

Job No.: JSE0121, JSE0099

Route: Various

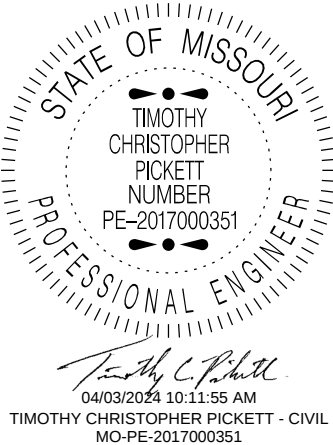
County: Various

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

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

A.	General - Federal JSP-09-02J	1
B.	Contract Liquidated Damages JSP-13-01C	1
C.	Work Zone Traffic Management JSP-02-06N	2
D.	Emergency Provisions and Incident Management JSP-90-11A	5
E.	Project Contact for Contractor/Bidder Questions JSP-96-05	6
F.	Supplemental Revisions JSP-18-01AB	6
G.	Contractor Quality Control NJSP-15-42	24
H.	Liquidated Damages for Winter Months JSP-04-17A	25
I.	Utilities	26
J.	Truck Mounted Attenuator (TMA) for Stationary Activities	26
K.	Airport Requirements	27
L.	Damage to Existing Roadways and Entrances	27
M.	Site Restoration	28
N.	Coordination with MoDOT Signal Personnel	28
O.	Material Storage of Commission Furnished Items	29
P.	Install Communication Equipment	29
Q.	Install CCTV Camera Assembly	30
R.	CCTV Camera Terminal Cabinet	32
S.	CCTV Battery Backup	34
T.	Conduit	35
U.	Fiber Optic Cable	37
V.	Install Concrete CCTV Pole	40
W.	Modify Existing Power Supply	43
X.	Testing	43
Y.	Documentation	44
Z.	Maintenance and Warranty	44

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 TIMOTHY CHRISTOPHER PICKETT - CIVIL MO-PE-2017000351	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65102 Phone 1-888-275-6636
	If a seal is present on this sheet, JSP's have been electronically sealed and dated.
	JOB NUMBER: JSE0099, JSE0121 VARIOUS COUNTIES, MO DATE PREPARED: March 4, 2024
ADDENDUM DATE:	
Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: All	

JOB
SPECIAL PROVISION

A. General - Federal JSP-09-02J

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

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

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

General Provisions & Supplemental Specifications

Supplemental Plans to July 2023 Missouri Standard Plans
For Highway Construction

These supplemental bidding documents contain all current revisions to the published versions and have important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

B. Contract Liquidated Damages JSP-13-01C

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.

Job No.: JSE0121, JSE0099
Route: Various
County: Various

Notice to Proceed: July 8, 2024
Completion Date: December 1, 2025

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
JSE0099	N/A	\$3200
JSE0121	N/A	\$3200

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 **\$750** 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-02-06N

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

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

1.2 Work Zone Deficiencies. 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 traffic management schedule shall conform to the limitations specified in Sec 616 regarding lane closures, traffic shifts, road closures and other width, height and weight restrictions.

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

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

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

2.5.1 Traffic Safety.

2.5.1.1 Recurring Congestion. Where traffic queues routinely extend to within 1000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway, the contractor shall extend the advance warning area, as approved by the engineer.

2.5.1.2 Non-Recurring Congestion. When traffic queues extend to within 1000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway infrequently, the contractor shall deploy a means of providing advance warning of the traffic congestion, as approved by the engineer. The warning location shall be no less than 1000 feet and no more than 0.5 mile in advance of the end of the traffic queue on divided highways and no less than 500 feet and no more than 0.5 mile in advance of the end of the traffic queue on undivided highways.

3.0 Work Hour Restrictions.

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

Memorial Day
Labor Day
Thanksgiving
Christmas
New Year's Day

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

When Independence Day falls on:	The Holiday is Observed on:	Halt Lane Closures beginning at:	Allow Lane Closures to resume at:
Sunday	Monday	Noon on Friday	6:00 a.m. on Tuesday
Monday	Monday	Noon on Friday	6:00 a.m. on Tuesday
Tuesday	Tuesday	Noon on Monday	6:00 a.m. on Wednesday
Wednesday	Wednesday	Noon on Tuesday	6:00 a.m. on Thursday
Thursday	Thursday	Noon on Wednesday	6:00 a.m. on Friday
Friday	Friday	Noon on Thursday	6:00 a.m. on Monday
Saturday	Friday	Noon on Thursday	6:00 a.m. on Monday

3.2 The contractor shall not perform any construction operation on the roadway, during restricted periods, holiday periods or other special events specified in the contract documents.

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

3.3.1 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.

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

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

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

Thomas Farris, Project Contact
Southeast District
Transportation Project Designer
Sikeston, MO 63801

Telephone Number: 573-472-5892 (Office) 573-703-7182 (Mobile)

Email: thomas.farris@modot.mo.gov

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

F. Supplemental Revisions JSP-18-01AB

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

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

Stormwater Compliance Requirements

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

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

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

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

2.1 Duties of the WPCM:

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

3.0 Pre-Activity Meeting for Grading/Land Disturbance and Required Hold Point. A Pre-Activity meeting for grading/land disturbance shall be held prior to the start of any land disturbance operations. No land disturbance operations shall commence prior to the Pre-Activity meeting except work necessary to install perimeter controls and entrances. Discussion items at the pre-activity meeting shall include a review of the Project SWPPP, the planned order of grading operations, proposed areas of initial disturbance, identification of all necessary BMPs

that shall be installed prior to commencement of grading operations, and any issues relating to compliance with the Stormwater requirements that could arise in the course of construction activity at the project.

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

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

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

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

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

Anti-Discrimination Against Israel Certification

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8.2.1 GTR SPG shall be 1.15

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

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

where:

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

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

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

P_{GTR} = percent GTR by total mixture weight

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

G_{GTR} = GTR specific gravity

8.4 G_{se} shall be calculated as follows:

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

8.5 P_{be} shall be calculated as follows:

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

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

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

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

Delete Sec 107 in its entirety and substitute the following:

107.1 Laws to be Observed The contractor shall know, observe and comply with all federal and state laws, local laws, codes, ordinances, orders, decrees and regulations existing at the time of or enacted subsequent to the execution of the contract that in any manner affect the prosecution of the work, except as specified in the contract or as directed by the engineer. The Contractor shall also ensure that any subcontractor know, observe and comply with all federal and state laws, local laws, codes, ordinances, orders, decrees and regulations as outlined above. The contractor and surety shall indemnify and save harmless the State, the Commission, the Commission's agents, employees and assigns from any claim or liability arising from or based on the violation of any such law, code, ordinance, regulation, order or decree, except any local regulations, decrees, orders, codes or ordinances directed by the contract.

107.1.1 Contract and Legal Inconsistency The engineer shall be notified immediately in writing if any discrepancy or inconsistency is discovered between the contract and any law, ordinance, regulation, order or decree.

107.1.2 Local Building and Zoning Codes or Ordinances The projects of the Commission are not typically subject to local building or zoning codes or ordinances. Therefore, the contractor usually need not obtain a local building or zoning permit or variance for work done exclusively as the Commission's contractor on the Commission's project and the Commission's right of way. Other local codes or ordinances may not apply to the Commission, and thus to the contractor as well. If any questions arise concerning whether the contractor shall comply with a local code, ordinance, decree or order of any type, the contractor shall advise the engineer of the problem immediately, for resolution by the engineer. This provision will not exempt the contractor from the requirement of thoroughly researching and determining, before submitting a bid on the contract and from complying with, all federal, state or local laws, regulations, codes, ordinances, decrees or orders that may apply to the contract work. The Commission will not be responsible for the contractor's failure to be informed before bidding as to the federal, state and local laws, regulations, codes, ordinances, decrees or orders that may govern the contract work, or for the contractor's failure to determine before bidding which of these do not govern the contract work.

107.1.3 Authentication of Certain Documents If plans, plats, detailed drawings or specifications for falsework, cofferdams or any other work are required to be submitted to the engineer, the documents shall be signed, sealed and stamped in accordance with the laws relating to the practice of architecture and professional engineering in the State of Missouri (Chapter 327, RSMo).

107.2 Permits, Licenses and Taxes Except as otherwise provided in the contract, the contractor shall procure all permits and licenses, shall pay all charges, fees and taxes, and shall give all notices necessary and incidental to the due and lawful prosecution of the work. No direct payment will be made for the cost of complying with this requirement.

107.3 Patented or Copyrighted Devices, Material and Processes. If the contractor is required or desires to use any design, device, material or process covered by letters, patent, copyright, service or trademark, the contractor shall arrange and provide for such use by suitable agreement with the patentee or owner, and a copy of the agreement may be required by the Commission. The contractor and surety shall indemnify and save harmless the State, the

Commission, the Commission's agents, employees and assigns from any suits, claims or damages arising from the infringement upon or use of any patented, copyrighted or registered design, device, material, process or mark.

107.4 Safety and Sanitary Provisions The contractor shall at all times take necessary precautions to protect the life and health of all persons employed on the project or, who at the direction of the contractor are present on the right of way. The contractor shall be familiar with the latest accepted accident prevention methods and shall provide necessary safety devices and safeguards accordingly. The Commission will refuse to provide inspection services at plants or work sites where adequate safety measures are not provided and maintained.

