Job No.: J6I3187 & J6I3149
Route: I-55
County: St. Louis County & City

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

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

Job No.: J6I3187 & J6I3149
Route: I-55
County: St. Louis County & City

	JOB NUMBER: COUNTY, MO DATE PREPARED:
Date:	ADDENDUM DATE:
Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: All	

(***Use for Consultant Electronic Seal***)

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."	**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION** 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65102 Phone 1-888-275-6636
	CONSULTANT NAME *Consultant Address* Certificate of Authority: Consultant Phone:
	If a seal is present on this sheet, JSP's have been electronically sealed and dated.
	JOB NUMBER: COUNTY, MO DATE PREPARED:
	ADDENDUM DATE:
Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: All	

Job No.: J6I3187 & J6I3149
Route: I-55
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JOB
SPECIAL PROVISION

A. General - Federal JSP-09-02G

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 2021 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. Contract Liquidated Damages JSP-13-01B

1.0 Description. Liquidated Damages for failure or delay in completing the work on time for this contract shall be in accordance with Sec 108.8. The liquidated damages include separate amounts for road user costs and contract administrative costs incurred by the Commission.

2.0 Period of Performance. Prosecution of work is expected to begin on the date specified below in accordance with Sec 108.2. Regardless of when the work is begun on this contract, all work shall be completed on or before the date specified below. Completion by this date shall be in accordance with the requirements of Sec 108.7.1.

Notice to Proceed: February 7, 2022
Completion Date: July 1, 2024

2.1 Calendar Days. The count of calendar days will begin on the date the contractor starts any construction operations on the project.

Job Number	Calendar Days	Daily Road User Cost
J6I3149	N/A	$11,400
J6I3187	N/A	$11,400

3.0 Liquidated Damages for Contract Administrative Costs. Should the contractor fail to complete the work on or before the completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged contract administrative liquidated damages in accordance with Sec 108.8 in the amount of **$3,000** per calendar day for each calendar day, or partial day thereof, that the work is not fully completed. For projects in combination, these damages will be charged in full for failure to complete one or more projects within the above specified completion date or calendar days.

4.0 Liquidated Damages for Road User Costs. Should the contractor fail to complete the work on or before the completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged road user costs in accordance with Sec 108.8 in the amount specified in Section 2.1 for each calendar day, or partial day thereof, that the work is not fully completed. These damages are in addition to the contract administrative damages and any other damages as specified elsewhere in this contract.

C. Work Zone Traffic Management

1.0 Description. 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.

1.1 Work Zone Specialist (WZS). The contractor shall name an individual, either employed by the contractor or hired by the contractor, to act as the Work Zone Specialist (WZS) throughout the entirety of the project. Any change in personnel for the WZS shall be submitted in written form to the engineer. This individual will be a trained Work Zone Specialist in accordance with the Standard Specifications Section 616.3.3 and will be directly involved with daily traffic management with the engineer. The WZS shall maintain daily contract with the engineer either on-site or via telecommunication.

1.2 Maintaining Work Zones and Work Zone Reviews. The Work Zone Specialist (WZS) shall maintain work zones in accordance with Sec 616.3.3 and as further stated herein. The WZS shall coordinate and implement any changes approved by the engineer. The WZS shall ensure all traffic control devices are maintained in accordance with Sec 616, the work zone is operated within the hours specified by the engineer, and will not deviate from the specified hours without prior approval of the engineer. The WZS is responsible to manage work zone delay in accordance with these project provisions. When requested by the engineer, the WZS shall submit a weekly report that includes a review of work zone operations for the week. The report shall identify any problems encountered and corrective actions taken. Work zones are subject to unannounced

inspections by the engineer and other departmental staff to corroborate the validity of the WZS's review and may require immediate corrective measures and/or additional work zone monitoring.

1.3 Work Zone Conflict Resolution. Any conflict resolution shall be in accordance with Standard Specification Section 616.4. Failure to make corrections on time may result in the engineer suspending work. The suspension will be non-excusable and non-compensable regardless if road user costs are being charged for closures.

2.0 Traffic Management Schedule.

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

2.2 The contractor shall request permission at least two weeks prior to lane closures or shifting traffic onto detours, and 14 calendar days prior to the imposition of height, width, or weight restrictions. This is to ensure closures do not conflict with other work within the zone of influence and the work zone information on the MoDOT's website can remain real-time. In accordance with Management of Traffic (MOT) procedures, the contractor will need to submit lane closure for the following week by Monday 3:00 pm.

2.3 The engineer shall be notified as soon as practical of any postponement due to weather, material or other circumstances.

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

2.5 Traffic Congestion. The contractor shall, upon approval of the engineer, take proactive measures to reduce traffic congestion in the work zone. The contractor shall immediately implement appropriate mitigation strategies whenever traffic congestion reaches an excess of 15 minutes to prevent congestion from escalating beyond this delay threshold. If disruption of the traffic flow occurs and traffic is backed up in queues equal to or greater than the delay time threshold listed above then the contractor shall immediately review the construction operations which contributed directly to disruption of the traffic flow and make adjustments to the operations to prevent the queues from reoccurring. Traffic delays may be monitored by physical presence on site or by utilizing real-time travel data through the work zone that generate text and/or email notifications where available. The engineer monitoring the work zone may also notify the contractor of delays that require prompt mitigation. The contractor may work with the engineer to determine what other alternative solutions or time periods would be acceptable. When a Work Zone Analysis Spreadsheet is provided, the contractor will find it in the electronic deliverables on MoDOT's Online Plans Room. The contractor may refer to the Work Zone Analysis Spreadsheet for detailed information on traffic delays.

2.5.1 Traffic Safety.

2.5.1.1 Recurring Congestion. Where traffic queues routinely extend to within 1000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet 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.

2.5.1.2 Non-Recurring Congestion. When traffic queues extend to within 1000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway infrequently, 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 and no more than 0.5 mile in advance of the end of the traffic queue on divided highways and no less than 500 feet and no more than 0.5 mile in advance of the end of the traffic queue on undivided highways.

3.0 Work Hour Restrictions.

3.1 Except for emergency work, as determined by the engineer, and long term lane closures required by project phasing, all lanes shall be scheduled to be open to traffic during the five major holiday periods shown below, from 12:00 noon on the last working day preceding the holiday until 6:00 a.m. on the first working day subsequent to the holiday unless otherwise approved by the engineer.

Memorial Day
Labor Day
Thanksgiving
Christmas
New Year's Day

3.1.1 Independence Day. The lane restrictions specified in Section 3.1 shall also apply to Independence Day, except that the restricted periods shall be as follows:

12:00 noon July 1, 2022 – 6:00 a.m. July 5, 2022
12:00 noon June 30, 2023 – 6:00 a.m. July 5, 2023

3.1.2 There may be other events of regional significance, such as specific sporting events (i.e. St. Louis Cardinals and St. Louis Blues home games), America Center, parades, marathons, concerts and other major St. Louis events. The Engineer will advise the contractor of any such events and how they are to be handled. Restricted periods for special events shall be determined by the Engineer.

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

3.3 Any work requiring a reduction in the number of through lanes of traffic shall be completed during nighttime hours.

Single Lane Closure		
	Northbound	Southbound
Monday thru Friday	6 pm to 9 am	7 pm to 5 am
Saturday & Sunday	No Restrictions	6 pm to 10 am

3.4 The contractor shall not alter the start time, ending time, or a reduction in the number of through lanes of traffic or ramp closures without advance notification and approval by the engineer. The only work zone operation approved to begin 30 minutes prior to a reduction in through traffic lanes or ramp closures is the installation of traffic control signs. Should lane closures be placed or remain in place, prior to the approved starting time or after the approved ending time, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delays, with a resulting cost to the traveling public. These damages are not easily computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **$1000 per 15 minute increment** for each 15 minutes that the temporary lane closures are in place and not open to traffic in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of unapproved closure time.

3.4.1 The said liquidated damages specified will be assessed regardless if it would otherwise be charged as liquidated damages under the Missouri Standard Specification for Highway Construction, as amended elsewhere in this contract.

3.5 All bridge demolition and hydro-demolition shall only occur between the hours of 7 am to 8 pm.

4.0 Detours and Lane & Trail Closures.

4.1 When a changeable message sign (CMS) is provided, the contractor shall use the CMS to notify motorists of future traffic disruption and possible traffic delays one week before traffic is shifted to a detour or prior to lane closures. The CMS shall be installed at a location as approved or directed by the engineer. The CMS shall be capable of communication with the Transportation Management Center (TMC), if applicable, prior to installation on right of way. All messages planned for use in the work zone shall be approved and authorized by the engineer or its designee prior to deployment. When permanent dynamic message signs (DMS) owned and operated by MoDOT are located near the project, they may also be used to provide warning and information for the work zone. Permanent DMS shall be operated by the TMC, and any messages planned for use on DMS shall be approved and authorized by the TMC at least 72 hours in advance of the work.

4.2 At least one lane of traffic in each direction on I-55 and all City Streets shall be maintained at all times except for brief intervals of time required when the movement of the contractor's equipment will seriously hinder the safe movement of traffic. Periods during which the contractor will be allowed to interrupt traffic will be designated by the engineer.

4.3 Mobile operations for concrete traffic barrier work, striping, removals, and pavement markers are permitted within the scope of approved traffic control plan provided with plans. In the event traffic control for mobile operations on this project is not addressed, the contractor shall submit a mobile operation traffic control plan to the engineer before operation may begin. On high-speed roadways, a third shadow vehicle should be used with Shadow Vehicle 1 in the closed lane, Shadow Vehicle 2 straddling the edge line, and Shadow Vehicle 3 on the shoulder. Reference mobile operation principles established within EPG 616.11.5 or MUTCD 6G.02, Typical Application 6H-35.

4.4 Changeable message signs (CMS) shall be posted 3 weeks prior to the Carondelet Connector closure.

4.5 Changeable message signs (CMS) shall be posted 2 weeks prior to the Grants Trail & River Des Peres Greenway periodic closures.

4.6 River Des Peres Greenway shall only be closed Monday thru Friday.

5.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provisions, unless specified elsewhere in the contract document. All authorized changes in the traffic control plan shall be provided for as specified in Sec 616.

D. Emergency Provisions and Incident Management JSP-90-11A

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

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

Transportation Management Center
14301 S. Outer Road
Chesterfield, MO 63017
314-275-1500

City of St. Louis Fire Department
1412 N. Jefferson Avenue
St. Louis, MO 63106
314-533-3406

Missouri State Highway Patrol (Troop C)
891 Technology Drive
Weldon Spring, MO 63304
636-537-3000

Mehlville Fire District (#5 House)
11020 Mueller Rd.
St. Louis, MO 63123
314-894-0420

City of St. Louis Police
1915 Olive Street
St. Louis, MO 63103
314-231-1212

Affton Fire Department
9282 Gravois Road
St. Louis, MO 63123
314-631-1803

St. Louis County Police
7900 Forsyth Blvd.
Clayton, MO 63105
636-529-8210

Lemay Fire Protection District
1201 Telegraph Road
St. Louis, MO 63125
314-631-4500

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 law enforcement agency.

2.2 The contractor shall notify law 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 law enforcement and emergency agencies, a report shall be furnished to the engineer on the status of incident management.

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

E. Project Contact for Contractor/Bidder Questions JSP-96-05

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

Aaron J. Groff, Project Contact
St. Louis District
1590 Woodlake Drive
Chesterfield, MO 63017

Telephone Number: 314-453-1876
Email: aaron.groff@modot.mo.gov

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

F. Supplemental Revisions JSP-18-01R

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.

COVID-19 Safety

1.0 Description. The coronavirus disease 2019 or COVID-19 has reached a pandemic stage across the United States, including the State of Missouri. To reduce the impact of COVID-19 outbreak conditions on businesses, workers, customers and the public, the contractor shall be aware of all COVID-19 guidance from the Center for Disease Control (CDC) and other government health mandates. The contractor shall conduct all operations in conformance with these safety directives. The guidance may change during the project construction and the contractor shall change and adapt their operation and safety protocols accordingly.

2.0 Safety Plan. The contractor shall include these procedures in the project safety plan as called for in the contract documents and revise the safety plan as needed.

3.0 Essential Work. In accordance with any state or local Stay at Home Order, care for the infrastructure has been deemed essential and MoDOT is moving forward with construction projects, this project is considered essential and the contractor and their employees, subcontractors and suppliers are considered essential business and performing essential functions.

4.0 Basis of Payment. Compliance with regulations and laws pertaining to COVID-19 is covered under Sec 107 of the Missouri Standard Specifications for Highway Construction. 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.

G. Liquidated Damages for Winter Months JSP-04-17A

Delete Sec 108.8.1.3 (a)

Liquidated damages for failure to complete the work on time shall not be waived from December 15 to March 15, both dates inclusive.

H. Utilities JSP-93-26F

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

Utility Name	Known Required Adjustment	Type
Ameren Missouri Dave Everding (McKenzie District) Telephone: 314.569.8268 Email: deverding@ameren.com	No	Electric (Both Projects)
Charter Communications(Spectrum) Kenneth Williams Telephone: 314.-393-2984 Email: Kenneith.Williams@charter.com	Yes	Communications (Both Projects)
AT&T Distribution Cheryl Gissler (east of Jefferson) Telephone: 636.479-0055 Email: CB1969@att.com	No	Communications (Both Projects)
Enable Pipeline (MRT) George Steinacker Telephone: 314.609.3723 Email: Stenacker@enable.com	No	Gas Pipeline (J6I3187)
City of St. Louis Water Division Mark Nankivil Telephone: 314.633.9034 Email: mdkelly@stlwater.com	No	Water (Both Projects)
City of St. Louis Traffic Division Justin Decarlo- (Lighting) Telephone:314.803.0248 decarloj@stlouis-mo.gov	No	Lighting (Both Projects)
Metropolitan Sewer District Thomas Boehm Telephone: 314.335-2046 Email: tcboeh@stlmsd.com	No 21MSD-00342	Sewer (Both Projects)
Spire Energy Brian Langenbacher Telephone: 314.768.7767 Email: brian.langenbacher@spireenergy.com	No	Gas (Both Projects)

Lumen (Formerly LightCore) Bill Carpenter Telephone: 636.357.8296 Email: william.carpenter@lumen.com	No	Communication (Both Projects)
AT&T-t Lenny Vohs Telephone: 816.275.4014 Email: lv2121@att.com	No	Communication (Both Projects)
Verizon(MCI) Andy Gotto Telephone: 636.577.7429 Email: andrew.gotto@verizon.com	No	Communication (Both Projects)
Missouri American Water Company Dave Pruitt Telephone: 314.992.2396 Email: dave.pruitt@amwater.com	No	Water (J6I3187)
St Louis County Highway – Traffic Division Marty Koeller Telephone:314.615.0210 Email: mkoeller2@stlouisco.com	No	Signals, Fiber and Lights (J6I3187)
MoDOT Traffic Division Ron Mize Telephone: 314.565.6727 Email: ronald.mize@modot.mo.gov	Yes (included in contract)	ITS, Signals & Lights

1.1 The existence and approximate location of utility facilities known to exist, as shown on the plans, are based upon the best information available to the Commission at this time. This information is provided by the Commission "as-is" and the Commission expressly disclaims any representation or warranty as to the completeness, accuracy, or suitability of the information for any use. Reliance upon this information is done at the risk and peril of the user, and the Commission shall not be liable for any damages that may arise from any error in the information. It is, therefore, the responsibility of the contractor to verify the above listing information indicating existence, location and status of any facility. Such verification includes direct contact with the listed utilities.

2.0 Project Specific Provisions: The Contractor shall be aware there are numerous utilities present along the routes in this contract. The locations listed below are not to be considered all inclusive.

3.0 Ameren's existing facilities within the project limits:

Ameren has many existing aerial facilities crossing I-55 throughout the project limits but no conflicts are anticipated. The contractor should be advised that Ameren has a 34kv line crossing the Missouri Pacific Railroad Bridge on a skew, as shown on sheet 21 & 22 of 60.

3.1 Ameren overhead power lines needing to be covered:

The contractor shall discuss the planned work as it relates to any energized power lines with Ameren Missouri and coordinate with Ameren Missouri for the installation of any insulation covers over the lines and/or any other designated requirements. Please note Ameren Missouri has revised the policy regarding the charges for placement, length of use and relocation of covers. The contractor is advised to contact Ameren Missouri regarding the current policy and so the anticipated cost to the contractor can be estimated and when payment is required. The Contractor shall contact Ameren Missouri at least two weeks in advance of when construction work is scheduled to begin to request covers to be placed at a given location. No direct payment will be made for this provision. The contractor is responsible for any charges from Ameren Missouri for this provision and payment will be directly to Ameren Missouri.

4.0 Charter's existing facilities within the project limits:

Charter has an aerial cable on Ameren's poles crossing I-55 throughout the entire project limits. Charter has an aerial cable crossing under the 2nd Street Bridge that is in conflict with the contractor's deck demo work. Charter advised they anticipate relocating the aerial cable to be placed buried by November 1, 2021.

5.0 AT&T-distribution's existing facilities within the project limits:

AT&T-d has existing aerial and copper facilities located throughout the entire project limits but no known conflicts are anticipated permitted to install new cables in the bridge and take 4 weeks to complete the new cable installation & splicing and wrecking out the temporary aerial cable. Tonya Wells with AT&T-d is the contact for the relocation at Ewing.

6.0 Enable Pipeline's (MRT) existing facilities within the project limits:

Enable Pipeline has a pipeline located just north of Green Park Road Bridge abutment. No conflicts are anticipated.

7.0 St Louis City – Water Division's existing facilities in project limits:

City Water existing water mains located on St Louis City Streets between River Des Peres to Arsenal. No conflicts are anticipated on either project.

8.0 City of St Louis Traffic Division's existing facilities:

St Louis City has lighting has street lights and signals in St Louis City Streets. At 2nd Street under I-55 NB bridge City Lighting has one light under the bridge. The contractor is advised not to disturb this light. If contractor needs to remove light when performing bridge work and install the light after bridge construction is complete, no payment will be made to perform this work. This work is incidental to the bridge construction at 2nd Street.

9.0 MSD has existing storm and sanitary facilities within the entire project limits, MSD job no is referenced as 21MSD-00342.

9.1 River Des Peres under I-55 Bridge (A1057): MSD maintains River Des Peres under I-55. Existing sanitary and storm sewers located under River Des Peres are shown approximately in the contract plans and labeled Do Not Disturb, "DND". The bridge section in this contract requires the contractor to have no debris or materials fall below the structure when performing deck/barrier removals. See section bridge JSP P "Removal of Bridge Deck and Debris. MSD's Operation Group – Sulfur Yard staff will be invited to the preconstruction meeting (contact number is 314-768-6242). The contractor shall contact MSD's Operation Group- Sulfur Yard a minimum of 3 days prior to any construction work above River Des Peres to discuss means and method of work operation and time line working over River Des Peres. Scott Washausen (RE on project) will invite MSD Operation staff to pre-activity meetings on the River Des Peres Bridge.

9.2 Gravois Creek under I-55 Bridge (A0607): MSD has an existing 54" RCP under the Gravois Creek bridge where type 2 rock blanket is being installed in the creek channel over the existing 54" RCP sanitary sewer. The rock blanket is detailed on special sheet 1 of 23 in the contract plans. The existing sewer is shown on the construction plans and bridge sheets and labeled do not disturb, "DND". The contractor is advised the sewer is shallow and is in poor condition. The contractor shall be careful not to disturb the sewer when installing the new rock blanket or other bridge work. The contractor shall pot hole the existing 54" RCP to determine the existing depth of cover over the RCP prior to installing the rock blanket. The contractor shall not exceed max load track equipment for class 3 RCP loading when placing rock blanket. The contractor shall use MSD required the deck concrete at Gravois Creek Bridge and River MSD also is requiring the contractor to video the 54" sanitary sewer before work commences and after work is complete under Gravois Creek bridge. See roadway JSP DD. "Inspection of 54" RCP Sanitary Sewer Adjacent to Gravois Creek under I-55 NB and SB Bridges (J6I3187)."
No direct pay for contractors work to pot hole sanitary sewer and use light equipment to place rock blanket. The bridge section in this contract requires the contractor to have no debris or materials fall below the structure when performing deck/barrier removals (Bridge A0607). See section bridge JSP R "Removal of Bridge Deck and Debris. Contractor will be required to obtain a permit from MSD (21MSD-003032) for work associated with working adjacent to MSD's 54" sanitary sewer.

10.0 Spire's existing facilities in the project limits.

10.1 Spire Energy has existing gas mains located in the project limits but no know conflicts are anticipated.

11.0 Lumen's (Formerly LightCore) existing facilities in the project limits:

11.1 Lumen has existing fiber located along I-55 right of way (east side) throughout the entire project limits but no know conflicts are anticipated.

12.0 AT&T-t's existing facilities in the project limits:

AT&T-t has an existing facility located along Broadway within Job No. J6I3149 but no know conflicts are anticipated.

13.0 Verizon fiber existing facilities in the project limits**:**

Verizon has an existing facility located along Broadway within Job No. J6I3149 but no know conflicts are anticipated.

14.0 Missouri American Water Company's existing facilities in the project limits:

Missouri American Water Company has existing water mains in St Louis County within the entire project limits of J6I3187, but no known conflicts are anticipated.

15.0 St Louis County Traffic Division's existing facilities in the project limits:

The traffic signals in St Louis County that are not maintained by MoDOT are maintained by St Louis County Signals and Traffic in project limits of J6I3187. No known conflicts are anticipated. St Louis County is not part of Mo One Call. In order for the contractor to request St Lois County to locate their facilities on One Call Tickets, contractor shall email signal_locates@stlouiscountymo.gov copies of One Call Tickets Numbers crossing on St Louis County Roads within the project limits.

16.0 MoDOT Traffic Division's existing facilities in project limits:

16.1 MoDOT maintains traffic signals at all the interchanges in the entire project limits and the lights & ITS along the entire I-55 corridor.

16.2 MoDOT currently has ITS facilities on five (5) sets of bridges in the project limits that the decks are being replaced. I-55 bridges over 2nd Street, I-55 bridges over Missouri Railroad, I-55 bridges over River Des Peres, I-55 bridges over Green Park Road, I-55 bridges over Gravois Creek. A bid item is set up for all five bridge to temporarily relocate cable (fibers and stran cable) off the existing barrier of each bridge and permanently attached facilities back on to the new barrier after the deck and barrier are complete. See JSP N "MoDOT ITS Facility Temporary Relocation".

16.3 MoDOT has existing lighting on two sets of bridges on I-55 at Missouri Pacific Railroad and River Des Peres. A bid item is set up to pay the contractor to temporarily remove the lights on both sets of bridges and permanently attached the lights in conduits in the bridge structure (barrier). See JSP U "Maintain Existing MoDOT Lighting (J6I3187)".

16.4 MoDOT has one light on both sides of I-55 lighting the pedestrian bridge that is being demo'd on this project. Each light is the last light of the circuit on both sides of I-55. Both lights are listed as removal of improvement items and for the contractor to disconnect the lighting cable at the adjacent light. MoDOT does not want the lights returned to MoDOT's Barret Station Office. The contractor to dispose of each light. No direct pay for the contractor to perform this work and dispose of both lights.

16.5 MoDOT has existing buried lighting circuits adjacent to both of the I-55 bridges over 2nd Street. Two light standards are being planned to be installed in this contractor on the outside barrier of both the NB and SB bridges. Bridge lighting quantities are set up to perform this work. Refer to the bridge quantities for this work.

I. Liquidated Damages Specified

1.0 Description. If all bridge construction, pavement, resurfacing and striping on I-55 and any other work requiring lane closures to I-55, ramps, and/or cross streets is not complete and open to traffic prior to the dates in the table below the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public.

2.0 Liquidated Damages Specified for Failure to Complete Work on Time. These costs are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount shown in the table below per day for each full day that all that all traffic lanes are not fully open on I-55 as specified elsewhere in this special provision. It will be the responsibility of the engineer to determine the quantity of excess closure time.

WORK	Completion Date	Closure Date Allowed	Liquidated Damages
Begin Traffic Switch for Stage 1		March 15, 2022	
Pedestrian Bridge (A0619) Demolition	July 1, 2022		$11,400 per day
Stages 1 thru 2 Complete / All lanes of I-55 open to traffic	December 1, 2022		$11,400 per day
Begin Traffic Switch for Stage 3		March 15, 2023	
Stages 3 thru 4 Complete / All lanes of I-55 open to traffic	December 1, 2023		$11,400 per day
Carondelet Connector trail open to public	December 31, 2023		$1000 per day
Project Completion	July 1, 2024		$11,400 per day

2.1 The said liquidated damages specified will be assessed in addition to any other liquidated damages charged under the Missouri Standard Specifications for Highway Construction, as indicated elsewhere in this contract.

2.2 This deduction will continue until such time as the necessary work is completed and traffic is restored.

J. MoDOT's Construction Workforce Program NJSP-15-17A

1.0 Description.

1.1 Projects utilizing federal funds include contract provisions for minority and female workforce utilization in the various trade crafts used to complete construction contracts. These federal

contract workforce goals are described in the section labeled "Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity". These goals are included in all MoDOT federal aid contracts and are under the authorization and enforcement of the U.S. Department of Labor (US DOL).

1.2 The Federal workforce requirement (Goals – TABLE 1) is authorized in 41 CFR Part 60-4 and Executive Order 11246 which set Equal Employment Opportunity goals with Affirmative Action requirements.

1.3 The required federal aid workforce provisions noted above, coupled with the following additional contract provisions, constitute MoDOT's Construction Workforce Program herein called Program.

1.4 This provision does not require pre-qualification nor is it a condition of award.

1.5 The Program does not eliminate or limit any actions the US DOL may take in relation to this contract's federal provisions.

1.6 The Program goals included in the contract are separate from any Disadvantaged Business Enterprise (DBE) or On-The-Job (OJT) training provision that may be included as contract provisions. DBE and OJT goals may or may not be included in a contract based on the individual size of contracts, type of contract work, anticipated length of contract, available and willing resources, or other reasons.

1.7 Contractor, for the purpose of this provision, means the prime contractor and any and all subcontractors.

1.8 It is expected that the contractor recognizes the construction workforce goals for both minority and female workers in the project's county and make efforts to attain those goals, if possible, through the existing workforce makeup of the prime (including subcontractors) that will be on the project and/or through hiring opportunities that may arise for the project. However, it is not the intent of this provision to compel any contractor to displace existing workforce or move workers around to just meet the workforce goals.

1.9 If the contractor's existing Missouri construction workforce meets or exceeds the federal workforce goals established in Table 1, then the OJT goal (Training Provision) if included in the contract, does not be apply.

1.10 Contractor's Workforce Plan. The Contractor shall submit its Workforce Plan a minimum of 1 week before construction starts. One plan shall be submitted for the project that shall include the cumulative planned workforce of the prime and subcontractor(s). The contractor shall prepare the plan, for total minority and female utilization, regardless of the craft. The Engineer will provide the Contractor with comments regarding their Workforce Plan prior to the start of construction. Once work starts, all monthly reporting shall include the craft of each worker reported. If the contractor's plan includes project manager, direct project support roles, project testers or other project professionals, these designations should also be included in addition to the workers designated by craft such as laborer, operator, carpenter, ironworker and others.

1.11 The plan accepted by the engineer before the start of construction will be the effort expected of the prime contractor to maintain during the life of the project.

1.12 If the contractors planned project workforce plan (including OJT hours if included in the contract) is short of the goals included in Table 1, there is opportunity for the contractor to receive a reimbursement of $10.00 / hour for any new project minority and female hires needed through the remainder of the project. The reimbursement is applicable to work that qualifies for prevailing wage under the federal Davis-Bacon Act, 40 U.S.C. §§ 3141–3148, in accordance with an approved workforce plan. Any reimbursement must be pre-approved by the Engineer. The reimbursement is provided as a remedy to the contractor and as an aid in the long-term growth of experienced persons in the building of roads and bridges in Missouri. The contractor shall manage the plan through the life of the project as described in the plan or as modified, in coordination with the Engineer. The total amount available per project is not capped.

1.13 The Contractor's workforce plan may include existing construction support and professional services staff.

2.0 Forms and Documentation. The bidder must submit the following documents if awarded the contract:

Cumulative Workforce Utilization Reports. This report is contract specific. One report shall be submitted to the Engineer by the 15th of each month. The report will be used to report the total workforce compliance data for the prime contractor and all subcontractors retained by the contractor on the Commission's construction contract. The reporting shall include the workforce hours per each craft broken down by gender and ethnicity. Construction Support, testing and other professional services hours shall be included as these hours are part of the overall plan. The report will include the previous month's hours worked for the project. For projects less than 60 days in length, only one report with total hours worked by classification is required at substantial completion of construction.

3.0 Methods for Securing Workforce Participation and Good Faith Efforts.

3.1 *By submitting a bid, the Bidder agrees, as a material term of the contract, to carry out MoDOT's Construction Workforce Program by making good-faith efforts to utilize minority and female workers on the contractor's job sites to the fullest extent consistent with submitting the lowest bid to MoDOT. The Bidder shall agree that the Program is incorporated into this document and agree to follow the Program. If a bidder is unable to meet the workforce goals at the time of bid, it shall be required to objectively demonstrate to MoDOT that the goals have been met or demonstrate a good faith effort has been made with the level of effort submitted prior to the start of construction.*

3.2 The Engineer, through consultation with MoDOT's External Civil Rights (ECR's) Division, may determine that the contractor has demonstrated that good-faith efforts to secure minority and female participation have been made.

3.3 In evaluating good-faith efforts, the ECR's Division will take into consideration the affirmative actions listed in the Federal Provisions (including provisions of Executive Order 11246).

3.4 MoDOT's Program allows the contractor flexibility to implement a project specific workforce and improve the diversity of their existing workforce that can be utilized across various areas of the state to meet future MoDOT Program goals and Federal Provisions.

