

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

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- NN. Site Restoration for ITS Work
- OO. Coordination with ITS Staff and Utility Locates
- PP. CCTV Foundations
- QQ. Install CCTV Assembly
- RR. Ameren Coordination
- SS. Conduit
- TT. Fiber Optic Cable
- UU. ITS Pull Box
- VV. 80 Foot CCTV Camera Pole and Lowering System
- WW. Pad Mounted Power Supply

Job No. J613029
Route I-44
St. Louis County

- XX. As-Built Communications Plans
- YY. Install Relocated Cables
- ZZ. ITS Management Tool
- AAA. Field Terminal Cabinet, Type 2
- BBB. Conduit Sleeve
- CCC. Relocate Existing Type 7 Cabinet
- DDD. MoDOT Buried Cable Driveable Delineator Post
- EEE. Check Valve
- FFF. Trash Guard
- GGG. Debris Rack

PRELIMINARY

<p>“THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.”</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p>
	<p>JACOBS 501 NORTH BROADWAY ST. LOUIS, MO 63102 Certificate of Authority:</p>
	<p>If a seal is present on this sheet, JSP’s have been electronically sealed and dated.</p>
	<p>JOB NUMBER: J6I3029 ST. LOUIS COUNTY, MO DATE PREPARED: 3/9/2019</p>
	<p>ADDENDUM DATE:</p>
<p>Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal:</p>	

<p>“THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.”</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p>
	<p>JACOBS 501 NORTH BROADWAY ST. LOUIS, MO 63102 Certificate of Authority:</p>
	<p>If a seal is present on this sheet, JSP’s have been electronically sealed and dated.</p>
	<p>JOB NUMBER: J6I3029 ST. LOUIS COUNTY, MO DATE PREPARED: 3/9/2019</p>
	<p>ADDENDUM DATE:</p>
<p>Only the following items of the Job Special Provisions (Structures) are authenticated by this seal:</p>	

<p>“THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.”</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p>
	<p>JACOBS 501 NORTH BROADWAY ST. LOUIS, MO 63102 Certificate of Authority:</p>
	<p>If a seal is present on this sheet, JSP’s have been electronically sealed and dated.</p>
	<p>JOB NUMBER: J6I3029 ST. LOUIS COUNTY, MO DATE PREPARED: 3/9/2019</p>
	<p>ADDENDUM DATE:</p>
<p>Only the following items of the Job Special Provisions (Drainage) are authenticated by this seal:</p>	

<p>“THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.”</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</p>
	<p>JACOBS 501 NORTH BROADWAY ST. LOUIS, MO 63102 Certificate of Authority:</p>
	<p>If a seal is present on this sheet, JSP’s have been electronically sealed and dated.</p>
	<p>JOB NUMBER: J6I3029 ST. LOUIS COUNTY, MO DATE PREPARED: 3/9/2019</p>
	<p>ADDENDUM DATE:</p>
<p>Only the following items of the Job Special Provisions (ITS) are authenticated by this seal:</p>	

“THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.”	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
	<i>EFK Moen, LLC</i> <i>13523 Barrett Parkway, Suite 250</i> <i>St. Louis, MO 63021</i>
	If a seal is present on this sheet, JSP’s have been electronically sealed and dated.
	JOB NUMBER: J6I3029 ST. LOUIS COUNTY, MO DATE PREPARED: 3/9/2019
	ADDENDUM DATE:
Only the following items of the Job Special Provisions (Signing) are authenticated by this seal:	

“THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.”	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
	ABNA 4140 LINDELL BLVD. ST. LOUIS, MO 63108 Certificate of Authority:
	If a seal is present on this sheet, JSP’s have been electronically sealed and dated.
	JOB NUMBER: J6I3029 ST. LOUIS COUNTY, MO DATE PREPARED: 3/9/2019
	ADDENDUM DATE:
Only the following items of the Job Special Provisions (Lighting) are authenticated by this seal:	

JOB
SPECIAL PROVISION

A. GENERAL – FEDERAL (JSP-09-02C)

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 "Bidding". 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 "Business"; "Standards and Specifications". The effective version shall be determined by the letting date of the project.

General Provisions & Supplemental Specifications

Supplemental Plans to July 2017 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: Month XX, 20XX
Completion Date: Month XX, 20XX

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
JXXXXX	XX	\$XXX
JXXXXX	XX	\$XXX
JXXXXX	XX	\$XXX
JXXXXX	XX	\$XXX

***** (If Calendar Days do not apply to the Job No., enter N/A for the number of Calendar Days) *****

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 \$XX 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 (JSP-02-06E)

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.

SECTIONS 1.1 – 1.3 SHOULD BE DELETED IF NO WZS. A WZS IS NEEDED ON ALL INTERSTATES, FREEWAYS AND MULTI-LANE ROADWAYS. A WZS SHOULD BE CONSIDERED ON ALL OTHER ROADWAYS, BUT IS NOT REQUIRED.

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 Standard Specifications Section 616.3.3 and will be directly involved with daily traffic management. It will be the responsibility of the WZS to coordinate daily traffic management with the engineer. The WZS shall maintain daily contact with the engineer either on-site or via telecommunication.

1.2 Maintaining Work Zones and Work Zone Reviews. The WZS shall maintain work zones on a daily basis to ensure safety to the traveling public and the workers; this includes long term work zones that have devices and/or roadway conditions that need to be maintained. If the engineer or a designated MoDOT employee (identified at the preconstruction meeting) notifies the WZS of any safety or traffic delay concerns in the work zone, the WZS shall promptly inspect and work to provide a solution to correct the situation. The WZS shall have personnel reviewing traffic control devices daily and any temporary lane drop traffic control devices for initial set up and during the operation. Missing, damaged or over-turned traffic control devices shall typically be corrected without the need for direction by the engineer. The WZS is responsible to assure all traffic control devices are maintained in accordance with EPG standards. The WZS is responsible to ensure 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. The WZS shall submit one weekly review of work zone operations identifying any concerns present and the 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.

1.3 Work Zone Conflict Resolution. Any conflict resolution shall be in accordance with Standard Specifications 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 working days 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.

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 **XX 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 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 When a traffic queue extends 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 due to non-recurring congestion, the contractor shall deploy a means of providing advance warning of the traffic congestion, as approved by the engineer. The warning location shall be no less than 1000 feet and no more than 0.5 mile in advance of the end of the traffic queue on divided highways.

3.0 Work Hour Restrictions.

3.1 There are six major holiday periods shown below. All lanes shall be scheduled to be open to traffic during these holiday periods, from 12:00 noon on the last working day proceeding the holiday until 9:00 a.m. on the first working day subsequent to the holiday unless approved by the Engineer.

Memorial Day
Independence Day
Labor Day
Thanksgiving
Christmas
New Year's Day

3.1.1 The contractor's working hours will be restricted for the Special Events as shown below. All lanes shall be scheduled to be open to traffic during these Special Events.

(Insert special event and time here)

3.2 The contractor shall not perform any construction operation on the (*roadway, roadbed or 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 The contractor shall be aware that traffic volume data indicates construction operations on the roadbed between the following hours will likely result in traffic queues greater than 15 minutes. Based on this, the contractor's operations will be restricted accordingly unless it can be successfully demonstrated the operations can be performed without a 15 minute queue in traffic. It shall be the responsibility of the engineer to determine if the above work hours may be

modified. Working hours for evenings, weekends and holidays will be determined by the engineer.

Route I-44 Eastbound:

6:00 a.m. - 9:00 a.m. Monday through Friday

9:00 a.m. - 1:00 p.m. Saturday

Route I-44 Westbound:

3:00 p.m. - 6:00 p.m. Monday through Friday

5:00 p.m. - 9:00 p.m. Saturday

3.4 Any work requiring a reduction in the number of through lanes of traffic shall be completed during nighttime hours. Nighttime hours shall be considered to be ___:00 p.m. to ___:00 a.m. for this project.

3.5 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 **\$XXXX 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.

3.5.1 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.

4.0 Detours and Lane 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 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 Closures of the following ramps will be permitted to construct permanent pavement, temporary widening and temporary ramps:

A weekend closure of the I-270 SB to I-44 WB permanent ramp to allow for construction of the north end tie to I-270. Allowable closure hours are from **X:XX p.m. Friday through X:XX a.m. Monday.**

An overnight closure of the I-270 NB to I-44 WB ramp to allow for construction of the temporary I-270 NB to I-44 WB ramp. Allowable closure hours are from **X:XX p.m. through X:XX a.m.**

Overnight closures of the I-44 WB to Soccer Park loop ramp to allow for construction of the temporary I-44 WB to Soccer Park ramp in Stage 1A and Stage 3A and adjacent temporary widening. Allowable closure hours are from **X:XX p.m. through X:XX a.m.**

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 Standard Specifications Section 616.

D. PROJECT CONTACT FOR CONTRACTOR/BIDDER QUESTIONS (JSP-96-05)

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

Tom Montes-De-Oca, P.E.
Transportation Project Manager
Missouri Department of Transportation
St. Louis District
1590 Woodlake Drive
Chesterfield, MO 63017

Telephone Number (314) 453-5031
Email thomas.montes-de-oca@modot.mo.gov

2.0 Documentation of Bidder Questions. The contractor is encouraged to submit all questions in writing by email, fax, or letter. The contractor may call the project contact for general questions; however, the project contact may require any questions to be submitted and answered by email, fax, or letter for clarity and documentation purposes. Contractors should refrain from contacting anyone other than the project contact for questions concerning this project.

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

E. EMERGENCY PROVISIONS AND INCIDENT MANAGEMENT (JSP-90-11)

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

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

Missouri Highway Patrol (800)-222-6400		
<u>City of Sunset Hills</u> Police: (314) 849-4400	<u>City of Fenton</u> Fire: (636) 343-4188 Police: (636) 349-8120	<u>City of Kirkwood</u> Fire: (314) 822-5858 Police: (314) 822-5883
Transportation Management Center (TMC) Hours of Operation: 24/7/365 Dispatch (314) 275-1500 Nextel Direct Connect 140*2*14100		

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

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

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

F. LAW ENFORCEMENT IN THE WORK ZONE (JSP-15-03)

1.0 Description. This project has been selected for use of law enforcement personnel in the work zone to help control traffic and promote safety.

2.0 Traffic Control Plan and Preconstruction Conference. The contractor shall present any variations planned to the Traffic Control Plan to the engineer prior to the preconstruction conference. Law enforcement agency representatives may be present at the preconstruction conference. The preconstruction conference will include discussion about the proposed strategy for use of law enforcement in the work zone. Based upon input from the law enforcement agency personnel, the engineer and the contractor, a strategy will be developed for best use of the law enforcement hours by spacing involvement at various times and durations throughout the life of the project.

3.0 Control of Work. The engineer will contact the law enforcement agency and make all arrangements to schedule this work. The contractor may make suggestions to the engineer for improving the strategy at any time. The engineer will contact the law enforcement agency with any approved changes.

3.1 The engineer will make the final decision on all aspects of law enforcement in the work zone.

4.0 Basis of Payment. The Commission will reimburse the law enforcement agency per terms of the agreement between the two agencies. The contractor will not be part of that agreement and will not be required to participate in the cost. No direct payment will be made to the contractor for any costs associated with this provision.

G. DIVISION 100 REVISIONS FOR COMPLEX PROJECTS (JSP-97-06)

Delete Sec 105.16.1 through Sec 105.16.2 of the Standard Specifications and substitute the following:

105.16 Controversies and Claims for Adjustment.

105.16.1 The provisions of this section apply to all controversies or claims, as defined, that arise out of or relate to the contracts of which this section or to which these Standard Specifications apply. The exception is DBE obligations of contracts and that program as described in the contract and in 7 CSR 10-8, in which a specific process is provided for certain matters that may be claims, controversies or issues for decision arising from or relating to award, performance and administration of those contracts. It is agreed as a condition of responsiveness of any bid tendered to Commission within the scope of 226.130--1(9),RSMo, that such issues will be adjusted and determined only under those prescribed procedures.

105.16.1.1 A controversy which relates to a cause for adjustment of time or compensation under the contract will be determined under the applicable provisions relating to that cause for adjustment and claims under this [Sec 105.16](#) including all notice and decision provisions and duty to supply records relating to the matter. Denomination of a claim as a controversy does not relieve either party of any and all duties relating to requests for adjustment of the contract. Controversies will be processed using the same process as a claim.

Delete Sec 108.4 through Sec 108.4.4 of the Standards Specifications and substitute the following:

108.4 Progress Schedules. The contractor shall submit a progress schedule to the engineer for review at least seven days prior to the pre-construction conference. The progress schedule shall be used to establish the construction operations and to monitor the progress of the work although the engineer's determination of the then major operation or controlling item of work shall always prevail. The progress schedule shall be in the form specified in [Sec. 108.4.1](#), unless the contract contains a different requirement. The progress schedule shall be based on the number of working days, calendar days or other increments as set forth in the contract that the contractor expects to require in completing the project recognizing the capabilities of labor, equipment, arrangements for material, mobilization, shop drawing preparation and approvals, and other relevant items.

108.4.1 Form and Contents of Progress Schedule. The progress schedule shall contain an activities schedule chart and written narrative which shall break down into detail the time in working days, calendar days or completion date involved in performing all construction activities for the duration of the project, and shall be in a suitable scale as to indicate the percentage of work scheduled for completion at any time.

108.4.1.1 The activities schedule chart shall contain:

(a) A bar chart chronologically sequenced and to time scale showing the order, identity and duration of all construction prosecution and preparation activities and the planned starting date of each activity.

(b) The durations represented by a bar shall note periods of planned non-work which exceed three consecutive calendar days and work planned during periods of normal seasonal shutdown or when certain activities are prevented by other provisions of the contract.

108.4.1.2 The written narrative shall contain:

(a) A description of activities so that work can be measured by working days, calendar days or completion date schedule, and activity dependencies are identified.

(b) A description of each activity identifying the item and location of the work

(c) A description of the activities schedule chart indicating planned work days per week, days allowed for weather, holidays, number of shifts per day, number of worker hours per shift and major items of equipment to be used to perform each activity.

108.4.1.3 The activities schedule chart and written narrative shall also clearly outline the intended maintenance of traffic, work phasing provided by the contract and such other information as required by the contract or as deemed appropriate by the engineer.

108.4.2 Preparation of Initial Schedule . The contractor shall complete development of the initial activities schedule chart and written narrative and present a copy of each to the engineer at least seven days prior to the pre-construction conference.

108.4.2.1 The construction time, as indicated by the activities schedule chart and written narrative, for the entire project or any milestone, shall not exceed the specified contract time.

If any milestone date or contract completion date is exceeded in the schedule, time estimates on the activities schedule chart must be revised. Following a review of the initial activities schedule chart and written narrative by the engineer, the engineer and contractor shall meet for a joint review, correction and adjustment of the schedule if required.

108.4.2.2 If necessary this process will be repeated. However, the schedule must be finalized by the contractor within seven days after request for correction and adjustment to the schedule.

108.4.3 Intent and Cost of Progress Schedules . The review by the engineer of any progress schedule does not constitute a determination that it is reasonable, that following it will result in timely completion, or that deviation will result in a delayed completion. The progress schedule and any updates provided are not a part of the contract. If the schedule reflects a completion date different than specified in the contract, that does not void the date or working days

specified in the contract. If any schedule reflects a completion time earlier than that specified in the contract, the contractor specifically understands that no claim for additional contract time or compensation will lie against the Commission if the work is not completed by the earlier time shown on the schedule. It is the contractor's responsibility to determine the most feasible order of work consistent with the requirements of the contract.

108.4.3.1 No direct payment will be made for furnishing progress schedules or revisions.

108.4.3.2 If the contractor fails to comply with the requirement to supply an initial or any revised progress schedule or if the engineer determines the original or any revised progress schedule does not provide the information required, the engineer may withhold progress payments until a schedule complying with this section has been submitted and reviewed.

108.4.4 Revised Progress Schedules. The contractor shall provide a revised progress schedule, which shall then become the current progress schedule:

- (a) When requested by the engineer or required by the contract.
- (b) When departure from the existing progress schedule makes it apparent that the project will not be completed in the time provided in the contract.
- (c) When the contractor determines that the progress schedule requires revision for any reason.

H. ALTERNATES FOR PAVEMENTS (JSP-96-04G)

1.0 Description. This work shall consist of a pavement composed of either portland cement concrete or asphaltic concrete, constructed on a prepared subgrade in accordance with the standard specifications and in conformity with the lines, grades, thickness and typical cross sections shown on the plans or established by the engineer.

1.1 Separate pay items, descriptions and quantities are included in the itemized proposal for each of the alternates. The bidder shall only bid one of the alternates and leave the contract unit price column blank for any pay item listed for any other alternate. If the bidder leaves any value in the unit price column for another alternate other than the one they are bidding, the bid will be rejected.

2.0 Mainline Pavements

2.0.1 A sum of \$_____ (*amount to be inserted by Central Office*) will be added by the Commission to the total bid using an asphalt alternate for the pavement for bid comparison purposes to factor in life cycle cost analysis of the roadway. The additional amount added will not represent any additional payment to be made to the successful bidder and is used only for determining the low bid.

2.1 A2 Shoulders

2.1.1 A sum of \$_____ (*amount to be inserted by Central Office*) will be added by the Commission to the total bid using an asphalt A2 Shoulder alternate for pavement for bid comparison purposes to factor in life cycle cost analysis of the roadway. The additional amount

added will not represent any additional payment to be made to the successful bidder and is used only for determining the low bid.

2.2 The quantities shown for each alternate reflect the total square yards of pavement surface designated for alternate pavement types as computed and shown on the plans. No additional payment will be made for asphaltic concrete mix quantities to construct the required 1:1 slope along the edge of the pavement, or for tack applied between lifts of asphalt.

2.3 The grading shown on the plans was designed for the thinner pavement alternate

2.4 Pavement alternates composed of Portland cement concrete shall have contrast pavements for intermittent markings (skips), dotted lines, and solid intersection lane lines. The pavement markings shall comply with Sec 620. No additional payment will be for the contrast pavement markings.

3.0 Method of Measurement. The quantities of concrete pavement will be measured in accordance with Sec 502.14. The quantities of asphaltic concrete pavement will be measured in accordance with Sec 403.22.

4.0 Basis of Payment. The accepted quantity of the chosen alternate and other associated items will be paid for at the unit price for each of the appropriate pay items included in the contract.

4.1 For projects with previously graded roadbeds, any additional quantities required to bring the roadway subgrade to the proper elevation will be considered completely covered by the pay item for Subgrading and Shouldering.

4.2 For projects with grading in the contract, there will be no adjustment of the earthwork quantities due to adjusting the roadway subgrade for alternate pavements.

I. DISPOSITION OF EXISTING SIGNAL/LIGHTING AND NETWORK EQUIPMENT (JSP-15-05A)

1.0 Description. All controllers, poles, cabinets, cabinet equipment, network equipment, Microwave Detectors, CCTV Cameras, antennas, radios, modems, and other equipment noted in the plans shall be removed by the contractor and delivered to a location determined by MoDOT. Location for delivered material can be arranged with MoDOT's Signal Shop Supervisor:

James Collier
Office: (314) 565-6751
James.Collier@modot.mo.gov

2.0 Signal Equipment and Poles. All equipment other than network communication devices noted in 3.0 are to be transported to the address listed above. The contractor shall notify the Commission's representative 24 hours prior to each delivery by calling the phone number listed above and ask for the field traffic supervisor. Pole foundations shall be removed and shall not be salvaged.

3.0 Network Communication Devices. Devices such as CCTV cameras and domes, video encoders, microwave detectors, device servers, Ethernet switches, media converters, and radio assemblies are to be transported to the address listed below. The contractor shall notify the Commission's representative 24 hours prior to each delivery by calling phone number listed below and providing details for the delivery.

Commission's TMC
14301 S. Outer Forty Rd.
Chesterfield, MO 63017
314-275-1500

4.0 The contractor shall exercise reasonable care in the handling of the equipment during the removal and transportation. Should any of the equipment be damaged by the contractor's negligence, it shall be replaced at the contractor's expense. The contractor shall dispose of any other equipment. Delivery shall be within 2 working days of removal. All items returned shall be tagged with the date removed, project number and location/intersection.

5.0 Basis of Payment. Payment for removal, handling and transportation of all equipment specified shall be considered completely covered by the contract unit price for 202-20.10, Removal of Improvements, per lump sum.

J. DISPOSITION OF EXISTING SIGNING (JSP-12-01A)

1.0 Description. The existing sheet and/or extruded aluminum sign panels to be removed by the contractor shall be delivered to the Missouri Department of Transportation's District Sign Shop located on Barrett Station Road in west St. Louis County. The contractor shall assist with the storage of these signs as directed by the engineer.

1.1 Any hardware (brackets, u-bolts, aluminum I-beams, etc) associated with removals involving overhead sign supports shall also be salvaged and delivered to the Sign Shop.

1.2 The contractor shall notify the sign shop at least 24 hours in advance of delivering any signing and fencing materials to this maintenance lot. Contact information is below:

James (Dusty) Henson, Signing / Striping Supervisor
Office: (314) 205-7313, Cell: (618) 340-5666

1.3 All sign supports, footings and other signing equipment to be removed shall become the property of the contractor and disposed of off the right of way.

1.4 The contractor shall exercise reasonable care in the handling of the signs. Should any sign be damaged due to the contractor's negligence during removal, transportation and/or reinstallation, it shall be replaced in kind at the contractor's expense. The engineer shall have the final determination on whether the said signs should be replaced or repaired.

2.0 Basis of Payment. All costs incurred for complying with this provision shall be considered completely covered by the contract unit price for Item 202-20.10, Removal of Improvements, Lump sum. No direct payment will be made for attaching existing signs onto existing or new posts as indicated in the plans.

K. LIQUIDATED DAMAGES FOR WINTER MONTHS (JSP-04-17)

1.0 Description. Revise Sec 108.8.1.3 (a) and (b) and substitute the following for the project:

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

L. LIQUIDATED DAMAGES SPECIFIED (JSP-93-28)

1.0 Description. If (description of work) _____ is not complete and open to traffic prior to _____ (date), 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 delay, with its resulting cost to the traveling public. 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 \$ _____ per day for each full day that (description of work) _____ is not complete and 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 excess closure time.

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

M. NOTICE TO BIDDERS OF THIRD PARTY CONCURRENCE IN AWARD (JSP-98-19)

1.0 Bidders are advised that Commission is party to a contract Great Rivers Greenway which provides that Great Rivers Greenway shall provide substantial funds for construction of Job No. _____ by reason of which Great Rivers Greenway has the right to concur or not concur in Commission's award of a contract for this job.

2.0 Bidders acknowledge that their bids are made with knowledge of and subject to the condition of Great Rivers Greenway concurrence in and prior authorization of any award of a contract for this job by Commission.

3.0 Bidders agree that they shall be estopped, both in law and equity, to assert any right to award of a contract for this job by Commission should Great Rivers Greenway not concur in that award for any reason.

N. SECTION 404 NATIONWIDE PERMIT SPECIAL CONDITIONS (JSP-97-05)

1.0 Special Conditions. The following additional special conditions prescribed by the Corps of Engineers District Engineer must be followed in order for authorization by the Nationwide Permit(s) to be valid:

<List special conditions here>

O. STORMWATER COMPLIANCE REQUIREMENTS (JSP-15-04A)

1.0 Description. The Contractor shall comply with the terms of the United States of America v. Missouri Highways and Transportation Commission Consent Decree (Consent Decree) that are identified as the responsibility of the Contractor or subcontractor, and with the terms of this provision. Viewing of the Consent Decree is available on the MoDOT Land Disturbance webpage under Contractor Resources, or by going to the web address www.modot.org/LD.

1.1 Applicability. The Consent Decree and this provision apply to any project that includes land disturbance of areas totaling greater than one (1) acre on the project site. The project site consists of all areas designated on the plans, including temporary and permanent easements. The Consent Decree and this provision do not apply to Contractor staging, plant, or borrow areas that are not located on MoDOT right of way (Off-site). The Contractor is responsible for obtaining its own separate land disturbance permit for Off-site areas. This provision is in addition to any other stormwater, environmental, and land disturbance requirements specified elsewhere in the contract.

2.0 Stormwater Training for Contractor Employees. The Contractor's on-site project manager, designated Water Pollution Control Manager (WPCM), as defined in Section 3.0, and WPCM delegate, shall complete MoDOT Stormwater Training prior to serving in those roles. If someone other than the Contractor's project manager is given the authority to manage the grading or erosion control operations, the project manager(s) for those operations shall also complete MoDOT Stormwater Training. MoDOT Stormwater Training is also required for any other person who the Contractor gives authority to take measures to prevent or minimize the consequences of non-compliance with the Stormwater requirements, as defined in Section 3.1(a) of this provision.

2.1 The Commission will provide MoDOT Stormwater Training to the Contractor employees specified in Section 2.0 at a location and time determined by MoDOT. There will be no fee for attending the training; however, the Contractor shall be responsible for all other cost related to the training, such as travel expenses, if necessary, and wages for its employees. The time to complete the training is anticipated to be no more than 6 hours. As long as the Consent Decree is in effect, MoDOT will provide periodic trainings at various locations around the state, as needed, to ensure contractors and bidders have the opportunity to maintain the number of WPCMs they need to comply with this provision.

2.2 Those who require MoDOT Stormwater Training per Section 2.0 shall complete the training prior to beginning any land disturbance work. Thereafter, training shall occur at least once every two (2) years. The training is not project-specific. Any Contractor employee who receives the training will be qualified to perform the WPCM duties on any MoDOT project for a period of two (2) years.

2.3 MoDOT will document the names and dates that contractor employees attend MoDOT Stormwater Training and will retain those records for the period of time specified in the Consent Decree. Duplicate record keeping by the contractor is not required.

3.0 Water Pollution Control Manager (WPCM). Prior to the Pre-Activity meeting for Grading/Land Disturbance, the Contractor shall designate a Water Pollution Control Manager (WPCM) to fulfill the duties and responsibilities listed in Section 3.1 until final stabilization occurs. The Contractor's on-site project manager may also serve as the WPCM or that role may be assigned

to another manager employed by the contractor or a subcontractor. The Contractor shall also maintain a WPCM delegate to temporarily fulfill the WPCM duties in the absence of the primary WPCM (e.g. illness, vacation, other leave).

