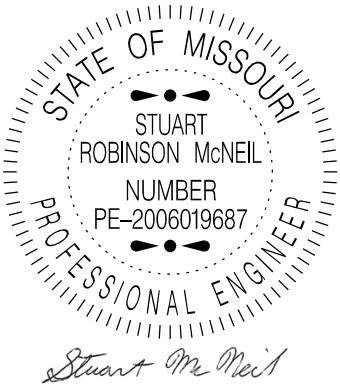
Job No.: J6S3280
Route: 67
County: St. Louis

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

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

Job No.: J6S3280
Route: 67
County: St. Louis



05/05/2023 8:30:06 AM
STUART ROBINSON McNEIL - CIVIL
MO-PE-2006019687

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: J6S3280
ST. LOUIS COUNTY, MO
DATE PREPARED: 4/18/2023

ADDENDUM DATE:

Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: All

Job No.: J6S3280
Route: 67
County: St. Louis

JOB
SPECIAL PROVISION

A. General - Federal JSP-09-02H

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 2022 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 on all projects (job numbers) shall be completed on or before the Contract Completion date specified below. Completion by this date shall be in accordance with the requirements of Sec 108.7.1.

Notice to Proceed: August 14, 2023
Completion Date: May 22, 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
J6S3280	NA	$5,400

33.0 Liquidated Damages for Contract Administrative Costs. Should the contractor fail to complete the work on or before the contract 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 **$2000** 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 contract 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 contract 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-02-06M

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 **10 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.

2.6 Transportation Management Plan. The contractor Work Zone Specialist (WZS) shall review the Transportation Management Plan (TMP), found as an electronic deliverable on MoDOT's Online Plans Room and discuss the TMP with the engineer during the preconstruction conference. Throughout the construction project, the WZS is responsible for updating any changes or modifications to the TMP and getting those changes approved by the engineer a minimum of two weeks in advance of implementation. The WZS shall participate in the post construction conference and provide recommendations on how future TMPs can be improved.

2.7 Traffic Management Center (TMC) Coordination. The Work Zone Specialist (WZS) or their designee shall contact by phone the MoDOT Traffic Management Center Gateway Guide TMC at 314-275-1513 within five minutes of a lane or ramp closure beginning and within five minutes of a lane or ramp closure being removed. The WZS shall make this phone call 24 hours a day, 365 days of the year since the MoDOT Traffic Management Centers are always staffed.

3.0 Work Hour Restrictions.

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

Memorial Day
Labor Day
Thanksgiving
Christmas
New Year's Day

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

12:00 noon June 30, 2023 – 6:00 a.m. July 5, 2023
12:00 noon July 3, 2024 – 6:00 a.m. July 5, 2024

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

3.3 The contractor shall be aware that traffic volume data indicates construction operations on the roadbed during the following hours will likely result in traffic queues greater than 10 minutes. Based on this, the contractor's operations will be restricted accordingly. It shall be the responsibility of the engineer to determine if the below work hours may be modified. Working hours for evenings, weekends and holidays will be determined by the engineer.

<u>Restricted Hours for Lane Closures</u>

Route 67 Southbound:
6:00 a.m. to 9:00 a.m. Everyday
2:00 p.m. to 7:00 p.m. Monday through Friday

Route 67 Northbound:
6:00 a.m. to 9:00 a.m. Everyday
2:00 p.m. to 7:00 p.m. Monday through Friday

3.4 Nighttime hours shall be enforced for all work requiring the closure of traffic lanes on Route 67 in the immediate vicinity of the following intersections and direction of travel. Nighttime hours shall be 7:00 p.m. to 6:00 a.m. for this project.

a) Route 340, Southbound
b) Ladue Rd, Southbound
c) I-64/Route 40, Southbound and Northbound
d) Route 100, Southbound and Northbound

3.5 The contractor shall not alter the start time, ending time, or a reduction in the number of through lanes of traffic or ramp closures without advance notification and approval by the engineer. The only work zone operation approved to begin 30 minutes prior to a reduction in through traffic lanes or ramp closures is the installation of traffic control signs. Should lane closures be placed or remain in place, prior to the approved starting time or after the approved ending time, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delays, with a resulting cost to the traveling public. These damages are not easily computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **$1,000.00 per 15 minute increment** for each 15 minutes that the temporary lane closures are in place and not open to traffic in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of unapproved closure time.