3.5 If the contractor's approved plan changes during the project and/or the available workforce changes from what is approved at any time, it is the contractor's responsibility to remedy, in coordination with MoDOT's ECR Division, the conditions as outlined and made available through this provision.

4.0 Compliance Determination. (Required with project closeout) All documentation and on-site information will be reviewed by MoDOT's ECR Division in making a determination of whether the contractor made sufficient good faith efforts to meet the compliance with MoDOT's Construction Workforce Program.

5.0 Liquidated Damages. If the contractor elects to not submit a workforce plan prior to work starting or fails to fulfill their workforce plan committed to prior to the start of construction, the contractor will be required to establish a good-faith effort determination, as to why either of these events occurred. MoDOT may sustain damages, the exact extent of which would be difficult or impossible to ascertain, as this impacts the cost of future road and bridge construction. Therefore, in order to liquidate those damages, MoDOT shall be entitled, at its sole discretion, to deduct and withhold the following amounts: **The sum of one thousand five hundred ($1,500)**

6.0 Administrative Reconsideration. The contractor shall be offered the opportunity for administrative reconsideration upon written request related to findings and/or actions determined by MoDOT's ECR's Division. The Administrative Reconsideration Committee shall be composed of individuals not involved in the original MoDOT determination(s).

7.0 Available Pre-Apprentice Training Programs. The Commission has established a labor force recruiting program intended to assist contractors in identifying, interviewing and hiring qualified job applicants. MoDOT strongly encourages the hiring of individuals from the MoDOT funded pre-apprentice training programs.

8.0 Independent Third-Party Compliance Monitor (Monitor). MoDOT may utilize a monitor that will be responsible for tracking the project's workforce utilization for the information the contractor submits. The contractor and its subcontractors shall allow the monitor access to their reports, be available to answer the monitor's questions and allow the monitor to access to the site and to contractor and subcontractor employees. The monitor shall abide by the contractor's project site protocols.

9.0 Regional Diversity Council (Council). (Applicable to the Kansas City and St. Louis District regions only) The Council shall consist of local community leaders, leadership of local construction trades, MoDOT staff, Industry representation, and a representative(s) from the Federal Highway Administration. The Council will meet quarterly and evaluate the workforce activity per each project according to the following criteria:

a. Review monthly workforce reports.
b. Review progress toward the stated project workforce program.
c. Review findings of Administrative Reconsideration hearings.
d. Recommend *other* workforce actions to MoDOT.

10.0 Federal Workforce Goals.

Female Participation for Each Trade is 6.9% Statewide for Missouri.

Minority Participation for Each Trade is shown below in Table 1.

TABLE 1:

County	Goal (Percent)	County	Goal (Percent)
Adair	4	Linn	4
Andrew	3.2	Livingston	10
Atchison	10	McDonald	2.3
Audrain	4	Macon	4
Barry	2.3	Madison	11.4
Barton	2.3	Maries	11.4
Bates	10	Marion	3.1
Benton	10	Mercer	10
Bollinger	11.4	Miller	4
Boone	6.3	Mississippi	11.4
Buchanan	3.2	Moniteau	4
Butler	11.4	Monroe	4
Caldwell	10	Montgomery	11.4
Callaway	4	Morgan	4
Camden	4	New Madrid	26.5
Cape Girardeau	11.4	Newton	2.3
Carroll	10	Nodaway	10
Carter	11.4	Oregon	2.3
Cass	12.7	Osage	4
Cedar	2.3	Ozark	2.3
Chariton	4	Pemiscot	26.5
Christian	2	Perry	11.4
Clark	3.4	Pettis	10
Clay	12.7	Phelps	11.4
Clinton	10	Pike	3.1
Cole	4	Platte	12.7
Cooper	4	Polk	2.3
Crawford	11.4	Pulaski	2.3
Dade	2.3	Putnam	4
Dallas	2.3	Ralls	3.1
Daviess	10	Randolph	4
DeKalb	10	Ray	12.7
Dent	11.4	Reynolds	11.4
Douglas	2.3	Ripley	11.4
Dunklin	26.5	St. Charles	14.7
Franklin	14.7	St. Clair	2.3
Gasconade	11.4	St. Francois	11.4
Gentry	10	Ste. Genevieve	11.4
Greene	2	St. Louis City	14.7

Grundy	10	St. Louis County	14.7
Harrison	10	Saline	10
Henry	10	Schuyler	4
Hickory	2.3	Scotland	4
Holt	10	Scott	11.4
Howard	4	Shannon	2.3
Howell	2.3	Shelby	4
Iron	11.4	Stoddard	11.4
Jackson	12.7	Stone	2.3
Jasper	2.3	Sullivan	4
Jefferson	14.7	Taney	2.3
Johnson	10	Texas	2.3
Knox	4	Vernon	2.3
Laclede	2.3	Warren	11.4
Lafayette	10	Washington	11.4
Lawrence	2.3	Wayne	11.4
Lewis	3.1	Webster	2.3
Lincoln	11.4	Worth	10
		Wright	2.3

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

This contractor and subcontractor shall abide by the requirements of 41 CFR 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability or veteran status.

As used in these specifications:

"Minority" includes;

(i) Black (all person having origins in any of the Black African racial groups not of Hispanic origin);
(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
(iii) Asian and pacific islander (all persons having origins in any of the original peoples of the Far East, southeast Asia, the Indian Subcontinent, or the Pacific Islands; and
(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North American and maintaining identifiable tribal

affiliations through membership and participation or community identification).

K. Contractor Quality Control NJSP-15-42

1.0 The contractor shall perform Quality Control (QC) testing in accordance with the specifications and as specified herein. The contractor shall submit a Quality Control Plan (QC Plan) to the engineer for approval that includes all items listed in Section 2.0, prior to beginning work.

2.0 Quality Control Plan.

(a) The name and contact information of the person in responsible charge of the QC testing.
(b) A list of the QC technicians who will perform testing on the project, including the fields in which they are certified to perform testing.
(c) A proposed independent third-party testing firm for dispute resolution, including all contact information.
(d) A list of Hold Points, when specified by the engineer.
(e) The MoDOT Standard Inspection and Testing Plan (ITP). This shall be the version that is posted at the time of bid on the MoDOT website (www.modot.org/quality).

3.0 Quality Control Testing and Reporting. Testing shall be performed per the test method and frequency specified in the ITP. All personnel who perform sampling or testing shall be certified in the MoDOT Technician Certification Program for each test that they perform.

3.1 Reporting of Test Results. All QC test reports shall be submitted as soon as practical, but no later than the day following the test. Test data shall be immediately provided to the engineer upon request at any time, including prior to the submission of the test report. No payment will be made for the work performed until acceptable QC test results have been received by the engineer and confirmed by QA test results.

3.1.1 Test results shall be reported on electronic forms provided by MoDOT. Forms and Contractor Reporting Excel2Oracle Reports (CRE2O) can be found on the MoDOT website. All required forms, reports and material certifications shall be uploaded to a Microsoft SharePoint® site provided by MoDOT, and organized in the file structure established by MoDOT.

3.2 Non-Conformance Reporting. A Non-Conformance Report (NCR) shall be submitted by the contractor when the contractor proposes to incorporate material into the work that does not meet the testing requirements or for any work that does not comply with the contract terms or specifications.

3.2.1 Non-Conformance Reporting shall be submitted electronically on the Non-Conformance Report form provided on the MoDOT Website. The NCR shall be uploaded to the MoDOT SharePoint® site and an email notification sent to the engineer.

3.2.2 The contractor shall propose a resolution to the non-conforming material or work. Acceptance of a resolution by the engineer is required before closure of the non-conformance report.

4.0 Work Planning and Scheduling.

4.1 Two-week Schedule. Each week, the contractor shall submit to the engineer a schedule that outlines the planned project activities for the following two-week period. The two-week schedule shall detail all work and traffic control events planned for that period and any Hold Points specified by the engineer.

4.2 Weekly Meeting. When work is active, the contractor shall hold a weekly project meeting with the engineer to review the planned activities for the following week and to resolve any outstanding issues. Attendees shall include the engineer, the contractor superintendent or project manager and any foreman leading major activities. This meeting may be waived when, in the opinion of the engineer, a meeting is not necessary. Attendees may join the meeting in person, by phone or video conference.

4.3 Pre-Activity Meeting. A pre-activity meeting is required in advance of the start of each new activity, except when waived by the engineer. The purpose of this meeting is to review construction details of the new activity. At a minimum, the discussion topics shall include: safety precautions, QC testing, traffic impacts, and any required Hold Points. Attendees shall include the engineer, the contractor superintendent and the foreman who will be leading the new activity. Pre-activity meetings may be held in conjunction with the weekly project meeting.

4.4 Hold Points. Hold Points are events that require approval by the engineer prior to continuation of work. Hold Points occur at definable stages of work when, in the opinion of the engineer, a review of the preceding work is necessary before continuation to the next stage.

4.4.1 A list of typical Hold Point events is available on the MoDOT website. Use of the Hold Point process will only be required for the project-specific list of Hold Points, if any, that the engineer submits to the contractor in advance of the work. The engineer may make changes to the Hold Point list at any time.

4.4.2 Prior to all Hold Point inspections, the contractor shall verify the work has been completed in accordance with the contract and specifications. If the engineer identifies any corrective actions needed during a Hold Point inspection, the corrections shall be completed prior to continuing work. The engineer may require a new Hold Point to be scheduled if the corrections require a follow-up inspection. Re-scheduling of Hold Points require a minimum 24-hour advance notification from the contractor unless otherwise allowed by the engineer.

5.0 Quality Assurance Testing and Inspection. MoDOT will perform quality assurance testing and inspection of the work, except as specified herein. The contractor shall utilize the inspection checklists provided in the ITP as a guide to minimize findings by MoDOT inspection staff. Submittal of completed checklists is not required, except as specified in 5.1.

5.1 Inspection and testing required in the production of concrete for the project shall be the responsibility of the contractor. Submittal of the 501 Concrete Plant Checklist is required.

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

L. 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.

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^{o} 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 140º F water for a minimum of 10 seconds contact on all surfaces. 140 º 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.

M. NTCIP Compliant Changeable Message Sign (Contractor Furnished and Retained)

1.0 Description. All solar powered changeable message signs, hereinafter referred to as a CMS, shall be in accordance with these specifications.

2.0 Material. Each CMS shall consist of an all LED (light emitting diode) matrix message board, solar/battery power supply and a user-operated interface, as specified, all mounted on a heavy duty, towable trailer.

2.1 Each CMS shall be either Full Matrix or Character Matrix, and have the following minimum characteristics:

(a) Full Matrix - Each CMS shall be the Full Matrix type with the capability of providing one, two, and three lines of individual changeable characters with minimum heights of 52 (1300), 28 (700), and 18 (450) inches (mm), respectively. Full Matrix signs shall be capable of both static and dynamic graphics, and full display sized messages.

(b) Character Matrix (Three Line) – Each CMS shall consist of a minimum of three lines containing eight individual changeable characters per line. Each character shall be a minimum of 12 inches wide and 18 inches (450 mm) high.

(c) Sign firmware shall comply with the current FHWA and DOT (Department of Transportation) NTCIP standards and support all NTCIP mandatory objects.

(d) The sign controller shall be remotely accessible by the MoDOT St Louis District Transportation Management Center (TMC) through the Commission's ATMS (Advanced Traffic Management System) software, currently TransSuite provided by TransCore. The contractor will be responsible for ensuring the CMS is added to the ATMS software.

(e) The CMS shall have a cellular data modem compatible with the district's current cellular IP (packet data) service provider and be capable of allowing the MoDOT St Louis District TMC ATMS software to have full control of the NTCIP compliant CMS controller remotely. Modem shall by capable of being programmed with a static IP.

(f) The sign shall have a GPS unit that can assist in locating the sign's position when polled by the TMC. The GPS unit must be remotely accessible by the TMC and be part of or work with the provided communication modem.

(g) Physical access to the onboard computer shall be protected by a padlock or other locking handle mechanism. Electronic access to the onboard computer shall be protected by a username and password.

2.2 Full matrix CMS and character matrix CMS shall meet the following:

(a) The overall sign dimensions shall not be less than 72 inches (1800 mm) high x 126 inches (3150 mm) wide.

(b) The CMS shall be legible up to a distance of 650 feet (200 m) for both day and night operations and shall be visible for ½-mile (800 m) with 18 inch (450 mm) characters.

(c) When fully raised in the display position, the bottom of the CMS board shall be at least a height of 7 feet (2100 mm) from the ground and shall be able to rotate a complete 360 degrees atop the lift mechanism. A sight tube, used to aim the CMS board to oncoming traffic, shall be installed on the CMS board or mast. The CMS shall have an electrical-hydraulic lifting mechanism that includes a manual lifting and lowering relief mechanism as a backup. It also must be able to be locked into various viewing angles as determined best for the motorists by the CMS operator.

(d) All LED displays and control circuitry shall be operational from -20 F (6 C) to 120 F (50 C). The LED's shall have a rated life of 100,000 hours. The LED's shall be ITE amber in color on a flat black background.

(e) The CMS face shall be constructed that if an individual panel or pixel fails the rest of the face shall continue to display the message.

(f) All costs and coordination needed for testing to verify modem communication, sign NTCIP compliance, remote GPS status polling, ability to control the sign via the St Louis District's ATMS software provided by TransCore shall be the sole responsibility of the Contractor. Full integration into TransCore's ATMS shall be completed at least 5 business days prior to use of the CMS in the project. TransCore contact information will be provided to the contractor by contacting MoDOT's Gateway Guide staff at 314-275-1526 or via email at ggtech@modot.mo.gov with details of the request. No other support shall be provided by MoDOT other than TransCore contact information. Information provided shall include, at a minimum, CMS make and model, IP address, and proposed locations and messages.

(g) The Contractor shall be responsible for all monthly cellular service fees for the duration of the project.

(h) The unit shall be able to withstand a 65-mph (105-kmph) maximum road wind speed. The trailer shall be able to support the fully extended CMS board in an 80-mph (130-kmph) wind load.

(i) Solar charging system shall allow for total autonomy of 24/7/365 continuous operation.

(j) All exterior surfaces except the sign face shall be cleaned, primed, and finished with two coats of Highway Safety Orange and the sign interior itself shall be cleaned and finished with one coat of corrosion inhibiting primer and two coats of flat black. The sign face shall be covered with a rigid translucent material to prevent damage to the sign face caused by the environment.

3.0 Construction Requirements. Prior to placing a CMS on a project, the engineer shall verify proposed CMS location is void of conflict with another DMS or CMS locations presently established. If a conflict is present, the engineer shall contact the Traffic Management Center (TMC) at 314-275-1526 to mitigate. If no conflict is present, engineer shall provide Traffic Management Center (TMC) with the Job Number, Route, County, specific CMS location, and a CMS identification number that is permanently affixed to the CMS. The engineer and contractor shall verify the message displayed on board is compliant with CMS messaging policies. The contractor shall place the CMS 6 feet [2 meters] off of the right edge of shoulder at the location shown on the plans or as directed by the engineer. The CMS shall be placed so that the right side of the unit is advanced approximately 3 degrees ahead with the direction of traffic. CMS shall not be located in medians. CMS shall be delineated with a minimum of five non-metallic channelizing devices. Installation, including location and placement, shall be approved by the engineer. If needed, the contractor shall relocate the CMS as directed by the engineer.

3.1 When not in use, the CMS shall be stored no closer than 30 feet [10 meters] to the edge of pavement carrying traffic, unless it is in a properly protected area or an off-site storage area or as otherwise directed by the engineer.

4.0 Basis of Payment. All expenses incurred by the contractor in integrating, maintaining, relocating, operating and protecting the changeable message signs as outlined above shall be paid for at the contract unit price for the following:

Item No.	Type	Description
616-99.02	Each	NTCIP Compliant Changeable Message Sign (Contractor Furnished and Retained

4.1 Cost for channelizers shall be included in the contract unit price for CMS.

4.2 Cost for cellular phone hookup and monthly usage fee for the duration of the project shall be included in the contract unit price for CMS.

N. MoDOT ITS Facility Temporary Relocation

1.0 Description. This work consists of relocating existing MoDOT Intelligent Transportation System (ITS) facilities (conduit, cable, and/or pull boxes) that are in conflict with this project's construction phases temporarily at the following bridges:

- I-55 at 2nd Street (J6I3149), St Louis City (Bridge No. A1085)
- I-55 at MO Pacific Railroad bridge (J6I3187), St Louis City (Bridge No. A1076/A1273)
- I-55 at River Des Peres (J6I3187), St Louis City (Bridge No. A1057)
- I-55 at Green Park (J6I3187), St Louis County (Bridge No. A0591)
- I-55 at Gravois Creek (J6I3187), St Louis County (Bridge No. A0607)

2.0 Materials. The materials used for relocating MoDOT ITS facilities shall be per MoDOT Approved Product List (APL) and meet all MoDOT Specifications. If the material is not in the APL, the contractor shall submit material specification documents to the Engineer and the MoDOT ITS group (via an email in advance to SLITS@modot.mo.gov) for review and approval.

3.0 Construction Requirements. The Contractor shall submit a proposal to MoDOT ITS staff for review and approval on how they are planning to temporarily detach the existing ITS conduit and fiber optic cables at each of the bridges listed above prior to any bridge construction. The contractor shall be aware there are numerous utilities present along the route in this contract. Utility locates were not performed during the design phase of the project; therefore, the extent of conflicts with utilities are unknown.

3.1 The contractor shall exercise reasonable care relocating MoDOT ITS In-Ground Facilities. Damage to any MoDOT facilities within the area of work caused by the contractor will be deemed by the Engineer as either "non-emergency" or "emergency" upon notification of the damages. Repair to damages will be performed as follows:

a) Non-Emergency: Contractor will have 4 hours to propose a repair plan to the Engineer for a complete repair within 3 business days.

b) Emergency: Upon notification of the damage, Contractor must immediately submit a repair plan to the Engineer which will take no more than 4 hours to respond on-site and complete repairs within 48 hours of notification of damage.

c) In either case, if the proposed plan is unacceptable for any reason to MoDOT, repairs will be made by MoDOT with all costs billed to the Contractor.

3.2 The ITS facilities located within the project limits are a crucial part of the traffic operation system for this area. It is imperative that the downtime be kept to a minimum when replacing, removing, or modifying any existing ITS facilities.

3.3 Prior to any in-ground work, the Contractor shall request for utility locates by contacting Missouri One Call (1-800 DIG-RITE or mo1call.com) for any in-ground installation locations as per plans. If there are any conflicts with MoDOT ITS In-Ground Facilities, the Contractor is responsible for relocation to the satisfaction of the Engineer prior to any in-ground work.

3.4 The Contractor shall coordinate this work with the MoDOT ITS group and have the Engineer's approval prior to performing this task.

3.5 In the case of a conduit conflict, the Contractor shall trench an area beyond the in-ground work limits, install one or two conduits (must be the same quality as the existing conduit) using Split Duct Method, relocate the existing cables into the new conduit, and seal the conduit joints per manufacturer specifications.

3.6 In the case of a fiber optic cable conflict, the Contractor shall provide the Engineer and the MoDOT ITS group an OTDR fiber testing report both before and after relocation per MoDOT Fiber Specifications.

3.7 After the completion of bridge construction, the contractor shall re-install the existing ITS conduits and fiber cables back to the bridge.

3.8 Upon completion of this work, the Contractor shall contact the MoDOT ITS group (via email at slits@modot.mo.gov or by calling 314-275-1526) to verify that all existing MoDOT ITS devices are online and request inspection of this work. Acceptance of this work shall be the sole judgment of the Engineer and the MoDOT ITS group's engineer.

3.9 The contractor shall restore those areas disturbed by this work or installation according to specifications herein.

4.0 The contractor shall submit "means and method" plans of their temporary ITS Relocation over the MO Pacific Railroad bridge to MO Pacific Railroad for approval. The plans shall be submitted to MO Pacific Railroad soon after the preconstruction meeting.

5.0 Basis of Payment. **The contractor shall bid each site separately.** Measurement and payment for "MoDOT ITS Facility Temporary Relocation" shall be paid as "Each" which includes the required temporary relocating of the existing ITS conduits and fiber cables on the bridge structure or temporary poles, maintaining MoDOT network online during the bridge repair work then permanently re-mounting the aluminum conduits and fiber cables back onto the bridge, testing the fiber for proper operations, restoration of all disturbed area, all labor and miscellaneous hardware to complete this task. Payment will be made as follows:

Item No.	Unit	Description
910-99.02	Each	MoDOT ITS Facility Temporary Relocation on I-55 at 2nd Street
910-99.02	Each	MoDOT ITS Facility Temporary Relocation on I-55 at MO Pacific Railroad bridge
910-99.02	Each	MoDOT ITS Facility Temporary Relocation on I-55 at River Des Peres
910-99.02	Each	MoDOT ITS Facility Temporary Relocation on I-55 at Green Park

910-99.02	Each	MoDOT ITS Facility Temporary Relocation on I-55 at Gravois Creek

O. Inlet Top Replacement

1.0 Description. This work shall consist of removing and replacing (in kind) the existing inlet tops, grates, and bearing plates along I-55 as shown on the plans.

2.0 Construction Requirements. The contractor shall field verify the size of the inlet and required grate opening area prior to ordering the corresponding curved vane grate covers, drop inlet tops and grate and bearing plates. The contractor shall saw-cut the existing pavement or shoulder around the inlet to provide the concrete pad around the inlet top in accordance with the dimensions shown in the plans. If needed, the inlet shall be adjusted to the proper elevation. The contractor shall also repair any damage to the inlet, inlet invert, or pipe connection to the inlet.

3.0 Method of Measurement. Measurement for replacing drop inlet tops will be per each and will include, but not limited to, saw-cutting, removing pavement, removing curb, removals of the existing inlet tops and grate and bearing plates, and furnishing and installing the new inlet tops, grates, bearing plates, and concrete curb.

4.0 Basis of Payment. Payment for furnishing the labor, materials, equipment, and excavation necessary to install the new inlet top and grate and bearing plates shall be considered completely covered by the contract unit price for:

Item No.	Unit	Description
731-99.02	Each	Inlet top Replacement (In Kind)

P. Pull Box Replacement (J6I3187)

1.0 Description. This work shall consist of removing and replacing (in kind) the existing pull box along I-55 as shown on the plans.

2.0 Construction Requirements. The contractor shall field verify the size of the pull box prior to ordering the replacement.

3.0 Method of Measurement. Measurement for replacing pull box will be per each and will include, but not limited to, removal of the existing pull box, furnishing and installing the new pull box and cover, compacting fill around pull box, and relocating the existing wires within the pull box.

4.0 Basis of Payment. Payment for furnishing the labor, materials, equipment, and excavation necessary to install the new pull box shall be considered completely covered by the contract unit price for:

Item No.	Unit	Description
901-99.02	Each	Pull Box Replacement

Q. Temporary Traffic Control

1.0 Description. All work necessary to maintain safe and efficient traffic flow through the work area shall be provided by the contractor. This will include furnishing, relocating, and removing temporary traffic control devices, truck mounted attenuators and equipment, and the removal and relocation or covering and uncovering of existing signs and other traffic control devices in accordance with the contact documents or as described by the engineer.

2.0 Work Requirements. Work shall be in accordance with Section 612, Section 616 and the contract plans.

3.0 Method of Measurement. The quantities shown on the plans shall be considered an estimate and may be subject to change based on field conditions. This work will not be measured for payment, and will be considered a lump sum unit. Any Value Engineering proposals to the temporary traffic control will not be paid for through value engineering but will be covered under Temporary Traffic Control, lump sum.

4.0 Basis of Payment.

4.1 Partial payments will be made as follows:

a) The first partial payment will be made when five percent of the original contract amount is earned. This payment will be the lesser of 50 percent of the contract price for the item of temporary traffic control or 5 percent of the original contract price.

b) The second partial payment will be made when 50 percent of the original contract amount is earned. This payment will be the lesser of 25 percent of the original contract price for the item of temporary traffic control or 2.5 percent of the original contract price.

c) The third partial payment will be made when 75 percent of the original contract amount is earned. This payment will be the lesser of 20 percent of the original contract price for the item of temporary traffic control or 2 percent of the original contract price.

d) When the engineer has accepted the contract for maintenance in accordance with Section 105, the remaining contract price for the item of temporary traffic control will be paid

e) e) The above partial payment schedule may be adjusted by the engineer if proof of invoices submitted by the contractor demonstrate additional temporary traffic control costs were incurred earlier than the above proposed schedule. The total payment for temporary traffic control will not exceed the bid amount for Temporary Traffic Control, lump sum, unless covered by a cost change order as referenced in the following Section 4.3.

4.1.1 For the purposes of this provision, the term “original contract price” will be construed as the total dollar value of the construction items (excluding temporary traffic control) of the original contract.

4.2 Payment for Temporary Traffic Control shall be made and considered completely covered by the contract unit price bid for:

Item No.	Unit	Description
616-99.01	LS	Temporary Traffic Control

No direct payment will be made for the following:

a) Incidental items necessary to complete the work, unless specifically provided as a pay item in the contract.

b) Installing, operating, maintaining, cleaning, repairing, removing or replacing traffic control devices.

c) Covering and uncovering existing signs and other traffic control devices.

d) Relocating temporary traffic control devices, including permanent traffic control devices temporarily relocated, unless specifically included as a pay item in the contract.

e) Providing channelizers.

f) Provide barricades.

g) Provide flashing arrow panels.

h) Worker apparel.

i) Flaggers, pilot vehicles, and appurtenances at flagging stations.

j) Temporary chain-link fence and gates.

k) Orange construction fencing.

l) Furnishing, installing, operating, maintaining, and removing construction-related vehicle and equipment lighting.

m) Construction and removal of temporary equipment crossovers, including restoring pre-existing crossovers.

n) Removing existing pavement markings, installing temporary pavement markings, and removing and relocating temporary pavement markings as necessary for staging operations.

o) Installing regional temporary construction Signs. Contractor required to provide post & footing design.

p) Installing “Drive Smart” and “Points of Presence” signs.

4.3 Any additional work deemed necessary by the engineer that requires temporary traffic control and is not covered by the contract plans will be included in the cost change order for the additional

work. However, if the added work is required in a stage where temporary traffic control is already in place, no additional traffic control pay will be allowing in this case.

R. Shaping Slopes Class III (Modified Material Requirements)

Delete Sec 215.1.3 and 215.1.3.1 and substitute the following:

215.1.3 Shaping Slopes, Class III, shall consist of providing rock fill material and shaping slopes to construct additional shoulder width for the installation of guardrail and Type A crashworthy end terminals in accordance with Missouri Standard Plans for Highway Construction. The rock fill material used shall meet the requirements specified in Sec 215.1.3.1. The shoulder surface shall be finished smooth such that it is traversable and without significant voids or depressions.

215.1.3.1 Material Requirements. Rock fill material used for Shaping Slopes, Class III, shall consist of a durable crushed stone, shot rock or broken concrete, with a predominant size of 4 inches minus. Acceptance by the engineer will be made by visual inspection.

S. Modified Linear Grading (J6I3187)

1.0 Description. Modified Linear Grading shall consist of any necessary clearing and grubbing in accordance with Sec 201, preparing the subgrade by excavating, compacting, fine-grading, and shaping existing shoulder and ditch fore-slope, conforming to the typical section shown on the plans. It may be necessary to haul material and involve work on high banks, side hills, and rock outcroppings.

2.0 Construction Requirements. The shoulder shall be excavated and graded as shown on the typical section with minimal disturbance of the existing sub-grade and fore-slope. Density shall be obtained from reasonable compactive efforts consisting of no less than three passes with a roller until no further visible compaction can be achieved, or by other methods approved by the Engineer. Subgrade preparation and compaction shall also be in accordance with Sections 209 and 210.

2.1 All ditches shall be graded to drain and maintain existing flow capacity, unless approved by the engineer. If fill material for the widening work impacts the ditch capacity, the contractor shall re-grade the backslope to maintain the flow capacity of the ditch. Fore slopes and back slopes shall be constructed no steeper than the existing slopes with a maximum slope of 3:1 unless approved otherwise by the engineer.

2.2 It may be necessary to go outside the limits of the right of way to obtain additional material or to dispose of excess material. All costs for providing additional material or disposing of excess material shall be included at the contract unit price for pay item 207-99.09, Modified Linear Grading. All contractor furnished material shall be approved by the Engineer prior to being incorporated into the project. Quarry screenings will not be considered an approved contractor furnished material.

2.3 Included in this work is any pavement edge treatment that might be necessary in order to stay in compliance with the Standard Plans. The need for edge treatment is determined by the contractor's method of operations.

2.4 This work may require excavation activities on rock outcroppings. No separate pay will be made for rock excavation needed to conform to the typical section as shown on the plans.

2.5 Any grading and ditch work that exists as a property owner's frontage that has been mowed and maintained by the property owner will be finish graded to a smooth and mowable surface free of rocks and debris.

3.0 Method of Measurement. Measurement will be made in accordance with Section 207.

4.0 Basis of Payment. Payment for Modified Linear Grading shall be made and considered completely covered by the contract unit price bid for:

Item No.	Unit	Description
207-99.09	STA	Modified Linear Grading

T. Union Pacific Railroad Requirements (J6I3187)

1.0 Introduction.

1.1 These Railroad Requirements set forth terms and conditions agreed upon between the Union Pacific Railroad Company (Railroad) and the Missouri Highways and Transportation Commission (Commission), under which the Railroad will allow the Commission's contractors to enter in and upon the Railroad's real property, right of way, tracks and other facilities (Railroad's Property) to perform the contractor's work relating to this project.

1.2 To report an emergency on the Railroad, call: (888) 877-7267.

1.3 The project location is at Railroad Milepost 5.51 on Railroads Desoto Subdivision, designated as USDOT Crossing # 424957P. **Current FRA data shows 3 daytime trains per day and 2 nighttime trains per day and 3 passenger trains per day.**

1.4 Definitions of terms set forth in the current edition of the Missouri Standard Specifications for Highway Construction shall be applicable to those terms as used in these Railroad Requirements.