3.1 Duties of the WPCM:

- (a) Be familiar with Stormwater Requirements including the National Pollutant Discharge Elimination System (NPDES), the current MoDOT State Operating Permit for construction stormwater discharges/ land disturbance activities, the Project-specific Stormwater Pollution Prevention Plan (Project SWPPP), the Corps of Engineers Section 404 Permit, when applicable, the Consent Decree, and this provision. The Project SWPPP includes: a title page with project-specific information, the general SWPPP posted on the MoDOT land disturbance website, the Project Erosion & Sediment Control Plan, all applicable special provisions, and all applicable specifications and standard drawings;
- (b) Complete the stormwater training set forth in Section 2.0;
- (c) Attend the Pre-Activity for Grading/ Land Disturbance Meeting or, if hired after the meeting has occurred, be familiar with the conference decisions;
- (d) Review and sign the Project-specific SWPPP and all updates thereto within time periods set out in the Consent Decree;
- (e) Visit and review the project site for compliance with Stormwater Requirements at least once per week from the start of any grading operations until final stabilization is achieved and permit is closed;
- (f) Be authorized by the Contractor to supervise all work performed by the Contractor and subcontractors that involves compliance with Stormwater Requirements, including the authority to order work be stopped on a Project, implement MoDOT-directed changes in work related to Stormwater Requirements, and order the taking of, measures to cease, correct, prevent, or minimize the consequences of non-compliance with Stormwater Requirements;
- (g) Review and certify electronically each MoDOT inspection report for the Project within three (3) days of receiving each report to ensure it conforms with report requirements in the National Pollution Discharge Elimination System Stormwater (NPDES SW) Permit, Project SWPPP and the Consent Decree and ensure that all Stormwater Deficiencies noted on the report are corrected within the time required;
- (h) Recommend in writing within three (3) days of discovering any changes in site conditions and Best Management Practices (BMPs) that require an update to the Project-specific SWPPP; and
- (i) Be the point of contact relating to Stormwater Requirements and the Consent Decree between the Contractor, Subcontractors and MoDOT.

4.0 Pre-Activity Meeting for Grading/Land Disturbance and Required Hold Point. At each Project, a Pre-Activity Meeting for Grading/Land Disturbance shall be held prior to the start of any land disturbance and shall include a physical visit and review of the project site. 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.

4.1 Contractor employees who shall attend the Pre-Activity Meeting for Grading/Land Disturbance include the WPCM for the Project and the person(s) designated the authority to manage the grading and erosion control operations.

4.2 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.

5.0 Compliance with the NPDES SW Permit and Project SWPPP. On all projects, the Contractor shall comply with all applicable Stormwater Requirements which are defined as, but are not limited to:

- (a) Consulting with the engineer on recommended design revisions to the Project SWPPP to accommodate the Contractor's staging plan, implementation, managing, and maintaining BMPs or other control measures to prevent or minimize sediment and other pollutants in stormwater runoff in accordance with contract specifications or any relevant manufacturer specifications and good engineering practices, including but not limited to the manuals (*Note: two manuals cited in the MoDOT permit are "Developing your stormwater pollution prevention plan: A guide for construction activities" and "Protecting Water Quality: A Field Guide to erosion, sediment and stormwater best management practices for development sites in Missouri"*) and any other applicable standards for sedimentation basins, stabilization, rock dams, brush checks, construction entrances, and other BMPs;
- (b) Installing all BMPs at the locations and relative times specified in the Project SWPPP; and
- (c) Complying with the Missouri Water Quality Standards and with effluent limitations in Section E.1 of the NPDES SW Permit. Measurement of effluent is not required except as specified in E.2.

5.1 Stormwater Deficiency Corrections. Per terms of the Consent Decree, Stormwater Deficiencies identified on the MoDOT Land Disturbance Inspection Report shall be corrected within 7 days of the inspection date to avoid stipulated penalties, except that more time might be 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.

6.0 Inspection Protocol. The Contractor and all subcontractors shall review and adhere to MoDOT’s written Stormwater Inspection Protocol, found on the MoDOT Land Disturbance webpage (www.modot.org/LD). The Inspection Protocol is applicable to all Projects under the consent decree. The MoDOT Resident Engineer will serve the role of Stormwater Resident Engineer, or a delegate will be named in their absence.

6.1 Inspection Reports. MoDOT will provide one or more Environmental Construction Inspectors (ECI) to perform the weekly and post run-off inspections and other duties described in paragraph 17 of the Consent Decree. The ECI will enter the inspection reports into a web-based Stormwater Compliance database. The WPCM will have access to this database to view all report information, including any noted deficiencies, and to certify the report as required in Section 3.1 (g.). Automated email reminders of pending reports that need to be certified and for deficiencies that need to be corrected will be sent to the WPCM. The Contractor may designate other employees or subcontractor employees to have viewing access to this database and to receive the email reminders. Completion of MoDOT Stormwater Training is necessary in order to receive the email reminders. The WPCM and other users shall be equipped with an electronic device (desktop computer, laptop, tablet, smartphone, etc.) with a browser and internet access to connect to the database. The contractor shall be responsible for providing the electronic devices.

7.0 Stipulated Penalties. If the Contractor fails to comply fully and timely with the requirements of the Consent Decree, stipulated penalties will be assessed to the Commission. For matters under the Contractor’s responsibility and control the following stipulated penalties will be assessed to the Contractor and MoDOT will withhold payment pursuant to the following:

Violation	Stipulated Penalty Amount
Failure to Designate or Maintain WPCM at each Project in Accordance with Section 3.0.	\$750 for the initial violation (each person not designated) and then \$750 for each fourteen (14) day period that person is not designated.
Failure to complete MoDOT Stormwater Training by an Individual Required to be Trained in Accordance with Section 2.0, such as the WPCM or Project Manager.	\$750 per person for each missed training. This \$750.00 per person violation shall continue to accrue for each fourteen (14) day period that the person fails to timely receive the applicable training
Failure of WPCM to Review and Certify an Inspection Report in Accordance with Inspection Protocol as set forth in Section 6.	\$250 per inspection report not reviewed or signed.
Failure to Comply with Any NPDES SW Permit or SWPPP Requirement.	\$1000 per violation for the first ten (10) days of the violation; \$2500 per violation for days 11-20; \$3500 per violation for days 21 and beyond.
Failure to Correct a Stormwater Deficiency Identified in a MoDOT Inspection Report, or Otherwise Discovered by the WPCM, within the Time Required by the NPDES SW Permit or SWPPP.	\$1000 per deficiency for the first ten (10) days after correction was required; \$2500 per deficiency for days 11-20 after correction was required; \$3500 per deficiency for days 21 and beyond after correction was required.

8.0 Information Collection and Retention. The EPA, its representatives and its agents shall have the right of entry into any facility covered by this Consent Decree, at all reasonable times, upon presentation of credential, to:

- (a) monitor the progress of activities required under the Consent Decree;
- (b) verify any data or information submitted to the United States in accordance with the terms of the Consent Decree;
- (c) obtain samples and, upon request, splits of any samples taken by MoDOT or its representatives, contractors, or consultants;
- (d) obtain documentary evidence, including photographs and similar data; and
- (e) assess MoDOT's compliance with the Consent Decree.

8.1 Until three (3) years after the termination of the Consent Decree, Contractors and the agents of the Contractors shall preserve all non-identical copies of all documents, records, or other information (including documents, records, or other information in electronic form) in its or its Contractors' or agents' possession or control, or that come into the Contractor's or agent's possession or control, and that relate to MoDOT's performance of its obligations under the Consent Decree or to the Contractor's performance of its obligations under the Consent Decree. This information-retention requirement shall apply regardless of any contrary corporate or institutional policies or procedures.

9.0 Basis of Payment. Payment for compliance with this provision will be made per week. All cost associated with the weekly on-site project reviews by the WPCM, compliance with this provision and the Consent Decree, including all other duties of the WPCM and delegate, and all expenses to attend training, will be considered fully covered under 806-99.28, Water Pollution Control Manager. Separate payment will be made for erosion and sediment control devices, and for permanent and temporary seeding and mulching, when payment for those items are provided elsewhere in the contract.

9.1 Method of Measurement. Measurement of the number of full weeks (7 days) will begin on the date of the first MoDOT Inspection Report following initial land disturbance and will continue until the engineer declares final stabilization has been achieved, except that no measurement will be made for any period of time past the contract completion date, or adjusted completion date, when liquidated damages are being assessed for failure of the Contractor to complete the work on time.

P. 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:

<u>Utility Name</u>	<u>Known Required Adjustment</u>	<u>Type</u>
Ameren Missouri Russell Robertson 9823 Mackenzie Road St. Louis, MO 63123 Telephone: 314-992-9712 Email: rrobertson2@ameren.com	None	Power
AT&T Distribution Terry Rogers 402 N 3rd Street Telephone: 636-949-1330 Cell: 636.448.4621 Email: tr5397@att.com	None	Communications
Charter Communications Mark Marrow 101 Northwest Plaza Dr. St Ann, MO 63074 Telephone: 636-667-6298 Email: mark.morrow@charter.com	None	Communications
AT&T Transmission Lenny Vohs 1425 Oak Street Kansas City, MO 64106 Telephone: 816-275-4014 Email: lv2121@att.com	None	Communications
Laclede Gas Company Brian Langenbacher 4118 Shrewsbury Ave. Shrewsbury, MO 63119 Telephone: 314-768-7767 Email: brian.langenbacher@thelacledegroup.com	None	Gas
City of Kirkwood Water Tim Rajchart Water Department Director 212 S. Taylor Ave. Kirkwood, MO 63122-4327 Telephone: (314) 822-5846 Email: rajchatd@kirkwoodmo.org	None	Water

Lightcore/Centurylink Mr. Jason Johns 16141 Swingley Ridge Road, Suite 200 Chesterfield, MO 63017 Telephone: 916-296-8520 Email: Jason.Johns@CenturyLink.com	YES	Communications
City of Kirkwood Electric Rick McKinley 212 S. Taylor Ave. Kirkwood, MO 63122 Telephone: 314-984-5925 Email: mckinlrj@kirkwoodmo.org	None	Electric
Missouri American Water Company Dave Pruitt 727 Craig Road St. Louis, MO 63141 Telephone: 314-996-2396 Cell: 314-574-3601 Email: Dave.Pruitt@amwater.com	None	Water
Level 3 Communications Ben Baker 1015 Locust St. Suite 300 St Louis, Mo. 63101 Cell: 618-304-3868 Office: 314-242-5608 Email: Ben.Baker@Level3.com	None	Communications

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.

Q. DBE PROGRAM REQUIREMENTS (NJSP-15-41A)

1.0 Description: Insert the following additional program provisions in the Disadvantaged Business Enterprise (DBE) Program Requirements of the General Provisions and Supplemental Specifications to Missouri Standard Specifications for Highway Construction.

13.6 Factors Used to Determine if a DBE Regular Dealer of Liquid Asphalt is Performing a CUF. The DBE must be responsible with respect to materials and supplies used on a contract perform all of the following, pursuant to 49 CFR § 26.55(c)(1) and 7 CSR 10-8.131:

- (a) Negotiating price.
- (b) Determining quality and quantity.
- (c) Ordering the material.
- (d) Paying for the material itself.
- (e) 30% of the work must be performed by the DBE's permanent employees (which does not include owner-operators or leased employees) or those hired by the DBE firm for the project from an independent source other than the prime contractor, such as a union hall. For at least 30% of the work the DBE's owned (not leased) equipment shall be used and the DBE must provide documentation that this owned equipment was used on the project as required by this provision.
- (f) For up to 70% of the remaining work the equipment used by the DBE must be by long term lease (at least one year) with another DBE or non-DBE but not the prime contractor. The DBE must have absolute priority over other businesses or entities to use the long term leased equipment and must display the name and identification number of the DBE.
- (g) The Contractor shall require DBE subcontractors to provide documentation in one of the following formats: bills of lading, hauling tickets, shippers manifest, and/or paid invoices. Regardless of the document format, the document(s) shall include the following information: name of the carrier, full name of the driver, driver ID number(s), truck and tanker ID or VIN number, and reflect the contract number, job number, county and route.

The contract number, job number, county and route can be reported through a consignee number or lift number, as long as the DBE Subcontractor has provided the consignee number, or lift number, along with project specific information which shall include contract number, job number, county and route.

The documentation must be submitted and generated by the DBE Subcontractor and be printed on letterhead or other similar documentation outlining the contact information for the DBE Subcontractor. In addition the documentation shall indicate the quantity and amount invoiced to the prime contractor (Such as an invoice). **“MoDOT's DBE Contractor/Subcontractor Project Trucker and Equipment List”** (Form 1) will be provided by MoDOT and shall be completed and submitted to MoDOT by the DBE Subcontractor or Liquid Asphalt Supplier before Asphalt Operations begin. The DBE Subcontractor shall report all trucks and tankers they currently own and all full time drivers that they employ, including all of the drivers numbers for each terminal the drivers pick up from. In addition the DBE Subcontractor shall include a list of “long term” leased equipment, along with drivers and drivers' numbers to the DBE Subcontractor Project Trucker and Equipment List. The DBE Subcontractor shall attach copies of all current long term lease agreements to the DBE Subcontractor Project Trucker and Equipment List.

- (h) DBE Trucking/Hauling regulations do not apply to regular dealers of liquid asphalt.

13.7 When a DBE Regular Dealer of Liquid Asphalt is Not Eligible for DBE Credit.

(a) "If its role is limited to that of an extra participant in a transaction, contract or project through which funds are passed in order to obtain the appearance of DBE participation." 49 CFR § 26.55(c)(2)

(b) If the type of transaction does not allow the DBE subcontractor to perform one of the four required functions, such as a prime contractor deciding the price of a commodity to be supplied by the DBE, that transaction is not eligible for DBE credit.

(c) Work that is performed with trucks that are not owned nor under a lease of at least one year by the DBE will not be eligible for DBE credit.

(d) A lack of documentation verifying that at least one DBE owned (not leased) tractor and tanker/ trailer was used to haul liquid asphalt on the project will result in no DBE credit given on that project.

13.8 This form will be completed by the inspector from the project office during the time of the project. MoDOT will use the *MoDOT DBE Job-Site Review CUF Determination Form* to verify CUF was performed on the project, a copy of which is available on the MoDOT Contractor Resource website.

R. 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).

S. QUALITY MANAGEMENT (NJSP-15-22)

1.0 Quality Management. The contractor shall provide Quality Management as specified herein to ensure the project work and materials meets or exceeds all contract requirements.

1.1 The contractor shall provide Quality Control (QC) of the work and material, as specified herein, to ensure all work and material is in compliance with contract requirements. QC staff shall perform and document all inspection and testing. The QC inspectors and testers may be employed by the contractor, sub-contractor, or a qualified professional service provided by the contractor.

1.2 The engineer will provide Quality Assurance (QA) inspection. The role of QA is to verify the performance of QC and provide confidence that the product will satisfy given requirements for quality.

1.3 The contractor shall designate a person to serve as the project Quality Manager (QM). The QM shall be knowledgeable of standard testing and inspection procedures for highway and bridge construction, including a thorough understanding of the Missouri Standard Specifications. The QM shall be responsible for the implementation and execution of the Quality Management Plan and shall oversee all QC responsibilities, including all sub-contract work. The QM shall be the primary point of contact for all quality related issues and responsibilities, and shall ensure qualified QC technicians and inspectors are assigned to all work activities. The QM should be separate from the manager of the work activities to effectively manage a QC program.

1.4 Any QC personnel determined in sole discretion of the engineer to be incompetent, derelict in their duties, or dishonest, shall at a minimum be removed from the project. Further investigation will follow with a stop work notification to be issued until the contractor submits a corrective action report that meets the approval of the engineer.

2.0 Quality Management Plan. The contractor shall develop, implement and maintain a Quality Management Plan (QMP) that will ensure the project quality meets or exceeds all contract requirements, and provides a record for acceptance of the work and material. A sample QMP, which shows minimum requirements, is provided on the MoDOT website at: www.modot.org/quality.

2.1 The QMP shall address all QC inspection and testing requirements of the work as described herein. A draft QMP shall be submitted to the Resident Engineer for review at least two weeks prior to the pre-construction conference. An approved QMP is required at least two weeks prior to the start of work, unless otherwise allowed by the engineer. Physical work on the project shall not begin prior to approval of the QMP by the engineer.

2.2 The approved QMP shall be considered a contract document and any revisions to the QMP will require approval from the engineer.

2.3 The following items shall be included in the Quality Management Plan:

- a) Organizational structure of the contractor's project management, production staff, and QC staff, specific to this project.
- b) Name, qualifications and job duties of the Quality Manager.
- c) A list of all certified QC testers who will perform QC duties on the project, including sub-contract work, and the tests in which they are certified.
- d) A list of all QC inspectors who will perform QC inspection duties on the project, including sub-contract work, and the areas of inspection that they will be assigned.
- e) A procedure for verifying documentation is accurate and complete as outlined in Section 3.
- f) A procedure describing QC Inspections as outlined in Section 4.
- g) A procedure describing QC Testing, as outlined in Section 5, including a job specific Inspection and Test Plan (ITP).
- h) A procedure describing Material Receiving as outlined in Section 6.
- i) A list of Hold Points that are not included in the checklist forms, as outlined in Section 8.
- j) A procedure for documenting and resolving Non-Conforming work as outlined in Section 9.
- k) A procedure for tracking and documenting revisions to the QMP.

- l) A list of any approved changes to the Standard Specifications or ITP, including a reference to the corresponding change order.
- m) Format for the Weekly Schedule and Work Plans as outlined in Section 10, including a list of activities that will require pre-activity meetings.

3.0 Project Documentation. The contractor shall establish a Document Control Procedure for producing and uploading the required Quality Management documents to a MoDOT-provided server. The document management software used by MoDOT is Microsoft SharePoint®. Contractors do not need to purchase Microsoft SharePoint®, however, it is recommended that new users acquire some basic training to better understand how to use this software. MoDOT does not provide the software training, but there are several online vendors who do. Contractors are required to use Microsoft Excel® and Microsoft Word® with some documents.

3.1 The contractor shall utilize the file structure and file naming convention provided by MoDOT. A sample file structure is available on the MoDOT website.

3.2 Documents (standard forms, reports, and checklists) referenced throughout this provision are considered the minimum documentation required. They shall be obtained from MoDOT at the following web address: www.modot.org/quality. The documents provided by MoDOT are required to be used in the original format, unless otherwise approved by the engineer. Any alteration to these forms shall be approved by the engineer.

3.3 Timely submittal of the required documents to the MoDOT document storage location is essential to ensure payment can be processed for the completed work. Submittal of the documents is required within 12 hours of the work shift that the work was performed, or on a document-specific schedule approved by the engineer and included in the QMP.

3.4 The contractor shall establish a verification procedure that ensures all required documents are submitted to the engineer within the specified time, and prior to the end of each pay period for the work that was completed during that period. Payment will not be made for work that does not include all required documents. Minimum documents that might be required prior to payment include: Test Reports, Inspection Checklists, Materials Receiving Reports, and Daily Inspection Reports.

3.5 The contractor shall perform an audit at project closeout to ensure the final collection of documents is accurate and complete.

4.0 Quality Control Inspections. The QMP shall identify a procedure for performing QC inspections. QC inspections shall be performed for all project activities to ensure the work is in compliance with the contract, plans and specifications.

4.1 The QM shall identify the QC inspectors assigned to each work activity. The QC inspectors shall inspect the work to ensure the work is completed in accordance with the plans and specifications, and shall document the inspection by completing the required inspection checklists, forms, and reports provided by MoDOT. Depending on the type of work, the checklists may be necessary daily, or they may follow a progressive work process. The frequency of each checklist shall be stated in the QMP. The contractor may propose alternate versions of checklists that are more specific to the work.

4.2 A Daily Inspection Report (DIR) is required to document pertinent activity on the project each day. This report shall include a detailed diary that describes the work performed as well as observations made by the inspection staff regarding quality control. The report shall include other items such as weather conditions, location of work, installed quantities, tests performed, and a list of all subcontractors that performed work on that date. The report shall include the full name of the responsible person who filled out the report and shall be digitally signed by an authorized contractor representative.

4.3 External fabrication of materials does not require further QC inspection if the product is currently under MoDOT inspection or an approved QC/QA program. QC inspection and testing required in the production of concrete for the project shall be the responsibility of the contractor.

4.4 The contractor shall measure, and document on the DIR, the quantity for all items of work that require measurement. Any calculations necessary to support the measurement shall be included with the documentation. The engineer will verify the measurements prior to final payment.

5.0 Quality Control Testing. The QMP shall identify a procedure for QC testing. The contractor shall perform testing of the work at the frequency specified in the Inspection and Test Plan (ITP).

5.1 MoDOT will provide a standard ITP and the contractor shall modify it to include only the items of work in the contract, including adding any Job Special Provision items. The standard ITP is available on the MoDOT website at www.modot.org/quality. The contractor shall not change the specifications, testing procedures, or the testing frequencies, from the standard ITP without approval by the engineer and issuance of a change order.

5.2 Test results shall be recorded on the standard test reports provided by the engineer, or in a format approved by the engineer. Any test data shall be immediately provided to the engineer upon request at any time, including prior to the submission of the test report.

5.3 The contractor shall ensure that all personnel who perform sampling and/or testing are certified by the MoDOT Technician Certification Program or a certification program that has been approved by MoDOT for the sampling and testing they perform.

5.4 If necessary, an independent third party will be used to resolve any significant discrepancies between QC and QA test results. All dispute resolution testing shall be performed by a laboratory that is accredited in the AASHTO Accreditation Program in the area of the test performed. The contractor shall be responsible for the cost to employ the third party laboratory if the third party test verifies that the QA test was accurate. The Commission shall be responsible for the cost if the third party test verifies that the QC test was accurate.

6.0 Material Receiving. The QMP shall identify a procedure for performing material receiving. Standard material receiving forms will be provided by the engineer.

6.1 The procedure shall address inspections for all material delivered to the site (excluding testable material such as concrete, asphalt, aggregate, etc.) for general condition of the material at the time it is delivered. The material receiving procedure shall record markings and accompanying documentation indicating the material is MoDOT accepted material (MoDOT-OK Stamp, PAL tags, material certifications, etc.).

6.2 All required material documentation must be present at the time of delivery. If the material is not MoDOT accepted, the contractor shall notify the engineer immediately and shall not incorporate the material into the work.

7.0 Quality Assurance. The engineer will perform Quality Assurance inspection and testing (QA) to verify the performance of QC inspection and testing. The frequency of the QA testing will be as shown in the ITP, but may be more frequent at the discretion of the engineer. The engineer will record the results of the QA testing and inspection and will inform the contractor of any known discrepancies.

7.1 QA is responsible for verifying the accuracy of the final quantity of all pay items in the contract. This includes taking measurements on items that require measurement and other items that are found to have appreciable errors.

7.2 QA inspection and test results shall not be used as a substitute for QC inspection and testing.

7.3 QA will be available for Hold Point inspections at the times planned in the Weekly Schedule. The inspections may be re-scheduled as needed, but a minimum 24-hour advance notification from the contractor is required unless otherwise approved by the engineer.

8.0 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 the succeeding work depends on a QA review of the preceding work before work can continue.

8.1 A list of minimum Hold Points will be provided by the engineer and shall be included in the QMP. The engineer may make changes to the Hold Point list at any time.

8.2 Prior to all Hold Point inspections, QC shall provide the engineer with the Daily Inspection Reports, Inspection Checklists, Test Reports, and Material Receiving Reports for the work performed leading up to the Hold Point. 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.

9.0 Non-Conformance Reporting. Non-conformance reports shall be issued by the contractor for work that does not meet the contract requirements. Non-conforming work includes work, testing, materials and processes that do not meet contract requirements. The contractor shall establish a procedure for identifying and resolving non-conforming work as well as tracking the status of the reports.

9.1 Contractor QC staff or production staff should identify non-conforming work and document the details on the Non-Conformance Report form provided by MoDOT. QA staff may also initiate a non-conformance report.

9.2 In-progress work that does not meet the contract requirements may not require a non-conformance report if production staff is aware of the issue and corrects the problem during production. QC or QA may issue a non-conformance report for in-progress work when documentation of the deficiency is considered beneficial to the project record.

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

9.4 For recurring non-conformance work of the same or similar nature, a written Corrective Action Request will be issued by QC or QA. The contractor shall then establish a procedure for tracking the corrective action from issuance of the request to implementation of the solution. Approval from the engineer is required prior to implementation of the proposed corrective action. The contractor shall notify the engineer after the approved corrective action has been implemented.

10.0 Work Planning and Scheduling. The contractor shall include Quality Management in all aspects of the work planning and scheduling. This shall include providing a Weekly Schedule, a Work Plan for each work activity, and holding pre-activity meetings for each new activity.

10.1 A Weekly Schedule shall be provided to the engineer each week that outlines the planned project activities for the following two-week period. This schedule shall include all planned work, identification of all new activities, traffic control events, and requested Hold Point inspections for the period. Planned quantity of materials, along with delivery dates should also be included in the schedule.

10.2 A Work Plan shall be submitted to the engineer at least one week prior to the pre-activity meeting. The Work Plan shall include the following: a safety plan, list of materials to be used, work sequence, defined responsibilities for QC testing and inspection personnel, and stages of work that will require Hold Point inspections.

10.3 A pre-activity meeting is required prior to the start of each new activity. The purpose of this meeting is to discuss details of the Work Plan and schedule, including all safety precautions. Those present at the meeting shall include: the production supervisor for the activity, the Quality Manager, QC inspection and testing staff, and QA. The Quality Manager will review the defined responsibilities for QC testing and inspection personnel and will address any quality issues with the production staff. Attendees may join the meeting in person or by phone or video conference.

11.0 Basis of Payment. Payment for all costs associated with developing, implementing and maintaining the Quality Management Plan, providing Quality Control inspection and testing, and all other costs associated with this provision, will be considered included in the unit price of each contract item. No direct pay will be made for this provision.