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

4.0 Detours and Lane Closures.

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

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

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

D. Emergency Provisions and Incident Management

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

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

Missouri Highway Patrol 1-800-525-5555 Cellular: *55		
St. Louis County Police 314-615-0111		
MoDOT Traffic Management Center (TMC) ***Gateway Guide***: 314-275-1513; Jim Connell 314-565-6717 ***Risk Management:*** Daytime (314) 453-1721; After Hours 314-594-SAFE (7233) ***Equipment Damage:*** Rico Fennewold Day 314-624-2921; After hours 314-205-7391		
City of Creve Coeur	West Overland Fire & EMS	City of Ladue
Fire: 314-432-5570	Fire: 314-428-6069	Fire: 314-993-0181
Police: 314-432-8000		Police: 314-993-1214
City of Frontenac	City of Kirkwood	
Fire: 314-994-1801	Fire: 314-822-5883	
Police: 314-994-9300	Police: 314-822-5858	

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

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

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

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

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

Stuart McNeil, PE - Project Contact
St. Louis District
1590 Woodlake Drive
Chesterfield, MO 63017

Telephone Number: 314-453-5402
Email: Stuart.McNeil@modot.mo.gov

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

F. 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.

G. Utilities

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

Utility Name	**Known Required Adjustment**	**Type**
Ameren Missouri Clark McLemore Telephone 314.830.8917 Email: cmclemore@ameren.com	See 2.0	Power
AT&T Distribution Danny Gray Telephone: 636.949.1320 Email: dg7548@att.com	See 3.0	Communications
Lumen (CenturyLink) Richard Obremski Telephone: 314.378.9931 Email: richard.obremski@lumen.com	none	Communications
Charter Communications Ron Dumke Telephone: 314.267.9581 Email: ronald.dumke@charter.com	See 5.0	Communications
City of Creve Coeur Jim Heines Telephone: 314.872.2538 Email: jheines@crevecoeurmo.gov	See 6.0	Lighting

Kirkwood Electric Rick McKinley Telephone: 314.984.5925 Email: mckinlrj.@kirkwoodmo.org	See 7.0	Electric/Lighting
Metropolitan Sewer District Steve Valli Telephone: 314.768.6211 Email: svalli@stlmsd.com	None	Sewer
Missouri American Water Dave Pruitt Telephone: 314.574.3601 Email: dave.pruitt@amwater.com	None	Water
Spire Energy Nick Eggert Telephone: 314.330.5720 Email: nicholas.eggert@spireenergy.com	See 10.0	Gas

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

2.0 Ameren Missouri. Ameren Missouri has overhead electric throughout the limits of the project. There is also underground electric throughout the limits of the project and will need to be considered during excavation. All adjustments are anticipated to be complete prior to the notice to proceed.

a) Ameren has a pole located at approximately STA 263+00 LT which will need to be relocated to accommodate MoDOT's proposed sidewalk improvements.
b) Ameren has a pole located at approximately STA 536+80 RT which will need to be relocated to accommodate MoDOT's proposed sidewalk improvements.

2.1 Service Disconnection. The contractor will need to work closely with Ameren to determine the feasibility of service disconnection for the benefit of the project. Availability of disconnection will depend on the time of year, length of disconnection, and pole/lines requested.

2.2 The contractor shall discuss the planned work as it relates to the energized power lines with Ameren Missouri and coordinate with Ameren Missouri for the installation of any insulation covers over the lines and/or any other designated requirements, if required. Please note Ameren Missouri has revised the policy regarding the charges for placement, length of use and relocation of covers. The contractor is advised to contact Ameren Missouri regarding the current policy and so the anticipated cost to the contractor can be estimated and when payment

is required. The Contractor shall contact Ameren Missouri at least six weeks in advance of when construction work is scheduled to begin to request covers to be placed at a given location.

2.3 No direct payment will be made for this provision. The contractor is responsible for any charges from Ameren Missouri for this provision and payment will be directly to Ameren Missouri.

2.4 Contractor shall directly contact Ameren Missouri to verify location of facilities. The contractor shall coordinate construction activities with Ameren Missouri and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

2.5 There will be no direct pay for compliance to any of the above provisions.

2.6 The Commission cannot warrant the information above which was provided by Ameren Missouri.

2.7 Power Service Connections. Should new electric service connections will be required for the construction or installation of the proposed improvements, the contractor shall contact the Ameren Power Service representative and the MoDOT utility coordinator. The MoDOT utility coordinator for this project is Steve Belcher (314.624.7382). The contractor must give Ameren Missouri at least 10 working days advance notice for each location needing service.

3.0 AT&T (Distribution). AT&T has existing overhead and underground facilities throughout the limits of the project.

a) AT&T has multiple manholes located in the limits of the proposed sidewalk with the majority located on the western side of Rte. 61/67. Contractor and MoDOT will need to work with AT&T to ensure pull boxes are adjusted to proper grade for ADA compliance.
b) AT&T will be replacing a pull box near Litzsinger Road near STA 455+00 LT. Contractor and MoDOT will need to work with AT&T to make sure replacement pull box is placed in a manner in which it is ADA compliant.
c) AT&T has a 12 way conduit system (4 fiber optic and 5 copper cables) attached to bridge H0989. AT&T will need to adjust to the Contractor's schedule to ensure service is maintained through the demolition and construction of the bridge over Deer Creek.
d) There are multiple stub poles that AT&T is attached aerially to. AT&T needs to relocate to the new Ameren power poles and remove the stub poles.