107.4.1 Apparel. All workers within highway right of way shall wear approved ANSI/ISEA 107 Performance Class 2 or 3 safety apparel and more specifically as follows:

107.4.1.1 During daytime activities, flaggers shall wear a high visibility hard hat, safety glasses, a Performance Class 3 top OR a Performance Class 2 top, and safety footwear. Hard hats other than high visibility orange or green shall be covered with a high visibility covering.

107.4.1.2 During daytime activities, workers shall wear a hard hat, safety glasses, a Performance Class 3 top OR a Performance Class 2 top, and safety footwear.

107.4.1.3 During nighttime activities, flaggers shall wear a high visibility/reflective hard hat, safety glasses, a Performance Class 3 top AND Class E bottoms, OR Performance Class 2 top AND Class E bottoms, and safety footwear. Hard hats shall be reflective or covered with a high visibility covering.

107.4.1.4 During nighttime activities, workers shall wear a hard hat, safety glasses, a Performance Class 3 top OR Performance Class 2 top AND Class E bottoms, and safety footwear.

107.4.2 The contractor shall provide and maintain in a neat and sanitary condition, such accommodations for the use of employees as may be necessary to comply with the requirements and regulations of any agency having jurisdiction over public health and sanitation. The contractor shall permit no public or private nuisance.

107.4.3 All sanitary facilities and safety devices shall be furnished free to employees and no direct payment will be made for such facilities or devices.

107.5 Public Convenience and Safety The contractor shall conduct the work in a manner that will ensure, as far as practical, the least obstruction to traffic and shall provide for the convenience and safety of the general public and residents along and adjacent to the highway in an adequate and satisfactory manner.

107.5.1 Obstructions Prohibited Fire hydrants on and adjacent to the highway shall be kept accessible to firefighting apparatus at all times, and no obstruction shall be placed within 15 feet of any such hydrant. Footways, gutters, sewers, outlets, inlets and portions of highways adjoining the work under construction shall not be obstructed. Pavements over which hauling is performed shall be kept clean of spilled or tracked-on material at all times when in use by traffic.

107.5.2 Objects Potentially Affecting Navigable Airspace. The contractor shall comply with all federal regulations pertaining to constructing, erecting or installing any object, temporary or permanent, which could potentially affect navigable airspace.

107.5.3 Material and Equipment. During construction hours, equipment, material and vehicles utilized in construction of the project will only be permitted on shoulders, medians or pavements where the locations are closed to traffic, properly signed and occupied by ongoing construction operations, unless otherwise approved by the engineer. Except in cases of emergency, construction equipment, material and vehicles will not be permitted on pavements or shoulders being utilized by traffic. If the contract specifies time periods the contractor will not be permitted to perform work, construction equipment or vehicles shall not enter or leave the construction area via the pavements handling traffic nor be operated on the pavements handling traffic within the construction area during the restricted time periods. During non-construction hours, construction equipment, material and vehicles will not be permitted within 30 feet of the edge of the pavement or shoulders carrying traffic unless the equipment, material and vehicles are located in a properly protected area, an off-site storage area or as otherwise directed by the engineer.

107.5.4 Distractions to the Traveling Public in Work Zones. In order to avoid distracting operators of vehicles traveling on the roadway, the Contractor and its sub-contractors shall not bring or display any signs, flags, logos, emblems, advertising, or any other communicative device on construction equipment that is large enough to be legible from the main traveled way of the highway in the work zone or on highway right of way. This prohibition does not apply to any sign, logo or emblem placed on Contractor equipment identifying the owner or manufacturer of the equipment or to any official highway signs approved by the Commission pursuant to 227.220 RSMo.

107.6 Bridges over Navigable Waters. All work on navigable waters shall be conducted such that free navigation of the waterways will not be interfered with and that existing navigable depths will not be impaired except as allowed by permit issued by the USCG or the USACE.

107.7 Use of Explosives. All blasting operations shall be conducted under the direct supervision of a licensed blaster as required by the Missouri Blasting Safety Act. When explosives are used in the prosecution of the work, the contractor shall use the utmost care to prevent bodily injury and property damage. The contractor shall be responsible for damage resulting from the use of explosives. The engineer will have the authority to suspend any unsafe blasting operation. The contractor shall be familiar and comply with the rules and regulations of any city, county, state or federal agency or any other agency that may have jurisdiction in the handling, loading, transporting, storage and use of explosives. All places used for explosives storage shall be marked clearly "DANGEROUS EXPLOSIVES".

107.7.1 Before beginning work, the contractor shall furnish the engineer letters of approval for the proposed operation from the appropriate regulating agencies. The contractor shall notify in writing the appropriate fire protection jurisdiction of the intent to store, transport or use explosives and shall provide proof of notice to the engineer. The contractor shall provide the engineer with copies of all permits, blasting logs and seismic monitoring data.

107.7.2 The contractor shall notify in advance each property owner, tenant and public utility company having structures or facilities close to the work of any intention to use explosives.

107.7.3 Removal of any item or material of any nature by blasting shall be done in such a manner and at such time as to avoid damage affecting the integrity of the design and to avoid damage to any new or existing structure, whether on Commission right of way or private property, included in or adjacent to the work. Unless the contract documents or the engineer restricts such operation, the contractor shall be responsible for determining a method of operation to ensure the desired results and the integrity of the completed work.

107.7.4 The contractor and surety shall indemnify and save harmless the State, the Commission, the Commission's agents, employees and assigns from any claim related to the possession, transportation, storage or use of explosives.

107.8 Preservation of Monuments and Artifacts.

107.8.1 Monuments. The contractor shall not disturb or damage any land monument or property landmark unless authorized by the engineer.

107.8.2 Human and Archaeological Remains. The contractor shall report to the engineer the discovery of human remains, artifacts, fossils and other items of historical, archaeological or geological significance discovered within the right of way during construction. Such items will remain in the Commission's custody and shall not be removed from the site unless directed by the engineer. The preservation and handling of such items shall be in accordance with [Sec 203.4.8](#).

107.9 Forest and Park Protection. Environmental and sanitary laws and regulations regarding the performance of work within or adjacent to state or national forests or parks shall be obeyed. The contractor shall keep the project site in an orderly condition, dispose of all refuse, obtain permits for the construction and maintenance of all construction camps, stores, warehouses, residences, latrines, cesspools, septic tanks and other structures in accordance with the regulations and instructions issued by the forest or park supervisor. The contractor shall require employees and subcontractors, independently, and at the request of forest officials, to prevent and suppress forest fires, and to notify a forest official of the location and extent of any fire.

107.10 Environmental Protection. The contractor shall comply with all federal, state and local laws and regulations controlling pollution of the environment. Pollution of streams, lakes, ponds and reservoirs with fuels, oils, bitumens, chemicals or other harmful material and pollution of the atmosphere from particulate and gaseous matter shall be avoided.

107.10.1 Fording of streams and fill for temporary work not specified on design plans will not be permitted unless the plan for such operation is authorized by the Corps of Engineers, meets the approval of the engineer, complies with the current MoDOT Pollution Plan and results in minimum siltation to the stream. Temporary stream crossings shall not be constructed unless specifically designated as a condition of the Corps of Engineers Section 404 permit or a permit is obtained, and the temporary stream crossing is in accordance with [Sec 806](#).

107.10.2 When work areas or pits are located in or adjacent to streams, the areas shall be separated from the main stream by a dike or barrier to keep sediment from entering the stream. Care shall be taken during the construction and removal of such barriers to minimize siltation of the stream.

107.10.3 Disposal of Portland cement concrete residue and wash water, water from aggregate washing, or other operations producing sediment laden runoff shall be treated in accordance with Sec 806.

107.10.4 Oil distributors or tanker trucks used for the transport or application of any petroleum-based products, and that have a capacity greater than 1,320 gallons, shall not be left unattended on MoDOT right of way within the project limits during non-construction hours unless secondary containment is deployed as per the Spill Prevention Control and Countermeasure rule. Parking of these vehicles on MoDOT right of way outside of the project limits, or on any MoDOT owned property, shall not be allowed without the aforementioned secondary containment and prior authorization from the engineer.

107.11 Responsibility for Claims for Damage or Injury. The contractor and insurance company shall indemnify and save harmless the State, the Commission, the Commission's agents, employees and assigns from all claims or suits made or brought for bodily injury, death or property damage, arising from performance of the work to the extent of:

(a) The negligent acts or omissions of the contractor, subcontractors, suppliers or their respective officers, agents or employees.

(b) The creation or maintenance of a dangerous condition of or on the Commission's property or right of way, which condition occurred due to the acts or omissions of the contractor, subcontractors, suppliers or their respective officers, agents or employees or for which the contractor had knowledge of or could have had knowledge of the condition in time to warn of or repair said condition.

(c) The failure of the contractor, subcontractors, suppliers or their respective officers, agents or employees, to perform the work in accordance with the plans and specifications.

107.11.1 The contractor will not be required to defend, indemnify or hold harmless any other person, including the State, the Commission, or the Commission's agents, employees or assigns for any acts, omissions or negligence of other persons.

107.11.2 Neither the Commission nor the contractor, by execution of a contract, shall intend to or create a new or enlarge an existing cause of action in any third party. This provision shall not be interpreted to create any new liability that does not exist under the law, or to waive or extinguish any defense that either party to this contract or their respective agents and employees may have to an action or suit by a third party.

