by the engineer.

2.2.3 Epoxy polymer concrete overlay shall be installed in accordance with Sec 623.

3.0 Method of Measurement. The thickness of repair may vary but the contract unit price shall prevail regardless, unless the total thickness is greater than ½ inch. Areas of epoxy polymer concrete overlay repair will be measured to the nearest square foot (0.1 m²) and be tabulated separately for repairs on concrete deck. Deck repairs will be measured and paid for separately in accordance with Sec 704.

4.0 Basis of Payment. The accepted quantity of epoxy polymer concrete overlay repair, concrete deck, will be paid for at the contract unit price for:

Item 704-99.04 Epoxy Polymer Overlay Repair, Concrete Deck Square Foot

TT. Cleaning and Epoxy Coating

1.0 Description. In order to protect the bridge superstructure concrete from deicing chemicals and other contaminants, all loose and delaminated concrete shall be removed, and a protective epoxy coating shall be applied to the concrete in the area of curb outlets and the vertical face of the curbs as shown in the bridge plans and per this job special provision.

2.0 Construction Requirements. The areas to be cleaned and epoxy coated shall be as follows:

- (a) Deck surface and vertical faces inside the curb outlets.
- (b) Outside edge of the deck to 12 inches on each side of the curb outlets.
- (c) Superstructure concrete area directly below the curb outlets from the edge of the deck to the edge of the top flange of the girder and to 12 inches on each side of the curb outlets.
- (d) Vertical face of the curbs for the entire length of the bridge.

2.1. Cleaning shall include removal of all loose and delaminated concrete with hand tools to the satisfaction of the engineer. Hand tools may include chipping chisels, wire brushes, dust brushes, etc. After cleaning, an epoxy coating meeting the requirements of Sec 1059.20 shall be applied in accordance with Sec 711.3.2 and the manufacturer's recommendations.

3.0 Method of Measurement. No measurement will be made for cleaning and epoxy coating except for authorized changes during construction or where appreciable errors are found in the plan quantity. When required, measurement will be made to the nearest square foot.

4.0 Basis of Payment. Payment for Cleaning and Epoxy Coating includes all material, equipment, labor and any other incidentals necessary to complete this work.

UU. Restrictions for Migratory Birds NJSP-16-06A

1.0 Description. Swallows or other bird species protected by the Migratory Bird Treaty Act may be nesting under the bridge or bridges that will be repaired under this contract.

2.0 Restrictions. To comply with the Migratory Bird Treaty Act, nests of protected species cannot be disturbed when active (eggs or young are present). Generally, nests are active between April 1 and July 31, but active nests can be present outside of these dates.

[DRAFTERS NOTE: Section 2.1 is deleted if MoDOT staff is not maintaining the structure free of nests prior to the Notice to Proceed]

2.1 MoDOT to Maintain Prior to the Notice to Proceed. The bridge, or bridges, associated with the work for this contract have been evaluated and any inactive nests found have been removed by MoDOT staff. MoDOT staff will maintain the structures to be free of nests until the Notice to Proceed date. At the notice to proceed, the contractor shall be responsible to maintain the structures to be free of nests until the work on the applicable bridge, or bridges, is complete.

3.0 Avoidance Measures. The contractor shall not disturb active nests or destroy adults, eggs or young birds. In an effort to comply with the Migratory Bird Treaty Act, the contractor operations will be limited to the options established in the following sections.

3.1 Inactive or Partially Constructed Nests. If nests are present and MoDOT determines that the nests are inactive or partially constructed, the contractor may remove the nests provided that the colony's inactive or partially constructed nests are completely removed by March 15 and the contractor maintains a nest free condition until the bridge work is complete. Dry removal methods shall be used when practicable. If dry removal is not practicable, hydro cleaning may be used if approved by the Engineer and only if water is free of blasting grit, chemicals, or detergents, and applied using pressure less than 5,000 PSI. Clean water such as that from municipal water treatment plants or wells shall be used. Use of source water from Waters of the State (i.e., streams or lakes), is allowable, if the appropriate methods to prevent the possible spread of invasive aquatic species are implemented.

3.2 Water and Equipment Used for Hydro cleaning. Aquatic invasives such as zebra mussels and some algae species have infested several bodies of water in the United States and can be transported by vessels (barges, boats, tugs, tankers, etc.) and equipment (tanks, tubing, pumps, etc.) that have been used in areas that contain these invasive species. If equipment is not properly inspected and treated to prevent the spread of invasives, these species can be introduced into areas not currently known to have a population. These invasive species are

detrimental to existing ecosystems and can outcompete native species. To assist in preventing the introduction and spread of aquatic invasive species through MoDOT projects in Missouri streams and lakes, the following precautions shall be followed.

3.2.1 Use of Water from Streams, Lakes or Ponds. Contractors shall not use water for nest removal from streams, lakes or ponds, unless they have implemented appropriate methods to prevent the possible spread of invasive aquatic species. Water sources from municipal water treatment plants or wells may be used without following these measures provided the equipment to be used has not previously contained waters from streams, lakes or ponds. If the equipment has previously contained waters from other streams or lakes, the following measures must be implemented prior to use.

3.2.1.1 Equipment Washing. Prior to the use or re-use of equipment following any use with water from streams, lakes or ponds, all equipment shall be washed and rinsed thoroughly with hard spray (power wash) and hot (minimum 120° F) water, for at least one minute.

3.2.1.2 Equipment Treating or Drying. Equipment shall be treated or dried in one of the following manners.

3.2.1.2.1 Equipment interior and/or other surfaces shall be treated with a 10% bleach solution to kill any aquatic nuisance species. This solution must also be run through all intake lines and hoses, to sterilize interior components. When chlorine treatment is used, all chlorine runoff from equipment washing must be collected and properly treated and/or disposed of in accordance with Sec 806.

3.2.1.2.2 Equipment interior and/or other surfaces shall be treated with 140° F water for a minimum of 10 seconds contact on all surfaces. 140 ° F water must also be run through all intake lines and hoses, to purge any standing water.

3.2.1.2.3 Equipment shall be flushed of all non-municipal water, and dried thoroughly, in the sun before using in or transporting between streams and lakes. Dry times will depend on the season the equipment is being used. Equipment must dry a minimum of 7 days for June-September, 18 days for March-May; 18 days for October-November, and 30 days for December-February. The drying method should be reserved as a last resort option.

3.2.2 Prior to use of equipment, contractors shall provide the MoDOT inspector written documentation of the equipment's geographic origin (including the water body it was last used in), as well as defining the specified treatment method used to adequately ensure protection against invasive species. The written documentation will include a statement indicating the contractor is aware of these provisions and will also treat the equipment appropriately after completion of the project.

3.3 Active Nests. The contractor may work on the bridge if active nests are present, as long as the work does not impact or disturb the birds and/or nests. At a minimum, work shall not be performed within 10 feet of an active nest; however, the contractor is responsible for ensuring their activities do not impact the nests, eggs, or young.

4.0 Additional Responsibilities. If active bird nests remain after all reasonable avoidance measures have been taken, or if bird nests are observed during project construction, the contractor shall notify the Resident Engineer and contact the MoDOT Environmental Section (573-526-4778) to determine if there are other allowable options.

VV. Sensitive Streams or Waterbodies Near Project Area

1.0 Description. The project crosses, or is in the vicinity of, a sensitive stream or watershed. Waterbodies within and near the project area may serve as habitat for federal and state listed sensitive species. To avoid any negative impacts to these species and their habitats, water quality shall be protected from construction impacts.

1.1 The contractor shall prevent any debris and materials from construction activities from entering streams and other waterbodies. If debris or materials do enter waterbodies, and if deemed necessary by the engineer or MoDOT's environmental personnel, it shall be removed as directed by the engineer at the contractor's expense.

2.0 Basis of Payment. No direct payment will be made for any expense incurred by the contractor by reason of compliance with the specific requirements of the provision, including any delay, inconvenience, or extra work except for those items for which payment is included in the contract.

WW. Environmental Guidance for Job Order Contracting Projects

1.0 Description. This Job Special Provision provides notes on a variety of environmental protection measures required for various job order contracting activities. Please follow EPG guidance on recommended work practices, as well as the specific notes provided in this document. These notes apply throughout the entire state, except for the T&E Species Guidance – Cave Recharge Areas section, which applies to cave recharge areas in nine counties across southern Missouri (Greene, Jasper, Lawrence, Newton, Christian, Barry, Stone, Perry, and Taney Counties).

2.0 Restrictions. The following restrictions will ensure that MoDOT adheres to all environmental regulations as required by federal law.

2.1 Tree Clearing. Due to bat tree management requirements, no tree clearing is permitted for any activity, without prior coordination with MoDOT Environmental.

2.2 Spill Reporting. Follow EPG general guidance on spill containment/reporting. Standard spill reporting includes contacting Central Office Hazardous Waste and other Environmental Specialists.

2.3 Erosion Control. Erosion control measures shall be implemented in order to reduce suspended solids, turbidity and downstream sedimentation that may enter the ecosystem of any cave, surface water, or ground water sink.

2.4 Repairs on or near Bridges. Personnel shall plug all bridge drains, and implement any other measures necessary, to prevent any construction materials/debris or overspray/liquid from getting into the waterways. Silt fencing, or other treatment as specified by the engineer, shall be placed at all four bridge corners to prevent any construction materials/debris from washing off the roadway or the bridge and flowing down the bank into the waterway.

Work shall not be allowed below the ordinary high water elevation. Personnel shall not drive or place any equipment in any waterway. Coordination with the Design - Environmental Section, and

permitting and consultation with regulatory agencies, is required prior to any proposed activity below ordinary high water elevation.

Petroleum products, paint, other chemicals and construction debris shall be prevented from entering the water or otherwise contaminating the streamside environment. Reports of any accidental releases of petroleum products or other contaminants that could harm fish and other aquatic life will be reported immediately to the MoDOT Environmental Section –See Spill Reporting Procedures, above. These numbers shall be readily available on the job site at all times and the Personnel or their Supervisors shall be responsible for immediate reporting in the event of a spill.

3.0 Basis of Payment. No direct pay shall be provided for any labor, equipment, time, or materials necessary to complete this work. The contractor shall have no claim, or basis for any claim or suit whatsoever, resulting from compliance with this provision.

XX. Protection Measures for Recharge Areas of Protected Species

1.0 Description. Portions of this project area include designated Ozark cavefish and Tumbling Creek cave snail recharge areas. To ensure the protection of these endangered species, as well as other sensitive species that may be present in these areas, the following restrictions should be applied for work taking place within the recharge areas.

2.0 Restrictions. Personnel shall take the following precautions when working within the designated recharge area to eliminate/minimize the potential for contamination of the groundwater system.

1.1 Debris Control. Construction debris, as well as petroleum products, paint, other chemicals, will be prevented from entering the water or otherwise contaminating the streamside environment. Reports of any accidental releases of petroleum products, or other contaminants that could harm fish and other aquatic life, will be reported immediately to the MoDOT Environmental Section. See below the “Hazardous Waste and Endangered Species Contacts” for the list of contacts and phone numbers. If no MoDOT contact is available at the provided numbers, contact the following:

Missouri Department of Natural Resources 573-634-2436
United States Fish and Wildlife Service:
Dave Mosby 573-234-2132 extension 113, cell 573-999-2747

These numbers shall be readily available on the job site at all times. Personnel or their Supervisors shall be responsible for immediate reporting in the event of a spill.

2.1.1 Bridges. For work on bridges over waterways, personnel shall take precautions to prevent construction materials/debris from falling into the waterway beneath these structures. Personnel shall plug all bridge drains and implement any other measures necessary to prevent any construction materials/debris or overspray/liquid from getting into the waterways. Silt fence, or other treatment as specified by the engineer, shall be placed at all four bridge corners to prevent any construction materials/debris from washing off the roadway or the bridge and flowing down the bank into the waterway.

1.2 Spill Prevention. The contractor shall not refuel, conduct material transfers, or perform maintenance on equipment while the equipment is located within or over any visible stream channels (wet or dry) or sinkholes. Equipment shall not be parked in these areas. Use best

management practices while fueling and maintaining equipment to prevent spills and to catch any material that is accidentally spilled. MoDOT has an approved State Operating Permit and a Pollution Prevention Plan developed in coordination with, and approved by, the Missouri Department of Natural Resources. MoDOT will assure strict adherence to this Permit and Plan throughout the course of the project. Any violation of the Plan will result in temporary suspension of work until corrective measures are implemented to comply with this provision. Personnel shall keep equipment properly maintained to avoid spills and leaks. Personnel shall inspect equipment before it is brought to the job site, and must replace or repair any faulty equipment.

1.3 Spill Containment. A spill is defined as fuel, lubricants, paints, solvents, etc. reaching the ground where the fluid could be absorbed into the ground or run-off into an absorbent ground area. Initial reporting of any spill shall be made to MoDOT Environmental Section. See below the “Hazardous Waste and Endangered Species Contacts” for the list of contacts and phone numbers. If no MoDOT contact is available at the provided numbers, contact the following:

Missouri Department of Natural Resources 573-634-2436
United States Fish and Wildlife Service:
Dave Mosby 573-234-2132 extension 113, cell 573-999-2747

These numbers shall be readily available on the job site at all times. Personnel or their Supervisors shall be responsible for immediate reporting in the event of a spill.

Personnel shall maintain absorbent material and other containment measures capable of containing any spill of less than 50 gallons. Such measures could consist of earthen berms, spill absorbing materials, and any other approved methods used for spill control. Personnel shall also have a mobile spill kit on-site throughout the course of the project.

All empty containers of lubricants, fuels, and solvents shall be properly disposed.

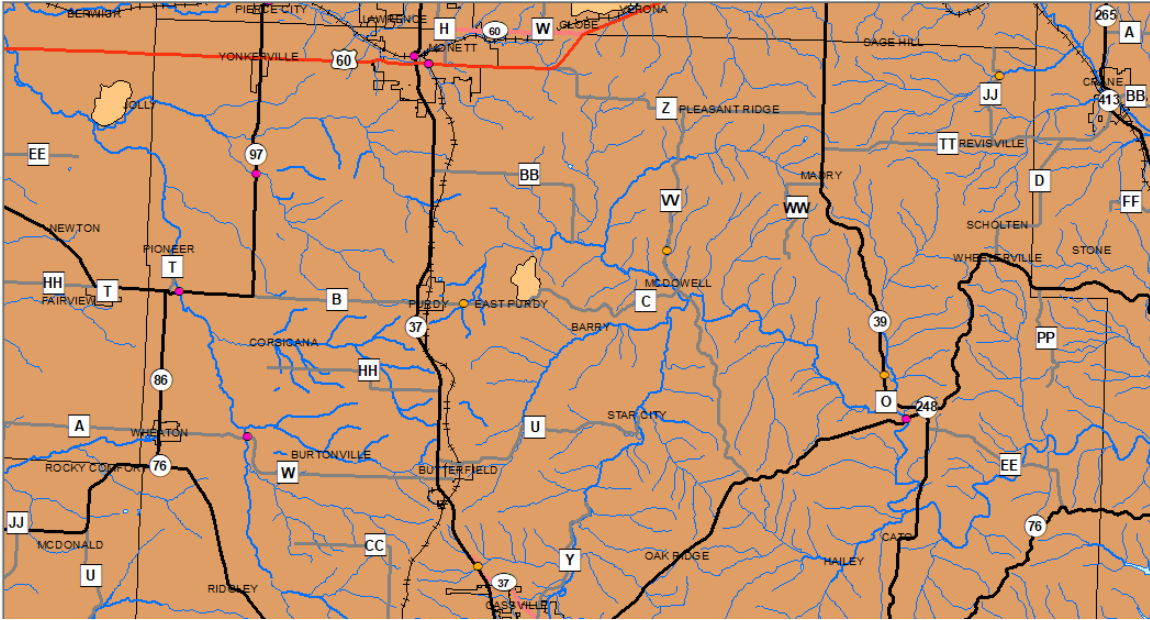
1.4 Erosion Control. Erosion control measures shall be implemented in order to reduce suspended solids, turbidity and downstream sedimentation that may enter the ecosystem of any cave, surface water, or ground water sink. MoDOT will ensure strict adherence to the design, placement and maintenance of such temporary and permanent erosion control measures as stated in Division 800, Section 806 et seq., Missouri Standard Specifications for Highway Construction.

Pollution refers to sedimentation and contamination. As described above, MoDOT has a State Operating Permit and a Pollution Prevention Plan that were developed in coordination with, and approved by, the Missouri Department of Natural Resources. Section III of the Plan prohibits MoDOT from polluting any waters of the state. The Pollution Prevention Plan shall be implemented throughout the duration of the project.

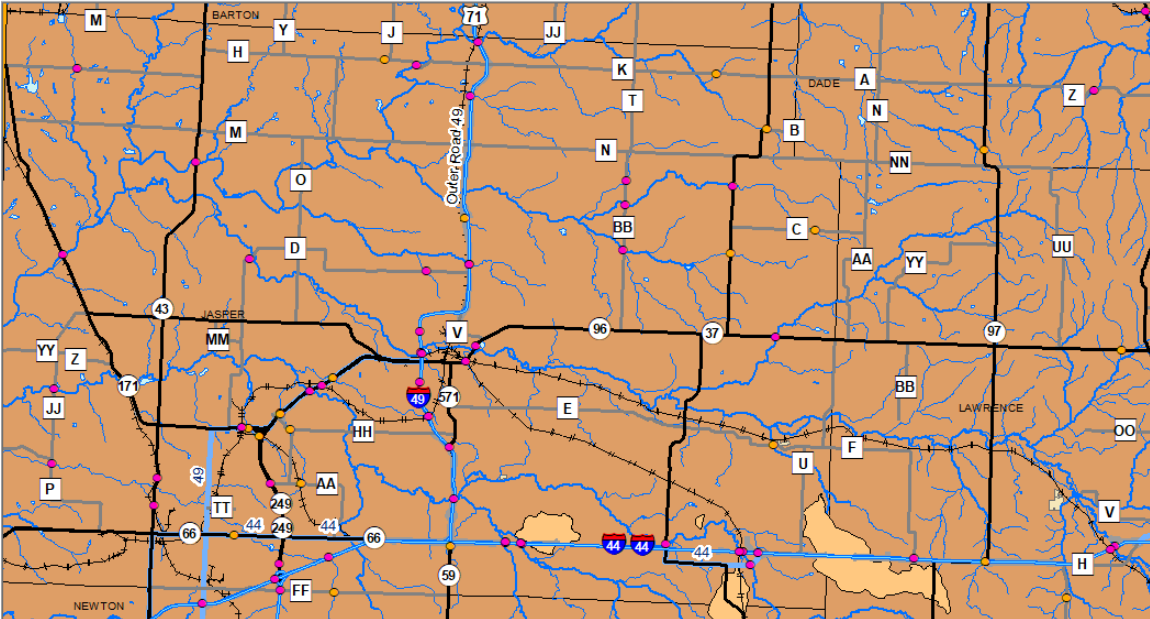
1.5 Weather Requirements. To eliminate/minimize the potential for contamination of the groundwater system, no operations shall be performed within designated recharge areas if it is raining or if the National Weather Service forecast is predicting any form of precipitation within ten (10) hours after the proposed completion time of the operation.

2.5.1 Temperature Requirements. Section 620 of the Engineering Policy Guide also provides minimum temperature requirements for pavement marking applications, insuring effective application of various pavement marking materials.

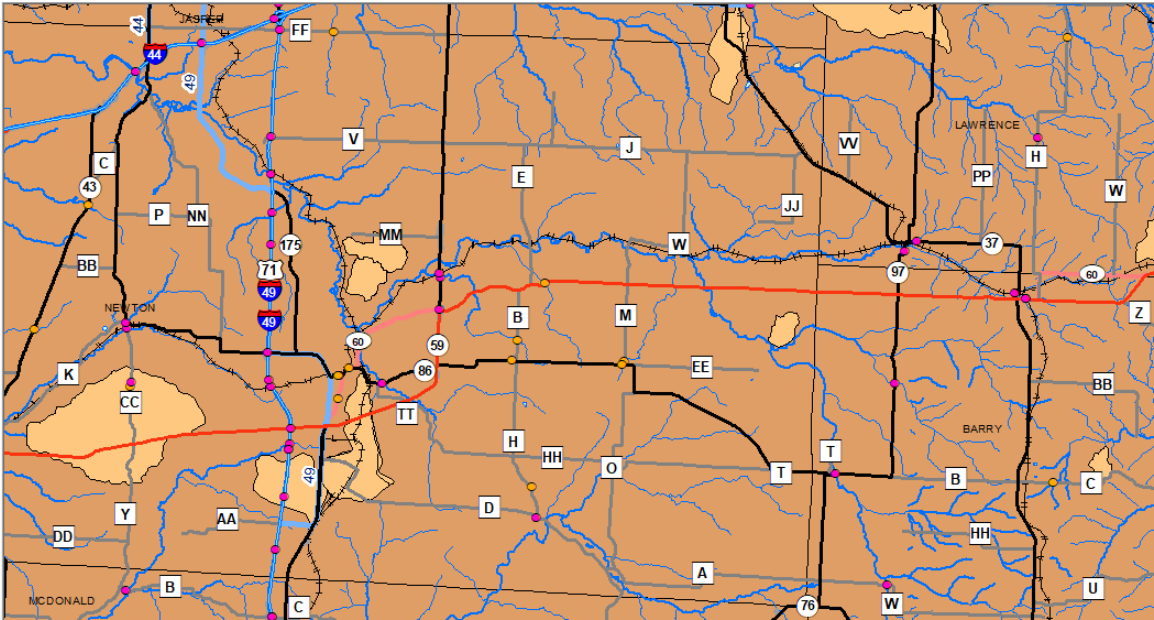
3.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above special provisions except as specified elsewhere in the contract document.