T. RESTRICTIONS FOR MIGRATORY BIRDS

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

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

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

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

3.0 Avoidance Measures. The contractor shall not disturb active nests or destroy adults, eggs or young. 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 Water Tanks 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 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 water hauling equipment has not previously contained waters from streams, lakes, or ponds. If the water hauling equipment has previously contained waters from other streams or lakes, the following measures must be implemented prior to use.

3.2.1.1 Tank Washing. Prior to the use or re-use of water hauling equipment following any use with water from streams, lakes or ponds, all equipment shall be washed and rinsed thoroughly with hard spray (power wash) or HOT (104° F) water, e.g. at a truck wash facility.

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

3.2.1.2.1 The equipment shall be dried thoroughly, 5-7 days, in the sun before using in or transporting between streams, lakes, and ponds.

3.2.1.2.2 All interior tank surfaces shall be treated with 140° F water for a minimum of 10 seconds contact on all surfaces.

3.2.3.2.3 All interior tank surfaces shall be treated with a 10% bleach solution to kill any aquatic nuisance species. When chlorine treatment is used, all chlorine runoff from equipment washing must be collected and properly treated and/or disposed of.

3.2.3 Prior to use of a water holding tank, contractors shall provide the MoDOT inspector written documentation of the tank'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 that 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 nests. At a minimum, work shall not be performed within 10 feet of an active nest; however, the contractor is responsible for ensuring that 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 MoDOT Environmental (573-526-4778) to determine if there are other allowable options.

U. MERAMEC RIVER SENSITIVE STREAM CLOSURE DATES

1.0 Description. The project area on the Meramec River has designated seasonal restrictions for activities due to spawning restrictions under Nationwide Permit Regional Condition 2. Because of this designation and possible presence of sensitive species, the contractor shall not conduct any work activities that disturbs the area below ordinary high water, including placing or removing a temporary or permanent fill, or debris between the dates of March 15 and June 15.

V. RESTORING RIVER CONDITIONS

1.0 Description. This project may require the use of temporary fill for construction access. The USACE requires that the river be restored to pre-construction conditions after project completion.

1.1 In addition to following MoDOT Standard Specification 806.100, the contractor shall conduct pre-construction and post-construction topographic mapping in order to ensure that the river bottom is restored to pre-construction conditions after temporary fill removal. The need for conducting pre-construction mapping is contingent on whether MoDOT has current survey data available.

2.0 Basis of Payment. No direct pay shall be provided for any labor, equipment, time, or materials necessary to complete this work.

W. BRIDGE WORK IN NAVIGABLE WATERS

1.0 Description. The construction of a bridge over the navigable waters of the Meramec River has been authorized through a permit issued by the U.S. Coast Guard. This permit has been reproduced and attached to the Contract Documents. The Contractor shall assume all obligations and comply with all requirements and provisions of this permit as it applies to this contract.

The Contractor's particular attention is invited to the various requirements established by the Corps of Engineers, the U.S. Coast Guard and others relative to construction work in and over a navigable stream which are applicable to this contract and which may not be covered by the above permit. Such matters of approval include, but are not necessarily limited to dredging, construction schedules, plans for cofferdams, temporary causeways, work bridges, erection equipment, falsework bents, anchorage of barges and construction equipment, temporary restriction of channel, lighting during construction, removal of temporary construction, and/or other temporary structures that will be placed in the water to facilitate the construction of the bridge. All construction operations in or over the river shall conform to the requirements or directions of the U.S. Army Corps of Engineers, U.S. Coast Guard and/or other authority having jurisdiction. All work in navigable waters shall be so conducted that free navigation of the waterway will not be unreasonably interfered with and that the existing navigable depths will not be impaired. The Contractor shall communicate with the appropriate agency or agencies and procure, at its own expense, all required permits. Copies of all permits, authorizations, directions or orders issued to the Contractor by the Corps of Engineers, Coast Guard, or other constituted authority during the progress of the work shall be filed with the Engineer for information and record.

The Contractor shall notify the U.S. Coast Guard no less than 30 days in advance of commencement of work in the river so that navigation interests may be notified of the presence of construction equipment and the Contractor also shall notify the same authority of any events that may affect navigation and when work in the river is complete. The Contractor shall keep the Engineer and the U.S. Coast Guard continually informed in writing of the progress of the work which affects navigation so that temporary navigation lights can be prescribed on remaining obstructions.

Should the Contractor, during the progress of work lose, throw overboard, sink or misplace any material, machinery, plant, or appliance which in the opinion of the Engineer may be dangerous or destructive to navigation, the Contractor shall immediately recover and remove the same with dispatch. The Contractor shall give immediate notice, with the description and location of such obstruction to the Engineer, Corps of Engineers and U.S. Coast Guard; and when required, the Contractor shall mark or buoy such obstructions until the same are removed.

Temporary navigation lights and other navigation signals or facilities that may be required by governmental authority on all temporary construction or vessels and on all partially or wholly finished permanent construction, shall be provided and maintained in accordance with the requirements of the U.S. Coast Guard District, 1222 Spruce Street, St. Louis, Missouri 63103. The Contractor shall submit to the Engineer and the U.S. Coast Guard for approval, prior to commencement of the work within the waterway, such information and documents as are customarily required by the said authority. Temporary lights, signals or facilities when so ordered, shall be provided and maintained throughout the life of the contract.

All costs incurred by the Contractor in complying with the above requirements shall be considered as included in and completely covered by the unit prices bid for the various items of work in this contract.

2.0 Method of Measurement. No direct measurement will be made.

3.0 Basis of Payment. No separate payment will be made for compliance with this Special Provision. All costs incurred by the Contractor in complying with the above requirements shall be considered as incidental to other items of work in this contract.

X. POTENTIAL CONSTRUCTION DELAYS DUE TO HIGH WATERS

1.0 Description. The project date will be extended on day for each day the Contractor is unable to progress critical path items of the work when the Meramec River stage as measured on the **Yarnell Creek at Fenton, MO** Gauge is at or above Elevation **400.0** or for any delays that critical path items of the work cannot be performed due to a navigation closure of the river by the U.S. Coast Guard. These river delays will be non-compensable. The Contractor's CPM schedule, current at the time of the high water event will be used for the purpose of identifying critical path activities.

Y. RIVER TRAFFIC DELAYS

1.0 Description. The Contractor and surety shall indemnify and save harmless the State and Commission from any liability arising from unplanned channel closures that result from the contractor's negligence and cause river traffic delays in excess of time permitted including reimbursing said State and/or Commission for any fines levied by the U.S. Coast Guard or any other regulatory authority.

Z. RECYCLED CONCRETE MATERIAL

1.0 Description. The contractor shall have the option of using concrete rubble from the removed portions of the existing bridge and concrete roadway pavement in lieu of the Type 2 Rock Ditch Liner and/or Type 2 Rock Blanket. This work shall be in accordance with Sec 609.60 & 611.30 and shall conform to the plan dimensions for Type 2 Rock Ditch Liner & Type 2 Rock Blanket. All concrete pieces shall be free of exposed rebar. Any bridge deck or concrete roadway pavement rubble determined by the engineer to be excess shall become the property of the contractor. Placement and specifications shall be as approved by the engineer.

2.0 Basis of Payment. Payment for this work will be made based on the plan quantities for furnishing and placing Type 2 Rock Ditch Liner and/or Type 2 Rock Blanket. No direct payment will be made to the contractor to recover the cost of equipment, labor, material or time required to crush concrete deck rubble or pavement to a size that satisfies Sec 609.60 & 611.30

AA. INLAID PAVEMENT MARKERS

1.0 Description. This work shall consist of furnishing and installing inlaid pavement markers as shown on the plans or as directed by the engineer. An inlaid pavement marker shall consist of a retroreflective pavement marker installed below the pavement surface. The marker shall be attached to the pavement with epoxy. In addition to cutting a location for the marker, a tapered

slot shall be grooved in to the pavement both before and after the marker to all for visibility of the marker and drainage.

2.0 Material. All material shall be in accordance with the following.

2.1 Marker. The marker shall have one or two retroreflective lenses, as shown on the plans, to reflect incident light from a single direction or from opposite directions. The lens shall be hermetically sealed and permanently bonded to the marker base. The manufacturer's identification shall be molded in the face of the marker lens or on the marker body so as to be visible after installation. The reflector color shall be as shown on the plans.

2.1.1 The marker shall have nominal dimensions of 2.0 x 4.0 x 0.5 inches. The reflective surface of each lens shall be a minimum of 1.55 square inches in area.

2.1.2 In addition to the requirements described, the marker shall have completed testing through National Transportation Product evaluation Program (NTPEP). A written request for qualification shall be sent by the manufacturer to Construction and Materials with the following information:

- (a) Brand name of the product.
- (b) A copy of the actual test results from NTPEP.
- (c) Certification that the material meets this specification and is intended for use as described.
- (d) Specific installation instructions.

2.1.3 The marker shall receive at a minimum an average rating of 3.0 for lens and visibility after one year of exposure on both concrete and asphalt test decks.

2.2 Epoxy Adhesive. The epoxy adhesive used to bond the marker to the pavement shall be in accordance with the manufacturer's recommendation.

3.0 Construction Requirements.

3.1 Reflector placement. The marker shall be placed such that the top of the marker body is 1/8 inch, plus or minus 1/16 inch below the pavement surface. A cradle may be used to hold the marker. If a cradle is used, it shall be made of plastic and the net weight of the cradle and marker shall be less than 5 ounces.

3.2 Tapered groove. There shall be a tapered groove cut both in advance and behind the marker using diamond tip blades. The tapered groove shall vary in depth from even with the pavement surface and uniformly increasing in depth to a maximum depth of 5/16 inch plus or minus 1/16 inch in advance of the marker. The same tapered groove shall be cut on the back side of the marker. The length of the tapered groove shall be 3.5 feet where a single marker is used. The length of the tapered groove shall be 3 feet when double markers are used in the same location. The width of the groove shall be 5 inches or per manufacturer's specifications.

3.3 Where a single inlaid marker is used, the overall length of the groove cut in the pavement surface shall be 7 feet with the reflector centered in the middle, 3.5 feet from either end. Where

a double inlaid marker is used, the overall length of the groove cut in the pavement surface shall be 9 feet, with markers placed 3 feet from either end and spaced 3 feet apart. The groove depth between markers in a dual system shall be 5/16 inch plus or minus 1/16 inch.

3.4 Installation. The groove and the bottom surface of the marker shall be free of scale, dirt, rust, oil, grease or any other contaminant that might reduce bonding to the epoxy adhesive.

3.4.1 The epoxy adhesive used to install the marker shall be machine mixed and applied unless otherwise approved by the engineer. The machine mixer and applicator shall be capable of accurately and uniformly proportioning the components. The mixing chamber shall produce an epoxy adhesive of uniform color with no visible evidence of streaks on the surface or within the mixed epoxy adhesive.

3.4.2 No markers shall be installed when the ambient temperature is below 50 F (10 C), the relative humidity is above 80 percent or when the pavement surface is wet.

3.4.3 Newly placed bituminous pavement surfaces shall be allowed to cure for a minimum of seven days prior to installing reflectors.

3.4.4 A longitudinal adjustment to the location of a marker shall be made in order to avoid damage to deteriorated pavement or transverse joints. In locations where concrete and bituminous surfaces abut, markers shall be installed in the concrete surface.

3.4.5 The pavement shall be accurately cut to the marker manufacturer's specifications. The depth of the groove where the marker is to be placed shall be in accordance with manufacturer's specifications.

3.4.6 If necessary, installation grooves on crowned pavements, superelevated pavements or ramps shall be cut as needed to provide proper marker fit.

3.4.7 When the roadway is opened to traffic during non-working hours, the contractor shall not cut more grooves than the number of markers that can be installed in the same day.

3.4.8 The groove shall be clean and dry prior to application of the epoxy adhesive.

3.4.9 There shall be no epoxy adhesive on the marker.

3.4.10 When hand mixing of epoxy adhesive is permitted, no more than one quart (L) of epoxy adhesive shall be mixed at one time. The marker shall be installed within five minutes after mixing operations are started.

3.4.11 The installed marker shall be protected from traffic until the epoxy adhesive has hardened. If, after the manufacturer's recommended cure time, the epoxy adhesive can be penetrated by a screwdriver or other pointed instrument, the marker shall be removed, cleaned and reinstalled.

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. When required, measurement of inlaid pavement markers will be measured per each. The revision or correction will be computed and added to or deducted from the contract quantity.

5.0 Basis of Payment. The accepted quantity of inlaid pavement markers will be completely covered by pay item 620-99.02 included in the contract, with no specific payment will be made for these markets. The cost for grooving and epoxy is also completely covered by pay item 620-99.02.

BB. CONCRETE CURB TYPE E (MODIFIED)

1.0 Description. This work shall consist of furnishing and installing Concrete Curb Type E (Modified) as shown on the plans as required by Section 609.10 of the Missouri Standard Specifications for Highway Construction.

2.0 Basis of Payment. All labor, equipment and material costs to complete the described work shall be completely covered by item numbers:

<u>Item No.</u>	<u>Item Description</u>	<u>Unit</u>
609-99.03	Concrete Curb Type E (Modified)	LF

CC. HIGH MAST TOWER LIGHTING

1.0 Description.

1.1 The work shall consist of furnishing and installing high mast lighting units complete, in place, including the pole, luminaire ring, lowering device, electrical equipment, anchor bolt assemblies, foundation, luminaires and all other fittings, fixture and attachments, all in accordance with the details shown on the plans, the applicable sections of [Sec 901](#), AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and as hereinafter specified.

1.2 The complete high mast tower system, may be manufactured and furnished by a single manufacturer or by not more than three manufacturers. Warrantees shall be extended to the department on the tower, the raising-lowering device, and the fixtures and lamps. Fixtures shall have 2 year and ballasts 5 year warrantees by the manufacturers. Warrantees shall not begin until the total high mast tower system has been accepted.

1.3 Tower heights and locations shall be as shown in the contract documents. Each tower shall have a mechanical lowering device except for a common raising-lowering drill, fittings and controls. If the contractor, suppliers or vendors wish to modify the location or height of the tower, no compensation will be made for those modifications, except as approved by the engineer. A geotechnical report is available. All cost for obtaining additional geological data, foundation studies and preparation of the foundation design, to be sealed and signed by a registered engineer, shall be the responsibility of the contractor. All modifications including modification to poles fixtures and other appliances will be subject to approval of the engineer.

1.4 The complete lighting unit shall be designed to withstand all loads which the units will be subjected to in the field, including the loads applied by material to be attached to the pole together with a minimum wind pressure resulting from a sustained wind velocity of 90 mph (145 km/h). Pole deflection resulting from this wind velocity shall not exceed 9 percent of the pole height measured from the vertical plane of the centerline of the pole shaft. The entire pole, including anchor bolts and anchor bolt embedment shall be designed in accordance with current

AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals with latest Interims. Group I, II, III and IV load combinations shall be used. The basic wind speed shall be 90 mph (145 km/h) with 50-year design life. The structure shall be designed as Fatigue Category I for vortex shedding and natural wind gusts. Any of the manufacturer's calculated base reactions that exceed the design values used with the drilled shafts, as shown on the plans, will required redesigned of the drilled shafts prior to drill shaft construction.

2.0 Poles and anchorages.

2.1 After assembly, the tower height shall equal the length of the pole shaft which shall be measured from the bottom of the pole base plate to the pole top. Pole shafts and base plates shall be constructed of steel in accordance with the requirements of ASTM A 572 or A 595. The pole and base plate shall have a minimum yield strength of 50 ksi (345 MPa). After the pole is fabricated, the pole shall be galvanized in accordance with AASHTO M 111 (ASTM A 123).

2.2 Anchor bolt quantity, diameter and embedment length shall be designed in accordance with current AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals with latest Interims. Group I, II, III and IV load combinations shall be used. The engineering calculations shall be signed and sealed by a Missouri registered professional engineer and furnished by the tower manufacturer. Towers heights over 100 feet (30.5 m) shall have a minimum of eight anchor bolts to attach the pole to its foundation. Anchor bolts shall be in accordance with AASHTO M 314 Grade 55 (380) with Supplementary Requirement S1. Nuts and washers for anchor bolts shall be in accordance with AASHTO M 314. The bolts shall have rolled threading for 12 inches (305 mm) on each end. The anchor bolts, nuts and washers shall be fully hot-dipped galvanized in accordance with AASHTO ASTM A 153.

2.3 The anchor bolt circle diameter shall be a minimum of 21 inch (530 mm) smaller than the diameter of the drilled shafts shown on the plans in order to fit into the drilled shaft foundations.

2.4 The contractor shall submit four sets of welding procedures prepared as a written procedure specification, shop drawings and engineering stress calculations for the poles and anchorages signed and sealed by a registered professional engineer to the engineer for approval prior to ordering the poles and anchor bolts from the manufacturer.

3.0 Lowering Devices.

3.1 The fixed head assembly shall incorporate no moving parts except for the necessary pulleys, rollers, sheaves and Iris arms which guide the lowering cables and electrical cable during the lowering operation of the assembly. The fixed head assembly shall be stainless or zinc coated steel and the luminaire lowering ring shall be galvanized steel in accordance with the requirements of AASHTO M 111 (ASTM A 123) with the specified number of 2 inch (51 mm) normal diameter galvanized steel pipe mounting arms.

3.2 The rollers that guide the power cable shall be mounted in a sheave composed of Ultra High Molecular Weight Polyethylene rollers 3 inch (76 mm) in diameter, vertical side plates shall be made of cold-rolled steel and zinc-electroplated per ASTM A 164 and yellow chromate dipped to a smooth surface. Multiple rollers shall be located on a radius on both ends of the assembly to support the power cord in at least a 7 inch (178 mm) bending radius. A keeper bar shall be positioned at both ends of the assembly to keep the cord in the track during pole erection and during normal operation.

3.3 During the unlatching sequence, latch barrels shall allow the operator to transfer the load while being a safe 20 feet (6.1 m) away from the base of the pole. Winch cable and hoist cables shall not independently rotate.

3.4 All required pulley rollers or sheaves and associated bearings, bushings and shafts shall be constructed of high corrosion resistant materials equal to Type C 1018 and yellow chromate zinc plated. All pulleys and rollers attached to the head assembly shall have permanently lubricated bearings or bushings.

3.5 All miscellaneous fittings, fasteners and hardware shall be fabricated from high corrosion resistant material.

3.6 The entire luminaire ring assembly shall be raised and lowered on three 3/16 inch (4.8 mm) 302 stainless steel in accordance with MIL-W83420B, Type 1, Composition B Suspension cables located inside the pole shaft and extending through the head frame, and attached to the luminaire lowering ring. The inside of the lowering ring shall have an approved shock absorbing roller mechanism to keep ring concentric with respect to the tower and allow operation in 30 mph (48 km/h) maximum wind speed. The ring hoisting cables shall be continuous from the luminaire ring to the transitioning assembly. A single cable shall run from the transition assembly to the winch drum. When the ring is in the lowered position, the single cable shall be long enough to have three complete turns around the winch drum. Stainless steel winch cable shall be "worked" by hand to remove all "reel lay" prior to being strung in a pole and shall be 19 x 7 anti-torquing stainless steel type. Safety grippers shall secure the transition assembly to the base of the pole while in the static load position. The lowering device, complete with luminaires and associated electrical and mechanical parts, shall be capable of being lowered to not more than 4 feet (1.2 m) above ground level for servicing.

3.7 Secondary lightning arresters, rated at 650 volts, as manufactured by Joslyn, McGraw Edison, General Electric, or approved equal, shall be installed from each phase conductor to ground. The arresters shall be attached in or on the luminaire lowering device in a location accessible for inspection and servicing when the device is lowered.

3.8 A 2-pole, 30 amp, molded case circuit breaker box shall be attached to the breaker box mounting bracket welded to the inside of the pole as shown on the plans. These circuit breakers shall provide a means for the power source to be disconnect from the luminaire ring power cable.

4.0 Power Cord.

4.1 The power cord shall be 600 volt #10 AWG three conductor, stranded, extra-flexible copper conductor type SO cord with chlorosulfonated polyethylene jacket or other approved. The cable shall maintain flexibility in ambient temperatures as low as -20° F (-29° C). The cable furnished shall be in accordance with all applicable sections of the latest edition of the National Electrical Code.

4.2 As a minimum, stainless steel Kellems cord grips with 12 inch (305 mm) mesh sleeves shall secure power cord to the luminaire mounting ring and the transition assembly. A rubber covered heavy duty type "SO" cable, rated at 600 volts, with appropriate electrical connections shall be provided for connecting between the circuit breaker box receptacle and the "lowered" luminaire

ring for testing the system at ground level. The "patch" cord shall be at least 20 feet (6.1 m) in length.

5.0 High Mast Luminaires.

5.1 Luminaires shall be high pressure sodium of the specified wattage with integral ballast of the magnetic regulator or auto regulator (ATR) type suitable for operation on the specified voltage and be designed for -40° F (-40° C) startup. Luminaires shall provide asymmetrical light pattern and semi cutoff classification as per RP-8.

5.2 All luminaries shall have a housing die cast or drawn from a non-ferrous copper free alloy and shall be free of cracks and excessive porosity. All nuts, screws, clips, washers and attaching hardware shall be fabricated from high corrosion resistant alloys. The housing shall house the ballast components, terminal block, bracket entry and lamp support or retainer for horizontal or vertical mounted bulbs.

6.0 Construction Requirements.

6.1 Poles and Anchorages.

6.1.1 Pole shafts shall have a constant taper from the base to the top, except an expanded lower section at the base is permitted if required to accommodate the mechanical and electrical equipment in the pole base. The poles shall be constructed in sections using single thickness steel plate. Pole sections shall be telescoped such that the splice is equal in strength and rigidity to the remainder of the pole shaft without detracting from the overall appearance of the pole. Telescoping shaft sections shall overlap a minimum of 1-1/2 times the outside diameter of the larger section at each joint. Pole shaft sections to be telescoped together shall be the sole responsibility of the contractor to insure straightness of the pole and accuracy of the mating surfaces and shall be match marked for accurate field assembly.

6.1.2 All welding shall be done by welders certified in accordance with the AWS code. All welding of the pole shaft or its attachments shall be performed in accordance with the current edition of AWS D1.1, Structural Welding Code - Steel and applicable portions of [Sec 1080](#) and the following:

6.1.3 Complete shop drawings and engineering calculations signed and sealed by a Missouri registered professional engineer shall be furnished in accordance with [Sec 1080](#).

6.1.4 All welding within the slip joint area shall be full penetration. Longitudinal seam welds shall be full penetration within 6 inches (150 mm) of circumferential welds at the base plate and at least 6 inches (150 mm) beyond required section overlap at slip joints. Circumferential welds at the base plate and all full penetration longitudinal welds shall be inspected by ultrasonic or radiographic methods. A random 25 percent of remaining longitudinal seam welds shall be inspected by magnetic particle testing (if partial penetration), ultrasonic or radiographic methods. The fabricator shall be certified under the AISC certification program as a minimum to the Simple Steel Bridge or Component Fabricator. The engineer shall be notified 4 working days in advance of radiographic testing so an inspector may be present to interpret and approve the testing and the welds.

6.1.5 All joints shall be sealed with an exterior 100 percent silicone caulk.

6.1.6 Poles may be round or hexdecagonal.

6.1.7 Anchor bolt size, number and configuration shall be such to develop the full strength of the pole shaft and connection to the pole base plate. Anchor bolt embedment shall be capable of developing the yield strength of the anchor bolt. Complete engineering calculations signed and sealed by a Missouri registered professional engineer shall be furnished by the tower manufacturer. Ring templates shall be used to maintain spacing and alignment of the anchor bolts during construction of the shaft. The anchor bolt ring templates shall be attached to the anchor bolts using one set of leveling nuts and two sets of hold down nuts on the template above the shaft, and two sets of nuts on the embedded bottom template. The upper anchor bolt ring template is temporary. The upper anchor bolt ring template shall be removed prior to placing the pole with base plate on the leveling nuts. The length of threads on the top end of the anchor bolts shall be of sufficient length to allow not less than 1/4 the diameter of the bolt to extend through the upper hold down nut. Two top nuts, 2 washers, and one leveling nut shall be used per anchor bolt in the final assembly of the pole to foundation.

6.1.8 High mast poles shall be installed at the locations shown on the plans. After erection of each pole with all fixtures and components attached, the straightness and plumb of the pole shall be checked and the plumb of the pole shall not vary from the vertical by more than the maximum diameter of the pole through the entire length of the pole.

6.1.9 After erection and alignment of the pole, the space between the foundation and the bottom of the base plate shall be filled with grout in accordance with [Sec 1066](#) for Mortar with Grout. At this time, 3-one inch (25 mm) PVC conduit drains equally spaced around the circumference of the base, shall be installed. The ends of these one inch (25 mm) conduits shall be fitted with 1/8 inch (3 mm) mesh screen or any other method approved by the engineer, to keep foreign objects from entering the pole base while providing ventilation for inside the high mast pole.

6.1.10 Anchor bolts, nuts, washers, and templates are to be furnished by the high mast pole manufacturer.

6.1.11 A reinforced handhole access opening, having a minimum size of 13 x 24 inch (330 x 610 mm), shall be provided in the base of the pole shaft to allow servicing and maintenance. Corners of the opening and door may be rounded. A gasket door with fasteners shall be supplied to secure this opening, capable of being locked with a padlock to be furnished by the engineer. The access opening shall be placed on the side of the pole as shown on the plan view of each pole orientation sketch.

6.2 Lowering Devices.

6.2.1 Each pole shall be furnished with a mechanical lowering assembly operated by cables and an anti-reversing, speed reducer winch system that will permit servicing of the luminaires and associated electrical and mechanical apparatus from the ground.

6.2.2 All parts of the head assembly shall be protected with covers, screens, shields, etc., as necessary, to prevent entrance of dirt, moisture, ice accumulation, nesting of insect or birds or other contaminants which may be harmful to the operation of the lowering device. The head assembly shall be oriented as shown on the plan view to describe the location of each pole.