2.0 Authority of Railroad Representative and Engineer.

2.1 The authorized representative of the Railroad, herein called "Railroad Representative", shall have final authority in all matters affecting the safe maintenance and operation of railroad traffic including the adequacy of the foundations and structures supporting the railroad tracks.

2.1.1 The Railroad designates the following individual as the Railroad Representative for this project. Except as otherwise provided in these Railroad Requirements, the contractor shall address all notices concerning this project to the Railroad Representative, as follows:

Melinda DuBay,
Engineering-Public Projects
Union Pacific Railroad Company

1400 Douglas, MS 0910
Omaha, NE 68179
Telephone: (402) 544-3992
E-mail: msdubay@up.com

2.1.2 The Railroad, or the individual identified above, may designate a different individual to act as the Railroad Representative for this project, and may change the address information stated above, by giving written notice of the changes to the contractor and to the Engineer, as provided in these Railroad Requirements.

2.2 The authorized representative of the Commission (Engineer) shall have authority over all other matters as prescribed herein and in the project specifications.

3.0 Contractor's Indemnity Obligations to the Railroad.

3.1 The contractor agrees to indemnify, defend and hold harmless the Railroad from and against any injury or death of persons whomsoever, or from any loss or damage to the Railroad's Property, caused by acts or omissions of the contractor in performing work on this project, whether on, over, under or in the vicinity of the Railroad's Property. In the event the contractor shall fail to restore the Railroad's Property immediately to a condition acceptable to the Railroad when any such loss or damage to the Railroad's Property is called to the contractor's attention by the Railroad, then the Railroad may perform such corrective work at the cost of the contractor. The Railroad shall have the right to bring an action directly against the contractor to recover any loss or damage sustained by the Railroad by reason of the contractor's breach of agreements contained in these Railroad Requirements. In addition to such remedies of the Railroad, the Commission will withhold from final payment due to the contractor the amount reasonably necessary to reimburse the Railroad for such loss or damage or for performing such work. The term "loss or damage" as used herein shall include, but not be limited to, the erosion and silting of, water damage to, and the accidental or intentional placing or dropping of objects on the Railroad's Property.

4.0 Notice of Starting Work.

4.1 The contractor shall not commence any work on the Railroad's right of way until contractor has complied with the following conditions (no particular order):

4.1.1 At least Thirty (30) days in advance of the date the contractor proposes to begin work on the Railroad's Property, the contractor has given written notice of the contractor's proposed start date and time to the Railroad Representative, and Railroad's Manager of Track Maintenance (see paragraph 12.2.3 below), with a copy to the Engineer.

4.1.2 The Commission has obtained written approval from the Railroad's Representative for the contractor's insurance coverage as required by Section 17 of these Railroad Requirements, and authorization for the contractor to begin work on the Railroad's Property.

4.1.3 The contractor has determined whether fiber optic cable systems are buried on the Railroad's Property. If fiber optic cable systems are buried on the Railroad's Property, then the contractor has contacted the Railroad at the 24 hour number, 800-336-9193, has contacted the telecommunications company involved, has arranged for a cable locator, and has made arrangements for relocation or other protection of the fiber optic cable system on the Railroad's Property.

4.1.4 The contractor's employees, representatives or agents who are regularly assigned to perform work on the Railroad's Property have been certified as having completed the Internet Safety Orientation available at www.contractororientation.com. This certification shall be renewed annually. In addition the contractor shall require that every employee, representative or agent who is not regularly assigned to perform work on the Railroad's Property has received appropriate safety training before performing any work on the Railroad's property. The cost of the Internet Safety Orientation, which is subject to change, is currently $11 per person per year.

4.2 Right of Entry. At least thirty (30) days in advance of the date the contractor proposes to begin work on the Railroad's Property, the contractor shall enter into a Contractor's Right of Entry Agreement (CROE) with Railroad prior to working on Railroad property. Submit the following information to the Railroad Representative:

a. MoDOT manager contact information
b. Contractor contact information
c. Site location (include address, DOT#)
d. Site map
e. Brief description of scope of work
f. Proposed schedule for work on UP right of way

4.2.1 After reviewing the information, the Railroad Representative will send all of the information to UP Real Estate for processing. UP Real Estate will draft the CROE agreement and send it to the contractor for signature. The signed contract and administrative fee must then be returned to UP Real Estate.

4.2.2 Administrative Fee. Upon the execution and delivery of this CROE agreement, Contractor shall pay the Railroad One Thousand twenty-five Dollars ($1,025) as reimbursement for clerical, administrative and handling expenses in connection with the processing of this CROE agreement.

4.2.3 If applicable to the project, the contractor must submit a plan for demolition, falsework, lifting plans over the Railroad property, shoring plans and any other applicable plans the Railroad may require as well as means and methods to the Railroad for review and approval. All plans submitted to the Railroad must be signed and sealed by Professional Engineer licensed in the State of Missouri. These plans can be submitted along with the Right of Entry application; however the Right of Entry will not be approved until all required plans are approved by the Railroad.

5.0 Interference with Railroad's Operations.

5.1 The Railroad's right of way is located within the limits of this project. The contractor shall take care to ensure that it will not drop any debris or material on the Railroad's Property.

5.2 The contractor shall arrange and conduct all of the contractor's work so that it causes no interference with the Railroad's operations, including train, signal, telephone, telegraphic services, damage to the Railroad's Property, poles, wires and other facilities of tenants on the Railroad's Property. Whenever the contractor's work may directly affect the operations or safety of trains, the contractor shall submit a written description of the method of doing such work to the Railroad Representative for approval, but such approval shall not relieve the contractor from liability resulting from the contractor's work. Any work to be performed by the contractor that requires

flagging service shall be deferred by the contractor until the flagging services are available at the job site.

5.3 Whenever the contractor's work upon the Railroad's Property will unavoidably cause an impediment to the Railroad's operations, such as requiring the use of runaround tracks or reduced train speed, the contractor should schedule and conduct these operations so that this impediment is reduced to the absolute minimum.

5.4 If conditions arising from, or in connection with the work require immediate and unusual provisions to protect the Railroad's operations and property, the contractor shall make such provisions. If in the judgment of the Railroad Representative, or the Engineer if the Railroad Representative is absent, such provision is insufficient, then the Railroad Representative or Engineer may require or provide such provisions as he/she deems necessary. In any event, the contractor shall make such provisions at the contractor's expense, and without cost to the Railroad or the Commission.

6.0 Track Clearances.

6.1 During construction, the contractor shall maintain not less than the minimum track clearances as shown on the project plans. However, before undertaking any work within the Railroad's Property and before placing any obstruction over any track, the contractor shall:

6.1.1 Notify the Railroad Representative and the Railroad's Manager of Track Maintenance at least ten (10) days in advance of the proposed work.

6.1.2 Receive assurance from the Railroad's Manager of Track Maintenance that arrangements have been made for flagging service as may be necessary.

6.1.3. Receive permission from the Railroad Representative to proceed with the work, as provided in section 4.0.

6.1.4. Confirm that the Engineer has received copies of the contractor's notice to the Railroad, and of the Railroads' response.

7.0 Construction Procedures.

7.1. General. The contractor's work on the Railroad's property shall be performed in accordance with these Railroad Requirements and shall be subject to the Railroad's inspection and review. The contractor shall submit plans that shall be signed, sealed, and stamped in accordance with the laws relating to Architects and Professional Engineers, Chapter 327, RSMo, for the demolition of any structure over Railroad right of way, and for temporary shoring and falsework that may affect the Railroad's facilities or traffic.

7.2 Excavation. The contractor shall maintain the subgrade of an operated track with the beam edge at least 12 feet from centerline of track and not more than 26 inches below top of rail, unless the existing section fails to meet this specification, in which case the contractor shall maintain the existing section.

8.0 Maintenance of Railroad Facilities. Within the project limits, the contractor shall maintain Railroad's Property, including all ditches and drainage structures, free of silt or other obstructions that may result from contractor's operations. The contractor shall promptly repair eroded areas

within the Railroad's Property and repair any other damage to the Railroad's Property or the Railroad's tenants. The contractor shall perform all such maintenance and repair of damages due to the contractor's operations at the contractor's expense.

9.0 Storage of Materials and Equipment.

9.1 The contractor shall obtain permission from the Railroad Representative before storing any materials or equipment anywhere on Railroad's Property. The Railroad will not ordinarily permit storage within twenty-five feet (25') from the centerline of any track, or within three hundred feet (300') from any grade crossing. The Railroad will not be liable for damage to such material and equipment from any cause, and the Railroad Representative may move such material and equipment or require the contractor to move it, at the contractor's expense.

9.2 The contractor shall not leave unattended any grading or construction machinery parked upon Railroad's Property, unless it is effectively immobilized so that unauthorized persons cannot move such machinery.

10.0 Cleanup. Upon completion of the work, the contractor shall remove from within the limits of the Railroad's Property all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the contractor's and shall leave Railroad's Property in a neat condition satisfactory to the Railroad Representative.

11.0 Damages. The Railroad shall not assume liability for any damages to the contractor, contractor's work, employees, servants, equipment and materials caused by the Railroad's traffic. However, the preceding sentence shall not exempt the Railroad from liability for any loss, damage or injury proximately caused by the Railroad's intentional misconduct or sole or gross negligence. The contractor shall directly reimburse the Railroad for any cost the Railroad reasonably incurs for repairing damages to the Railroad's Property or to property of the Railroad's tenants, caused by or resulting from the operations of the contractor relating to this project.

12.0 Flagging Services.

12.1 When Flagging is Required. The Railroad has sole authority to determine the need for flagging to protect the Railroad's operations. Whenever the Railroad requires flagging services with reference to any of the contractor's work on this project, the contractor shall not perform any such work until all required flaggers are present at the job site.

12.1.1 In general, the Railroad may require flagging services whenever the contractor's personnel or equipment are, or are likely to be, working on the Railroad's Property, or across, over, adjacent to, or under a track, or when such work has disturbed or is likely to disturb a railroad structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging, to prevent unreasonable risks of accidental hazard to the Railroad's operations or personnel.

12.1.2 Normally, the Railroad will assign one flagger to a project; but in some cases, more than one may be necessary, such as yard limits where the Railroad may assign up to three flaggers. However, if the contractor works within distances that violate instructions given by the Railroad Representative, or performs work upon or adjacent to Railroad's Property that has not been scheduled with the Railroad Representative, the Railroad may require flagging services full time until the project is completed.

12.1.3 If flagging is determined to be required by the Manager of Track Maintenance (MTM), and the MTM advises that third party flagging is to be used, then third party flagging must be used. If flagging is determined to be required by the MTM and the MTM advises that an agreement employee flagging is to be used, then an agreement flagger will be put up for bid (and scheduled accordingly).

12.2 Scheduling and Notification of Flagging Services.

12.2.1 The contractor shall arrange with the Railroad all flagging services required by the Railroad to accomplish the contractor's work on this project.

12.2.2 Before the contractor begins work on the Railroad's Property, the contractor shall furnish to the Railroad Representative and the Engineer a schedule for all work required to complete the contractor's portion of the project within the Railroad's Property, and shall arrange for a job site meeting between the contractor, the Engineer, and the Railroad Representative. Until the contractor has provided its work schedule and met on-site with the Railroad Representative and the Engineer, the Railroad may withhold all flagging services from the contractor's proposed job site.

12.2.3 Before the contractor first begins any work upon or adjacent to the Railroad's Property, the contractor shall give not less than thirty (30) days advance notice to the Railroad, and to the Engineer, of its intent to begin such work. The contractor shall address all notices relating to flagging as instructed in the fully executed CROE agreement.

Jacob Meyer - Manager of Track Maintenance
402-233-1701 (office)
402-651-5709 (cell)
jrmeyer@up.com

12.2.4 The Railroad usually assigns one flagger to work at the job site on a continuous basis until the contractor no longer needs flagging services. The contractor shall not call for flagging services on a spot basis. The Railroad's assigned flagger shall notify the Engineer when flagging services have begun and ended. The flagger shall give these notices immediately upon arrival at the job site on the first day, and before departing from the job site on the last day of each separate period when the Railroad provides flagging services, or as soon as possible thereafter. The Engineer shall document these notifications in the project records.

12.2.5 After the contractor has begun work that requires flagging services, the contractor shall give not less than ten (10) day's advance written notice to the Railroad before discontinuing flagging services and terminating the obligation to pay for flagging services. The contractor shall simultaneously provide a copy of this notice to the Engineer. If the contractor's work on or adjacent to the Railroad's Property is suspended at any time, or for any reason, then before the contractor resumes any work on or adjacent to the Railroad's Property, the contractor shall give advance, written notice to the Railroad and to the Engineer of its intent to resume such work. This notice shall provide sufficient details of the contractor's proposed work to enable the Railroad Representative to determine whether flagging services will be required before the contractor resumes its work on or adjacent to the Railroad's Property. The contractor shall give this required notice at least three (3) working days before it intends to resume such work; however. The Railroad may take up to thirty (30) days after the contractor has given this notice before resuming flagging services at the job site. The requirements of this paragraph 12.2.5 shall not apply if the

suspension and resumption of the contractor's work were previously scheduled with the Railroad pursuant to paragraph 12.2.2 of these Railroad Requirements, or the suspension was caused by an emergency as provided in paragraph 12.2.6 of these Railroad Requirements.

12.2.6 If, after the Railroad has assigned a flagger to the project site in accordance with section 12.0, any emergency requires the flagger's presence elsewhere, then the contractor shall suspend work on the Railroad's Property until the flagger is again available. Any additional costs to the contractor resulting from such delay shall be borne by the contractor and not by the Railroad.

12.3 Payment for Flagging Services.

12.3.1 The Commission will pay the Railroad directly for the cost of flagging services associated with this project by deducting the amount from the Commission's payments to the contractor. If a third-party flagger is used, the contractor has the option to pay the flagger directly but must notify the MoDOT Engineer of such payments for flagging.

12.3.2 The estimated cost of flagging services is approximately $1,400 per day, based on an 8-hour workday and a 40-hour work week. The Railroad shall charge not more than its actual cost of providing these flagging services, which includes the base pay for the flagger or flaggers who actually performed the required flagging services, the Railroad's reasonable overhead costs, and the reasonable costs actually incurred for the flagger's travel expenses, meals and lodging if required. The Railroad may charge a maximum of one hour of travel time each way per day per flagger, for travel to and from the job site. A flagger's work in excess of 8 hours per day or 40 hours per week, but not more than 12 hours per day, will result in overtime pay at 1.5 times that employee's regular hourly rate. A flagger's work in excess of 12 hours per day will result in overtime pay at 2.0 times that employee's regular hourly rate. If a flagger performs required flagging services on a holiday, then the overtime pay rate shall be 2.5 times that employee's regular hourly rate. The Commission or contractor also shall reimburse the Railroad for its actual expenses reasonably incurred in preparing and handling invoices to the Commission or contractor for the cost of these flagging services. The Railroad's charges to the Commission or contractor shall comply with applicable provisions of the current FAPG issued by the FHWA.

12.3.3 The Railroad shall submit progress invoices to the Engineer during the time the Railroad requires flagging services. The Railroad shall submit its final invoice for flagging services to the Engineer within one hundred eighty (180) days after the contractor has notified the Railroad and the Commission that all its work over the Railroad's Property is complete, in accordance with section 18.0 below. If the Commission does not receive the Railroad's final flagging invoice within this time period, then the Railroad shall obtain payment directly from the contractor.

12.3.4 If a dispute arises between the Railroad, the Commission and the contractor concerning the amount charged for flagging service, then the Commission may deduct the full amount of the Railroad's invoice from the contractor's payment until the dispute is resolved.

12.4 Flagging Complaints. The contractor and the Railroad shall attempt to resolve any complaints concerning flagging services in a timely manner. If the contractor disputes the need for a flagger, the contractor shall notify the Railroad Representative and the Engineer. The contractor shall confirm any verbal complaints in writing within five (5) working days, by sending a copy to the Railroad Representative and to the Engineer.

13.0 Temporary Construction Grade Crossing.

13.1 When the contractor has no reasonable alternate method of transporting construction materials and personnel across the Railroad's track, the contractor shall make all necessary arrangements with the Railroad for the installation, maintenance, and removal of one temporary grade crossing for a construction haul road. The contractor shall bear all costs incidental to such crossings, including flagging, whether services are performed by contractor's own forces or by the Railroad's personnel. The contractor shall execute the Railroad's standard Road Crossing Agreement covering terms and conditions for the temporary crossing.

13.2 Neither the contractor nor the Railroad shall construct any crossing for use by the contractor for transporting materials or equipment across the tracks of the Railroad until the Railroad Representative specifically authorizes the installation, maintenance, necessary watching and flagging thereof and removal, which shall be done at the contractor's expense.

14.0 Work for the Benefit of the Contractors. The project plans show all temporary or permanent changes in wire lines or other facilities that are necessary to complete the project, or these changes will be covered by appropriate plan revisions approved by the Commission and the Railroad. If the contractor desires any further changes, the contractor shall make separate arrangements with the Railroad for those changes, at the contractor's expense.

15.0 Cooperation and Delays. The contractor shall arrange a schedule with the Railroad for accomplishing staged construction involving work by the Railroad or tenants of the Railroad. In arranging a schedule, the contractor shall request information from the Railroad, and the Railroad shall promptly provide information, concerning the minimum lead time required for assembling crews and materials. The contractor shall schedule adequate time for those activities. The contractor shall not make any claim against the Railroad for hindrance or delay on account of railway traffic for:

15.1 Any work the Railroad performs.

15.2 Other delay incident to or necessary for the safe maintenance of railway traffic.

15.3 Any delays due to compliance with these Railroad Requirements.

16.0 Trainman's Walkways. The contractor shall maintain along the outer side of each exterior track of multiple operated tracks, and on each side of single operated track, an unobstructed continuous space suitable for trainman's use in walking along trains, extending to a line not less than 12 feet from the centerline of the track. Before the close of each workday, the contractor shall remove all temporary impediments to walkways and track drainage encroachments or obstructions that were allowed during work hours when flagging services were available. Whenever the contractor excavates or maintains any excavation near the walkway, the contractor shall install a handrail with 12 feet minimum clearance from the centerline of the track.

17.0 Insurance.

17.1 General Insurance Provisions. The contractor shall, at its sole cost and expense, procure and continuously maintain in force during this project, the insurance coverage required under this section 17 until the contractor has completed all project work on the Railroad's Property, has removed all equipment and materials from the Railroad's Property, and has cleaned and restored the Railroad's Property to the satisfaction of the Engineer and the Railroad Representative. The

amount of work to be performed upon, over or under the Railroad's Property is estimated to be twenty percent (20%) of the contractor's total bid for the project.

17.2 Commercial General Liability Insurance. The contractor shall maintain commercial general liability ("CGL") insurance with a limit of not less than $5,000,000 for each occurrence and an aggregate limit of not less than $10,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage). The policy must contain the following endorsement, which must be stated on the certificate of insurance: **"**Contractual Liability Railroad's" ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Railroad Company Property" as the Designated Job Site.

17.3 Business Automobile Coverage Insurance. The contractor shall maintain business auto coverage written on ISO form CA 00 01 (or a substitute form providing equivalent liability coverage) with a combined single limit of not less than $5,000,000 for each accident. The policy must contain the following endorsements, which must be stated on the certificate of insurance: "Coverage For Certain Operations In Connection With Railroad's" ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Property" as the Designated Job Site; and Motor Carrier Act Endorsement - Hazardous Materials Clean Up (MCS-90) if required by law.

17.4 Alternate Liability Insurance Limits. Instead of the minimum limits of insurance coverage described above in subsections 17.2 and 17.3, Railroad will accept CGL insurance limits of at least $2,000,000 for each occurrence or claim and an aggregate limit of at least $2,000,000, and will accept Business Automobile Insurance containing a combined single limit of at least $2,000,000 per occurrence or claim, if the contractor will secure Railroad Protective Liability Insurance coverage with a combined single limit of $5,000,000 per occurrence and an aggregate limit of $10,000,000. The contractor's election to maintain these alternate liability insurance limits shall not affect the applicability of any other terms and conditions set forth in these Railroad Requirements.

17.5 Workers' Compensation and Employers' Liability Insurance. The contractor shall maintain workers' compensation insurance coverage, with not less than the minimum statutory liability required under the workers' compensation laws of the State of Missouri. The contractor shall maintain Employers' Liability (Part B) insurance coverage with limits of at least $500,000 for each accident, a $500,000 disease policy limit, and $500,000 for each employee. If the contractor is self-insured, then the contractor shall provide evidence of state approval and excess workers' compensation coverage, which must include coverage for liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable. The policy must contain the following endorsement, which must be stated on the certificate of insurance: "Alternate Employer Endorsement" ISO form WC 00 03 01 A (or a substitute form providing equivalent coverage) showing the Railroad in the schedule as the alternate employer (or a substitute form providing equivalent coverage).

17.6 Railroad Protective Liability Insurance. The contractor must maintain Railroad Protective Liability insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of the Railroad as named insured, with a limit of not less than $5,000,000 per occurrence and an aggregate limit of $10,000,000. Before commencing any work on the Railroad's Property, the contractor shall submit the original insurance policy to the Railroad, or may submit a binder stating that the required Railroad Protective Liability policy is in place until

the contractor delivers the original policy to the Railroad. The contractor shall cause the Railroad Protective Liability Insurance policy to include a description of the named insured, the work, and the job site, as follows:

17.6.1 Named Insured: Union Pacific Railroad Company.

17.6.2 Description and Designation:
Redeck Southbound bridge A1276 and Northbound bridge A1076
Route I-55 in St. Louis City
Job No. J6I3187
USDOT # 424 957P MP 5.51 on the Desoto Sub in St. Louis, MO.

17.7 Umbrella or Excess Insurance. If the contractor utilizes umbrella or excess insurance policies, these policies must "follow form" and afford no less coverage than the primary policy.

17.8 Pollution Liability Insurance. The contractor shall maintain pollution liability insurance coverage, which must be written on ISO form Pollution Liability Coverage Form Designated Sites CG 00 39 12 04 (or a substitute form providing equivalent liability coverage), with limits of at least $5,000,000 per occurrence and an aggregate limit of $10,000,000. If the scope of work as defined in this Project includes the disposal of any hazardous or non-hazardous materials from the job site, the contractor must furnish to the Railroad evidence of pollution legal liability insurance maintained by the disposal site operator for losses arising from the insured facility accepting the materials, with coverage in minimum amounts of $1,000,000 per loss, and an annual aggregate of $2,000,000.

17.9 Other Insurance Requirements.

17.9.1. Each policy required above (except workers' compensation and employers' liability) must include the Railroad as "Additional Insured" using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to the Railroad as an additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20 26 and CA 20 48, provide coverage for the Railroad's negligence whether sole or partial, active or passive.

17.9.2 Where allowable by law, the punitive damage exclusion shall be deleted, and the deletion shall be indicated on the certificate of insurance.

17.9.3 The contractor waives all rights of recovery, and its insurers also waive all rights of subrogation of damages against the Railroad and its agents, officers, directors and employees, except that these waivers shall not apply to punitive damages, nor to any loss, damage or injury proximately caused by the Railroad's intentional misconduct or sole or gross negligence. The certificate of insurance shall acknowledge these waivers.

17.9.4 Prior to commencing any work on the Railroad's Property, the contractor shall furnish the Railroad with one or more certificates of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements set forth in this Section 17.0.

17.9.5 The contractor shall only obtain insurance policies written by a reputable insurance company acceptable to the Railroad, or which currently has a Best's Insurance Guide Rating of A– and Class VII or better, and which is authorized to do business in the State of Missouri.

17.9.6 The fact that insurance is obtained by the contractor or by the Railroad on behalf of the contractor will not be deemed to release or diminish the liability of the contractor, including, without limitation, liability under the indemnity provisions contained in Section 3.0 of these Railroad Requirements. Damages recoverable by the Railroad from the contractor or any third party will not be limited by the amount of the required insurance coverage, except to the extent of any payments the Railroad has received pursuant to that insurance coverage obtained and paid for by the contractor.

17.10 Evidence of Insurance. The contractor shall provide evidence of insurance as required above to the addresses shown below, for review by the Commission and transmittal to the Railroad.

Railroad
Mr. Casey Moore
Real Estate
Union Pacific Railroad Company
1400 Douglas St., MS 1690
Omaha, NE 68179-1690

Commission
Mr. Dave Ahlvers
State Construction and Materials Engineer
Missouri Department of Transportation
P.O. Box 270
Jefferson City, MO 65102

17.11 Except as otherwise specifically provided in these Railroad Requirements, the Railroad will not accept binders as evidence of insurance, and the contractor shall provide the Railroad with the original insurance policy.

17.12 Insurance Required of Subcontractors. If any part of the work is sublet, the contractor shall maintain and provide evidence of similar insurance, in the same amounts as required of the prime contractor, to cover the subcontractor's operations. The Railroad will accept endorsements to the prime contractor's policies specifically naming subcontractors and describing the subcontractor's operations, for this purpose.

17.13 Cancellation of Insurance. The contractor and its insurers shall not cancel any of the required insurance coverage, except by permission of the Commission and the Railroad, or after thirty (30) days' written notice to the Commission and the Railroad at the addresses shown in subsection 17.10.

18.0 Completion of Work on Railroad's Property. The contractor shall notify Engineer and Railroad's Representative when the contractor has completed its work on Railroad's Property.

19.0 Failure to Comply. If the contractor violates or fails to comply with any of the requirements of these Railroad Requirements, then the Railroad Engineer may require that the contractor vacate the Railroad's property and the Engineer may withhold all monies due to the contractor until the contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

20.0 Payment for Cost of Compliance. No separate payment will be made for any other cost incurred on account of compliance with this special provision. All such costs shall be included in

the contract unit price for other items included in the contract. Railroad will not be responsible for paying the contractor for any work performed under this special provision.

20.1 Payment responsibilities for submittal of construction plans and reviews

If applicable to the project, the contractor must submit a plan for demolition, falsework, lifting plans over the Railroad property, shoring plans and any other applicable plans the Railroad may require as well as means and methods to the Railroad for review and approval. All plans submitted to the Railroad must be signed and sealed by Professional Engineer licensed in the State of Missouri. These plans can be submitted along with the Right of Entry application; however, the Right of Entry will not be approved until all required plan submittals are approved by the Railroad. The Railroad may also require an onsite inspector to assure the work is carried out in accordance with the Railroad approved plans.

20.1.1 Payment for plan submittal, Railroad plan review and Railroad inspection fees.

The contractor shall be responsible for all costs associated with the generation and submittal of Railroad plans required for the right of entry agreement. The Commission will be responsible for and directly pay the Railroad for all Railroad review fees associated with these plan submittals and any onsite inspection and management fees charged by the Railroad. A line item (Railroad Plan Submittal) is provided for all costs associated with the generation and submittal of plans required for the Railroad right of entry agreement.

Item No.	Unit	Description
618-10.15	LS	Railroad Plan Submittal

U. Maintain Existing MoDOT Lighting

1.0 Description. All work necessary to maintain power to the existing MoDOT light fixtures along I-55 during/after bridge construction within the project limits and to temporary remove existing lights, store and re-install existing light fixtures permanently back on bridges A1076 & A1276 (UPRR) and A1057 (River Des Peres) due to the deck/barrier replacement in contract. Existing roadway lighting circuits are located on bridge structures of UPRR bridges and River Des Peres bridges. It should be noted that existing lighting circuits are shown approximately on the plans at the UPRR bridges, River Des Peres bridges and adjacent to the 2nd Street bridges over I-55. MoDOT existing lighting as-builts plans are available in the electronic deliverables.

2.0 Work Requirements. Work shall be in accordance with Section 901 of the Standard Specifications.

3.0 Method of Measurement. This work will not be measured for payment and will be considered a lump sum unit.

4.0 Basis of Payment. Payment for furnishing the labor, all materials and equipment necessary to maintain lighting to existing lights along I-55 from Lindbergh Blvd to Arsenal Street and payment for furnishing the labor, all materials, equipment necessary to temporary remove existing lights on the I-55 twin bridges over UPRR and River Des Peres (includes 45' light poles and lighting wall-packs, wires and conduits), temporary store and re-install existing light fixtures and

wiring/conduit system. All work shall be considered completely covered by the contract unit price for:

Item No.	Unit	Description
901-99.01	Lump Sum	Maintain &/or Reinstall Existing MoDOT Lighting

V. Concrete Traffic Barrier, Type C (Modified) (J6I3187)

1.0 Description. This work shall consist of constructing Concrete Traffic Barrier, Type C (Modified) on a reinforced concrete footing as detailed in the plans. This work shall be completed in accordance with Sec 617.10 except as modified herein.

2.0 Material. Material shall be as specified in Sec. 617.10.2.

3.0 Construction Requirements. The Concrete Traffic Barrier, Type C (Modified) and reinforced concrete footing shall be constructed as detailed in the plans and in accordance with Sec 617.10.3.

4.0 Method of Measurement. 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. Where required, measurement for Concrete Traffic Barrier, Type C (Modified) will be made to the nearest ½ linear foot for each continuous length and totaled to the nearest linear foot for the sum of the lengths. Reinforced concrete footing, reinforcing steel, dowels, joint filler material, sawed joints, and excavation for the barrier or footing will not be measured for payment.

5.0 Basis of Payment. Accepted Concrete Traffic Barrier, Type C (Modified) will be paid for at the contract unit price per linear foot. Reinforced concrete footing, reinforcing steel, dowels, joint filler material, sawed joints and excavation for the barrier or footing will not be paid for separately but shall be considered included in the unit bid price for Concrete Traffic Barrier, Type C (Modified).

Item Number	Type	Description
617-99.03	L.F.	Concrete Traffic Barrier, Type C (Modified)

W. MGS Concrete Barrier Transition (Thrie Beam Rail) (J6I3149)

1.0 Description. This work shall consist of furnishing and installing MGS Concrete Barrier Transition (Thrie Beam Rail) as shown and detailed in the plans.