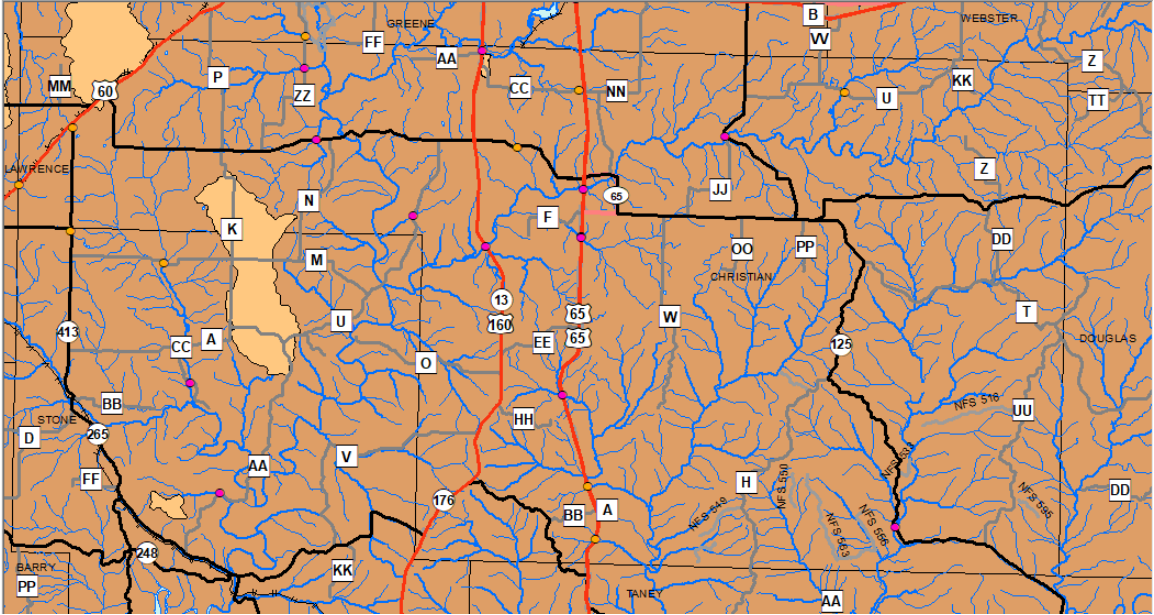
Newton County Recharge Area 2021



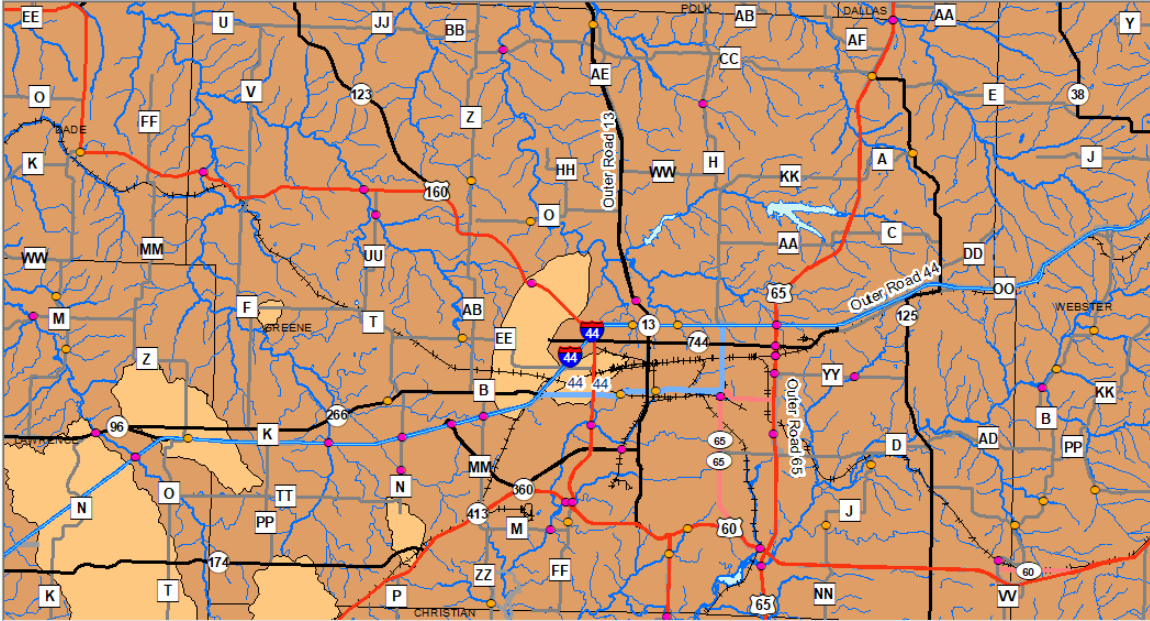
Jasper County Recharge Area 2021



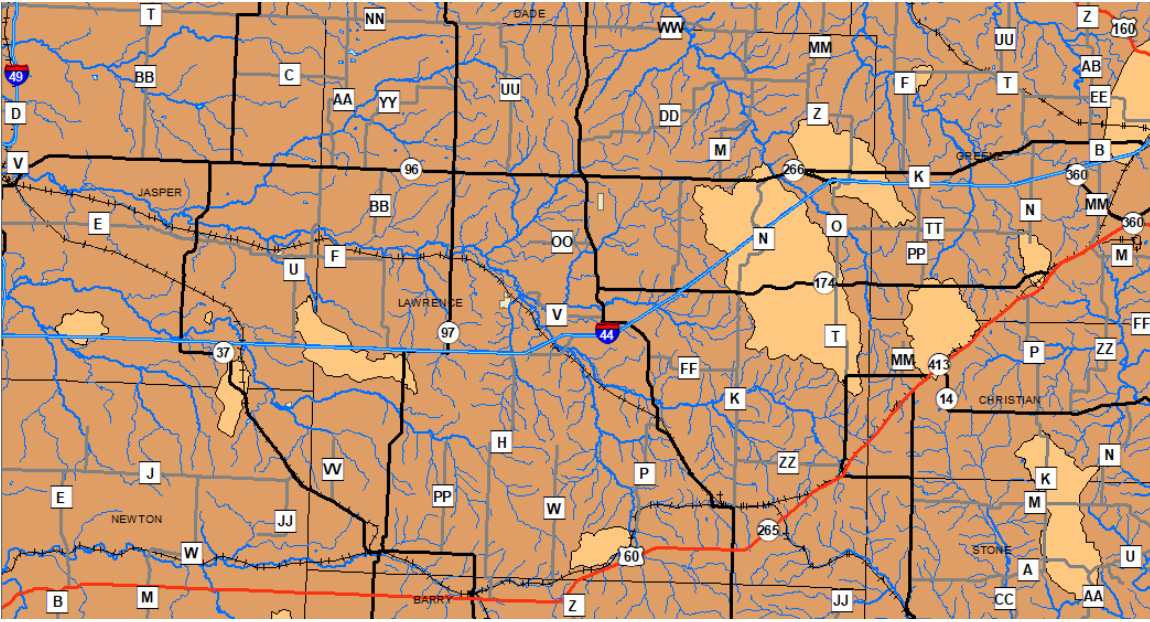
Barry County Recharge Area 2021



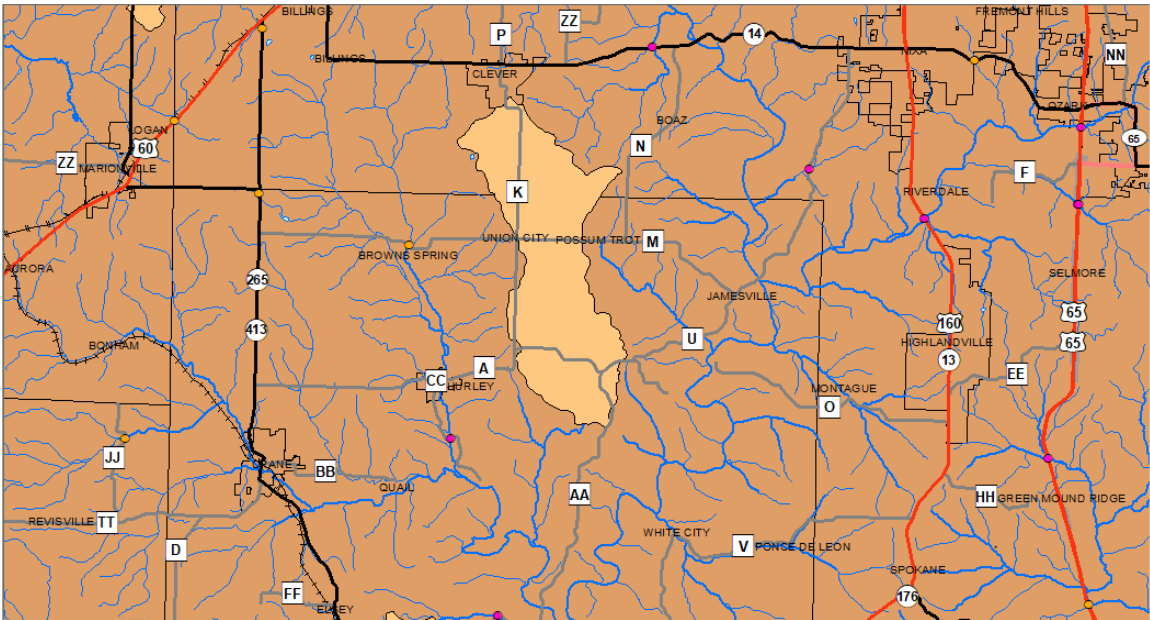
Christian County Recharge Area 2021



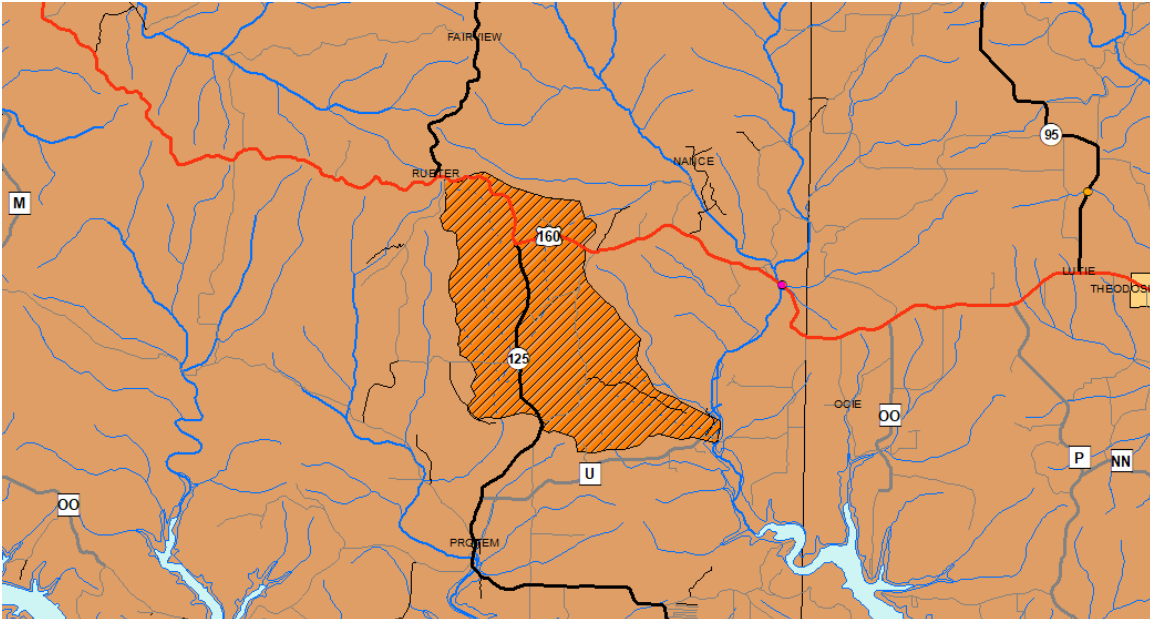
Greene County Recharge Areas 2021



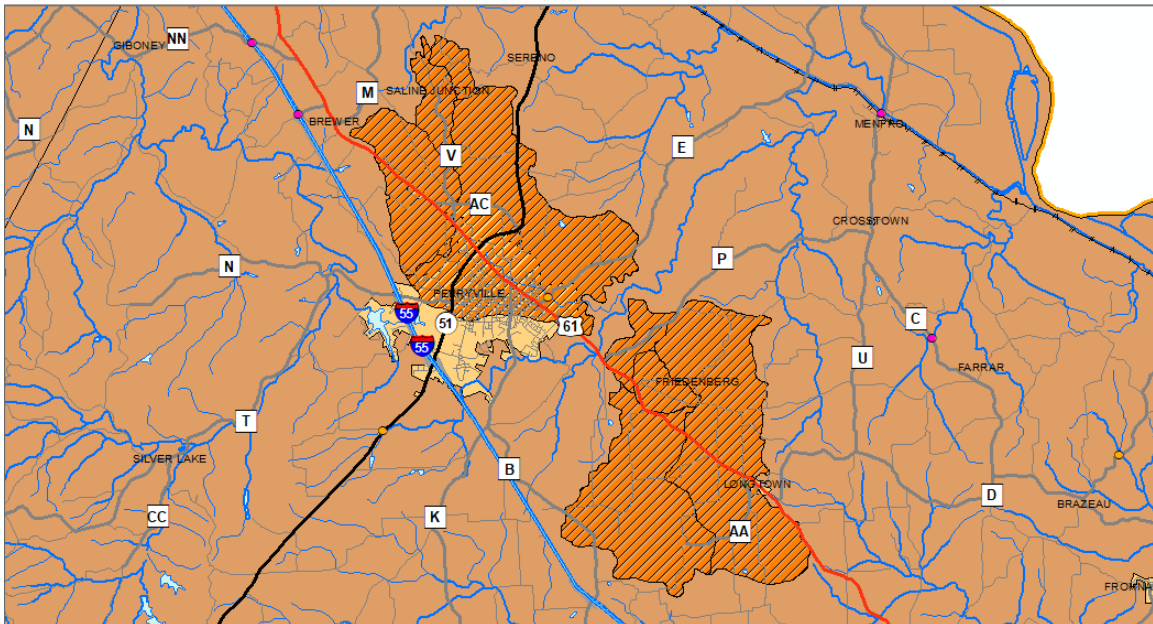
Lawrence County Recharge Areas 2021



Stone County Recharge Areas 2021



Taney County Recharge Area 2021



Perry County Recharge Area 2021

HAZARDOUS WASTE AND ENDANGERED SPECIES CONTACTS

Updated 2/18/2022

Spill Reporting Procedures in Cave Recharge Areas and Work Over Streams:

Standard spill reporting procedures apply, which include **first sending an email to the group “spillreporting”** (spillreporting@modot.mo.gov).

Contacts for Hazardous Waste:

- NW, NE, CD (Howard, Boone, Callaway, Cole, Gasconade, Osage):
Kevin Kelly: 573-526-2904 (office), 573-508-7678 (cell)
- KC, SW, CD (Cooper, Moniteau, Morgan, Miller, Camden, Laclede):
Ethank Musick: 573-522-5562 (office), 573-508-6907 (cell)
- SE, STL, CD (Maries, Pulaski, Phelps, Crawford, Washington, Dent):
Andy Stivers: 573-526-3599 (office), 573-395-6439 (cell)
- **Kyle Grayson**, Environmental Compliance Manager: 573-526-5648 (office), 573-508-3255 (cell)

In addition, spills within cave recharge areas or over active streams shall also be reported to the following Threatened and Endangered Species contacts:

Contacts for T&E:

- **Bree McMurray**, Senior Environmental Specialist: 573-526-0606 (office), 573-508-2205 (cell)
- If Bree is unavailable:
 - **Chris Shulse**, Environmental Compliance Manager: 573-526-6678 (office), 573-406-2207 (cell)
 - **Kyle Grayson**, Environmental Compliance Manager: 573-526-5648 (office), 573-508-3255 (cell)
 - **Melissa Schepelerle**, Environmental and Historic Preservation Manager: 573-526-6684 (office), 573-508-2848 (cell)
- If all listed Environmental T&E staff are unavailable, default to USFWS Contaminants Specialist contacts:
 - **Dave Mosby:** 573-234-2132, ext. 113 (office), 573-476-9552 (work cell), 573-999-2747 (personal cell)
 - **Leslie Lueckenhoff:** 573-234-5020 (work), 573-353-3016 (cell)

For the **Tumbling Creek Cave area**, the primary contact/local owner is:

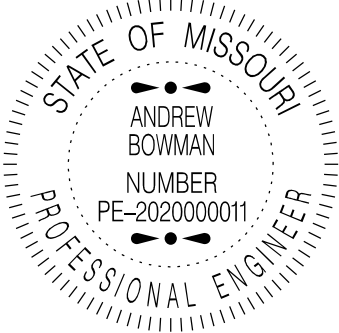
- **Tom Aley**, Ozark Underground Lab, Protem MO: 417-785-4289

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VV. Sensitive Streams or Waterbodies Near Project Area

 <p>Andrew J. Bowman 12/06/2023 11:42:45 AM ANDREW BOWMAN - CIVIL MO-PE-202000011</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65102 Phone (888) 275-6636</p>
	<p>If a seal is present on this sheet, JSP's has been electronically sealed and dated.</p>
	<p>JOB NO. J8P3234 VARIOUS COUNTIES, MO Date Prepared: 12/6/2023</p>
<p>Only the following items of the Job Special Provisions are authenticated by this seal: ALL</p>	

JOB
SPECIAL PROVISIONS

A. General - Federal JSP-09-02J

1.0 Description. The Federal Government is participating in the cost of construction of this project. All applicable Federal laws, and the regulations made pursuant to such laws, shall be observed by the contractor, and the work will be subject to the inspection of the appropriate Federal Agency in the same manner as provided in Sec 105.10 of the Missouri Standard Specifications for Highway Construction with all revisions applicable to this bid and contract.

1.1 This contract requires payment of the prevailing hourly rate of wages for each craft or type of work required to execute the contract as determined by the Missouri Department of Labor and Industrial Relations and requires adherence to a schedule of minimum wages as determined by the United States Department of Labor. For work performed anywhere on this project, the contractor and the contractor's subcontractors shall pay the higher of these two applicable wage rates. State Wage Rates, Information on the Required Federal Aid Provisions, and the current Federal Wage Rates are available on the Missouri Department of Transportation web page at www.modot.org under "Doing Business with MoDOT", "Contractor Resources". Effective Wage Rates will be posted 10 days prior to the applicable bid opening. These supplemental bidding documents 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.

1.2 The following documents are available on the Missouri Department of Transportation web page at www.modot.org under "Doing Business with MoDOT"; "Standards and Specifications". The effective version shall be determined by the letting date of the project.

General Provisions & Supplemental Specifications

Supplemental Plans to July 2023 Missouri Standard Plans
For Highway Construction

These supplemental bidding documents contain all current revisions to the published 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.

B. Project Contact for Contractor/Bidder Questions

1.0 Any project specific questions shall be directed to the following contact:

Andrew Bowman
MoDOT – Southwest District
3025 E Kearney Street
Springfield, MO 65803
Cell: 417-292-1742
Email: Andrew.Bowman@modot.mo.gov

2.0 Upon award and execution of the contract, the successful bidder/contractor shall forward all questions and coordinate the work with the contract administrator. The contract will be administered and inspected by the engineer/contract administrator listed below:

Matt Koppitz – Resident Engineer
MoDOT – Southwest District
3025 E Kearney
Springfield, MO 65803
Office: 417-895-7600
Cell: 417-830-8440
Email: Matthew.Koppitz@modot.mo.gov

3.0 All questions concerning the bid document preparation can be directed to the Central Office – Design at (573) 751-2876.

C. Scope of Work

1.0 The scope of work for this project includes various types of maintenance and repair to select bridges and concrete barrier wall (non-bridge), as determined by the engineer. The work will be prescribed through individual Job Orders negotiated between the contractor and the Commission on an as needed basis at each work location. A work location shall be limited to a specific bridge, twin structures, or a series of bridges within a common complex of structures, or isolated locations of concrete barrier wall (non-bridge). The engineer reserves the right to have others (including Commission forces) perform some or all of the work at individual locations based on the needs of the Commission.

2.0 The work boundaries for the terms of the contract include all Commission owned bridge structures in Greene and Christian Counties within the limits of Commission right-of-way.

2.1 Planned work and estimate quantities are anticipated at, but not limited to the following locations:

County	Bridge#	Route	Over	Amount Needed (SF)
Greene	A0441	Farm Rd 127	I-44	140

3.0 Job Orders for Asphaltic Concrete Overlay Repair will only be issued for work to be performed from April 1 to November 30, unless otherwise mutually agreed upon between the contractor and the engineer.

4.0 The Commission is not bound to issue a minimum or maximum number of Job Orders during the contract term. It is the intent, however, to meet the anticipated budget, as noted elsewhere within this proposal. Award of contract does not guarantee any Job Orders during the duration of the contract.

D. Job Order Contract

1.0 A Job Order Contract is an indefinite quantity contract pursuant to which the contractor shall perform the work itemized in a Job Order at individual work locations throughout the project limits. The contractor shall perform all tasks itemized in the Job Order.

2.0 The engineer will identify the required work at an individual work location in collaboration with the contractor at a Joint Scope Meeting. The engineer will provide the contractor with a draft Detailed Scope of Work which the contractor shall review. Once the detailed Scope of Work is agreed upon, the engineer will issue a Job Order to the contractor. At any given time the contractor may be performing more than one Job Order.

3.0 The contract includes a list of fixed cost pay items with fixed unit prices. Payment for the work will be determined by multiplying the fixed unit prices by the Adjustment Factor. The contractor shall bid the Adjustment Factor to be applied to the fixed unit prices. The total cost of an individual Job Order will be determined by multiplying the fixed unit price of each fixed cost pay item by the Adjustment Factor.

4.0 Definitions.

4.1. Detailed Scope of Work. A written document that sets forth the work the contractor is obligated to perform in connection with a particular Job Order.

4.2 Joint Scoping Process. Field meeting between the engineer and the contractor to review site conditions and determine job tasks to be performed within the scope of an agreed to Job Order.

4.3 Job Order Proposal. A draft document that gives an itemized listing of the job tasks to be performed by the contractor, estimated quantities, fixed cost pay items and any non-fixed cost pay items and costs that have been determined. The Job Order must also include a proposed project schedule; a list of proposed subcontractors indicating D/M/WBE status; and any sketches, drawings, or layouts; amendments to the safety plan and an erosion and sedimentation control plan; or technical data or information on proposed materials or equipment.

4.4 Job Order. A written order from the engineer to the contractor directing the work required at an individual work location in accordance with the Detailed Scope of Work within the Job Order Completion Time.

4.5 Job Order Completion Time. The time within which the contractor must complete the Detailed Scope of Work for a particular Job Order.

4.6 Fixed Cost Pay Item. Work for which a description and fixed cost is set forth in the fixed cost pay item list.

4.7 Non-Fixed Cost Pay Item. Work for which a description and fixed cost is not set forth in the pay item list. Payment for non-fixed cost pay items will be determined in accordance with Sec 109.4.2, 109.4.3, or 109.4.4. Non-fixed cost pay items will be paid using an Adjustment Factor of 1.000.

4.7.1 Concrete Barrier Wall (non-bridge). Due to the high variability in cost to repair concrete barrier wall that is not on or attached to a structure, this work shall be compensated as a non-fixed pay item.

E. Procedures for Developing a Job Order

1.0 Initiation of a Job Order. The engineer will notify the contractor of a potential Job Order by issuing a Notice of Joint Scope Meeting. The notification will be issued by electronic mailing,

unless the engineer approves other arrangements. The contractor shall confirm receipt of all job orders by the same means as issued.

1.1 The contractor shall attend the Joint Scope Meeting and be prepared to discuss, at a minimum:

- a. The general scope of the work;
- b. Existing conditions, presence of waterways, wetlands, or other natural resources,
- c. Presence of hazardous materials
- d. Methods and alternative for accomplishing the work;
- e. Access to the site;
- f. Staging area availability/location;
- g. Requirements for catalog cuts, technical data, samples and shop drawings;
- h. Requirements for professional services, including sketches, drawings, and specifications;
- i. Hours of operation;
- j. Construction duration;
- k. Liquidated damages;
- l. Specific quality requirements for equipment and material;
- m. Date on which Job Order Proposal is due.

1.2 Upon completion of the joint scoping process, the engineer will prepare a draft detailed Scope of Work referencing any sketches, drawings, photographs, and specifications required to document accurately the work to be accomplished. The contractor shall review the proposed detailed Scope of Work and request any desired changes or modifications thereto. When an acceptable detailed Scope of Work has been completed, the engineer will issue a Draft Job Order.