6.2.3 The luminaire ring shall be equipped with the specified number of 2 inch (51 mm) slipfitters equally spaced around the luminaire ring. The slipfitters shall be of sufficient length so that the clearance between the properly mounted luminaires shall be 3-1/2 inches (89 mm) minimum.

6.2.4 A copperclad lightning rod shall be attached to the top of each pole and shall be firmly attached to the pole shaft or head assembly to provide good electrical bonding of the pole shaft.

6.2.5 Each high mast pole shaft shall be equipped with two grounding connections near the access door. Two- 3/4 inch x 10 foot (19 mm x 3.1 m) copperclad ground rods driven a minimum of 6 feet (1.8 m) deep, shall be installed at the locations shown on the plans near the underground cable entrance into each pole complete with approved connectors, and with AWG #1/0 (min) bare copper leads connected to the grounding lug in the pole shaft.

6.2.6 The head frame and support ring assembly shall be secured with a bottom latching device. The wire rope cables that are under constant loading shall be pre-stretched by loading to 60 percent of nominal breaking strength at the factory.

6.2.7 The inside of the lowering ring shall have an approved shock absorbing roller mechanism to keep it concentric with respect to the tower and allow operation in 30 mph (48 km/h) maximum wind speed.

6.2.8 In the raised position the luminaire mounting ring shall be securely positioned at the top of the pole to the mast head assembly and securely held against the mast head by compression springs. Compression springs which attach to the transition assembly or other means may also be considered by the engineer. The springs shall maintain a force equal to two times the design wind loading on the ring assembly.

6.2.9 Grippers shall secure the hoisting cable transition assembly to the base of the pole while the luminaire ring is in the raised position. The ultimate support of the ring shall not depend upon the winch assembly.

6.2.10 All mechanisms shall be designed to provide the operator with a positive means of ascertaining when the ring assembly is in the full raised position.

6.2.11 The luminaire ring shall serve as a wire raceway for all electrical connections to the lights. The luminaire ring shall be of adequate size and shape to accommodate the number of luminaires and wiring scheme as shown on the plans. The ring shall be balanced for the number and type of high mount luminaires used in the installation. Counter-weights shall be attached to the arms without luminaires to balance weight distribution on the entire ring.

6.2.12 The winch assembly for each high mast assembly shall consist of a single drum, at least 20 nominal wire rope diameter in size, AGMA rated winch assembly with sufficient reduction to prevent creep of the mounting ring when traveling in either direction. The use of sprockets and chains will not be accepted.

6.2.13 The winch assembly shall be driven by a drill motor, or other motor, equipped with a torque limiting safety clutch and a removable operator control unit on a minimum 20 foot (6.1 m) long line. Power for the motor shall be obtained from a receptacle inside the pole and a portable step-down transformer. The receptacle and matching plug on the drive motor input shall be a plastic or rubber enclosed, grounded twist lock device of the proper voltage and current rating. Two electric motors with mounting apparatus sets shall be provided under this contract. The

drive unit and complete lowering assembly shall be designed for the operator to raise the ring to the point the safety clutch begins to slip without damage to the mounting ring, the wire rope cables or the pole top assembly. This drive unit shall be designed to be attached to the pole and winch and ready for operating in less than 5 minutes.

6.2.14 The input or drive pulley shall be equipped with a double brakeshoe to serve as a safety brake when either the motor drive belt or the motor is removed. Raising or lowering speed of the luminaire ring shall be in the range of 12 to 15 feet (3.7 to 4.6 m) per minute.

6.2.15 The installation and operational checkout of the approved luminaire support assembly and lowering device shall be accomplished under the auspices of the manufacturer's authorized representative whose presence shall be arranged for by the contractor. The manufacturer's representative shall have at least 5 years experience in the manufacturing and installation of lowering devices. This requirement shall apply to not less than two tower systems. Correct operation of each raising and lowering device and all fixtures in the system shall be ensured by the contractor before final inspection is made by the engineer.

6.3 High Mast Luminaires.

6.3.1 The slipfitter shall securely clamp the luminaire to the bracket arm and shall permit a positive means of horizontal and vertical alignment of the luminaire in the field.

6.3.2 The optic assembly, if of the closed type, shall be provided with permanently resilient gaskets and so constructed that an effective seal against moisture and other contaminants will be maintained. Suitable screens shall be provided at the slipfitter opening to deter the nesting of insects.

6.3.3 Hinges and other fasteners shall be designed in such a manner as to permit easy removal of the lens assembly from the luminaire but shall provide a means of preventing an unintentional separation. Lens or fasteners shall provide a positive means of maintain closure of the luminaire and shall be of such design that a quick visual inspection can reveal whether or not the unit has been properly latched.

6.3.4 The reflector shall be weather resistant and shall have sufficient strength and rigidity to prevent distortion during routine installation and maintenance operations. Lenses shall be manufactured from high strength, heat and shock resistant tempered glass.

6.3.5 The lamp socket shall be rigidly attached to a high grade porcelain base which shall extend and completely enclose the metal shell. A locking means, or equivalent, shall be incorporated in the shell of the socket to resist the removal of the lamp and insure positive lamp contact.

6.3.6 The inner reflectors of the high pressure sodium luminaires shall have the capability of being rotated to control the asymmetrical light pattern of the individual luminaires. A detailed plan shall be submitted to the engineer by the contractor, prior to ordering from the supplier, including a layout of each high mast luminaire ring and the orientation angle of each luminaire. All luminaires will be checked by the engineer for proper orientation while the luminaire is at ground level.

7.0 Documentation.

7.1 Operations and Maintenance Manual.

7.1.1 The contractor shall furnish and deliver to the engineer upon completion of the project three copies of an operating and maintenance instructions manual for the high mast system. These instructions shall include, but not be limited to spare parts lists, lubrication charts, lubricating procedures and recommended maintenance schedules. All material included in the operation and maintenance manual shall be contained in one suitable hard cover, loose leaf type binder.

7.1.2 All material included shall be properly indexed and cross referenced with a table of contents at the beginning of the manual. The manual shall contain copies of all final approved shop drawings, working drawings and as-built contract plans. Brochures or copies of catalog pages shall be included which show the manufacturer's name and catalog numbers of electrical components and equipment part numbers. No direct payment will be made for furnishing the operation and maintenance manuals.

7.1.3 Requirements for shop drawings and design computations for stress analysis of the high mast poles are as described elsewhere in this special provision.

7.2 Photometric Data.

7.2.1 The lighting system has been designed using the distribution patterns for each high mast assembly as shown on the plans to provide an average maintained (light lost factor too be illumination of 0.7 for open high pressure sodium fixtures, 0.6 for enclosed fixtures) intensity of not less than 6 lux (0.6 footcandles) or more on the roadways including ramps with the point of least illumination not being less than 2 lux (0.2 footcandles) at the time of the lowest effective light output for the luminaires. The Average to minimum shall not exceed 3 to 1 and the maximum shall not exceed 10 to 1. Ballast factor shall be used if lamps are not powered at 100%.

7.2.2 If the contractor desires to alter the tower location or equipment, he shall submit to the engineer photometric data certifying that the required lighting levels will be provided before the lighting assemblies are installed. The photometric data shall consist of reproducible scaled drawings of one inch (25 mm) equal 100 feet (30 m) indicating the maintained lighting levels and listing all values used of lamp lumen ratings, lumen depreciation factors, dirt depreciation factors, coefficients of utilization, equipment factors and any other pertinent information as may be required by the engineer. All lux (footcandle) calculations to be generated from a computer lighting program with points on each driving lane every 50 feet (15.2 m) or less.

7.3 Testing. Testing of the high mast lighting system shall be in accordance with the applicable provisions [Sec 901](#).

8.0 Method of Measurement. Measurements of high mast lighting units, complete in place, except for luminaires will be made as a single unit and will include anchor bolt assemblies, high mast poles, head assembly, lowering device, Iris guide arm, power unit, luminaire ring, lighting cables power cable, reinforced concrete footing and all other necessary components.

9.0 Basis of Payment. The accepted high mast lighting units, complete in place, will be paid for at the unit price for each of the pay items included in the contract. No direct payment will be made for any incidental items necessary to complete the work unless specifically provided as a pay item in the contract.

DD. REMOVAL OF IMPROVEMENTS (SIGNING ITEMS)

1.0 Description. The contractor is advised that the Removal of Improvements list shown on the quantity sheets for signing items is not considered to be an all-inclusive list of items for the signing items of this project. The removal of each existing sign, footing, overhead truss and footing, asphalt and/or sidewalk, cat walks, electrical boxes, etc. is considered completely covered under the pay item Removal of Improvements.

The contractor is encouraged to visually inspect the site prior to submitting his bid and to prepare his bid based on what he observes as Removal of Improvement items. No adjustment shall be allowed for the items listed or not listed that are minor in nature or that obviously needs to be removed in order to construct the improvements provided for in this contractor including existing fence, signs, or guardrail.

2.0 Basis of Payment. This work shall be considered included in the contract unit price for Removal of Improvements.

EE. REMOVE AND RELOCATE EXISTING GROUND MOUNTED SIGNS

1.0 Description. This item provides for relocating and mounting existing signs of various sizes to new posts at locations shown on the plans.

2.0 Construction Requirements. The contractor shall install new sign support posts at the locations shown and then relocate and mount existing signs to the new posts. All work shall be in accordance with the construction requirements of Section 903.

3.0 Method of Measurement. Measurement shall be made per each for relocating and mounting existing signs to new posts. Measurement for any concrete footings, structural steel posts, pipe posts, perforated square steel tubes and anchor sleeves, and breakaway assemblies will be made in accordance with Section 903.

4.0 Basis of Payment. All costs incurred for relocating and mounting existing signs to new posts at the locations shown, complete in place, will be paid for at the contract unit price for bid item 903-99.02, Remove and Relocate Signs, per each. Payment for all other labor, equipment, material, and incidental items will be considered completely covered by the bid items included in the contract.

FF. PAINTING SIGN TRUSSES

1.0 General. This specification includes furnishing and applying an epoxy primer and urethane intermediate and finish coat painting system for sign trusses. This work shall include painting the column or columns with support these trusses.

1.1.1 Galvanized steel coating for steel sections shall be coated in accordance with ASTM A 123. Galvanized steel coatings for steel mounting hardware shall be coated in accordance with ASTM A 153. Aluminum components shall be fabricated from ASTM Alloy 6061-T6 and prepared for painting as specified in this specification provision.

1.1.2 The contractor shall have the option to proposed shop painting with field touch-up or field painting and touch-up in the required painting plan submittal (Section 1.4 of this provision). Painting plan shall contain contractor's reasons for proposed approach for field or shop painting and field touch-up to provide a high quality, durable paint system as specified in this provision.

1.1.3 During surface preparation, the contractor shall inspect the truss for structural defects, and shall be required to make minor repairs by either field welding or other mechanical repairs of the truss as approved by the engineer. The contractor is strongly encouraged to view each truss to be painted to determine for himself the extent of repairs that may be required. This shall include replacement of any existing defective hardware found on the truss required for sign support attachments.

1.1.4 If trusses are removed to be painted offsite, the contractor shall temporarily ground mount all signs required for driver information, including but not limited to advanced guide signs, exit guide signs, or other regulatory signs deemed necessary for the safety and information of the travelling public. The contractor shall note that space for ground mounted signs locations shall be approved by the engineer.

1.1.5 All painting operations over shoulders or traffic lanes shall require a shoulder closure or lane drop of the roadway below, and is further restricted to working hours as specified elsewhere in the roadway special provisions. This may require the movement of the existing signs on the truss in order to access all areas of the truss for surface preparation, prime and final coats. This may be accomplished by either temporarily ground mounting the existing signs, or moving the signs on the existing truss as needed. Ground mounting signs shall be as described in other roadway special provisions.

1.1.6 Duration of Temporary Removal. The contractor shall be required to re-install or temporarily ground mount guide signs within the same day as removal or as approved by the engineer.

1.1.7 All incidental/related work not specifically covered in this special provision shall comply with Sec 712.12, Sec 1045.1, Sec1045.6.5, and Sec 1045.7.5, and approved revisions at the time of project letting.

1.2 Reference Standards. The following reference standards shall govern the painting work:

1.2.1 American Society of Testing Materials (ASTM)

- (a) ASTM B 117 – “Standard Practice for Operating Salt Spray (Fog) Apparatus”
- (b) ASTM D 6386 – “Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting”.

1.2.2 Society for Protective Coatings (SSPC)

- (a) SP-1 Method – Solvent Cleaning Surface Preparation Specification
- (b) SP-2 Method – Hand Tool Cleaning Surface Preparation Specification
- (c) SP-3 Method – Power Tool Cleaning Surface Preparation Specification

1.3 Quality Assurance. The contractor shall have a minimum of 5 years' experience of successfully completing projects of similar scope and size for the painting work contained in this specification provision. In addition, the QC manager overseeing the painting work shall be a SSPC PCS, NACE Certified Coating Inspector.

1.3.1 The painting manufacturer shall have a minimum of 5 years' experience of successfully providing materials and completing projects of similar scope and size for the painting work contained in this specification provision.

1.3.2 The painting manufacturer shall be required to certify compliance for paint materials used and paint application work performed by the painting contractor covered by this special provision (Sec 1.4 of this provision).

1.3.3 Accepted mock-ups shall be the standard by which work in place will be evaluated for technical and aesthetic merit and shall be retained at a location specified by the Commission for the duration of painting work (Sec 1.4 of this provision). Engineer's approval of mock-ups shall be required prior to painting required sign trusses.

1.4 Submittals. The contractor shall provide manufacturer's product data information sheets listing product properties per this specification (reference tables in Sec 2.2 of this provision) and color charts of manufacturer's available standard colors. The color shall be a galvanized dull gray color to match the existing truss condition. Color shall be reviewed and approved by the engineer.

1.4.1 The contractor shall provide painted mock-ups utilizing 2 foot long sections and hardware pieces of actual job specific materials including poles, mounting brackets and hardware (bolts & nuts) for approval. The contractor shall utilize required preparation and application methods and quality of workmanship for mock-ups to produce the paint finish specified for sign trusses.

1.4.2 The contractor shall provide test results, certified by an independent testing laboratory, for epoxy primer and urethane painting system verifying compliance with specified requirements.

1.4.3 The contractor shall provide manufacturer's standard written product warranty and written certification that surface preparation and painting systems products were properly applied in accordance with manufacturer's specified requirements.

1.4.4 The contractor shall comply with approval requirements for manufacturer and brand name as required by Sec 1045 for all paint materials supplied. MoDOT shall also require sampling and testing of the material to assure it meets the requirements listed herein.

1.4.5 The contractor shall provide a detailed painting plan to the engineer for approval including, but not limited to, surface preparation methods, initial field and/or shop and field touch-up application instructions and methods, material product data and color samples as well as required mock-ups, and temporary sign ground mounting plans prior to beginning paint work.

1.4.6 Acceptance of the detailed painting plan by MoDOT does not require MoDOT to accept the final product. Final acceptance will be based on all coatings meeting all testing requirements outlined in this provision.

1.5 Delivery, Storage, and Handling. The contractor shall comply with painting materials manufacturer's recommendations. The contractor shall clearly label all paint containers with

product name, specification, lot number, and date of manufacturer, quantity of paint in container, information, and warnings as may be required by Federal and State Laws, as well as manufacturer's name and address.

2.0 Manufacturers and Materials.

2.1 Epoxy Primer and Urethane Paint Manufacturers. As listed or approved equal:

2.1.1 Painting System Manufacturers:

- (a) DuPont High Performance Coatings
 10th & Market Streets
 Wilmington, Delaware 19898
 1-800-572-1568
www.dupont.com

- (b) Rust-Oleum Corporation
 11 Hawthorn Parkway
 Vernon Hills, Illinois 60061
 1-847-367-7700
www.rustoleum.com

2.2 Epoxy Primer and Urethane Paints. Aesthetic paint finish or approved equal:

2.2.1 Product Systems and Characteristics:

- (a) DuPont System:
 - Prime Coat: Corlar 3.2 PR High Solids Epoxy Primer (grey) @ 4 to 5 mils dft.
 - Intermediate Coat: Imron 2.8 HG High Gloss Polyurethane (gray from manufacturer's standard colors) @ 2 to 3 mils dft.
 - Finish Coat: Imron 2.8 HG High Gloss Polyurethane (gray from manufacturer's standard colors) @ 2 to 3 mils dft.

Total DuPont finish coat system to provide a minimum of 8 and a maximum of 11 mils dry finish thickness.

- (b) Rust-Oleum High Performance Coatings or approved equal:
 - Primer Coat: Rust-Oleum 9100 High Performance Epoxy (w/ 9101 high-build, activator) @ 4 to 5 mils dft.
 - Intermediate Coat: Rust-Oleum 9800 System DTM Urethane Mastic (gray from manufacturer's standard colors) @ 3 to 4 mils dft.
 - Finish Coat: Rust-Oleum 9800 System DTM Urethane Mastic (gray from manufacturer's standard colors) @ 3 to 4 mils dft.

Total Rust-Oleum finish coat system to provide a minimum of 10 and a maximum of 13 mils dry finish thickness.

Required Properties Primer Coat (or approved equal)	Required Value
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Recoat Window @ 77°F/50% RH	16 hrs
Weight (mass) per gallon (Liter), Lbs (kg), min., - ASTM D 1457	11.8lb/gal
Solids, percent by weight (mass), min., ASTM D 1644 for 72 hours at 100°F (37.8°C), min.	73%
Pigment, percent by weight (mass), min., Federal Test Method 4021	42.2%
Viscosity, Krebs-Stormer, 77°F (25°C), KU	70-90 KU
Volatile Organic Content, max., lb/gal (g/L)	3.2 lbs/gal
Fineness of Grind, Hegeman Gage, min.	6-7
Sag Resistance, Leneta Anti-Sag Meter, mils (µm) wet, min.	12 mils
Pot Life at 70°F (21°C), hours, min.	2 hrs
Dry to Touch, hours, min. @ 77°F/50% RH	6 hrs
Dry to Handle, hours, min. @ 77°F/50% RH	16 hrs
Theoretical Spread Rate, sf/gal @ 1 dft(min)	866 sf/gal
Dry Finish Thickness (dft) min. to max., mils (µm)	4 to 5 mils dft

Required Properties Intermediate Coat (or approved equal)	Required Value
Recoat Window @ 77°F/50% RH	8 hrs
Weight (mass) per gallon (Liter), Lbs (kg), min., - ASTM D 1457	10 lb/gal
Solids, percent by weight (mass), min., ASTM D 1644 for 72 hours at 100°F (37.8°C), min.	72%
Pigment, percent by weight (mass), min., Federal Test Method 4021	27%
Viscosity, Krebs-Stormer, 77°F (25°C), KU	65-85 KU
Volatile Organic Content, max., lb/gal (g/L)	2.8 lbs/gal
Fineness of Grind, Hegeman Gage, min.	7-8
Sag Resistance, Leneta Anti-Sag Meter, mils (µm) wet, min.	7 mils
Pot Life at 70°F (21°C), hours, min.	1.5 hrs
Dry to Touch, hours, min. @ 77°F/50% RH	4 hrs
Dry to Handle, hours, min. @ 77°F/50% RH	36 hrs
Theoretical Spread Rate, sf/gal @ 1 dft(min)	962 sf/gal
Dry Finish Thickness (dft) min. to max., mils (µm)	2 to 4 mils dft

Required Properties Primer Coat (or approved equal)	Required Value
Recoat Window @ 77°F/50% RH	8 hrs
Weight (mass) per gallon (Liter), Lbs (kg), min., - ASTM D 1457	10 lb/gal
Solids, percent by weight (mass), min., ASTM D 1644 for 72 hours at 100°F (37.8°C), min.	72%
Pigment, percent by weight (mass), min., Federal Test Method 4021	27%
Viscosity, Krebs-Stormer, 77°F (25°C), KU	65-85 KU
Volatile Organic Content, max., lb/gal (g/L)	2.8 lbs/gal
Fineness of Grind, Hegeman Gage, min.	7-8
Sag Resistance, Leneta Anti-Sag Meter, mils (µm) wet, min.	7 mils
Pot Life at 70°F (21°C), hours, min.	1.5 hrs
Dry to Touch, hours, min. @ 77°F/50% RH	4 hrs
Dry to Handle, hours, min. @ 77°F/50% RH	36 hrs
Theoretical Spread Rate, sf/gal @ 1 dft(min)	962 sf/gal
Dry Finish Thickness (dft) min. to max., mils (µm)	2 to 4 mils dft
Percent Gloss/Color Retention – 18 month exposure test – min.	75%

2.2.2 All approved materials utilized in painting work shall be supplied by a single manufacturer for the duration of the project and shall meet or exceed the requirements stated in the above tables.

2.2.3 All material supplied under this specification provision shall be subject to timely inspection by the Commission or authorized representative. The Commission shall have the right to reject any materials supplied, which are found not to comply with the specified requirements.

2.2.4 Samples for any and all materials/ingredients used in the manufacture of the specified paint may be requested by the Commission and shall be supplied upon request along with the supplier's name and identification of the material.

2.2.5 Urethane finish coat products as specified shall be capable of easy recoating and touch-up. Surface preparation for recoat or touchup shall be limited to the use of thorough power washing only and not abrasive surface/sanding preparation techniques.

2.2.6 Color selection of finish coat shall be made by the engineer from manufacturer's available standard colors.

3.0 Preparation and Application Conditions.

3.1 The contactor shall coat all sign trusses indication for painting with a high performance, multi-coat epoxy primer and urethane painting system by approved manufacturers or equal as listed in this specification provision (Sec 2.0 of this provision).

3.2 Painted finishes shall be subjected to ASTM B 117 – Salt Spray (fog) test – 1,000 hours. The coated steel shall exhibit no visible evidence of rust. The material must be submitted to MoDOT at least 41 days prior to painting to allow for this test to be performed.

3.3 Substrate preparation for epoxy primer and urethane painting applied over galvanized steel members shall be properly prepared by the contractor in accordance with paint manufacturer's recommendations for proper adhesion of primer, intermediate and finish coating products to galvanized surfaces. Suggested minimum preparation shall be as follows:

(a) SSPC SP-1: Solvent clean to remove solubles, grime, etc., Spot SSPC SP-2 Hand Tool Clean, and/or SP-3 Power Tool Clean any corroded areas of the galvanized steel.

(b) Apply a 3% to 5% solution of Phosphoric Acid to galvanize steel surfaces followed by clean water rinse for newly galvanized surfaces and/or galvanized surfaces that have not weathered sufficiently prior to installation/painting.

(c) ASTM D 6386 – Use method for partially weathered galvanized steel where applicable.

3.4 Substrate preparation for epoxy primer and urethane painting applied over aluminum catwalk members shall be properly prepared by the contractor in accordance with painting manufacturer's recommendations for proper adhesion of primer, intermediate and finish coating products to aluminum surfaces. Suggested minimum preparation shall be as follows:

(a) Remove any oil or grease from the surfaces to be painted per SSPC SP-1. Profile substrate per SSPC SP-7 (brush blast) using fine abrasive or other approved method to provide a texture of fine sandpaper with a maximum profile not to exceed 1 mil.

3.5 The contractor shall apply primer, intermediate, and finish coat products to galvanized steel and aluminum surfaces in accordance with paint materials manufacturer's requirements and where applicable, the Missouri Department of Transportation's requirements.

3.6 The contractor shall retain painting manufacturer's representative to verify surface preparation, application and curing procedures for painting work to verify compliance with these special provisions and manufacturer's instructions/requirement (Sec 1.4 of this provision).

3.7 The contractor shall employ necessary measures to adequately protect surrounding improvements, surfaces and vehicles from damage to surface preparation and paint application procedures. The contractor shall be responsible for the satisfactory repair of any and all damage resulting from such procedures at no cost to the Commission, and shall maintain a safe and clean working area throughout the duration of painting operations.

3.8 Final acceptance of painting work shall be based on the manufacturer's certification (Sec 1.4 of this provision) submitted by the contractor to the engineer and upon laboratory and/or field tests results of samples of the material. The engineer reserves the right to sample and test each lot of each component prior to approval or use of the material.

4.0 Basis of Payment – Existing Trusses. Furnishing and apply primer, intermediate and finish paint coatings, regardless of length of truss span or cantilever/butterfly arms, regardless of number of columns per truss, including all surface preparation requirements and all incidental work as specified will be as follows:

Item No.	Description	Type
903-99.02	Painting Truss Columns	Each
903-99.02	Cantilever/Butterfly Box Truss Painting	Each

GG. MOUNTING NEW OVERHEAD SIGNS ON EXISTING TRUSSES

1.0 Description. This work shall consist of removing existing signs from existing trusses, and mounting new signs on the existing tubular or box trusses, and remounting existing signs on new or existing trusses. Unless otherwise specified this shall include all stainless steel bolts, nuts, sign post clips, and all other miscellaneous hardware required to attach signs to sign supports, and sign supports to trusses.

The contractor shall not mount new signs or new sign supports on existing trusses until after the truss is painted unless approved by the engineer.

The contractor shall be required to close traffic lanes or shoulders as determined by the engineer when working on overhead trusses.

2.0 Horizontal Placement of Overhead Signs

2.1 New signs or existing signs shall be placed on the new or the existing trusses in a location as indicated on the plans. The plans generally indicate which traffic lane to place the sign over. It is the contractor's responsibility to field measure from the center of the existing truss column to the center of the appropriate lane to determine the sign location on the truss. For the signs that span over one lane, the sign shall be centered over the center of the traffic

lane. For signs that span over two lanes, the sign shall be centered over the stripe line between the traffic lanes. For signs that span over three lanes, the sign shall be centered over the center of the center traffic lane. For signs that span over four lanes, the sign shall be centered over the stripe line between the center two traffic lanes.

2.2 For signs with down arrows, the down arrow shall be placed as close as possible to the center of the lane to which it applies. When adjacent signs are larger than the lane they are over, signs with down arrows shall take precedence for centering over adjacent informational guide signs without down arrows.

3.0 Vertical Placement of Overhead Signs.

3.1 Whenever possible, all new signs shall be vertically centered on the existing truss or tubular sign supports. Signs may not be vertically placed off center of the truss unless indicated on the plans, or without approval from the engineer.