107.12 Contractor's Responsibility for Work From the earlier of the date of commencement of the work or the effective date of the notice to proceed, and until any work is accepted by the engineer, the work shall be in the custody and under the charge and care of the contractor. Issuance of a payment estimate on any part of the work done will not be considered as final acceptance of any work completed up to that time.

107.12.1 Damages to any portion of the work before the work is completed and accepted, caused by the action of the elements or from any other reason, shall be repaired or replaced at the contractor's expense. The contractor, at the contractor's option, may insure against any such damages. The Commission may, in its discretion, make such a payment, determined in accordance with [Sec 109.4](#), for damage to the work due to unforeseeable causes beyond the control of, and without fault or negligence on the part of the contractor, unless the contractor has

been reimbursed for such damages by the contractor's insurer. Prior to reimbursement, the contractor shall furnish documentary evidence of all efforts to recover such repair costs.

107.12.2 The contractor shall immediately give written notice to the engineer of any pedestrian, worker and/or vehicular accident. The contractor may be directed by the engineer to repair permanent Commission facilities that have been damaged by events that are beyond the control of the contractor. Reimbursement will be provided by the Commission, determined in accordance with [Sec 109.4](#), for the actual direct cost of labor, equipment and material, exclusive of overhead, indirect or consequential costs of profit. The Commission may elect to make such repairs in lieu of the contractor.

107.13 General Insurance Requirements. The Contractor shall procure and maintain at the Contractor's expense until Final Acceptance of the project by the engineer, insurance for all damages and losses imposed by law and assumed under the contract, of the kinds and in the amounts specified in [Secs 107.13.1](#) through [107.13.8](#).

107.13.1 Sovereign Immunity Limits for Missouri Public Entities. The Contractor shall procure and maintain at least minimum insurance coverages to meet the sovereign immunity limits for Missouri public entities as calculated by the Missouri Department of Insurance and published annually in the Missouri Register pursuant to Section 537.610 RSMo., for Secs 107.13.2 through 107.13.5, unless specified otherwise for each type of insurance coverage. Each policy shall provide additional insured status for the Missouri Highways and Transportation Commission (Commission), the Missouri Department of Transportation (MoDOT) and its employees up to Missouri's sovereign immunity limits.

107.13.2 Commercial General Liability Insurance. The Contractor shall procure, and maintain during the term of the project, commercial general liability insurance with coverage at least as broad as Insurance Services Office (ISO) policy form CG 00 01. The general aggregate limit shall, by endorsement or otherwise, provide a designated aggregate limit solely for this project using ISO form CG 25 03 05 09 or an equivalent form. General liability policies shall be endorsed to add the Commission, MoDOT, and its employees as additional insureds (the "Additional Insureds") using Insurance Services Office forms CG 20 10 or the equivalent under such policy. For construction contracts, an endorsement providing completed operations coverage to the Additional Insureds, ISO form CG 20 37 or the equivalent, is also required. This form, CG 20 37, shall be endorsed on each subsequent commercial general liability policy issued to the Contractor for three (3) years after final acceptance of the project. The contractor could provide extended completed operations for specific project needs. Discontinued operations coverage shall be provided for three (3) years when applicable. Coverage shall not be reduced by insured versus insured exclusions or by explosion, collapse and underground (XCU) exclusions.

107.13.3 Commercial Automobile Liability Insurance. The Contractor shall procure and maintain automobile liability coverage at least as broad as ISO policy form CA 00 01 covering owned, hired, and non-owned autos. The policy shall include as insureds anyone liable for the conduct of an insured as described by policy provision or by endorsement added to the policy.

107.13.4 Contractor's Pollution Liability (CPL) Insurance. The Contractor performing excavation, remediation, hazardous materials removal, or any other work involving potential pollution arising from construction operations shall procure and maintain contractor's pollution liability insurance for liability arising out of sudden, accidental, and gradual pollution and remediation. The policy shall have minimum limits of \$1,000,000 and the Commission, MoDOT

and its employees shall be endorsed as additional insureds under such policy. The policy shall provide coverage for the hauling of waste from the project site to the final disposal location, including non-owned disposal sites. Products/completed operations coverage for pollution liability insurance shall extend a minimum of three (3) years after final acceptance of the project. Coverage shall be included on behalf of the insured for covered claims arising out of the actions of independent contractors. If the insured is using subcontractors, the Policy must include work performed "by or on behalf" of the insured. Policy shall specifically provide for a duty to defend on the part of the insurer.

107.13.5 Aircraft Liability Insurance. If aircraft, including unmanned aircraft, will be used on the project, Contractor shall provide, or cause to be provided, aircraft liability insurance protecting against claims for damages resulting from such use in all cases where any aircraft that is owned, leased or chartered by any Contractor-Related Entity used on the Project. The policy shall have minimum limits of \$1,000,000 and the Commission, MoDOT and its employees shall be additional insureds on the policy by endorsement or policy provision. The use of any aircraft in performance of the Work, the aircraft crew, flight path and altitude, including landing of any aircraft on the Site or on any property owned by the Commission, MoDOT or other parties at interest, shall be subject to review and written acceptance by the Commission prior to any such usage. If any aircraft are leased or chartered with crew and/or pilot, evidence of non-owned aircraft liability insurance will be acceptable to meet these requirements but must be provided prior to use of the aircraft. For use of unmanned aircraft vehicles, the contractor may provide insurance either through an aircraft liability insurance policy, or by endorsement to the Contractor's commercial general liability insurance policy and excess liability policies. Use of unmanned aircraft must comply with all state and federal rules and regulations, including FAA requirements.

107.13.6 Excess or Umbrella Liability Insurance. The Contractor may satisfy the required limits for Secs 107.13.2 through 107.13.5 by use of excess or umbrella liability insurance policies in any combination that meets the contract limits requirements. Such policies shall include as insureds, the Missouri Highways and Transportation Commission (Commission), the Missouri Department of Transportation (MoDOT) and its employees.

107.13.7 Workers' Compensation Insurance. The Contractor shall provide evidence to the engineer that the Contractor has obtained workers' compensation insurance and employers liability insurance as required by the state or is exempt and provides proper documentation to the engineer. Coverage shall include all statutory workers' compensation benefits to Contractor employees who may sustain work-related injury, death or disease. If applicable, commensurate with the requirements of the U.S. Longshore and Harbor Workers' Compensation Act (USL&H) and the Jones Act, with a minimum limit of \$2,000,000 per occurrence and in the aggregate, or as may be specified by law, for each. The required insurance must be endorsed to include a waiver of subrogation in favor of the Commission, MoDOT and its employees.

107.13.8 Railroad Protective Liability Insurance. In addition to other forms of required insurance, the Contractor shall provide railroad protective liability insurance when any of the Contractor's work is to be performed within any railroad right of way and in some cases may be required when the project improvements are near a railroad right of way. The name or names of the railroad companies known to be in the vicinity of the contract improvements will be specified in each contract, but the contractor shall confirm the railroad companies impacted and the final insurance needed with each railroad. The minimum limits of the insurance indicated by each railroad to the Commission will be included in the contract bid documents for informational purposes, but the contractor shall be bound by each individual railroad company requirements.

Each railroad agency has final determination in the content and coverage limits of the policies required. No work will be permitted within any railroad's right of way until the railroad involved has reviewed and approved the insurance policy. Any day upon which the Contractor cannot perform work due to such a policy not being approved by the railroad will not be counted as a contract day under [Sec 108.7](#).

107.13.9 Evidence of Insurance. Required evidence of insurance providing confirmation of compliance with these requirements shall consist of a certificate of insurance, an endorsement to any workers compensation policy waiving the subrogation by the insurer, and any endorsements adding the Commission, MoDOT and its employees as additional insureds where specified. "Blanket" or "automatic" additional insured endorsements providing additional insured coverage "where required by contract," may be used, provided that such forms provide coverage at least as broad as provided by the specified endorsement forms required. The contractor and any subcontract work shall not commence under the contract until the contractor obtains the applicable insurance coverage required and receives approval for such insurance from the engineer. All evidence of insurance for the prime contractor, including certificates of insurance and required endorsements, and notices shall be submitted electronically by the insurance agent to ContractorSupport@MoDOT.mo.gov. The Contractor shall promptly furnish the engineer with a complete copy of its policy upon request. Failure to furnish evidence of proper insurance, or complete insurance policies when requested, may result in the suspension of work as provided in [Sec 108](#), and may result in other claims or actions for breach of contract or otherwise, as may be recognized at law or in equity.

107.13.9.1 Work Performed by Subcontract. Prior to its commencement of the applicable work, the contractor shall cause each of its subcontractors to provide insurance that complies with the requirements for contractor-provided insurance. Contractor's determination of such insurance shall not be interpreted as relieving Contractor or its insurer of any liability otherwise imposed on Contractor or its insurers under these Contract Documents. The Contractor shall promptly furnish the engineer with a complete copy of its subcontractor policies upon request. Failure to furnish evidence of proper insurance, or complete insurance policies when requested, may result in the suspension of work as provided in [Sec 108](#), and may result in other claims or actions for breach of contract or otherwise, as may be recognized at law or in equity.

107.13.10 Other Conditions and Requirements

107.13.10.1 Acceptability of Insurance Companies. All insurers must be authorized to transact business under the laws of the State of Missouri and hold an AM Best rating of no less than A-: VI.