3.1 Contractor shall directly contact AT&T to verify location of facilities. The contractor shall coordinate construction activities with AT&T and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

3.2There will be no direct pay for compliance to any of the above provisions.

3.3 The Commission cannot warrant the information above which was provided by AT&T.

4.0 CenturyLink Communications. CenturyLink has facilities throughout the limits of the project. No planned adjustments of CenturyLink facilities are anticipated for this project.

4.1 Contractor shall directly contact CenturyLink to verify location of facilities. The contractor shall coordinate construction activities with CenturyLink and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

4.2 There will be no direct pay for compliance to any of the above provisions.

4.3 The Commission cannot warrant the information above which was provided by CenturyLink.

5.0 Charter Communications. Charter has overhead and underground facilities throughout the limits of the project.

a) Charter has an aerial cable on the eastern side of Rte. 61/67 near Plaza Frontenac from approximately STA 438+00 LT to STA440+30 LT. Charter will need to relocate underground to accommodate MoDOT's proposed signal replacement.

5.1 Contractor shall directly contact Charter to verify location of facilities. The contractor shall coordinate construction activities with Charter and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

5.2 There will be no direct pay for compliance to any of the above provisions.

5.3 The Commission cannot warrant the information above which was provided by Charter.

6.0 City of Creve Coeur. The City of Creve Coeur has facilities throughout the limits of the project.

a) The City of Creve Coeur has a pole located at approximately STA 306+30 LT which will need to be relocated to accommodate MoDOT's proposed sidewalk improvements.
b) The City of Creve Coeur has a pole located at approximately STA 309+80 LT which will need to be relocated to accommodate MoDOT's proposed sidewalk improvements.
c) The City of Creve Coeur has a pole located at approximately STA 341+60 LT which will need to be relocated to accommodate MoDOT's proposed sidewalk improvements.

6.1 Contractor shall directly contact The City of Creve Coeur to verify location of facilities. The contractor shall coordinate construction activities with The City of Creve Coeur and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

6.2 There will be no direct pay for compliance to any of the above provisions.

6.3 The Commission cannot warrant the information above which was provided by The City of Creve Coeur.

7.0 Kirkwood Electric. Kirkwood Electric has facilities throughout the limits of the project.

a) Kirkwood Electric has a pole located at approximately STA 558+50 LT which will need to be relocated to accommodate MoDOT's proposed sidewalk improvements.
b) Kirkwood Electric has a pole located at approximately STA 564+10 LT which will need to be relocated to accommodate MoDOT's proposed sidewalk improvements.

7.1 Contractor shall directly contact Kirkwood Electric to verify location of facilities. The contractor shall coordinate construction activities with Kirkwood Electric and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

7.2 There will be no direct pay for compliance to any of the above provisions.

7.3 The Commission cannot warrant the information above which was provided by Kirkwood Electric.

8.0 Metropolitan Sewer District. Metropolitan Sewer District (MSD) has facilities throughout the limits of the project. No planned adjustments of MSD facilities are anticipated for this project.

8.1 Contractor shall directly contact MSD to verify location of facilities. The contractor shall coordinate construction activities with MSD and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

8.2 There will be no direct pay for compliance to any of the above provisions.

8.3 The Commission cannot warrant the information above which was provided by MSD.

9.0 Missouri American Water. Missouri American Water Company (MAWC) has facilities throughout the limits of the project. No planned adjustments of MAWC facilities are anticipated for this project.

9.1 Contractor shall directly contact MAWC to verify location of facilities. The contractor shall coordinate construction activities with MAWC and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

9.2 There will be no direct pay for compliance to any of the above provisions.

9.3 The Commission cannot warrant the information above which was provided by MAWC.

10.0 Spire Energy. Spire has facilities throughout the limits of the project.

a) Spire has multiple valves located in the limits of the proposed sidewalk. Contractor and MoDOT will need to work with Spire to ensure valves are adjusted to proper grade for ADA compliance.

b) Spire has a 20" high pressure main running parallel on the western side of bridge H0989. Spire will be relocating the main to be out of footprint of the new bridge before the anticipated construction period of the summer of 2024.

10.1 Contractor shall directly contact Spire to verify location of facilities. The contractor shall coordinate construction activities with the Spire and take measures to ensure the integrity of the existing facilities are not disturbed. The contractor shall protect the integrity of any existing facility in close proximity to contract work while performing construction activities.

10.2 There will be no direct pay for compliance to any of the above provisions.

10.3 The Commission cannot warrant the information above which was provided by Spire.

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

1.0 Description.

1.1 Projects utilizing federal funds include contract provisions for minority and female workforce utilization in the various trade crafts used to complete construction contracts. These federal contract workforce goals are described in the section labeled "Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity". These goals are included in all MoDOT federal aid contracts and are under the authorization and enforcement of the U.S. Department of Labor (US DOL).