1.3 The contractor does not have the right to refuse to perform any Job Order or any work identified in a Job Order. If the contractor refuses to perform any Job Order or any work identified in a Job Order, the contractor may be considered to be in default in accordance with Sec 108.

2.0 Preparation Of The Job Order. The engineer will prepare a Draft Job Order and submit the order to the contractor for final review. The contractor and the engineer will jointly review the Draft Job Order and finalize the order. Establishment of pricing for any non-fixed cost pay items shall be in accordance with Sec 109.4.2 or 109.4.3. If no agreement to pricing can be made then the work will proceed with payment for non-fixed cost items under Sec 109.4.4.

3.0 Job Order Proposal. The engineer's Job Order Proposal shall include, at a minimum:

- a. Job Order Price Proposal;
- b. Required architectural or engineering drawings or sketches;
- c. Catalog cuts, technical data or samples;
- d. List of anticipated Subcontractors and Material Suppliers indicating DBE status and anticipated price;
- e. Construction schedule;
- f. Sample warranties or guarantees for materials, equipment or systems proposed;

3.1 The engineer's Job Order Proposal shall be submitted by the date as agreed to by the contractor and the engineer at the Joint Scoping Meeting. It will be the contractor's responsibility to furnish any documentation or information as requested by the engineer in order to process the Job Order Proposal. The time allowed for preparation of the Job Order Proposal will depend on the complexity and urgency of the Job Order, but should typically be less than 7 days. On complex

Job Orders allowance will be made to provide adequate time for preparation and submittal of the necessary documents.

3.2 Job Order Issuance. When the engineer and contractor have agreed to the scope of work and fixed price and non-fixed price tasks to be performed, the engineer will finalize the official Job Order and submit a signed Job Order for the contractor to review and sign. The affixed signatures by the engineer and the contractor shall bind the Job Order. The Job Order will reference the Detailed Scope of Work and set forth the amount to be paid and the time to complete the work.

3.2.1 If the contractor is not clear or in disagreement with the terms of the Job Order he shall NOT sign the Job Order, but shall work with the engineer to clear up any discrepancies in the work to be done. If the contractor fails to execute the Job Order, the contractor may be considered to be in default in accordance with Sec 108.

4.0 The Commission reserves the right to reject a Job Order Proposal or cancel a proposed work task for any reason. The Commission also reserves the right not to issue a Job Order if it is determined to be in the best interests of the Commission. The contractor shall not recover costs arising out of or related to the development of the Job Order including but not limited to the costs to attend the Joint Scope Meeting, review the Detailed Scope of Work, prepare a Proposal, subcontractor costs, and the cost to review the Job Order Proposal with the Commission.

5.0 Notice to Proceed. Each Job Order will include a notice to proceed, which will stipulate the date the contractor is expected to begin work. The notice to proceed date will normally be within 14 calendar days after the job order is issued.

5.1 The contractor shall provide 5-days notification prior to start of repair work for all Job Orders.

F. Term of Contract

1.0 The term of this contract shall be for the period commencing *February 22, 2024* and shall end *February 21, 2025*.

1.1 Any work already ordered or in progress when the contract term ends shall be completed in accordance with the provisions, price proposals and timelines established in the issued Job Order(s), or liquidated damages will be assessed against the contractor in accordance with the provisions of this contract.

2.0 The contract may be extended under the original terms and contract prices for the period commencing *February 22, 2025* and shall end *February 21, 2026* for a maximum contract term of two (2) years. If, in the sole discretion of the Commission, the Commission desires to extend the contract, the contractor will be given written notification of the extension no later than December 1 of the current contract year. The contractor shall provide written notification of acceptance or rejection of the extension of this contract no later than January 1 of the current contract year. If the option for extending the contract is exercised by MoDOT, a time adjustment change order will be issued by the Commission to extend the contract to the new term limits. The contractor shall increase the performance contract bond to an amount equal to the original contract amount plus the extended contract amount (i.e., double the original bond amount).

G. Fixed Unit Price List

1.0 Description. A fixed unit price list containing unit prices associated with bridge deck repair and traffic control is listed below. Fixed unit prices are for complete and in-place construction and include all labor, equipment and material required to complete the construction task. All labor, material, equipment and work required by a specification shall be considered part of the fixed unit price, unless otherwise stated elsewhere in this contract. Pay limits will be defined in the approved Job Order.

2.0 Fixed Unit Price List for Bridge Deck Repair and Traffic Control.

MISC. TRAFFIC CONTROL ITEMS			
<u>Item Number</u>	<u>Description</u>	<u>Unit</u>	<u>Fixed Unit Price</u>
6169902	MISC. ADDITIONAL TRUCK MOUNTED ATTENUATOR (TMA)	EA	\$750.00
6169904	MISC. ADDITIONAL CONSTRUCTION SIGNS	SF	\$3.00
6169902	MISC. ADDITIONAL CHANNELIZER (TRIMLINE)	EA	\$9.00
6169902	MISC. ADDITIONAL TYPE III MOVEABLE BARRICADE	EA	\$75.00
6169902	MISC. ADDITIONAL DIRECTIONAL INDICATOR BARRICADE	EA	\$18.75
6169902	MISC. ADDITIONAL FLASHING ARROW PANEL	EA	\$390.00
6169902	MISC. SEQUENTIAL FLASHING WARNING LIGHT	EA	\$50.00
6169902	MISC. ADDITIONAL CMS (CONTRACTOR FURNISHED/RETAINED)	EA	\$1,200.00
6169902	SINGLE LANE CLOSURE	EA	\$3,000.00
6169902	DOUBLE LANE CLOSURE	EA	\$3,900.00
6169902	INTERIOR LANE CLOSURE	EA	\$3,900.00
6169902	TRIPLE LANE CLOSURE	EA	\$4,500.00
6169902	RAMP CLOSURE	EA	\$1,800.00
6169902	TEMPORARY TRAFFIC CONTROL SINGLE LANE SHIFT	EA	\$1,000.00
6169902	MISC. 1-LANE 2-WAY OPERATION W/ FLAGGERS	EA	\$3,000.00

BRIDGE ITEMS			
<u>Item Number</u>	<u>Description</u>	<u>Unit</u>	<u>Fixed Unit Price</u>
2169903	REMOVAL OF EXISTING EXPANSION JOINT SILICONE SEALANT	LF	\$35.00
2169903	REMOVAL OF EXISTING EXPANSION JOINT COMPRESSION SEAL	LF	\$52.00
4019904	ASPHALTIC CONCRETE OVERLAY REPAIR	SF	\$12.00
4094000	SEAL COAT, GRADE A	SY	\$4.00
4094010	SEAL COAT, GRADE B	SY	\$4.00
6234000	POLYMER CONCRETE	CF	\$300.00
7040101	SUBSTRUCTURE REPAIR (FORMED)	SF	\$178.00
7040113	CLEANING AND EPOXY COATING	SF	\$8.00
7049904	BRIDGE DECK APPROACH SLAB REPAIR (PARTIAL DEPTH) (OVER 200 SF)	SF	\$40.00
7049904	BRIDGE DECK APPROACH SLAB REPAIR (PARTIAL DEPTH) (0-200 SF)	SF	\$80.00
7049904	BRIDGE DECK APPROACH SLAB REPAIR (FULL DEPTH)	SF	\$90.00
7049904	REPAIRING CONCRETE DECK (HALF-SOLING) (OVER 600 SF)	SF	\$35.00

BRIDGE ITEMS			
<u>Item Number</u>	<u>Description</u>	<u>Unit</u>	<u>Fixed Unit Price</u>
7049904	REPAIRING CONCRETE DECK (HALF-SOLING) (200-600 SF)	SF	\$50.00
7049904	REPAIRING CONCRETE DECK (HALF-SOLING) (UNDER 200 SF)	SF	\$60.00
7049904	DECK REPAIR W/ VOID TUBE REPLACEMENT (OVER 80 SF)	SF	\$90.00
7049904	DECK REPAIR W/ VOID TUBE REPLACEMENT (0-80 SF)	SF	\$130.00
7049904	FULL DEPTH REPAIR (OVER 600 SF)	SF	\$60.00
7049904	FULL DEPTH REPAIR (200-600 SF)	SF	\$80.00
7049904	FULL DEPTH REPAIR (UNDER 200 SF)	SF	\$100.00
7049904	DENSE CONCRETE OVERLAY REPAIR (OVER 600 SF)	SF	\$20.00
7049904	DENSE CONCRETE OVERLAY REPAIR (200-600 SF)	SF	\$30.00
7049904	DENSE CONCRETE OVERLAY REPAIR (UNDER 200 SF)	SF	\$40.00
7049904	EPOXY POLYMER OVERLAY REPAIR, CONCRETE DECK (OVER 600 SF)	SF	\$8.00
7049904	EPOXY POLYMER OVERLAY REPAIR, CONCRETE DECK (200-600 SF)	SF	\$12.00
7049904	EPOXY POLYMER OVERLAY REPAIR, CONCRETE DECK (UNDER 200 SF)	SF	\$14.00
7049904	VERTICAL SUBSTRUCTURE REPAIR (UNFORMED)	SF	\$128.00
7049904	VERTICAL SUPERSTRUCTURE REPAIR (UNFORMED)	SF	\$128.00
7049904	OVERHEARD SUBSTRUCTURE REPAIR (UNFORMED)	SF	\$137.00
7049904	OVERHEARD SUPERSTRUCTURE REPAIR (UNFORMED)	SF	\$137.00
7119905	CONCRETE & MASONRY PROTECTION SYSTEM	SY	\$4.00
7033013	PENETRATING CONCRETE SEALER	SY	\$4.20
7049905	CONCRETE CRACK FILLER – HIGH MOLECULAR WEIGHT METHACRYLATE	SY	\$15.00
7179903	SILICONE EXPANSION JOINT SEALANT (<2.5" WIDTH)	LF	\$50.00
7179903	PREFORMED SILICONE OR EPDM EXPANSION JOINT SEAL (2.5"- 4.5" WIDTH)	LF	\$100.00

H. Adjustment Factor

1.0 Description. The Adjustment Factor includes business and construction related costs as defined in this specification. It is the responsibility of the contractor to verify the unit prices provided in this contract and to modify their Adjustment Factor accordingly.

1.1 Business Costs. Business related costs consist of profit, overhead costs, subcontractor profit and overhead, taxes, finance costs, and other costs including but not limited to;

- (a) insurance, bonds and indemnification
- (b) project meetings, training, management and supervision
- (c) project office staff and equipment
- (d) employee or subcontractor wage rates that exceed prevailing wages
- (e) fringe benefits, payroll taxes, worker's compensation, insurance costs and any other payment mandated by law in connection with labor that exceeds the labor rate allowances
- (f) Business risks such as the risk of low than expected volumes of work, smaller than anticipated Job Orders, poor subcontractor performance, and inflation or material cost fluctuations

1.2 Construction Costs. Construction related costs include but are not limited to;

- (a) personnel safety equipment
- (b) security requirements
- (c) excess material waste
- (d) daily and final clean-up
- (e) costs resulting from inadequate supply of materials, fuel, electricity, or skilled labor
- (f) costs resulting from productivity loss
- (g) working in extreme and adverse weather conditions
- (h) any other discreet items of work required to complete a particular Job Order

1.3 Mobilization Costs. All costs in accordance with Sec 618 shall be included in the contractor's Adjustment Factor as defined in the contract except as otherwise noted in this contract.

1.4 General Costs. The above lists are not exhaustive and are intended to provide general examples of cost items to be included in the contractor's Adjustment Factor as defined in the contract.

2.0 Adjustment Factor. The Adjustment Factor may include daytime, nighttime, and/or weekend hours as identified by the Engineer.

2.1 Daytime hours are defined as ½ hour after sunrise to ½ hour before sunset. If the contractor works outside of the defined daytime hours, the contractor shall provide lighting equipment at no additional cost to the Commission.

3.0 Nighttime Work. If the engineer determines traffic volumes are such that work cannot be performed during the daytime, without significant traffic impacts, the Job Order will specify nighttime repair operations.

4.0 Weekend Work. If the Engineer determines traffic volumes are such that work cannot be performed Monday through Friday without significant traffic impacts, the Job Order will specify weekend repair operations.

I. Bidding the Adjustment Factor

1.0 The bidder shall complete the bid form by writing in the Adjustment Factor. The Adjustment Factor shall be specified to three decimal places. Note that this is a contract pay item for contractor payment, not work items.

EXAMPLE: The Adjustment Factor shall be entered as the following example illustrates.

1 . 1 9 8
OR
0 . 9 8 7

Note: The Adjustment Factors used are for example purposes only and is not an indication of factors being bid by the contractor.

J. Contract Award

1.0 The Commission will evaluate the bids with the intent of awarding the contract to the lowest responsible bidder. The anticipated budget for this project is \$100,000. If the contract is extended in accordance with the TERM OF CONTRACT JSP, the anticipated budget will be two times the amount.

2.0 The lowest bid will be determined by multiplying the Adjustment Factor by the anticipated budget for the adjustment factor. For purposes of bidding this contract, the estimated percentage of work performed during Daytime hours is 15%, Nighttime hours is 80%, and Weekend hours is 5%. The dollar quantities provided in the bid form are anticipated budgets and are not intended to represent the actual value of work that will be assigned.

K. Bonds

1.0 The amount of the Bid Bond shall be 5% of the anticipated budget for this project.

2.0 The amount of the Performance Bond shall be 100% of the anticipated budget for this project.

L. Notice to Proceed

108.2 Notice to Proceed. For each Job Order, the engineer will include a notice to proceed, which will stipulate the date the contractor is expected to begin work. The notice to proceed date will normally be 14 calendar days after the job order is issued.

M. Accelerated Repair

1.0 Should the engineer deem an expedited Notice to Proceed is necessary in order to avoid detours or significant traffic congestion due to a bridge or lane closure, the Job Order shall be designated as an Accelerated Repair. Commission forces or others will initially respond to the location and perform such work as necessary to reduce the immediate impact to traffic.

2.0 The contractor will be notified by phone of the location of the accelerated repair and extent of work needed. Written confirmation of the required work will be provided by email or personal delivery immediately after notification. The contractor shall provide a means for the engineer to contact the contractor 24 hours a day for such emergencies. The Job Order will be negotiated and issued by the Commission within 48 hours of notification to the contractor. It is estimated that an accelerated repair could occur up to three times during the term of this contract.

3.0 The contractor shall respond to the work location and begin the accelerated repair work within five (5) calendar days of execution of the Job Order. After beginning the accelerated repair work, the contractor shall continuously and diligently pursue the work according to the mutually agreed upon schedule in the Job Order until all of the repairs described in the Job Order are complete, unless otherwise approved by the engineer.

4.0 No additional payment will be made for an accelerated repair Job Order that includes a Notice to Proceed date of five (5) or more days from issuance of the Job Order. Should a Notice to Proceed date of less than five (5) calendar days be requested by the engineer, additional costs due to accelerating the work will be reimbursed, as agreed upon by both parties prior to execution

of the Job Order. The Adjustment Factor will not be applied to any agreed payment for accelerated repair. All other items necessary to complete the repair work will be paid for at the fixed unit price multiplied by the Normal Work or Nighttime Work Adjustment Factor, as mutually agreed upon in the Job Order.

N. Completing the Work

1.0 The contractor shall perform any task in the fixed unit price list for the fixed unit price multiplied by the quantity, multiplied by the Adjustment Factor. The contractor shall perform the Detailed Scope of Work for the Job Order Price as calculated in accordance with the procedure for developing Job Orders set forth herein.

2.0 When installed quantities differ from the estimated quantities in the issued Job Order, the as built quantities in the final Job Order will address the quantity variation(s) for final payment. When quantities are not specified in the Detailed Scope of Work, the Job Order Price will be deemed to be lump sum for such work.

3.0 The contractor shall employ and supply a sufficient force of workers, materials and equipment and shall progress the work with such diligence so as to ensure completion of the Detailed Scope of Work within the Job Order completion Time or within such extended time for completion as may be granted by the engineer.

4.0 In order to assist in reviewing the Job Order Price Proposal, the contractor shall as part of the Job Order Proposal prepare and submit to the engineer for approval, a progress schedule showing the order in which the contractor proposes to carry on the work, the date of which it will start the major items of work (including but not limited to excavation, drainage, paving, structures, mobilization, soil erosion and sediment control, etc.) and the critical features (including procurement of materials, plant and equipment) and the contemplated dates for completing the same.

O. Final Inspection and Acceptance of the Work

Delete Sec 105.10.7 through 105.10.7.2 and substitute the following:

105.10.7 Final Inspection. Upon completion of the required work for each Job Order, the contractor shall notify the engineer by phone or electronic mailing, and the engineer will perform an inspection. If the engineer determines all work required by the contract has been satisfactorily completed, the engineer will make the acceptance for maintenance and notify the contractor in writing of the date of acceptance for maintenance.

105.10.7.1 Work determined to be unsatisfactory by the engineer and not accepted shall be corrected to acceptable standards at the contractor's sole cost. All items that are unsatisfactory shall be corrected within the specified working days for each job order. If needed for correction of unsatisfactory work, the contractor will be given an extension of contract time in an amount equal to the number of working days remaining in the job order at the time the engineer was notified for inspection. No contract time extension will be made for notification made prior to completion of the work. Any time extension given will be considered a noncompensable delay. Upon completion of the corrections, the contractor shall notify the engineer for a reinspection.

105.10.7.2 Following a Job Order final inspection, the contractor, subcontractors, and suppliers are relieved of any new or additional liability to third parties for personal injury, death, or property damages which may be alleged to result from the performance of the work required by that job order, unless additional work on the right of way is required by the engineer.

105.10.7.3 Nothing in this section shall be deemed to excuse the contractor of liability or responsibility for any personal injury, death, or property damages which may arise from acts or the failure to act prior to the final inspection of the work required by the Job Order.

P. Liquidated Damages for Failure or Delay in Beginning Work and/or Completing Work on Time

1.0 Description. If the contractor, or in case of default, the surety fails to begin or complete the work required in a job order within the time specified, or within such extra time as may be allowed by the contract, the contractor shall be charged with liquidated damages in the amount of **\$250 per day** for each day or partial day that the job order remains incomplete in excess of the specified time. The amount specified is agreed upon, not as a penalty, but as liquidated damages for loss to the Commission and the public. This amount will be deducted from any amount due under the contract. These damages will apply to each individual job order for which the contractor fails to complete the work on time. The contractor and surety shall be liable for all liquidated damages. Permitting the contractor to continue the work after the expiration of the specified time or any extension of time will not constitute a waiver by the Commission of any contractual rights. It shall be the responsibility of the engineer to determine the quantity of excess time.

2.0 Sec 108.8.1 through 108.8.1.3 shall not apply to this contract.

3.0 These liquidated damages will not be charged for Saturdays, Sundays, national, and state holidays established by law.

Q. Contract Payments

1.0 The contractor shall request payment by submitting an invoice to the engineer. The invoice shall be for the job orders completed and shall be itemized by job order number. A summary of all contract items used, contract unit prices, and total cost shall be included with the invoice.

1.1 The engineer will make payment estimates for the Job Orders completed and final inspected and the value thereof at the price established in the Job Order, including any necessary adjustments. The payment estimates will include deductions from the contractor's invoice for any liquidated damages applicable to any of the Job Orders.

1.2 Material Allowance. No material allowance will be made for this contract.

R. Work Zone Traffic Management

1.0 Description. The contractor may be responsible for the work zone traffic management as mutually agreed upon by the contractor and engineer for each individual Job Order. Work zone traffic management shall be in accordance with applicable portions of Division 100 and Division 600 of the Standard Specifications, and specifically as follows.

2.0 Traffic Management Schedule.

2.1 The contractor shall notify the engineer at least 48 hours prior to performing any work at each work site. The notification shall include all information needed to identify traffic impacts such as work location, anticipated work hours, traffic control plan type, required lane or shoulder closures, anticipated duration of the work, etc. The contractor shall designate a contact person who is available for the duration of the work to resolve any traffic impact issues resulting from the contractor's operations. The engineer will make appropriate notification to the public, MoDOT customer service, and MoDOT work crews of the contractor's operations. The contractor shall notify the engineer as soon as practical any postponement due to weather, material, or other circumstances and shall notify the engineer when the work has been rescheduled.

2.2 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 reopened to traffic.

3.0 Maintenance of Traffic.

3.1 Traffic shall be maintained through the work zone using the existing pavement in accordance with the traffic control plans. No detours or lane shifts onto shoulders will be allowed unless otherwise approved by the engineer.

3.2 Provisions shall be made to allow the movement of emergency vehicles through the limits of construction at all times.

3.3 During non-working hours the contractor shall have all lanes of traffic open for all routes, ramps, and side roads. All channelizers and other traffic control devices shall be removed from the roadway during non-working hours unless otherwise approved by the engineer.

4.0 Traffic Congestion and Delay. The contractor shall, upon approval of the engineer, take proactive measures to reduce traffic congestion in the work zone. The contractor shall be responsible for maintaining the existing traffic flow through the job site during the work. 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 queues from occurring again.

5.0 Traffic Safety.

5.1 Where traffic queues routinely extend to within 1000 feet (300 m) of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet (150 m) of the ROAD WORK AHEAD, or similar, sign on an undivided highway, the contractor shall extend the advance warning area, as approved by the engineer.

5.2 When a traffic queue extends to within 1000 feet (300 m) of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet (150 m) of the ROAD WORK AHEAD, or similar, sign on an undivided highway due to non-recurring congestion, the contractor shall deploy a means of providing advance warning of the traffic congestion, as approved by the engineer. The warning location shall be no less than 1000 feet (300 m) and no more than 0.5 mile (0.8 km) in advance of the end of the traffic queue on divided highways and no less than

500 feet (150 m) and no more than 0.5 mile (0.8 km) in advance of the end of the traffic queue on undivided highways.

6.0 Work Hour Restrictions.

6.1 All work shall be scheduled to avoid major sporting events, conventions, concerts, and similar special events as specified by the engineer. During the term of this contract, there are six major holiday weekends: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. All lanes shall be scheduled to be open to traffic during these holiday periods, from 12:00 noon on the last working day preceding the holiday until 9:00 a.m. on the first working day subsequent to the holiday, unless otherwise designated by the engineer.

6.2 During non-working hours the contractor shall have all lanes of traffic open for all routes, ramps, and side roads. Working hours for weekends and holidays shall be determined by the engineer.

6.3 Due to the wide variance in traffic volumes throughout the contract area, it is not possible to give specific work hours for the term of the contract. Each Job Order will specify work hours or work hour restrictions based on the repair location, this may include peak hour restrictions. The following table provides general guidance as to the most restrictive schedule for when work on or adjacent to the roadway may be allowed.

<u>Traffic Control Plan Type</u>	<u>Work Hours (Monday thru Friday)</u>
Single Lane Closure	7:30 p.m. to 4:30 a.m.
Double Lane Closure	9:30 p.m. to 4:30 a.m.
Triple Lane Closure	10:00 p.m. to 4:30 a.m.
Interior Lane Closure	9:30 p.m. to 4:30 a.m.
Ramp Closure	Hours and days as approved by the engineer
One Lane Two Way Operation Flagger	Hours and days as approved by the engineer with

Specific work hours for an individual work location shall be according to the mutually agreed upon schedule in the Job Order.