107.13.10.2 Waiver of Right of Recovery. All insurance coverage maintained or procured pursuant to this agreement shall be endorsed to waive subrogation against the Commission, MoDOT and its employees or shall specifically allow the Contractor, or others providing insurance evidence in compliance with these specifications, to waive their right of recovery prior to a loss. Contractor hereby waives its own right of recovery against the Commission, MoDOT and its employees.

107.13.10.3 Enforcement of Contract Provisions (non estoppel). Contractor acknowledges and agrees that any actual or alleged failure on the part of the Commission, MoDOT or its employees to inform Contractor of non-compliance with any requirement imposes no additional obligations on the Commission, MoDOT or its employees, nor does it waive any rights hereunder.

107.13.10.4 Primary and Non-contributory. For any claims related to this contract, the Contractor's insurance coverage shall be primary insurance with respects to the Commission, MoDOT and its employees as the additional insureds. Any other insurance or self-insurance maintained by any of these parties shall be excess of the Contractor's insurance and shall not contribute with the Contractor's insurance.

107.13.10.5 Specifications not Limiting. Requirements of specific coverage features, or limits contained in this Section are not intended as a limitation on coverage, limits or other requirements, or a waiver of any coverage normally provided by any insurance. Specific reference to a given coverage feature is for purposes of clarification only as it pertains to a given issue and is not intended by any party or insured to be all inclusive, or to the exclusion of other coverage, or a waiver of any type.

107.13.10.6 Notice of Cancellation and Change in Insurance Carrier. Contractor agrees to oblige its insurance agent or broker, and insurers by endorsement to the policy, to provide to the engineer with thirty (30) days advance notice of cancellation, except for nonpayment for which ten (10) days' notice is required, or nonrenewal of coverage for each required coverage. If any policy is canceled or the insurance carrier is planned to change before the contract work is complete, a satisfactory replacement policy shall be obtained and in force, with notice and evidence of insurance submitted to the engineer, prior to the effective date of cancellation of the former policy.

107.13.10.7 Self-insured Contractors and Self-insured Retentions. A self-insured contractor will not be considered to comply with these specifications unless approved by the engineer prior to beginning work. A contractor with insurance policies arranged with self-insured retentions must be declared to and approved by the engineer prior to beginning work. The Commission reserves the right to require that self-insured retentions be eliminated, lowered, or replaced by a deductible or other policy type.

107.13.10.8 Timely Notice of Claims. Contractor shall give the engineer prompt and timely notice of claims made or suits instituted that arise out of or result from Contractor's performance under this Agreement, and that involve or may involve coverage under any of the required liability policies. The Commission and MoDOT will provide timely notice to the contractor of any claims or lawsuits that it receives. If the Commission demands that the contractor defend the suit and/or indemnify the Commission, the contractor or its insurance company shall acknowledge that demand within 20 days of receiving it and the contractor shall respond within a total of 45 days of the claim receipt the intent of the contractor to defend.

107.13.10.9 Exhaustion of Policy Limits. It shall be the contractor's responsibility to notify the engineer promptly when any provided insurance limits are not able to be maintained during the contract period or provide verification that additional coverage or excess coverage is also available.

107.14 Cooperation in Defense. The indemnified party shall cooperate with the indemnifying party in the defense of a third-party claim subject to the foregoing, (1) the indemnified party shall not have any obligation to participate in the defense of or to defend any third-party claim, and (2) the indemnified party's defense of or its participation in the defense of any third-party claim shall not in any way diminish or lessen its right to indemnification as provided in this section.

107.15 Third Party Liability. Neither the State of Missouri, including the Commission, nor the contractor, by execution of the contract including these specifications, intend to create a right of action in a third-party beneficiary, except as specifically set out in these specifications and the contract. It is not intended by any required contractual liability in the contract or in these specifications that any third-party beneficiary has a cause of action arising out of the condition of the project when completed in accordance with the plans and accepted by the Commission.

107.16 Personal Liability of Public Officials. There shall be no personal liability upon the Chief Engineer, or any member, employee, or agent of the Commission in carrying out any of the provisions of the contract or in exercising any power or authority granted to the individual, it being understood that in such matters the individual acts as an agent and representative of the State, with official and public duty doctrine immunity. If any provision of the contract appears to impose a duty on such an individual, the duty will remain exclusively that of the Commission and will not be a personal duty or obligation of the individual.

107.17 Contractors That Are Not Resident In Missouri. Any contractor that is not a permanent resident of or domiciled in Missouri shall provide to the Commission proof of compliance with the Missouri "nonresident employers" financial assurance laws at Sections 285.230 to 285.234, RSMo, before the contractor performs any work on a project.

107.17.1 A nonresident contractor that is a "transient employer" as that term is defined in Section 285.230.1, RSMo, and 12 CSR 10-2.017(1)(A), shall file with the Commission a photocopy of the contractor's current transient employer's certificate of registration issued by the Missouri Department of Revenue before performing any work on a project. A nonresident contractor that is not classified by the Missouri Department of Revenue as a "transient employer" because the nonresident contractor has properly registered with the Missouri Department of Revenue and the Missouri Division of Employment Security, and has filed and paid Missouri state income taxes for more than 24 consecutive months, shall file with the Commission a photocopy of the contractor's certificate of registration, issued by the Missouri Department of Revenue, that it is not a "transient employer" before performing any work on a project.

107.17.2 The contractor shall require a nonresident subcontractor to file with the Commission a photocopy of the subcontractor's current transient employer's or alternate certificate of registration, as issued by the Missouri Department of Revenue, before that subcontractor performs any work on a project.

107.17.3 Any nonresident contractor or subcontractor that fails to file the financial assurance forms with the Missouri Department of Revenue as required by Missouri law will be prohibited from contracting for or performing labor on any project for a period of one year.

107.18 Basis of Payment. No direct payment will be made for compliance with [Sec 107](#), except as provided by [Sec 618](#).

Buy America

In addition to Section 106.9 of the Missouri Standard Specifications for Highway Construction, the following requirements will also be in effect for this project.

1.0 Description. The Bipartisan Infrastructure Law (BIL) was enacted on November 15, 2021. The BIL includes Build America, Buy America Act Publication L. No. 117-58. This provision

expands the Buy America requirements beyond what is currently only required for steel and iron products. The steel and iron provisions have not changed with the new bill. Cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives are excluded from this requirement. All other materials and manufactured products permanently incorporated into the project will be subject to Buy America requirements. There are three categories requiring Buy America Certification:

- a) Iron and steel – no changes to the current specification requirements.
- b) Manufactured products – these are currently exempted under the 1983 waiver from FHWA.
- c) Construction materials consisting primarily of:
 - Non-ferrous metals;
 - Plastic and polymer-based products (including polyvinylchloride, composite build materials, and polymers used in fiber optic cables);
 - Glass (including optic glass);
 - Lumber; or
 - Drywall

1.1 All products and or materials will only be classified under one of these categories and not under multiple categories. It is the prime contractor's responsibility to assure all submittals required for Buy America are submitted to the Engineer prior to the products and or materials being incorporated in the job. The implementation of this policy will be in effect for all projects awarded after November 10, 2022.

1.2 New items designated as construction materials under this requirement will require the prime contractor to submit a material of origin form certification prior to incorporation into the project. The Certificate of Material origin form ([link to certificate form](#)) from the supplier and/or fabricator must show all steps of the manufacturing being completed in the United States. The Certificate of Material form shall be filed with the contract documents.

1.3 Any minor miscellaneous construction material items that are not included in the materials specifications shall be certified by the prime contractor as being procured domestically. The certification shall read "I certify all materials permanently incorporated in this project covered under this provision have been to the best of my knowledge procured and all manufactured domestically." The certification shall be signed by an authorized representative of the prime contractor.

1.4 The National Transportation Product Evaluation Program (NTPEP) compliance program verifies that some non-iron and steel products fabrication processes conform to 23 CFR 635.410 Buy America Requirements and an acceptable standard per 23 CFR 635.410(d). NTPEP compliant suppliers will not be required to submit step certification documentation with the shipment for some selected non-iron and steel materials. The NTPEP compliant supplier shall maintain the step certification documentation on file and shall provide this documentation to the engineer upon request.

2.0 Basis of Payment. Any costs incurred by the contractor by reason of compliance with the above requirements shall be considered as included in and completely covered by the unit price

bid for the various items of work included in the contract.

Delete Sec 617.20.3 and substitute the following:

617.20.3 Certification. Prior to use the contractor shall submit to the engineer a manufacture's certification of crashworthiness per NCHRP 350 or MASH 2016 for portable concrete barrier or other approved temporary barrier. Type F three-loop temporary concrete barrier is required to meet NCHRP 350 requirements regardless of manufacturing date and may be used until January 1, 2030. All other temporary barriers manufactured prior to January 1, 2023 may be used until January 1, 2030. All other temporary barriers manufactured after January 1, 2023 shall meet MASH 2016 crash test requirements.