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

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

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

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

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

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

1.8 It is expected that the contractor recognizes the construction workforce goals for both minority and female workers in the project's county and make efforts to attain those goals, if

possible, through the existing workforce makeup of the prime (including subcontractors) that will be on the project and/or through hiring opportunities that may arise for the project. However, it is not the intent of this provision to compel any contractor to displace existing workforce or move workers around to just meet the workforce goals.

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

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

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

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

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

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

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

3.0 Methods for Securing Workforce Participation and Good Faith Efforts.

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

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

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

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

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

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

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

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

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

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

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

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

10.0 Federal Workforce Goals.

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

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

TABLE 1:

County	Goal (Percent)	County	Goal (Percent)
Adair	4	Linn	4
Andrew	3.2	Livingston	10
Atchison	10	McDonald	2.3
Audrain	4	Macon	4
Barry	2.3	Madison	11.4
Barton	2.3	Maries	11.4
Bates	10	Marion	3.1
Benton	10	Mercer	10
Bollinger	11.4	Miller	4
Boone	6.3	Mississippi	11.4
Buchanan	3.2	Moniteau	4
Butler	11.4	Monroe	4
Caldwell	10	Montgomery	11.4
Callaway	4	Morgan	4
Camden	4	New Madrid	26.5
Cape Girardeau	11.4	Newton	2.3
Carroll	10	Nodaway	10
Carter	11.4	Oregon	2.3
Cass	12.7	Osage	4
Cedar	2.3	Ozark	2.3
Chariton	4	Pemiscot	26.5
Christian	2	Perry	11.4
Clark	3.4	Pettis	10
Clay	12.7	Phelps	11.4
Clinton	10	Pike	3.1

Cole	4	Platte	12.7
Cooper	4	Polk	2.3
Crawford	11.4	Pulaski	2.3
Dade	2.3	Putnam	4
Dallas	2.3	Ralls	3.1
Daviess	10	Randolph	4
DeKalb	10	Ray	12.7
Dent	11.4	Reynolds	11.4
Douglas	2.3	Ripley	11.4
Dunklin	26.5	St. Charles	14.7
Franklin	14.7	St. Clair	2.3
Gasconade	11.4	St. Francois	11.4
Gentry	10	Ste. Genevieve	11.4
Greene	2	St. Louis City	14.7
Grundy	10	St. Louis County	14.7
Harrison	10	Saline	10
Henry	10	Schuyler	4
Hickory	2.3	Scotland	4
Holt	10	Scott	11.4
Howard	4	Shannon	2.3
Howell	2.3	Shelby	4
Iron	11.4	Stoddard	11.4
Jackson	12.7	Stone	2.3
Jasper	2.3	Sullivan	4
Jefferson	14.7	Taney	2.3
Johnson	10	Texas	2.3
Knox	4	Vernon	2.3
Laclede	2.3	Warren	11.4
Lafayette	10	Washington	11.4
Lawrence	2.3	Wayne	11.4
Lewis	3.1	Webster	2.3
Lincoln	11.4	Worth	10
		Wright	2.3

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

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

As used in these specifications:

"Minority" includes;

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

I. Optional Temporary Pavement Marking Paint NJSP-18-07D

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

1.1 No application of PPMP shall occur between October 1, 2023 and March 1, 2024, both dates inclusive, except as stated herein. When the contractor has begun application of PPMP prior to October 1, 2023, and weather limitations stated in Sec 620.20.2.4 can be met, the contractor may complete the PPMP within the first seven (7) calendar days of October. If all (100%) of the PPMP is not completed on or before October 7, 2023, all previously applied PPMP, including any painted markings applied prior to October 1, shall be considered TPMP, and the contractor shall complete the remaining marking with TPMP, and then re-apply PPMP in all planned locations after March 1, 2024. All PPMP shall be completed prior to June 1, 2024. No additional payment will be made for PPMP that is later determined to be TPMP due to the contractor's failure to complete the PPMP within the time specified.

1.2 Use of TPMP Prior to October 1. The contractor has the option to apply TPMP in lieu of PPMP prior to October 1, 2023, even when there is sufficient time to complete the PPMP prior to October 1, 2023. For example, the contractor may choose to use TPMP as a base coat for the PPMP on open-graded surfaces in order to achieve higher retroreflectivity readings on the surface coat as compared to a single application.

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

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

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

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

4.0 Time Exception. If application of PPMP is to be delayed to the spring of 2024, the contractor shall submit a request to the engineer for a time exception and shall provide a revised work schedule that shows the planned completion of the PPMP.

4.1 Upon receipt of the time exception request in Section 4.0, the engineer will list "Application of Permanent Pavement Marking Paint" as an exception on the Semi-Final Inspection form, thus granting an exception to the count of contract time thru June 1, 2024, solely for the purpose of delaying application of PPMP. This time exception shall not apply to any time needed to complete any other work items. Liquidated Damages, as specified elsewhere in this contract, shall remain in effect for all other work items not completed by the contract time limits, as specified elsewhere in this contract, and for PPMP not completed by June 1, 2024.