3.2 For all existing trusses with catwalks or sign lighting supports, the bottom of the sign shall be a minimum of 6 inches above the top of the catwalk or sign lighting support, whichever is higher.

3.3 For all existing trusses without catwalks or sign lighting supports, the bottom of the sign shall be a minimum of 17 feet, 6 inches above the highest driving lane elevation or shoulder elevation. This highest elevation shall include top of curb elevations on the shoulders that are within 10 feet of the edge of new signs.

4.0 6-Inch Aluminum 'I' and 3-Inch Aluminum 'I' Sign Supports, Box Trusses

4.1 The contractor shall be required to provide new 6-inch aluminum 'I' and/or 3-inch aluminum 'I' supports as required to attach new signs to existing box trusses. Details for these 6-inch aluminum 'I' supports are shown on Standard Plan 903.10. Details for placement of these supports are shown on Standard Plan 903.10. This work shall include providing all necessary U-bolts and nuts, straps, or any other type of hardware materials necessary to attach the new 6-inch aluminum 'I' supports to the existing truss.

4.2 Horizontal sign overhang shall be no greater than 2 feet, 6 inches.

4.3 There shall be no vertical sign overhang from the 6-inch aluminum 'I' support. These supports may extend beyond the sign only if needed to attach to the box truss upper or lower chords. All new signs shall be supported for the full height of the sign, either by means of existing sign supports or new sign supports. Existing supports that extend above or below the new sign shall be cut off to match the height of the new signs as indicated in the standard plans.

4.4 Existing signs supports may be extended. If this is the preferred method of construction, at no direct pay and with the approval of the engineer, the contractor shall provide the engineer a set of detailed plans for this work that is signed and sealed by a professional engineer registered in the state of Missouri.

5.0 Catwalk Removals. The contractor shall be required to remove the catwalks off of all the existing sign trusses within the project limits that are shown on the plans to be U.I.P and will have their existing signs replaced and/or updated. The entire catwalk will become the property of the contractor and disposed of off the right-of-way. All 6-inch aluminum 'I' and steel angle

supports shall be removed to the bottom of the final sign layout as described above. The edge of the removed sign support shall be left clean and straight and free of excess burrs, sharp edges, etc as approved by the engineer. Field galvanizing shall be required on all newly exposed edges of steel sign supports.

All sign supports that originally supported the catwalks or removed signs but are not needed for the final sign layout shall be removed by the contractor and disposed of off the right-of-way.

6.0 Reinstalling Existing Signs. Existing signs that are relocated to new trusses or reused on existing trusses per plan locations are considered completely covered under the cost of Removal of Improvements. This includes all incidental items, labor, time, transporting signs to new location, and reinstalling the signs to its new location as shown on the plans unless otherwise specified elsewhere in the roadway special provisions.

<u>Item No.</u>	<u>Description</u>	<u>Type</u>
903-50.11A	ST-Structural	SQFT
903-99.03	6-Inch Aluminum 'I' Sign Support	LF
903-99.03	3-Inch Aluminum 'I' Sign Support	LF

Removal of catwalks, aluminum I-beams, angles, and all other miscellaneous hardware and support equipment shall be included in the cost for the bid item for Removal of Improvements.

Existing I beams may be reused as approved by the engineer if they are of proper height and in good condition.

HH. TEMPORARY GROUND MOUNTED SIGNS

1.0 Description. Several existing overhead signs may require temporary ground mounting until new signs or existing signs can be installed on the new or existing trusses, or during painting of existing trusses. This temporary mounting may be necessary if a new truss is constructed in the same location as the existing truss, the truss is being painted, or a new truss installation obstructs the sight distance of the existing signs. As directed by the engineer, the contractor shall remove any signs that the sight distance is obstructed and temporarily ground mount these signs until the obstruction is eliminated. The contractor shall take care not to damage these signs in any way. Signs damaged due to the contractor's construction activities shall be replaced by the contractor at his expense.

1.1 Signs shall be mounted on breakaway sign supports as approved by the engineer. The bottom of the sign shall be at least 7 feet above the top of the edge of the nearest driving lane, and a minimum of 6 feet from the edge of shoulder.

2.0 Basis of Payment. No direct payment shall be made to the contractor in order to comply with the requirements of this provision.

II. SIGN TRUSS CONSTRUCTION/UTILITY COORDINATION

1.0 Description. Truss footing shall be in accordance with applicable portions of the Standard Specifications, and specifically as follows:

2.0 Conflicts with Utility Facilities and Contractor Elects Utility Facility to be Relocated

2.1 Known existing utility facilities (including but not limited to public utility facilities, roadway lighting conduit, ITS fiber optic conduit, and MoDOT drainage facilities) are located in close proximity or in direct conflict to proposed truss footing locations as shown approximately on the signing cross sections.

2.1.1 Unknown existing utility facilities (including but not limited to public utility facilities, roadway lighting conduit, ITS fiber optic conduit, and MoDOT drainage facilities) may be located in close proximity or in direct conflict to proposed truss footing locations.

2.2 In the event where any existing utility facility requires adjustment in order for the contractor to construct any new sign truss footing, the contractor shall be advised the cost of any work necessary to adjust the location of said utility facility will be considered incidental to the cost of constructing the truss footing.

3.0 Conflicts with Utility Facilities and Contractor Elects to Modify/Shift Footing to Avoid Utility Conflict

3.1 The contractor shall provide utility locates at each proposed truss location to verify the absence or presence of unforeseen underground conflicts. If conflicts are found, the contractor may propose a new location to construct the truss. Trusses, columns, anchor bolts, and other special order materials shall not be ordered until the new truss location is approved by the engineer.

3.2 If new locations are proposed, the contractor shall obtain utility locates at the proposed site, and verify standard horizontal and vertical clearances of the truss at the new location. This work shall consist of furnishing design calculations, shop drawings, materials, and labor necessary to construct the truss foundation at the new location. Shop drawings shall be signed and sealed by a registered professional engineer to the engineer for approval prior to ordering any equipment from the manufacturer and beginning construction activities for the foundation.

4.0 Basis of Payment. No direct payment shall 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.

JJ. MISCELLANEOUS SIGNING

1.0 Site Restoration. All areas disturbed by the installation of ground mounted signs or truss pedestals/foundations shall be returned to their original elevation and condition as before the work was done. Concrete pavement, sidewalks, and asphalt surfaces shall be replaced in-kind, with the same thickness, and in an aesthetically pleasing manner as approved by the engineer. This shall include saw cuts around concrete and asphalt surfaces for a clean and aesthetically pleasing repair. Concrete pavement may require tie bars to tie the newly repaired area into the existing concrete pavement.

1.1 All grassy areas shall be restored with permanent seeding, mulching and fertilizing as specified elsewhere in the contract.

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

KK. FERTILIZING, SEEDING AND MULCHING

1.0 Construction Requirements. In accordance with Sections 801 and 805, the following shall be applied at the rate specified in the locations specified. Dry seeding applications methods will be required for slopes flatter than 3:1. Bulk seed may be used provided live seed rates are met. Vegetative mulch will be stabilized with recycled paper overspray in accordance with Section 802.

Cool Season Mixture	
Seeding Mixture	Pounds Pure Live Seed/Acre
Tall Fescue	80
Annual Ryegrass	10
Perennial Ryegrass	6
White Clover	6
Oats	10
TOTAL	112
Within the first 30 feet (mow area)	
Fertilizer	Pounds/Acre
Nitrogen (N)	80
Phosphoric Acid (P2O5)	160
Soluble Potash (K2O)	160
Effective Neutralizing Material	0
Beyond 30 feet	
Fertilizer	Pounds/Acre
Nitrogen (N)	40
Phosphoric Acid (P2O5)	80
Soluble Potash (K2O)	80
Effective Neutralizing Material	0

2.0 Basis of Payment. All expense incurred by the contractor for furnishing and applying seed fertilizer and mulch shall be considered as included in and completely covered by the contract unit price for 805-10.00A Seeding – Cool Season Mixtures, per acre. Fertilizing and mulching will be considered incidental to seeding and therefore the contractor shall not receive any direct pay for these two items.

LL. MODOT ITS EQUIPMENT WITHIN PROJECT LIMITS

1.0 Description. MoDOT-owned fiber optic cable and conduit, critical MoDOT power supplies and power cables, pull boxes for fiber and power cabling, CCTV cameras and cabinets on high mast light towers, and hub cabinets are present within the limits of this project. Damage or interruption of these items shall not be permitted.

2.0 Construction Requirements. The Contractor shall exercise reasonable care while completing work near these facilities, and shall take steps necessary to protect these facilities from damage for all items that are not specifically identified as being removed and/or relocated in the plans. Should any of the existing wiring or conduit be damaged by the Contractor, it shall be replaced at the Contractor's expense and the system in full operation within 4 hours of when the damage occurred. If it is mutually agreed upon between the Commission and the contractor that the repairs will require more than 4 hours to complete, a mutually agreed upon time for repairs to be complete will be determined.

2.0.1 The Contractor shall not modify any existing network or electrical connections within equipment cabinets, unless coordinated with MoDOT ITS staff. Existing connections include, but are not limited to, fiber jumpers, CAT5(e) cables, power supplies, and power strips. The connection to specific fiber and copper ports on network equipment shall also not be modified, unless coordinated with MoDOT ITS staff, as the network equipment has been configured specifically for each equipment cabinet.

3.0 Liquidated Damages. In the event of damage, if the system is not repaired and in full operation within 4 hours of the damage occurring, or within the timeframe agreed upon, the Contractor will be charged with a liquidated damage specified in the amount of \$100.00 per hour for each full hour that the system is not fully operational. This damage will be assessed independently of the liquidated damages specified elsewhere in the contract.

3.0.1 The MoDOT engineer will also have the option of issuing a work order for MoDOT's on-call ITS Maintenance Contractor to make repairs, if it is the engineer's opinion that the Contractor creating the damage will not be able to make repairs in a timely manner. The ITS Maintenance Contractor will then bill the Contractor causing the damage directly.

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

MM. LIQUIDATED DAMAGES FOR ITS WORK

1.0 Description. All communication and network cut-over SHALL be done between 9:00 PM and 3:00 AM, Monday through Friday, or any time on Saturday and Sunday, per engineer's approval. Regardless of when work is begun, the Contractor shall keep all existing MoDOT communication systems operational outside the given work hours. If MoDOT communication systems are not operational by end of each work period, 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 delay, with its resulting cost to the traveling public. 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 **\$250 per hour** for the time duration that the ITS program, including assets and communication systems, has not been restored to the full functionality that existed prior to the work. It shall be the responsibility of the Engineer to determine the quantity of excess closure time.

NN. SITE RESTORATION FOR ITS WORK

1.0 Description. This work shall consist of restoring to its original condition any disturbed areas at sites including, but not limited to, pull box, cabinet foundations, conduit, and pole base installations. Restoration shall be accomplished by placing material equivalent to that of the adjacent undisturbed area. Disturbed unpaved areas shall be fertilized and either seeded and mulched or sodded as directed by the Engineer. The Engineer will have the final authority in determining the acceptability of the restoration work.

1.0.1 For disturbed areas that are being restored as part of immediate subsequent effort, notify the Engineer. The Engineer may, at their discretion, permit the Contractor to not restore a particular area if an adjacent effort will perform the work.

2.0 Method of Measurement. This work will not be measured for payment.

3.0 Basis of Payment. No direct payment will be made for any materials or labor, which is performed under this provision, and will be considered incidental to items installed that disturb the earth.

OO. COORDINATION WITH ITS STAFF AND UTILITY LOCATES

1.0 Description. Any work that impacts the existing communications network shall be coordinated with the Commission's St. Louis District ITS staff. This includes but is not limited to removal and replacement of any existing communications equipment, adding new devices, and changes to power sources or disconnects. Minor modifications to the existing communications network can have significant impacts on the system and operation of other ITS and traffic signal systems.

1.0.1 If the scope of work contains modification, addition, and/or expansion of existing underground MoDOT ITS, lighting, or signal facilities, the Contractor shall notify the MoDOT Utilities Locate staff prior to any work, in order for MoDOT to update MoDOT utility location records with Missouri One Call.

2.0 Contact. Initial contact shall be made at least seven calendar days before work that may impact the existing communications network commences. The ITS staff shall be contacted via an email at SLITS@modot.mo.gov. The Engineer shall be notified prior to making contact with ITS staff. For MoDOT Utility location updates, the Contractor shall contact MoDOT TMC at 314-275-1500 and ask for Utility Locate Section at least seven calendar days before performing any work.

2.0.1 The ITS and network devices 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 adding, removing, or modifying any existing ITS and network devices. This may require the Contractor to perform work that will affect existing network devices during nighttime and/or weekend hours, at the discretion of the Engineer. Allowable timeframes for this work will be subject to the need for ITS devices in the area to be used to manage other traffic impacting work zones.

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

PP. CCTV FOUNDATIONS

1.0 Drilled Shafts for CCTV Poles.

1.1 Description. Follow the requirements of Sec 701 of the Standard Specifications except for the following:

- Delete Secs 701.4.10.3 through 701.4.11.2
- Delete Secs 701.6.4 and 701.6.5
- Replace Secs 701.7.1 and 701.7.8 with sections 1.2.1, and 1.2.2 respectively, below.
- Delete Secs 701.7.5 and 701.7.6

1.2 Basis of Payment. Follow the requirements of Sec 701.7 of the Standard Specifications, except for the following.

1.2.1 Drilled Shaft. Replaces Sec 701.7.1 of the Standard Specifications. Payment will be considered full compensation for all reinforcing steel, anchor bolts and templates, washers, nuts, disposal of excavated soil, restoration of site around the drilled shaft, costs of drilling (including temporary casing), excavation, slurry, cleaning, an acceptable method of inspection as required, furnishing and placing concrete, grouting and incidental work and material required by the contract documents. Payment for any drilled shaft installed and accepted will be at the contract unit price per linear foot for the diameter of the drilled shafts specified, irrespective of the character of the material actually encountered during excavation. No additional compensation will be made for concrete required to fill an oversized casing or for oversized excavation.

Item No.	Type	Description
701-11.05	Linear Foot	Drilled Shaft (3 FT. 6 IN. Dia.)

1.2.2 Sonic Logging Testing. Replaces Sec 701.7.8 of the Standard Specifications. Payment for sonic logging testing of drilled shafts as required by the Engineer will be made at the contract unit price per each for sonic logging testing. No payment will be made for supplementary sonic logging testing to evaluate defects. Payment for sonic logging testing will be considered full compensation for providing all equipment, access pipes, conducting the actual probing measurements as specified, furnishing reports, removing equipment, and all tools, labor, and any incidentals necessary to complete the work. The number of sonic logging inspections may vary from the estimated quantities, but the contract unit price will prevail regardless of the variation.

Item No.	Type	Description
701-16.00	Each	Sonic Logging Testing

QQ. INSTALL CCTV ASSEMBLY

1.0 General.

1.1 Description. The Contractor shall install a Commission-furnished IP (Internet Protocol) closed circuit television (CCTV) assembly on a metal pole, and install a Commission-furnished

power supply and surge protection in the CCTV camera cabinet. The pole and cabinet will be paid for separately. The Contractor shall provide cables connecting the camera to the equipment in the cabinet and to ground, provide an air terminal, set up the camera assembly, and test for proper operation.

1.2 Qualified Personnel. The Commission's agreement with the camera assembly manufacturer obligates the manufacturer to train the Commission's installation Contractors in the unpacking, assembling, mounting, positioning, connecting to the communication network, set up, and testing of the camera assemblies. The training is free to the Contractor and is conducted at the jobsite. The Contractor shall not perform any work until the manufacturer has certified the Contractor as qualified. Only personnel who have been trained by the manufacturer shall participate in the camera assembly installation, setup, and testing. A Commission representative shall be present to observe the training.

1.2.1 Contractors certified under a previous Commission contract need not be trained a second time, but only personnel who received the training shall participate in the camera assembly installation and testing.

1.3 Support During Installation. The Commission's agreement with the camera assembly manufacturer obligates the manufacturer to provide both on-site and remote factory support.

2.0 Materials.

2.0.1 Camera assembly, power supply, and surge suppressors shall be provided by the Commission. Any materials required to attach the camera to the Contractor-furnished camera lowering device shall be coordinated with the Commission and provided by the Contractor.

2.0.2 The Contractor shall acquire cables for power, video, and camera control for this project from MoDOT's current camera supplier manufacturer.

2.0.3 The air terminal shall be solid copper and at least 5/8 inch in diameter. The top of the rod shall be tapered to a point. The bottom of the rod shall be flattened and bolted to the pole using at least three stainless steel bolts. The Contractor shall provide a shop drawing detail this connection to the CCTV camera pole.

3.0 Construction Requirements.

3.0.1 The Contractor shall install the dome and lowering device arm so that the pole does not block the camera's view of traffic.

3.0.2 The Contractor shall install the air terminal on the opposite side of the pole from the dome. The Contractor shall position the rod to project a minimum of five feet above the highest point of the pole, attach it to the pole with bolts passing through the wall of the pole, and bond the air terminal to the top of the pole. The Contractor shall apply a copper-based conductive sealant between the rod and the pole before tightening the bolts. The pole itself shall be the ground conductor.

3.0.3 The Contractor shall connect the bottom of the pole to one or more ground rods using a bare, solid AWG #6 copper wire. The Contractor shall use exothermic welding for all ground wire connections, except the connection to the pole, which shall use the pole's grounding lug. The Contractor shall use a device that measures resistance to ground using the three-point fall-

of-potential method to ensure that the resistance from the air terminal to ground does not exceed 8 ohms. The Contractor shall add more ground rods if necessary to achieve this requirement. The Contractor shall perform all work related to the installation of the air terminal in accordance with NFPA 780.

3.0.4 The Contractor shall terminate all the cables on surge protectors, install the Commission-furnished power supply in the cabinet, and connect the camera power circuit to the power supply.

3.0.5 The Contractor shall restrict the camera's field of view, if necessary, so that a user cannot use the cameras to look in the windows of dwellings. To the extent that it does not interfere with the use of the camera for traffic management purposes, the Contractor shall ensure that a camera cannot be used to view residential property. Prior to creating these restrictions, the Contractor shall submit to the Engineer a written description of the proposed restrictions to be installed at each camera, and the proposed method of achieving them. It shall not be possible for an operator to override these restrictions without intervention by his or her supervisor. Affixing a mask to the inside of the clear dome shall be an acceptable method to achieve this. The Contractor shall highlight situations in which there is a conflict between the need to protect privacy and the need to know about traffic situations. The Contractor shall revise the field of view restrictions as directed by the Engineer.

3.0.6 The Contractor shall apply a rain repellent coating to the outside of the lower dome, following the coating manufacturer's instructions. The coating shall be recommended by its manufacturer for clear acrylic.

4.0 Acceptance Testing.

4.0.1 Upon delivery of a shipment of camera assemblies, the manufacturer's representative shall conduct a visual inspection and test of the camera assemblies to check for manufacturing defects and shipping damage. The camera assemblies shall be powered during this testing, and tests shall follow procedures developed by the manufacturer and approved by the Engineer. The Engineer shall witness this testing and the Contractor may witness this testing if he or she chooses. The manufacturer shall be responsible for replacing all defective units uncovered by this testing.

4.0.2 After installing each camera assembly, the Contractor shall test it using the same procedures that the manufacturer's representative used when the camera assemblies were delivered. In addition, the Contractor shall demonstrate that the agreed-upon viewing restrictions have been implemented. Also, the Contractor shall use a device that measures resistance to ground using the three-point fall-of-potential method to demonstrate that the resistance from the air terminal to ground does not exceed 8 ohms. If the installed camera assembly fails to operate properly, and the problem cannot be fixed by changing the wiring or setup parameters, the camera assembly will be deemed defective and the Contractor shall return it to the manufacturer for replacement. Except for costs borne by the manufacturer under his warranty agreement, the cost of replacement shall be borne entirely by the Contractor.

5.0 Basis of Payment. Measurement and payment for camera assembly installation includes cables, testing, grounding, and all miscellaneous hardware required for a safe, fully operational camera assembly. Payment will be made as follows:

Item No.	Type	Description
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910-37.00	Each	CCTV Camera Assembly, Installed
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RR. AMEREN COORDINATION

1.0 Description. This work shall consist of coordinating to obtain new electrical services and paying monthly energy charges to Ameren until the acceptance of the system by MoDOT. Existing services to be removed shall be coordinated with Ameren to deactivate the service and account.

2.0 Construction. The Contractor shall coordinate with Ameren and apply for new service drops (single phase, 120/240 V) from Ameren at the location shown on the plans. Service is to be made in MoDOT's name, but all bills are to be received by the Contractor at the Contractor's address. Request a single bill that includes all the charges by meter location. Request from Ameren the extension of their electrical services to the points of services (POS) indicated. The Contractor is to be responsible for energy charges up to 60 days after the acceptance of the ITS system. After 60 days, transfer the billing address to a MoDOT address as provided by the Engineer.

2.0.1 The Contractor shall provide the service entrance and disconnect under a pay item "Pad Mounted Power Supply, 120V ITS" that shall accommodate a meter provided by Ameren. The Contractor shall coordinate the installation power service and energization above and beyond the work included under "Pad Mounted Power Supply, 120V ITS".

2.0.2 At locations where power service is to be removed, the Contractor shall coordinate with Ameren to de-energize the service point prior to removing the existing power supply assembly. Upon de-energization, the account for the location shall be closed on behalf of MoDOT.

3.0 Method of Measurement. This work will not be measured for payment, but will be considered a lump sum unit. The work shall include the furnishing of an Ameren service point, meter, and disconnect switch and coordinating for Ameren to provide any other services to energize the service point. Also included is the decommissioning and removal of an existing Ameren Service point.

4.0 Basis of Payment. Ameren Coordination will be paid for at the contract lump sum price.

Item No.	Type	Description
910-99.01	Lump Sum	Ameren Coordination

SS. CONDUIT

1.0 Description.

1.0.1 This work shall consist of furnishing and installing conduits as shown on the plans and as described within this section. The plans depict conduit routing in schematic form only. The Contractor shall determine final routing based on actual field conditions at each site, including utility locator service markings, to assure no conflicts with existing utilities.

1.0.2 The Contractor shall inspect the project area prior to submittal of bid to determine the types and extent of incidental removal, relocation, and replacement items to include in the unit price of conduit and pull boxes.

2.0 Materials.

2.0.1 Conduits shall meet the requirements of Sec 1060.

2.0.2 Non-metallic flexible conduit shall be color coded orange for communication cable and black for power cable.

2.0.3 Pull ropes or tapes shall be polypropylene with a minimum tensile strength of 600 pounds.

2.0.4 Locator wire shall be solid copper wire, AWG 10, type THHN, with blue insulation.

3.0 Construction Requirements.

3.1 General. The Contractor shall comply with Sec 902.16, except as noted in this special provision.

3.1.1 Warning tape shall be furnished and installed in all trenches containing conduit.

3.1.2 Pull ropes shall be furnished and installed in all empty conduit cells.

3.1.3 Contractor shall install locator wire in all underground non-metallic conduits and into each pull box or base. Affix the wire to the sidewall of each pull box.

3.1.4 Flexible non-metallic duct shall not be spliced. All runs shall be continuous.

3.1.5 When installing flexible duct in trench, the Contractor shall keep the duct as straight as possible and avoid undulations up and down and side to side.

3.2 Directional Drilling.

3.2.1 Preliminary Site Work. The Contractor shall determine all utility locations near the path of the proposed bore, including depth. This information shall be used to avoid damage to utilities and/or facilities within the work area. The Contractor shall provide this information, including the sources, to the Engineer a minimum of five working days prior to boring for approval. No work shall proceed until the Engineer provides approval. Utilities shall be exposed prior to drilling for all facilities which it is customary and safe to do so.

3.2.2 Boring. The diameter of the drilled hole shall conform to the outside diameter of the conduit as closely as practical. The Contractor shall pressure grout as directed by the Engineer, to fill any voids, which develop during the installation operation. The Contractor shall remove and replace any conduit damaged in directional drilling operations at no expense to the project.

3.2.3 Drilling Fluids. The use of water and other fluids in connection with the drilling operation shall be permitted only to the extent necessary to lubricate cuttings. Jetting shall not be permitted, and the use of water alone as a drilling fluid shall not be permitted. The Contractor shall use a drilling fluid/slurry consisting of at least 10% high grade, processed Bentonite to

consolidate excavated material, seal the walls of the hole, and furnish lubrication for subsequent removal of material and immediate installation of the pipe.

3.2.3.1 The Contractor shall provide a means of collecting and containing drilling fluid/slurry that returns to the surface, such as slurry pit, or a method approved by the Engineer.

3.2.3.2 The Contractor shall provide measures to prevent drilling fluids from entering storm sewer systems. Drilling fluid/slurry shall be prevented from accumulating on or flowing onto sidewalks, other pedestrian walkways, driveways, or streets. Slurry that is inadvertently deposited on pedestrian walkways shall be immediately removed. Drilling slurry waste shall be transported from the site for disposal. Wetlands shall be protected for slurry entry using appropriate soil erosion control measures approved by the Engineer.

3.2.4 Drilling Control. The Contractor shall use a digital walkover locating system to track the drill head during the bore. At minimum, the locating system shall be capable of determining the pitch, roll, heading, depth, and horizontal position of the drill head at any point along the bore. During each drilling operation, the drill head shall be located every 10 feet along the bore and prior to crossing any underground utility or structure. Upon completion of the drilling operation and conduit installation, the Contractors shall furnish the Engineer with an as-built profile drawing and plan drawing for the drilled conduit showing the horizontal and vertical locations of the installed conduit.

3.3 Wall Penetrations. Wall penetrations of existing concrete retaining walls shall be performed by the drilling, or other approved construction means, of an opening with a minimum diameter of 1 inch greater than the outside diameter of the conduit(s) to be inserted through the wall. Reinforcing bars shall be located on the fill face of the wall using non-destructive scanning techniques. Openings shall be located to avoid cutting or otherwise damaging reinforcing bars on the fill face side of the wall. Sufficiently remove any rough edges from the wall opening to prevent damage to the conduit(s). The wall penetrations shall be filled with a Type III epoxy grout conforming to Sec 1039. The cost of wall penetrations will be considered incidental to the unit price of conduit.