2.0 Material. Material shall be as specified in Sec. 606.10.

3.0 Construction Requirements. The MGS Concrete Barrier Transition (Thrie Beam Rail) shall be constructed as detailed in the plans and in accordance with Sec 606.10.

4.0 Method of Measurement. Measurement for MGS Concrete Barrier Transition (Thrie Beam Rail) will be made to the nearest ½ foot for each segment measured along the center of the rail

from the centerline of the mid-span lap splice to the centerline of the mid-span lap spice totaled to the nearest linear foot for the sum of the increments in the contract.

5.0 Basis of Payment. The accepted quantity of MGS Concrete Barrier Transition (Thrie Beam Rail), complete in place, will be paid for at the contract unit price per linear foot. No direct payment will be made for end sections or terminal connectors. No direct payment will be made for setting posts in rock. No direct payment will be made for delineators provided on new guardrail.

Item Number	Type	Description
606-99.03	L.F.	MGS Concrete Barrier Transition (Thrie Beam Rail)

X. Concrete Curb Under Guardrail

1.0 Description. This work shall consist of removing and replacing or modifying existing curb to comply with guardrail standards for a variety of concrete curb types and heights at locations shown on the plans within guardrail limits.

2.0 Construction Requirements. The contractor shall have the option of either removing and replacing existing curbs or modifying existing curbs by horizontal saw cut methods to meet the required curb height dimensions as designated in the plans. If the contractor elects to remove and replace the existing curbs, the contractor has the option to choose the most practical curb type at each location unless specified in the plans. The method of obtaining curb height compliance under guardrail shall be at the discretion of the contractor considering traffic control and safety requirements. The contractor shall inform the engineer of the types of curbs that will be used and in what locations before work begins. The contractor shall resolve any concerns expressed by the Engineer. Construction and materials shall be in accordance with Sec 609, except as modified herein. Any special materials that may be used shall be tested and approved by MoDOT Materials prior to commencing this work.

2.1 Joints shall be constructed at intervals and locations shown on the plans or as directed by the engineer.

2.2 Reinforcing steel epoxy coating shall be repaired in accordance with Section 710.3.3.

3.0 Basis of Acceptance. Acceptance of this provision will be based on visual inspection by the engineer.

4.0 Method of Measurement. Final measurement will be field verified and measured to the nearest linear foot along the curb face.

5.0 Basis of Payment. Payment for furnishing all labor, equipment, materials, seeding, mulching, grading, sawcut, erosion control, removal and traffic control including other incidentals necessary to remove and replace or modify existing curbs shall be completely covered by the contract unit price for the following pay item:

Item Number	Type	Description
609-99.03	L.F.	Concrete Curb Under Guardrail

Y. Coordination with MoDOT Signal Shop for Cabinet Entry

1.0 Description. Commission-furnished color-coded pad locks have been placed on all of MoDOT's signal cabinets in addition to the key used to unlock the door handle. To gain access to the appropriate cabinets during the project all contractors shall coordinate with MoDOT's signal shop to obtain the proper keys and locks.

1.0.1 Keys & Locks. Red locks & keys are provided when a contractor has modified the signal cabinet and MoDOT staff shall not have access to the cabinet until it is accepted for maintenance. The blue keys are provided for entry into the cabinet where MoDOT's Signal Shop group deems the access to be minor in nature (entry to the cabinet to make a simple network switch connection, for example).

1.0.2 Completion of Project. At the completion of the project all keys and pad locks distributed to contractor during the project shall be returned to the Signal Shop supervisor or their representative and keys shall not be reproduced.

2.0 Contact. Initial contact must be made at least seven calendar days before work begins, preferably when the project has the notice to proceed or during the pre-construction meeting, if applicable. MoDOT's Signal Shop supervisors shall be notified prior to work beginning. Contact the signal shop via email at **sltrs@modot.mo.gov** to coordinate which padlocks are to be used.

3.0 Basis of Payment. No direct payment shall be made for compliance with this provision.

Z. Traffic Signal Maintenance and Programming

1.0 Description. Traffic signal maintenance and timing for this project shall be in accordance with Section 902 of the Standard Specifications, and specifically as follows.

2.0 Qualified Traffic Engineer

2.1 The Contractor shall have an experienced traffic engineer with a Professional Engineer's (PE) license in Missouri as well as a Professional Traffic Operations Engineer (PTOE) certification (hereafter referred to as "Contractor's traffic engineer") with the noted experience defined below. The Engineer shall approve the traffic engineer prior to them being hired.

2.2 Experience. Any proposed Contractor traffic engineer shall be able to demonstrate personal successful previous experience in the following tasks:

2.2.1 Response. The Contractor's traffic engineer shall have the ability to be on site within one (1) hour of being requested.

2.2.2 Corridor Management: Time/space diagram manipulation in order to successfully adjust offsets and splits for rapidly changing traffic demands.

2.2.3 Controller Programming: Ability to program by hand and by software Phase, TBC, and Coordination levels of any Commission-owned Advanced Traffic Signal Controller.

2.2.4 Intersection Programming: Implementation of adjusted and/or new timing plans as a result of changing traffic demand.

2.2.5 Signal Software: Use and understanding of TransCore traffic control software.

2.3 The Contractor shall submit the names(s) of proposed traffic engineer(s) and the name(s) of all other personnel on their proposed staff along with detailed experience in all tasks outlined in Paragraph 2.2 above. The Engineer reserves the right to reject any Contractor traffic engineer, before the start of work, who does not have sufficient experience or, at any point during the project, which does not satisfy the requirements set forth within this Job Special Provision. A list of potential traffic engineers shall be submitted for review to the Commission prior to bid.

2.4 VPN Access. The Commission operates the noted signals through a central signal system which is capable of remote adjustments to controller programming.

2.4.1 The approved contractor's traffic engineer and any staff assigned to manage the traffic signals during the project is encouraged to apply for VPN (Virtual Private Network) access with the Engineer once the project is awarded. If approved, the Engineer will assign a unique IP address to the Contractor's traffic engineering staff, which will allow for remote access to the Commission's central signal control system as appropriate and the ability to interface with the noted signals on this project.

3.0 Existing Traffic Signals and Communication System

3.1 The Contractor shall notify the Engineer three (3) weeks prior to the date of bridge closure and detour implementation. The contractor shall meet with the Engineer's representatives along with representatives of any other agency whose signals are controlled by this provision to discuss their traffic mitigation plan at least one (1) week before the date of the first closure and as needed between construction stages. The traffic mitigation plan should at a minimum include:

- Proposed Timing Plan changes and any models
- Anticipated locations of concern
- A map in electronic format displaying the locations and names of the signals as detailed in Paragraphs 3.2 and 3.3 below.
- Other traffic mitigation efforts

The contractor shall also reach out to the following contact to coordinate all work on St. Louis County's signal facilities at least two weeks prior to commencing any work. The contractor shall also notify the engineer when making contact with the County.

Scott Halter
St. Louis County Dept. of Transportation
Traffic Signals
314-615-0202

3.2 Once the bridge closure has been implemented by the Contractor, the Contractor shall then be solely responsible for the following signals' controller programming until completion of all closures necessary to complete the Contractor's work. Maintenance at these locations for items other than controller programming issues or incidents caused by controller programming or other construction done by the Contractor shall remain with the Commission. If any part of an existing traffic signal or its controller within the limits of this project has otherwise been modified or

adjusted by the Contractor, or the Contractor makes any roadway changes to reduce the traffic capacity through a signalized intersection within the limits of the project, or the Contractor begins work at an intersection with signals already in operation, the Contractor shall then be solely responsible for that signal's controller programming and all signal maintenance as specified in 902.2 and 902.3, except for power costs, until Final Acceptance of the project.

Commission Signals:

- I-55 at Arsenal
- I-55 at Loughborough
- I-55 at Germania
- I-55 at Carondelet / River City Blvd
- I-55 at Bayless
- I-55 at Reavis Barracks SB Ramp
- I-55 at Reavis Barracks NB Ramp
- Route 21 @ Reavis Rd
- Route 21 @ Green Park Rd / Musick Ave
- Route 30 @ Russell Blvd / I-55 NB Off-Ramp
- Route 30 @ 12th St / Geyer Ave / I-44 & 55 NE On-Ramp
- Route 50/61/67 @ Route 21
- Route 50/61/67 @ Mueller Rd
- Route 50/61/67 @ Flori / Yuma
- Route 50/61/67 @ East Concord / Von Talge
- Route 50/61/67 @ St. John's Church / Rusty Rd
- Route 50/61/67 @ I-55
- Route 50/61/67 @ Union Rd
- Route 267 at Bayless
- Route 267 at Hoffmeister
- Route 267 at Telegraph
- Route 267 at Reavis Barracks

St. Louis County Signals:

- Union Rd at Bayless Ave / Weber Rd
- Union Rd at Reavis Barracks Rd

City of St. Louis Signals:

- Russell Blvd @ 12th St
- Russell Blvd @ 7th St
- 7th @ Sidney St
- Broadway @ Lynch St
- Broadway @ Dorcas St
- Broadway @ Arsenal St
- Arsenal St @ 9th St
- Arsenal @ Lemp St
- Broadway @ Lemp Ave
- Broadway @ Chippewa St
- Broadway @ Keokuk St
- Broadway @ Gasconade

- Broadway @ Meramec St
- Broadway @ Osceola St
- Broadway @ Maeder St
- Broadway @ Bates St
- Bates St @ Virginia St
- Broadway @ Loughborough Ave
- Loughborough Ave @ Loughborough Dr
- Broadway @ Nagel Ave
- Broadway @ E Davis St
- Broadway @ Marceau St
- Marceau St @ Germania St

3.3 The Engineer shall provide to the Contactor with two (2) weeks' notice an electronic report on the existing phasing and timing of each traffic signal which may be the Contractor's responsibility to program. The Engineer shall be available to the Contractor before any changes are made to a signal or controller to answer any questions about the report. In lieu of the report, the Contractor's traffic engineer may obtain this information from the Commission's central signal control system. Once the Contractor has modified a signal or controller for any reason, the Contractor shall be solely responsible for the existing timing plans and all subsequent timing changes.

3.4 The Contractor shall notify the Engineer of the changes no later than (1) working day after changes are programmed if unable to provide advance notice as specified in 902.2.

3.5 The Contractor shall be solely responsible for maintaining the coordination at any affected signal to the satisfaction of the Engineer until completion of work as set forth in section 3.2 of this provision. Maintenance of coordination may include the synchronization of the affected controller's internal time clocks to the second using an atomic clock, or other means approved by the Engineer. If time clock synchronization is used, the Contractor shall verify all affected controllers are synchronized at least one (1) time per week with a report to the Engineer
This report will be in the form of a documentation record as spelled out in the Work Zone Traffic Management Plan.

4.0 Existing Traffic Signal Maintenance and Response

4.1 The Contractor shall respond to any signal timing complaints or malfunction complaints for those locations detailed in Section 3.0 of this provision and as specified in Section 902.21.1.
Response time shall be one (1) hour for complaints received by the contractor between 6 AM and 6 PM on non-holiday weekdays, and two (2) hours for all other times. For some cases (due to travel times or other extenuating circumstances) additional time may be acceptable within reason, but must be approved by the Engineer. These timeframes will replace the '24 hour' response time in Section 105.14 for any signal-related incidents, where the entire cost of the work, if performed by Commission personnel or a third party, will be computed as described in Section 108.9 and deducted from the payments due the Contractor.

4.2 The Contractor must supply a contact name and phone number who will be responsible for receiving signal timing complaints for the Engineer. These complaints may be forwarded directly to the Contractor by someone other than the Engineer, including but not limited to the Commission's Customer Service Representatives, and will not relieve the Contractor from

properly responding based on the response times of this Provision. The Contractor shall respond to the Engineer within 12 hours of the complaint as to the remedy. The Contractor shall submit to the Engineer a weekly report of complaints received and remedies performed throughout the duration of the project.

5.0 Original Signal Controller Programming and Acceptance

5.1 The Contractor will be responsible for restoring the original signal controller programming at existing intersections and coordination plans for each intersection immediately upon bridge reopening. The Engineer shall preserve and house the original controller files and provide the Contractor with access to those files in order to perform the restoration of the original plans. Normal plan restoration can be done by a manual command in the signal control system or a preprogrammed time-of-day command change. For any locations rendered offline at the time of re-opening, these locations shall be returned to normal operation by hand. The contractor will be relieved of signal programming maintenance at an existing restored intersection once 48 consecutive hours have passed without a programming malfunction, including restoring normal signal programming to the satisfaction of the Commission.

6.0 Post Project Report

6.1 The Contractor shall submit to the Engineer a post project report, four to six weeks after the final signal adjustments have been completed. The report shall include at a minimum an observation report, summary of timing changes and locations, summary of complaints, and any other pertinent information regarding the contractor's efforts for managing these signal corridors in one electronic document.

7.0 Deliverables

7.1 All deliverables mentioned in this provision shall be submitted to the Engineer in a timely manner to the satisfaction of the Engineer prior to receiving full compensation for this work.

- Experience submittal
- Preliminary Traffic Mitigation Plan
- Notification of Detour Implementation
- Time Base Reports, As Needed
- Complaint Resolutions
- Notification of Restoration to Normal Operations
- Post Project Report

8.0 Construction Requirements. Construction requirements shall conform to Sections 902, 1061 and 1092.

9.0 Method of Measurement. Method of measurement shall conform to Section 902.

10.0 Basis of Payment. Payment will be considered full compensation for all Contractor services, installation, and labor to complete the described work:

Item Number	Description	Unit
616-99.01	Traffic Signal Maintenance and Programming	Lump Sum

AA. Concrete Median Barrier Replacement

1.0 Description. This work shall consist of setting traffic control devices for the removal of the existing median concrete traffic barrier, and constructing new median concrete traffic barrier as shown on the plans.

2.0 Construction Requirements. Bridge work for J6I3149 shall be completed in 2022, and bridge work for J6I3187 shall be completed in 2023. Except at proposed temporary crossover locations, new concrete median barrier for J6I3149 shall be completed in 2023, and new concrete median barrier for J6I3187 shall be completed in 2022.

2.1 A set number of devices have been provided to replace 1-mile segments of the median barrier at a time. The contractor may be allowed to do more or less due to the contractor's preferred method of construction, and as approved by the engineer.

2.2 If the contractor elects to construct segments longer than 1 mile, certain temporary traffic control devices may be underrun, such as relocation of Impact Attenuators. If the contractor elects to construct segments shorter than 1-mile, no additional pay will be made for relocating Impact Attenuators or replacement sand barrels, other than the amount provided for in the contract. Also, no additional compensation will be made for additional time, labor and equipment to relocate all other devices such as signs, flashing arrow panels, channelizers, directional indicator barricades, etc.

2.3 For gaps left for temporary crossovers, the contractor shall relocate temporary traffic barrier to adequately protect traffic from new concrete barrier ends, as seen on the plans, until such time as the crossover is no longer needed, and the new barrier is constructed.

3.0 Basis of Payment. Payment for the work provided for in this provision shall be considered completely covered by the items provided for in this contract.

BB. Temporary Long-Term Rumble Strips JSP-13-04C

1.0 Description. The work shall include furnishing, installing, maintaining and removing long-term rumble strips, as shown in the plans, or as designated by the engineer.

2.0 Material.

2.1 The long-term rumble strips shall be 10 feet to 12 feet in length, fabricated from a polymer material, and be orange in color.

2.2 The long-term rumble strips shall have a minimum width of 4 inches, but no greater than 6 inches. The long-term rumble strips shall have a minimum thickness of 0.25 inch, but no greater than 0.50 inch.

2.3 The long-term rumble strips shall have a pre-applied adhesive backing for securing to the asphalt or concrete roadway surface.

3.0 Construction. Long-term rumble strips layout and spacing shall be in accordance with the plans or as approved by the engineer. The long-term rumble strips shall be installed and removed

in accordance with manufacturer's recommendation. The contractor shall monitor and repair, and maintain if necessary the long-term rumble strips until removed.

3.1 Each set shall consist of five individual strips spaced ten to twelve feet on center.

3.2 The long-term rumble strips removal process shall not damage the roadway surface. If any damage occurs to the pavement during the removal of long-term rumble strips, the contractor shall replace or repair the damaged pavement at no cost to the Commission.

4.0 Method of Measurement. Measurement of long-term rumble strips will be per each complete set of five strips.

5.0 Basis of Payment. No direct payment will be made for Temporary Long-Term Rumble Strips and shall be completely covered under pay item 616-99.01 Lump Sum Temporary Traffic Control.

CC. Clean Water Act Section 404 Permit Requirements (J6I3187)

1.0 Description. The Contractor shall be aware that any work within streams, wetlands, or special aquatic sites requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE).

2.0 This project meets the conditions of the following listed permits with no pre-construction notification (No PCN) to the USACE:

Section 404 Nationwide Permit (NWP) # 14

Job No.: J6I3187 & J6I3149
Route: I-55
County: St. Louis County & City

MoDOT

Missouri Department of Transportation
Patrick K. McKenna, Director

109 West Capitol Avenue
P.O. Box 270
Jefferson City, Missouri 65102

1.888.ASK MODOT (275.6636)

July 1, 2021

To Whom It May Concern:

Subject: **Nationwide Permit #14 (Projects Below the Reporting Threshold)**
MoDOT Job Number J6I3187
St. Louis County, I-55, at Gravois Creek
Bridge A0607 Replacement

The U.S. Army Corps of Engineers issues Nationwide Permit # 14 for activities required for the construction, expansion, modification, or improvement of linear transportation crossings (e.g., highways, railways, trails, airport runways, and taxiways) in waters of the U.S. Nationwide Permit # 14 projects with minimal impact can be defined as those projects involving discharges to waters of the U.S. (e.g. streams, lakes, and ponds) causing losses no greater than 1/10-acre. No wetland impact may result if the project is to meet the minimal impact definition.

The Missouri Department of Transportation (MoDOT) and its contractors regularly construct bridge and roadway projects that have been evaluated by MoDOT staff and have been determined to have minimal impact to waters of the U.S. Bridge replacement activities at MoDOT bridge A0607 on I-55 over Gravois Creek in St. Louis County, Missouri, have been determined to meet the criteria as defined above, and no pre-construction notification is required by the Corps of Engineers.

The permittee is still bound by and shall follow the Section 404 Nationwide Permit # 14 conditions, the Section 404 Nationwide Permit General Conditions within the General Provisions, and the Missouri Nationwide Permit Regional Conditions. In addition, the permittee must follow the Section 401 Water Quality Conditions in the Memorandum of Understanding between MoDOT and MDNR.

If you have any questions regarding the contents of this letter, please contact Christopher Hamilton Environmental Specialist, at 573-526-6676.

Sincerely,

Christopher Shulse

Christopher Shulse
Environmental Compliance Manager

3.0 The Contractor shall abide by all general and regional conditions of Section 404 Permits, Section 401 Water Quality Certification, and specific conditions of the following listed Nationwide Permit found in the General Provisions and Supplemental Specifications to the current Missouri Standard Specifications for Highway Construction referenced in this contract.

NWP 14 No PCN letter attached to RES

3.1 If the Contractor makes any changes to the scope or limits of the project, the Contractor shall notify the Engineer who shall then notify the MoDOT Environmental Section to verify the project still meets permit conditions.

3.2 No additional time will be added to this contract for the Contractor to obtain any permits unless the need for additional permits is beyond the control of the Contractor.

4.0 Basis of Payment. There will be no direct payment for compliance with this provision.

DD. Inspection of 54" RCP Sanitary Sewer Adjacent to Gravois Creek under I-55 NB and SB Bridges (J6I3187)

1.0 Description. The contractor shall provide a video inspection (before work commences and after work is complete) of Metropolitan St. Louis Sewer District (MSD) 54" RCP sewer between existing manholes on the east and west side of I-55 bridges over Gravois Creek. **21MSD-00342** MSD has an old 54" RCP sanitary sewer located on the north side of Gravois Creek under the I-55 NB and SB Bridges. Both bridges will have concrete decks replaced and new rock lining being placed from the top of slope of the creek to the abutment over MSD's existing 54" RCP sanitary sewer. MoDOT received MSD's inspection video dated September 27, 2014. MSD is requiring the contractor to video the sewer before any work commences under the bridge and after all work is complete under the bridge to confirm condition of sewer remains the same as the before condition. The pre-existing sewer inspection video will be included in MoDOT's electronic deliverable. MSD will require an MSD permit for this work. The camera inspection shall provide adequate resolution and clarity that any existing and subsequent defects and condition can be determined. Reports shall be provided documenting the condition of the sewer in the vicinity of all construction activities.

1.1 Video copies shall be provided in the format meeting MSD requirements. Still-frame snapshots shall be provided in a hard copy of any defect areas. Video and still shots to be submitted to MSD soon after performed under the project number via "Accela".

1.2 The contractor shall contact MSD to schedule an MSD representative to be present during all video inspection.

2.0 Basis of Payment: Payment after both before and after work video is received by MSD and MSD advises no change in video from the before and after work videos of existing 54" sanitary sewer.

Item Number	Type	Description
604-99.01	Lump Sum	Inspection of 54" RCP Sanitary Sewer

EE. Coordination with other Projects

1.0 Description. The contractor shall coordinate traffic management between this project and any other projects on I-55, and projects which affect I-55, including future projects. Each Contractor shall conduct their work so as not to interfere with or hinder the progress or completion of the work being performed by other Contractors. In case of dispute, the Engineer shall be the referee and the Engineer's decision shall be final and binding on all.

2.0 Coordination. The Contractor shall coordinate all limits of the project with the Missouri Department of Transportation and the St. Louis County Transportation & Public Works related to the following projects:

- Pavement Rehabilitation Project on I-55 from Lindbergh Blvd. in St. Louis County to I-44 in St. Louis City (Job No. J6I3427)
- Bayless Avenue Bridge over Gravois Creek (Federal Project No. STP-9901(637))
- Bayless Avenue Resurfacing (Federal Project No. STP-4900(635)).

This list of projects is not all inclusive. The contractor shall be aware that there may be other projects including, but not limited to, utility, St. Louis City, private, MoDOT maintenance, permit, or other projects that may impact project construction or traffic control in the vicinity of this project. It shall be the responsibility of the contractor to determine what, if any, projects other than the ones listed above may impact this project and work to coordinate construction and traffic management efforts between this project and any other project involved.

4.0 Site Construction. The Contractor shall arrange the work and shall place and dispose of the materials being used so as not to interfere with the operations of the other contractor.

5.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of the equipment, labor, materials, or time required to for this coordination with other projects.

FF. Slurry and Residue Produced During Surface Treatment of PCCP and Bridge Decks JSP-06-05

1.1 Description. This work covers the requirements for controlling residue or slurry produced by milling, grinding, planing, grooving or other methods of surface treatments on new or existing PCCP and bridge decks in addition to Section 622.

2.0 Construction Requirements. The following shall be considered the minimum requirements for performing this work within the project limits.

2.1 The contractor shall submit to the Engineer for approval in writing prior to the pre-construction meeting, the best management practices (BMP's) to be used to protect the environment, including the method of disposal of the residue whether on right of way or off-site.

2.2 Prior to starting work, slurry or residue "no discharge zones" will be identified by the Engineer with respect to the contractor's approved BMP and residue disposal plan.

2.3 Operations may be suspended by the Engineer during periods of rainfall or during freezing temperatures.

2.4 When slurry is dispersed on the right of way, BMP's shall be installed to keep slurry residue from entering drainage structures, from entering any waterways and from leaving the right of way.

4.0 Basis of Payment. No direct payment for slurry or residue control requirements for BMP's will be made. Compliance with this specification along with the cost of all materials, labor and equipment necessary for the surface treatment work shall be included in and completely covered by the unit price bid for each of the items of work for surface treatment included in contract.

GG. Delayed Possession of Right of Way (J6I3187)

1.0 The contractor's attention is directed toward the following parcels which could be subject to delayed possession:

- Parcel 1 & 2 Loughborough Commons, LLC
- Union Pacific Railroad for bridge #'s A1076 & A1276

2.0 The contractor shall not enter or proceed with physical construction across said Parcel Numbers 1 & 2 or the Union Pacific Railroad Right of Way until authorization is granted by the engineer. The contractor will take no action that will result in unnecessary inconvenience, disproportionate injury or any other action coercive in nature to the business or operations thereon. Possession of each parcel is anticipated to be obtained by the dates specified below. This possession date is estimated and is not warranted, and a later possession date is equally possible.

- Anticipated Possession Date: Parcel 1 & 2 – December 31, 2022
- Anticipated Fully Executed Construction Maintenance Agreement with UPRR - December 31, 2022

3.0 The contractor is required to plan its order of work, manpower and equipment loading, and bid, taking into consideration all effects of the possible delayed possession of the parcel. Any effects, impacts, cumulative impacts or consequences of delay in possession of the parcel shall be non-compensable. This shall include any claim for extra work, as well as delay effects on work not delayed, suspension or acceleration of the work, differing site condition, interference or otherwise.

4.0 The contractor and the Commission understand and agree that by executing this contract, the contractor releases the Commission from any possible liability under this contract or for a possible breach of this contract for failing to make the job site available until the possession of the parcel is authorized by the engineer, and for all direct and indirect, incidental, or consequential damages or losses the contractor may suffer from this delay in making the job site available or issuing a timely authorization. The contractor further waives any right the contractor may have by contract, at law or in equity to challenge the validity or enforceability of the contract, in return

for the award of the J6I3187 & J6I3149 contracts to the contractor at its stated contract prices as bid for the required work. It is provided, however, as contractors SOLE REMEDY for any delay in possession of the above parcel that the completion date of this contract may be extended, day for day, for each day that delayed possession actually interferes with the major items of work as determined by the engineer.

HH. Environmental Considerations

1.0 Description. The contractor shall conduct work in the waterway so as to minimize increases in suspended solids and turbidity that may degrade water quality and damage aquatic life outside the immediate area of operations.

2.0 Construction Requirements.

2.1 General Requirements.

2.1.1 The contractor shall establish and carry out a program for immediate removal of debris during construction in order to prevent the accumulation of unsightly, deleterious and potentially polluted materials in the waterway.

2.1.2 The contractor shall not permit any fuel or oil storage containers, permanent or mobile, located near any waterway to be placed in such a manner to cause the spread of petroleum products in case of leakage. A contingency plan shall be formulated to be effective in event of accidental spill of petroleum products.

2.1.3 The contractor shall be required to store all materials, equipment and petroleum products, when not in use, above anticipated high water levels. The contractor shall not permit debris or any waste material to be stored in any area where debris or waste material could be washed into the waterway as a result of natural runoff or flooding.

2.1.4 Construction activities shall be in accordance with the existing rules and regulations of governmental agencies having jurisdiction over streams and water supplies in the area. To prevent contamination of streams and other water resources adjacent to the project area, the contractor shall not cause interference with water use practices near public recreation areas or water supply intakes.

2.2 Impacts to Fish and Fish Habitat.

2.2.1 Fish habitat within the affected area is primarily turbulent rock rubble and scour holes in the area below the existing bridge. The bottom type varies from sand to silt, with no rooted aquatic vegetation. Due to the lack of suitable cover within the study area, some species are less likely to occur there. Species (e.g., buffalo, bass, carp, drum) that have general upstream or downstream movements, usually associated with spawning, may be found within the affected area at any time. The contractor shall perform the following tasks aimed at reducing impacts to the aquatic environment:

(a) The contractor shall use the minimum charge during demolition shots to minimize the impact on the environment.

(b) The contractor shall use millisecond delays between detonation of successive charges. This effectively reduces the total weight of explosive being detonated at a given time and reduces environmental impacts.

(c) The contractor shall take every precaution to avoid damage and control flyrock, air blast overpressure, particle velocity and to mitigate blast impacts on river fauna by detonating small repelling charges prior to the demolition shot to frighten fish from the proximity of underwater shooting. Repelling charges shall be required for all blasts having one or more explosive locations more than 3 feet below the water surface.

2.2.2 MoDOT may decide to monitor, in coordination with affected state and federal fish and wildlife agencies, a number of initial demolition blasts to determine the magnitude of the fish mortality, if any. The Senior Environmental Specialist shall be contacted at least 10 days in advance of the initiation of blasting so that the US Fish and Wildlife Service and appropriate state conservation agencies can be notified accordingly.

3.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of the equipment, labor, materials, or time required to for environmental considerations.

II. Seeding – Sigma Chemical Co. (J6I3149)

1.0 Description. This work shall consist of furnishing and sowing seed for the disturbed area under and around the 2nd Street Bridge (the Sigma Chemical Co. Parcel).

2.0 Material. Material will be in accordance with Section 805 and following seed and fertilizer requirements:

Seed Requirements	
Seed Type	**Rate**
3 or 5 Blend Turf Type Tall Fescue w/ 10% Bluegrass	450 lbs/acre

Fertilizer Requirements	
Fertilizer Type	**Rate**
12-12-12	500 lbs/acre

3.0 Method of Measurement. Measurement will be made in accordance with Section 805.

4.0 Basis of Payment. Payment for Seeding – Sigma Chemical Co. shall be made and considered completely covered by the contract unit price bid for:

Item No.	Unit	Description
805-99.19	ACRE	Seeding – Sigma Chemical Co

JJ. Optional Temporary Pavement Marking Paint NJSP-18-07B

1.0 Description. This provision provides the contractor with the option to either complete all Permanent Pavement Marking Paint (PPMP) prior to the time limits specified herein or to apply Temporary Pavement Marking Paint (TPMP) in accordance with Sec 620.10.2 (4 in. width) in all locations shown on the plans as PPMP and delay application of the PPMP until the spring of 2024, as allowed herein. PPMP is defined as Standard Waterborne Paint and High Build Waterborne Paint and does not include Sec 620.20.3 Durable Pavement Markings.