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

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

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

Item Number	Description	Unit
620-99.01	Temporary Pavement Marking Paint	LS

J. Winter Months Requirements JSP-15-07A

1.0 Description. This project contains work which spans the winter months.

2.0 Work to be Completed. When the contractor ceases operations for the winter months, any paving operation performed by the contractor shall not result in a lane height differential between adjacent lanes.

3.0 Maintenance of Pavement Marking. Prior to ceasing operations for winter months, a permanent or temporary stripe shall be provided on any completed length to the point that the original stripe was obliterated or obscured by the contractor's operation. Temporary striped areas shall be re-striped with the remaining route upon performance of the final striping.

4.0 Winter Related Maintenance Activities. The contractor shall have the project in a condition as not to interfere with the plowing of snow. The contractor shall also provide a taper at the end of his paving that will not be damaged by the plowing of snow.

5.0 Basis of Payment. There will be no direct pay for compliance with this provision.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

L. Balanced Mix Design Performance Testing for Job Mix Approval NJSP-21-08A

1.0 Description. This work shall consist of providing asphalt mixture in accordance with Sec 403 that meet the minimum Balanced Mix Design (BMD) performance requirements of cracking and rutting resistance. The BMD performance requirements will be applied to SuperPave mainline wearing surface mixtures only. Bituminous binder and base, level course, shoulder, and pavement repair mixtures are excluded from the BMD requirements.

2.0 Performance Testing. Acceptable test results meeting the performance requirements for both Cracking Tolerance Index (CT_{Index}) and Hamburg Wheel Track (HWT) shall be submitted with the mix design for approval. No incentive/disincentive payment will be imposed during production. The performance requirements for each mix type are detailed in the table below:

Performance Criteria / Mix Type	Cracking Tolerance Index (CT_{Index})	Hamburg Wheel Track (HWT)
Non SMA Mixtures	45 minimum	12.5 mm maximum rut depth @ designated wheel passes in Section 8
SMA Mixtures	135 minimum	12.5 mm maximum rut depth @ designated wheel passes in Section 8

Quality Control (QC) and Quality Assurance (QA) sampling and testing shall be conducted and reported. The results will be used for informational purposes only.

The contractor shall conduct Quality Control (QC) testing for the CT_{Index} and HWT at a frequency of 1/10,000 tons for the mainline pavement. The random testing location will be determined by the engineer. The engineer will conduct performance testing at a frequency of 1/20,000 tons for Quality Assurance (QA).

Gyratory compacted samples for the Asphalt Material Performance Tester (AMPT) shall be fabricated at a minimum of once per project or as directed by the engineer.

3.0 Design Gyrations. The number (N) of gyrations required for gyratory compaction shall be in accordance with Sec 403.4.5. For Non-SMA mixtures, at the option of the contractor the number of gyrations and air voids may be lowered. Mixtures having lowered gyrations shall have a minimum volume of effective asphalt, equal to the VMA minus the air voids, as shown in the chart below, with design air voids between 3.0% to 4.0%. The minimum VMA shall be the design air voids plus the volume of effective asphalt.

Mixture	Volume of Effective Asphalt (percent)
SP125	11.0
SP095	12.0
SP048	13.0

The minimum gyration level shall be in accordance with the following:

Design	N_{design}
F	35
E	50
C	60
B	65

4.0 VFA Requirements. Section 403.4.6.3 Voids Filled with Asphalt shall be omitted provided that the HWT requirements described above are satisfied and the CT_{Index} is 45 or greater.

5.0 Sec 403 Revisions.

Delete Section 403.5.2 and replace with the following…

403.5.2 Density. The final, in-place density of the mixture shall be between 92.0 and 97.5 percent of the theoretical maximum specific gravity for all mixtures except SMA. SMA mixtures shall have a minimum density of 94.0 percent of the theoretical maximum specific gravity. The theoretical maximum specific gravity shall be determined from a sample representing the material being tested. Tests shall be taken not later than the day following placement of the mixture. The engineer will randomly determine test locations.

Delete Section 403.23.7.3 and replace with the following…

403.23.7.3 Removal of Material. All lots of material with a PFT less than 50.0 shall be removed and replaced with acceptable material by the contractor. Any sublot of material with a percent of theoretical maximum density of less than 90.0 percent or greater than 98.0 percent shall be removed and replaced with acceptable material by the contractor. For SMA mixtures, any sublot of material with a percent of theoretical maximum density of less than 92.0 percent shall be removed and replaced with acceptable material by the contractor**.** Any sublot of material with air voids in the compacted specimens less than 2.0 percent shall be evaluated with Hamburg testing and removed and replaced with acceptable material by the contractor if the rut depth is greater than 14.0 mm at the designated number of wheel passes above. No additional payment will be made for such removal and replacement. The replaced material will be tested at the frequencies listed in Sec 403.19. Pay for the material will be determined in accordance with the applicable portions of Sec 403.23 based on the replacement material.