3.4 Install Conduit into Existing Pull Box. Where indicated on the plans, the Contractor shall install a proposed conduit into an existing pull box (Drill Box).

3.4.1 The Contractor shall carefully expose the outside of the existing pull box without disturbing any existing conduits or cabling.

3.4.2 An appropriate sized hole shall be drilled for the entering conduit at a location within the pull box that shall not disturb the existing cabling and that shall not hinder the installation of new cabling within the installed conduit.

3.4.3 Any void area between the drilled hole and the conduit shall be filled with an Engineer-approved filling material to protect against conduit movement and the entry of fill material.

3.4.4 Backfill shall be carefully tamped in place. All disturbed areas shall be restored in accordance with the provisions of "Site Restoration for ITS Work" JSP.

4.0 Shop Drawing Submittal Requirements.

4.0.1 Catalog cuts shall be provided for all conduit types.

5.0 Method of Measurement. This work will be measured for payment to the nearest linear foot as shown on the plans.

6.0 Basis of Payment. This work will be paid for at the contract unit price per linear foot.

6.0.1 Expansion fittings, liquid-tight flexible conduits, tracer wires, pull ropes, hangers, supports, resin anchor systems, and all hardware are incidental to the cost of conduit.

6.0.2 Conduit may be installed by directional boring at locations shown as trenched on the plans. Such conduit will be paid for as if it had been installed by trenching.

Item No.	Type	Description
910-99.03	Linear Feet	Conduit, 2 in., HDPE, Trenched
910-99.03	Linear Feet	Conduit, 2 in., HDPE, Directional Drill
910-99.02	Each	Drill Box

TT. FIBER OPTIC CABLE

1.0 Description. This work shall consist of installing, splicing, and terminating fiber optic cables. The fiber optic cables in this project include a 24-strand single-mode fiber optic distribution cable and a 72-strand single-mode fiber optic trunk cable.

2.0 Materials.

2.1 Cable. Fiber optic cable shall be gel-free, loose tube, single mode dielectric cable. The cable shall be listed in the latest edition of the Rural Utilities Service (RUS) *List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers*, category oc-d-F, and shall have a short-term tensile rating of at least 600 lbs. The cable sheath shall have length markings in feet, and shall indicate that the unit of measure is feet. The cable shall have an operating temperature range of -40° C to 70° C.

2.1.1 All fibers shall be suitable for transmission using both 1310 nm and 1550 nm wavelengths. Attenuation shall not exceed 0.35 dB/km and 0.25 dB/km for 1310 nm and 1550 nm signals, respectively.

2.1.2 The cables shall be constructed with twelve fibers per tube.

2.2 Splice Tray. Splice trays shall be 11.7" long, 3.9" wide, and 0.2" tall. They shall be aluminum with clear plastic covers, designed for outdoor use. Each shall accommodate 24 fusion splices. The trays shall have a black powder coat finish. The trays shall have both perforations for cable ties and crimpable metal tabs for buffer tube strain relief.

2.3 Connector. Connectors shall be made with ceramic ferrules. Type ST connectors shall be used for pigtail and jumper connections to patch panels. Type LC connectors shall be used for jumper connections to Ethernet switches. All connectors shall be suitable for use in traffic cabinets and shall be designed for single mode fibers.

2.4 Pigtail. Pigtails shall be factory-made, buffered, and strengthened with aramid yarn to reduce the possibility that accidental mishandling will damage the fiber or connection. Pigtails

shall be yellow. They shall use the type of connector specified in Sec 2.3 of this provision. Each shall contain one fiber. Length shall suffice to provide two feet of slack after installation.

2.5 Jumper. Jumpers shall meet the requirements for pigtails, but shall have a connector on each end. The second connector shall be as specified in Sec 2.3 of this provision except where a different connector is required for compatibility with the equipment to which the jumper connects. Length shall suffice to provide approximately five feet of slack after installation.

2.6 Rack-Mounted Splice Enclosure. The enclosure shall have brackets and all other hardware required for rack mounting in an EIA standard 19-in. equipment rack. However, alternate forms of mounting will be permitted if more practical at a particular location. The enclosure shall take up no more than five rack units (1¾ inch each) in the cabinet. It shall be made of powder-coated aluminum.

2.6.1 The enclosure shall have provisions for cable strain-relief. It shall have hinged front and rear doors.

2.6.2 The enclosure shall include splice trays as specified in Sec 2.2 of this provision. The Contractor shall provide enough splice trays for all the splices made in the enclosure. The enclosure shall include a splice tray holder with capacity for 22 trays. It shall be mounted on a sliding shelf inside the enclosure so that individual trays can be removed from the enclosure without disturbing the other trays or removing the enclosure itself from the cabinet.

2.7 Rack-Mounted Interconnect Center. An interconnect center is a splice enclosure that has a patch panel built into one of its walls. Within the interconnect center, fibers in cables are spliced to pigtails and the pigtails are plugged into the patch panel from the inside. This allows jumper cables (not part of the interconnect center) to plug into the patch panel from the outside, connecting the fibers to equipment in the cabinet or to other fibers on the patch panel. Within an interconnect center, some fibers may be spliced to the corresponding fiber in a mating cable, rather than to a pigtail. Other fibers may be coiled, unterminated.

2.7.1 The enclosure shall have brackets and all other hardware required for rack mounting in an EIA standard 19-in. equipment rack. It shall take up no more than three rack units (1¾ inch each) in the cabinet. It shall have front and rear doors. It shall be made of powder-coated aluminum.

2.7.2 The enclosure shall hold at least four splice trays meeting the requirements of Sec 2.2 of this provision. Enough trays shall be provided to accommodate all splices made in the interconnect center. The enclosure's patch panel shall have at least 24 positions, compatible with the connectors specified in Sec 2.3 of this provision. It shall have provisions for cable strain relief and for connector labeling.

3.0 Construction Requirements.

3.1 Cable Installation. Prior to installation, the Contractor shall perform tests as indicated in Sec 4.0 of this provision to confirm that the cable is in good condition and complies with the specifications. Any defects found after installation shall be deemed the fault of the Contractor.

3.1.1 The cable shall be installed such that the optical and mechanical characteristics of the fiber are not degraded. Do not violate the minimum bend radius or the maximum tension, both during and after installation.

3.1.2 Before any cable installation is performed, the Contractor shall provide the Engineer with four copies of the cable manufacturer's recommended installation procedures which shall include maximum pulling tension, minimum bending radius, and list of approved pulling lubricants for each cable size.

3.1.3 If the cable is pulled by mechanical means, a clutch device shall be used to ensure the allowable pulling tension is not exceeded. Also, a strain gauge shall be attached to the pulling line at the cable exit location, and at a sufficient distance from the take-up device, such that the strain gauge can be read throughout the entire cable pulling operation.

3.1.4 The let-off reel shall not be left unattended during a pull in order to minimize the chance of applying excess force, center pull, or back feeding.

3.1.5 An approved lubricant shall be used, in the amount recommended by the cable manufacturer, to facilitate pulling the cable. After the cable has been installed, the exposed cable in a pull box, junction box, or cabinet shall be wiped clean of cable lubricant with a cloth before leaving the pull box, junction box, or cabinet.

3.1.6 In every intermediate pull box, 50 feet of slack fiber optic cable shall be installed for every cable that passes through the pull box. Additional slack storage, as indicated on the plans, is required in designated pull boxes. At cabinet locations, where cable runs from the pull box directly to an equipment cabinet, 100 feet of slack fiber optic cable slack shall be stored in the pull box. Additionally, the cable returning from the cabinet to the pull box shall be treated as a separate cable, and 100 feet of slack shall be provided. Slack cable shall be neatly stored on the walls of the pull box using racking hardware acceptable to the Engineer.

3.1.7 The fiber optic cable ends shall be sealed to prevent the entry of water.

3.2 Splicing. Optical fibers shall be spliced as shown on the plans. Splices shall be allowed only in equipment cabinets except where shown on the plans.

3.2.1 All splices shall be made using a fusion splicer that automatically positions the fibers using either the Light Injection and Detection (LID) system or the High-resolution Direct Core Mounting (HDCM) system. The Contractor shall provide all equipment and consumable supplies.

3.2.2 Each spliced fiber shall be secured in a protective groove in a splice tray. Spliced fibers shall be re-coated with a protective room temperature vulcanizing (RTV) coating, gel, or similar substance, prior to insertion in the groove, so as to protect the fiber from scoring, dirt or microbending.

3.2.3 Prior to splicing to a fiber installed by others, the Contractor shall measure and record the optical loss over that fiber. See Sec 4.0 of this provision.

3.2.4 A different splice tray shall be used for each buffer tube color. If an enclosure contains multiple buffer tubes of the same color, but none of the fibers in one of the tubes are spliced to fibers in other tubes of the same color, a separate splice tray shall be used for that tube.

3.3 Termination. Fibers shall be terminated by splicing them to factory-made pigtails. All connectors that are not connected to a mating connector shall be capped.

4.0 Acceptance Testing.

4.1 General. The Contractor shall test the fiber after installation, including all splicing and termination, is complete. Note that this test procedure involves measuring the loss of fiber installed by others before splicing to it. For each fiber optic link, including spare fibers, the Contractor shall determine whether the optical loss is within the limits permitted by these specifications. A link is a continuous segment of fiber between one connector (or unterminated end) and another connector (or unterminated end). When testing links that do not have connectors on both ends, use a mechanical splice to attach a pigtail to the unterminated fiber for the duration of the test.

4.2 Test Procedure. For each fiber link, the Contractor shall follow this procedure:

- (a) If the link includes fiber installed by others, the Contractor shall use an optical loss test set to measure and record the optical loss over that portion of the link before it is spliced to new fiber.
- (b) The Contractor shall calculate the maximum allowable loss for the completed link, at both 1310 nm and 1550 nm. The Contractor shall use the following formula:

$$\begin{aligned} \text{Maximum link loss} = & \text{Measured loss over portion installed by others} \\ & + (\text{Fiber length in km}) \times (0.35 \text{ for } 1310 \text{ nm and } 0.25 \text{ for } 1550 \text{ nm}) \\ & + (\text{Number of fusion splices}) \times (0.05) \\ & + (\text{Number of mechanical splices [for temp. connection]}) \times (0.3) \\ & + (\text{Number of connections}) \times (0.5) \end{aligned}$$

The Contractor shall provide this calculation to the Engineer along with the test results.

- (c) The Contractor shall calibrate an optical loss test set and provide evidence satisfactory to the Engineer that the set produces accurate results at both wavelengths. This can be a demonstration that the set correctly measures the loss of a test fiber whose loss is known.
- (d) The Contractor shall use the test set to measure the loss of the link under test, shall record the result at both 1310 nm and 1550 nm, and shall arrange for the Engineer or his representative to witness these tests.
- (e) If the measured loss exceeds the calculated maximum, the Contractor shall use an optical time domain reflectometer and other test equipment to troubleshoot the link. The Contractor shall take whatever corrective action is required, including cable replacement, to achieve a loss less than the calculated maximum.

4.3 Test Result Documentation. The Contractor shall prepare a diagram showing all of the links tested in this project. The diagram shall show all of the equipment cabinets, splices, and pigtails for the portion of the fiber network installed in this project. On each line representing a link, the diagram shall show the maximum allowable loss and the actual loss. The actual loss shall be the one measured after all corrective actions have been taken. The Contractor shall submit 5 copies of this diagram to the Engineer, along with the calculations for the maximum allowable loss. The Contractor shall also submit the diagrams and calculations in an electronic format acceptable to the Engineer.

5.0 Documentation. The Contractor shall provide the Engineer with mark-ups of the plans, neat and legible, illustrating as-built versions of the splice and connection diagrams that are contained in the plans.

6.0 Certifications. The fiber optic cable shall be factory certified to meet the requirements in this specification. In addition, the manufacturer shall certify that the fiber optic cable has a life expectancy of 20 years.

7.0 Guarantee. All items covered by this specification shall carry a two-year guarantee from the date of acceptance against any defects in workmanship or materials.

8.0 Basis of Payment. Measurement and payment for items covered by this specification include the documentation and acceptance testing, in addition to all materials and equipment necessary for a fully operational system. Payment will be made as follows:

Item No.	Type	Description
910-99.03	Linear Foot	Fiber Optic Cable, 72 Strand, Single Mode
910-99.03	Linear Foot	Fiber Optic Cable, 24 Strand, Single Mode
910-99.02	Each	Fiber Optic Pigtail, SM, Furnish and Install
910-99.02	Each	Rack-Mounted Splice Enclosure, Furnish and Install
910-99.02	Each	Fiber Optic Splice

UU. ITS PULL BOX

1.0 Description. The Contractor shall furnish and install ITS Pull Boxes as shown on the plans.

2.0 Basis of Payment. Measurement and payment for ITS Pull Boxes includes excavation, materials, construction, backfill, and all miscellaneous hardware required for a fully operational system. Payment will be made as follows:

Item No.	Type	Description
910-99.02	Each	ITS Pull Box, Preformed Class 5

VV. 80 FOOT CCTV CAMERA POLE AND LOWERING SYSTEM

1.0 Description. The Contractor shall furnish and install an 80-foot CCTV camera pole and lowering device as shown on the plans. The camera lowering system shall be designed to support and lower a standard closed circuit television camera, lens, housing, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. The camera lowering system device and the pole are interdependent; and thus, shall be considered a single unit or system. The lowering system shall consist of a pole, suspension contact unit, divided support arm, and a pole adapter for attachment to a pole top tenon, pole top junction box, conduit mount adapter and camera connection box. The divided support arm and receiver brackets shall be designed to self-align the contact unit with the pole center line during installation and insure that the contact unit cannot twist under high wind conditions. Round support arms are not acceptable. The camera-lowering device shall withstand wind forces of 120 mph with a 14 percent gust factor using a

1.65 safety factor. The lowering device manufacturer, upon request, shall furnish independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum effective projected area, the actual EPA or an EPA greater than that of the camera system to be attached. The camera-lowering device to be furnished shall be the product of manufacturers with a minimum of 3 years of experience in the successful manufacturing of camera lowering systems. The lowering device provider shall be able to identify a minimum of 3 previous projects where the purposed system has been installed successfully for over a one-year period of time each.

1.0.1 The lowering device manufacturer shall furnish a factory representative to assist the electrical Contractor with the assembly and testing of the first lowering system onto the pole assembly. The manufacturer shall furnish the Engineer with documentation certifying that the electrical Contractor has been instructed on the installation, operation and safety features of the lowering device. The Contractor shall be responsible for providing applicable maintenance personnel "on site" operational instructions.

1.1 Suspension Contact Unit. The suspension contact unit shall have a load capacity 200 lbs. with a 4 to 1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a minimum of 2 latches. This latching mechanism shall securely hold the device and its mounted equipment. The latching mechanism shall operate by alternately raising and lowering the assembly using the winch and lowering cable. When latched, all weight shall be removed from the lowering cable. The fixed unit shall have a heavy duty cast tracking guide and means to allow latching in the same position each time. The contact unit housing shall be weatherproof with a gasket provided to seal the interior from dust and moisture.

1.1.1 The prefabricated components of the lift unit support system shall be designed to preclude the lifting cable from contacting the power or video cabling. The lowering device manufacturer shall provide a conduit mount adapter for housing the lowering cable. This adapter shall have an interface to allow the connection of a Contractor-provided conduit and be located just below the cable stop block at the back of the lowering device. The contractor shall supply internal conduit in the pole as required by the engineer. The only cable permitted to move within the pole or lowering device during lowering or raising shall be the stainless steel lowering cable. All other cables shall remain stable and secure during lowering and raising operations.

1.1.2 The female and male socket contact halves of the connector block shall be made of thermosetting synthetic rubber known as Hypalon. The female brass socket contacts and the male high conductivity brass pin contacts shall be permanently molded into the Hypalon body.

1.1.3 The current carrying male contacts shall be 1/8 inches in diameter. There shall be two male contacts that are longer than the rest which will make first and break last providing optimum grounding performance. The number of contacts shall be 14 and the camera mounted thereto, shall be capable of performing all of its necessary functions on 14 contacts or less.

1.1.4 The current carrying female contacts shall be 1/8 inches I.D. All of the contacts shall be recessed 0.125" from the face of the connector. Cored holes in the rubber measuring 0.25" in diameter and 0.125" deep molded into the connector body are centered on each contact on the face of the connector to create rain-tight seals when mated with the male connector.

1.1.5 The wire leads from both the male and female contacts shall be permanently and integrally molded in the Hypalon body. The current carrying and signal wires molded to the connector body shall be constructed of #18/1 AWG Hypalon jacketed wire.

1.1.6 The contacts shall be self-wiping with a shoulder at the base of each male contact so that it will recess into the female block, thereby giving a rain-tight seal when mated. The electrical contact connector shall meet Mil Spec Q-9858 and Mil Spec I-45208.

1.2 Lowering Tool. The camera-lowering device shall be operated by use of a portable lowering tool. The tool shall consist of a lightweight metal frame and winch assembly with cable as described herein, a quick release cable connector, an adjustable safety clutch and a variable speed industrial duty electric drill motor. This tool shall be compatible with accessing the support cable through the hand hole of the pole. The lowering tool shall attach to the pole with one single bolt. The tool will support itself and the load assuring lowering operations and provide a means to prevent freewheeling when loaded. The lowering tool shall be delivered to the applicable DOT Engineer upon project completion. The lowering tool shall have a reduction gear to reduce the manual effort required to operate the lifting handle to raise and lower a capacity load. The lowering tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The lowering tool shall be equipped with a positive breaking mechanism to secure the cable reel during raising and lowering operations and prevent freewheeling. The manufacturer shall provide a variable speed, heavy-duty reversible drill motor and a minimum of one lowering tool plus any additional tools required by plan notes. The lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

2.0 Materials. All pulleys for the camera lowering device and portable lowering tool shall have sealed, self lubricated bearings, oil tight bronze bearings, or sintered- oil impregnated, bronze bushings. The lowering cable shall be a minimum 1/8-inch diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds with (7) strands of 19 wire each.

2.0.1 All electrical and video coaxial connections between the fixed and lowerable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. The electrical connections between the fixed and movable lowering device components shall be designed to conduct high frequency data bits and one (1) volt peak-to-peak video signals as well as the power requirements for operation of dome environmental controls.

2.0.2 The interface and locking components shall be made of stainless steel and or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

2.0.3 The camera junction box shall be cast ZA-12 (12% aluminum and 88% zinc) and weigh a minimum of 50 LBS to insure stability of camera during the raising and lowering operation. The camera junction box shall have 2 fully gasketed doors to prevent water intrusion. The bottom of the camera junction box shall be equipped with a condensation/moisture exit system.

2.0.4 The camera manufacturer shall provide weights and/or counterweights as necessary to assure that the alignment of pins and connectors are proper for the camera support to be raised

into position without binding. The lowering unit will have sufficient weight to disengage the camera and its control components in order that it can be lowered properly.

2.0.5 The camera manufacturer shall provide the power and signal connectors for attachment to the bare leads in the pole top and/or camera junction boxes.

2.0.6 Either the camera manufacturer or the lowering device provider shall provide a mounting flange sufficient for mounting the respective camera assembly to the bottom of the camera connection box.

2.1 Camera Lowering System Steel Pole.

2.1.1 Design. Design shall be in accordance with the latest edition of AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals." Minimum Loading requirements shall be based on an isotach wind velocity for the area of installation according to 2015 AASHTO isotach wind chart with a 1.14 gust factor.

2.1.1.1 Shop Drawings are required and shall include details of the hand holes, cable inlets, and pole cap, as well as fasteners and hardware required for the lowering device. Calculations showing that the pole meets the requirements of the AASHTO specifications shall be submitted with the shop drawings, and calculations shall be signed and sealed by a Professional Engineer registered in the State of Missouri.

2.1.2 Fabricator. The fabricator shall be certified under Category I, "Conventional Steel Structures" as set forth by the American Institute of Steel Construction Quality Certification Program. Proof of this certification will be required to ensure that the fabricator has the personnel, organization, experience, procedures, knowledge, equipment, capability and commitment to fabricate quality pole structures.

2.1.3 Welding. All welding shall be in accordance with Sections 1 through 8 of the American Welding Society (AWS) D1.1 Structural Welding Code. Tackers and welders shall be qualified in accordance with the code. Tube longitudinal seam welds shall be free of cracks and excessive undercut, performed with automatic processes, and be visually inspected. Longitudinal welds suspected to contain defects shall be magnetic particle inspected. All circumferential butt-welded pole and arm splices shall be ultrasonically or radiographically inspected.

2.1.4 Material Certifications. All materials and products shall be manufactured in the United States of America, and comply with ASTM or AASHTO specifications. Mill certifications shall be supplied as proof of compliance with the specifications.

2.1.5 Performance Calculations. The pole shall be designed to support the specified camera and accessories. Close consideration shall be given to the effective projected area of the complete lowering system and camera equipment to be mounted on the pole along with the weight when designing the pole to meet the specified deflection performance criteria. The pole top deflection shall not exceed one inch in a 30-mph (non-gust) wind. The calculations shall include a pole, base plate, and anchor bolt analysis. The pole calculations shall be analyzed at the pole base, at 5-ft. pole intervals/segments, and at any other critical pole section. At each of these locations, the following information shall be given:

- The pole's diameter, thickness, section modulus, moment of inertia, and cross sectional area.
- The centroid, weight, projected area, drag coefficient, velocity pressure, and wind force of each pole segment.
- The axial force, shear force, primary moment, total moment, axial stress, bending stress, allowable axial stress, allowable bending stress, and combined stress ratio (CSR).
- The pole's angular and linear deflection.

2.1.6 Pole Shaft. The pole shaft shall conform to ASTM A595 Grade A with a minimum yield strength of 55 ksi or ASTM A572 with a minimum yield strength of 65 ksi. The shaft shall be round, 12-sided, or 16 sided with a four inch corner radius, have a constant linear taper of 0.14 in/ft, and contain only one longitudinal seam weld. Circumferential welded tube butt splices and laminated tubes are not permitted. Longitudinal seam welds within 6 inches of complete penetration pole to base plate welds shall be complete penetration welds. The shaft shall be hot dip galvanized per the requirements of the contract documents.

2.1.7 Winch Hand Hole. The hand hole opening shall be reinforced with a minimum 2-inch wide hot rolled steel rim. The minimum outside dimension shall be 6 inches x 27 inches. The handhole shall have a tapped hole for mounting the portable winch thereto as shown on the drawings. Unless otherwise required, the bottom lip of this handhole shall be a minimum of 30 inches from the pole base.

2.1.8 Pole Top Tenon. The pole shall have a custom plate mounted tenon that allows the field modification of the arm/camera orientation up to 360 degrees. With this design, the MoDOT Engineer can make slight orientation modifications to the camera mount to allow optimum viewing in case of future road development, change in terrain, or a change in the viewing needs priority. The tenon shall have mounting holes and slot as required for the mounting of the camera-lowering system. The tenon shall be of dimensions necessary to facilitate camera lowering device component installation. For details, see applicable drawings.

2.1.9 Cable Supports / Electrical Cable Guides and Parking Stand (Eyebolts). Top and bottom electrical cable guides shall be located within the pole, aligned with each other as referenced in the drawings. One cable guide shall be positioned 2 inches below the handhole and the other shall be positioned 1 inch directly below the top of tenon. Two parking stands shall be positioned a maximum of 2.75 inches below the top of the handhole and located at 90 and 270 degrees from the handhole.

2.1.10 Base Plate. Base plates shall conform to ASTM A36 or A572 Grade 42. Plates shall be integrally welded to the tubes with a telescopic welded joint or a full penetration butt weld with backup bar. Plates shall be hot dip galvanized per the requirements of the contract documents.

2.1.11 Anchor Bolts. Anchor bolts shall conform to the requirements of ASTM F1554 Grade 55. The upper 12 inches of the bolts shall be hot dip galvanized per ASTM A153. Each anchor bolt shall be supplied with two hex nuts and two flat washers. The strength of the nuts shall equal or exceed the proof load of the bolts.

3.0 Shop Drawings. Shop Drawings are required and shall include details of the hand holes, cable inlets, and pole cap, as well as fasteners and hardware. Calculations showing that the pole and foundation connection meet the requirements of the latest edition of AASHTO's *Specification for Structural supports for Highway Signs, Luminaires and Traffic Signals* shall be

submitted with the shop drawings. Calculations shall be signed and sealed by a Professional Engineer registered in the State of Missouri.

4.0 Basis of Payment. Measurement and payment for the CCTV pole includes the furnishing and the installation of both the pole and lowering device, and all miscellaneous hardware required for a fully operational system as shown on the plans.

Item No.	Type	Description
910-99.02	Each	80-foot CCTV Camera Pole and Lowering Device, Furnish and Install

WW. PAD MOUNTED POWER SUPPLY

1.0 Description. This work shall consist of furnishing and installing a 120/240 Volt power supply assembly, Type 2, at the location shown on the plans. The power supply shall be multi-circuit pad mounted. Available power supplies are listed in the lighting section of the MoDOT approved products list under Pad Mounted Lighting Controllers. Control stations shall be installed in accordance with the plans and by direction of the Engineer.

2.0 Basis of Payment. Payment for furnishing and installing pad mounted power supplies will include all excavation, materials, equipment, tools, labor, and work incidental thereto. Payment will be made as follows:

Item No.	Type	Description
910-86.21	Each	Pad Mounted Power Supply, 240/120V ITS

XX. AS-BUILT COMMUNICATIONS PLANS

1.0 Description. This work shall consist of providing both Microsoft Visio and PDF files of as-built communications plans for the project. The Commission will furnish Visio versions of the advertised plans. If there are any field connections or terminations completed that are different from the provided communications plans, the Contractor shall submit revised drawings in the requested formats to the Commission.