7.0 Weekend Bridge Work. Some bridges will need full weekend lane closures. The contractor is required to give at least one week notice prior to any weekend lane closures.

8.0 Work Within Another Work Zone. The engineer may determine it is in the best interest of the Commission and the traveling public to have the work designated in the job order performed within another contractor's work zone or within a MoDOT work zone. If the work is designated to be performed within another work zone, the contractor shall coordinate and perform the work in accordance with Sec 105.6.

9.0 Ramp Closure. Ramp closures shall be minimized and shall be approved by the engineer a minimum of five days prior to the closure. Only one ramp closure will be permitted in a particular interchange or complex at one time. Work on acceleration / deceleration lanes will not require ramp closure unless approved by the engineer. Detour traffic handling details will be as specified by the engineer. Major ramp closures may require detour signing with other ramp closures only requiring use of changeable message signs (CMS) for detours. If the engineer determines detour signing is required, all necessary detour trailblazing placards will be furnished, installed, and covered by others. The contractor shall furnish all CMS required by the engineer. The contractor shall be responsible for uncovering and covering the trailblazing placards as work progresses.

10.0 Changeable Message Signs. The contractor shall provide changeable message signs notifying motorists of future traffic disruption and possible traffic slow down one week before traffic is shifted to a detour. The changeable message sign installation shall be placed at a location as approved or directed by the engineer.

11.0 Basis of Payment. All items necessary to complete the traffic control will be paid for at the fixed unit price multiplied by the Adjustment Factor, as mutually agreed upon in the Job Order.

S. Traffic Control Plan Types

1.0 Description. The following traffic control plan types shall be used for the work. The contract provides an estimated number of traffic control items required for single lane closures, double lane closures, triple-lane closures, and ramp closures. The engineer may determine that the contractor shall perform work on more than one bridge within a lane closure when the bridges are within close proximity to each other.

2.0 Plan Types.

2.1 Single Lane Closure. A single lane closure shall be performed by furnishing, installing, and removing the following set of traffic control devices.

2 each	Bridge Work Ahead
2 each	Right (Left) Lane Closed Ahead
2 each	Reduced Speed Limit Ahead (Symbol)
1 each	Right (Left) Lane Closed
1 each	Merge with Right (Left) Arrow
2 each	Speed Limit XX MPH
2 each	Work Zone (Plaque)
14 each	Directional Indicator Barricade
30 each	Channelizer (Trim Line)
2 each	Flashing Arrow Panel (One Truck Mount for TMA)
1 each	Truck Mounted Attenuator
1 each	Changeable Message Sign (Contractor Furnished / Retained)

2.2 Double Lane Closure. The contractor shall obtain approval from the engineer prior to any double lane closure. A double lane closure shall be performed by furnishing, installing, and removing the following set of traffic control devices.

2 each	Bridge Work Ahead
2 each	2 Right (Left) Lanes Closed Ahead
2 each	Reduced Speed Limit Ahead (Symbol)
2 each	Right (Left) Lane Closed
2 each	Merge with Right (Left) Arrow
4 each	Speed Limit XX MPH
4 each	Work Zone (Plaque)
2 each	Speed Limit XX (Normal Speed)
28 each	Directional Indicator Barricade
100 each	Channelizer (Trim Line)
3 each	Flashing Arrow Panel (One Truck Mount for TMA)
1 each	Truck Mounted Attenuator

1 each Changeable Message Sign (Contractor Furnished / Retained)

2.3 Interior Lane Closure. The contractor shall obtain approval from the engineer prior to any interior lane closure. An interior lane closure shall be performed by furnishing, installing, and removing the following set of traffic control devices.

2 each Bridge Work Ahead
2 each Right (Left) Lane Closed Ahead
2 each Reduced Speed Limit Ahead (Symbol)
1 each Right (Left) Lane Closed
1 each Merge with Right (Left) Arrow
2 each Speed Limit XX MPH
2 each Work Zone (Plaque)
1 each Center Lane Closed Ahead
1 each Right (Left) Reverse Curve (Symbol)
2 each Speed Limit XX (Normal Speed)
14 each Directional Indicator Barricade
100 each Channelizer (Trim Line)
3 each Flashing Arrow Panel (One Truck Mount for TMA)
1 each Truck Mounted Attenuator
1 each Changeable Message Sign (Contractor Furnished / Retained)

2.4 Triple Lane Closure. The contractor shall obtain approval from the engineer prior to any triple lane closure. A triple lane closure shall be performed by furnishing, installing, and removing the following set of traffic control devices.

2 each Bridge Work Ahead
2 each 3 Right (Left) Lanes Closed Ahead
2 each Reduced Speed Limit Ahead (Symbol)
3 each Right (Left) Lane Closed
3 each Merge with Right (Left) Arrow
6 each Speed Limit XX MPH
6 each Work Zone (Plaque)
2 each Speed Limit XX (Normal Speed)
42 each Directional Indicator Barricade
70 each Channelizer (Trim Line)
4 each Flashing Arrow Panel (One Truck Mount for TMA)
1 each Truck Mounted Attenuator
1 each Changeable Message Sign (Contractor Furnished / Retained)

2.5 Ramp Closure. The contractor shall obtain approval from the engineer a minimum of five days prior to any ramp closure. A ramp closure shall be performed by furnishing, installing, and removing the following set of traffic control devices. Uncovering and covering any detour trailblazing placards furnished and installed by others is included in the work.

2 each Bridge Work Ahead
2 each Ramp Closed Ahead
2 each Reduced Speed Limit Ahead (Symbol)
2 each Detour Ahead
2 each Speed Limit XX MPH
2 each Work Zone (Plaque)
1 each Road Closed

2 each	Speed Limit XX (Normal Speed)
14 each	Directional Indicator Barricade
40 each	Channelizer (Trim Line)
2 each	Flashing Arrow Panel (One Truck Mount for TMA)
1 each	Truck Mounted Attenuator
2 each	Changeable Message Sign (Contractor Furnished / Retained)
3 each	Type III Movable Barricade

2.6 One-Lane Two-Way Operation with Flaggers. A minimum of two flaggers will be required to direct traffic. Additional flaggers may be required when working at intersecting streets or ramps as directed by the engineer. No direct payment will be made for flaggers. "One-Lane Two-Way Operation with Flaggers", shall include furnishing, installing, and removing the following set of traffic control devices as shown on the plans:

2 each	Road Work Ahead
2 each	One Lane Road Ahead
2 each	Be Prepared To Stop
2 each	Flagger (Symbol)

3.0 Additional Traffic Control Devices. The engineer may determine that signs, channelizers, and Type III Movable Barricades in addition to those devices shown in the plans are necessary to safely accommodate traffic. These additional devices may be needed for merging ramp traffic, detours, multiple bridges, or other special cases to supplement the specified lane closure devices. The contract provides a fixed cost for any additional traffic control items.

4.0 Flaggers. Flaggers may be required when working at intersecting streets or ramps as directed by the engineer. No direct payment will be made for flaggers.

5.0 Temporary Traffic Control Single Lane Shift. When a Single Lane Closure is used for work on a divided highway, and repairs are necessary in both the right and left lanes within the same log mile range and direction, payment for the Temporary Traffic Control Single Lane Shift shall be paid for at the fixed unit price.

6.0 Method of Measurement and Basis of Payment.

6.1 Measurement of lane closures will be made per each set-up made within the term of the Job Order. A set-up is defined as each installation and removal of traffic control devices at a specific work site. If a set-up is switched to a different lane (i.e., from a left lane closure to a right lane closure), the contractor will be paid per each set-up. If the duration of a lane closure exceeds one week, the contractor will be paid an additional fixed unit cost for the Changeable Message Sign (Contractor Furnished/Retained) and the Flashing Arrow Panel (One Truck Mount for TMA) per week. If the engineer determines that a lane closure is needed both on the bridge and under the bridge to accommodate the work, each lane closure type will be paid for at the work site per the fixed unit price established for each type lane closure. Payment will not be made for any lane closure that does not result in productive deck repair work as determined by the engineer. Additional lane closures may be installed by the contractor at his expense. The accepted quantity of each lane closure will be paid for at the fixed unit price for:

Item 616-99.02	Single Lane Closure	Each
Item 616-99.02	Double Lane Closure	Each
Item 616-99.02	Interior Lane Closure	Each
Item 616-99.02	Triple Lane Closure	Each

Item 616-99.02	Ramp Closure	Each
Item 616-99.02	Temporary Traffic Control Single Lane Shift	Each
Item 616-99.02	One-Lane Two-Way Operation with Flaggers	Each

multiplied by the Adjustment Factor, as mutually agreed upon in the Job Order.

6.2 Measurement of additional traffic control devices will be made per each set-up made within the term of the Job Order. Payment for the devices shall include furnishing, installing, and removing the additional devices at a specific work site. No payment will be made for additional devices used by the contractor without prior approval of the engineer. The accepted quantity of additional traffic control devices will be paid for in accordance with the fixed unit price list, multiplied by the Adjustment Factor, as mutually agreed upon in the Job Order.

T. Work Plan and Schedule for Accomplishing Work

Delete Sec 108.4 through 108.4.4 and substitute the following:

108.4 Work Plan and Schedule. Prior to or at the preconstruction conference, the contractor shall provide a proposed work plan and typical schedule for accomplishing work. The work plan shall include a written list of equipment and personnel that the contractor intends to use in executing the work.

108.4.1 The work plan will be reviewed by the engineer to determine in general if adequate personnel and equipment appear to be available to complete the work within the required number of calendar days. If the engineer determines the work plan is inadequate, the engineer and contractor shall meet for a joint review of the plan to correct and adjust the plan and schedule as necessary. A revised work plan and schedule shall be provided by the contractor prior to commencing the work.

108.4.2 If multiple job orders are issued with overlapping completion periods, the priority of the work will be jointly determined by the engineer and the contractor, with final approval of the work plan by the engineer. The work schedule and work priorities will be determined by the needs of the Commission and not the contractor's convenience of work location.

108.4.3 No direct payment will be made for furnishing the work plan or revisions.

108.4.4 The contractor shall determine the most feasible work plan and schedule consistent with the requirements of the contract. The engineer's approval of contractor's work plan is not intended to be acknowledgment or representation that it is reasonable or will accomplish the work within a particular time or at a particular cost.

U. 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 engineer shall also be notified when the contractor requests emergency assistance.

Matt Koppitz, Resident Engineer, Construction and Materials: 417-830-8440

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 Troop D – All other counties	417-895-6868
MoDOT Incident Response (4:00 PM to 7:30 AM CST)	417-766-3265
MoDOT SW District Customer Service (7:30 AM to 4:00 PM CST)	417-895-7600

COUNTY SHERIFF	CITY POLICE
Christian County 417-581-5133	Nixa 417-725-2510
Greene County 417-868-4040	Ozark 417-581-7914
	Republic 417-732-3900
	Strafford 417-736-4000
	Springfield 417-864-1810
	Willard 417-742-3077

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 payment will be made to the contractor to recover the cost of the communication equipment, labor, materials or time required to fulfill the above provisions.

V. Utilities

1.0 It is the inherent risk of the work under this contract that the contractor may encounter utilities above and/or below the ground or in the vicinity of any given job order which may interfere with their operations. The contractor expressly acknowledges and assumes this risk even though the nature and extent is unknown to both the contractor and the Commission at the time of bidding and award of the contract. The effect in cost or time of the presence of utilities above, below or in the vicinity of the contractor’s work under this contract shall not be compensable.

W. Delay Provisions

1.0 If the contractor is delayed in the commencement, prosecution or completion of the work by any act of the Commission, or by any cause beyond the contractor’s control, then the contractor

will be entitled to an extension of time. If the contractor is delayed or prevented from working on a particular date as a result of a delay, error or omission of the Commission, and the contractor incurs unavoidable labor costs as a direct result thereof because the contractor did not have enough time to cancel or divert its labor force, then the contractor will be reimbursed for such costs. For each worker so paid, the contractor will be reimbursed the amount paid the worker. Also, the contractor will be reimbursed for construction tasks required as a direct result of such delay, error or omission, such as closing off areas of work. No other costs shall be paid as a result of a delay or late cancellation.

1.1 If the contractor fails to provide 5-days notification for all Job Orders, this provision will not apply.

X. Eliminated Materials

1.0 Materials required by the Detailed Scope of Work and not incorporated into the work due to changes caused by field conditions or revisions to the design by the Commission after the material was ordered or purchased will be reimbursed at the material portion of the Pre-priced Task, or if there is no Pre-priced Task, then its material cost minus salvage value, or the material cost plus delivery costs.

Y. Sample Job Orders

1.0 Description. The following are example Job Orders intended to be illustrations that may be used as a guide for formulating the bid of the Adjustment Factor. For each example Job Order, the appropriate items that would be used and the quantities are computed based upon the sample work that would be completed in the Job Order. The contractor shall be reminded these are Job Order samples and the quantity totals in actual Job Orders, if issued, may be more or less than that depicted below or be totally different from the samples illustrated.

1.1 Job Order Sample 1: Bridge deck repair for Bridge No. A1234 on Interstate or Major Route requiring night work.

Item Description	Fixed Unit Price	Quantity	Price
Repairing Concrete Deck (Half-Soling) (Under 200 SF)	\$60.00	150 SF	\$9,000.00
Full Depth Repair (Under 200 SF)	\$100.00	50 SF	\$5,000.00
Dense Concrete Overlay Repair (Under 200 SF)	\$40.00	180 SF	\$7,200.00
Double Lane Closure	\$1,300.00	1 Each	\$1,300.00
		Subtotal	\$22,500.00
		:	
Adjustment Factor	1.200		
		TOTAL:	\$27,000.00

1.2 Job Order Sample 2: Bridge deck and epoxy polymer overlay repair for Bridge No. A1501 on Interstate requiring night work. Includes closing WB entrance ramp from Broadway.

Item Description	Fixed Unit Price	Quantity	Price
Construction Signs	\$1.00	480 SF	\$480.00
Type III Moveable Barricade	\$25.00	10 Each	\$250.00
Single Lane Closure	\$1000.00	10 Each	\$10,000.00
Repairing Concrete Deck (Half-soling) (Over 600 SF)	\$35.00	1000 SF	\$35,000.00
Epoxy Polymer Overlay Repair, Concrete Deck (Over 600 SF)	\$8.00	1200 SF	\$9,600.00
		Subtotal:	\$55,330.00
Adjustment Factor	1.171		
		TOTAL	\$64,791.43

1.3 Job Order Sample 3: Bridge deck repair in center lane eastbound on Manchester Trafficway Bridge No. L0967 requiring nighttime work.

Item Description	Fixed Unit Price	Quantity	Price
Single Lane Closure	\$1,000.00	6 Each	\$6,000.00
Double Lane Closure	\$1,300.00	8 Each	\$10,400.00
Repairing Concrete Deck (Half-soling) (Over 600 SF)	\$35.00	2500 SF	\$87,500.00
Full Depth Repair (Under 200 SF)	\$100.00	100 SF	\$10,000.00
		Subtotal:	\$113,900.00
Adjustment Factor	1.218		
		TOTAL:	\$138,730.20

Z. Supplemental Revisions JSP-18-01AA

Compliance with [2 CFR 200.216 – Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment](#).

The Missouri Highways and Transportation Commission shall not enter into a contract (or extend or renew a contract) using federal funds to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as substantial or as critical technology as part of any system where the video surveillance and telecommunications equipment was produced by Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).

Stormwater Compliance Requirements

1.0 Description. This provision requires the contractor to provide a Water Pollution Control Manager (WPCM) for any project that includes land disturbance on the project site and the total area of land disturbance, both on the project site, and all Off-site support areas, is one (1) acre or more. Regardless of the area of Off-site disturbance, if no land disturbance occurs on the project

site, these provisions do not apply. When a WPCM is required, all sections within this provision shall be applicable, including assessment of specified Liquidated Damages for failure to correct Stormwater Deficiencies, as specified herein. This provision is in addition to any other stormwater, environmental, and land disturbance requirements specified elsewhere in the contract.

1.1 Definitions. The project site is defined as all areas designated on the plans, including temporary and permanent easements. The project site is equivalent to the “permitted site”, as defined in MoDOT’s State Operating Permit. An Off-site area is defined as any location off the project site the contractor utilizes for a dedicated project support function, such as, but not limited to, staging area, plant site, borrow area, or waste area.

1.2 Reporting of Off-Site Land Disturbance. If the project includes any planned land disturbance on the project site, prior to the start of work, the contractor shall submit a written report to the engineer that discloses all Off-site support areas where land disturbance is planned, the total acreage of anticipated land disturbance on those sites, and the land disturbance permit number(s). Upon request by the engineer, the contractor shall submit a copy of its land disturbance permit(s) for Off-site locations. Based on the total acreage of land disturbance, both on and Off-site, the engineer shall determine if these Stormwater Compliance Requirements shall apply. The Contractor shall immediately report any changes to the planned area of Off-site land disturbance. The Contractor is responsible for obtaining its own separate land disturbance permit for Off-site areas.

2.0 Water Pollution Control Manager (WPCM). The Contractor shall designate a competent person to serve as the Water Pollution Control Manager (WPCM) for projects meeting the description in Section 1.0. The Contractor shall ensure the WPCM completes all duties listed in Section 2.1.

2.1 Duties of the WPCM:

- (a) Be familiar with the stormwater requirements including the current MoDOT State Operating Permit for construction stormwater discharges/land disturbance activities; MoDOT’s statewide Stormwater Pollution Prevention Plan (SWPPP); the Corps of Engineers Section 404 Permit, when applicable; the project specific SWPPP, the Project’s Erosion & Sediment Control Plan; all applicable special provisions, specifications, and standard drawings; and this provision;
- (b) Successfully complete the MoDOT Stormwater Training Course within the last 4 years. The MoDOT Stormwater Training is a free online course available at MoDOT.org;
- (c) Attend the Pre-Activity Meeting for Grading and Land Disturbance and all subsequent Weekly Meetings in which grading activities are discussed;
- (d) Oversee and ensure all work is performed in accordance with the Project-specific SWPPP and all updates thereto, or as designated by the engineer;
- (e) Review the project site for compliance with the Project SWPPP, as needed, from the start of any grading operations until final stabilization is achieved, and take necessary actions to correct any known deficiencies to prevent pollution of the waters of the state or adjacent property owners prior to the engineer’s weekly inspections;

- (f) Review and acknowledge receipt of each MoDOT Inspection Report (Land Disturbance Inspection Record) for the Project within forty eight (48) hours of receiving the report and ensure that all Stormwater Deficiencies noted on the report are corrected as soon as possible, but no later than stated in Section 5.0.

3.0 Pre-Activity Meeting for Grading/Land Disturbance and Required Hold Point. A Pre-Activity meeting for grading/land disturbance shall be held prior to the start of any land disturbance operations. No land disturbance operations shall commence prior to the Pre-Activity meeting except work necessary to install perimeter controls and entrances. Discussion items at the pre-activity meeting shall include a review of the Project SWPPP, the planned order of grading operations, proposed areas of initial disturbance, identification of all necessary BMPs that shall be installed prior to commencement of grading operations, and any issues relating to compliance with the Stormwater requirements that could arise in the course of construction activity at the project.

3.1 Hold Point. Following the pre-activity meeting for grading/land disturbance and subsequent installation of the initial BMPs identified at the pre-activity meeting, a Hold Point shall occur prior to the start of any land disturbance operations to allow the engineer and WPCM the time needed to perform an on-site review of the installation of the BMPs to ensure compliance with the SWPPP is met. Land disturbance operations shall not begin until authorization is given by the engineer.

4.0 Inspection Reports. Weekly and post run-off inspections will be performed by the engineer and each Inspection Report (Land Disturbance Inspection Record) will be entered into a web-based Stormwater Compliance database. The WPCM will be granted access to this database and shall promptly review all reports, including any noted deficiencies, and shall acknowledge receipt of the report as required in Section 2.1 (f.).

5.0 Stormwater Deficiency Corrections. All stormwater deficiencies identified in the Inspection Report shall be corrected by the contractor within 7 days of the inspection date or any extended period granted by the engineer when weather or field conditions prohibit the corrective work. If the contractor does not initiate corrective measures within 5 calendar days of the inspection date or any extended period granted by the engineer, all work shall cease on the project except for work to correct these deficiencies, unless otherwise allowed by the engineer. All impact costs related to this halting of work, including, but not limited to stand-by time for equipment, shall be borne by the Contractor. Work shall not resume until the engineer approves the corrective work.

5.1 Liquidated Damages. If the Contractor fails to complete the correction of all Stormwater Deficiencies listed on the MoDOT Inspection Report within the specified time limit, the Commission will be damaged in various ways, including but not limited to, potential liability, required mitigation, environmental clean-up, fines, and penalties. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of \$2,000 per day for failure to correct one or more of the Stormwater Deficiencies listed on the Inspection Report within the specified time limit. In addition to the stipulated damages, the stoppage of work shall remain in effect until all corrections are complete.

6.0 Basis of Payment. No direct payment will be made for compliance with this provision.

Anti-Discrimination Against Israel Certification

By signing this contract, the Company certifies it is not currently engaged in and shall not, for the duration of the contract, engage in a boycott of goods or services from the State of Israel, companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel, or persons or entities doing business in the State of Israel as defined by Section 34.600 RSMo. This certification shall not apply to contracts with a total potential value of less than One Hundred Thousand Dollars (\$100,000) or to contractors with fewer than ten (10) employees.

Ground Tire Rubber (GTR) Dry Process Modification of Bituminous Pavement Material

1.0 Description. This work shall consist of the dry process of adding ground tire rubber (GTR) to modify bituminous material to be used in highway construction. Existing GTR requirements in Section 1015 pertain to the wet process method of GTR modification that blends GTR with the asphalt binder (terminal blending or blending at HMA plant). The following requirements shall govern for dry process GTR modification. The dry process method adds GTR as a fine aggregate or mineral filler during mix production. All GTR modified asphalt mixtures shall be in accordance with Secs 401, 402, or 403 as specified in the contract; except as revised by this specification.

2.0 Materials. The contractor shall furnish a manufacturer’s certification to the engineer for each shipment of GTR furnished stating the name of the manufacturer, the chemical composition, workability additives, and certifying that the GTR supplied is in accordance with this specification.

2.1 Product Approval. The GTR product shall contain a Trans-Polyoctenamer (TOR) added at 4.5 % of the weight of the crumb rubber or an engineered crumb rubber (ECR) workability additive that has proven performance in Missouri. Other GTR additives shall be demonstrated and proven prior to use such as a five-year field performance history in other states or performance on a federal or state-sanctioned accelerated loading facility.

2.2 General. GTR shall be produced from processing automobile or truck tires by ambient or cryogenic grinding methods. Heavy equipment tires, uncured or de-vulcanized rubber will not be permitted. GTR shall also meet the following material requirements:

Table 1 – GTR Material Properties		
Property	Test Method	Criteria
Specific Gravity	ASTM D1817	1.02 to 1.20
Metal Contaminates	ASTM D5603	≤ 0.01%
Fiber Content	ASTM D5603	≤ 0.5%
Moisture Content	ASTM D1509	≤ 1.0%*
Mineral Filler	AASHTO M17	≤ 4.0%

*Moisture content of the GTR shall not cause foaming when combined with asphalt binder and aggregate during mix production

2.3 Gradation. The GTR material prior to TOR or ECR workability additives shall meet the following gradation and shall be tested in accordance with ASTM D5603 and ASTM D5644.