1.1 No application of PPMP shall occur between October 1 and March 1, both dates inclusive, except as stated herein. When the contractor has begun application of PPMP prior to October 1, and weather limitations stated in Sec 620.20.2.4 can be met, the contractor may complete the PPMP within the first seven (7) calendar days of October. If all (100%) of the PPMP is not completed on or before October 7, all previously applied PPMP, including any painted markings applied prior to October 1, shall be considered TPMP, and the contractor shall complete the remaining marking with TPMP, and then re-apply PPMP in all planned locations after March 1. All PPMP shall be completed prior to July 1, 2024. No additional payment will be made for PPMP that is later determined to be TPMP due to the contractor's failure to complete the PPMP within the time specified.

1.2 Use of TPMP Prior to October 1. The contractor has the option to apply TPMP in lieu of PPMP prior to October 1, even when there is sufficient time to complete the PPMP prior to October 1. For example, the contractor may choose to use TPMP as a base coat for the PPMP on open-graded surfaces in order to achieve higher retroreflectivity readings on the surface coat as compared to a single application.

1.2.1 The contractor has the option of using TPMP in lieu of Temporary Raised Pavement Markers if applied each day that existing markings are obliterated.

2.0 Construction Requirements. TPMP shall be accurately placed in the final planned location and shall be completely covered by the final application of PPMP. Any failure to comply with this requirement shall be corrected by removal of the misplaced pavement markings at the contractor's expense and without marring of the pavement surface.

2.1 Prior to application of the PPMP on TPMP, TPMP shall be fully cured in accordance with the manufacturer's recommendation, or for a period of 12 hours, whichever is greater.

3.0 Weather Limitations. All weather limitations specified in Sec 620 for PPMP and TPMP shall apply. Cold Weather Pavement Marking Paint, in accordance with Sec 620.10.6, shall be used for TPMP when specified weather limitations do not allow the use of waterborne paint. No additional payment will be made for the use of Cold Weather Pavement Marking Paint as TPMP. Cold Weather Pavement Marking Paint is not an allowable substitute for PPMP and shall subsequently be covered with PPMP.

4.0 Time Exception. If application of PPMP is to be delayed to the spring, the contractor shall submit a request to the engineer for a time exception and shall provide a revised work schedule that shows the planned completion of the PPMP.

4.1 Upon receipt of the time exception request in Section 4.0, the engineer will list "Application of Permanent Pavement Marking Paint" as an exception on the Semi-Final Inspection form, thus

granting an exception to the count of contract time thru July 1, 2024, solely for the purpose of delaying application of PPMP. This time exception shall not apply to any time needed to complete any other work items. Liquidated Damages, as specified elsewhere in this contract, shall remain in effect for all other work items not completed by the contract time limits, as specified elsewhere in this contract, and for PPMP not completed by July1, 2024.

5.0 Method of Measurement. No final measurement will be made for TPMP.

6.0 Basis of Payment. Full payment for TPMP will be made at the contract lump sum price even when PPMP is completed prior to the time limitation and TPMP is not used or only partially used.

6.2 If a $0 bid is entered for TPMP, no payment will be made should TPMP become necessary.

Item No.	Unit	Description
620-99.01	LS	Temporary Pavement Marking Paint

KK. Grant's Trail Construction Requirements (J6I3187)

1.0 Description. This provision contains general construction requirements for this project to maintain use of the Grant's Trail underneath I-55 parallel to Green Park Road. Grant's Trail is also called the Gravois Greenway and is owned by Trailnet within the project area. ("Trail")

2.0 Construction Requirements. Plans for the existing structure(s) over Grant's Trail/Green Park Road will be available to the successful bidder as directed by the engineer.

2.1 The Trail is open daily from 30-minutes before sunrise to 30-minutes after sunset. ("Operating Hours")

2.2 A detour route will be provided on Green Park Road when the Trail needs to be closed due to construction overhead. Two 10' wide, 2" thick commercial mix asphalt connections must be paved through the existing gravel parking lot for temporary use. When used for the bicycle/pedestrian detour, Green Park Road will be closed to vehicular traffic. At the end of construction, the temporary asphalt paths shall be removed by the contractor.

2.3 During the duration of construction the Contractor will be responsible for removing equipment and debris from Grant's Trail around the area of bridge A0591 such that either the Trail or the detour on Green Park Road is usable and accessible during Operating Hours for pedestrians, bicyclists, and other recreational users of the Trail.

2.4 During Operating Hours either the Trail or the detour on Green Park Rd shall be open for continuous public use through the limits of the project.

2.5 Provisions shall be made to prevent any debris and materials from falling onto the Trail. 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. Trail traffic under the bridge shall be maintained in accordance with the contract documents.

2.6 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.

2.7 Provisions shall be made to prevent damage to the asphaltic trail pavement surface and wayfinding signage. Any damage sustained to the asphaltic pavement surface or wayfinding signs 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 trail operator, owner and as approved by the engineer.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above-described work will be considered completely covered by the contract unit price bid for:

Item No.	Unit	Description
616-99.01	Lump sum	Misc. temporary traffic control

LL. Property Owner Agreements (J6I3149)

1.0 Description. During the negotiations of easements and rights of way, MoDOT entered into agreements with certain property owners. The Contractor shall abide by the following commitments.

(a) **Parcel 1** (Sigma-Aldrich Co, LLC) For this parcel, the GRANTEE listed below shall be considered the Contractor, and the Grantor is the owner of Parcel 1 noted above:

Indemnity. To the extent permitted by law, Grantee shall require its contractor to Indemnify, defend and hold harmless Grantor and Sigma-Aldrich Co, LLC (as defined herein) from any and all losses, liabilities (including strict liability), claims, causes of action, damages, injuries, liens, (including mechanic's liens and materialman's liens), expenses and costs, including without limitation reasonable attorney's fees of any settlement, judgment or claims of any and every kind whatsoever paid, incurred, or suffered, in connection with any damage or liability to persons or property that might arise directly or indirectly during construction of Grantee's improvements, or use of the Easement.

Insurance. Grantee shall require the contractor to procure and maintain insurance as set forth in the Missouri Standard Specifications for Highway Construction Section 107, for any claims, costs, causes of action, damages or liabilities which may arise out of the entry onto or the activities of the Grantee or its agents or contractors on Grantor's property. Additionally, the Commission will require the contractor to list the Grantor as an additional insured party on the contractor's commercial liability policy.

2.0 Basis of Payment. Payment for the above-mentioned items will be considered incidental and there will be no direct payment.

TABLE OF CONTENTS

"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."	**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION** 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636
	If a seal is present on this sheet, JSP's has been electronically sealed and dated.
	JOB NO. J6I3149 St. Louis County, MO Date Prepared: 8/5/2021
	Addendums only, blank otherwise **Addendum No. #**
Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: A thru P	

A. CONSTRUCTION REQUIREMENTS

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

2.0 Construction Requirements. The plans and the asbestos and lead inspection report for the existing structure(s) are included in the contract in the bridge electronic deliverables zip file for informational purposes only.

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

2.2 Bridge work by contractor forces, including erection, rehabilitation or demolition, shall not be allowed over traffic unless a bridge platform protection system is installed below the work area except for work performed above a deck that is intact. The protection system shall be capable of catching all falling objects such as tools, overhang brackets or materials. Lifting of objects that are heavier than the capacity of the bridge protection system shall not be permitted.

2.3 Qualified special mortar shall be a qualified rapid set concrete patching material in accordance with Sec 704. A qualified rapid set concrete patching material will not be permitted for half-sole repair, deck repair with void tube replacement, full depth repair, modified deck repair and substructure repair (formed) unless a note on the bridge plans specifies that a qualified special mortar may be used.

2.4 The existing slab for the bridge(s) to be redecked was constructed as composite or non-composite as shown in the table below.

Bridge No.	Type of deck
A1085	Composite

2.5 Provisions shall be made to prevent any debris and material from falling onto the roadway. In addition, material from removal of the existing bridge deck on Bridges A10852 and A10853 shall not be allowed to fall below the superstructure. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits 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.

2.6 Any damage sustained to the remaining structure or adjacent facilities 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.

2.7 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.

2.8 A washer shall be required under head and nut when any reaming is performed for bolt installation.

2.9 SSPC-SP2 and SSPC-SP3 surface preparation shall be in accordance with the environmental regulations in Sec 1081 and collection of residue shall be in accordance with Sec

1081 for collection of blast residue. SSPC-SP6, SSPC-SP10 and SSPC-SP11 surface preparation shall be in accordance with the approved blast media and environmental regulations in Sec 1081 and collection of blast residue shall be in accordance with Sec 1081.

3.0 Coating Information.

3.1 Straps Removal. Exposed portions of straps for stay-in-place forms shall be removed prior to surface preparation. Straps need not be removed in areas that are not being painted. Flame cutting will not be permitted. The contractor shall exercise care not to damage the existing structure during removal. 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.

3.2 Slab Drains and Stay-In-Place Forms. The stay-in-place forms, slab drains and slab drain brackets shall not be recoated, overcoated or damaged during the painting operation. Any portion of the slab drain bracket that is blast cleaned shall be recoated with System G. Any damage sustained 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.

3.4 Environmental Contact. Environmental Section may be contacted at the below address or phone number. The Missouri Department of Health may be contacted at (573) 751-6102.

MoDOT - Design Division - Environmental Section
P.O. Box 270
105 W. Capitol Ave., Jefferson City, MO 65102
Telephone: (573) 526-4778

3.5 Approved Smelter and Hazardous Waste Treatment, Storage and Disposal Facility. The following is the approved smelter and hazardous waste treatment, storage and disposal facility:

Doe Run Company - Resource Recycling Division - Buick Facility
Highway KK
Boss, MO 65440
Telephone: (573) 626-4813

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.

B. STRUCTURAL STEEL REQUIREMENTS

1.0 Description. This provision contains general structural steel requirements for this project.

2.0 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as shown below. The gray epoxy-mastic primer (non-aluminum) shall be compatible with concrete and produce a dry film thickness of no less than 3 mils (75 µm).

Item	Section
Structural Steel Construction	712
Gray Epoxy-Mastic Primer (non-aluminum)	1045

Item	Section
Structural Steel Fabrication	1080
Coating of Structural Steel	1081

3.0 Construction Requirements.

3.1 Before fabrication of new metalwork, the contractor shall make the necessary measurements in the field to verify dimensions of the existing structure where new members are affected. Any deviation of the dimensions shown on the plans shall be called to the engineer's attention. The contractor shall be responsible for developing all required dimensional adjustments and coordinating the implementation of the dimensional adjustments with all involved fabricators and subcontractors.

3.2 Prior to erection of the new structural steel, the steel that is to remain shall be carefully inspected for irregularities. If such irregularities are found, the irregularities shall be brought to the attention of the engineer.

3.3 Holes in the new diaphragm or cross frame connection plates and angles may be used as a template for drilling the holes in the existing material.

3.4 A minimum edge distance shall be maintained for all field drilled holes. The minimum edge distance for bolts shall be as shown in table below measured from the centerline of holes.

Bolt Diameter inch (mm)	Minimum Edge Distance inch (mm)
3/4 (19.0)	1-1/4 (32)
7/8 (22.2)	1-1/2 (38)
1 (25.4)	1-3/4 (45)

3.5 The surfaces of existing steel that will become faying surfaces for non-slip critical new connections, typically secondary members, shall be cleaned according to the manufacturer's recommendation and with a minimum of SSPC-SP-3 surface preparation and coated with one prime coat of Gray Epoxy-Mastic Primer (non-aluminum) in accordance with Sec 1081. The surfaces of existing steel that will become faying surfaces for slip critical new connections, typically primary members, shall be in accordance with contact surfaces in Sec 1081. Primary member connections include girder/beam splices, end diaphragms and intermediate diaphragms in curved structures.

3.6 Exposed girder/beam areas that are not faying surfaces or not covered by concrete that are scratched, damaged by the contractor or by field welding operations shall be touched up with Gray Epoxy-Mastic Primer (non-aluminum) in accordance with Sec 1081. The areas shall receive the coating system as shown on the plans.

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 the structural steel items included in the contract. No payments or adjustments will be made where new members are affected due to any deviation of the dimensions shown on plans or shop drawings.

C. REMOVAL OF EXISTING BEARINGS

1.0 Description.

1.1 With the deck removed, this work shall consist of but is not limited to raising and supporting existing girders and/or beams at the locations specified on the plans, removing and disposing of the existing bearings and anchor bolts and performing all other required preparations prior to installing new bearings and anchor bolts as shown on plans.

1.2 The responsibility for the design and construction of falsework required to support the girders and/or beams during bearing removal and new bearing installation shall rest solely with the contractor. The design shall ensure that the falsework can support all applicable dead loads and any construction loads. The design shall also provide an adequate factor of safety when selecting the temporary support members. The falsework design and working plans including detailed computations shall be signed, sealed and stamped by a registered professional engineer in the State of Missouri in accordance with Authentication of Certain Documents in Sec 107.

1.3 Existing girders and/or beams shall be subject to minimal construction loading by performing this work with the existing deck removed.

1.4 Existing bearing top plates shall be removed and girder and/or beam surfaces cleaned and coated before placement of new bearings. The removal of the existing bearing top plate and cleaning shall be completed in such a manner as to not cause any damage to the existing bottom flange. Method of removal shall be as approved by the engineer.

2.0 Construction Requirements and Materials.

2.1 Raising and Supporting the Superstructure.

2.1.1 Before beginning operations, the contractor shall submit to the engineer for review the method and sequence of operation proposed to be used in performing this work. With the deck removed, the contractor shall exercise caution when supporting the structural steel and shall raise the girders and/or beams the minimum extent necessary to perform this work with a maximum raise of 1/4 inch. Raising the girders and/or beams at the location of reset bearings shall be performed in a manner to prevent any damage to the adjoining steel. The lifting operation shall be performed only when authorized, but such authorization shall not relieve the contractor of responsibility for the safety of the operation or for damage to the structure. Any damage caused by the contractor's operations shall be repaired at the contractor's expense as approved by the engineer.

2.1.2 Temporary timber supports (bearing stiffeners) shall be placed between the girder and/or beam flanges at each jacking location to prevent flange rotation. Permanent steel stiffening angles shall be designed and attached to the beam web when the beam web thickness is not adequate to support the jacking load.

2.1.3 Raising the girders and/or beams shall be performed simultaneously and shall be performed in a manner to prevent any damage to the adjoining steel.

2.1.4 Existing end diaphragms at bent may require loosening or be completely removed in order to install new anchor bolts and bearings as authorized by the engineer.

2.1.5 Bolts of existing end diaphragms that must be loosened or removed shall be replaced with like size galvanized high strength bolts with washer under head and nut.

2.2 Bearing Removal.

2.2.1 After the structural members are supported, the contractor shall remove the existing bearings.

2.2.2 The contractor shall remove the existing anchor bolts to one inch below the concrete surface or to the extent needed for installation of the new anchor bolts as required by the plans and as authorized by the engineer. The resultant holes shall be filled with a qualified special mortar in accordance with Sec 704.

2.3 Cleaning and Painting. Faying surfaces where existing end diaphragms will be reconnected and inside of drilled holes and the bottom surface of existing flange which will become faying surfaces of new connections shall be cleaned and painted with one coat of gray epoxy-mastic primer (non-aluminum).

3.0 Method of Measurement. Final measurement for removal of the existing bearings and preparation for the installation of the new bearings will be made per each.

4.0 Basis of Payment. Payment for furnishing and placing all temporary falsework (including stiffeners), materials, removals, disposal of all falsework, labor, tools, equipment and all incidentals necessary to complete this item will be considered completely covered by the contract unit price for Removal of Existing Bearings.

D. DRAINAGE SYSTEM

1.0 Description.

1.1 The work under this item consists of furnishing, fabricating, and installing the drainage items necessary to complete the entire drainage system as shown on the design plans.

1.2 Detailed shop drawings of the drainage system shall be prepared and submitted to the engineer. Shop drawings shall be in accordance with Sec 1080. Catalog data may be furnished for components that are standard manufactured items in lieu of detailed drawings, providing, governing dimensions are given.

2.0 Materials.

2.1 Scupper outlets and grates shall be equivalent to Neenah R-4014-C2. Castings shall be cast gray iron in accordance with Sec 614. A fabricated outlet and grate of similar size and in accordance with the requirements for ASTM A 709 Grade 36 (250) steel may be submitted for approval. Castings shall be coated a prime coat of the coating system as specified on the bridge plans to provide a minimum dry film thickness of 5 mils (127 µm) or may be galvanized in accordance with ASTM A 385. Steel outlets and grates shall be coated as described above or galvanized in accordance with ASTM A 123.

2.2 Reinforced fiberglass pipe, collection basins and fittings shall be a Reinforced Thermosetting Resin Pipe (RTRP) system in accordance with the requirements of ASTM D 2996. The RTRP system shall have a minimum short time rupture strength hoop tensile stress of 30,000 psi (207 MPa). The RTRP system shall be pigmented resin throughout the wall. The color of the RTRP system shall be concrete gray or as specified on the bridge plans. The RTRP system shall not be coated with paint, gel-coat or any other exterior coating.

2.3 The contractor shall furnish a manufacturer's certification to the engineer for each lot furnished, certifying that the materials supplied is in accordance with all requirements specified. The certification shall include results of all required tests. Acceptance of the material will be based on the manufacturer's certification and upon results of such tests as may be performed by the engineer. The certification shall show the quantity and lot number that is represented.

3.0 Construction Requirements.

3.1 All connections shown on the plans to facilitate future removal for maintenance cleanout or flushing shall be made with a threaded gasket coupler system, bolted gasket flange system or a female to male threaded PVC plug. Adhesive bonded joints will be permitted for runs of pipe between such connections.

3.2 Runs of pipe shall be supported at a spacing of not greater than the lesser of those as recommended by the manufacturer of the pipe or as shown on the bridge plans. Supports that have point contact or narrow supporting areas shall be avoided. Standard sling, clamp, clevis hangers and shoe supports designed for use with steel pipe may be used. Minimum hanger thickness shall be 3/16 inch (5 mm) with the minimum strap width for the pipe sizes shown in the table below. Straps shall have 120 degree minimum contact with the pipe. Pipe supported on a surface with less than 120 degrees of contact shall have a split fiberglass pipe protective sleeve bonded in place with adhesive. All new steel, hangers and miscellaneous hardware for drainage system shall be ASTM A 709 Grade 36 (250) steel except as noted on the bridge plans. All new steel, hangers and miscellaneous hardware for drainage system shall be galvanized in accordance with ASTM A 153 except as noted on the bridge plans.

Pipe Sizes inches (mm)	Minimum Strap Width inches (mm)
3 (76.2)	1.25 (32)
4 (101.6)	1.25 (32)
6 (152.4)	1.50 (38)
8 (203.2)	1.75 (45)
10 (254.0)	1.75 (45)
12 (304.8)	2.00 (51)
14 (355.6)	2.00 (51)

3.3 The RTRP system shall be handled and installed in accordance with guidelines and procedures as recommended by the manufacturer.

3.4 When the drainage system continues between superstructure units and/or between the superstructure and substructure units, the drainage system shall have allowance for the expected differential expansion and contraction movements as recommended by the manufacturer.

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary, will be considered completely covered under the contract lump sum price for “Drainage System (On Structure)”.

E. SHOTCRETE CONCRETE REPAIR

1.0 Description. Substructure repair (formed and unformed), superstructure repair (unformed) and slab edge repair shall be in accordance with Sec 704 and as shown on the contract plans. Shotcrete, in accordance with this Special Provision, shall be used for slab edge repair and may be used at the Contractor's option for formed and unformed substructure and superstructure repairs.

1.1 Shotcrete shall be in accordance with the current requirements of American Concrete Institute (ACI) 506.2-13, "Specification for Shotcrete", except as otherwise specified. Shotcrete shall consist of an application of one or more layers of mortar or concrete conveyed through a hose and pneumatically projected at a high velocity against a prepared surface.

1.2 Shotcrete shall be produced by a dry-mix process. The dry-mix process shall consist of thoroughly mixing all the ingredients except accelerating admixtures and mixing water and conveying the mixture through the hose pneumatically and the mixing water is introduced at the nozzle. For additional descriptive information, the Contractor's attention shall be directed to the ACI 506R-16, "Guide to Shotcrete".

2.0 Contractor Experience Requirements.

2.1 Workers, including foremen, nozzlemen and delivery equipment operators, shall be fully experienced to perform the work.

2.2 Initial qualification of nozzlemen will be based ACI or EFNARC certification for the application process being used. The nozzlemen shall submit documented proof they have been certified in accordance with the ACI 506.3R-91 "Certification of Shotcrete Nozzlemen" or EFNARC "Nozzleman Certification Scheme". The certification shall have been done by an ACI or EFNARC recognized shotcrete testing lab and/or recognized shotcreting consultant and have covered the type of shotcrete to be used (plain dry-mix).

2.3 The Contractor may supply 1 reference project for the project nozzleman in lieu of completing test panels in accordance with Section 5.1 of this Job Special Provision to demonstrate the experience of the nozzleman in similar shotcrete application work. Owner contact information for the reference project shall be provided to allow for the Engineer to confirm satisfactory results.

3.0 Shotcrete Materials.

3.1 Shotcrete materials shall consist of one of the following premixed and packaged materials:

a) BASF MasterEmaco S 211SP
b) Euclid Chemical Eucoshot F
c) King Shotcrete MS-D1
d) CTS Cement Low-P

3.2 No material testing is anticipated. Acceptance will be based on the prequalified materials listed in this Special Provision, approval of the nozzleman prior to material placement, and visual inspection. If questions arise based from visual examination, placement methods, curing methods or other potentially undesirable influences the Engineer reserves the right to test any material properties listed on the published product data sheet for the material selected. Testing will be done at the Contractor's expense.

3.3 Material shall be delivered, stored and handled to prevent contamination, segregation, corrosion or damage.

3.4 Proportioning and Use of Admixtures. Admixtures will not be permitted unless approved by the Engineer.

3.5 Bonding Agents. Bonding agents will not be permitted.

3.6 Air Entrainment. Additional air entrainment admixtures will not be required.

4.0 Construction Submittals.

4.1 At least 15 days before the planned start of formed and unformed substructure repair, a copy of the following information shall be submitted in writing to the Engineer for review:

(a) Written documentation of the nozzlemen's qualifications including proof of ACI or EFNARC certification;

(b) Proposed methods of shotcrete placement and of controlling and maintaining facing alignment including equipment models;

(c) Shotcrete mix; and

(d) One reference project including: Nozzleman’s name, material used, process used, and whether a blow pipe was utilized. Owner contact information shall be provided to ensure satisfactory results were accomplished on the reference project; or

(e) A satisfactory test panel shall be provided with the material to be used.

4.2 The Engineer will approve or reject the Contractor's submittals within 10 days after the receipt of a complete submission. The Contractor will not be permitted to begin formed or unformed substructure repair with Shotcrete until the submittal requirements are satisfied and found acceptable to the Engineer. Changes or deviations from the approved submittals shall be re-submitted for approval. No adjustment in contract time will be allowed due to incomplete submittals.

4.3 A pre-construction meeting scheduled by the Engineer will be held prior to the start of work. Attendance shall be mandatory. The shotcrete Contractor shall attend.

5.0 Field Quality Control.

5.1 Production test panels will not initially be required if a reference project for the nozzleman is provided as outlined in Section 2.3 of this Job Special Provision. The Engineer may halt repair work if satisfactory results are not produced by the Contractor and require production test panels.

5.2 If a comparable project demonstrating satisfactory results cannot be provided, the skills of the nozzleman shall be demonstrated and tested with at least one production test panel being furnished prior to performing repairs.

5.3 Production Test Panels (If Required).

5.3.1 Qualified personnel shall perform shotcreting and coring of the test panels with the Engineer present. The Contractor shall provide equipment, materials and personnel as necessary to obtain shotcrete cores for testing including construction of test panel boxes, field curing requirements and coring.

5.3.2 Production test panels shall be made with the minimum full thickness and dimension of 18 x 18 inch and at least 3½ inch thick with 2-#4 bars placed in each direction. The #4 bars shall be centered in the 3½ inch dimension and evenly spaced in each direction with the bars touching at the 4 intersecting locations.

5.4 Test Panel Curing, Test Specimen Extraction and Testing.

5.4.1 Immediately after shooting, the test panels shall be field moist cured by covering and tightly wrapping with a sheet of material meeting the requirements of ASTM C 171 until delivered to the testing lab or test specimens are extracted. The test panels shall not be immersed in water. The test panels for the first 24 hours after shooting shall not be disturbed.

5.4.2 At the direction of the Engineer at least two 3 inch diameter core samples shall be cut at two of the intersections to ensure consolidation around the bars. If voids are present the material and nozzleman are not approved for use. The Contractor may continue with changes to the materials or nozzleman. The same process will be followed until no voids are present.

6.0 Shotcrete Facing Requirements.

6.1 Shotcrete Alignment Control. The final surface of the shotcrete shall maintain the existing concrete plane surface.

6.2 Surface Preparation. In addition to the manufacturer's recommendations, the surfaces to be shotcreted shall be cleaned of loose materials, mud, rebound, overspray or other foreign matter that could prevent or reduce shotcrete bond. Shotcrete shall not be placed on frozen surfaces.

6.3 Delivery and Application. In addition to the manufacturer's recommendations, a clean, dry, oil free supply of compressed air sufficient for maintaining adequate nozzle velocity shall be maintained at all times. The equipment shall be capable of delivering the premixed material accurately, uniformly and continuously through the delivery hose. Shotcrete application thickness, nozzle technique, air pressure and rate of shotcrete placement shall be controlled to prevent sagging or sloughing of freshly applied shotcrete.

6.3.1 The shotcrete shall be applied from the lower part of the area upwards to prevent accumulation of rebound. The nozzle shall be oriented at a distance and approximately perpendicular to the working face so that rebound will be minimal and compaction shall be maximized. Special attention shall be paid to encapsulating reinforcement. Care shall be taken while encasing reinforcing steel and mesh to keep the front face of the reinforcement clean during shooting operations, so that the shotcrete builds up from behind, to encase the reinforcement and prevent voids and sand pockets from forming. If a blow pipe was used to qualify, a blow pipe shall be required. The blow pipe is used to remove rebound and overspray immediately ahead of the nozzle. Rebound shall not be worked back into the construction. Rebound that does not fall clear of the working area shall be removed. Hardened rebound and hardened overspray shall be removed prior to the application of additional shotcrete using abrasive blast cleaning, chipping hammers, high pressure water blasting or other suitable techniques.

6.3.2 When using multiple layer shotcrete construction, the surface of the receiving layer shall be prepared before application of a subsequent layer, by either:

(a) Brooming the stiffened layer with a stiff bristle broom to remove all loose material, rebound, overspray or glaze, prior to the shotcrete attaining initial set.

(b) If the shotcrete has set, surface preparation shall be delayed 24 hours, at which time the surface shall be prepared by sandblasting or high pressure water blasting to remove all loose material, rebound, hardened overspray, glaze or other material that may prevent adequate bond.

6.4 Defective Shotcrete. The Engineer will have authority to accept or reject the shotcrete work. Shotcrete that is not in accordance with the project specifications may be rejected either during the shotcrete application process, or on the basis of tests. Shotcrete surface defects shall be repaired as soon as possible after placement. Shotcrete that exhibits segregation, honeycombing, laminations, voids or sand pockets shall be removed and replaced. In-place shotcrete determined not meeting the published Technical Information for the product used will be subject to remediation as approved by the Engineer. Possible remediation options range from required latex over coating for excessive cracking up to removal and replacement at the Contractor's expense

6.5 Construction Joints. Construction joints shall be tapered uniformly toward the excavation face over a minimum distance equal to the thickness of the shotcrete layer. Square joints will not be permitted except at the expansion joint. The surface of the joints shall be rough, clean and sound. A minimum reinforcement overlap at reinforcement splice joints shall be provided. The surface of a joint shall be clean and wet before adjacent shotcrete is applied.

6.6 Final Face Finish. Shotcrete finish shall be a wood float, rubber float, steel trowel or smooth screeded finish.

6.7 Additional Construction Requirements.

6.7.1 If the work to be performed is in the vicinity of a jurisdictional water of the US, care shall be taken to avoid any rebound from entering the regulated waterway.

6.7.2 If the work to be performed is in the vicinity of an enclosed drainage system, care shall be taken to avoid any rebound from entering the drainage system.

6.8 Weather Limitations.

6.8.1 The shotcrete shall be protected if placed when the ambient temperature is below 40°F and falling or when likely to be subject to freezing temperatures before gaining sufficient strength. Cold weather protection shall be maintained until the compressive strength of the shotcrete is greater than 725 psi. Cold weather protection includes blankets, heating under tents or other means acceptable to the Engineer. The temperature of the shotcrete mix, when deposited, shall be not less than 50°F or more than 85°F. The air in contact with the shotcrete surfaces shall be maintained at temperatures above 32°F for a minimum of 7 days.

6.8.2 If the prevailing ambient temperature conditions (relative humidity, wind speed, air temperature and direct exposure to sunlight) are such that the shotcrete develops plastic shrinkage and/or early drying shrinkage cracking, shotcrete application shall be suspended. The Contractor shall reschedule the work to a time when more favorite ambient conditions prevail or

adopt corrective measures, such as installation of sun screens, wind breaks or fogging devices to protect the work. Newly placed shotcrete exposed to rain that washes out cement or otherwise makes the shotcrete unacceptable shall be removed and replaced at the Contractor's expense.

6.9 Curing. Permanent shotcrete shall be protected from loss of moisture for at least 1 day after placement. Shotcrete shall be cured by methods that keep the shotcrete surfaces adequately wet and protected during the specified curing period. Curing shall commence within one hour of shotcrete application. When the ambient temperature exceeds 80°F, the work shall be planned such that curing can commence immediately after finishing. Curing shall be in accordance with the following requirements.

> **(a) Membrane Curing.** Membrane curing is required on overhead surfaces that cannot be adequately wet cured. Curing compounds will not be permitted on any surface against which additional shotcrete or other cementitious finishing materials are to be bonded unless the surface is thoroughly sandblasted in a manner acceptable to the Engineer. Membrane curing compounds shall be spray applied as quickly as practical after the initial shotcrete set at rate of coverage of not less than 7.1 square feet per gallon.