Delete Sec 1063.2 and substitute the following:

1063.2 General Requirements. All temporary traffic control devices shall be manufactured as shown on the plans and as specified, in accordance with MUTCD requirements and shall be NCHRP 350 or MASH 2016 compliant. FHWA Category 1 temporary traffic control devices are not required to be crash tested unless modified. Non MASH 2016 FHWA Category 2 temporary traffic control devices and appurtenances manufactured prior to January 1, 2023 may be used until January 1, 2026. Non MASH 2016 FHWA Category 3 temporary traffic control devices and appurtenances manufactured prior to January 1, 2023 may be used until January 1, 2030. All other FHWA Category 2 and Category 3 temporary traffic control devices and appurtenances manufactured after January 1, 2023 shall meet MASH 2016 Test Level 3 crash test requirements. Type F three-loop temporary concrete barrier is required to meet NCHRP 350 requirements regardless of manufacturing date and may be used until January 1, 2030. MASH 2016 FHWA Category 4 temporary traffic control devices should be used when available. Nominal dimensions will be permitted for dimensional lumber where applicable. All temporary traffic control devices shall exhibit good workmanship and shall be free of objectionable marks or defects that affect appearance or serviceability. The brand name or model number shall be permanently identified on each traffic control device.

Alternate Weather Limitations for Plant Mix Bituminous Surface Leveling

1.0 Description. Weather limitations for Plant Mix Bituminous Surface Leveling mixtures shall be as specified in Sec 402.10.1 except as otherwise allowed herein.

1.1 When all remedial actions listed in Section 2.0 have been implemented by the contractor, at no additional cost to the Commission, the alternate weather limitations in Section 1.2 shall apply in lieu of Sec 402.10.1

1.2 Alternate Weather Limitations. Bituminous mixtures shall not be placed (1) when either the air temperature or the temperature of the surface on which the mixture is to be placed is below 40 F, or (2) on any wet surface or frozen pavement. Temperatures shall be obtained in accordance with MoDOT Test Method TM 20.

2.0 Remedial Actions.

- a) Reclaimed Asphalt Pavement (RAP) content in the mix does not exceed 20% asphalt binder replacement.
- b) No Reclaimed Asphalt Shingles (RAS) are added to the mix.
- c) A material transverse vehicle is utilized to transfer the mix from the haul trucks to the paver.

- d) Warm mix technology shall be incorporated into the mix (either by chemical additive or foaming), as approved by the engineer.

G. Contractor Quality Control NJSP-15-42

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

2.0 Quality Control Plan.

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

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

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

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

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

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

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

4.0 Work Planning and Scheduling.

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

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

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

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

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

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

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

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

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

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

Delete Sec 108.8.1.3 (a)

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

I. Utilities

1.0 For informational purposes only, names, addresses, and telephone numbers of the known utility companies in the area of the construction work for this improvement are included on the corresponding plan sheet.

1.1 The Contractor shall be aware there are numerous utilities present along the route in this contract. Full utility locates were not performed during the design phase of the project; therefore, the extent of conflicts with utilities are unknown. It is the inherent risk of the work under this contract that the contractor may encounter these utilities above and/or below the ground or in the vicinity of any given work item which may interfere with their operations. The contractor expressly acknowledges and assumes this risk even though the nature and extent are unknown to both the contractor and the Commission at the time of bidding and award of the contract

2.0 JSE0121 Project Specific Provisions : Ozark Border Electric Cooperative will be providing power at the interchange for Route 67 and Route M. Ozark Border Electric Cooperative will install the meter loop on existing pole A5-003. Contact John Walker at 573-785-4631 for coordination of the installation.

The City of Poplar Bluff will supply power at the Route PP and Route 67 interchange. The city will make final connections at the pole as shown on the plans. Contact Bill Bach at 573-686-8003 for coordination of the installation.

J. Truck Mounted Attenuator (TMA) for Stationary Activities

1.0 Description. Provide and maintain Truck Mounted Attenuators (TMA) in accordance with Sec 612 and as specified herein.

2.0 Construction Requirements. Truck Mounted Attenuators (TMA) shall be used for the work activities indicated in the plans or specified herein.

2.1 Lane Closure, Shoulder Closure, or Partial Ramp Closure – Use a TMA at locations where construction operations encroach into the traveled way or shoulder. See plans for traffic control detail.

2.2 Installation of CCTV pole – Use a TMA at locations during installation of CCTV poles.

3.0 Method of Measurement. No measurement will be made for Truck Mounted Attenuators (TMA).

4.0 Basis of Payment. Delete Sec 612.5.1 and substitute with the following:

612.5.1 No payment will be made for truck mounted attenuators (TMAs) used in mobile operations or for any TMAs designated as optional.

612.5.1.1 Payment for TMAs required for stationary work activities will be paid for at the contract unit bid price for Item 612-30.01, Truck Mounted Attenuator (TMA), per lump sum. The lump sum payment includes all work activities that require a TMA, regardless of the number of deployments, relocations, or length of time utilized. No payment will be made for repair or replacement of damaged TMAs.

K. Airport Requirements

1.0 Description. The project is located near a public use airport or heliport or is more than 200 feet above existing ground level, which requires adherence to Federal Aviation Regulation Part 77 (FAA Reg Part 77). "Near" to a public use airport or heliport is defined as follows:

20,000 feet (4 miles) from an airport with a runway length of at least 3,200 feet
10,000 feet (2 miles) from an airport with runway length less than 3,200 feet
5,000 feet (1 mile) from a public use heliport

2.0 The maximum height of the improvement and the equipment operating while performing the improvements was assumed to be 50 feet above the current travelway during the process of evaluating the project for compliance with FAA Reg Part 77.

2.1 If the contractor's height of equipment or if the improvement itself is beyond the assumed height as indicated in Sec 2.0, the contractor will work with the resident engineer to fill out the Form 7460-1, or revise the original Form 7460-1 based upon the proposed height and resubmit, if necessary, for a determination by FAA on compliance with FAA Reg Part 77. Further information can be found in MoDOT's Engineering Policy Guide 235.8 Airports. If the Form 7460-1 must be filed, the associated work shall not be performed prior to the FAA determination, which could take up to 45 days.

2.2 If the contractor's height of equipment and the improvement itself is below the assumed height as indicated in Sec 2.0, no further action is necessary to fulfill the requirements set forth in FAA Reg Part 77.

3.0 Basis of Payment. There will be no direct payment for any work associated with this provision. Contract time extension will be given for the time necessary to obtain or revise the FAA permit. Any delays or costs incurred in obtaining the revised permit will be noncompensable.

L. Damage to Existing Roadways and Entrances

1.0 Description. This work shall consist of repairing any damage to existing pavement, shoulders, side roads, and entrances caused by Contractor operations. This shall include, but is not limited to, damage caused by the traffic during Contractor operations within the project limits including the work zone signing.

2.0 Construction Requirements. Any cracking, gouging, or other damage to the existing pavement, shoulders, side roads, or entrances from general construction shall be repaired within twenty-four (24) hours of the time of damage at the Contractor's expense. Repair of the damaged pavement, shoulders, side roads, or entrances shall be as determined by the Engineer.

3.0 Method of Measurement. No measurement of damaged pavement, shoulder, side roads, or entrances, as described above, shall be made.

4.0 Basis of Payment. No payment will be made for repairs to existing pavement, shoulders, side roads or entrances damaged by Contractor operations.

M. Site Restoration

1.0 Description. Restore to its original condition any disturbed areas at sites including, but not limited to, pull box, conduit, pole base installations, relocated signs and temporary removal of guardrail. Restoration shall be accomplished by returning the site back to the pre-existing layout and replacing, as needed, material equivalent to that of the adjacent undisturbed area. Disturbed unpaved areas shall be fertilized and seeded and mulched. The Engineer will have the final authority in determining the acceptability of the restoration work.

1.1 The Contractor shall take special care to minimize the disturbance of the existing ground.

2.0 Basis of Payment. The cost of restoration of disturbed areas, including erosion control during construction, will be incidental to the unit price of CCTV pole installation, conduit, and/or pull box. No direct payment will be made for any materials or labor, which is performed under this provision.

N. Coordination with MoDOT Signal Personnel

1.0 Description. Any work that will impact the existing communications network must be coordinated with Gateway Guide IT staff. This includes removal and replacement of any existing communications equipment, 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.

2.0 Contact. Initial contact must be made at least seven calendar days before work that may impact the existing communications network. The listed contact will assist in coordinating with Gateway Guide IT staff.

Chris Medley, Traffic Signal Supervisor
Telephone Number: 573-469-9022 (Office) 573-252-0631 (Mobile)
Email: Christopher.Medley@modot.mo.gov

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

O. Material Storage of Commission Furnished Items

1.0 Description. Commission furnished items will be stored and available for pick-up at the following location. Contact the MoDOT signal personnel listed seven calendar days prior to schedule a pick-up time.

Missouri Department of Transportation
District 10 Garage
2675 N Main Street
Sikeston, Mo 63801

1.1 The Contractor will be responsible for picking up, loading, transporting and unloading all Commission furnished items.

1.2 The Contractor will be responsible for inspecting and testing Commission furnished items as described in these Special Provisions prior to loading them

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

P. Install Communication Equipment

1.0 Description. Install Commission-furnished communication equipment in new and existing roadside cabinets, including existing traffic signal cabinets. Connect it to power, communication, and ground. Test the completed installation and report any problems to the engineer. Trouble shoot to the point of identifying the particular device that is causing the communication problem.

2.0 Materials.

2.1 Ethernet switches and power supply, video encoders, fiber optic data modems, and device servers will be provided by the Commission. These will include power cables.