2.0 Basis of Payment. As-built Communications Plans will be paid for at the contract lump sum price.

Item No.	Type	Description
910-99.01	Each	As-built Communications Plans

YY. INSTALL RELOCATED CABLES

1.0 Description. This work shall consist of relocating existing communications or power cables as shown in the plans.

2.0 Construction Requirements. The removal and installation of fiber optic cables shall meet all the requirements specified in "Fiber Optic Cable" JSP, including testing. The removal and installation of copper cables shall meet all requirements specified in Sec. 902.

3.0 Basis of Payment. Measurement and payment for install relocated cables shall be considered full compensation for all Contractor-provided equipment, terminations, labor, and material to complete the described work. Payment will be made as follows:

Item No.	Type	Description
910-99.03	Linear Foot	Install Relocated Cable

ZZ. ITS ASSET MANAGEMENT TOOL

1.0 Description. This work shall consist of updating the Commission’s ITS asset management tool to reflect the final condition of the entire ITS system within the project limits as shown on the plans. Updates shall be provided for all locations where any ITS components are modified. Updating shall be performed by a Commission-approved vendor (currently NexusWorx).

2.0 Construction Requirements.

2.1 The Contractor shall provide any relevant notes to a specific location that can be entered into the tool to aid in the understanding of the device configuration and location. At a minimum, this will include providing the latitude and longitude coordinates of each pull box, CCTV camera, node cabinet, added or abandoned conduit, cable, and fiber, along with any serial numbers and/or identification information. The Contractor shall locate the conduit at least every 100 feet using a GIS locating device that is accurate to the nearest foot. The Contractor shall provide a GIS based map of the conduit route and a complete listing of all of map coordinates in an electronic spreadsheet. Population of the ITS asset management tool will be required for all previously installed devices as well as any devices installed under this contract.

2.2 The Commission will provide, upon request, existing ITS as-built plans to the Contractor, if available. The contractor shall furnish to Commission approved staff a copy of final as-built construction plans relevant to all of the ITS components in Visio and/or MicroStation formats, if relevant.

2.3 The Contractor shall be provided one licensed login ID for read-only access to NexusWorx by the Commission before work begins.

3.0 Acceptance Testing.

3.1 All entries and updates shall be completely entered and available for use within 30 days from final acceptance of the project.

3.2 Commission staff shall verify population of the ITS asset management tool, including accuracy and completeness of details for each component prior to acceptance and payment.

4.0 Basis of Payment. Payment for all items covered by this specification, including the population and acceptance testing, shall be paid for at the contract unit price for at the contract unit price for:.

Item No.	Type	Description
910-99.01	Lump Sum	ITS Asset Management Tool

AAA. FIELD TERMINAL CABINET, TYPE 2

1.0 Description. The Contractor shall furnish and install a new cabinet for splicing fiber optic cables.

2.0 Materials.

2.0.1 All cabinets shall include a grounding system. Connection to ground shall be bare, solid AWG #6 copper wire or equivalent bonding strap.

2.0.2 All doors shall have cabinet identification labels displaying the cabinet identifier. The Engineer shall provide a list of the identifiers for each location, as well as the format for the labels.

2.0.3 All seams shall be continuously welded and ground smooth.

2.0.4 All fasteners shall be stainless steel.

2.0.5 All cabinets shall have a natural aluminum finish, free from blemishes.

2.0.6 The Contractor shall provide terminal blocks for all conductors entering the cabinet. Except for blocks used for coaxial cable, the blocks shall be the barrier type with nickel-plated brass screw terminals and solid backs. Terminal blocks for conductors carrying more than 60 volts shall be covered by a clear acrylic shield.

2.0.7 All cabinet doors shall have locks keyed to match MoDOT's other Gateway Guide cabinets.

2.1 Type 2 Cabinet.

2.1.1 The Contractor shall provide a cabinet meeting the requirements for a Model 334 cabinet in the latest edition of *Transportation Electrical Equipment Specifications* published by Caltrans, except as specified in this JSP. The manufacturer shall be on the Missouri Department of Transportation's Traffic Operations Approved Products List for Type 170 controller cabinets and racks.

2.1.2 Components described in Chapter 6 Section 4 of *Transportation Electrical Equipment Specifications* are not required, nor are police panels. The following components are required:

- **Sunshields:** On all four sides and the top.
- **Housing, Mounting Cage, and Side Panels**
- **Rack-mounted, slide out shelf with storage tray:** Mounted immediately above the fiber optic splice enclosure.
- **Concrete foundation:** The concrete foundation shall be constructed as shown on the plans and in accordance with Sec 902.15 of the standard specifications.

- **Base adapter:** The base adapter shall be a hollow aluminum box one foot high, 30 inches wide, and 30.25 inches deep (the same depth as the cabinet). It shall have a cutout opening centered in the top 15 inches wide and 21 inches deep, matching the opening in the bottom of the cabinet. It shall have a similar cutout on the bottom, directly below the top cutout.

Around the top cutout shall be four punched holes that match the anchor bolt holes in the cabinet. The Contractor shall provide bolts, nuts, washers, and lock washers to bolt the cabinet to the base adapter through these holes. Around the bottom cut out shall be four punched holes that also match the anchor bolt holes in the cabinet.

The Contractor shall construct the adapter so that it does not sag under the weight of the fully loaded cabinet. Any internal members shall not obstruct cables going from the cabinet to adjacent cabinets, nor to the conduits below. The Contractor shall construct the adapter of the same material used for the cabinet and give it a matching finish. All seams shall be continuously welded and ground smooth.

- **Anchor bolts, nuts, and washers:** For installation in a concrete foundation.

3.0 Construction Requirements.

3.0.1 Base Adapter and Cabinet Installation. Prior to bolting the base adapter to the foundation, the Contractor shall apply silicone sealant to the mating surface of the adapter to prevent water from seeping between the adapter and foundation. Likewise, prior to bolting the cabinet to the base adapter, the Contractor shall apply silicone sealant to the mating surface of the cabinet to prevent water entry. The Contractor shall ensure that the cabinet is plumb, using shims if necessary, and ensure that it is properly aligned with the front edge of the base adapter.

3.0.2 Bonding and Grounding. The Contractor shall connect base-mounted cabinets directly to a ground rod.

4.0 Acceptance Testing.

4.0.1 The Contractor shall conduct a visual inspection of the cabinet, and arrange for the Engineer's representative to witness the inspection.

4.0.2 The Contractor shall give the Engineer a report documenting the result of the visual inspection. The Contractor shall include a summary indicating whether the cabinet passed the inspection. The cabinet shall pass the inspection to be accepted.

4.0.3 If the cabinet fails, the Contractor shall correct the problems and arrange for a new test.

5.0 Documentation.

5.0.1 Prior to purchasing the cabinets, the Contractor shall provide five sets of complete shop drawings, layout drawings, catalog cuts, and schematics. The layout drawings shall be dimensioned drawings showing the proposed location of all equipment for each cabinet. The drawings shall demonstrate that all the equipment will fit, and that all controls, connections, and other service points are readily accessible. The Contractor shall lay out all cabinets that have the same equipment in the same way and submit a single drawing for all like cabinets. The

Contractor shall revise the layout as instructed by the Engineer and resubmit the drawings until they are accepted.

5.0.2 After installation, the Contractor shall provide one reproducible 24 inch X 36 inch and two prints of the cabinet diagram for each cabinet. The diagrams shall be nonproprietary. They shall reflect as-built conditions and shall identify all equipment and cabling in such a manner as to be readily interpreted. The diagrams shall be placed in a heavy duty, clear plastic pouch and attached to the front cabinet door. The pouch shall be of such design and material that it provides adequate storage and access to the wiring diagram.

6.0 Guarantee. All items covered by this specification shall carry a two-year guarantee from the date of acceptance against any imperfections in workmanship or materials.

7.0 Spare Parts. The Contractor shall furnish spare parts to the Transportation Management Center.

8.0 Basis of Payment. Measurement and payment for items covered by this specification include the documentation and acceptance testing, in addition to all materials, including base adapters and equipment. Payment will be made as follows:

Item No.	Type	Description
910-99.02	Each	Field Terminal Cabinet, Type 2, Furnish and Install
910-91.00	Cubic Yard	Base, Concrete

BBB. CONDUIT SLEEVE

1.0 Description. This work shall consist of installing a conduit sleeve to join to separate conduits inside an existing handhole to be demolished.

2.0 Material. Sleeve shall be in accordance with requirements outlined in Section 1060 unless otherwise approved by the Engineer.

3.0 Construction Requirements.

3.0.1 At the pull box site noted on the plans, the Contractor shall pull all slack fiber optic cable into adjacent pull boxes with care, such that the fiber optic cables are not damaged. The Contractor shall coil all fiber slack in adjacent pull boxes. No slack shall remain in the pull box. Damage to existing fiber optic cables will be repaired at the Contractor's expense.

3.0.2 The Contractor shall install a conduit sleeve between the two existing conduit runs, such that the fiber optic cable(s) is completely housed within the sleeve and the existing conduit runs are coupled together. The Contractor shall tighten the conduit sleeve so that no part of the fiber optic cable is exposed and that the sleeve will not break free during subsequent earthwork.

3.0.3 Once the sleeve is placed, the Contractor shall breakdown and remove the pull box. The Contractor shall exercise care so as not to disturb or damage the existing conduit integrity or sleeve. The Contractor shall fill in the void left by the pull box removal and bury the conduit under with an Engineer approved backfill. The Contractor shall restore the site so that the pull box hole is filled in and the terrain is at the same grade.

4.0 Basis of Payment. Measurement and payment for work covered by this specification includes equipment, tools, and materials necessary to install the conduit sleeve and restore the site. Payment will be made as follows:

Item No.	Type	Description
910-99.02	Each	Conduit Sleeve

CCC. RELOCATE EXISTING TYPE 7 CABINET

1.0 Description. The Contractor shall relocate an existing Type 7 cabinet and its contents from an existing CCTV camera pole to a new CCTV camera pole. The Contractor shall remove the existing cabinet and reinstall the cabinet on the new camera pole, make necessary connections, and test for proper network connection. This work shall be coordinated with MoDOT SLITS Group via an email to SLITS@modot.mo.gov.

2.0 Materials.

2.0.1 The Contractor shall provide new stainless steel banding straps and any other mounting hardware needed to attach the existing cabinet on the new CCTV camera pole.

2.0.2 The Contractor shall provide any cables (such as Category 5E patch cords, coax patch cords, power cables, and short serial cables, etc) as required to re-establish power and communications for the cabinet equipment.

3.0 Construction Requirements.

3.0.1 The cabinet and its entire contents shall be removed by the Contractor from its existing location with approval from the Engineer. Power and fiber cables to the cabinet shall be removed and/or relocated as shown on the plans. The existing video encoder and associated cabling shall be removed and salvaged per the "Disposition of Existing Signal/Lighting and Network Equipment" JSP.

3.0.2 The Contractor shall mount the existing cabinet on the new pole as shown on the plans. Power and grounding cables shall be reconnected to match the configuration from prior to removal from the existing site. The Contractor shall connect the communication cables as shown on the on the plans. The Contractor shall NOT move any cables from port to port on the network switches without prior MoDOT approval.

3.0.3 The Contractor shall assist Commission staff in making the relocated equipment operational. This may entail having a person with a cellular telephone at the cabinet reporting on results and making changes as directed by Commission staff to ensure the cabinet communicates with the network. It may also entail installing replacement equipment when a unit cannot be made to work properly.

4.0 Basis of Payment. Measurement and payment for cabinet and communication equipment relocation will be on a per cabinet basis. The unit price shall include patch cords, cabling, assistance to Commission staff in getting the equipment operational, documentation, and all miscellaneous hardware required for a safe, fully operational system. Payment will be made as follows:

Item No.	Type	Description
910-99.02	Each	Field Terminal Cabinet, Type 7, Remove and Relocate

DDD. MODOT BURIED CABLE DRIVEABLE DELINEATOR POST

1.0 Description. The Contractor shall install a MoDOT 'Buried Cable' delineator post (see plans for details) next to all new fiber optic pull boxes within the project limits. The post shall withstand multiple directional impacts and provide a long-lasting and extremely durable product requiring little field maintenance. The Contractor shall not be required to install posts at pull boxes nearest to new or existing field cabinets. The posts shall also be placed at a minimum spacing of 500 feet between pull boxes, unless line of sight to the adjacent post would be obstructed, in which case the engineer may direct the Contractor to install posts at points to allow for ground-level line of sight from adjacent posts or field cabinets.

2.0 Materials. The posts shall be supplied in orange color and incorporate a premium UV inhibitor package to resist harmful effects to the sun. The posts shall have a minimum 0.20" wall thickness and shall stand up straight in all weather conditions and self-right to straight upon impact. Top of posts shall be permanently sealed and partially flattened and transition to round to afford 360-degree visibility. The post materials shall include an anchor, a non-mechanical flexible joint, and a round delineator post.

2.0.1 The post assembly should allow for easy change out of any one part if necessary.

3.0 Construction Requirements. Construction requirements shall conform to the delineator post manufacture recommendations and the engineer's approval.

4.0 Basis for Payment. Payment for the 'Buried Cable' delineator post shall be considered full compensation for all Contractor-provided equipment items, labor, and material to complete the described work. Payment will be made as follows:

Item No.	Type	Description
910-99.02	Each	MODOT BURIED CABLE DRIVEABLE DELINEATOR POST

EEE. Check Valve

1.0 Description. This work shall consist of furnishing and installing the check valve in the location as shown on the plans. The valve shall allow passage of flow in one direction while preventing reverse flow from the Meramec River.

2.0 Submittals. Prior to construction submit project literature that includes information on operation of the valve, material of construction, dimensions and weights, elastomer characteristics, flow data, headloss data and pressure ratings. Engineer must approve prior to installation.

3.0 Materials. Check valves are to be all rubber of the flow operated check type with inline connection. The check valve is designed to slip into the specified pipe diameter and attached by means of vendor furnished stainless steel clamps, which expand outward to secure the valve inside the pipe. The valve shall be one piece rubber construction.

4.0 Construction Requirements. Valves shall be installed in accordance with manufacturer's written installation and operation manual.

5.0 Method of Measurement. Measurement of check valve will be made per each.

6.0 Basis of Payment. All labor, equipment and material costs to complete the described work shall be completely covered at the contract unit price for Check Valve.

FFF. Trash Guard

1.0 Description. This work shall consist of furnishing and installing a flared end section trash guard in the location as shown on the plans using Haala Standard Trash Guard TG12S-R, or equal.

2.0 Submittals. The Engineer shall approve any alternative Trash Guard prior to installation.

3.0 Construction Requirements. Trash Guards shall be installed in accordance with manufacturer's installation instructions.

4.0 Method of Measurement. Measurement of trash guard will be made per each.

5.0 Basis of Payment. All labor, equipment and material costs to complete the described work shall be completely covered at the contract unit price for Trash Guard.

GGG. Debris Rack

1.0 Description. This work shall consist of furnishing and installing a Debris Rack in the locations as shown on the plans using Contech StormRax Flat Series 1, or equal. Each rack shall have a maximum opening size of two-inches.

2.0 Submittals. The Engineer shall approve any alternative Debris Rack prior to installation.

3.0 Construction Requirements. Debris Racks shall be installed in accordance with manufacturer's installation instructions.

4.0 Method of Measurement. Measurement of Debris Rack will be made per square foot.

6.0 Basis of Payment. All labor, equipment and material costs to complete the described work shall be completely covered at the contract unit price for Debris Rack.

GGG. TEMPORARY TRAFFIC CONTROL

1.0 Description. All work necessary to maintain safe and efficient traffic flow through the work areas 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 contract documents or as directed by the engineer.

2.0 Work requirements. Work shall be in accordance with Sec 612, 616, 619, 620 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, but 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 Sec 105, the remaining contract price for the item of temporary traffic control will be paid.
- (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 Temporary traffic control will be paid for at the contract lump sum price for Item:

Item No.	Unit	Description
616-99.01	Lump Sum	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, directional indicator barricades, moveable barricades, drums, etc.
- (f) Worker apparel.
- (g) Flaggers, pilot vehicles, and appurtenances at flagging stations.
- (h) Furnishing, installing, operating, maintaining, and removing construction-related vehicle and equipment lighting including.
- (i) Construction and removal of temporary equipment crossovers, including restoring pre-existing crossovers.
- (j) Removing existing pavement markings, installing temporary contrast pavement markings, and removing and relocating temporary pavement markings as necessary for staging operations. Removal of pavement markings shall not mar the surface of the pavement.

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 allowed in this case.

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ATTACHMENT TO JOB SPECIAL PROVISIONS

United States Coast Guard Bridge Permit (_ - _)

<p>“THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.”</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636</p>
	<p>Jacobs 501 North Broadway St. Louis, MO 63102 Certificate of Authority # 000704 Consultant Phone # 314.335.4000</p>
	<p>If a seal is present on this sheet, JSP's has been electronically sealed and dated.</p>
	<p>JOB NO. J6I3029 St. Louis County, MO Date Prepared: 2/8/2018</p>
	<p>Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: A, B, C, D, E, F, G, H, I, J, K</p>

PRELIMINARY

JOB SPECIAL PROVISIONS (BRIDGE)

A. CONSTRUCTION REQUIREMENTS

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

2.0 Construction Requirements. Plans for the existing structure(s) are included in the contract with the bridge plans for informational purposes only.

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

2.2 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 allowed.

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

2.4 Any damage sustained to 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.

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

3.0 Navigation Requirements.

3.1 All work shall be performed so that the free flow of navigation is not unreasonably interfered with and the navigable depths are not impaired. 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 website. If scaffolding or nets are suspended below the steel in the navigations span, the engineer shall be advised so that 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 spark producing, flame producing, lighted or damaging objects from falling 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.

3.2 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 for approval.

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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. BRIDGE REMOVAL - BRIDGE NO. L0623 AND A2643

1.0 Description. This work shall consist of the complete removal in accordance with [Sec 216](#) for removal of bridges for existing Bridge L0623 and A2643. The substructure consists of units as shown on the existing bridge plans.

2.0 Construction Requirements.

2.1 Demolition. The contractor's demolition plan shall specify adequate resources available as back up to meet unforeseen contingencies that could jeopardize the completion of the project. In addition, the plan shall include possible alternative methods for span removal should water levels change drastically or equipment fail while in service. Prior to commencement of demolition activities and after all demolition is complete; the contractor shall provide a grid sounding of the river channel to establish riverbed elevations. The grid sounding shall extend from bank to bank of the river and for a distance of 150 feet on each side of the centerline existing bridge. The grid shall be at 50 feet distance.

2.2 Removal Limits. The existing bridges (L0623 and A2643) shall be completely removed to a depth of four feet below finished grade.

2.3 Utilities. Presently there are utilities on, beneath or immediately adjacent to the bridge. Prior to the start of work by the contractor, the contractor shall see that all such utilities that may impede or prove a hazard to the contractor's operations, shall be relocated, abandoned or otherwise modified to eliminate any impediment or hazard. There are also Century Link and ITS utilities on the existing structure that will be moved to the proposed structures. Relocation of these utilities to the new structure shall be coordinated to avoid interruption of utility services.

2.4 Material Disposal. All material disposals shall be in accordance with [Sec 202](#). Any permit or license require for deposal of material shall be in accordance with [Sec 107](#).

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 lump sum price for "Removal of Bridges".

C. NAVIGATIONAL CONSIDERATIONS AND WORK WITHIN RIVER

1.0 Description. Demolition of the I-44 Bridges (L0623 and A2643) across the navigable waters of the Meramec River, at the City of Fenton, St. Louis County, Missouri has been authorized by an instrument of approval and signed by direction of the District Commandant, US Coast Guard. Copy of the US Coast Guard permit is attached with job special provisions.

2.0 Construction Requirements. The contractor shall assume all the obligations and shall comply with all the requirements and provisions of the permits, which are applicable to the work of this contract. The said instrument of approval for removing the structures authorizes the

JOB SPECIAL PROVISIONS (BRIDGE)

contractors to proceed with the work upon direction from the State of Missouri without further communication on the part of any contractor with authorities of the Federal Government.

2.1 Demolition Schemes and Working Plans. The contractor shall not be relieved from responsibility for preparing demolition schemes and working plans of temporary structures, etc. The demolition scheme and working plans prepared by the contractor shall be submitted to the engineer. The demolition scheme and working plans will be reviewed by the engineer and, when in concurrence therewith, the engineer will forward the material to the US Coast Guard District for approval.

2.1.1 All demolition operations in and over the Meramec River shall be in accordance with the requirements and directions of the District Commander, Western Rivers Operation, Eighth Coast Guard District, Bridge Branch; the US Army Corps of Engineers; the State of Missouri; and other federal, state or local authority having cognizance of any aspect pertaining to the location and demolition of the bridge. All work shall be so conducted that the free navigation of the waterway is not unreasonably interfered with and the present navigable depths are not impaired. The construction of falsework, pilings or other obstructions, if required for the work, shall be accomplished in accordance with plans prepared by the contractor and shall be submitted to the engineer. The plans for construction of falsework, pilings or other obstructions will be reviewed by the engineer, and when in concurrence therewith, the engineer will forward the material to the US Coast Guard District for approval. The channel or channels through the structure shall be promptly cleared of all obstructions placed therein or caused by the demolition of the bridge to the satisfaction of the District Commander, when in the District Commander's judgment the construction work has reached a point where such action should be taken.

2.1.2 Plans for temporary structures within the waterway area, construction schemes and other applications or documents customarily requiring approval by the above-mentioned authorities or permits to perform specific work shall initially be submitted to the engineer. Such plans, narratives or applications will be reviewed by the engineer and, when in concurrence therewith, the engineer will forward the material to the appropriate agency or agencies for approval. The contractor shall furnish all necessary and sufficient copies of material for submittal as may be established by procedure and submittals shall be made sufficiently in advance of the work involved as to permit orderly processing. This procedure is established with matters pertaining to details, prosecution of work, etc. and does not require specific action by the contractor with respect to the afore mentioned authorization to proceed with removal.

2.1.3 Permits returned by governing authorities in response to the above described submittals will be issued to the Missouri Highway and Transportation Commission, with all stipulations therein becoming the obligation of the contractor in carrying out the work. Routine approvals with or without conditions attached will be returned to the contractor via the engineer.

2.2 Bridge Removal Requirements. The waterway through the structure shall be promptly cleared of all obstructions caused by the bridge removal to the satisfaction of the District Commander, Western Rivers Operation, Eighth Coast Guard District, Bridge Branch.

2.2.1 Should the contractor, during the progress of work, lose, throw overboard, sink or misplace any material, machinery, plant or appliance which in the opinion of the engineer may be dangerous or obstructive to navigation, the contractor shall immediately recover and remove. The contractor shall give immediate notice with the description and location of such obstruction to the engineer and US Coast Guard. When required, the contractor shall mark, by one or more lighted buoys, obstructions until removed to the satisfaction of the District Commander, Western

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Rivers Operation, Eighth Coast Guard District, Bridge Branch. Such buoys shall be horizontally striped orange and white with the top stripe orange. The buoys shall be aligned cross-river at intervals of about 25 feet or as close as practicable to the obstruction in the river. Each buoy shall be lighted at night with a quick flashing white light (60 flashes per minute). If obstruction is extending above water, orange flags by day and quick flashing white lights by night may be displayed on the obstruction in lieu of any buoy.

2.2.2 Positive precautions shall be taken to prevent the dropping of spark-producing, lighted and other damaging objects on tows or vessels. All flame-cutting, welding and similar spark-producing operations shall be ceased over the channel when vessels are passing beneath the bridge.

2.2.3 The main channel spans, after being dropped into the river, shall be promptly and completely removed. All debris shall be removed and the area swept and cleared within 48 hours.

2.2.4 Immediately upon completion of the removal of each river span or other obstruction, a thorough sweeping of the area shall be made at the contractor's expense. The procedure to sweep the river shall be approved by the US Army Corps of Engineers, St. Louis District. The sweeping operation shall be performed while an authorized representative of that agency is present to observe results. Mutually agreed upon tentative dates for each sweep shall be made with the US Army Corps of Engineers prior to dropping each river span.

2.2.5 A final sweep of the channel, including the area upstream and downstream of the bridge, shall be conducted after removal of structure, to verify complete removal of demolished material from the river. As part of this verification, the contractor shall provide a final sounding of the river at the grid locations of the pre-demolition sounding survey.

2.2.6 Barges and other craft engaged in this demolition shall display such lights and signals as required by the current "Inland Navigational Rules".

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 lump sum price for "Removal of Bridges".

D. DEMOLITION PROCEDURES AND SAFETY CONSIDERATIONS

1.0 Description. This work shall consist of the most feasible and effective method for removal of the old bridge structure, particularly the concrete piers, is a combination of dismantling and demolition. The depth of demolition or removal shall be in accordance with [Sec 216](#) for removal of bridges.

2.0 Removal Requirements.

2.1 The steel, concrete and associated materials on the bridge decking may be lowered onto barges in pieces and demolished further at a non-wetland site. The superstructure shall be demolished in stages and removed from the river.

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2.2 Definition of Demolition Terms.

(a) Demolition materials shall describe all non-concrete excavated materials, including but not limited to, any liquids, wood, steel, earth excavations, cleared vegetation and refuse. Demolition materials shall become the property of the contractor and shall be removed from the project site. Demolition materials shall not be buried or burned on the site.

(b) Disposal debris refers to excavated river alluvium, riprap stone and mass concrete rubble that is to be removed from the river. The term "concrete" as used herein shall be interpreted to mean both reinforced and unreinforced mass concrete.

(c) Flyrock is rubble projectiles thrown by the blast to variable distances from a blast site.

(d) Mucking is defined as the removal of blast demolition materials, disposal of debris or muck from the blast location to the final disposal site.

2.2.1 Concrete rubble and the flyrock resulting from a controlled explosion, shall be regarded as disposal debris, as defined above, when falling into the river. No concrete rubble shall be left in the river. All such rubble shall become the property of the contractor and shall be removed and placed in a non-wetland site. Concrete may be reused as described in the special provision entitled RECYCLED CONCRETE MATERIAL.

2.2.2 Exposed, non-concrete projections (e.g., exposed rebar, steel sheet piling, timber piling) shall be regarded as demolition materials, as defined above, and shall be severed and removed by any safe, practicable means and disposed of properly in a non-wetland site.