7.0 Safety Requirements. Nozzlemen and helpers shall be equipped with gloves, eye protection and adequate protective clothing during the application of shotcrete. Whip checks are required on air lines. The Contractor shall be responsible for meeting all federal, state and local safety requirements.

8.0 Method of Measurement. Measurement of Substructure Repair (Formed), Substructure Repair (Unformed), Superstructure Repair (Unformed) and Slab Edge Repair shall be in accordance with Sec 704.

9.0 Basis of Payment. Payment for Substructure Repair (Formed), Substructure Repair (Unformed), Superstructure Repair (Unformed) and Slab Edge Repair shall be in accordance with Sec 704.

F. NON-DESTRUCTIVE TESTING

1.0 Description. This work shall consist of performing non-destructive testing on the welds of all existing top flange cover plates.

2.0 Construction Requirements.

2.1 After the concrete deck is removed, the steel that is to remain will be inspected by the engineer. In addition to this inspection, the welds and adjacent base metal at the ends of the top cover plates shall have non-destructive (magnetic particle) testing performed. Non-destructive testing shall be performed by an acceptable testing agency. The contractor shall provide the engineer with documentation of the testing agency and the qualifications of personnel performing the testing. The documentation and qualifications shall be submitted to the State Bridge Engineer for acceptance. Personnel performing the tests shall be qualified for SNT-TC-1A Level II.

2.2 The length of weld to be tested and the base metal, one inch either side of the weld, shall be cleaned of all rust prior to the testing. On cover plates with square ends, the weld shall be tested one inch from each corner along the ends of the cover plate plus 6 inches back along the side from each corner of the plate. On cover plates with tapered ends, the weld shall be tested along the end of the cover plate, along tapered edges and 6 inches back along the cover plate from end of taper.

2.3 If fatigue cracks are found, the cracks are expected to be very small and may be located in the base metal at the toe of the welds. Any cracks discovered by testing, regardless of length, shall be marked and reported to the engineer. All repairs shall be made by a certified welder in accordance with Sec 712.6. Any repair work and retesting of the repair work required, as a result of this inspection, will be paid for in accordance with Sec 109. This shall not relieve the contractor from responsibility to repair any damage caused by this work at the contractor's expense. Any delay or inconvenience caused by this inspection requirement will be non-compensable and effect on time of performance non-excusable.

3.0 Method of Measurement. Measurement of non-destructive testing will be to the nearest linear foot. The extent of non-destructive testing may vary from the estimated quantities, but the contract unit price shall prevail regardless of the variation. Final measurements 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.

4.0 Basis of Payment. Accepted quantities of non-destructive testing will be paid for at the contract unit price. 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 Non-Destructive Testing.

G. DEFLECTION AND HAUNCHING

1.0 Description. The contractor shall determine dead load deflections and haunching based on field measurements and/or existing bridge plans and these shall be adjusted based on the difference between the new and existing dead load weights.

2.0 Construction Requirements. In order to properly form the haunches for the new deck, the contractor shall survey top of deck elevations above each beam including centerline of roadway and along each beam line (top or bottom flange) prior to deck removal followed by surveying elevations of the beams (top or bottom flange) after deck removal.

3.0 Method of Measurement. No measurement will be made.

4.0 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.

H. REMOVAL OF CATHODIC PROTECTION SYSTEM

1.0 Description. This work shall consist of disengaging the power to the cathodic protection system during rehabilitation. The removal of the cathodic protection system shall include all of the cathodic protection system except as shown on the plans.

2.0 Removal Requirements. Any damage cause by the contractor's operations to the cathodic protection system that is to remain in place, shall be repaired or replaced at the contractor's expense.

2.1 The existing cathodic protection system shall be turned off as directed by the engineer prior to beginning work. The existing cathodic protection system shall not be reused except as shown on the plans. All insulated wiring associated with the removal of the cathodic protection system shall be disposed by the contractor and as approved by the engineer.

2.2 If during removal of the cathodic protection system, the existing concrete deck is damaged and not covered by new concrete, the areas on the deck shall be repaired with Class B-1 concrete in accordance with Sec 704. If the concrete is damaged at other locations, the repair areas shall be made with a qualified special mortar. The qualified special mortar shall be in accordance with Sec 704.

3.0 Method of Measurement. No measurement will be made.

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 considered completely covered by the contract lump sum price for "Removal of Cathodic Protection System".

I. DIAMOND GRINDING

1.0 Description. This work will only be performed at the discretion of the engineer and will be underrun if not required by the engineer. This work shall consist of grinding the new concrete surface to provide good riding characteristics, a surface texture and proper drainage. If the engineer determines it necessary to provide good riding characteristics, grinding shall be performed on all or part of the bridge approach slabs and sealed in accordance with Sec 703.3.8. The finished surface shall be in accordance with Sec 703.3.7 and as shown on the plans or as directed by the engineer except as modified below.

2.0 Equipment. The equipment shall be of a size that will grind a strip at least 3 feet wide using diamond blades, and shall not cause spalls at cracks, joints or other locations.

3.0 Construction Requirements. The construction operation shall be scheduled and proceed in a manner that produces a uniform finished surface. Auxiliary or ramp lane grinding shall transition from the edge of the mainline as required to provide drainage and an acceptable riding surface.

3.1 Deck repair, if required, shall be completed prior to any grinding.

3.2 Grinding shall be accomplished in a manner that eliminates joint or crack faults and provides lateral drainage by maintaining a constant cross slope between grinding extremities in each lane. A maximum tolerance of 1/16 inch will be allowed for adjacent sides of joints and cracks, except that under no circumstances shall the grinding depth exceed 1/4 inch from the top of the original surface. When grinding across faulted joints, a minimum of a 20-foot transition onto the approach side slab shall be used.

3.3 The cross slope of the pavement shall be as shown on the plans and shall have no depressions or misalignment of slope greater than 1/4 inch in 12 feet when measured with a 12-foot straightedge placed perpendicular to the centerline. Areas of deviation shall be reground. Straightedge requirements will not apply across longitudinal joints or outside the ground area.

3.4 As soon as practical after grinding, the surface will be straightedged longitudinally and all variations exceeding 1/8 inch in 10 feet will be plainly marked. Areas of deviation shall be reground.

3.5 Substantially all of the pavement surface shall be textured. Extra depth grinding to eliminate minor depressions in order to provide texturing on 100 percent of the pavement

surface will not be required. No unground surface area between passes will be permitted, except as specified otherwise in the contract documents.

3.6 The grinding process shall produce a final pavement surface that is true to grade and uniform in appearance with a longitudinal line type texture. The line-type texture shall contain parallel longitudinal corrugations that present a narrow ridge corduroy-type appearance. The peaks of the ridges shall be approximately 1/32 inch higher than the bottoms of the grooves. The grooves shall be evenly spaced. There shall be approximately 50-55 grooves per foot, measured perpendicular to the centerline.

3.7 The contractor shall remove and dispose of all residue from the grinding in a manner and at a location to satisfy environmental regulations. The contractor shall have the engineer's approval for the method of spreading and disposal of the residue prior to beginning any grinding operations.

3.8 Solid residue shall be removed from the pavement surface before any residue is blown by traffic action or wind.

3.9 Residue shall not be permitted to encroach on open lanes.

3.10 The residue shall not enter into gutters or closed drainage systems.

3.11 The contractor may disperse residue onto unpaved shoulders, adjacent roadside embankments, or median ditch areas of divided highways where the residue runoff can percolate into the soil, unless specified otherwise in the contract. The spread rate shall not generate surface runoff. If surface runoff occurs at a grinding location, the contractor shall haul the residue to an approved location at the contractor's expense.

3.12 Discharge of any residue runoff shall not flow into adjacent rivers, streams, lakes, ponds or other open bodies of water.

3.13 Residue shall not be spread within 100 feet of any streams, lakes or other open bodies of water, or within 15 feet of a water filled ditch.

3.14 The contractor shall use appropriate equipment and methods so the discharging of the residue does not cause erosion of soil or damage to established vegetation along the roadway. The contractor shall repair and reseed any areas where the discharge of grinding residue causes damage to roadway slopes or vegetated areas at the contractor's expense.

3.15 If the solids concentration of discharged residue at any particular area is determined to be excessive by the engineer, the contractor shall provide equipment and material to flush the areas with water as directed by the engineer, at the contractor's expense.

3.16 The pavement shall be cleaned prior to opening to traffic as directed by the engineer.

4.0 Smoothness Requirements.

4.1 No diamond grinding shall be done until the pavement has attained a strength sufficient to be opened to all types of traffic. All diamond grinding shall be completed on any section prior to opening that section to other than construction traffic, unless approved by the engineer.

4.2 The engineer will be the sole authority for determining if the driving surface is sufficiently smooth.

4.3 The engineer will evaluate the smoothness of the concrete wearing surface after the concrete has cured and direct the contractor to diamond grind where deemed necessary.

4.4 After initial diamond grinding operations, if any, the engineer will again evaluate the smoothness of the concrete wearing surface and approach slab, repeating as many times as necessary to achieve the desired surface smoothness.

4.5 Any deficiencies in the final surface due to improper contractor operations or equipment shall be corrected by the contractor, at the contractor's expense.

4.6 All areas shall be tested with a 10 foot straightedge in accordance with Sec 3.4 of these provisions.

5.0 Method of Measurement. Measurement for diamond grinding will be made to the nearest square yard. Measurement will be based upon the area of initial diamond grinding completed as directed by the engineer. Subsequent passes of diamond grinding over a previously ground area will not be measured. No deduction will be made for gaps to avoid striping or raised pavement markers. No additional measurement will be made for diamond grinding bridge approach slabs.

6.0 Basis of Payment. Payment for diamond grinding will be paid for at the contract unit price per square yard. Payment for diamond grinding will be considered full compensation for all labor, equipment, material, and incidentals to complete this work, including hauling and disposal of grinding residue and cleaning the pavement prior to opening to traffic.

J. SPECIAL CHANGE ORDER AND VALUE ENGINEERING CONSIDERATION

1.0 Description. Increased Federal Share has been approved by the FHWA for an innovative technology or practice. The Commission will receive an additional five percent Federal Share of the overall contract value due to innovations within the following pay item(s).

Pay Item Number	Pay Item Description	Innovation
703-99-07	Ultra - High Performance Concrete	High performance concrete at expansion joints.

Due to the increased federal share, the project components related to the innovation(s) described above must be constructed with the materials, quantities, methods and innovations as shown on the project plans and specifications. If the contractor requests materials, quantities, methods or innovations other than those included in the plans and specifications, the request must be reviewed and approved by the Commission and FHWA. Approved changes to the innovation items above shall be at no additional cost to the Commission and shall not increase the contract time.

2.0 Consideration of Change Orders and Value Engineering Change Proposals (VECP). Change ordering and/or value engineering the pay item(s) listed in section 1.0

jeopardize ability for the Commission to receive an additional Federal Share for the overall contract value. Special consideration should be given to the change order value for removing such item(s) from the contract ensuring that the benefit outweighs the cost.

3.0 Contacting Financial Services. If it is determined that the proposed change order and/or VECP outweighs the additional overall five percent Federal Share value, the Engineer shall notify MoDOT project manager.

K. ULTRA-HIGH-PERFORMANCE CONCRETE

1.0 Description. This work shall consist of furnishing and installing ultra-high-performance concrete (UHPC) at the locations shown on the plans or as directed by the Engineer. Ultra- high -performance concrete (UHPC) to be installed at expansion device joint header slabs. It does not include bridge deck overlays

2.0 Materials.

2.1 Water. Water shall meet the requirements of Section 1070.

2.2 Ultra-High Performance Concrete (UHPC). The material shall be a fiber-reinforced UHPC with a minimum steel fiber content of 2% by volume. The UHPC shall meet the performance requirements outlined in the table below, at an age of 28 days unless otherwise noted. Test data substantiating these results shall be conducted by an AASHTO-accredited lab.

Ultra-High Performance Concrete (UHPC)		
Property	**Requirement**	**Test Method**
Compressive Strength	4 days: 12 ksi, minimum 28 days: 17.4 ksi, minimum	ASTM C1856
Flexural Strength	First-peak strength: 1.4 ksi, minimum; Peak strength: 2.0 ksi, minimum; Ratio, peak to first-peak strength: 1.25, minimum	ASTM C1856
Length Change	800 microstrain, maximum; Initial reading at 24 hours, store in air for 28 days (no moist cure after initial reading)	ASTM C1856
Indication of Resistance to Chloride Ion Penetration	300 Coulombs, maximum, after 56 days extended moist cure Test on samples cast without fibers	ASTM C1856
Scaling Resistance	Visual rating 0 or 1 after 50 cycles	ASTM C672
Abrasion Resistance	0.1 ounces lost, maximum after 6 minutes Test on ground* surface	ASTM C1856
Resistance to Freezing and Thawing	RDM after 600 cycles: 95%, minimum	ASTM C1856

* Surface to be ground using method used for project. Testing may be performed on cores sampled from mock-up slab.

2.2.1 UHPC Materials. Materials commonly used in UHPC include:

- Fine aggregate
- Cementitious material
- Mineral admixtures
- Superplasticizer
- Accelerator
- Steel fibers

All components shall be supplied by one UHPC manufacturer.

2.2.1.1 Aggregates. Aggregates used in UHPC shall be innocuous (0.10% maximum expansion after 14 days of immersion) when tested either according to ASTM C1260 alone or according to ASTM C1567 in combination with the specific supplementary cementitious materials and mineral admixtures to be included in the UHPC. If tested by ASTM C1567, the proportions of supplementary cementitious materials and mineral admixtures used in the test specimens shall not exceed those used in the UHPC mixture. The water-to-binder ratio used for testing shall not be less than 0.47, where the binder includes both the cementitious materials and the mineral admixtures.

2.2.1.2 Steel fibers. Steel fibers used in UHPC shall conform to ASTM A820, Type I. Fibers shall have a minimum tensile strength of 190 ksi.

2.2.1.3 Chemical admixtures. Chemical admixtures used in UHPC shall conform to AASHTO M 194.

2.3 High Molecular Weight Methacrylate (HMWM). The high molecular weight methacrylate (HMWM) resin used as repair for leaking joints shall be low viscosity and non-fuming. The HMWM shall comply with the following requirements:

High Molecular Weight Methacrylate (HMWM) Resin		
Property	**Requirement**	**Test Method**
Viscosity	25 cps, maximum	ASTM D2849
Density	8.4 lb./gal., minimum (at 77°F)	ASTM D1475
Flash Point	200°F, minimum	ASTM D3278
Vapor Pressure	1.0 mm Hg, maximum (at 77°F)	ASTM D323
Glass Transition Temperature	136°F, minimum	ASTM D3418
Gel Time	40 minutes, minimum (for 100 gram mass)	ASTM C881
Percent Solids	90% by weight, minimum	
Bond Strength	1500 psi, minimum	ASTM C882

2.3.1 HMWM Sand. The sand used for the HMWM shall be a commercial quality dry blast sand. 95% of the sand shall pass the No. 8 sieve and 95% of the sand shall be retained on the No. 30 sieve.

2.4 Delivery of Materials. All materials shall be delivered in their original containers bearing the manufacturer's label, date of manufacturing, batch number, trade name, and quantity. Each shipment of HMWM resin shall be accompanied by a Safety Data Sheet (SDS).

2.5 Storage of Materials. The Contractor shall assure the proper storage of the UHPC premix, fibers, and additives as required by the supplier's specifications to protect materials against loss of physical and mechanical properties. Sufficient material to perform the entire UHPC installation shall be in storage at the site prior to any field application, so that there shall be no delay in procuring the material for each day's application.

2.6 Technical Support. The Contractor shall arrange for a representative of the UHPC supplier to be on site during the mixing and placement of UHPC until the Contractor's own staff has become trained in the use of the material and until approved by the Engineer. The representative shall be knowledgeable in the supply, mixing, delivery, placement, and curing of the UHPC material.

3.0 Submittals. The Contractor shall submit to the Engineer the following items for review and approval at least 30 days prior to UHPC placement:

3.1 Material Certifications.

3.1.1 UHPC Certifications. The Contractor shall furnish a test report confirming that all materials for the UHPC have been pretested and will meet all requirements listed in Section 2.0. All testing shall be conducted by an AASHTO-accredited testing lab on the same UHPC mix design used by the project. The test report shall include the following information:

a. The type and source of each constituent material.
b. The mixture proportions, including limits on water and admixture quantities.
c. Mixing procedures.
d. Curing procedures, including thermal treatment procedures (if used).
e. The properties of the UHPC in accordance with Section 2.0.

3.1.2 HMWM Certifications. The Contractor shall furnish documentation from the HMWM manufacturer certifying that it conforms to the requirements listed in Section 2.0.

3.2 Qualifications.

3.2.1 Manufacturer Qualifications. The manufacturer of the UHPC shall be ISO 9001:2000 certified and have a quality assurance program independently audited on a regular basis.

3.2.2 Contractor Qualifications. The Contractor shall be experienced in the field application of UHPC joints and have 5 years of experience in similar project types. The Contractor shall furnish documentation of experience with UHPC in similar project types, including location and scope UHPC use and identifying personnel for the current project. The Contractor shall maintain technical personnel at the site who have received product training by a manufacturer's representative for a minimum of one day during a Mockup Test. If the Contractor does not have 5 years of experience in similar project types, a manufacturer's representative shall be on-site during the placement of the UHPC for the duration of the project.

3.3 UHPC Field Installation Plan. The Contractor shall submit a UHPC Field Installation Plan that includes drawings of proposed joint locations and forming details and describes the equipment, batching sequence, placement sequencing, UHPC temperature limits, and curing methods for the UHPC installation. When using the maturity method, the Contractor shall use the maturity method data provided in the UHPC Field Installation Plan to demonstrate the proposed method of curing will achieve the required strength at the required time. All safety and weather conditions required by the manufacturer shall be in compliance with applicable rules and regulations of local, state, and federal authorities having jurisdiction.

4.0 Construction.

4.1 Mockup Test. A mockup test shall be performed by the Contractor at least one week prior to the UHPC placement. The test will verify that the Contractor is familiar with UHPC operations and troubleshooting installation procedures. The mockup shall closely replicate the placement conditions, operations, and dimensions of the UHPC to be installed. The mockup shall be a minimum 10 feet in length and match the cross-slope of the planned joint. If hydrostatic pressure head will be used on the project to consolidate the joints, the pressure head during the mockup should replicate the maximum pressure head anticipated on the project.

4.2 Pre-Pour Meeting. Prior to the initial placement of the UHPC, the Contractor shall arrange for an on-site meeting with the UHPC representative. The Contractor's staff and the Engineer and Inspectors shall attend the site meeting. The objective of the meeting is to clearly outline the procedures for mixing, transporting, finishing, and curing of the UHPC material.

4.3 Formwork. The design and fabrication of forms shall follow approved drawings provided in the UHPC Field Installation Plan and shall follow the recommendations of the UHPC manufacturer. The forms shall be non-absorptive or coated to prevent absorption of water and shall be installed water-tight to prevent leakage of the UHPC during placement. A top form shall be used.

4.4 Surface Preparation. The precast concrete or existing concrete surfaces to be in contact with UHPC shall have a roughened surface with an amplitude of 1/4" +/- 1/8". The concrete surfaces shall be cleaned of debris and pre-wetted with water continuously for a minimum of 24 hours immediately prior to UHPC placement. Standing water shall be removed from the concrete and formwork surfaces prior to UHPC placement.

4.5 Batching. The Contractor shall follow the batching sequence as specified in the approved UHPC Field Installation Plan. Mixers used for batching UHPC shall be suitable for mixing UHPC and shall be approved for use by the UHPC supplier prior to construction.

4.5.1 Temperature Control. The temperature of the UHPC shall be measured for each batch prior to placement, in accordance with ASTM C1064. The temperature shall be between 55°F and 85°F, unless otherwise approved by the on-site UHPC representative. When batching in warm weather, ice may be required as a full or partial substitute for the mixing water to control the UHPC mix temperature to within acceptable limits. If ambient temperatures are expected to drop below 40°F during the UHPC placement or within 48 hours after placement, cold weather placement procedures shall be used.

4.5.2 Flow Spread. The Contractor shall measure the flow spread for each batch of UHPC prior to placement, in accordance with ASTM C1856. The flow shall be between 7 and 10 inches unless otherwise approved by the on-site UHPC representative. There shall be no visual sign of fiber segregation.

4.6 Placement. The material shall be placed starting at the low end of the joint and working toward the high end. The material shall not travel more than 10 feet during placement. Provide port/pour holes with a minimum diameter of 3 inches when top forms are used. The surface of the UHPC field joints shall be filled to a minimum of +1/4 inch above the intended final elevation. Internal vibration shall not be used during UHPC placement.

4.7 Curing. The UHPC shall be covered and cured in the forms according to the UHPC Field Installation Plan to attain the required strength shown on the contract documents. The UHPC shall not be disturbed until a minimum compressive strength of 10 ksi is achieved. The UHPC shall be ground flush with the top of bridge deck after the material has attained a minimum compressive strength of 10 ksi. Strength shall be verified by a cylinder compression test conducted on field-cured cylinders or by the maturity method.

4.8 Removal of Forms. Forms shall not be removed until the UHPC has attained a compressive strength of at least 10 ksi. Strength shall be verified by a cylinder compression test conducted on field-cured cylinders or by the maturity method.

4.9 Installation of Overlay. Installation of overlay onto UHPC joint header surfaces shall not be initiated until the UHPC has attained a compressive strength of at least 14 ksi. Strength shall be verified by a cylinder compression test conducted on field-cured cylinders or by the maturity method.

5.0 Testing. The contractor shall fabricate for every 25 cubic yards or a minimum of once per day, whichever is more frequent, a minimum of six field-cured 3-inch by 6-inch cylinders and six standard-cured 3-inch by 6-inch cylinders in accordance with ASTM C1856. The six standard-cured cylinders shall be used for acceptance testing. If early strength is to be validated by the maturity method as defined in Section 6.0, cast additional cylinders as required.

5.1 QC Testing. The following process control tests shall be performed by the Contractor on-site during each day of UHPC casting and submitted to the Engineer:

QC Testing					
Property	**Test Method**	**No. of Specimens**	**Test Age**	**Test Result**	**Test Frequency**
Flow	ASTM C1856	1 test	Prior to placement	7 to 10 inches*; no visual sign of fiber segregation	Each batch
Temperature	ASTM C1064	1 test	Prior to placement	55 to 85°F*	Each batch
Compressive Strength	ASTM C1856, field cured samples or ASTM C1074, maturity method	3 at each age**	As needed for formwork removal and grinding	> 10 ksi	Every 25 cy, with a minimum once per day
			As needed for installation of overlay	> 14 ksi	

* Unless otherwise approved by the on-site UHPC representative.

** Testing for compressive strength for formwork removal and grinding or for installation of overlay may alternatively be eliminated if using the ASTM C1074 maturity method as described in Section 6.0.

5.2 Acceptance Testing. The Contractor will perform the following testing for acceptance:

Acceptance Testing					
Property	**Test Method**	**No. of Specimens**	**Test Age**	**Test Result**	**Test Frequency**
Compressive Strength	ASTM C1856, standard cured samples	3	7 days	N/A (informational)	Every 25 cy, with a minimum once per day
		3	28 days	> 17.4 ksi	

6.0 Estimation of In-Place Strength using Maturity Method. In-place strength may be estimated using the maturity method in accordance with ASTM C1074. The maturity function used to estimate strength shall be calculated with using same formula that is defined in the UHPC Field Installation Plan. All testing shall be performed by an AASHTO-accredited testing lab.

6.1 Development of Strength-Maturity Relationship. If maturity method is used, develop Strength-Maturity Relationship prior to submission of UHPC Field Installation Plan as outlined in ASTM C1074, except that 3-inch by 6-inch cylinders shall be used for maturity testing.

6.2 Thermocouple Placement. Two thermocouples or maturity meter probes shall be installed per UHPC placement, one at each end, at half the depth of the placement and no nearer to an edge than half the depth. The locations of the thermocouple installations shall be shown on the installation drawings. The thermocouple wiring may be connected to reinforcing steel, but probe endings shall not be in direct contact with the steel.

6.3 Monitoring. Record and save the maturity data from the thermocouple or maturity meter until the strength reaches 17.4 ksi. Disconnect the meter and clip all wires flush to the concrete surface.

6.4 Validation of Strength-Maturity Relationship. Validate the strength-maturity relationship at mock-up or first placement. Fabricate and field cure a minimum of 10 cylinders. Equip one cylinder with a thermocouple or maturity meter probe. Test the other cylinders in sets of three as close as possible to maturity values corresponding to 8, 10, and 14 ksi. Record the maturity value immediately prior to testing. If the average value of compressive strength for each set of cylinders is within 10% of the estimated value, the strength-maturity relationship is validated. If the average cylinder value is more than 10% below the estimated value at any age, the strength-maturity relationship shall be re-established.

7.0 Watertight Integrity.

7.1 Watertight Integrity Test. After the joints and blockouts have been ground, each joint and blockout shall be flooded with water for a minimum of 15 minutes. The Contractor shall provide the Engineer safe access for inspecting the underside of the joints. The concrete surfaces under the joint will be inspected by the Engineer during this 15 minute period and also for a minimum of 45 minutes after the supply of water has stopped, for any evidence of dripping water or moisture.

Should the joint system exhibit evidence of water leakage whatsoever, the Contractor shall locate the leak and repair the joint with HMWM.

7.2 HMWM Repair of Leaking Joints. The repair shall be performed at the Contractor's expense and at no time extensions to the project. The Contractor shall abrasive blast clean the area to be treated, removing all contaminants from the surface, and clean adjacent surfaces of the leaking joints using compressed air free of oil and moisture. The HMWM shall be mixed and applied according to the manufacturer's instructions with no more than 5 gallons applied at a time. The HMWM shall be poured over the joints. HMWM shall be applied to clean, dry surfaces when the surface temperature is at least 50°F and, if near 50°F, rising. HMWM shall not be applied if rain is expected within 12 hours of completion. A subsequent watertight integrity test may be required at the direction of the Engineer after the repair has been made.

7.2.1 Driving Surfaces. When the HMWM surface will be used as a driving surface, sand shall be applied to provide friction. After the HMWM has been applied, at least 20 minutes but not more than 40 minutes shall elapse before applying the sand. The sand shall be broadcast at a rate of approximately two pounds per square yard, completely covering the HMWM. Once the HMWM is cured, any loose sand shall be removed from the surface.

7.2.2 Opening to Traffic. The HMWM must be tack-free before construction traffic is permitted to resume.

8.0 Method of Measurement. This work will be measured as the number of cubic yards of ultra-high-performance concrete (UHPC) satisfactorily furnished and installed.

9.0 Basis of Payment. The contract unit price for ultra-high-performance concrete (UHPC) will be full compensation for all materials and other items entering into the construction of the UHPC. The accepted quantity of UHPC will be paid for at the contract unit price.

L. RAPID SET CONCRETE PATCHING MATERIAL – VERTICAL AND OVERHEAD REPAIRS

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:

(a) New Products Evaluation Form

(b) Certified test results from an independent laboratory showing compliance with this special provision.

(c) 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.

(d) 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.

3.1.1 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 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	Bridge Decks 1000 coulombs @ 28 days Roadway 2000 coulombs @ 28 days	Bridge Deck 1000 coulombs @ 28 days Roadway 2000 coulombs @ 28 days	Bridge Deck 1000 coulombs @ 28 days Roadway 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

[1]The 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.
[2]Not 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.

M. RAPID SET CONCRETE PATCHING MATERIAL – HORIZONTAL REPAIRS

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:

(e) New Products Evaluation Form

(f) Certified test results from an independent laboratory showing compliance with this special provision.

(g) 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.

(h) 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	Bridge Decks 1000 coulombs @ 28 days Roadway	Bridge Deck 1000 coulombs @ 28 days Roadway	Bridge Deck 1000 coulombs @ 28 days Roadway

		2000 coulombs @ 28 days	2000 coulombs @ 28 days	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

[1]The 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.
[2]Not 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.

N. SLURRY AND RESIDUE PRODUCED DURING SURFACE TREATMENT OF PCCP AND BRIDGE DECKS

1.1 Description. This work covers the requirements for controlling residue or slurry produced by milling, grinding, planing, grooving or other methods of surface treatments on new or existing PCCP and bridge decks in addition to Section 622.

2.0 Construction Requirements. The following shall be considered the minimum requirements for performing this work within the project limits.

2.1 The contractor shall submit to the Engineer for approval in writing prior to the pre-construction meeting, the best management practices (BMP's) to be used to protect the environment, including the method of disposal of the residue whether on right of way or off-site.

2.2 Prior to starting work, slurry or residue "no discharge zones" will be identified by the Engineer with respect to the contractor's approved BMP and residue disposal plan.

2.3 Operations may be suspended by the Engineer during periods of rainfall or during freezing temperatures.

2.4 When slurry is dispersed on the right of way, BMP's shall be installed to keep slurry residue from entering drainage structures, from entering any waterways and from leaving the right of way.

3.0 Basis of Payment. No direct payment for slurry or residue control requirements for BMP's will be made. Compliance with this specification along with the cost of all materials, labor and equipment necessary for the surface treatment work shall be included in and completely covered by the unit price bid for each of the items of work for surface treatment included in contract.

O. SURFACE SEALING CONCRETE

1.0 Description. This provision allows surface sealing concrete to be applied as last order of work.

2.0 Construction Requirements. The surface of the new concrete shall be surface sealed in accordance with Sec 703.3.8 except that lanes may be opened to traffic after the concrete has properly cured in accordance with Sec 703 and the sealant applied as a last order of work. Any lanes open to traffic prior to surface sealing shall have foreign materials removed. Surfaces that are sealed after each stage of construction shall have all vertical construction joints between stages protected from the surface sealant. If asphalt roadway surface is adjacent to the new concrete, the asphalt surface shall be protected from spillage of the sealant.

3.0 Method of Measurement. No measurement will be made.

4.0 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.