Sieve	Percent Passing by Weight
No. 20	100
No. 30	98-100
No. 40	50-70
No. 100	5-15

3.0 Delivery, Storage, and Handling. The GTR shall be supplied in moisture-proof packaging or other appropriate bulk containers. GTR shall be stored in a dry location protected from rain before use. Each bag or container shall be properly labeled with the manufacturer’s designation for the GTR and specific type, mesh size, weight and manufacturer’s batch or Lot designation.

4.0 Feeder System. Dry Process GTR shall be controlled with a feeder system using a proportioning device that is accurate to within ± 3 percent of the amount required. The system shall automatically adjust the feed rate to always maintain the material within this tolerance and shall have a convenient and accurate means of calibration. The system shall provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds per minute, to verify feed rate. The supply system shall report the feed in 1-pound increments using load cells that will enable the user to monitor the depletion of the GTR. Monitoring the system volumetrically will not be allowed. The feeder shall interlock with the aggregate weight system and asphalt binder pump to maintain correct mixture proportions at all production rates.

Flow indicators or sensing devices for the system shall be interlocked with the plant controls to interrupt mixture production if GTR introduction rate is not within ± 3 percent. This interlock will immediately notify the operator if GTR introduction rate exceeds introduction tolerances. All plant production will cease if the introduction rate is not brought back within tolerance after 30 seconds. When the interlock system interrupts production and the plant has to be restarted, upon restarting operations; the modifier system shall run until a uniform feed can be observed on the output display. All mix produced prior to obtaining a uniform feed shall be rejected.

4.1 Batch Plants. GTR shall be added to aggregate in the weigh hopper. Mixing times shall be increased per GTR manufacturer recommendations.

4.2 Drum Plants. The feeder system shall add GTR to aggregate and liquid binder during mixing and provide sufficient mixing time to produce a uniform mixture. The feeder system shall ensure GTR does not become entrained in the exhaust system of the drier or plant and is not exposed to the drier flame at any point after introduction.

5.0 Testing During Mixture Production. Testing of asphalt mixes containing GTR shall not begin until at least 30 minutes after production or per additive supplier’s recommendation.

6.0 Construction Requirements. Mixes containing GTR shall have a target mixing temperature of 325 F or as directed by the GTR additive supplier. The additive supplier’s recommendations shall be followed to allow for GTR binder absorption/reaction. This may include holding mix in the silo to allow time for binder to absorb into the GTR. Rolling operations may need to be modified.

7.0 Mix Design Test Method Modification. A formal mixing procedure from the additive supplier shall be provided to the contractor and engineer that details the proper sample preparation, including blending GTR with the binder or other additives. Samples shall be prepared and

fabricated in accordance with this procedure by the engineer and contractor throughout the duration of the project.

8.0 Mix design Volumetrics. Mix design volumetric equations shall be modified as follows:

8.1 Additional virgin binder added to offset GTR absorption of binder shall be counted as part of the mix virgin binder

8.2 GTR shall be included as part of the aggregate when calculating VMA of the mix.

8.2.1 GTR SPG shall be 1.15

8.3 Mix G_{sb} used to determine VMA shall be calculated as follows:

$$G_{sb (JMF)} = \frac{(100 - P_{bmv})}{\left(\frac{P_s}{G_{sb}} + \frac{P_{GTR}}{G_{GTR}}\right)}$$

where:

$G_{sb (JMF)}$ = bulk specific gravity of the combined aggregate including GTR

P_{bmv} = percent virgin binder by total mixture weight

P_s = percent aggregate by total mixture weight (not including GTR)

P_{GTR} = percent GTR by total mixture weight

G_{sb} = bulk specific gravity of the combined aggregate (not including GTR)

G_{GTR} = GTR specific gravity

8.4 G_{se} shall be calculated as follows:

$$G_{se} = \frac{(100 - P_b - P_{GTR})}{\left(\frac{100}{G_{mm}} - \frac{P_b}{G_b} - \frac{P_{GTR}}{G_{GTR}}\right)}$$

8.5 P_{be} shall be calculated as follows:

$$P_{be} = P_b - \frac{P_{ba}}{100} * (P_s + P_{GTR})$$

9.0 Minimum GTR Amount. The minimum dosage rate for GTR shall be 5 % by weight of total binder for an acceptable one bump grade or 10 % by weight of total binder for an acceptable two bump grade as detailed in the following table. Varying percentage blends of GTR and approved additives may be used as approved by the engineer with proven performance and meeting the specified requirements of the contract grade.

Contract Binder Grade	Percent Effective Virgin Binder Replacement Limits	Required Virgin Binder Grade	Minimum GTR Dosage Rate
PG 76-22	0 - 20	PG 70-22	5 %
		PG 64-22	10 %
PG 70-22	0 - 30	PG 64-22	5 %
		PG 58-28	10 %
PG 64-22	0 - 40*	PG 58-28	5 %
		PG 52-34	10 %
PG 58-28	0 - 40*	PG 52-34	5 %
		PG 46-34	10 %

* Reclaimed Asphalt Shingles (RAS) may be used when the contract grade is PG 64-22 or PG 58-28. RAS replacement shall follow the 2 x RAS criteria when calculating percent effective binder replacement in accordance Sec 401.

Delete Sec 403.19.2 and substitute the following:

403.19.2 Lots. The lot size shall be designated in the contractor’s QC Plan. Each lot shall contain no less than four sublots and the maximum sublot size shall be 1,000 tons. The maximum lot size shall be 4,000 tons for determination of pay factors. Sublots from incomplete lots shall be combined with the previous complete lot for determination of pay factors. When no previous lot exists, the mixture shall be treated in accordance with [Sec 403.23.7.4.1](#). A new lot shall begin when the asphalt content of a mixture is adjusted in accordance with [Sec 403.11](#).

Delete Sec 106.9 and substitute the following:

106.9 Buy America Requirements

Buy America Requirements are waived if the total amount of Federal financial assistance applied to the project, through awards or subawards, is below \$500,000.

106.9.1 Buy America Requirements for Iron and Steel.

On all federal-aid projects, the contractor’s attention is directed to Title 23 CFR 635.410 *Buy America Requirements*. Where steel or iron products are to be permanently incorporated into the contract work, steel and iron material shall be manufactured, from the initial melting stage through the application of coatings, in the USA except for “minimal use” as described herein. Furthermore, any coating process of the steel or iron shall be performed in the USA. Under a general waiver from FHWA the use of pig iron and processed, pelletized, and reduced iron ore manufactured outside of the USA will be permitted in the domestic manufacturing process for steel or iron material.

106.9.2 Buy America Requirements for Iron and Steel for Manufactured items.

A manufactured item will be considered iron and steel if it is “predominantly” iron or steel. Predominantly iron or steel means that the cost of iron or steel content of a product is more than 50 percent of the total cost of all its components.

106.9.2 Any sources other than the USA as defined will be considered foreign. The required domestic manufacturing process shall include formation of ingots and any subsequent process. Coatings shall include any surface finish that protects or adds value to the product.

106.9.3 “Minimal use” of foreign steel, iron or coating processes will be permitted, provided the cost of such products does not exceed 1/10 of one percent (0.1 percent) of the total contract cost or \$2,500.00, whichever is greater. If foreign steel, iron, or coating processes are used, invoices to document the cost of the foreign portion, as delivered to the project, shall be provided and the engineer’s written approval obtained prior to placing the material in any work.

106.9.4 Buy America requirements include a step certification for all fabrication processes of all steel or iron materials that are accepted per Sec 1000. The AASHTO Product Evaluation and Audit Solutions compliance program verifies that all steel and iron products fabrication processes conform to 23 CFR 635.410 Buy America Requirements and is an acceptable standard per 23 CFR 635.410(d). AASHTO Product Evaluation and Audit Solutions compliant suppliers will not be required to submit step certification documentation with the shipment for some selected steel and iron materials. The AASHTO Product Evaluation and Audit Solutions compliant supplier shall maintain the step certification documentation on file and shall provide this documentation to the engineer upon request.

106.9.4.1 Items designated as Category 1 will consist of steel girders, piling, and reinforcing steel installed on site. Category 1 items require supporting documentation prior to incorporation into the project showing all steps of manufacturing, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements. This includes the Mill Test Report from the original producing steel mill and certifications documenting the manufacturing process for all subsequent fabrication, including coatings. The certification shall include language that certifies the following. That all steel and iron materials permanently incorporated in this project was procured and processed domestically and all manufacturing processes, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410.

106.9.4.2 Items designated as Category 2 will include all other steel or iron products not in Category 1 and permanently incorporated in the project. Category 2 items shall consist of, but not be limited to items such as fencing, guardrail, signing, lighting and signal supports. The prime contractor is required to submit a material of origin form certification prior to incorporation into the project from the fabricator for each item that the product is domestic. The Certificate of Materials Origin form ([link to certificate form](#)) from the fabricator must show all steps of manufacturing, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements and be signed by a fabricator representative. The engineer reserves the right to request additional information and documentation to verify that all Buy America requirements have been satisfied. These documents shall be submitted upon request by the engineer and retained for a period of 3 years after the last reimbursement of the material.

106.9.4.3 Any minor miscellaneous steel or iron items that are not included in the materials specifications shall be certified by the prime contractor as being procured domestically. Examples of these items would be bolts for sign posts, anchorage inserts, etc. The certification shall read “I certify that all steel and iron materials permanently incorporated in this project during all manufacturing processes, including coating, as being completed in the United States and in accordance with CFR Title 23 Section 635.410 Buy America Requirements procured and processed domestically in accordance with CFR Title 23 Section 635.410 Buy America

Requirements. Any foreign steel used was submitted and accepted under minor usage". The certification shall be signed by an authorized representative of the prime contractor.

106.9.5 When permitted in the contract, alternate bids may be submitted for foreign steel and iron products. The award of the contract when alternate bids are permitted will be based on the lowest total bid of the contract based on furnishing domestic steel or iron products or 125 percent of the lowest total bid based on furnishing foreign steel or iron products. If foreign steel or iron products are awarded the contract, domestic steel or iron products may be used; however, payment will be at the contract unit price for foreign steel or iron products.

106.9.6 Buy America Requirements for Construction Materials other than iron and steel materials. Construction materials means articles, materials, or supplies that consist of only one of the items listed. Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material. Upon request by the engineer, the contractor shall submit a domestic certification for all construction materials listed that are incorporated into the project.

- (a) Non-ferrous metals
- (b) Plastic and Polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables)
- (c) Glass (including optic glass)
- (d) Fiber optic cable (including drop cable)
- (e) Optical fiber
- (f) Lumber
- (g) Engineered wood
- (h) Drywall

106.9.6.1 Minimal Use allowance for Construction Materials other than iron or steel.

"The total value of the non-compliant products is no more than the lesser of \$1,000,000 or 5% of total applicable costs for the project." The contractor shall submit to the engineer any non-domestic materials and their total material cost to the engineer. The contractor and the engineer will both track these totals to assure that the minimal usage allowance is not exceeded.

106.9.7 Buy America Requirements for Manufactured Products.

Manufactured products means:

- (a) Articles, materials, or supplies that have been:
 - (i) Processed into a specific form and shape; or
 - (ii) Combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.
- (b) If an item is classified as an iron or steel product, a construction material, or a section 70917(c) material under § 184.4(e) and the definitions set forth in this section, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under § 184.4(e) and paragraph (1) of this definition may include components that are construction materials, iron or steel products, or section 70917(c) materials.

106.9.7.1 Manufactured products are exempt from Buy America requirements. To qualify as a manufactured product, items that consist of two or more of the listed construction materials that have been combined together through a manufacturing process, and items that include at least

one of the listed materials combined with a material that is not listed through a manufacturing process, should be treated as manufactured products, rather than as construction materials.

106.9.7.2 Manufactured items are covered under a general waiver to exclude them from Buy America Requirements. To qualify for the exemption the components must comprise of 55% of the value of materials in the item. The final assembly must also be performed domestically.

AA. Previous Job Order Information

1.0 Previous Job orders. Job order information, consisting of quantities and pay items that were issued for past contracts will be available from the Project Contact upon the bidder's written request. This information does not constitute part of the bid or contract documents. It is provided for the bidder's use during bid preparation, and shall not be considered a representation of actual job orders to be issued during construction for this contract. Furnishing this information does not relieve a bidder or contractor from the responsibility of estimating the number and types of job orders that will be issued for future contracts. The bidder or contractor shall assume the risk of error if the information is used for any purposes for which the information was not intended. The Commission makes no representation as to the accuracy or reliability of the information, since the information may not be representative of the sealed contract documents. Any assumption the bidder or contractor may make from this information is at the bidder or contractor's risk; none are intended by the Missouri Highways and Transportation Commission. The bidder or contractor assumes the sole risk of liability or loss if the bidder or contractor does rely on this information to its detriment, delay or loss.

BB. Railroad Requirements

1.0 The right of way of various Railroads, herein called "Railroad", are located within the limits of this project. However, this project has been developed with the specific intention that no involvement with the Railroad's facilities, traffic or right of way is required for the performance of the contractual work herein. The work to be performed over the Railroad's right of way shall not interfere with the Railroad's operations or facilities. Under these circumstances, the requirements of Sec 104.12.3, Sec 104.12.8 through 104.12.10.5 (inclusive), and Sec 107.13.4 shall not apply.

2.0 Should the contractor violate this condition of no railroad involvement, all terms and conditions of the interaction with the Railroad shall be solely between the Railroad and the contractor.

CC. Environmental Guidance for Job Order Contracting Projects

1.0 Description. This Job Special Provision provides notes on a variety of environmental protection measures required for various job order contracting activities. Please follow EPG guidance on recommended work practices, as well as the specific notes provided in this document. These notes apply throughout the entire state, except for the T&E Species Guidance – Cave Recharge Areas section, which applies to cave recharge areas in nine counties across southern Missouri (Greene, Jasper, Lawrence, Newton, Christian, Barry, Stone, Perry, and Taney Counties).

2.0 Restrictions. The following restrictions will ensure that MoDOT adheres to all environmental regulations as required by federal law.

2.1 Tree Clearing. Due to bat tree management requirements, no tree clearing is permitted for any activity, without prior coordination with MoDOT Environmental Section.

2.2 Work Near Water Bodies. Personnel shall plug all bridge drains, and implement any other measures necessary, to prevent any construction materials/debris or overspray/liquid from getting into the waterways. Work shall not be allowed below the ordinary high water elevation of any stream or lake. No work will be allowed in any wetlands. Personnel shall not drive or place any equipment in any waterway. Coordination with the Design - Environmental Section, and permitting and consultation with regulatory agencies, is required prior to any proposed activity below ordinary high water elevation or within a wetland.

3.0 Basis of Payment. No direct pay shall be provided for any labor, equipment, time, or materials necessary to complete this work. The contractor shall have no claim, or basis for any claim or suit whatsoever, resulting from compliance with this provision.

DD. Restrictions for Migratory Birds

1.0 Description. Swallows or other bird species protected by the Migratory Bird Treaty Act may be nesting under the bridge or bridges that will be repaired under this contract.

2.0 Restrictions. To comply with the Migratory Bird Treaty Act, nests of protected species cannot be disturbed when active (eggs or young are present). Generally, nests are active between April 1 and July 31, but active nests can be present outside of these dates.

2.1 MoDOT to Maintain Prior to the Notice to Proceed. The bridge, or bridges, associated with the work for this contract have been evaluated and any inactive nests found have been removed by MoDOT staff. MoDOT staff will maintain the structures to be free of nests until the Notice to Proceed date. At the notice to proceed, the contractor shall be responsible to maintain the structures to be free of nests until the work on the applicable bridge, or bridges, is complete.

3.0 Avoidance Measures. The contractor shall not disturb active nests or destroy adults, eggs or young birds. In an effort to comply with the Migratory Bird Treaty Act, the contractor operations will be limited to the options established in the following sections.

3.1 Inactive or Partially Constructed Nests. If nests are present and MoDOT determines that the nests are inactive or partially constructed, the contractor may remove the nests provided that the colony's inactive or partially constructed nests are completely removed by March 15 and the contractor maintains a nest free condition until the bridge work is complete. Dry removal methods shall be used when practicable. If dry removal is not practicable, hydro cleaning may be used if approved by the Engineer and only if water is free of blasting grit, chemicals, or detergents, and applied using pressure less than 5,000 PSI. Clean water such as that from municipal water treatment plants or wells shall be used. Use of source water from Waters of the State (i.e., streams or lakes), is allowable, if the appropriate methods to prevent the possible spread of invasive aquatic species are implemented.

3.2 Water and Equipment Used for Hydro cleaning. Aquatic invasives such as zebra mussels and some algae species have infested several bodies of water in the United States and can be transported by vessels (barges, boats, tugs, tankers, etc.) and equipment (tanks, tubing, pumps, etc.) that have been used in areas that contain these invasive species. If equipment is not properly inspected and treated to prevent the spread of invasives, these species can be introduced into areas not currently known to have a population. These invasive species are

detrimental to existing ecosystems and can outcompete native species. To assist in preventing the introduction and spread of aquatic invasive species through MoDOT projects in Missouri streams and lakes, the following precautions shall be followed.

3.2.1 Use of Water from Streams, Lakes or Ponds. Contractors shall not use water for nest removal from streams, lakes or ponds, unless they have implemented appropriate methods to prevent the possible spread of invasive aquatic species. Water sources from municipal water treatment plants or wells may be used without following these measures provided the equipment to be used has not previously contained waters from streams, lakes or ponds. If the equipment has previously contained waters from other streams or lakes, the following measures must be implemented prior to use.

3.2.1.1 Equipment Washing. Prior to the use or re-use of equipment following any use with water from streams, lakes or ponds, all equipment shall be washed and rinsed thoroughly with hard spray (power wash) and hot (minimum 120° F) water, for at least one minute.

3.2.1.2 Equipment Treating or Drying. Equipment shall be treated or dried in one of the following manners.

3.2.1.2.1 Equipment interior and/or other surfaces shall be treated with a 10% bleach solution to kill any aquatic nuisance species. This solution must also be run through all intake lines and hoses, to sterilize interior components. When chlorine treatment is used, all chlorine runoff from equipment washing must be collected and properly treated and/or disposed of in accordance with Sec 806.

3.2.1.2.2 Equipment interior and/or other surfaces shall be treated with 140° F water for a minimum of 10 seconds contact on all surfaces. 140 ° F water must also be run through all intake lines and hoses, to purge any standing water.

3.2.1.2.3 Equipment shall be flushed of all non-municipal water, and dried thoroughly, in the sun before using in or transporting between streams and lakes. Dry times will depend on the season the equipment is being used. Equipment must dry a minimum of 7 days for June-September, 18 days for March-May; 18 days for October-November, and 30 days for December-February. The drying method should be reserved as a last resort option.

3.2.2 Prior to use of equipment, contractors shall provide the MoDOT inspector written documentation of the equipment's geographic origin (including the water body it was last used in), as well as defining the specified treatment method used to adequately ensure protection against invasive species. The written documentation will include a statement indicating the contractor is aware of these provisions and will also treat the equipment appropriately after completion of the project.

3.3 Active Nests. The contractor may work on the bridge if active nests are present, as long as the work does not impact or disturb the birds and/or nests. At a minimum, work shall not be performed within 10 feet of an active nest; however, the contractor is responsible for ensuring their activities do not impact the nests, eggs, or young.

4.0 Additional Responsibilities. If active bird nests remain after all reasonable avoidance measures have been taken, or if bird nests are observed during project construction, the contractor shall notify the Engineer and the Engineer shall contact the MoDOT Environmental Section (573-526-4778) to determine if there are other allowable options.

EE. Bat Roosting on Bridges

1.0 Description. Federally listed bat species are known to roost on some bridges.

1.1 Bridges included in this project have not been inspected by a qualified MoDOT biologist to determine if bats have roosted or are currently roosting on the structure.

1.2 If bats are observed roosting on the structure at any time during the project, the contractor shall notify the Engineer and the Engineer shall contact the MoDOT Environmental Section (573) 526-4778.

1.3 Bats shall not be disturbed in any manner. Work must stop and shall not commence until approved by the Engineer after consultation with a qualified MoDOT biologist.

2.0 Basis of Payment. No direct pay shall be provided for any labor, equipment, time, or materials necessary to complete this work. The contractor shall have no claim, or basis for any claim or suit whatsoever, resulting from compliance with this provision.

FF. Construction Requirements

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. Plans for the existing structure(s) will be available to the successful bidder as directed by the engineer.

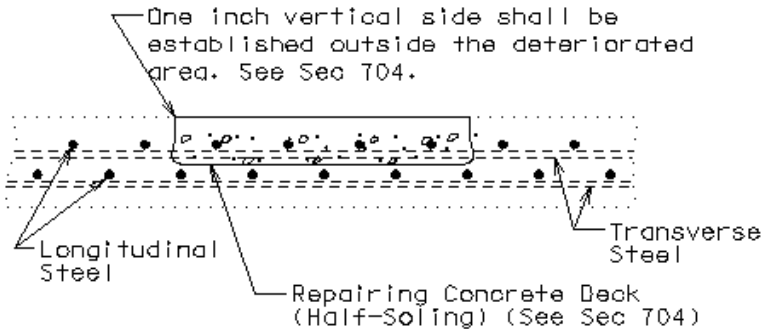
2.1 In order to assure the least traffic interference, the work shall be scheduled so that a lane closure is for the absolute minimum amount of time required to complete the work. A lane shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

2.2 Provisions shall be made to prevent any debris and materials from falling into the stream, lake or onto the roadway. Any debris and materials that falls below the bridge outside the limits mentioned previously and if determined necessary by the engineer, the debris shall be removed as approved by the engineer at the contractor's expense. Traffic under the bridge shall be maintained in accordance with the contract documents.

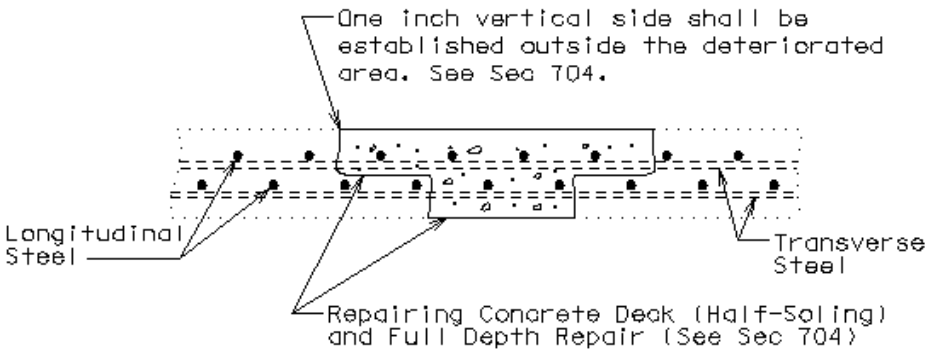
2.3 Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

2.4 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

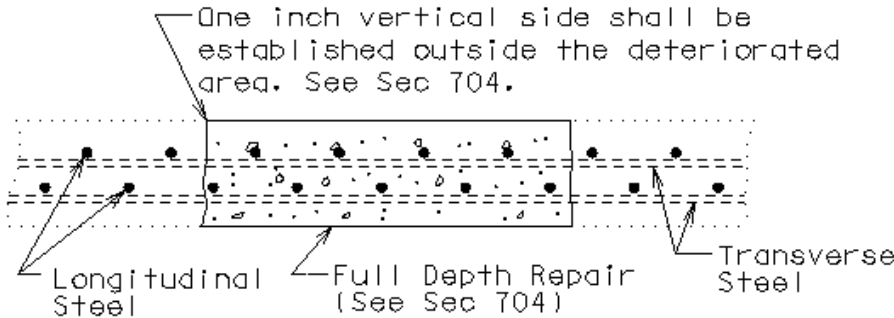
3.0 Bridge Deck Repairs.