2.2 Provide communication cables (Category 5E patch cords, coax patch cords, and short serial cables) as required.

3.0 Construction Requirements.

3.1 Provide to the engineer a detailed schedule of installation of Commission-furnished communications equipment, at least thirty (30) days before commencing this type of work. Additionally, coordinate such work with the engineer.

3.2 For equipment installed in cabinets, mount the equipment in the rack as shown in the approved cabinet layout diagram or, for existing cabinets, as directed by the engineer, and connect the power cables and ground wires. If there are insufficient outlets in existing cabinets, provide power strips as required. Connect the communication cables as shown on the connection diagrams in the plans. The equipment will be configured by the Commission, and therefore do not change any configuration settings.

3.3 Assist Commission staff in making the installed 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. 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 communication equipment installation will be on a per cabinet basis. The unit price shall include patch cords, cabling, assistance to Commission staff in getting the equipment operational, and all miscellaneous hardware required for a safe, fully operational system. Payment will be made as follows:

Item No.	Description	Unit
902-99.02	Misc. Install Ethernet Switch and Power Supply	Each

Q. Install CCTV Camera Assembly

1.0 General.

1.1 Description. 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 a nearby cabinet (usually on the same pole). The pole and cabinet will be paid for separately. 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. Do 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 will 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.

2.1 Camera assembly, mounting bracket, power supply, and surge suppressors will be provided by the Commission.

2.2 Provide stainless steel bands to affix the mounting bracket to the pole. The banding shall be 1-inch wide, 0.044-inch thick, stainless steel.

2.3 The air terminal shall be solid copper 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 as indicated on the plans.

3.0 Construction Requirements.

3.1 Install the dome so that the pole does not block the camera's view of traffic.

3.2 Install the air terminal on the opposite side of the pole from the dome. Position the rod to project a minimum of five feet above the highest point of the pole and 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. Apply a copper-based conductive sealant between the rod and the pole before tightening the bolts. The pole itself shall be the ground conductor.

3.3 Connect the bottom of the pole to one or more ground rods using a bare, solid AWG # 6 copper wire. Use exothermic welding for all ground wire connections, except the connection to the pole, which shall use the pole's grounding lug. 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. 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.

3.4 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.

3.5 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, ensure that a camera cannot be used to view residential property. Prior to creating these restrictions, 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. Highlight situations in which there is a conflict between the need to protect privacy and the need to know about traffic situations. Revise the field of view restrictions as directed by the engineer.

3.6 Apply a rain repellent coating to the outside of the lower dome, following the coating manufacturer's instructions. The coating must be recommended by its manufacturer for clear acrylic.

4.0 Acceptance Testing.

4.1 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 assembly shall be powered during this testing, and tests shall follow procedures developed by the manufacturer and approved by the engineer. The engineer will 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.

4.2 After installing the camera assembly, test it using the same procedures as the manufacturer's representative used when the camera assemblies were delivered. In addition, demonstrate that the agreed upon viewing restrictions have been implemented. Also, 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.	Description	Unit
910-99.02	Misc. Install CCTV Camera Assembly	Each

R. CCTV Camera Terminal Cabinet

1.0 Description. This work shall consist of furnishing and installing new CCTV cabinets.

2.0 Materials.

2.1 Provide a single door, NEMA 3R, aluminum cabinet. The aluminum shall be at least 0.188 inches thick, except that the door and top need be only 0.125 inches thick. The cabinet shall be approximately 36 inches high, 20 inches wide, and 17 inches deep. The cabinets shall be designed for pole mounting (with the back against the pole). The cabinet shall have a three-point door latch. It shall also have provision for padlocking. The door hinge shall be continuous and shall be affixed by nuts and bolts that are concealed when the door is closed.

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

2.3 All powered cabinets shall be wired for three-wire 240/120 volt AC service except as noted on the plans. Provide a surge protector designed to protect 120/240 VAC split phase breaker panels. The protector shall use metal oxide varistors as the protective elements. The response time shall be under five nanoseconds and the maximum surge current shall be at least 40,000 amps. The clamping voltage shall not exceed 400 volts. The device shall protect line-to-line and line-to-neutral.

2.4 Provide an additional surge protector just for the circuits powering the communication and traffic management equipment (excluding the dynamic message sign, which has its own surge protectors). This shall be a filtering, two-stage surge protector. Install it on the load side of the appropriate breaker. The protector shall provide radio frequency noise filtering and be capable of protecting equipment drawing a total of at least 10 amps. If the maximum load on the circuit exceeds 10 amps, the Contractor shall split the load among multiple circuits, each with a surge protector. The protector shall clamp both the main line and the main neutral at 250 volts, both relative to each other and relative to the cabinet ground. The response time shall be such that the voltage never exceeds 250 volts. The surge protector shall suppress surges of up to 20,000 amps.

2.5 All circuit breakers shall be molded case units with quick-make, quick-break, trip-free mechanism, and with a minimum interrupting capacity of 10,000A (RMS Symmetrical). The

circuit breakers shall be of fixed trip type and UL listed. Circuit breakers shall be listed on the latest Qualified Products List QPL-W-C-375 maintained by the Defense Supply Center.

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

2.7 All seams shall be continuously welded and ground smooth.

2.8 All fasteners must be stainless steel.

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

2.10 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 must be covered by a clear acrylic shield.

2.11 All cabinet doors shall have locks keyed to match MoDOT's Existing DMS Cabinets.

2.12 The cabinet shall be equipped with the following:

- Rack: For mounting 19-inch equipment. The mounting rails must have holes of the EIA standard size and spacing for the entire height of the cabinet.
- Mounting panels: For terminal blocks, breakers, surge protectors and other small items on the back and side walls.
- Fluorescent light: Controlled by a door switch.
- Duplex ground fault interrupt outlet: For use by technicians.
- Thermostatically controlled fan and heater: The fan shall move 100 CFM through vents at the top of the cabinet. The air intake shall be through louvers in the door, and the air shall pass through a replaceable filter as it enters the cabinet. The heater shall use at least 250 watts and shall be designed to prevent accidental contact with dangerous heat or voltage.
- Electrical distribution system: Consisting of two 15 amp main circuit breakers, one for each side of the split phase service. One of the main breakers shall serve the communication and traffic management equipment in the cabinet. Provide at least four outlets on this circuit. The second main breaker shall power auxiliary devices in the cabinet, such as the fan, heater, light, and GFI outlet. If the cabinet feeds power to other cabinets, the Contractor shall provide two separate branch circuits for each of the other cabinets (one circuit for communication and traffic management equipment and the other circuit for the remaining devices). The Contractor shall equip those branch circuits with 15 amp breakers.
- Sunshield: On the top.
- Mounting brackets: Stainless steel U-bolts and any other mounting hardware needed.

3.0 Construction Requirements.

3.1 Pole Mounted Cabinets. Securely fasten pole-mounted cabinets to their poles using mounting brackets as indicated in the plans.

3.2 Bonding and Grounding. Bond pole-mounted cabinets to the pole and ensure that the pole is connected to a ground rod. Copper clad ground rods $\frac{3}{4}$ " x 10' are required as needed to meet grounding requirements.

4.0 Acceptance Testing.

4.1 Develop a proposed test procedure for the cabinets and submit it to the Engineer for approval. It shall include visual inspection, testing of lights, fan, heater, power outlets and alarm sensors. It shall also include a test in which each branch circuit is shorted to the cabinet wall to confirm that the breaker trips. Use a device that measures resistance to ground using the three-point fall-of-potential method to ensure that the resistance from the sign's ground bar to ground does not exceed 5 ohms. Add more ground rods if necessary to achieve this requirement. Revise the proposed test procedure until it is acceptable to the Engineer.

4.2 Provide all equipment and personnel needed to safely conduct the tests, arrange for the Engineer's representative to witness the tests, and give the Engineer a report documenting the result of every visual inspection and test. Include a summary indicating whether the cabinet passed every test. The cabinet must pass every test to be accepted.

4.3 If the cabinet fails, correct the problems and arrange for a new test.

5.0 Documentation.

5.1 Prior to purchasing the cabinets, 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. It should also demonstrate that incoming conductors reach surge suppressors as soon as they enter the cabinet. Lay out all cabinets that have the same equipment in the same way and submit a single drawing for all like cabinets. Revise the layout as instructed by the Engineer and resubmit the drawings until they are accepted.

5.2 After installation, provide one reproducible 24 inch X 36 inch and two prints of the cabinet wiring diagram for each cabinet. The diagrams shall be nonproprietary. They shall reflect as-built conditions and shall identify all circuits 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 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. Payment will be made as follows:

Item No.	Description	Unit
910-99.02	Misc. CCTV Camera Terminal Cabinet, Pole Mounted	Each

S. CCTV Battery Backup

1.0 Description. This work shall consist of furnishing and installing new CCTV battery backup.

2.0 Materials.

2.1 Provide a self-contained, pole mounted battery backup that is compatible with the CCTV Camera Terminal Cabinet and MoDOT furnished CCTV camera.

3.0 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. Payment will be made as follows:

Item No.	Description	Unit
910-99.02	Misc. CCTV Battery Backup, Pole Mounted	Each

T. Conduit**1.0 Description.**

1.1 Furnish and install conduits as shown on the plans and as described within this section. The plans depict conduit routing in schematic form only. Determine final routing based on actual field conditions at each site, including utility locator service markings, to assure no conflicts with existing utilities.