P. REMOVAL OF BRIDGE DECK AND DEBRIS

1.1 Description. The contractor shall make provisions to prevent debris and materials from the removal of the bridge decks of A10852 and A10853 from falling below the bridge superstructure. Removal of bridges shall be in accordance with section 216 of the specifications.

1.1 Any damage sustained by the remaining structures or adjacent facilities 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.

1.2 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.

2.0 Method of Measurement. No measurement will be made.

3.0 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. Payment for the above described work will be considered completely covered by the contract lump sum price for Removal of Bridges.

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	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636
"THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT."	If a seal is present on this sheet, JSP's has been electronically sealed and dated.
	JOB NO. J6I3187 St. Louis County, MO Date Prepared: 8/5/2021
	Addendums only, blank otherwise **Addendum No. #**
Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: A thru R	

A. CONSTRUCTION REQUIREMENTS

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

2.0 Construction Requirements. The plans and the asbestos and lead inspection report for the existing structure(s) are included in the contract in the bridge electronic deliverables zip file for informational purposes only.

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

2.2 Bridge work by contractor forces, including erection, rehabilitation or demolition, shall not be allowed over traffic unless a bridge platform protection system is installed below the work area except for work performed above a deck that is intact. The protection system shall be capable of catching all falling objects such as tools, overhang brackets or materials. Lifting of objects that are heavier than the capacity of the bridge protection system shall not be permitted.

2.3 Qualified special mortar shall be a qualified rapid set concrete patching material in accordance with Sec 704. A qualified rapid set concrete patching material will not be permitted for half-sole repair, deck repair with void tube replacement, full depth repair, modified deck repair and substructure repair (formed) unless a note on the bridge plans specifies that a qualified special mortar may be used.

2.4 The existing slab for the bridge(s) to be redecked was constructed as composite or non-composite as shown in the table below.

Bridge No.	Type of deck
A0607	Composite
A0591	Composite
A1057	Composite
A1076	Composite
A1276	Composite

2.5 Provisions shall be made to prevent any debris and material from falling onto the roadway. In addition, material from removal of the existing bridge decks on Bridges A05914, A05915, A06072, A06073, A10574 and A10575 shall not be allowed to fall below the superstructure. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits 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.

2.6 Any damage sustained to the remaining structure or adjacent facilities 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.

2.7 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.

2.8 A washer shall be required under head and nut when any reaming is performed for bolt installation.

2.9 SSPC-SP2 and SSPC-SP3 surface preparation shall be in accordance with the environmental regulations in Sec 1081 and collection of residue shall be in accordance with Sec 1081 for collection of blast residue. SSPC-SP6, SSPC-SP10 and SSPC-SP11 surface preparation shall be in accordance with the approved blast media and environmental regulations in Sec 1081 and collection of blast residue shall be in accordance with Sec 1081.

3.0 Coating Information.

3.1 Straps Removal. Exposed portions of straps for stay-in-place forms shall be removed prior to surface preparation. Straps need not be removed in areas that are not being painted. Flame cutting will not be permitted. The contractor shall exercise care not to damage the existing structure during removal. 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.

3.2 Slab Drains and Stay-In-Place Forms. The stay-in-place forms, slab drains and slab drain brackets shall not be recoated, overcoated or damaged during the painting operation. Any portion of the slab drain bracket that is blast cleaned shall be recoated with System G. Any damage sustained 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.

3.4 Environmental Contact. Environmental Section may be contacted at the below address or phone number. The Missouri Department of Health may be contacted at (573) 751-6102.

MoDOT - Design Division - Environmental Section
P.O. Box 270
105 W. Capitol Ave., Jefferson City, MO 65102
Telephone: (573) 526-4778

3.5 Approved Smelter and Hazardous Waste Treatment, Storage and Disposal Facility. The following is the approved smelter and hazardous waste treatment, storage and disposal facility:

Doe Run Company - Resource Recycling Division - Buick Facility
Highway KK
Boss, MO 65440
Telephone: (573) 626-4813

4.0 Navigation Requirements.

4.1 All work shall be performed so that the free flow of navigation is not unreasonably interfered with, the navigable depths are not impaired and navigation lighting is visible at all times. Any floating equipment or vessels working in the channel shall display lights and signals as required by the current “Handbook of Missouri Boating Laws and Responsibilities” available on the Missouri Water Patrol web site. If scaffolding or nets are suspended below low steel in the navigation span, the engineer shall be advised so that the temporary reductions in clearance for river traffic can be checked for reasonableness and appropriate notices can be published. Positive precautions shall be taken to prevent the accidental dropping of spark producing, flame producing, lighted or damaging objects onto barges or vessels passing beneath the bridge. All

flame cutting, welding or other similar spark producing operations shall be ceased over the channel when vessels are passing beneath the bridge.

4.2 The contractor shall be responsible for submitting a work plan to the engineer for review. When the engineer is in concurrence with the work plan, the engineer will forward the material to the appropriate agency or agencies for approval.

5.0 Method of Measurement. No measurement will be made.

6.0 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.

B. DEMOLITION REQUIREMENTS FOR BRIDGE A0619

1.0 Description. This provision contains demolition requirements for the removal of existing bridge A0619.

2.0 Demolition Requirements. Demolition of A0619 shall follow as specified in Missouri Standard Specification 216. Demolition shall be coordinated with other work. The contractor shall submit a detailed demolition plan to the engineer at least 4 weeks prior to beginning the demolition process. The demolition plan shall be in accordance with the traffic control plans and all Bridge and Roadway Job Special Provisions.

2.1 The contractor's demolition plan shall include demolition staging, equipment used and placement of equipment, temporary falsework as required, removal methods, disposition of removed materials, and duration of temporary road closures if applicable. The plan shall also specify adequate resources available as back up to meet unforeseen contingencies that could jeopardize the completion of the project.

2.2 The contractor's demolition plan shall be sealed by a professional engineer licensed in the state of Missouri.

2.3 No demolition activities may take place prior to approval of the demolition plan by the engineer.

2.4 Material Disposal. All material disposals shall be in accordance with Sec 216. Any permit or license required for disposal on material shall be in accordance with Sec 107.

2.5 The completion date for the demolition of the pedestrian bridge is July 1, 2022.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Removal of bridges will be paid for at the contract lump sum payment price.

C. STRUCTURAL STEEL REQUIREMENTS

1.0 Description. This provision contains general structural steel requirements for this project.

2.0 Material. All material shall be in accordance with Division 1000, Material Details, and specifically as shown below. The gray epoxy-mastic primer (non-aluminum) shall be compatible with concrete and produce a dry film thickness of no less than 3 mils (75 µm).

Item	Section
Structural Steel Construction	712
Gray Epoxy-Mastic Primer (non-aluminum)	1045
Structural Steel Fabrication	1080
Coating of Structural Steel	1081

3.0 Construction Requirements.

3.1 Before fabrication of new metalwork, the contractor shall make the necessary measurements in the field to verify dimensions of the existing structure where new members are affected. Any deviation of the dimensions shown on the plans shall be called to the engineer's attention. The contractor shall be responsible for developing all required dimensional adjustments and coordinating the implementation of the dimensional adjustments with all involved fabricators and subcontractors.

3.2 Prior to erection of the new structural steel, the steel that is to remain shall be carefully inspected for irregularities. If such irregularities are found, the irregularities shall be brought to the attention of the engineer.

3.3 Holes in the new diaphragm or cross frame connection plates and angles may be used as a template for drilling the holes in the existing material.

3.4 A minimum edge distance shall be maintained for all field drilled holes. The minimum edge distance for bolts shall be as shown in table below measured from the centerline of holes.

Bolt Diameter inch (mm)	Minimum Edge Distance inch (mm)
3/4 (19.0)	1-1/4 (32)
7/8 (22.2)	1-1/2 (38)
1 (25.4)	1-3/4 (45)

3.5 The surfaces of existing steel that will become faying surfaces for non-slip critical new connections, typically secondary members, shall be cleaned according to the manufacturer's recommendation and with a minimum of SSPC-SP-3 surface preparation and coated with one prime coat of Gray Epoxy-Mastic Primer (non-aluminum) in accordance with Sec 1081. The surfaces of existing steel that will become faying surfaces for slip critical new connections, typically primary members, shall be in accordance with contact surfaces in Sec 1081. Primary member connections include girder/beam splices, end diaphragms and intermediate diaphragms in curved structures.

3.6 Exposed girder/beam areas that are not faying surfaces or not covered by concrete that are scratched, damaged by the contractor or by field welding operations shall be touched up with Gray Epoxy-Mastic Primer (non-aluminum) in accordance with Sec 1081. The areas shall receive the coating system as shown on the plans.

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 the structural steel items included in the contract. No

payments or adjustments will be made where new members are affected due to any deviation of the dimensions shown on plans or shop drawings.

D. REMOVAL OF EXISTING BEARINGS

1.0 Description.

1.1 With the deck removed, this work shall consist of but is not limited to raising and supporting existing girders and/or beams at the locations specified on the plans, removing and disposing of the existing bearings and anchor bolts and performing all other required preparations prior to installing new bearings and anchor bolts as shown on plans.

1.2 The responsibility for the design and construction of falsework required to support the girders and/or beams during bearing removal and new bearing installation shall rest solely with the contractor. The design shall ensure that the falsework can support all applicable dead loads and any construction loads. The design shall also provide an adequate factor of safety when selecting the temporary support members. The falsework design and working plans including detailed computations shall be signed, sealed and stamped by a registered professional engineer in the State of Missouri in accordance with Authentication of Certain Documents in Sec 107.

1.3 Existing girders and/or beams shall be subject to minimal construction loading by performing this work with the existing deck removed.

1.4 Existing bearing top plates shall be removed and girder and/or beam surfaces cleaned and coated before placement of new bearings. The removal of the existing bearing top plate and cleaning shall be completed in such a manner as to not cause any damage to the existing bottom flange. Method of removal shall be as approved by the engineer.

2.0 Construction Requirements and Materials.

2.1 Raising and Supporting the Superstructure.

2.1.1 Before beginning operations, the contractor shall submit to the engineer for review the method and sequence of operation proposed to be used in performing this work. With the deck removed, the contractor shall exercise caution when supporting the structural steel and shall raise the girders and/or beams the minimum extent necessary to perform this work with a maximum raise of 1/4 inch. Raising the girders and/or beams at the location of reset bearings shall be performed in a manner to prevent any damage to the adjoining steel. The lifting operation shall be performed only when authorized, but such authorization shall not relieve the contractor of responsibility for the safety of the operation or for damage to the structure. Any damage caused by the contractor's operations shall be repaired at the contractor's expense as approved by the engineer.

2.1.2 Temporary timber supports (bearing stiffeners) shall be placed between the girder and/or beam flanges at each jacking location to prevent flange rotation. Permanent steel stiffening angles shall be designed and attached to the beam web when the beam web thickness is not adequate to support the jacking load.

2.1.3 Raising the girders and/or beams shall be performed simultaneously and shall be performed in a manner to prevent any damage to the adjoining steel.

2.1.4 Existing end diaphragms at bent may require loosening or be completely removed in order to install new anchor bolts and bearings as authorized by the engineer.

2.1.5 Bolts of existing end diaphragms that must be loosened or removed shall be replaced with like size galvanized high strength bolts with washer under head and nut.

2.2 Bearing Removal.

2.2.1 After the structural members are supported, the contractor shall remove the existing bearings.

2.2.2 The contractor shall remove the existing anchor bolts to one inch below the concrete surface or to the extent needed for installation of the new anchor bolts as required by the plans and as authorized by the engineer. The resultant holes shall be filled with a qualified special mortar in accordance with Sec 704.

2.3 Cleaning and Painting. Faying surfaces where existing end diaphragms will be reconnected and inside of drilled holes and the bottom surface of existing flange which will become faying surfaces of new connections shall be cleaned and painted with one coat of gray epoxy-mastic primer (non-aluminum).

3.0 Method of Measurement. Final measurement for removal of the existing bearings and preparation for the installation of the new bearings will be made per each.

4.0 Basis of Payment. Payment for furnishing and placing all temporary falsework (including stiffeners), materials, removals, disposal of all falsework, labor, tools, equipment and all incidentals necessary to complete this item will be considered completely covered by the contract unit price for Removal of Existing Bearings.

E. HINGE MODIFICATION

1.0 Description. This work shall consist of furnishing the necessary materials, labor, and equipment for installation of new hanger plate system and the removal of hanger straps and pins at the open joints near intermediate bents/piers. This work shall be in accordance with this job special provision and the bridge plans.

2.0 Construction Requirements.

2.1 Before commencing operations, the contractor shall submit to the engineer complete working plans for the temporary support of the girders for review of the method and sequence of operation proposed to be use in performing this work. The working plans shall be signed, sealed and stamped by a registered professional engineer in the State of Missouri in accordance with Authentication of Certain Documents in Sec 107. The hinge modification operation shall be done only when authorized, but such authorization shall not relieve the contractor of responsibility for the safety of the operation or for damage to the structure.

2.2 The contractor shall exercise caution during the entire operation to protect the bridge from damage. Any damage to the existing structure as a result of this work shall be repaired to the satisfaction of the engineer at the contractor's expense.

2.3 The contractor shall visually inspect the area of hinge modification for any damaged welds or other irregularities. Any damaged welds shall be repaired as directed by the engineer. If any irregularities are found, the irregularities shall be brought to the attention of the engineer.

2.4 The existing steel contact surfaces that will become faying surfaces for the slip critical hinge modification connection shall have the surface prepared in accordance with Recoating of Structural Steel (System G, H or I) in Sec 1081 and contact surfaces shall be in accordance with Protective Coating of Structural Steel in Sec 1081.

2.5 Before making field welds for the hinge modification, the areas to be welded shall be thoroughly cleaned of paint, rust, oils and any other foreign substances. Cleaning shall be an SSPC-SP11 finish and to the extent necessary to obtain satisfactory welds. Protective equipment shall be provided by the contractor during the modification of the existing steel to prevent possible exposure of the workers to toxic fumes or dust. All welding shall be performed by a certified welder in accordance with Sec 712. E7018 welding electrode or self-shielded welding process from the MoDOT approved electrode list shall be used. All welding shall be in accordance with Sec 712.

2.6 Structural steel construction shall be in accordance with Sec 1080.

3.0 Method of Measurement. Measurement for the hinge modification and any necessary repair in the area will be made per each.

4.0 Basis of Payment. Payment for the above described work including all material, labor, tools, equipment, temporary jacks and all incidentals necessary to complete this item of work will be considered completely covered by the contract unit price for "Fabricated Structural Low Alloy Steel (Misc.)" and "Type N PTFE Bearing", unless noted otherwise.

F. DRAINAGE SYSTEM

1.0 Description.

1.1 The work under this item consists of furnishing, fabricating, and installing the drainage items necessary to complete the entire drainage system as shown on the design plans.

1.2 Detailed shop drawings of the drainage system shall be prepared and submitted to the engineer. Shop drawings shall be in accordance with Sec 1080. Catalog data may be furnished for components that are standard manufactured items in lieu of detailed drawings, providing, governing dimensions are given.

2.0 Materials.

2.1 Scupper outlets and grates shall be equivalent to Neenah R-4014-C2. Castings shall be cast gray iron in accordance with Sec 614. A fabricated outlet and grate of similar size and in accordance with the requirements for ASTM A 709 Grade 36 (250) steel may be submitted for approval. Castings shall be coated a prime coat of the coating system as specified on the bridge plans to provide a minimum dry film thickness of 5 mils (127 µm) or may be galvanized in accordance with ASTM A 385. Steel outlets and grates shall be coated as described above or galvanized in accordance with ASTM A 123.

2.2 Reinforced fiberglass pipe, collection basins and fittings shall be a Reinforced Thermosetting Resin Pipe (RTRP) system in accordance with the requirements of ASTM D 2996. The RTRP system shall have a minimum short time rupture strength hoop tensile stress of 30,000 psi (207 MPa). The RTRP system shall be pigmented resin throughout the wall. The color of the RTRP system shall be concrete gray or as specified on the bridge plans. The RTRP system shall not be coated with paint, gel-coat or any other exterior coating.

2.3 The contractor shall furnish a manufacturer's certification to the engineer for each lot furnished, certifying that the materials supplied is in accordance with all requirements specified. The certification shall include results of all required tests. Acceptance of the material will be based on the manufacturer's certification and upon results of such tests as may be performed by the engineer. The certification shall show the quantity and lot number that is represented.

3.0 Construction Requirements.

3.1 All connections shown on the plans to facilitate future removal for maintenance cleanout or flushing shall be made with a threaded gasket coupler system, bolted gasket flange system or a female to male threaded PVC plug. Adhesive bonded joints will be permitted for runs of pipe between such connections.

3.2 Runs of pipe shall be supported at a spacing of not greater than the lesser of those as recommended by the manufacturer of the pipe or as shown on the bridge plans. Supports that have point contact or narrow supporting areas shall be avoided. Standard sling, clamp, clevis hangers and shoe supports designed for use with steel pipe may be used. Minimum hanger thickness shall be 3/16 inch (5 mm) with the minimum strap width for the pipe sizes shown in the table below. Straps shall have 120 degree minimum contact with the pipe. Pipe supported on a surface with less than 120 degrees of contact shall have a split fiberglass pipe protective sleeve bonded in place with adhesive. All new steel, hangers and miscellaneous hardware for drainage system shall be ASTM A 709 Grade 36 (250) steel except as noted on the bridge plans. All new steel, hangers and miscellaneous hardware for drainage system shall be galvanized in accordance with ASTM A 153 except as noted on the bridge plans.

Pipe Sizes inches (mm)	Minimum Strap Width inches (mm)
3 (76.2)	1.25 (32)
4 (101.6)	1.25 (32)
6 (152.4)	1.50 (38)
8 (203.2)	1.75 (45)
10 (254.0)	1.75 (45)
12 (304.8)	2.00 (51)
14 (355.6)	2.00 (51)

3.3 The RTRP system shall be handled and installed in accordance with guidelines and procedures as recommended by the manufacturer.

3.4 When the drainage system continues between superstructure units and/or between the superstructure and substructure units, the drainage system shall have allowance for the expected differential expansion and contraction movements as recommended by the manufacturer.

4.0 Method of Measurement. No measurement will be made.

5.0 Basis of Payment. Payment for the above described work, including all material, equipment, labor and any other incidental work necessary, will be considered completely covered under the contract lump sum price for “Drainage System (On Structure)”.

G. SHOTCRETE CONCRETE REPAIR

1.0 Description. Substructure repair (formed and unformed), superstructure repair (unformed) and slab edge repair shall be in accordance with Sec 704 and as shown on the contract plans. Shotcrete, in accordance with this Special Provision, shall be used for slab edge repair and may be used at the Contractor's option for formed and unformed substructure and superstructure repairs.

1.1 Shotcrete shall be in accordance with the current requirements of American Concrete Institute (ACI) 506.2-13, "Specification for Shotcrete", except as otherwise specified. Shotcrete shall consist of an application of one or more layers of mortar or concrete conveyed through a hose and pneumatically projected at a high velocity against a prepared surface.

1.2 Shotcrete shall be produced by a dry-mix process. The dry-mix process shall consist of thoroughly mixing all the ingredients except accelerating admixtures and mixing water and conveying the mixture through the hose pneumatically and the mixing water is introduced at the nozzle. For additional descriptive information, the Contractor's attention shall be directed to the ACI 506R-16, "Guide to Shotcrete".

2.0 Contractor Experience Requirements.

2.1 Workers, including foremen, nozzlemen and delivery equipment operators, shall be fully experienced to perform the work.

2.2 Initial qualification of nozzlemen will be based ACI or EFNARC certification for the application process being used. The nozzlemen shall submit documented proof they have been certified in accordance with the ACI 506.3R-91 "Certification of Shotcrete Nozzlemen" or EFNARC "Nozzleman Certification Scheme". The certification shall have been done by an ACI or EFNARC recognized shotcrete testing lab and/or recognized shotcreting consultant and have covered the type of shotcrete to be used (plain dry-mix).

2.3 The Contractor may supply 1 reference project for the project nozzleman in lieu of completing test panels in accordance with Section 5.1 of this Job Special Provision to demonstrate the experience of the nozzleman in similar shotcrete application work. Owner contact information for the reference project shall be provided to allow for the Engineer to confirm satisfactory results.

3.0 Shotcrete Materials.

3.1 Shotcrete materials shall consist of one of the following premixed and packaged materials:

a) BASF MasterEmaco S 211SP
b) Euclid Chemical Eucoshot F
c) King Shotcrete MS-D1
d) CTS Cement Low-P

3.2 No material testing is anticipated. Acceptance will be based on the prequalified materials listed in this Special Provision, approval of the nozzleman prior to material placement, and visual inspection. If questions arise based from visual examination, placement methods, curing methods or other potentially undesirable influences the Engineer reserves the right to test any material properties listed on the published product data sheet for the material selected. Testing will be done at the Contractor's expense.

3.3 Material shall be delivered, stored and handled to prevent contamination, segregation, corrosion or damage.

3.4 Proportioning and Use of Admixtures. Admixtures will not be permitted unless approved by the Engineer.

3.5 Bonding Agents. Bonding agents will not be permitted.

3.6 Air Entrainment. Additional air entrainment admixtures will not be required.

4.0 Construction Submittals.

4.1 At least 15 days before the planned start of formed and unformed substructure repair, a copy of the following information shall be submitted in writing to the Engineer for review:

(a) Written documentation of the nozzlemen's qualifications including proof of ACI or EFNARC certification;

(b) Proposed methods of shotcrete placement and of controlling and maintaining facing alignment including equipment models;

(c) Shotcrete mix; and

(d) One reference project including: Nozzleman’s name, material used, process used, and whether a blow pipe was utilized. Owner contact information shall be provided to ensure satisfactory results were accomplished on the reference project; or

(e) A satisfactory test panel shall be provided with the material to be used.

4.2 The Engineer will approve or reject the Contractor's submittals within 10 days after the receipt of a complete submission. The Contractor will not be permitted to begin formed or unformed substructure repair with Shotcrete until the submittal requirements are satisfied and found acceptable to the Engineer. Changes or deviations from the approved submittals shall be re-submitted for approval. No adjustment in contract time will be allowed due to incomplete submittals.

4.3 A pre-construction meeting scheduled by the Engineer will be held prior to the start of work. Attendance shall be mandatory. The shotcrete Contractor shall attend.

5.0 Field Quality Control.

5.1 Production test panels will not initially be required if a reference project for the nozzleman is provided as outlined in Section 2.3 of this Job Special Provision. The Engineer may halt repair work if satisfactory results are not produced by the Contractor and require production test panels.

5.2 If a comparable project demonstrating satisfactory results cannot be provided, the skills of the nozzleman shall be demonstrated and tested with at least one production test panel being furnished prior to performing repairs.

5.3 Production Test Panels (If Required).

5.3.1 Qualified personnel shall perform shotcreting and coring of the test panels with the Engineer present. The Contractor shall provide equipment, materials and personnel as necessary to obtain shotcrete cores for testing including construction of test panel boxes, field curing requirements and coring.

5.3.2 Production test panels shall be made with the minimum full thickness and dimension of 18 x 18 inch and at least 3½ inch thick with 2-#4 bars placed in each direction. The #4 bars shall be centered in the 3½ inch dimension and evenly spaced in each direction with the bars touching at the 4 intersecting locations.

5.4 Test Panel Curing, Test Specimen Extraction and Testing.

5.4.1 Immediately after shooting, the test panels shall be field moist cured by covering and tightly wrapping with a sheet of material meeting the requirements of ASTM C 171 until delivered to the testing lab or test specimens are extracted. The test panels shall not be immersed in water. The test panels for the first 24 hours after shooting shall not be disturbed.

5.4.2 At the direction of the Engineer at least two 3 inch diameter core samples shall be cut at two of the intersections to ensure consolidation around the bars. If voids are present the material and nozzleman are not approved for use. The Contractor may continue with changes to the materials or nozzleman. The same process will be followed until no voids are present.

6.0 Shotcrete Facing Requirements.

6.1 Shotcrete Alignment Control. The final surface of the shotcrete shall maintain the existing concrete plane surface.

6.2 Surface Preparation. In addition to the manufacturer's recommendations, the surfaces to be shotcreted shall be cleaned of loose materials, mud, rebound, overspray or other foreign matter that could prevent or reduce shotcrete bond. Shotcrete shall not be placed on frozen surfaces.

6.3 Delivery and Application. In addition to the manufacturer's recommendations, a clean, dry, oil free supply of compressed air sufficient for maintaining adequate nozzle velocity shall be maintained at all times. The equipment shall be capable of delivering the premixed material accurately, uniformly and continuously through the delivery hose. Shotcrete application thickness, nozzle technique, air pressure and rate of shotcrete placement shall be controlled to prevent sagging or sloughing of freshly applied shotcrete.

6.3.1 The shotcrete shall be applied from the lower part of the area upwards to prevent accumulation of rebound. The nozzle shall be oriented at a distance and approximately perpendicular to the working face so that rebound will be minimal and compaction shall be maximized. Special attention shall be paid to encapsulating reinforcement. Care shall be taken while encasing reinforcing steel and mesh to keep the front face of the reinforcement clean during shooting operations, so that the shotcrete builds up from behind, to encase the reinforcement and prevent voids and sand pockets from forming. If a blow pipe was used to qualify, a blow pipe shall be required. The blow pipe is used to remove rebound and overspray immediately ahead of the nozzle. Rebound shall not be worked back into the construction. Rebound that does not fall clear of the working area shall be removed. Hardened rebound and hardened overspray shall be removed prior to the application of additional shotcrete using abrasive blast cleaning, chipping hammers, high pressure water blasting or other suitable techniques.

6.3.2 When using multiple layer shotcrete construction, the surface of the receiving layer shall be prepared before application of a subsequent layer, by either:

(a) Brooming the stiffened layer with a stiff bristle broom to remove all loose material, rebound, overspray or glaze, prior to the shotcrete attaining initial set.

(b) If the shotcrete has set, surface preparation shall be delayed 24 hours, at which time the surface shall be prepared by sandblasting or high pressure water blasting to remove all loose material, rebound, hardened overspray, glaze or other material that may prevent adequate bond.

6.4 Defective Shotcrete. The Engineer will have authority to accept or reject the shotcrete work. Shotcrete that is not in accordance with the project specifications may be rejected either during the shotcrete application process, or on the basis of tests. Shotcrete surface defects shall be repaired as soon as possible after placement. Shotcrete that exhibits segregation, honeycombing, laminations, voids or sand pockets shall be removed and replaced. In-place shotcrete determined not meeting the published Technical Information for the product used will be subject to remediation as approved by the Engineer. Possible remediation options range from required latex over coating for excessive cracking up to removal and replacement at the Contractor's expense

6.5 Construction Joints. Construction joints shall be tapered uniformly toward the excavation face over a minimum distance equal to the thickness of the shotcrete layer. Square joints will not be permitted except at the expansion joint. The surface of the joints shall be rough, clean and sound. A minimum reinforcement overlap at reinforcement splice joints shall be provided. The surface of a joint shall be clean and wet before adjacent shotcrete is applied.

6.6 Final Face Finish. Shotcrete finish shall be a wood float, rubber float, steel trowel or smooth screeded finish.

6.7 Additional Construction Requirements.

6.7.1 If the work to be performed is in the vicinity of a jurisdictional water of the US, care shall be taken to avoid any rebound from entering the regulated waterway.

6.7.2 If the work to be performed is in the vicinity of an enclosed drainage system, care shall be taken to avoid any rebound from entering the drainage system.

6.8 Weather Limitations.

6.8.1 The shotcrete shall be protected if placed when the ambient temperature is below 40°F and falling or when likely to be subject to freezing temperatures before gaining sufficient strength. Cold weather protection shall be maintained until the compressive strength of the shotcrete is greater than 725 psi. Cold weather protection includes blankets, heating under tents or other means acceptable to the Engineer. The temperature of the shotcrete mix, when deposited, shall be not less than 50°F or more than 85°F. The air in contact with the shotcrete surfaces shall be maintained at temperatures above 32°F for a minimum of 7 days.

6.8.2 If the prevailing ambient temperature conditions (relative humidity, wind speed, air temperature and direct exposure to sunlight) are such that the shotcrete develops plastic shrinkage and/or early drying shrinkage cracking, shotcrete application shall be suspended. The Contractor shall reschedule the work to a time when more favorite ambient conditions prevail or

adopt corrective measures, such as installation of sun screens, wind breaks or fogging devices to protect the work. Newly placed shotcrete exposed to rain that washes out cement or otherwise makes the shotcrete unacceptable shall be removed and replaced at the Contractor's expense.

6.9 Curing. Permanent shotcrete shall be protected from loss of moisture for at least 1 day after placement. Shotcrete shall be cured by methods that keep the shotcrete surfaces adequately wet and protected during the specified curing period. Curing shall commence within one hour of shotcrete application. When the ambient temperature exceeds 80°F, the work shall be planned such that curing can commence immediately after finishing. Curing shall be in accordance with the following requirements.

> **(a) Membrane Curing.** Membrane curing is required on overhead surfaces that cannot be adequately wet cured. Curing compounds will not be permitted on any surface against which additional shotcrete or other cementitious finishing materials are to be bonded unless the surface is thoroughly sandblasted in a manner acceptable to the Engineer. Membrane curing compounds shall be spray applied as quickly as practical after the initial shotcrete set at rate of coverage of not less than 7.1 square feet per gallon.

7.0 Safety Requirements. Nozzlemen and helpers shall be equipped with gloves, eye protection and adequate protective clothing during the application of shotcrete. Whip checks are required on air lines. The Contractor shall be responsible for meeting all federal, state and local safety requirements.

8.0 Method of Measurement. Measurement of Substructure Repair (Formed), Substructure Repair (Unformed), Superstructure Repair (Unformed) and Slab Edge Repair shall be in accordance with Sec 704.

9.0 Basis of Payment. Payment for Substructure Repair (Formed), Substructure Repair (Unformed), Superstructure Repair (Unformed) and Slab Edge Repair shall be in accordance with Sec 704.