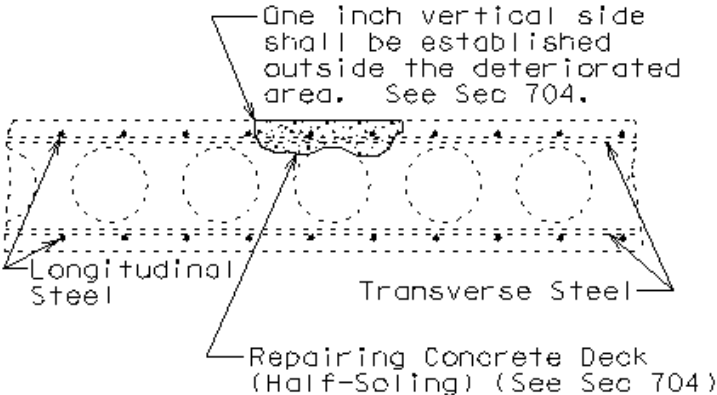
HALF-SOLED AREA



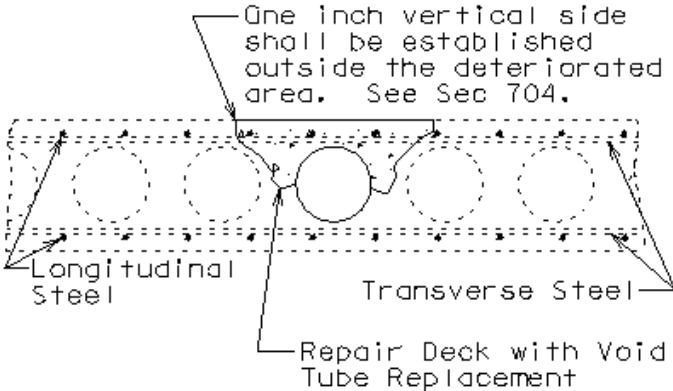
FULL DEPTH REPAIR
IN HALF-SOLED AREA



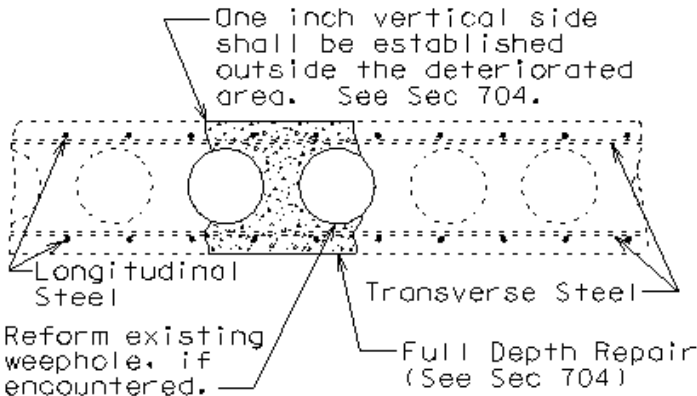
FULL DEPTH REPAIR



HALF-SOLED REPAIR



DECK REPAIR WITH VOID TUBE REPLACEMENT



FULL DEPTH REPAIR

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

GG. Concrete Masonry Repair

Delete paragraphs 704.4.1.6.2 and substitute the following:

704.4.1.6.2 Deck Repairs. The minimum depth of repair for repairing concrete deck (half-soling), approach slab repair or modified deck repair shall expose the upper layer of the top mat of reinforcing steel. All repair areas shall completely expose 100 percent of the reinforcing steel providing one inch (25 mm) clearance around all bars, regardless of observed bond or condition.

Delete paragraph 704.5.1 and substitute the following:

704.5.1 Repairing concrete deck (half-soling), approach slab repair, deck repair with void tube replacement, full depth repair, modified deck repair, superstructure repair (unformed) and substructure repair (formed and unformed) will be measured to the nearest square foot (0.1 m²).

Amend Sec 704 to include the following:

704.3.10 Approach Slab Repair. This work shall consist of partial removal and replacement of approach slab concrete in the required areas.

704.4.1.9 Zone Requirements. Bridges with steel girder superstructures like plate girders and I-beams or wide flange girders may have unlimited repair quantities per span unless otherwise shown on the plans or as designated by the engineer. Bridges with concrete superstructures like voided slabs, solid slabs, deck girders, rigid frame and box girders always have special repair zones.

704.4.1.9.1 Special Repair Zones. Any half-soling required in the areas designated as special repair zones shall be completed in alphabetical sequence. The contractor shall make a request to the engineer for the special repair zones areas before commencing work on bridges that always have special repair zones. Any repair in the remainder of the bridge that is adjacent to Zone A and not designated as a special repair zone shall be completed prior to work in Zone A. Removal and repair shall be completed in one special repair zone and concrete shall have attained a compressive strength of 3200 psi (22 MPa) before work can be started in the next special repair zone. Before placing concrete in areas adjacent to areas of subsequent repair, the concrete shall be separated with a material such as polyethylene sheets to aid in removal of old concrete.

704.4.1.9.2 Multiple Column Bents. Zones with the same letter designation may be repaired at the same time.

704.4.1.9.3 Single Column Bents. Zones with the same letter designation may be repaired at the same time except for the zones directly adjacent to the centerline of bent. If either of the zones adjacent to centerline of bent has a single repair area of over 10 square feet (0.9 m²) or a total repair area of over 20 square feet (1.9 m²), that zone shall be repaired before removing concrete in the other zone of the same designation at that bent.

704.4.1.9.4 Voided or Solid Slab Structures. If any single repair area does not exceed 4 square feet (0.35 m²) in size and the total repair within a special repair zone does not exceed 12 square feet (1.1 m²), the special repair zone requirement does not apply for that zone. An exposed void in the deck of a voided slab bridge shall be patched as approved by the engineer in a manner that shall maintain the void area completely free of concrete. Cost of patching an exposed void will be considered completely covered by the contract unit price of other items included in the contract.

704.4.1.9.5 Box and Deck Girder Structures. Total width of full depth repair shall not exceed 1/3 of the deck width at one time. For any area of deck repair that extends over a concrete girder and is more than 18 inches (460 mm) in length along the girder, the concrete removal shall stop at the centerline of girder and repair completed in this area. Prior to continuing work in this area, the concrete shall have attained a compressive strength of 3200 psi (22 MPa). No traffic shall be permitted over the girder that is undergoing repair. When the full depth repair extends over a diaphragm or girder and the deteriorated concrete extends into the diaphragm or girder, all deteriorated concrete shall be removed and replaced as full depth repair. Concrete in girders shall not be removed below the deck haunch of the girder without prior review and approval from the engineer.

704.4.1.9.6 Box Girder Structures. Interior falsework installed by the contractor resting on the bottom slab shall be removed where entry access is available. If any single repair area does not exceed 9 square feet (0.8 m²) in size and the total repair within a special repair zone does not exceed 27 square feet (2.5 m²), the special repair zone requirement does not apply for that zone. Half-soling repair in the special repair zone, on either side of the intermediate bents, shall be to a depth that will not expose half the diameter of the longitudinal reinforcing bar. Full depth repair shall be made when removal of deteriorated concrete exposes half or more of the diameter of the longitudinal reinforcing bar.

HH. Rapid Set Concrete Patching Material – Vertical and Overhead Repairs JSP-02-01

1.0 Description. This specification covers cementitious concrete, polymer-modified concrete and polymer concrete that are suitable for repairing concrete surfaces on bridges or concrete structures, particularly under fast setting or special conditions. The repairs would involve vertical or overhead applications. The work shall consist of removing, furnishing, preparing, and placing materials at locations as shown on the plans or as directed by the engineer.

2.0 Material. All materials shall be in accordance with MoDOT specifications and as noted herein.

2.1 Aggregate For Extending Commercial Mixture. Coarse and fine aggregates shall be in accordance with [Sec 1005](#), except the requirements for gradation and percent passing the No. 200 sieve shall not apply. Coarse aggregate meeting Gradation E requirements shall be used for repairs greater than one inch (25 mm) in depth. Fine aggregate will be allowed for repairs less than one inch (25 mm). Aggregate specified, bagged, labeled and furnished by the rapid set concrete patching material manufacturer may also be used for mortar extension.

2.2 Material Applications. The contractor shall select and use the product most suitable for the work and field conditions in accordance with these specifications.

2.3 Curing. Rapid set concrete patching material shall be cured until the minimum compressive strength 1500 psi is attained using standard curing specifications, unless otherwise specified by the manufacturer.

2.4 Qualification and Project Acceptance.

2.4.1 Inspection. All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required to conduct inspection and sampling.

2.4.2 Qualification. Prior to use, rapid set concrete patching materials need to be qualified.

2.4.2.1 Requested Information. The manufacturer shall submit with samples of the materials, a written request to Construction and Materials with the following information:

- (a) New Products Evaluation Form
- (b) Brand name of the product.
- (c) Certification that the material meets this specification.
- (d) Certified test results from an independent laboratory showing compliance with this specification.
- (e) Specific preparation instructions of repair area.
- (f) Specific mixing, handling and curing instructions.
- (g) Application type (i.e., vertical or overhead).

2.4.2.2 Field Evaluation. Final approval will be granted when the following requirements are met:

- (a) MoDOT report documenting two years of field performance on MoDOT system. The report will contain the placement date, field observations (semiannual), description of field performance and photographs of in-place material.
- (b) A manufacturer's representative shall be present during placement of the material to provide technical expertise.

2.4.2.2.3 Disqualification. If during the two year observation period the repair area(s) fails the product will not be added to the qualified list.

2.5 Qualified List. The listing of qualified products are available from Construction and Materials or on MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed. The material will be subject to removal from the qualified list if there is evidence of unsatisfactory performance or a change in manufacturing process or formulation, or when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

2.6 Certification. The contractor shall supply a manufacturer's certification to the engineer for each lot of material furnished. The certification shall include the name of the manufacturer, a manufacturer certification statement that the material supplied is the same as that qualified and listing the date of qualification.

2.7 Acceptance. Acceptance of the material will be based on the use of a qualified product, the manufacturer's certification that the material supplied is the same as that approved and upon the results of such tests as may be performed by the engineer.

3.0 Mixture. Unless otherwise specified, rapid set concrete patching material shall be approved commercial mixtures meeting Sections 3.1 – 3.1.3. Rapid set concrete patching materials shall be specifically designed for the application needed.

3.1 Commercial Mixtures. Rapid set concrete patching material in its sacked form and mixtures when properly prepared in accordance with the manufacturer's specifications, shall meet the minimum test requirements given in Table 1. Mixtures may be supplied, as required, as a patching mortar or as a patching mortar with aggregate extension. If the material is to be supplied with extender aggregate, this shall also pass the required tests in Table 1 using the maximum allowed amount of extender aggregate.

3.1.1 Mixture Requirements. Rapid set concrete patching material shall be single packaged dry mix requiring the addition of water or other liquid component just prior to mixing. The material shall not contain soluble chlorides as an ingredient of manufacture. The material shall be placed in accordance to the manufacturer's recommendations.

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Bond Strength by Slant Shear	ASTM C882/C928 ²	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days	n/a	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days
Linear Coefficient of Thermal Expansion ¹ (for bagged mortar only, without extension aggregate)	ASTM C531	n/a	n/a	4 – 8 X 10 ⁻⁶ in/in/deg F
Resistance to Rapid Freezing & Thawing	AASHTO T161 or ASTM C666	80% min. using Procedure B ³ (300 Cycles)	80% min. using Procedure B ³ (300 Cycles)	n/a
Compressive Strength	AASHTO T22 or ASTM C39	1500 psi @ 3 hr & 3000 psi @ 24 hr	1500 psi @ 3 hr & 3000 psi @ 24 hr	n/a
Rapid Chloride Permeability	AASHTO T277 or ASTM C1202	1000 coulombs @ 28 days	1000 coulombs @ 28 days	1000 coulombs @ 28 days
Length Change	AASHTO T 160 or ASTM C157	In water Storage (+0.15) In air storage (-0.15)	In water storage (+0.15) In air storage (-0.15)	n/a
Color		gray	gray	gray

¹ Not required for extended mixtures if the mortar passes this requirement.

² ASTM C882 shall be performed on non-water based materials. ASTM C928 shall be performed on water-based materials.

³ Procedure A may be used in lieu of Procedure B

3.1.2 Construction Requirements. The manufacturer shall provide with the bagged mixture, specifications for the mixing procedure, amount and kind of liquid to be added, and the amount of aggregate extension allowed, if any. All mixing, handling and curing practices recommended by the manufacturer shall be followed and will be considered a part of these specifications.

3.1.3 Removal from Qualified List. All mixtures shall be approved before use. Reoccurring failures of any mixture for any reason will be cause for removal from the qualified list.

3.2 Vertical Repair.. A qualified rapid set concrete patching material approved for vertical use may be used when specified on the plans and as approved by the engineer. The engineer will make field cylinders to verify the 1500 psi (10 MPa) minimum strength. The material shall adhere to the concrete surface without sagging.

3.3 Overhead Repair. A qualified rapid set concrete patching material approved for overhead use may be used when specified on the plans and as approved by the engineer. The material shall be placeable in layers of at least 1 inch on overhead applications without the use of formwork or anchoring devices. The material shall adhere to the concrete surface without sagging. The engineer will make field cylinders to verify the 1500 psi (10 MPa) minimum strength.

4.0 Construction Requirements.

4.1 Mixing. Rapid set concrete patching material shall be mixed and finished according to the manufacturer's recommendation.

4.2 Preparation of Repair Area. Deteriorated, damaged or defective concrete as shown on the plans, required by the specifications or as directed by the engineer, shall be removed. All exposed reinforcement shall be thoroughly cleaned as shown on the plans, required by the specifications or as directed by the engineer. Unless otherwise specified by the commercial mixture manufacturer, the existing surface shall be damp and all free water shall be removed prior to placement of the required material.

4.3 Bonding Agent. A bonding agent may be used if recommended by the rapid set concrete patching material manufacturer.

5.0 Method of Measurement. No measurement will be made for rapid set concrete patching material.

6.0 Basis of Payment. Rapid set concrete patching material will be paid for at the contract unit price for other items and will be considered full compensation for all labor, equipment and material to complete the described work.

II. Rapid Set Concrete Patching Material – Horizontal Repairs JSP-02-10

1.0 Description. This specification covers cementitious concrete, polymer-modified concrete and polymer concrete that are suitable for repairing concrete surfaces on bridges or roadways, particularly under fast setting or special conditions. The repairs would involve horizontal applications. The work shall consist of removing, furnishing, preparing, and placing materials at locations as shown on the plans or as directed by the engineer.

2.0 Material. All materials shall be in accordance with MoDOT specifications and as noted herein.

2.1 Aggregate For Extending Commercial Mixture. Coarse and fine aggregates shall be in accordance with [Sec 1005](#), except the requirements for gradation and percent passing the No. 200 sieve shall not apply. Coarse aggregate meeting Gradation E requirements shall be used for repairs greater than one inch (25 mm) in depth. Fine aggregate will be allowed for repairs less than one inch (25 mm). Aggregate specified, bagged, labeled and furnished by the rapid set concrete patching material manufacturer may also be used for mortar extension.

2.2 Material Applications. The contractor shall select and use the product most suitable for the work and field conditions in accordance with these specifications.

2.3 Curing. Rapid set concrete patching material shall be cured until the minimum compressive strength 3200 psi is attained using standard curing specifications, unless otherwise specified by the manufacturer.

2.4 Qualification and Project Acceptance.

2.4.1 Inspection. All materials shall be subject to inspection and sampling by MoDOT at the source of manufacture, intermediate shipping terminal or destination. MoDOT will be allowed free access to all facilities and records as required to conduct inspection and sampling.

2.4.2 Qualification. Prior to use, rapid set concrete patching material shall be qualified. In order to become qualified, a material shall have completed testing through AASHTO's National Transportation Product Evaluation Program (NTPEP). The manufacturer shall contact the AASHTO/NTPEP coordinator to obtain the testing location for the rapid setting concrete patching material.

2.4.2.1 Requested Information. The manufacturer shall submit with samples of the materials, a written request to Construction and Materials with the following information:

- (a) Brand name of the product.
- (b) Certification that the material meets this specification.
- (c) NTPEP test results showing compliance with this special provision.
- (d) Specific mixing, handling and curing instructions.
- (e) Application type (i.e., bridge or roadway).

2.4.2.2 Qualified List. Upon approval by the engineer, the brand name and manufacturer will be placed on a qualified list of rapid set concrete patching materials. The listing of qualified materials is available from Construction and Materials or on MoDOT's web site. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed. The material will be subject to removal from the qualified list if there is evidence of unsatisfactory performance or a change in manufacturing process or formulation, or when random sampling and testing of material offered for use indicates nonconformity with any of the requirements herein specified.

2.4.3 Provisional Approval. Provisional approval may be granted provided the following requirements have been met:

- (c) New Products Evaluation Form
- (d) Certified test results from an independent laboratory showing compliance with this special provision.
- (e) Documentation prepared by MoDOT covering two years of field performance on MoDOT's system. MoDOT will need to approve the location of the test site. Documentation will contain the placement date, field observations (semi annual), description of field performance and photographs of in-place material.

(f) During placement the manufacturer’s representative shall be present on the project to provide technical expertise.

2.4.3.1 Disqualification. If during the two year observation period the repair area(s) fails provisional approval will not be granted. Repair area(s) experiencing any cracking, debonding or spalling will be considered a failure.

2.4.3.2 Length of Provisional Approval. Provisional approval will be granted for three years or until NTPEP testing is completed.

2.5 Certification. The contractor shall supply a manufacturer's certification to the engineer for each lot of material furnished. The certification shall include the name of the manufacturer, a manufacturer certification statement that the material supplied is the same as that qualified and listing the date of qualification.

2.6 Acceptance. Acceptance of the material will be based on the use of a qualified or provisionally approved material, the manufacturer's certification that the material supplied is the same as that approved and upon the results of such tests as may be performed by the engineer.

3.0 Mixture. Unless otherwise specified, rapid set concrete patching material shall be approved commercial mixtures meeting [Sections 3.1 – 3.1.3](#) or deck repair cementitious mortar meeting [Section 3.2](#). Rapid set concrete patching materials shall be specifically designed for the application needed.

3.1 Commercial Mixtures. Rapid set concrete patching material in its sacked form and mixtures when properly prepared in accordance with the manufacturer’s specifications, shall meet the minimum test requirements given in Table 1. Mixtures may be supplied, as required, as a patching mortar or as a patching mortar with aggregate extension. If the material is to be supplied with extender aggregate, this shall also pass the required tests in Table 1 using the maximum allowed amount of extender aggregate.

3.1.2 Mixture Requirements. Rapid set concrete patching material shall be single packaged dry mix requiring the addition of water or other liquid component just prior to mixing. The material shall be capable of ½ inch (13 mm) to full depth repair and require no bonding agent. The material shall not contain soluble chlorides as an ingredient of manufacture. The material shall be placed in accordance to the manufacturer's recommendations.

Table 1 (English Unit)				
Physical Test Property	Specification	Requirement for cementitious concrete	Requirement for polymer-modified concrete	Requirement for polymer concrete
Bond Strength by Slant Shear ¹	ASTM C882/C928 ³	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days	n/a	min. 1000 psi @ 24hrs.& min. 1500 psi @ 7 days
Linear Coefficient of Thermal Expansion ^{1, 2} (for bagged mortar only, without extension aggregate)	ASTM C531	n/a	n/a	4 – 8 X 10-6 in/in/deg F

Resistance to Rapid Freezing & Thawing ¹	AASHTO T161 or ASTM C666	80% min. using Procedure B ⁵ (300 Cycles)	80% min. using Procedure B ⁵ (300 Cycles)	n/a
Compressive Strength ¹	AASHTO T22 or ASTM C39	3200 psi @ 3 hr & 4000 psi @ 7 days	3200 psi @ 3 hr & 4000 psi @ 7 days	n/a
Rapid Chloride Permeability ¹	AASHTO T277 or ASTM C1202	<u>Bridge Decks</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days	<u>Bridge Deck</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days	<u>Bridge Deck</u> 1000 coulombs @ 28 days <u>Roadway</u> 2000 coulombs @ 28 days
Length Change ^{1, 4}	AASHTO T 160 or ASTM C157	In water Storage (+0.15) In air storage (-0.15)	In water storage (+0.15) In air storage (-0.15)	n/a
Color		gray	gray	gray

¹The commercial mix test values can be located in the AASHTO's National Transportation Product Evaluation Program (NTPEP) reports for Laboratory Evaluations of Rapid Set Concrete Patching Materials. Data for provisionally approved materials is located at the Construction and Materials Division.

²Not required for extended mixtures if the mortar passes this requirement.

³ ASTM C882 shall be performed on non-water based materials. ASTM C928 shall be performed on water-based materials.

⁴ As modified by ASTM C928.

⁵ Procedure A may be used in lieu of Procedure B

3.1.2 Construction Requirements. The manufacturer shall provide with the bagged mixture, specifications for the mixing procedure, amount and kind of liquid to be added, and the amount of aggregate extension allowed, if any. All mixing, handling and curing practices recommended by the manufacturer shall be followed and will be considered a part of these specifications.

3.1.3 Removal from Qualified List. All mixtures shall be approved before use. Reoccurring failures of any mixture for any reason will be cause for removal from the qualified list.

3.2 Deck Repair Concrete. A qualified rapid set concrete patching material indicated for horizontal use and intended for patching concrete bridge decks may be used when specified on the plans and as approved by the engineer. If this option is selected, the contractor shall provide a trial mix to determine the total cure time needed to achieve a compressive strength of 3200 psi (22 MPa). Compressive specimens shall be prepared in accordance with current MoDOT test methods and cured to simulate actual field conditions. Testing of compressive specimens shall be performed by methods and at facilities acceptable to the engineer. The repaired deck shall not be opened to traffic until at least 4 hours after the last placement of deck repair concrete, the established cure time has elapsed and until such concrete has achieved a compressive strength of 3200 psi (22 MPa). A new trial mix may be required if the engineer determines the field conditions vary substantially from trial mix conditions. The engineer will make field cylinders to verify the 3200 psi (22 MPa) minimum strength.

4.0 Construction Requirements.

4.1 Mixing. Rapid set concrete patching material shall be mixed and finished according to the manufacturer's recommendation.

4.2 Preparation of Repair Area. Deteriorated, damaged or defective concrete as shown on the plans, required by the specifications or as directed by the engineer, shall be removed. All exposed reinforcement shall be thoroughly cleaned as shown on the plans, required by the specifications or as directed by the engineer. Unless otherwise specified by the commercial mixture manufacturer, the existing surface shall be damp and all free water shall be removed prior to placement of the required material.