Delete Section 403.23.7.4.1 and replace with the following…

403.23.7.4.1 Small Quantities. Small quantities are defined in Sec 403.19.3.2.1. Unless the contractor has elected to use the normal evaluation in the Bituminous QC Plan for small quantities, the following shall apply for each separate mixture qualifying as a small quantity

(a) QLA and PWL will not be required.

(b) Mixtures shall be within the specified limits for VMA, V_a, AC and density. In addition to any adjustments in pay due to profile, the contract unit price for the mixture represented by each set of cores will be adjusted based on actual field density above or below the specified density using the following schedule:

Field Density (Percent of Laboratory Max. Theoretical Density)			**Pay Factor (Percent of Contract Unit Price)**
For all SP mixtures other than SMA:			
		92.0 to 97.5 inclusive	100
97.6 to 98.0	or	91.5 to 91.9 inclusive	90
	or	91.0 to 91.4 inclusive	85
	or	90.5 to 90.9 inclusive	80
	or	90.0 to 90.4 inclusive	75
Above 98.0	or	Below 90.0	Remove and Replace

For SMA mixtures:			
		>94.0	100
		93.5 to 93.9 inclusive	90
		93.0 to 93.4 inclusive	85
		92.5 to 92.9 inclusive	80
		92.0 to 92.4 inclusive	75
		Below 92.0	Remove and Replace

6.0 Mix Sampling and Preparation. Laboratory mixed samples for mix design submittal shall be short term conditioned in accordance with AASHTO R30 prior to conducting performance testing. Loose mix samples shall be taken from the plant in accordance with AASHTO R 97 and split to the appropriate size in accordance with AASHTO R 47. No conditioning is required on plant mixed samples. Samples shall then be heated to the compaction temperature +/- 3° C prior to compacting necessary samples for QA/QC testing. QA personnel shall be present during the sampling, splitting, and molding process. QC shall fabricate all test specimens. QA will randomly select the specimens to submit to the MoDOT Central Laboratory for performance testing. The following table details the minimum number of specimens required when sampled:

Performance Test	QC Frequency	QA Frequency	Minimum Number of Specimens per Set	Molded Specimen Height (mm)
Cracking Tolerance Index (CT_{Index})	1/10,000 tons	1/20,000 tons	3	62
Hamburg Wheel Track (HWT)	1/10,000 tons	1/20,000 tons	4	62
AMPT Samples	N/A	1/Project	5	180

AMPT samples for BMD research shall be fabricated in accordance with AASHTO PP 99-19, carefully following the exceptions noted herein:

1) Pour the mixture into the center of the mold to minimize air void variation between samples. Pouring material down the sides of the mold will result in lower air voids on that side of the mold.
2) Charge the mold in two equal lifts. After each lift, use the spatula to scrape the walls of the mold, inserting the spatula 8-10 times around the circumference of the mold. Insert the spatula into the center of the mixture 10-12 times in an evenly distributed pattern. Insert the spatula as far as possible into the mixture without damaging aggregates.

6.1 Molding Samples. The specimens shall be compacted to an air void content of 7.0 +/- 0.5% or 6.0 ± 0.5% for SMA mixtures. The gyratory specimen weight for each performance test shall be submitted with the mix design. The compacted test specimens shall be allowed to cool to 25 +/- 3° C prior to determining the air void content.

6.2 Determining Air Voids. The bulk specific gravity of the test specimen will be determined in accordance with AASHTO T166. Specimens shall be air dried for 24 +/- 3 hours before

preconditioning the test specimens for CT_{Index} testing. Test specimens shall be preconditioned as specified in the test methods. If a water bath is utilized, it is critical that samples are kept dry.

6.3 Records. Compaction temperature, times in and out of the oven, gyratory specimen weight, and sample identification shall be recorded. The samples shall be shipped in the appropriate containers and submitted to the MoDOT Central Laboratory for performance testing.

7.0 Cracking Tolerance Index (CT_{Index}) Testing. The CT_{Index} testing shall be completed in accordance with ASTM D8225 and at a test temperature of 25 C +/- 1° C.

8.0 Hamburg Wheel Track (HWT). HWT testing will be completed in accordance with AASHTO T324 at test temperature of 50 C and 62 mm specimen height. The following table details the minimum number of wheel passes required.

PG Grade High Temperature *	Minimum Wheel Passes	Maximum Rut Depth (mm)
58S-xx	5,000	12.5
64S-22	7,500	12.5
64H-22	15,000	12.5
64V-22	20,000	12.5

*Determined by the binder grade specified in the contract.

9.0 Basis of Pavement. Payment for compliance with this provision will be made at the contract unit price for Item No. 403-10.57, Asphalt Performance Testing Reporting, lump sum.