H. NON-DESTRUCTIVE TESTING

1.0 Description. This work shall consist of performing non-destructive testing on the welds of all existing top flange cover plates.

2.0 Construction Requirements.

2.1 After the concrete deck is removed, the steel that is to remain will be inspected by the engineer. In addition to this inspection, the welds and adjacent base metal at the ends of the top cover plates shall have non-destructive (magnetic particle) testing performed. Non-destructive testing shall be performed by an acceptable testing agency. The contractor shall provide the engineer with documentation of the testing agency and the qualifications of personnel performing the testing. The documentation and qualifications shall be submitted to the State Bridge Engineer for acceptance. Personnel performing the tests shall be qualified for SNT-TC-1A Level II.

2.2 The length of weld to be tested and the base metal, one inch either side of the weld, shall be cleaned of all rust prior to the testing. On cover plates with square ends, the weld shall be tested one inch from each corner along the ends of the cover plate plus 6 inches back along the side from each corner of the plate. On cover plates with tapered ends, the weld shall be tested along the end of the cover plate, along tapered edges and 6 inches back along the cover plate from end of taper.

2.3 If fatigue cracks are found, the cracks are expected to be very small and may be located in the base metal at the toe of the welds. Any cracks discovered by testing, regardless of length, shall be marked and reported to the engineer. All repairs shall be made by a certified welder in accordance with Sec 712.6. Any repair work and retesting of the repair work required, as a result of this inspection, will be paid for in accordance with Sec 109. This shall not relieve the contractor from responsibility to repair any damage caused by this work at the contractor's expense. Any delay or inconvenience caused by this inspection requirement will be non-compensable and effect on time of performance non-excusable.

3.0 Method of Measurement. Measurement of non-destructive testing will be to the nearest linear foot. The extent of non-destructive testing may vary from the estimated quantities, but the contract unit price shall prevail regardless of the variation. Final measurements 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.

4.0 Basis of Payment. Accepted quantities of non-destructive testing will be paid for at the contract unit price. 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 Non-Destructive Testing.

I. DEFLECTION AND HAUNCHING

1.0 Description. The contractor shall determine dead load deflections and haunching based on field measurements and/or existing bridge plans and these shall be adjusted based on the difference between the new and existing dead load weights.

2.0 Construction Requirements. In order to properly form the haunches for the new deck, the contractor shall survey top of deck elevations above each beam including centerline of roadway and along each beam line (top or bottom flange) prior to deck removal followed by surveying elevations of the beams (top or bottom flange) after deck removal.

3.0 Method of Measurement. No measurement will be made.

4.0 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.

J. REMOVAL OF CATHODIC PROTECTION SYSTEM

1.0 Description. This work shall consist of disengaging the power to the cathodic protection system during rehabilitation. The removal of the cathodic protection system shall include all of the cathodic protection system except as shown on the plans.

2.0 Removal Requirements. Any damage cause by the contractor's operations to the cathodic protection system that is to remain in place, shall be repaired or replaced at the contractor's expense.

2.1 The existing cathodic protection system shall be turned off as directed by the engineer prior to beginning work. The existing cathodic protection system shall not be reused except as shown on the plans. All insulated wiring associated with the removal of the cathodic protection system shall be disposed by the contractor and as approved by the engineer.

2.2 If during removal of the cathodic protection system, the existing concrete deck is damaged and not covered by new concrete, the areas on the deck shall be repaired with Class B-1 concrete in accordance with Sec 704. If the concrete is damaged at other locations, the repair areas shall be made with a qualified special mortar. The qualified special mortar shall be in accordance with Sec 704.

3.0 Method of Measurement. No measurement will be made.

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 considered completely covered by the contract lump sum price for "Removal of Cathodic Protection System".

K. DIAMOND GRINDING

1.0 Description. This work will only be performed at the discretion of the engineer and will be underrun if not required by the engineer. This work shall consist of grinding the new concrete surface to provide good riding characteristics, a surface texture and proper drainage. If the engineer determines it necessary to provide good riding characteristics, grinding shall be performed on all or part of the bridge approach slabs and sealed in accordance with Sec 703.3.8. The finished surface shall be in accordance with Sec 703.3.7 and as shown on the plans or as directed by the engineer except as modified below.

2.0 Equipment. The equipment shall be of a size that will grind a strip at least 3 feet wide using diamond blades, and shall not cause spalls at cracks, joints or other locations.

3.0 Construction Requirements. The construction operation shall be scheduled and proceed in a manner that produces a uniform finished surface. Auxiliary or ramp lane grinding shall transition from the edge of the mainline as required to provide drainage and an acceptable riding surface.

3.1 Deck repair, if required, shall be completed prior to any grinding.

3.2 Grinding shall be accomplished in a manner that eliminates joint or crack faults and provides lateral drainage by maintaining a constant cross slope between grinding extremities in each lane. A maximum tolerance of 1/16 inch will be allowed for adjacent sides of joints and cracks, except that under no circumstances shall the grinding depth exceed 1/4 inch from the top of the original surface. When grinding across faulted joints, a minimum of a 20-foot transition onto the approach side slab shall be used.

3.3 The cross slope of the pavement shall be as shown on the plans and shall have no depressions or misalignment of slope greater than 1/4 inch in 12 feet when measured with a 12-foot straightedge placed perpendicular to the centerline. Areas of deviation shall be reground. Straightedge requirements will not apply across longitudinal joints or outside the ground area.

3.4 As soon as practical after grinding, the surface will be straightedged longitudinally and all variations exceeding 1/8 inch in 10 feet will be plainly marked. Areas of deviation shall be reground.

3.5 Substantially all of the pavement surface shall be textured. Extra depth grinding to eliminate minor depressions in order to provide texturing on 100 percent of the pavement

surface will not be required. No unground surface area between passes will be permitted, except as specified otherwise in the contract documents.

3.6 The grinding process shall produce a final pavement surface that is true to grade and uniform in appearance with a longitudinal line type texture. The line-type texture shall contain parallel longitudinal corrugations that present a narrow ridge corduroy-type appearance. The peaks of the ridges shall be approximately 1/32 inch higher than the bottoms of the grooves. The grooves shall be evenly spaced. There shall be approximately 50-55 grooves per foot, measured perpendicular to the centerline.

3.7 The contractor shall remove and dispose of all residue from the grinding in a manner and at a location to satisfy environmental regulations. The contractor shall have the engineer's approval for the method of spreading and disposal of the residue prior to beginning any grinding operations.

3.8 Solid residue shall be removed from the pavement surface before any residue is blown by traffic action or wind.

3.9 Residue shall not be permitted to encroach on open lanes.

3.10 The residue shall not enter into gutters or closed drainage systems.

3.11 The contractor may disperse residue onto unpaved shoulders, adjacent roadside embankments, or median ditch areas of divided highways where the residue runoff can percolate into the soil, unless specified otherwise in the contract. The spread rate shall not generate surface runoff. If surface runoff occurs at a grinding location, the contractor shall haul the residue to an approved location at the contractor's expense.

3.12 Discharge of any residue runoff shall not flow into adjacent rivers, streams, lakes, ponds or other open bodies of water.

3.13 Residue shall not be spread within 100 feet of any streams, lakes or other open bodies of water, or within 15 feet of a water filled ditch.

3.14 The contractor shall use appropriate equipment and methods so the discharging of the residue does not cause erosion of soil or damage to established vegetation along the roadway. The contractor shall repair and reseed any areas where the discharge of grinding residue causes damage to roadway slopes or vegetated areas at the contractor's expense.

3.15 If the solids concentration of discharged residue at any particular area is determined to be excessive by the engineer, the contractor shall provide equipment and material to flush the areas with water as directed by the engineer, at the contractor's expense.

3.16 The pavement shall be cleaned prior to opening to traffic as directed by the engineer.

4.0 Smoothness Requirements.

4.1 No diamond grinding shall be done until the pavement has attained a strength sufficient to be opened to all types of traffic. All diamond grinding shall be completed on any section prior to opening that section to other than construction traffic, unless approved by the engineer.

4.2 The engineer will be the sole authority for determining if the driving surface is sufficiently smooth.

4.3 The engineer will evaluate the smoothness of the concrete wearing surface after the concrete has cured and direct the contractor to diamond grind where deemed necessary.

4.4 After initial diamond grinding operations, if any, the engineer will again evaluate the smoothness of the concrete wearing surface and approach slab, repeating as many times as necessary to achieve the desired surface smoothness.

4.5 Any deficiencies in the final surface due to improper contractor operations or equipment shall be corrected by the contractor, at the contractor's expense.

4.6 All areas shall be tested with a 10 foot straightedge in accordance with Sec 3.4 of these provisions.

5.0 Method of Measurement. Measurement for diamond grinding will be made to the nearest square yard. Measurement will be based upon the area of initial diamond grinding completed as directed by the engineer. Subsequent passes of diamond grinding over a previously ground area will not be measured. No deduction will be made for gaps to avoid striping or raised pavement markers. No additional measurement will be made for diamond grinding bridge approach slabs.

6.0 Basis of Payment. Payment for diamond grinding will be paid for at the contract unit price per square yard. Payment for diamond grinding will be considered full compensation for all labor, equipment, material, and incidentals to complete this work, including hauling and disposal of grinding residue and cleaning the pavement prior to opening to traffic.

L. SPECIAL CHANGE ORDER AND VALUE ENGINEERING CONSIDERATION

1.0 Description. Increased Federal Share has been approved by the FHWA for an innovative technology or practice. The Commission will receive an additional five percent Federal Share of the overall contract value due to innovations within the following pay item(s).

Pay Item Number	Pay Item Description	Innovation
703-99-07	Ultra-High-Performance Concrete	High performance concrete at expansion joints.

Due to the increased federal share, the project components related to the innovation(s) described above must be constructed with the materials, quantities, methods and innovations as shown on the project plans and specifications. If the contractor requests materials, quantities, methods or innovations other than those included in the plans and specifications, the request must be reviewed and approved by the Commission and FHWA. Approved changes to the innovation items above shall be at no additional cost to the Commission and shall not increase the contract time.

2.0 Consideration of Change Orders and Value Engineering Change Proposals (VECP). Change ordering and/or value engineering the pay item(s) listed in section 1.0

jeopardize ability for the Commission to receive an additional Federal Share for the overall contract value. Special consideration should be given to the change order value for removing such item(s) from the contract ensuring that the benefit outweighs the cost.

3.0 Contacting Financial Services. If it is determined that the proposed change order and/or VECP outweighs the additional overall five percent Federal Share value, the Engineer shall notify MoDOT project manager.

M. ULTRA-HIGH-PERFORMANCE CONCRETE

1.0 Description. This work shall consist of furnishing and installing ultra-high-performance concrete (UHPC) at the locations shown on the plans or as directed by the Engineer. Ultra- high -performance concrete (UHPC) to be installed at expansion device joint header slabs. It does not include bridge deck overlays

2.0 Materials.

2.1 Water. Water shall meet the requirements of Section 1070.

2.2 Ultra-High Performance Concrete (UHPC). The material shall be a fiber-reinforced UHPC with a minimum steel fiber content of 2% by volume. The UHPC shall meet the performance requirements outlined in the table below, at an age of 28 days unless otherwise noted. Test data substantiating these results shall be conducted by an AASHTO-accredited lab.

Ultra-High Performance Concrete (UHPC)		
Property	**Requirement**	**Test Method**
Compressive Strength	4 days: 12 ksi, minimum 28 days: 17.4 ksi, minimum	ASTM C1856
Flexural Strength	First-peak strength: 1.4 ksi, minimum; Peak strength: 2.0 ksi, minimum; Ratio, peak to first-peak strength: 1.25, minimum	ASTM C1856
Length Change	800 microstrain, maximum; Initial reading at 24 hours, store in air for 28 days (no moist cure after initial reading)	ASTM C1856
Indication of Resistance to Chloride Ion Penetration	300 Coulombs, maximum, after 56 days extended moist cure Test on samples cast without fibers	ASTM C1856
Scaling Resistance	Visual rating 0 or 1 after 50 cycles	ASTM C672
Abrasion Resistance	0.1 ounces lost, maximum after 6 minutes Test on ground* surface	ASTM C1856
Resistance to Freezing and Thawing	RDM after 600 cycles: 95%, minimum	ASTM C1856

* Surface to be ground using method used for project. Testing may be performed on cores sampled from mock-up slab.

2.2.1 UHPC Materials. Materials commonly used in UHPC include:

- Fine aggregate
- Cementitious material
- Mineral admixtures
- Superplasticizer
- Accelerator
- Steel fibers

All components shall be supplied by one UHPC manufacturer.

2.2.1.1 Aggregates. Aggregates used in UHPC shall be innocuous (0.10% maximum expansion after 14 days of immersion) when tested either according to ASTM C1260 alone or according to ASTM C1567 in combination with the specific supplementary cementitious materials and mineral admixtures to be included in the UHPC. If tested by ASTM C1567, the proportions of supplementary cementitious materials and mineral admixtures used in the test specimens shall not exceed those used in the UHPC mixture. The water-to-binder ratio used for testing shall not be less than 0.47, where the binder includes both the cementitious materials and the mineral admixtures.

2.2.1.2 Steel fibers. Steel fibers used in UHPC shall conform to ASTM A820, Type I. Fibers shall have a minimum tensile strength of 190 ksi.

2.2.1.3 Chemical admixtures. Chemical admixtures used in UHPC shall conform to AASHTO M 194.

2.3 High Molecular Weight Methacrylate (HMWM). The high molecular weight methacrylate (HMWM) resin used as repair for leaking joints shall be low viscosity and non-fuming. The HMWM shall comply with the following requirements:

High Molecular Weight Methacrylate (HMWM) Resin		
Property	**Requirement**	**Test Method**
Viscosity	25 cps, maximum	ASTM D2849
Density	8.4 lb./gal., minimum (at 77°F)	ASTM D1475
Flash Point	200°F, minimum	ASTM D3278
Vapor Pressure	1.0 mm Hg, maximum (at 77°F)	ASTM D323
Glass Transition Temperature	136°F, minimum	ASTM D3418
Gel Time	40 minutes, minimum (for 100 gram mass)	ASTM C881
Percent Solids	90% by weight, minimum	
Bond Strength	1500 psi, minimum	ASTM C882

2.3.1 HMWM Sand. The sand used for the HMWM shall be a commercial quality dry blast sand. 95% of the sand shall pass the No. 8 sieve and 95% of the sand shall be retained on the No. 30 sieve.

2.4 Delivery of Materials. All materials shall be delivered in their original containers bearing the manufacturer's label, date of manufacturing, batch number, trade name, and quantity. Each shipment of HMWM resin shall be accompanied by a Safety Data Sheet (SDS).

2.5 Storage of Materials. The Contractor shall assure the proper storage of the UHPC premix, fibers, and additives as required by the supplier's specifications to protect materials against loss of physical and mechanical properties. Sufficient material to perform the entire UHPC installation shall be in storage at the site prior to any field application, so that there shall be no delay in procuring the material for each day's application.

2.6 Technical Support. The Contractor shall arrange for a representative of the UHPC supplier to be on site during the mixing and placement of UHPC until the Contractor's own staff has become trained in the use of the material and until approved by the Engineer. The representative shall be knowledgeable in the supply, mixing, delivery, placement, and curing of the UHPC material.

3.0 Submittals. The Contractor shall submit to the Engineer the following items for review and approval at least 30 days prior to UHPC placement:

3.1 Material Certifications.

3.1.1 UHPC Certifications. The Contractor shall furnish a test report confirming that all materials for the UHPC have been pretested and will meet all requirements listed in Section 2.0. All testing shall be conducted by an AASHTO-accredited testing lab on the same UHPC mix design used by the project. The test report shall include the following information:

a. The type and source of each constituent material.
b. The mixture proportions, including limits on water and admixture quantities.
c. Mixing procedures.
d. Curing procedures, including thermal treatment procedures (if used).
e. The properties of the UHPC in accordance with Section 2.0.

3.1.2 HMWM Certifications. The Contractor shall furnish documentation from the HMWM manufacturer certifying that it conforms to the requirements listed in Section 2.0.

3.2 Qualifications.

3.2.1 Manufacturer Qualifications. The manufacturer of the UHPC shall be ISO 9001:2000 certified and have a quality assurance program independently audited on a regular basis.

3.2.2 Contractor Qualifications. The Contractor shall be experienced in the field application of UHPC joints and have 5 years of experience in similar project types. The Contractor shall furnish documentation of experience with UHPC in similar project types, including location and scope UHPC use and identifying personnel for the current project. The Contractor shall maintain technical personnel at the site who have received product training by a manufacturer's representative for a minimum of one day during a Mockup Test. If the Contractor does not have 5 years of experience in similar project types, a manufacturer's representative shall be on-site during the placement of the UHPC for the duration of the project.

3.3 UHPC Field Installation Plan. The Contractor shall submit a UHPC Field Installation Plan that includes drawings of proposed joint locations and forming details and describes the equipment, batching sequence, placement sequencing, UHPC temperature limits, and curing methods for the UHPC installation. When using the maturity method, the Contractor shall use the maturity method data provided in the UHPC Field Installation Plan to demonstrate the proposed method of curing will achieve the required strength at the required time. All safety and weather conditions required by the manufacturer shall be in compliance with applicable rules and regulations of local, state, and federal authorities having jurisdiction.

4.0 Construction.

4.1 Mockup Test. A mockup test shall be performed by the Contractor at least one week prior to the UHPC placement. The test will verify that the Contractor is familiar with UHPC operations and troubleshooting installation procedures. The mockup shall closely replicate the placement conditions, operations, and dimensions of the UHPC to be installed. The mockup shall be a minimum 10 feet in length and match the cross-slope of the planned joint. If hydrostatic pressure head will be used on the project to consolidate the joints, the pressure head during the mockup should replicate the maximum pressure head anticipated on the project.

4.2 Pre-Pour Meeting. Prior to the initial placement of the UHPC, the Contractor shall arrange for an on-site meeting with the UHPC representative. The Contractor's staff and the Engineer and Inspectors shall attend the site meeting. The objective of the meeting is to clearly outline the procedures for mixing, transporting, finishing, and curing of the UHPC material.

4.3 Formwork. The design and fabrication of forms shall follow approved drawings provided in the UHPC Field Installation Plan and shall follow the recommendations of the UHPC manufacturer. The forms shall be non-absorptive or coated to prevent absorption of water and shall be installed water-tight to prevent leakage of the UHPC during placement. A top form shall be used.

4.4 Surface Preparation. The precast concrete or existing concrete surfaces to be in contact with UHPC shall have a roughened surface with an amplitude of 1/4" +/- 1/8". The concrete surfaces shall be cleaned of debris and pre-wetted with water continuously for a minimum of 24 hours immediately prior to UHPC placement. Standing water shall be removed from the concrete and formwork surfaces prior to UHPC placement.

4.5 Batching. The Contractor shall follow the batching sequence as specified in the approved UHPC Field Installation Plan. Mixers used for batching UHPC shall be suitable for mixing UHPC and shall be approved for use by the UHPC supplier prior to construction.

4.5.1 Temperature Control. The temperature of the UHPC shall be measured for each batch prior to placement, in accordance with ASTM C1064. The temperature shall be between 55°F and 85°F, unless otherwise approved by the on-site UHPC representative. When batching in warm weather, ice may be required as a full or partial substitute for the mixing water to control the UHPC mix temperature to within acceptable limits. If ambient temperatures are expected to drop below 40°F during the UHPC placement or within 48 hours after placement, cold weather placement procedures shall be used.

4.5.2 Flow Spread. The Contractor shall measure the flow spread for each batch of UHPC prior to placement, in accordance with ASTM C1856. The flow shall be between 7 and 10 inches unless

otherwise approved by the on-site UHPC representative. There shall be no visual sign of fiber segregation.

4.6 Placement. The material shall be placed starting at the low end of the joint and working toward the high end. The material shall not travel more than 10 feet during placement. Provide port/pour holes with a minimum diameter of 3 inches when top forms are used. The surface of the UHPC field joints shall be filled to a minimum of +1/4 inch above the intended final elevation. Internal vibration shall not be used during UHPC placement.

4.7 Curing. The UHPC shall be covered and cured in the forms according to the UHPC Field Installation Plan to attain the required strength shown on the contract documents. The UHPC shall not be disturbed until a minimum compressive strength of 10 ksi is achieved. The UHPC shall be ground flush with the top of bridge deck after the material has attained a minimum compressive strength of 10 ksi. Strength shall be verified by a cylinder compression test conducted on field-cured cylinders or by the maturity method.

4.8 Removal of Forms. Forms shall not be removed until the UHPC has attained a compressive strength of at least 10 ksi. Strength shall be verified by a cylinder compression test conducted on field-cured cylinders or by the maturity method.

4.9 Installation of Overlay. Installation of overlay onto UHPC joint header surfaces shall not be initiated until the UHPC has attained a compressive strength of at least 14 ksi. Strength shall be verified by a cylinder compression test conducted on field-cured cylinders or by the maturity method.

5.0 Testing. The contractor shall fabricate for every 25 cubic yards or a minimum of once per day, whichever is more frequent, a minimum of six field-cured 3-inch by 6-inch cylinders and six standard-cured 3-inch by 6-inch cylinders in accordance with ASTM C1856. The six standard-cured cylinders shall be used for acceptance testing. If early strength is to be validated by the maturity method as defined in Section 6.0, cast additional cylinders as required.

5.1 QC Testing. The following process control tests shall be performed by the Contractor on-site during each day of UHPC casting and submitted to the Engineer:

QC Testing					
Property	**Test Method**	**No. of Specimens**	**Test Age**	**Test Result**	**Test Frequency**
Flow	ASTM C1856	1 test	Prior to placement	7 to 10 inches*; no visual sign of fiber segregation	Each batch
Temperature	ASTM C1064	1 test	Prior to placement	55 to 85°F*	Each batch
Compressive Strength	ASTM C1856, field cured samples or ASTM C1074, maturity method	3 at each age**	As needed for formwork removal and grinding	> 10 ksi	Every 25 cy, with a minimum once per day
			As needed for installation of overlay	> 14 ksi	

* Unless otherwise approved by the on-site UHPC representative.
** Testing for compressive strength for formwork removal and grinding or for installation of overlay may alternatively be eliminated if using the ASTM C1074 maturity method as described in Section 6.0.

5.2 Acceptance Testing. The Contractor will perform the following testing for acceptance:

Acceptance Testing					
Property	**Test Method**	**No. of Specimens**	**Test Age**	**Test Result**	**Test Frequency**
Compressive Strength	ASTM C1856, standard cured samples	3	7 days	N/A (informational)	Every 25 cy, with a minimum once per day
		3	28 days	> 17.4 ksi	

6.0 Estimation of In-Place Strength using Maturity Method. In-place strength may be estimated using the maturity method in accordance with ASTM C1074. The maturity function used to estimate strength shall be calculated with using same formula that is defined in the UHPC Field Installation Plan. All testing shall be performed by an AASHTO-accredited testing lab.

6.1 Development of Strength-Maturity Relationship. If maturity method is used, develop Strength-Maturity Relationship prior to submission of UHPC Field Installation Plan as outlined in ASTM C1074, except that 3-inch by 6-inch cylinders shall be used for maturity testing.

6.2 Thermocouple Placement. Two thermocouples or maturity meter probes shall be installed per UHPC placement, one at each end, at half the depth of the placement and no nearer to an edge than half the depth. The locations of the thermocouple installations shall be shown on the installation drawings. The thermocouple wiring may be connected to reinforcing steel, but probe endings shall not be in direct contact with the steel.

6.3 Monitoring. Record and save the maturity data from the thermocouple or maturity meter until the strength reaches 17.4 ksi. Disconnect the meter and clip all wires flush to the concrete surface.

6.4 Validation of Strength-Maturity Relationship. Validate the strength-maturity relationship at mock-up or first placement. Fabricate and field cure a minimum of 10 cylinders. Equip one cylinder with a thermocouple or maturity meter probe. Test the other cylinders in sets of three as close as possible to maturity values corresponding to 8, 10, and 14 ksi. Record the maturity value immediately prior to testing. If the average value of compressive strength for each set of cylinders is within 10% of the estimated value, the strength-maturity relationship is validated. If the average cylinder value is more than 10% below the estimated value at any age, the strength-maturity relationship shall be re-established.

7.0 Watertight Integrity.

7.1 Watertight Integrity Test. After the joints and blockouts have been ground, each joint and blockout shall be flooded with water for a minimum of 15 minutes. The Contractor shall provide the Engineer safe access for inspecting the underside of the joints. The concrete surfaces under the joint will be inspected by the Engineer during this 15 minute period and also for a minimum of 45 minutes after the supply of water has stopped, for any evidence of dripping water or moisture.

Should the joint system exhibit evidence of water leakage whatsoever, the Contractor shall locate the leak and repair the joint with HMWM.

7.2 HMWM Repair of Leaking Joints. The repair shall be performed at the Contractor's expense and at no time extensions to the project. The Contractor shall abrasive blast clean the area to be treated, removing all contaminants from the surface, and clean adjacent surfaces of the leaking joints using compressed air free of oil and moisture. The HMWM shall be mixed and applied according to the manufacturer's instructions with no more than 5 gallons applied at a time. The HMWM shall be poured over the joints. HMWM shall be applied to clean, dry surfaces when the surface temperature is at least 50°F and, if near 50°F, rising. HMWM shall not be applied if rain is expected within 12 hours of completion. A subsequent watertight integrity test may be required at the direction of the Engineer after the repair has been made.

7.2.1 Driving Surfaces. When the HMWM surface will be used as a driving surface, sand shall be applied to provide friction. After the HMWM has been applied, at least 20 minutes but not more than 40 minutes shall elapse before applying the sand. The sand shall be broadcast at a rate of approximately two pounds per square yard, completely covering the HMWM. Once the HMWM is cured, any loose sand shall be removed from the surface.

7.2.2 Opening to Traffic. The HMWM must be tack-free before construction traffic is permitted to resume.

8.0 Method of Measurement. This work will be measured as the number of cubic yards of ultra-high-performance concrete (UHPC) satisfactorily furnished and installed.

9.0 Basis of Payment. The contract unit price for ultra-high-performance concrete (UHPC) will be full compensation for all materials and other items entering into the construction of the UHPC. The accepted quantity of UHPC will be paid for at the contract unit price.

N. RAPID SET CONCRETE PATCHING MATERIAL – VERTICAL AND OVERHEAD REPAIRS

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:

(a) New Products Evaluation Form

(b) Certified test results from an independent laboratory showing compliance with this special provision.

(c) 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.

(d) 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.

3.1.1 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 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	Bridge Decks 1000 coulombs @ 28 days Roadway 2000 coulombs @ 28 days	Bridge Deck 1000 coulombs @ 28 days Roadway 2000 coulombs @ 28 days	Bridge Deck 1000 coulombs @ 28 days Roadway 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

[1]The 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.
[2]Not 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.

O. RAPID SET CONCRETE PATCHING MATERIAL – HORIZONTAL REPAIRS

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:

(e) New Products Evaluation Form

(f) Certified test results from an independent laboratory showing compliance with this special provision.

(g) 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.

(h) 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
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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	Bridge Decks 1000 coulombs @ 28 days Roadway	Bridge Deck 1000 coulombs @ 28 days Roadway	Bridge Deck 1000 coulombs @ 28 days Roadway

		2000 coulombs @ 28 days	2000 coulombs @ 28 days	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

[1]The 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.
[2]Not 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.

P. SLURRY AND RESIDUE PRODUCED DURING SURFACE TREATMENT OF PCCP AND BRIDGE DECKS

1.1 Description. This work covers the requirements for controlling residue or slurry produced by milling, grinding, planing, grooving or other methods of surface treatments on new or existing PCCP and bridge decks in addition to Section 622.

2.0 Construction Requirements. The following shall be considered the minimum requirements for performing this work within the project limits.

2.1 The contractor shall submit to the Engineer for approval in writing prior to the pre-construction meeting, the best management practices (BMP's) to be used to protect the environment, including the method of disposal of the residue whether on right of way or off-site.

2.2 Prior to starting work, slurry or residue "no discharge zones" will be identified by the Engineer with respect to the contractor's approved BMP and residue disposal plan.

2.3 Operations may be suspended by the Engineer during periods of rainfall or during freezing temperatures.

2.4 When slurry is dispersed on the right of way, BMP's shall be installed to keep slurry residue from entering drainage structures, from entering any waterways and from leaving the right of way.

3.0 Basis of Payment. No direct payment for slurry or residue control requirements for BMP's will be made. Compliance with this specification along with the cost of all materials, labor and equipment necessary for the surface treatment work shall be included in and completely covered by the unit price bid for each of the items of work for surface treatment included in contract.

Q. SURFACE SEALING CONCRETE

1.0 Description. This provision allows surface sealing concrete to be applied as last order of work.

2.0 Construction Requirements. The surface of the new concrete shall be surface sealed in accordance with Sec 703.3.8 except that lanes may be opened to traffic after the concrete has properly cured in accordance with Sec 703 and the sealant applied as a last order of work. Any lanes open to traffic prior to surface sealing shall have foreign materials removed. Surfaces that are sealed after each stage of construction shall have all vertical construction joints between stages protected from the surface sealant. If asphalt roadway surface is adjacent to the new concrete, the asphalt surface shall be protected from spillage of the sealant.

3.0 Method of Measurement. No measurement will be made.

4.0 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.

R. REMOVAL OF BRIDGE DECK AND DEBRIS

1.1 Description. The contractor shall make provisions to prevent debris and materials from the removal of the bridge decks of bridges A05914, A05915, A06072, A06073, A10574 and A10575 from falling below the bridge superstructure. Removal of bridges shall be in accordance with section 216 of the specifications.

1.1 Any damage sustained by the remaining structures or adjacent facilities 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.

1.2 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.

2.0 Method of Measurement. No measurement will be made.

3.0 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. Payment for the above described work will be considered completely covered by the contract lump sum price for Removal of Bridges.