4.3 Bonding Agent. A bonding agent may be used if recommended by the rapid set concrete patching material manufacturer.

5.0 Method of Measurement. No measurement will be made for rapid set concrete patching material.

6.0 Basis of Payment. Rapid set concrete patching material will be paid for at the contract unit price for other items and will be considered full compensation for all labor, equipment and material to complete the described work.

JJ. Dense Concrete Overlay Repair

1.0 Description. This work shall consist of repairing designated areas of bridge decks with an existing dense concrete overlay (low slump, latex modified, or silica fume concrete). All work shall be in accordance with Sec 704 and the job special provision "Concrete Masonry Repair" except as herein modified.

2.0 Construction Requirements.

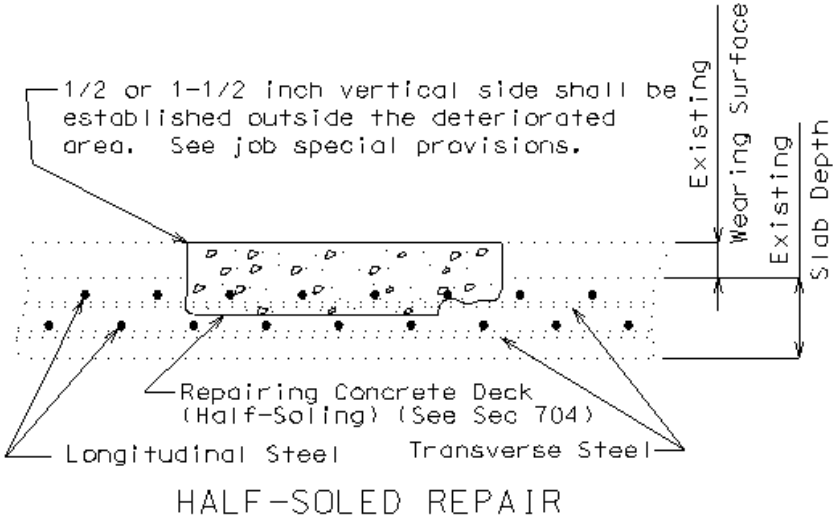
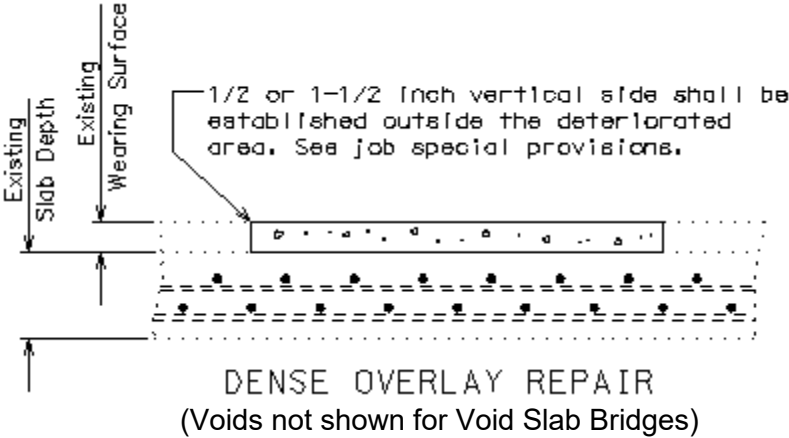
2.1 Bridges without Cathodic Protection Systems. A boundary perimeter with vertical sides shall be established outside the delaminated and deteriorated dense concrete overlay repair areas by saw cutting 1 ½ inch minimum in depth. The contractor shall use caution to not saw into the underlying bridge deck. The remaining overlay around the perimeter of the saw cut shall be chipped vertically and all overlay material within the perimeter removed. Upon removal of the deteriorated overlay, the engineer will sound the underlying bridge deck to determine areas of deteriorated concrete. The engineer may require removal of additional areas of dense overlay to determine the extent of deteriorated underlying bridge deck.

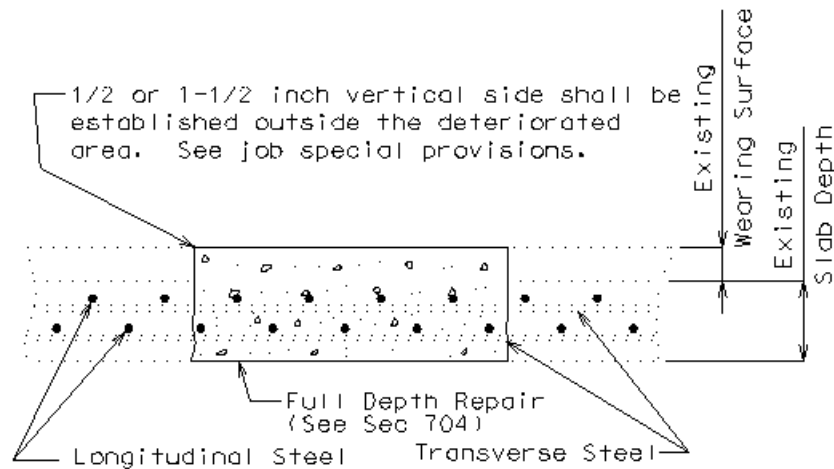
2.2 Bridges with Cathodic Protection Systems. Cathodic protection system shall be turned off before operations of repairing the dense overlay starts. A boundary perimeter with vertical sides shall be established outside the delaminated and deteriorated dense concrete overlay repair areas by saw cutting ½ inch minimum in depth and not cutting the cathodic protection system. The remaining overlay around the perimeter of the saw cut shall be chipped vertically and all overlay material within the perimeter removed. Upon removal of the deteriorated overlay, the engineer will sound the underlying bridge deck to determine areas of deteriorated concrete. The engineer may require removal of additional areas of dense overlay to determine the extent of deteriorated underlying bridge deck. The cathodic protection system shall be repaired before the concrete for the dense overlay is poured. Cathodic protection system shall be turned on after the dense overlay repair areas are opened to traffic.

2.2 Dense overlay repairs shall be performed the same as deck repairs except no exposed

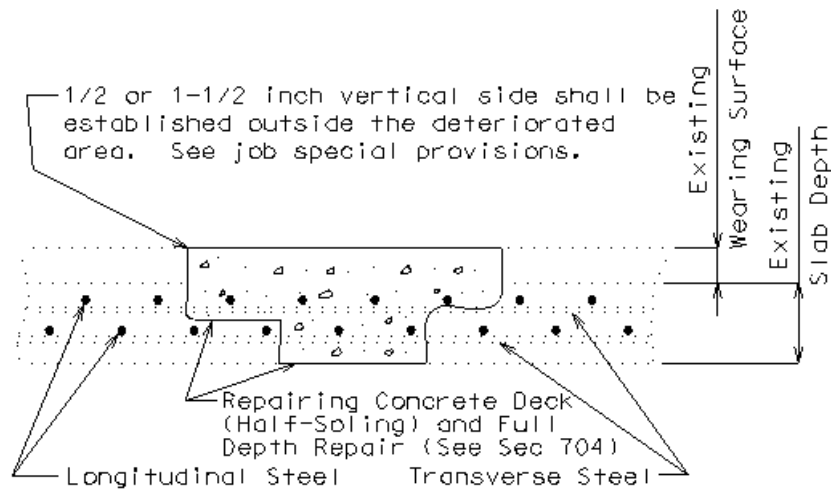
reinforcing steel is required. Deck repairs shall be in accordance with Sec 704. Concrete to replace the dense overlay repair with or without deck repairs shall be the same as that required for the deck repairs. Concrete for the dense concrete overlay repairs with deck repairs shall be placed monolithically up to the top surface of the dense overlay. Finishing and curing the repair area shall be in accordance with Sec 704.

2.3 Dense Concrete Overlay Repair With or Without Underlying Bridge Deck Repair.

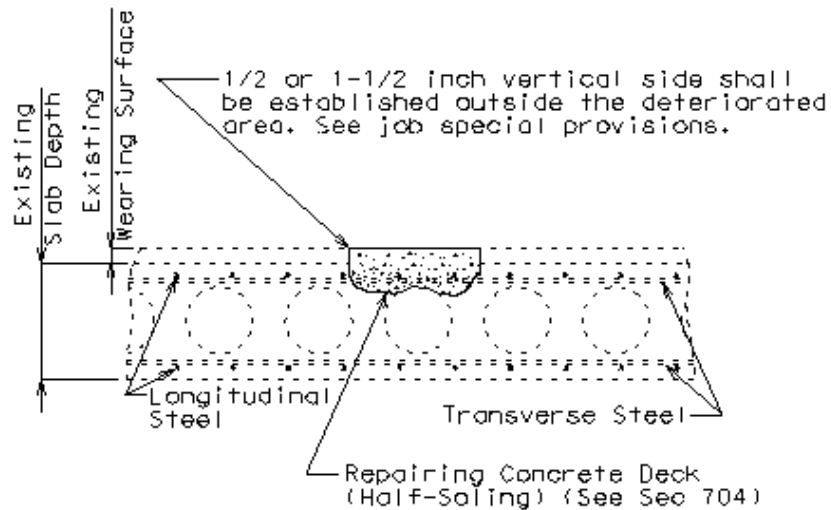




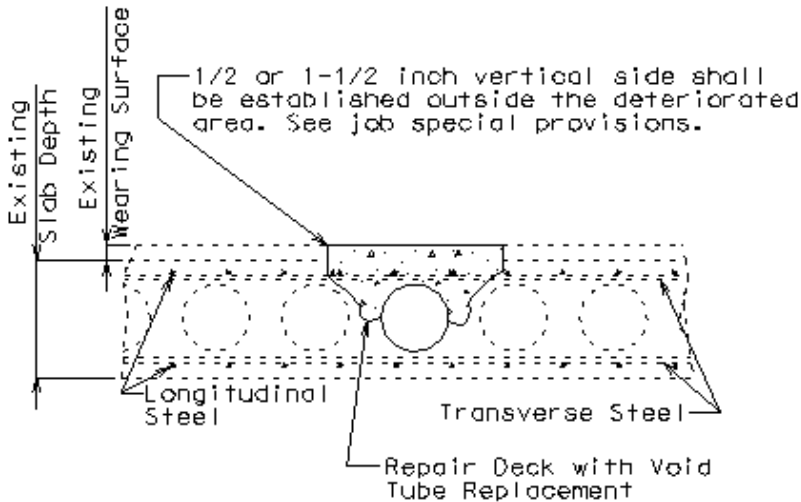
FULL DEPTH REPAIR



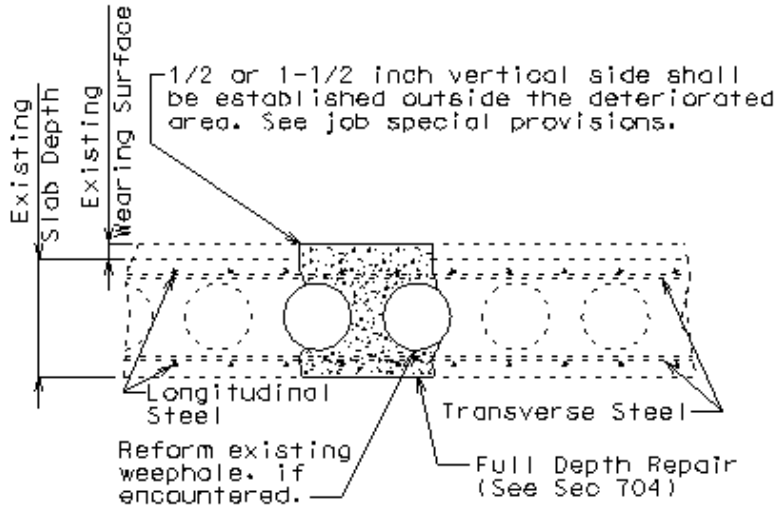
FULL DEPTH REPAIR
 WITH HALF-SOLED REPAIR



HALF-SOLED REPAIR



DECK REPAIR WITH VOID
 TUBE REPLACEMENT



FULL DEPTH REPAIR

3.0 Method of Measurement. The depth of repair may vary but the contract unit price shall prevail regardless of the variation. No duplication of measurement will be made for full depth repair, repairing concrete deck (half-soling), deck repair with void tube replacement or dense concrete overlay repair. Areas of dense concrete overlay repair will be measured to the nearest square foot. Deck repairs will be measured and paid for in accordance with Sec 704.

4.0 Basis of Payment. The accepted quantity of dense concrete overlay repair will be paid for at the contract unit price for:

Item 704-99.04	Dense Concrete Overlay Repair	Square Foot
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KK. Asphalt Wearing Surface Repair

1.0 Description. This work shall consist of repairing designated areas of bridge deck with an existing asphaltic concrete. All work shall be in accordance with Sec 704 and the job special provision “Concrete Masonry Repair” except as herein modified.

2.0 Materials.

2.1 All material shall be in accordance with Division 1000, Materials Details, and specifically as follows:

Item	Section
Asphaltic Concrete	401.5.3
Tack Coat	407

2.2 Patching material for repairing asphaltic concrete overlays shall be an approved asphaltic concrete surface mix that meets or exceeds the requirements of Sec 401.5.3 and is sufficiently stable enough to withstand axle loads of interstate highway traffic.

3.0 Construction Requirements.

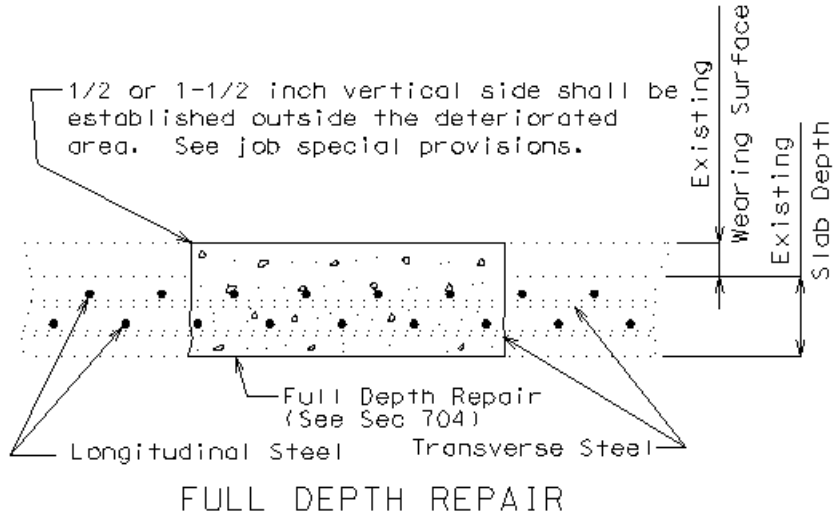
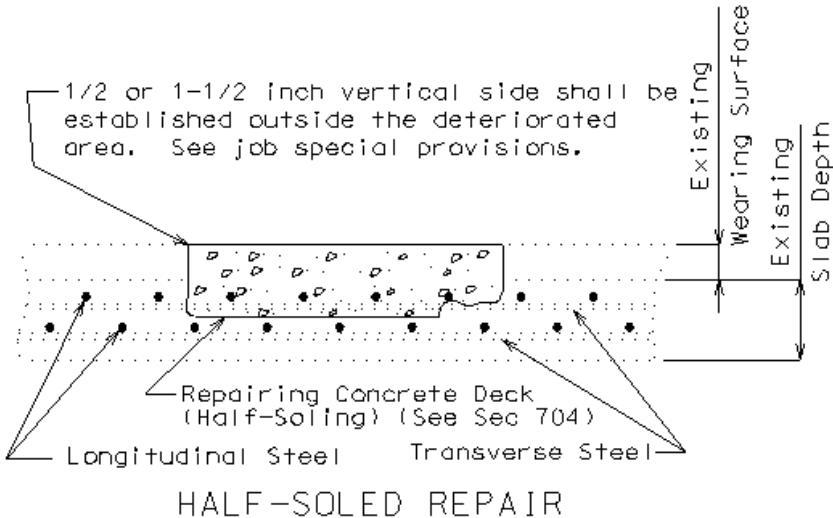
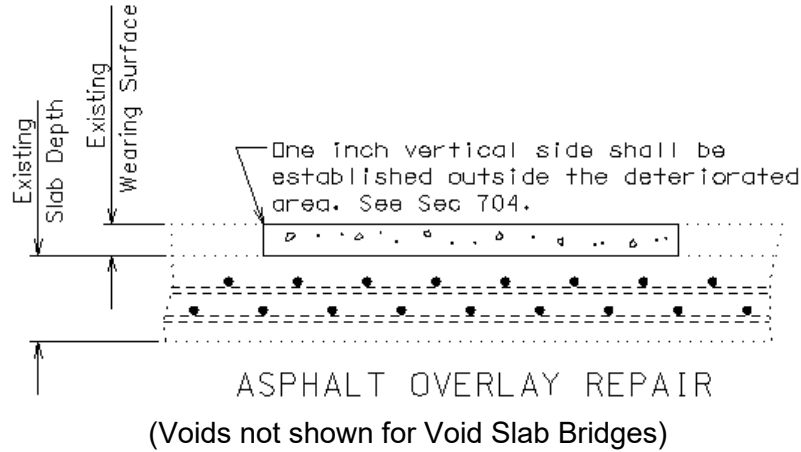
3.1 A boundary perimeter with vertical sides shall be established outside the delaminated and deteriorated asphalt overlay area by saw cutting. The contractor shall use caution to not saw into the underlying bridge deck. All overlay material within the perimeter shall be removed. The contractor may, with approval of the engineer, remove the asphalt wearing surface by cold milling so long as satisfactory results are obtained and there is minimal disturbance to the underlying bridge deck. Upon removal of the deteriorated overlay, the engineer will sound the underlying bridge deck to determine areas of deteriorated concrete. The engineer may require removal of additional areas of asphalt overlay to determine the extent of deteriorated underlying bridge deck.

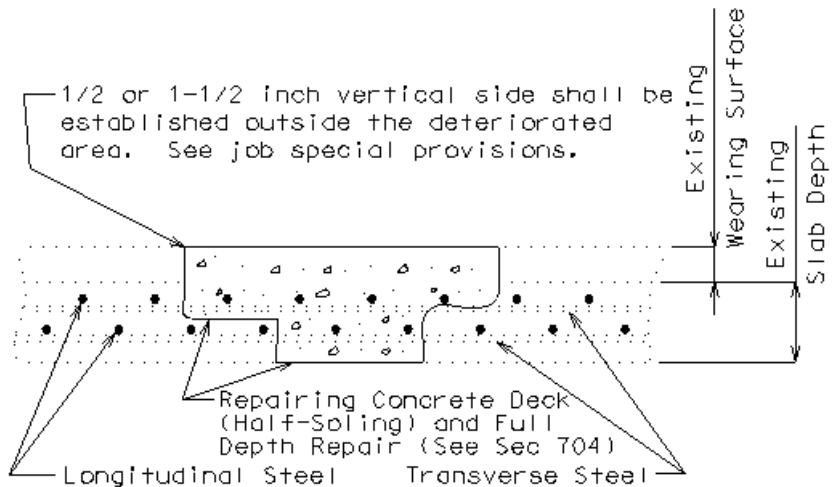
3.2 Deck repairs shall be in accordance with Sec 704. Concrete for the deck repairs shall be placed up to the top of the driving surface unless otherwise directed by the engineer. Finishing and curing the repair area shall be in accordance with Sec 704.

3.3 The asphalt overlay repair area shall be prepared for patching by uniformly applying tack coat to the bottom and sides of the repair area in accordance with Sec 407. Asphaltic concrete patching material shall be placed in the repair area and thoroughly compacted with a minimum 1 1/4 ton roller. The finished repair shall be smooth and level with the existing asphalt wearing surface. The lane shall not be opened to traffic until the patch has sufficiently cooled. All asphaltic concrete overlay repairs shall be complete before traffic is restored to the lane.

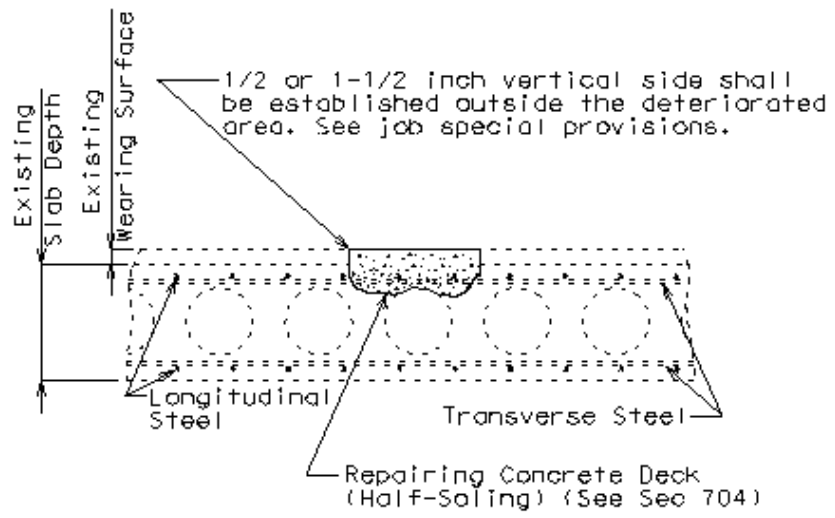
3.4 Before opening to traffic, the contractor shall seal all edges of the repaired area with a rapid setting polymer modified liquid asphalt emulsion. The sealed edges shall be coated with a black colored sand to prevent tracking and to blend in with the existing asphalt surface. There will be no direct payment for furnishing or placing the asphalt emulsion or sand.

3.5 Asphalt Overlay Repair With or Without Underlying Bridge Deck Repair. If an asphalt wearing surface has been placed on top of a dense concrete overlay, the dense concrete overlay and bridge deck repair shall be performed the same as shown in job special provision “Dense Concrete Overlay Repair”. If the dense concrete overlay needs repaired but the bridge deck does not require repair, the dense concrete overlay shall be repaired monolithically with the asphalt wearing surface.