M. ADA Compliance and Final Acceptance of Constructed Facilities JSP-10-01C

1.0 Description. The contractor shall comply with all laws pertaining to the Americans with Disabilities Act (ADA) during construction of pedestrian facilities on public rights of way for this project. An ADA Checklist is provided herein to be utilized by the contractor for verifying compliance with the ADA law. The contractor is expected to familiarize himself with the plans involving pedestrian facilities and the ADA Post Construction Checklist prior to performing the work.

2.0 ADA Checklist. The contractor can locate the ADA Checklist form on the Missouri Department of Transportation website:

www.modot.org/business/contractor_resources/forms.htm

2.1 The ADA Checklist is not to be considered all-inclusive, nor does it supersede any other contract requirements. The ADA checklist is a required guide for the contractor to use during the construction of the pedestrian facilities and a basis for the commission's acceptance of work. Prior to work being performed, the contractor shall bring to the engineer's attention any planned work that is in conflict with the design or with the requirement shown in the checklist. This notification shall be made in writing. Situations may arise where the checklist may not fully address all requirements needed to construct a facility to the full requirements of current ADA law. In those situations, the contractor shall propose a solution to the engineer that is compliant with current ADA law using the following hierarchy of resources: 2010 ADA Standards for Accessible Design, Draft Public Rights of Way Accessibility Guidelines (PROWAG) dated

November 23, 2005, MoDOT's Engineering Policy Guidelines (EPG), or a solution approved by the U.S. Access Board.

2.2 It is encouraged that the contractor monitor the completed sections of the newly constructed pedestrian facilities in attempts to minimize negative impacts that his equipment, subcontractors or general public may have on the work. Completed facilities must comply with the requirements of ADA and the ADA Checklist or have documented reasons for the non-compliant items to remain.

3.0 Coordination of Construction.

3.1 Prior to construction and/or closure on an existing pedestrian path of travel, the contractor shall submit a schedule of work to be constructed, which includes location of work performed, the duration of time the contractor expects to impact the facility and an accessible signed pedestrian detour compliant with MUTCD Section 6D that will be used during each stage of construction. This plan shall be submitted to the engineer for review and approval at or prior to the pre-construction conference. Accessible signed detours shall be in place prior to any work being performed that has the effect of closing an existing pedestrian travel way.

3.2 When consultant survey is included in the contract, the contractor shall use their survey crews to verify that the intended design can be constructed to the full requirements as established in the 2010 ADA Standards. When 2010 ADA Standards do not give sufficient information to construct the contract work, the contractor shall refer to the PROWAG.

3.3 When consultant survey is not included in the contract, the contractor shall coordinate with the engineer, prior to construction, to determine if additional survey will be required to confirm the designs constructability.

4.0 Final Acceptance of Work. The contractor shall provide the completed ADA Checklist to the engineer at the semi-final inspection. ADA improvements require final inspection and compliance with the ADA requirements and the ADA Checklist. Each item listed in the checklist must receive either a "YES" or an "N/A" score. Any item receiving a "NO" will be deemed non-compliant and shall be corrected at the contractor's expense unless deemed otherwise by the engineer. Documentation must be provided about the location of any non-compliant items that are allowed to remain at the end of the construction project. Specific details of the non-compliant items, the ADA requirement that the work was not able to comply with, and the specific reasons that justify the exception are to be included with the completed ADA Checklist provided to the engineer.

4.1 Slope and grade measurements shall be made using a properly calibrated, 2 foot long, electronic digital level approved by the engineer.

5.0 Basis of Payment. The contractor will receive full pay of the contract unit cost for all sidewalk, ramp, curb ramp, median, island, approach work, cross walk striping, APS buttons, pedestrian heads, detectible warning systems and temporary traffic control measures that are completed during the current estimate period as approved by the engineer. Based upon completion of the ADA Checklist, the contractor shall complete any necessary adjustments to items deemed non-compliant as directed by the engineer.

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

N. ADA Curb Ramps

1.0 Description. This work shall consist of constructing new concrete curb ramps and island cut-throughs that are compliant with current Americans with Disabilities Act (ADA) and MoDOT guidelines at locations shown on the plans and as directed by the engineer. Providing work zone protections for pedestrians will be a primary component of this project. Specifically, this work shall consist of providing pedestrian detours, including all necessary designing of specific detour routes, placing of signing, barricades, and channelizing. Nothing in this provision shall be construed to limit contractor innovation in mitigating pedestrian traffic impacts. All revisions shall be submitted to the engineer in writing 3 days prior to approval

1.1 The contractor shall assure that the persons establishing the grades of the ADA facilities have a copy of ADA related provisions at hand for reference including the construction ADA checklist, ADA related JSPs, plans, and standard plans. If it is found that written provisions for ADA facilities are not at hand, the engineer may cause ADA work to be ceased until a copy arrives.

2.0 Construction Requirements. Except as noted herein, all applicable provisions in Sec 608 for construction of curb ramps shall apply. Items and materials used for pedestrian traffic control shall be in accordance with Section 616 of the Missouri Standard Specifications for Highway Construction of the version current at the time of the bid opening, as applicable.