1.2 Inspect the project area prior to submittal of bid to determine the extent of trenching in rock, types and extent of incidental removal, relocation and replacement items to include in the unit price of conduit and pull boxes.

2.0 Materials.

2.1 Conduits shall meet the requirements of Sec 1060.

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

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

2.4 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 conduit cells.

3.1.3 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. Locator wire is incidental to the conduit and will not be paid for separately.

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

3.2 Directional Drilling.

3.2.1 Preliminary Site Work. Determine all utility locations near the path of the proposed bore, including depth. Use this information to avoid damage to utilities and/or facilities within the work area. Provide this information, including the sources, to the Engineer a minimum of five working days prior to boring. Do not bore until the Engineer approves that submittal.

Prior to boring, expose all utilities for 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. Pressure grout as directed by the Engineer to fill any voids which develop during the installation operation. 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 will be permitted only to the extent necessary to lubricate cuttings. Jetting will not be permitted, and the use of water alone as a drilling fluid will not be permitted. 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.

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. Provide measures to prevent drilling fluids from entering storm sewer systems. Prevent drilling fluid/slurry from accumulating on or flowing onto sidewalks, other pedestrian walkways, driveways, or streets. Immediately remove any slurry that is inadvertently deposited on pedestrian walkways. Transport waste drilling slurry from the site and dispose of it. Do not allow slurry to enter wetlands. Protect wetlands using appropriate soil erosion control measures approved by the Engineer.

3.2.4 Drilling Control. 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, locate the drill head every 10 feet along the bore and prior to crossing any underground utility or structure. Upon completion of the drilling operation and conduit installation, 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 Install Conduit into Existing Pull Box. Where indicated on the plans, install a proposed conduit into an existing pull box.

3.3.1 Carefully expose the outside of the existing pull box without disturbing any existing conduits or cabling.

3.3.2 Drill the appropriately sized hole for the entering conduit at a location within the pull box that will not disturb the existing cabling, and that will not hinder the installation of new cabling within the installed conduit, and not less than 4" from the bottom of the pull box.

3.3.3 Fill any void area between the drilled hole and the conduit with an Engineer-approved filling material to protect against conduit movement and the entry of fill material.

3.3.4 Backfill shall be carefully tamped in place. All disturbed areas shall be restored in accordance with the provisions for Site Restoration.

4.0 Basis of Payment.

4.1 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.

4.2 The pay items for conduit include:

Item No.	Description	Unit
910-99.03	Misc. Conduit, 2in. HDPE, Directional Drilled	Linear Foot
910-99.03	Misc. Conduit, 2in. HDPE, in Trench	Linear Foot
910-99.03	Misc. Conduit, 2in. HDPE, on Structure	Linear Foot

U. Fiber Optic Cable

1.0 Description. This work shall consist of installing, splicing and terminating fiber optic cables.

2.0 Materials.

2.1 Cable. Fiber optic cable shall be 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 12 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 ST compatible, with ceramic ferrules. They 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 must use the type of connector specified in Sec 2.3 of this provision. Each must 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.

3.0 Construction Requirements.

3.1 Cable Installation. Prior to installation, perform such 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 will be deemed the fault of the Contractor

3.1.1 Install the cable 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, provide the Engineer with four copies of the cable manufacturer's recommended maximum pulling tensions for each cable size. These pulling tensions shall be specified for pulling from the cable's outer jacket. Also, provide a list of the minimum allowable cable bending radius and the cable manufacturer's approved pulling lubricants. Only those lubricants approved by the cable manufacturer will be permitted.

3.1.3 If the cable is pulled by mechanical means, use a clutch device to ensure the allowable pulling tension is not exceeded. Also, attach a strain gauge 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 Do not leave the let-off reel unattended during a pull, in order to minimize the chance of applying excess force, center pull, or back feeding.

3.1.5 Use an approved lubricant, in the amount recommended by the cable manufacturer, to facilitate pulling the cable. After the cable has been installed, wipe the exposed cable in a pull box, junction box, or field terminal cabinet clean of cable lubricant with a cloth before leaving the pull box, junction box, or cabinet.

3.1.6 In every intermediate pull box, store 10 feet of slack fiber optic cable for every cable that passes through the pull box. At cabinet locations, where cable runs from the pull box directly to a pole with cabinet, store 60 feet of slack fiber optic cable in the pull box. Store slack cable neatly on the walls of the pull box using racking hardware acceptable to the Engineer. Additional slack cable that is included in the pay quantity includes 50 feet at the splice point within the MoDOT fiber access handhole and 15 feet at the interconnect.

3.1.7 Seal the fiber optic cable ends to prevent the escape of the filling compound and the entry of water.

3.1.8 Label every cable immediately upon installation. Label the cables at every point of access, including junction boxes, pull boxes, and termination points. Use self-laminating vinyl labels at least 1.5" wide and long enough that the translucent portion of the label completely covers the white area bearing the legend. The vinyl shall have a layer of pressure sensitive acrylic adhesive. The labels shall resist oil, water, and solvents and shall be self-extinguishing. The legend shall be machine printed in letters at least 3/32" high. Consult with the Engineer

concerning the desired method of identifying each cable. Labeling cables is incidental to the installing the cable and will not be paid separately.

3.2 Splicing. Splice all optical fibers, including spares, to provide continuous runs. Splices shall be allowed only in equipment cabinets and splice enclosures except where shown on the plans.

3.2.1 Make all splices 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. Provide all equipment and consumable supplies.

3.2.2 Secure each spliced fiber in a protective groove. Completely re-coat bare fibers 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, measure and record the optical loss over that fiber. See Sec 4.0 of this provision.

3.2.4 Use a different splice tray 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, use a separate splice tray for that tube.

3.3 Termination. Terminate fibers by splicing them to factory-made pigtails. Cap all connectors that are not connected to a mating connector.

3.4 Jumper Management. Use spiral wrap to guide and protect bundles of jumpers between the patch panel and equipment. Affix the spiral wrap to the wall of the field terminal cabinet or vertical member of the rack. Label the jumpers at each end, numbering them sequentially.

3.5 Underground splices. Use a fiber optic splice enclosure for underground splicing. Upon completion of the splices, the splice trays shall be secured to the inner enclosure. The enclosure shall be sealed using a procedure recommended by the manufacturer that will provide a waterproof environment for the splices. Ensure a tight salt-resistant and waterproof seal is made which will not leak upon aging. The outer enclosure shall be flash-tested at 15 psi to demonstrate an adequate seal. Fasten the enclosure securely to the wall of the pull box in a manner that allows the cables to enter at the end of the enclosure without violating the minimum bending radius for the cables, while maximizing the clearance from the bottom of the pull box.

3.6 Splicing Existing Fiber. When making splices to the existing fiber in MoDOT handholes, equally distribute the slack fiber on either side of the splice enclosure.

4.0 Acceptance Testing.

4.1 General. Test the fiber after installation, including all splicing and terminations. For each fiber optic link terminated at the field terminal cabinet patch panels, 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).

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

- (a) Calculate the maximum allowable losses for the Contractor installed fiber link, both at 1310 nm and at 1550 nm. Use the following formula:

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

Provide this calculation to the Engineer along with the test results.

- (b) Provide the Engineer documentation that the optical time domain reflectometer to be used in testing has been calibrated and is working properly.
- (c) Use an optical time domain reflectometer to assess the losses along the Contractor furnished and installed fiber paths (connector in camera cabinet though the fusion splice in the MoDOT handhole) from the camera cabinet end of the fiber only. Record the result at both 1310 nm and 1550 nm. Arrange for the Engineer or his representative to witness these tests.
- (d) Use an optical time domain reflectometer and other test equipment to troubleshoot the link. Take whatever corrective action is required, including cable replacement, to achieve a loss less than the calculated maximum.

4.3 Test Result Documentation. Prepare a diagram showing all of the links tested in this project. For the portions installed in this project, show the field terminal cabinets, splices, and pigtails. On each line representing a link, show the maximum allowable loss and the actual loss. The actual loss shall be the one measured after all corrective actions have been taken. Submit this diagram to the Engineer, along with the calculations for the maximum allowable loss. Submit the diagrams and calculations in an electronic format acceptable to the Engineer.

5.0 Documentation. Provide the Engineer 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 manufacturer's warranty 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.	Description	Unit
910-99.03	Misc. Fiber Optic Cable, 24-Strand Single Mode	Linear Foot

V. Install Concrete CCTV Pole

1.0 Description. Install a Commission furnished 59-foot long spun concrete CCTV pole and camera lowering device as shown on the plans and specified following manufacturer's recommendations.

1.1 Maintenance Pad. A 5' X 5' X 6" Class B Concrete maintenance pad shall be constructed around the center of the pole base.

1.2 Handling and Erection Specifications. The poles must be lifted and supported during stockpiling, transporting, and erecting operations only at the points shown on the shop drawings provided by the pole manufacturer. Qualified experienced personnel must be obtained to perform the transportation, site handling, and erection of the poles with acceptable equipment and methods. Manufacturer handling instructions may be obtained from MoDOT signal personnel.

2.0 Materials.

2.1 A concrete camera pole with a total length of 59-feet, weighing approximately 8,500 lbs. and including a camera lowering device and pre-fabricated access points will be provided by the Commission. The Contractor will be responsible for picking up, loading and unloading, and transporting each pole. Poles will be delivered to centrally located MoDOT facilities in relatively close proximity to the project as detailed within these provisions.