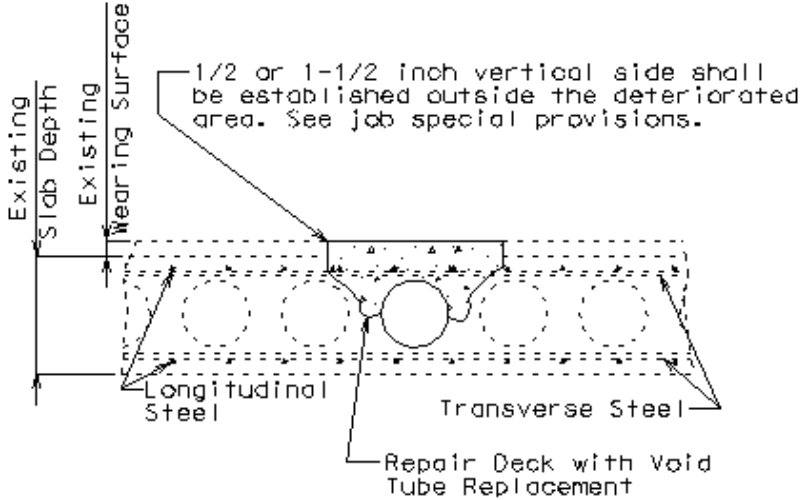




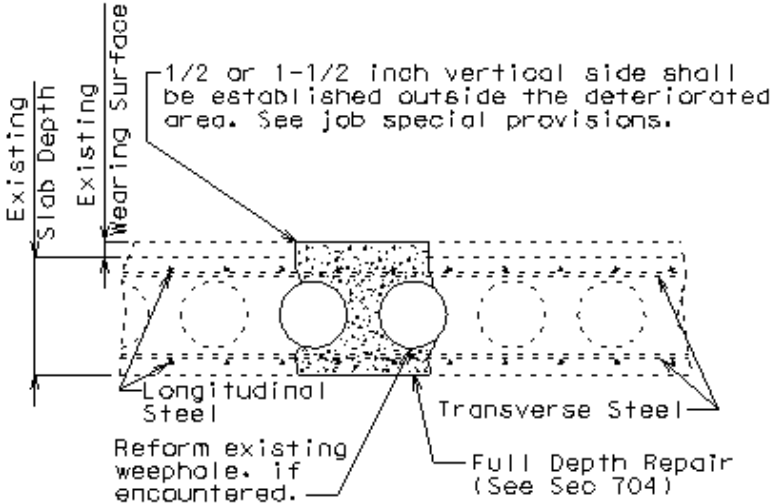
FULL DEPTH REPAIR
WITH HALF-SOLED REPAIR



HALF-SOLED REPAIR



DECK REPAIR WITH VOID
 TUBE REPLACEMENT



FULL DEPTH REPAIR

4.0 Method of Measurement. The depth of repair may vary but the contract unit price shall prevail regardless of the variation. No duplication of measurement will be made for full depth repair, repairing concrete deck (half-soling), deck repair with void tube replacement or asphaltic concrete overlay repair. Areas of asphaltic concrete overlay repair will be measured to the nearest square foot. Deck repairs will be measured and paid for in accordance with Sec 704.

5.0 Basis of Payment. Accepted quantity of asphaltic concrete overlay repair will be paid for at the contract unit price for:

Item 401-99.04	Asphaltic Concrete Overlay Repair	Square Feet
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LL. Concrete and Masonry Protection System

1.0 Description. This work shall consist of installing a protective coating that shall consist of a clear penetrating siloxane or silane based sealer. The surface preparation and application shall be in accordance with the manufacturer's recommendations.

2.0 Material. All material shall be in accordance with division 1000, materials division, specifically Sec 1059 protective coating material.

3.0 Construction Requirements. The preparation and application of the concrete and masonry protection system shall follow specification 711.3.3.

4.0 Method of Measurement. Final measurement will be made to the nearest square yard.

5.0 Basis of Payment. The accepted quantity of concrete and masonry protection system will be paid for at the contract unit price for:

Item No.	Unit	Description
711-99.05	Square Yard	Concrete and Masonry Protection System.

MM. Concrete Crack Filler - High Molecular Weight Methacrylate

1.0 Description. This work shall consist of preparing and treating Portland cement concrete bridge deck and bridge approach slab surfaces with a high molecular weight methacrylate crack filler meeting this specification.

2.0 Material. The material used shall be a low viscosity, non-fuming, and high molecular weight methacrylate resin in accordance with the following:

Property	Test Method	Requirement
Viscosity	Brookfield RVT 100 RPM @ 72°F (22°C)	25 cps maximum
Pot Life	Application life before curing begins [@ 68°F (20°C) air temperature]	15 minutes minimum
Curing Time	On site at 50°F (10°C)	6 hours Maximum

3.0 Construction Requirements.

3.1 Equipment. Application equipment shall be as recommended by the manufacturer. The spray equipment, tanks, hoses, brooms, rollers, coaters, squeegees, etc. shall be thoroughly clean, free of foreign matter, oil residue and water prior to applying the treatment.

3.2 Cleaning and Surface Preparation. Surfaces, which are to be treated, shall meet the approved product's requirements for surface condition. Sealing shall not be done until all concrete repairs and any corrective actions needed have been completed and cured. The contractor shall furnish the engineer with written instructions for surface preparation requirements and a representative of the manufacturer shall be present to assure that the surface condition meets the manufacturer's requirements.

3.2.1 Sealing shall be done after the bridge deck and bridge approach slabs have been textured.

3.2.2 At a minimum, the surface shall be thoroughly cleaned to remove dust, dirt, oil, wax, curing components, efflorescence, laitance, coatings and other foreign materials. The manufacturer or manufacturer's representative shall approve the use of chemicals and other cleaning compounds to facilitate the removal of these foreign materials before use. The treatment shall be applied within 48 hours following surface preparation.

3.2.3 Cleaning equipment shall be fitted with suitable traps, filters, drip pans and other devices to prevent oil and other foreign material from being deposited on the surface.

3.3 Test Application. Prior to final application, the contractor shall treat a measured test coverage area on horizontal and vertical surfaces of the different components of the structure to be treated for the purpose of demonstrating the desired physical and visual effect on an application or of obtaining a visual illustration of the absorption necessary to achieve the specified coverage rate. In the latter case, the applicator shall use at least ½ gallon (1.9 liter) of treatment following the manufacturer's recommended method of application for the total of the test surfaces. Horizontal test surfaces shall be located on the deck and on the curb or sidewalk, and vertical test surfaces shall be located on a parapet or safety barrier curb so that the different textures are displayed.

3.4 Application. The concrete treatment shall be applied to concrete surfaces as designated on the plans or per the manufacturer's specification. The penetrating sealer shall be applied by thoroughly saturating the concrete surfaces at an application rate specified by the manufacturer and as shown in the approved certified test data.

3.4.1 The concrete surface temperature shall be above 35°F (2°C).

3.4.2 The treatment shall be spread from puddles to dry areas.

3.4.3 If the applicator is unable to complete the entire application continuously, the location where the application was stopped shall be noted and clearly marked.

3.5 Protection of Adjoining Surfaces and the Public.

3.5.1 When applying a treatment, the contractor shall protect adjoining surfaces of the structure that are not to be sealed by masking off or by other means. The contractor shall also make provision to protect the public when treating the fascia of a bridge that spans an area used by the public.

3.5.2 Asphalt and mastic type surfaces shall be protected from spillage and heavy overspray. Joint sealants, traffic paints and asphalt overlays may be applied to the treated surfaces 48 hours after the treatment has been applied. Adjoining and nearby surfaces of aluminum or glass shall be covered where there is possibility of the treatment being deposited on the surfaces. Plants and vegetation shall be protected from overspray by covering with drop cloths. Precautions shall be followed as indicated on the manufacturer's material and safety data sheet.

3.6 Opening to Traffic. Traffic shall be allowed on a deck only after a treated area does not track.

4.0 Method of Measurement. Measurement will be made to the nearest square yard (m²) measured longitudinally from end of the bridge approach slab to end of the bridge approach slab and transversely from roadway face of curb to roadway face of curb extended to end of the approach slabs. No deduction will be made for gaps to avoid, raised pavement markers, manholes or other obstructions. Material placed on curb faces will not be measured. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for "Penetrating Sealers".

NN. Seal Coat for Bridge Decks Prior to Asphalt Overlay

1.0 Description. This work shall consist of placing bituminous material followed by placing cover aggregate on bridge decks. All work shall be in accordance with Sec 409 except as herein modified.

2.0 Material.

2.1 Bituminous material shall be polymer modified liquid asphalt emulsion in accordance with Sec 1015.

2.2 Cover aggregate shall be Grade A in accordance with Sec 1003, unless otherwise approved by the engineer.

3.0 Construction Requirements.

3.1 Bridge Deck Repairs. Bridge sealing shall not begin until bridge deck repair operations are complete and repaired areas have adequately cured. For bridge decks repaired using a qualified special mortar in accordance with Sec 704, the repaired areas shall have adequately cured in compliance with the patching material manufacturer's recommendations.

3.2 Seal Coat. Seal coat shall be applied, rolled and then shall be allowed to cure as recommended by the manufacturer. After curing, all loose aggregate shall be removed prior to opening to traffic. Any seal coat that is pulled up or damaged during the operation shall be repaired by the contractor at the contractor's expense.

4.0 Traffic Control. Delete Sec 409.6.2. Temporary striping with tape shall be incidental to the operation.

5.0 Basis of Payment. Payment for the above described work, including all materials, equipment, labor and any other incidental work necessary to complete this work, will be considered completely covered by the contract unit price. The accepted quantity of seal coat and any temporary striping will be paid for at the contract unit price for:

Item 409-40.00	Seal Coat, Grade A	Square Yard
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OO. Removal of Existing Expansion Joint Silicone Sealant or Compression Seal

1.0 Description. This work shall consist of removing and disposing of existing expansion joints compression seals or silicone sealant as directed by the engineer.

2.0 Removal Requirements. The existing compression seal or silicone sealant shall be cleanly removed and disposed of in accordance with Sec 202.

3.0 Method of Measurement. Final measurement of removal of existing expansion joint compression seal or silicone sealant will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Removal of the existing expansion joint compression seal and silicone sealant will be measured to the nearest linear foot based on measurement from roadway face of curb to roadway face of curb along centerline of the existing joint. Portions of the joint extending past the roadway face of curbs will not be measured for payment.

4.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary to complete this item, will be based on the Job Order quantities and will be considered completely covered by the contract unit price for "Removal of Existing Expansion Joint Silicone Sealant" or "Removal of Existing Expansion Joint Compression Seal". Any change in the job order quantities, based on approved change orders, will be paid for at the contract unit price.

PP. Epoxy Polymer Concrete Resurfacing Over and Near Streams and Wetlands

1.0 Description. In general, because of the process for epoxy polymer application, that being the use of an epoxy spray for adhesion or fluid epoxy polymer mix, care must be taken to avoid overspray or runoff that will enter bodies of water. For use on bridges, all drains must be adequately blocked until the mixture is set up permanently. This includes the cleanup process for loose material/aggregate. No spray, runoff, or materials shall be allowed to enter the drains or the stream or wetland.

QQ. Removal Of Bridge Debris

1.0 Description. Environmental surveys of the Missouri and Mississippi Rivers for pallid sturgeon and Meramec River for mussels and endangered fish species were not conducted at the project location because debris is not anticipated to fall into the water. If debris including, but not limited to, sand from sandblasting, water from hydroblasting, paint chips, runoff from painting/sealing processes, etc. falls into the water, the project will be required to shut down while biologists determine if there are any threatened or endangered species at the site and while MoDOT's environmental section reassesses impacts to those species.

1.1 The contractor shall make provisions to prevent debris and materials from falling below the bridges. If this does occur and if deemed necessary by the engineer, it shall be removed as directed by the engineer at the contractor's expense.

1.2 The contractor shall prevent any debris and materials from falling into the river, stream, lake, or wetland below the bridges.

1.3 Any damage sustained by the remaining structures as a result of the contractor's operations shall be repaired or the material replaced as determined by the engineer at the contractor's expense.

1.4 If the contractor's operation requires work below the deck, directly above the river, stream, lake or wetland below the bridge, the contractor shall notify the engineer who will then contact MoDOT's Environmental Section for further review.

2.0 Basis of Payment. No direct payment will be made for any expense incurred by the contractor by reason of compliance with the specific requirements of the provision, including any delay, inconvenience, or extra work except for those items for which payment is included in the contract.

RR. Preformed Silicone or EPDM Expansion Joint Seal

1.0 Description. This work shall consist of furnishing and installing the preformed silicone or EPDM expansion joint seal for joints as shown on the plans or as directed by the engineer.

2.0 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as follows. All necessary components, materials and equipment required for the installation shall be obtained through an approved supplier. All components of each respective joint system shall come from the same manufacturer and cannot be substitutes for others.

2.1 Joint Seal.

2.1.1 The gland material shall meet or exceed the following physical requirements:

Joint Seal		
Property	Specification	Requirement
Durometer (Shore A)	ASTM D 2240	55 ±5 min.
Tensile Strength	ASTM D 412	550 psi min.
Elongation	ASTM D 412	350% min.
Tear Strength (Die B)	ASTM D 624	100 ppi min.
Compression Set At 350° F 22 hrs	ASTM D 395	30% max.
Operating Temperature Range		-60° F to 350° F
Specific Gravity		1.51 ±0.10

2.1.2 The joint seal shall be pre-qualified by undergoing and passing a cyclic loading test. Any rips, tears or bond failure will be cause for rejection. Manufacturer shall provide documentation to verify testing meetings these minimum requirements.

Cyclic Loading Test	
Property	Requirement
Test Sample Length	2 feet min.
Joint Skew	45°
Number of Cycles	200 min.
Joint Opening	2 inches
Movement	±1 inch
Temperature	-20° F

2.2 Epoxy Primer. Epoxy primer shall be as specified by the manufacturer to insure the appropriate bond of the joint sealing system and shall meet the following physical requirements:

Epoxy Primer		
Property	Specification	Requirement
Viscosity (centipoises)	ASTM D 2196	44
Solids	ASTM D 4209	41
Specific Gravity	ASTM D 1217	0.92
Flashpoint	ASTM D 56	48
VOC	ASTM D 3960	520

2.3 Locking Adhesive. The adhesive material shall cure quickly and shall be as recommended by the manufacturer. The material shall adhere to concrete, elastomeric concrete, polymer concrete and steel and shall meet the following physical requirements:

Locking Adhesive		
Property	Specification	Requirement
Sag/Flow	ASTM C 639	3/16 inch max.
Hardness	ASTM C 661	20-30
Tack Free Time	ASTM C 679	30 minute max.
Cure Through To ¼ inch thickness	At 75°F/50% Relative Humidity	24 hours max.
Skin over time (Tooling Time)	At 75°F/50% Relative Humidity	5 minute max.
Resistance to U.V.	ASTM C 793	No cracking, Ozone Chalking or Degradation
Tensile Strength	ASTM D 412	200 psi min.
Elongation	ASTM D 412	450% min.

2.4 Certification. The contractor shall furnish a manufacturer's certification for all material specified in this job special provision. The certification shall show representative test results of the material and certify that the material supplied is in accordance with this job special provision.

3.0 Construction Requirements. The contractor shall furnish to the engineer the manufacturer's written product information, installation procedures and instructional information at least two weeks prior to installation. The contractor shall obtain the services of a qualified technical representative approved by the manufacturer of the expansion joint seal and acceptable to the engineer, to assist during the installation. The contractor, the technical representative and

the engineer shall meet to review and clarify installation procedures and requirements prior to starting the work. The start of surface preparations and seal installation shall not occur without the technical representative being present. The technical representative shall be present for at least one day at the start of surface preparations and seal installation.

3.1 Surface Preparation. The concrete or steel surface shall be prepared for priming and seal placement. New Portland cement concrete shall be fully cured and allowed to dry a minimum of seven days. The joint shall be cleaned of all gravel, loose material and other contaminants before sand blasting. Areas that will be in contact with the sealant shall be sand blasted with a clean, hard aggregate that will leave little to no dust residue. Sand blasted concrete surfaces will be considered acceptable when areas that will be in contact with the sealant have a roughened surface with clean, exposed aggregate. The surface shall be free of foreign matter or plastic residue. Sand blasted steel surfaces will be considered acceptable when the steel surfaces have been cleaned to an SSPC-SP10 degree of cleanliness. After sand blasting is completed, the joint shall be cleaned of debris using oil-free and water-free compressed air or a vacuum, either being at least 90 psi. Using a rag saturated in denatured alcohol, wipe clean both vertical faces of the expansion joint opening.

3.2 Priming. Priming shall immediately follow sand blasting and cleaning and will only be permitted to proceed when the air and substrate temperatures are at least 40° F and rising. Sand blasting, priming and installing the seal shall be performed on the same day. The entire sand blasted surface shall be primed. Application and drying times for primers shall be in accordance with the manufacturer's recommendations. All leftover primer shall be properly disposed.

3.3 Installation. The preformed silicone or EPDM expansion joint seal shall be installed in joints in one continuous piece without field splices. The locking adhesive and seal shall be applied in accordance with the manufacturer's recommendations, in a manner that prevents the seal from being damaged and from being in tension. Twisting, curling and nicking the seal will be prohibited. Unless the installation tool is capable of installing the seal without elongation prior to placement, the seal shall be pre-cut to the exact length for the joint plus ends as shown in the contract documents or as directed by the engineer. The pre-cut seal shall be installed and measured for stretch. The seal shall be removed and reinstalled if the seal stretch length exceeds five percent of the pre-cut length at the contractor's expense.

4.0 Method of Measurement. The preformed silicone or EPDM expansion joint seal will be measured to the nearest linear foot based on measurement from the roadway face of curb to roadway face of curb along the centerline of the joint. Final measurement will not be made except for authorized changes during construction, or if appreciable errors are found in the contract quantity. Portions of the joint that extend past the roadway face of curbs will not be measured for payment.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor, technical assistance and any other incidental work necessary to complete this item, will be based on the contract plan quantities and will be considered completely covered by the contract unit price for "Preformed Silicone or EPDM Expansion Joint Seal". Any change in the contract plan quantities, based on approved change orders, will be paid for at the contract unit price.

SS. Epoxy Polymer Concrete Overlay Repair

1.0 Description. This work shall consist of repairing designated areas of bridge decks with an existing epoxy polymer concrete overlay. All work shall be in accordance with Sec 623, Sec 704

and the job special provisions "Concrete Masonry Repair" except as herein modified.

2.0 Construction Requirements.

2.1 Epoxy Polymer Overlay Thickness. The total thickness of the overlay repair will vary and shall match the existing overlay thickness but shall not be greater than ½ inch.

2.2 Concrete Deck.

2.2.1 A boundary perimeter with vertical sides shall be established outside the delaminated and deteriorated epoxy polymer concrete overlay repair areas by saw cutting. The contractor shall use caution to not saw into the underlying bridge deck. All overlay material within the perimeter shall be removed. Upon removal of the deteriorated overlay, the engineer will sound the underlying bridge deck to determine areas of deteriorated concrete. The engineer may require removal of additional areas of epoxy polymer overlay to determine the extent of deteriorated underlying bridge deck.

2.2.2 Deck repairs shall be in accordance with Sec 704. Concrete for the deck repairs shall be placed up to the top surface of the original deck unless otherwise directed by the engineer.

2.2.3 Epoxy polymer concrete overlay shall be installed in accordance with Sec 623.

3.0 Method of Measurement. The thickness of repair may vary but the contract unit price shall prevail regardless, unless the total thickness is greater than ½ inch. Areas of epoxy polymer concrete overlay repair will be measured to the nearest square foot (0.1 m²) and be tabulated separately for repairs on concrete deck. Deck repairs will be measured and paid for separately in accordance with Sec 704.

4.0 Basis of Payment. The accepted quantity of epoxy polymer concrete overlay repair, concrete deck, will be paid for at the contract unit price for:

Item 704-99.04 Epoxy Polymer Overlay Repair, Concrete Deck Square Foot

TT. Cleaning and Epoxy Coating

1.0 Description. In order to protect the bridge superstructure concrete from deicing chemicals and other contaminants, all loose and delaminated concrete shall be removed, and a protective epoxy coating shall be applied to the concrete in the area of curb outlets and the vertical face of the curbs as shown in the bridge plans and per this job special provision.

2.0 Construction Requirements. The areas to be cleaned and epoxy coated shall be as follows:

- (a) Deck surface and vertical faces inside the curb outlets.
- (b) Outside edge of the deck to 12 inches on each side of the curb outlets.
- (c) Superstructure concrete area directly below the curb outlets from the edge of the deck to the edge of the top flange of the girder and to 12 inches on each side of the curb outlets.
- (d) Vertical face of the curbs for the entire length of the bridge.

2.1. Cleaning shall include removal of all loose and delaminated concrete with hand tools to the satisfaction of the engineer. Hand tools may include chipping chisels, wire brushes, dust brushes, etc. After cleaning, an epoxy coating meeting the requirements of Sec 1059.20 shall be applied in accordance with Sec 711.3.2 and the manufacturer's recommendations.

3.0 Method of Measurement. No measurement will be made for cleaning and epoxy coating except for authorized changes during construction or where appreciable errors are found in the plan quantity. When required, measurement will be made to the nearest square foot.

4.0 Basis of Payment. Payment for Cleaning and Epoxy Coating includes all material, equipment, labor and any other incidentals necessary to complete this work.

UU. Environmental Guidance for Job Order Contracting Projects

4.0 Description. This Job Special Provision provides notes on a variety of environmental protection measures required for various job order contracting activities. Please follow EPG guidance on recommended work practices, as well as the specific notes provided in this document. These notes apply throughout the entire state, except for the T&E Species Guidance – Cave Recharge Areas section, which applies to cave recharge areas in nine counties across southern Missouri (Greene, Jasper, Lawrence, Newton, Christian, Barry, Stone, Perry, and Taney Counties).

5.0 Restrictions. The following restrictions will ensure that MoDOT adheres to all environmental regulations as required by federal law.

5.1 Tree Clearing. Due to bat tree management requirements, no tree clearing is permitted for any activity, without prior coordination with MoDOT Environmental.

5.2 Spill Reporting. Follow EPG general guidance on spill containment/reporting. Standard spill reporting includes contacting Central Office Hazardous Waste (Ethan Musick:573-508-6907. Spills within cave recharge areas or active streams shall also be reported to the following Threatened and Endangered Species contacts: Bree McMurray: 573-508-2205.

5.3 Erosion Control. Erosion control measures shall be implemented in order to reduce suspended solids, turbidity and downstream sedimentation that may enter the ecosystem of any cave, surface water, or ground water sink.

5.4 Repairs on or near Bridges. Personnel shall plug all bridge drains, and implement any other measures necessary, to prevent any construction materials/debris or overspray/liquid from getting into the waterways. Silt fencing, or other treatment as specified by the engineer, shall be placed at all four bridge corners to prevent any construction materials/debris from washing off the roadway or the bridge and flowing down the bank into the waterway.

Work shall not be allowed below the ordinary high-water elevation. Personnel shall not drive or place any equipment in any waterway. Coordination with the Design - Environmental Section, and permitting and consultation with regulatory agencies, is required prior to any proposed activity below ordinary high-water elevation.

Petroleum products, paint, other chemicals, and construction debris shall be prevented from entering the water or otherwise contaminating the streamside environment. Reports of any accidental releases of petroleum products or other contaminants that could harm fish and other

aquatic life will be reported immediately to the MoDOT Environmental Section –See Spill Reporting Procedures, above. These numbers shall be readily available on the job site at all times and the Personnel or their Supervisors shall be responsible for immediate reporting in the event of a spill.

6.0 Basis of Payment. No direct pay shall be provided for any labor, equipment, time, or materials necessary to complete this work. The contractor shall have no claim, or basis for any claim or suit whatsoever, resulting from compliance with this provision.

VV. Sensitive Streams or Waterbodies Near Project Area

1.0 Description. The project crosses, or is in the vicinity of, a sensitive stream or watershed. Waterbodies within and near the project area may serve as habitat for federal and state listed sensitive species. To avoid any negative impacts to these species and their habitats, water quality shall be protected from construction impacts.

1.1 The contractor shall prevent any debris and materials from construction activities from entering streams and other waterbodies. If debris or materials do enter waterbodies, and if deemed necessary by the engineer or MoDOT's environmental personnel, it shall be removed as directed by the engineer at the contractor's expense.

2.0 Basis of Payment. No direct payment will be made for any expense incurred by the contractor by reason of compliance with the specific requirements of the provision, including any delay, inconvenience, or extra work except for those items for which payment is included in the contract.