2.3 General Requirements. The project shall require the demolition of reinforced concrete, structural steel and the severance of metal and any timber from both above and below the water level. Precautions to avoid damage and control flyrock, air blast overpressure, particle velocity and to mitigate blast impacts on river fauna shall be taken.

2.3.1 Methods used for steel severance fall into five categories as shown below. The burning bar method shall be prohibited from being used in underwater operations.

- (a) Standard shearing or sawing.
- (b) Standard oxyacetylene torches.
- (c) Ultrathermic cutting rods.
- (d) Prime cut rods.
- (e) Burning bars.

2.3.2 The contractor shall use any safe means to remove the existing bridge, provided that nearby structures remain secure and provided that river vessel and motor vehicle traffic is not delayed without approval of the appropriate federal, state and local agencies. Should the contractor elect to use blast demolition, the contractor shall adhere to the following restrictions:

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- (a) All steel that is free from concrete and all exposed non-concrete projections (e.g. rebar, steel sheet piling, timber piling, etc.) shall be regarded as demolition materials, as defined above, and shall be removed.
- (b) Controlled blasting methods for metal severance shall be in accordance with all requirements for blasting.
- (c) The contractor shall use the minimum charge necessary during each shot.

2.3.3 All reinforcement and embedded metals may not be detailed on the reference drawings. Reinforcement supports, form ties and other embedded items not shown on the reference drawings may exist in the concrete. The contractor shall be responsible for making allowances for the embedded items.

2.4 Operational Blasting Plan. The operation blasting plan shall include the requirements that a pre-demolition meeting be held at least two weeks prior to the plan execution. The meeting shall be coordinated with the US Coast Guard Bridge Branch, who will invite other Federal agencies. The operational blasting plan shall be a document, subject to amendment by the contractor, which shall specify the blast demolition parameters established to date and the means and reasons for modification. The contractor shall submit, at least 21 days prior to commencing blasting, four copies of the original operational blasting plan to the engineer. The operational blasting plan shall include as a minimum requirement the following items:

- (a) List of permits and clearances required, when applied for and date of approval or anticipated approval by federal, state and local agencies.
- (b) Precautions to avoid damage and control flyrock, air blast overpressure, particle velocity and to mitigate blast impacts on river fauna (e.g., repelling charges).
- (c) Plan and explanation showing location of warning signs, signals and buoys to be used. Methods for radio and visible communications to be used for control of river vessel, rail and motor vehicle traffic before blast initiation, during closure for detonation and following the blasting operations.

2.5 Flyrock Control. Flyrock shall be prevented or limited as necessary to avoid injury or damage at the site and in adjoining areas. The contractor shall use whatever means the contractor deems necessary to prevent injury or damage due to flyrock. Before the firing of any blast in areas where flying rubble may result in personal injury or in damage to property or the work site, the concrete structure to be shot shall be covered with approved blasting mats, soil or other equally serviceable material to prevent flyrock.

2.6 Mucking. Concrete rubble shall be regarded as disposal debris when displaced from original position in the structure. The department does not specify any limits on the muck size (i.e., the size of rubble blocks). Exposed, non-concrete projections, both above and below the water, shall be severed and removed by any safe, practicable means and disposed off-site. All cutting of non-concrete materials and all work with diving or hand-held tools, which may be necessary for muck removal, shall be considered as incidental items to mucking.

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2.7 Blasting Safety.

2.7.1 The contractor shall coordinate and work with the applicable federal, state and local agencies, as approving authorities, prior to delaying river vessel and motor vehicle traffic. The contractor shall keep the traffic and all pedestrians at safe distances from vibration, air blast and blast noise after the appropriate agencies have given approval.

2.7.2 Flaggers shall be used to warn river traffic before blasting. Not less than one hour prior to and during the detonation of explosives, flaggers shall be stationed in radio equipped boats positioned one-half mile upstream and downstream of the bridge to positively warn approaching river traffic of the impending action and obstructions in the river. The contractor shall provide such warning devices as may be necessary to keep boats out of the immediate danger area.

2.7.3 If, in the opinion of the person in charge of the explosive detonation, the use of radio, telephone or other electronic equipment in the area should be prohibited, at any time, the US Coast Guard, City of Fenton, and the engineer shall be advised well in advance so that timely notices can be published.

2.7.4 If explosives are to be transported by water, permits shall be obtained in accordance with Title 49, Code of Federal Regulations. Applications shall be submitted to the US Coast Guard Marine Safety Office, Paducah, KY.

2.8 Sweeping. The contractor shall verify by sweeping the river bottom that all demolition material from the bridge has been removed and that the pre-demolition elevations of the river bottom in the areas adjacent to the bridge have been restored as reasonably practicable. The contractor shall submit to the engineer for approval, the apparatus and methods proposed for sweeping. Should the sweeping operations reveal that material projects above the specified elevations, the contractor shall remove the obstructions at contractor's expense.

2.9 Removal of Demolition Materials and Refuse.

2.9.1 All demolition materials and refuse, except as specified above, resulting from demolition operations for this contract shall be removed from the site before completion of the work under these specifications. Concrete may be reused as described in the special provision entitled RECYCLED CONCRETE MATERIAL.

2.9.2 All construction and demolition operations in or over the river shall be in accordance with to the requirements and directions of MoDOT; the US Army Corps of Engineers; the US Coast Guard; and other authority having jurisdiction. All work in navigable waters shall be conducted so that free navigation of the waterway shall not be unreasonably interfered with, and that the existing navigable depths shall not be impaired.

2.10 Existing Permit. The contractor's attention is directed to existing construction permits acquired by MoDOT from the US Coast Guard and the US Army Corps of Engineers. The permits contain certain requirements that may affect the demolition contract. The contractor shall become familiar with the requirements and conduct the work accordingly.

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 lump sum price for "Removal of Bridges".

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E. ENVIROMENTAL 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

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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.

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

F. GALVANIZED STRUCTURAL STEEL PILE

1.0 Description. This job special provision contains general requirements for furnishing, coating and placing galvanized steel piles as shown on the plans and shall be in addition to the requirements of Sec 702.

2.0 Material. Structural steel piles shall be galvanized in accordance with ASTM A123 and Sec 1080. Repairs to the galvanized coating and field galvanizing shall be in accordance with ASTM A780. Zinc rich paints will not be allowed. Repairs and field galvanizing will not be required where the pile will be encased in concrete or below the limits specified in section 3.0 of this job special provision. Protective Coatings specified in Sec 702 will not be required for galvanized piles.

3.0 Construction Requirements.

3.1 Galvanizing material shall be omitted or removed 1 inch clear of weld locations. The method used to omit or remove the galvanizing material shall be masking, grinding or other methods as approved by the engineer. If a weld location falls within an area where galvanizing is required, clean the weld area making sure to remove all welding slag. Then field galvanize the weld area in accordance with ASTM A780. Zinc rich paints will not be allowed.

3.2 All pile below the pile concrete encasement shall be galvanized down to an elevation as shown on the plans.

3.3 At the contractor's option, the entire pile length may be galvanized.

4.0 Method of Measurement. Galvanized Structural Steel Pile in place will be the actual length to the nearest linear foot for that portion of the pile that remains permanently in the structure. See Sec 702 Basis of Payment for any additional length authorized by the engineer resulting from pile splices. No separate measurement will be made for pile that is not galvanized.

5.0 Basis of Payment. The accepted quantity of galvanized and non galvanized pile in place will be paid for at the contract unit price for Galvanized Structural Steel Pile. No direct payment will be made for incidental items necessary to complete the work unless specifically provided as a pay item in the contract

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G. PRE-BORE FOR PILES

1.0 Description. Replace Sec. 702.4.3 and substitute the following.

2.0 Pre-boring. The subsurface investigation encountered some cobble to boulder size material at the west end bent (End Bent 1) in the existing embankment slope between existing Bridges L0623 and A2643. Based upon borings drilled (BBWB-1A, 1B and 1D) this material extends at least 20 feet from the top of slope into the embankment. It is anticipated that pre-boring for piles may be required at End Bent 1 to the elevation shown on the plans. The holes shall have a diameter no less than six inches larger than the largest cross-sectional dimension of the pile, measured diagonally between opposite tips of the flanges for H-Piles. The size of the hole shall be approved by the engineer before pre-boring is started. Pilot holes of lesser diameter than the pile shall not extend below the pile tip. Piles installed in pre-bored holes shall be driven/seated such that the pile is fully bearing on the bearing stratum, not sloughed material. After the pile is installed in the hole and before the capacity is verified, the space remaining around the pile shall be filled with seal concrete in accordance with Sec. 501 or grout in accordance with Sec. 1066.

2.1. The contractor may, at his own risk, attempt to drive piles without prebore. However, if the minimum tip elevation is not achieved the pile shall be removed and prebore shall be required. Pilot holes may be used to determine if the full size prebore hole is required.

H. PILE WAVE ANALYSIS

1.0 General.

1.1 Scope of Work. Scope of work shall include furnishing a wave equation analysis of piles (WEAP) as specified in this special provision.

1.2 Performance and Design Requirements. Performance and design conditions for WEAP shall be in accordance with [section 4.0](#) of this special provision.

1.3 Qualifications. The contractor shall perform wave equation analysis utilizing the services of an independent dynamic pile testing consultant and qualified personnel. An engineer with a minimum of 5 years WEAP experience shall perform the analysis.

2.0 Execution.

2.1 Pile Driving Modeling. The contractor shall perform preconstruction wave equation analyses and prepare a summary report of the results. The wave equation analyses shall be used to assess the ability of all proposed pile driving systems to install piles to the required capacity and the desired penetration depth within allowable driving stresses. The report shall include a drivability graph relating pile capacity, blow count and driving stresses to depth. The report shall include a bearing graph relating the pile capacity to the pile driving resistance. The bearing graph shall indicate blow count versus capacity and stroke. The report shall also contain a constant capacity analysis or inspector's chart to assist the engineer in determining the required driving resistance at other field observed strokes. The contractor shall perform wave equation analyses in accordance with [section 4.0](#) of this special provision. Acceptability of the wave equation report and the adequacy of analyses will be determined by the engineer.

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2.1.1 WEAP shall provide driving criteria for driving piling to rock. WEAP shall give pile solution for driving piling through hard material to rock, or through soft material to rock.

2.1.2 Approval by the engineer of the proposed pile driving system will be based upon the wave equation analyses indicating that the proposed system can develop the specified pile capacity at a pile driving rate of 2 to 10 blows per inch at the end of driving, and within allowable driving stresses per *AASHTO LRFD Bridge Construction Specifications*, Section 4.4.1. The contractor shall provide preliminary pile driving criteria based on wave equation analyses and any anticipated capacity changes after driving, set-up or relaxation, subject to revision based upon field measurements.

2.1.3 If any changes or modifications are made to the approved pile driving system, additional wave equation analyses in accordance with [section 2.1](#) of this special provision shall be required.

3.0 Schedule of Contract Submittals.

3.1 Proposed independent dynamic pile testing consultant, and a list of assigned personnel and their experience and qualifications shall be submitted to the engineer. All documents shall be submitted 45 calendar days before pile driving starts.

4.0 Wave Equation Analysis. A minimum of one and sufficient additional analyses as needed are required to define performance for all combinations of piles, driving systems and subsurface conditions anticipated.

5.0 Method of Measurement. Pile wave analysis will be measured per each bent.

6.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for "Pile Wave Analysis".

I. FORM LINERS

1.0 Description. This work item shall consist of constructing the form liner aesthetic treatment on mechanically stabilized earth (MSE) wall systems as shown on the plans and described in this special provision.

2.0 Materials.

2.1 Shop Drawings. Contractor shall provide complete shop drawings of all aesthetic treatments.

2.2 Formwork. Formwork for aesthetic treatment of the concrete facing panels for the MSE wall systems shall be a type that produces uniform results consistent in both, pattern and depth of relief with the project design aesthetics. The contractor shall be responsible to coordinate the aesthetic treatments of all components to meet the design aesthetic criteria described herein and as shown on plans. No mixing of pattern numbers or manufacturers will be permitted. The form liner pattern shall be one of the patterns listed on the plans or approved equal.

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2.3 Form Release Agent. Form release agents shall be the manufacturer's standard non-staining, non-petroleum based and compatible with surface sealer finish coating. Form release agents shall be applied to all surfaces of the form liner at the manufacturer's recommended rate.

2.4 Aggregate Source. The aggregate incorporated into the concrete mix of all aesthetic concrete MSE Wall components shall be from the same source. The purpose for this provision is to ensure uniformity of materials and color once areas are pressure washed and aggregates become exposed. Single-source shall be interpreted as one contiguous rock quarry, gravel pit or dredging location. This provision in no way alters the specification requirements for aggregate quality specified in other sections of the project specifications.

3.0 Construction Requirements.

3.1 Reveals and Texture. All reveals and texture shall be continuous from element to element through construction joints and around corners. Techniques shall be utilized to ensure true continuous texture between separate elements. Sand blasting will not be permitted for cleaning concrete surface, as sand blasting will reduce the special surface texture specified. Pressure washing with water is the preferred method of removing laitance. Pressure washing cleaning shall provide a minimum pressure of 3000 psi at a rate of 3 to 4 gallons per minute (11.4 to 15.1 L/min) using a fan nozzle held perpendicular to the surface at a distance of 2 to 3 feet. The completed surface shall be free of blemishes, discolorations, surface voids and conspicuous form marks to the satisfaction of the engineer.

3.2 Sample Test Panels. Sample test panels shall be constructed to demonstrate the contractor's workmanship for all form liner textures and patterns as shown on the plans. The sample test panels may also be used for demonstration special surface finish if approved by the engineer. The architectural surface treatment of the finished work shall achieve the same final effect as demonstrated on the approved sample test panels. The materials used in construction of the sample test panels shall be in accordance with all standards as listed in this specification and the plans. The concrete mix shall be consistent with the project specifications and criteria. The minimum size of the sample test panels shall be 6 x 6 feet x 8 inches. The form liner finish shall be demonstrated in a vertical strip covering one-half to three-quarters of the sample test panel(s).

4.0 Method of Measurement. Final measurement will not be made except for authorized changes during construction or where significant errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

4.1 Form Liners on MSE Wall Systems. No measurement of form liners on MSE wall systems shall be made.

4.2 Architectural Elements. Measurement will be made per each.

5.0 Basis of Payment.

5.1 Form Liners on MSE Wall Systems. Payment for the above described work, including all material, additional concrete, equipment, labor and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for "MSE Wall Systems".

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J. 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.

K. MODULAR EXPANSION JOINT SYSTEM

1.0 Description. This work shall consist of furnishing materials, services, labor, tools, equipment, and incidentals necessary to design, fabricate, inspect, test and install the expansion joint system as specified.

1.1 General. The modular expansion joint system shall consist of multiple strip seal joints that shall allow movements as shown on the plans. The configuration of the expansion joint system shall consist of neoprene strip seals mechanically held in place by steel edge and separation beams. Each separation beam shall be supported by independent multiple support bars, which are welded to the separation beams. The multiple support bars shall be suspended over the joint opening by sliding elastomeric bearings. Scissor type modular expansion joint systems will not be permitted. An equidistant control system shall be incorporated that develops its maximum compressive force when the joint is at its maximum opening. The expansion joint system shall not incorporate any bolted connections between the separation beams and support bars. The final completed expansion joint system shall be continuous across the full width of the roadway and continue into the traffic barriers as shown on the plans.

1.2 Qualified Manufacturers. The qualified manufacturer shall have a minimum of 5 years experience in designing and fabricating modular expansion joint systems and be certified as a minimum under the AISC certification program for "Simple Bridges". The following manufacturers are known suppliers of modular expansion joint systems:

D.S. Brown
300 East Cherry Street
North Baltimore, OH 45872
Telephone (419) 257-3561
www.dsbrown.com

D.S. TechStar, Inc.
1219 West Main Cross Street
Findlay, OH 45840
Telephone: (419) 424 0888
www.techstar-inc.com

Watson-Bowman & Acme Corp
95 Pineview Drive
Amherst, NY 14120
Phone (716) 691-7566
www.wbacorp.com

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2.0 Design Requirements.

2.1 Truck and Impact Loading. The modular expansion joint system shall be designed in accordance with the latest edition of AASHTO LRFD Bridge Design Specifications with the following exceptions: In Table 3.6.2.1-1 the Dynamic Loading Allowance, IM shall be increased from 75% to 100%. The modular expansion joint system shall be designed for all possible combinations of loaded lanes up to the maximum number of lanes between the barrier curbs as specified in Section 3.6.1.1.1. The Multiple Presence Factors, m shown in Table 3.6.1.1.2-1 shall be included in the design of the modular expansion joint system. The modular expansion joint system shall be designed for the staged traffic loading as shown on plans.

2.2 Field Splices. The design and fabrication of the modular expansion joint system shall be one continuous unit without field splices except as required by stage construction requirements as shown on the plans. If the site and/or stage construction requirements require the need for field splices, the splices shall be located in areas outside the main traffic lanes or as shown on the plans and consist of a welded separation beam splice in which the weld is a full penetration weld. The contractor shall complete the field splices in accordance with the details and procedures included in the shop drawings.

2.3 Movement. The modular expansion joint system shall be designed to provide the minimum total movement as noted on the plans and to accommodate all expected longitudinal movements (i.e. thermal, creep, shrinkage, elastic shortening, etc.) as well as vertical and horizontal rotations. This design shall incorporate strip seal glands with a maximum movement range of 3.15 inches (80 mm) per seal.

2.4 Fatigue. The modular expansion joint system shall be tested and designed following the guidelines provided in the National Cooperative Highway Research Program (NCHRP), Report 402 "Fatigue Design of Modular Bridge Expansion Joints" as well as the provisions included in Chapter 14, "Joints and Bearings", of the latest edition of AASHTO LRFD Bridge Design Specifications.

2.5 Water Tightness. After the modular expansion joint system has been completely installed, the joint shall be flooded for a minimum of one hour to a minimum depth of 3 inches (75 mm). Testing shall be done in stages with traffic flow maintained in accordance with the traffic control plans. If the engineer observes leakage, the expansion joint system shall be repaired at the contractor's expense. The repair procedure shall be as recommended by the manufacturer and approved by the engineer.

2.6 Corrosion Protection. All steel surfaces, except as noted, shall be hot dip galvanized in accordance with AASHTO M 111 (ASTM A 123).

2.7 Anchorage of Expansion System. The modular expansion joint system anchorage shall be designed by the manufacturer and included in the design computations and shown in the shop drawings.

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

3.1 Structural Steel. Structural Steel shall be in accordance with AASHTO M 270, Grade 50 (345) (ASTM A 709, Grade 50 (345)). All shop-welded connections that splice the horizontal

JOB SPECIAL PROVISIONS (BRIDGE)

separation beams and edge beams shall be full penetration welds. All separation beams to support bar welded connections shall be full penetration welds in accordance with NCHRP Report 402 requirements. Aluminum components will not be permitted. All fabrication of structural steel shall be in accordance with [Sec 712](#) and [1080](#).

3.2 Stainless Steel. The stainless steel shall be in accordance with [Sec 1038.4.2](#).

3.3 Sliding Bearings. The sliding bearings shall be fabricated as steel reinforced elastomeric pads with polytetrafluorethylene (PTFE) in accordance with [Sec 1038](#) and as required by the manufacturer. The bearings shall be designed so that they are removable and replaceable.

3.4 Strip Seals and Lubricant Adhesive. Strip seals and lubricant adhesive shall be in accordance with [Sec 717](#) and [1073](#). The strip seals shall not protrude above the top of the joint.

3.5 Submittals.

3.5.1 Design Computations and Shop Drawings. The contractor shall submit, for the engineer's review, the design computations and shop drawings, all 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 design computations shall include fatigue design and a strength design for all structural elements and connections. Shop drawings shall be prepared for the modular expansion joint system in accordance with [Sec 1080](#). The shop drawings shall also include the following:

- (a) Plans, elevation, and section of the joint system for each movement rating and roadway width showing dimensions and tolerances.
- (b) All ASTM, AASHTO or other material designations.
- (c) Method of installation, including but not limited to sequence, setting relative to temperature, anchorage during setting and installation at curbs.
- (d) Corrosion protection system.
- (e) Details of temporary support for shipping and handling.

3.5.2 Maintenance Manual. The manufacturer shall submit to the engineer a written maintenance manual and part replacement plan at the time of the shop drawing submission. Included in the submission shall be list of parts to be inspected, acceptable wear tolerances and the method of part replacement. The manufacturer shall conduct a pre-installation meeting to train MoDOT's construction inspectors and maintenance personnel on the installation and maintenance of the modular expansion joint system.

3.5.3 Certificates of Compliance. The manufacturer shall provide certification of the manufacturer's experience, including a list of projects, and certificate of compliance with the AISC certification program, in accordance with Section 1.2 of this job special provision, to be submitted to the engineer.

4.0 Construction Requirements. The expansion joint system shall be stored at the job site in accordance with the manufacturer's written recommendations. Damage to the joint system during shipping or handling will be cause for rejection of the joint system. Any damage to the

JOB SPECIAL PROVISIONS (BRIDGE)

corrosion protection system shall be repaired to the satisfaction of the engineer at the contractor's expense. The support boxes shall rest on cast-in-place concrete or grout pads installed into a preformed block out. Concrete shall be forced under and around support boxes, anchorage systems and supporting hardware. Proper consolidation shall be achieved by localized internal vibration. Installation of the modular expansion joint system shall be as recommended by the manufacturer. The contractor shall obtain the services of a qualified technical representative, approved by the manufacturer of the expansion joint system and acceptable to the engineer, to assist during the installation. The installation shall not occur without the qualified technical representative being present. The qualified technical representative shall have 3 years of experience working on installation of modular expansion joint systems on bridges. This experience shall also include modular joints that had field splices for staged construction.

5.0 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. Where required, the modular expansion joint system will be measured to the nearest linear foot (0.5 m), based on measurement from the roadway face of curb to roadway face of curb along the centerline of the joint. Portions of the joint that extend past the roadway face of curbs will not be measured for payment. The revision or correction will be computed and added to or deducted from the contract quantity.

6.0 Basis of Payment. Modular expansion joint system, including all material, coating, equipment, labor, fabrication, installation, technical assistance and any other incidental work necessary to complete this work, will be paid for at the contract unit price for "Modular Expansion Joint System".

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

- A. Construction Requirements
- B. Galvanized Structural Steel Pile
- C. Pre-bore for Piles

<p>“THIS MEDIA SHOULD NOT BE CONSIDERED A CERTIFIED DOCUMENT.”</p>	<p>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65102 Phone 1-888-275-6636</p>
	<p><i>Engineering Design Source, Inc.</i> 16141 Swingley Ridge Rd., Suite 300 Chesterfield, MO 63017 Certificate of Authority: #001523 Consultant Phone: (636) 537-5585</p>
	<p>If a seal is present on this sheet, JSP's have been electronically sealed and dated.</p>
	<p>JOB NUMBER: J6I3029 ST. LOUIS COUNTY, MO DATE PREPARED: 2/9/2018</p>
	<p>ADDENDUM DATE:</p>
<p>All Job Special Provisions (Bridge) are authenticated by this seal.</p>	

PRELIMINARY

JOB SPECIAL PROVISIONS (BRIDGE)

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for Bridge A8684.

2.0 Construction Requirements.

2.1 All work shall be consistent with the project traffic control plans. In order to assure the least traffic interference, the work shall be scheduled to minimize any disruptions to traffic, including any allowed lane closures, to the absolute minimum amount of time required to complete the work. A lane shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

2.2 The sequence of bridge end bent construction shall be as shown on the plans.

2.3 Bridge work by contractor forces, including erection, 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 allowed.

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

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

3.0 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.

B. GALVANIZED STRUCTURAL STEEL PILE

1.0 Description. This job special provision contains general requirements for furnishing, coating and placing galvanized steel piles as shown on the plans and shall be in addition to the requirements of Sec 702.

2.0 Material. Structural steel piles shall be galvanized in accordance with ASTM A123 and Sec 1080. Repairs to the galvanized coating and field galvanizing shall be in accordance with ASTM A780. Zinc rich paints will not be allowed. Repairs and field galvanizing will not be required where the pile will be encased in concrete or below the limits specified in section 3.0 of this job special provision. Protective Coatings specified in Sec 702 will not be required for galvanized piles or bracing.

3.0 Construction Requirements.

3.1 Galvanizing material shall be omitted or removed 1 inch clear of weld locations. The method used to omit or remove the galvanizing material shall be masking, grinding or other methods as approved by the engineer. If a weld location falls within an area where galvanizing is required, clean the weld area making sure to remove all welding slag. Then field galvanize the weld area in accordance with ASTM A780. Zinc rich paints will not be allowed.

3.2 All pile shall be galvanized from the bottom of the reinforced concrete end bent beam down to an elevation as shown on the plans.

3.3 At the contractor's option, the entire pile length may be galvanized.

4.0 Method of Measurement. Galvanized Structural Steel Pile in place will be the actual length to the nearest linear foot for that portion of the pile that remains permanently in the structure. See Sec 702 Basis of Payment for any additional length authorized by the engineer resulting from pile splices. No separate measurement will be made for pile that is not galvanized.

5.0 Basis of Payment. The accepted quantity of galvanized and non galvanized pile in place will be paid for at the contract unit price for Galvanized Structural Steel Pile. No direct payment will be made for incidental items necessary to complete the work unless specifically provided as a pay item in the contract.

C. PRE-BORE FOR PILES

1.0 Description. Replace Sec. 702.4.3 and substitute the following.

2.0 Pre-boring. Pre-boring for piles is required at both end bents to the elevation shown on the plans. The pre-bored holes shall have a diameter no less than six inches larger than the largest cross-sectional dimension of the pile, measured diagonally between opposite tips of the flanges for H-Piles. The size of the hole shall be approved by the engineer before pre-boring is started. Pilot holes of lesser diameter than the pile shall not extend below the pile tip. Piles installed in pre-bored holes shall be driven/seated such that the pile is fully bearing on the bearing stratum, not sloughed material. After the pile is installed in the hole, the annular space of the pre-bored hole shall be filled with seal concrete in accordance with Sec. 501 or grout in accordance with Sec. 1066.