2.2 Electrical Ground. At a minimum a #2 AWG bare copper ground conductor shall run from the pole ground lug at the bottom of the pole to the ground rods. Copper clad ground rods $\frac{3}{4}$ " x 10' are required as needed to meet grounding requirements.

2.3 Maintenance Pad. Use Class B concrete with $f'_c = 3,000$ psi and reinforcing steel with $f_y = 60,000$ psi and meeting the requirements in Section 706.

3.0 Construction Requirements.

3.1 General Requirements.

- (1) Construct the drilled shaft to support the pole. The timing of shaft construction must be coordinated so that the pole can be embedded in the fresh shaft during concrete placement. The pole must be temporarily supported until the concrete reaches a compressive strength of 2000 psi.
- (2) After fulfilling all the requirements for constructing the appropriate foundation and after receiving approval by the Engineer of the installation plan, the Contractor will install the pole.
- (3) Care must be exercised in installation of poles so that the shaft is in true vertical position when loaded. The orientation of the camera lowering device connections with the pole installed shall result in the attached camera lowering devices having the directional orientation shown on the plans. All pole orientations must be approved by the Engineer prior to installation.
- (4) A preformed fiber expansion joint must be provided between the pole and the maintenance pad.

3.2 Specific Requirements for Drilled Shafts. Equipment used for excavation, drilling and cleaning operations must have adequate capacity including power, torque and down thrust to excavate a hole to the depths shown in the plans. The drilling equipment must be able to penetrate the subsurface materials that are encountered in order to construct the shaft excavation to the depth and size required. When applicable, or as required by the Engineer, provide drilling slurry and equipment that maintains stability of the subsurface formation. If slurry is not used, then the shaft excavation must be dewatered for stability, so that no more than 3 inches of water is present in the base of the shaft at the time of concrete placement.

3.2.1 No additional compensation will be made for a casing, if required, or additional backfill required to fill an oversized excavation. If casing is to be used; rigid, smooth, clean, watertight and of ample strength to withstand both handling and driving stresses and the pressure of both concrete and the surrounding earth and water. The outside diameter of the casing may not be less than the specified shaft diameter. If a casing is required due to soil conditions, the casing should either be removed as the fill material is poured, or the casing may be left in place with fill material poured outside of the casing to ensure solid contact with the surrounding soil.

3.2.2 Submit a drilled shaft Installation plan at least 14 days prior to beginning of drilled shaft construction for approval by the Engineer. Acceptance of the installation plan does not relieve the Contractor of responsibility for successful completion of the drilled shafts. Submit the design and foundation specification including the soil boring analysis at this time.

3.2.3 If the method of construction requires that drilled shaft casing be seated into the sound rock such that the bottom of the casing is below the determined top of sound rock elevation, payment for excavation below the top of the sound rock layer (top of the rock socket) will be included in the payment for the rock socket. If sound rock is encountered within the excavation at which point a rock auger, core barrel or other rock-removing specialty tool must be used by the Contractor before the top of the sound rock elevation to be used as "top of the rock socket" is confirmed by the Engineer, that work will be paid for as rock socket excavation.

3.3 Grounding. Connect the pole ground lug at the bottom of the pole to the grounding system using a minimum AWG #2 copper conductor.

3.3.1 Achieve a resistance to ground measurement of 5 ohms (Ω) or less between the grounding electrode and the soil by using multiple electrodes, if necessary. Use a grounding electrode system (i.e., multiple electrodes as required to achieve a resistance to ground measurement of 5 Ω or less) approved by the Engineer. Make all connections to the grounding electrode using exothermic welds.

3.3.2 Connect all grounding electrodes related to the ITS device and its subsystems, and any grounded electrical system within a 100-foot radius (but not beyond the right of way) of the camera pole, to a single point main grounding electrode, sometimes referred to as the ground window, which shall be driven a maximum of 3 feet from the base of the pole. Provide for each grounding electrode an interfacing hemisphere, which is an imaginary cylinder with a radius and depth equal to the length of the electrode, so each additional electrode must be spaced two times the electrode length away from other electrodes. Bury the bonding wires a minimum of 30 inches below the grade.

3.3.3 All grounding rod attachments shall be exothermically welded at all connection points. Bond all metal components of the ITS device subsystem, such as the cabinets and steel poles,

to the grounding system with a grounding cable that uses a mechanical connection on the equipment side and an exothermically welded connection at the down cable.

3.4 Ground Resistance Testing and Certification. Measure the ground resistance with an instrument designed specifically to measure and document earth/ground resistance, soil resistance, and current flow. Conduct the test by using the Fall-of-Potential method as described in the IEEE Standard 142-2007. Provide the Engineer with written test results for each testing location prior to backfilling the grounding electrode. Include in the test results, the instrument model and date of calibration for the device used in the testing, the local environmental conditions at the time of testing, and a full Fall-of-Potential graph. Certify and sign the test results submitted.

4.0 Basis of Payment. Measurement and payment for CCTV pole installation includes excavation, backfilling and backfill material, incidental grading, maintenance pad, installation of camera lowering device, grounding and all miscellaneous equipment required for a plumb, safe, fully operational camera mounting assembly. Payment will be made as follows:

Item No.	Description	Unit
910-99.02	Misc. Install CCTV Concrete Pole	Each

W. Modify Existing Power Supply

1.0 Description. Provide and install circuit breakers in existing power supply disconnects in order to provide 120 volt circuits to proposed CCTV camera sites.

2.0 Materials. Provide circuit breakers, splices, cabinet wiring, and any incidental materials necessary to provide a source of power for a CCTV site.

3.0 Construction Requirements. Mount new circuit breaker as directed by Engineer's representative.

4.0 Acceptance Testing. Provide all equipment and personnel needed to safely test the circuit. Arrange for the Engineer's representative to witness the tests.

5.0 Documentation. Provide testing results for all modified power supply disconnects.

6.0 Basis of Payment. Measurement and payment for power supply disconnect modifications includes the circuit breaker, splicing, incidental wiring, testing, and all miscellaneous hardware required for a fully operational power source. Payment will be made as follows:

Item No.	Description	Unit
910-99.02	Misc. Modify Existing Power Supply	Each

X. Testing

1.0 Description. Verify that Commission furnished and Contractor furnished equipment is installed and operating in accordance with manufacturer's recommendations. Equipment to be tested includes but is not limited to: fiber optic cable, category 5E cable, RF cable,

communication cable, power service pedestals, conductors, communications equipment, concrete CCTV pole lowering device, modifications to existing signal control cabinets and modifications to existing power supply disconnects.

Testing will be limited to demonstration of equipment installed at the sites. It will be the Commission's responsibility to connect the equipment into the Commission WAN and integrate with existing software management systems.

For each piece of equipment develop a test plan and submit to the Engineer for review and approval. Modify and resubmit the test plans as directed by the Engineer until approved. Test plan shall incorporate requirements listed herein and manufacturer's testing procedures. Test plans shall clearly demonstrate that the equipment has been installed and is operating in accordance with manufacturer's recommendations. Test plans shall include the following: name of the equipment being tested, date of the testing, name of the person(s) performing the testing, pass/fail check boxes for each testing procedure, lines for signature of tester and Commission testing witness.

2.0 Materials. Provide test plan, testing equipment, incidental materials, patch and interconnect cables and labor necessary to successfully test and demonstrate that the equipment has been installed and is operating in accordance with manufacturer's specifications and requirements listed herein.

3.0 Basis of Payment. No direct payment will be made to the Contractor to recover the cost of equipment, labor, materials or time required to fulfill this provision, unless specified elsewhere in the contract document.

Y. Documentation

1.0 Description. Provide completed test plans signed by the Contractor and Commission witness, as-built documentation as described herein and documentation for all Contractor furnished equipment. Documentation includes but is not limited to: fiber optic cable, category 5E cable, RF cable, communication cable, power service pedestals, conductors, communications equipment, concrete CCTV pole lowering device, modifications to existing signal control cabinets and modifications to existing power supply disconnects. Documentation for Contractor supplied equipment shall include but is not limited to product cut sheets, operation and maintenance information and warranty information.

2.0 Materials. Provide copy of testing results, certifications, product data and as-built drawings.

3.0 Basis of Payment. No direct payment will be made to the Contractor to recover the cost of equipment, labor, materials or time required to fulfill this provision, unless specified elsewhere in the contract document.

Z. Maintenance and Warranty

1.0 Maintenance. Maintain all equipment and cables installed in this project and pay power service bills until the ITS device has passed all testing requirements specified here in, has operated without problems for a two (2) week continuous operational period, and all work at the

Job No.: JSE0121, JSE0099

Route: Various

County: Various

specific site is complete including cleanup and labeling. Once the operational period has successfully been completed maintenance of the device may be turned over to the Commission. The operational period will be successfully completed when the device has operated without any problems for a continuous two week period of time. During the two week operational period the Engineer may test the device to verify that it is working. If the device is found to have an operational problem, the problem shall be resolved and the operational period will restart.

2.0 Warranty. Obtain, assign and furnish to the Commission written manufacturer's warranties for all electronic equipment consistent with those provided as customary trade practice.

3.0 Basis of Payment. No direct payment will be made to the Contractor to recover the cost of equipment, labor, materials or time required to fulfill this provision, unless specified elsewhere in the contract document.