2.1 The area to be removed and/or constructed under this provision includes the entire curb ramp, flares, landing pads, truncated domes, sidewalk, and any curbs, including variable height curbs.

2.1.1 Asphalt Mill and fill may be necessary at the face of the ADA ramp to provide a smooth transition from the roadway to the ramp or to drain storm water away from the ADA ramp. The contractor shall establish the grade of the flow line of the gutter before establishing the grades of ADA facilities. Running or standing storm water shall not be pushed out into the roadway by the asphalt where it may be splashed on pedestrians by passing vehicles or cause a hydroplaning hazard. The asphalt mill and fill shall be a minimum of 1.75 inches thick and the edges shall be at a smooth milled butt joint. The contractor shall use an approved BP-1 mix for all corner asphalt mill and fill work unless otherwise specified elsewhere in the contract. Asphalt mill and fill is included in the work of ADA Curb Ramps. If asphalt mill and fill is needed at a corner without any other ADA work, it will be found as a separate line item in this contract.

2.2 Recommendations for the design type of each curb ramp to be built on this project are shown on the plans. These curb ramps may vary from the original design in size, shape, and location as necessary to comply with ADA laws. It is the contractor's responsibility to inspect locations in the field before bidding to verify quantities needed to satisfy this provision.

2.2.1 ADA provides some exceptions to ramp slope where space limitations exist. The apparent construction limits shown on the plans are not considered a space limitation. The use of these exceptions will not be considered by the engineer unless the length needed for compliance goes beyond 10 additional feet as shown as the plans are interpreted by the

engineer. The contractor shall not place any ADA exceptions without consulting the engineer on a case by case basis.

2.3 Work Area Safety. The contractor shall maintain a work area that is safe for pedestrians. The areas adjacent to the contractor's physical work site shall also be maintained as needed to provide access to adjoining properties, regardless of whether a detour route is in place. All holes shall be covered with secured plywood or steel plates, and the work area walkways shall be free of trip hazards, loose debris, vehicles, materials, and equipment when the contractor is not in the work area. A 3 foot minimum path shall be maintained on any used-in-place walkway needed for access. The contractor shall not be permitted to park on any walkway solely to avoid the need for a lane closure. Items for lane closures are provided in the plans and quantities. The contractor shall fence in his work area to provide no access to the general public during the construction of the project.

2.4 Prosecution of Work. The contractor shall have all necessary personnel, equipment, and materials at hand for all work at each location before the work begins so that work may proceed without delay. Curb ramp work on each street corner shall be completed 84 hours after work begins on that corner, including adjusting pull boxes, placing sod, placing curb, or any other incidental work. The contractor shall be allowed to work at no more than two corners of an intersection at any time, regardless of the amount of work at each intersection.

2.4.1 Pedestrian Detours. The contractor may exempt themselves from the above 84 hour provision by providing and maintaining a signed pedestrian detour at their own cost on a route with equal or better ADA accessibility than the closed pathway if such routes exist. Pedestrian detours shall be approved by the engineer. Since MoDOT may not own the right-of-way of the detour path, the contractor shall ascertain that the detour route will remain open during its planned use as a detour. The contractor shall inform the engineer of their plans to use a detour not less than three weeks before it is set up.

2.4.2 Detour Locations. Pedestrian detours are to cross the street or go around the block where facilities exist. It may be possible to provide one detour for more than one corner/work location; the quantity for pedestrian detours will be based on the number of work locations needing detours and not on the number of detours actually used. The detour routes shall have equal or better accessibility than existing in the construction location and shall be approved by the engineer. Detours may also use roadway shoulders with sufficient width to provide for pedestrians, and the traffic control to protect them, and where parking is not allowed, provided drainage structures are not a hazard.

At locations where a pedestrian detour is not feasible, the contractor has the option of staging work to maintain a 3' minimum pathway, providing a temporary pathway (3' minimum width) that does not reduce the number of through lanes of the roadway, or providing a full closure with signs for a maximum of 84 hours to reopen the walkway to pedestrian traffic in its final configuration. Locations for full closure shall be submitted to the engineer in writing 2 weeks prior to beginning work, and signs shall be placed announcing the closure 1 week before work begins.

2.5 Liquidated Damages. If work associated with curb ramp modification begins but is not complete and open to pedestrian traffic within **84 hours** of commencement, 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, and pedestrian delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified.

Therefore, the contractor will be charged with liquidated damages specified in the amount of **$250.00 per hour** of delay that closes a walkway in excess of 84 hours. The contractor's superintendent and the engineer shall be on site at the time of any closures, and shall both record an agreed time when the walkway was closed. It shall be the responsibility of the engineer to determine the quantity of excess closure time.

2.5.1 The said liquidated damages specified will be assessed regardless of if whether it would otherwise be charged as liquidated damages under the Missouri Standard Specification for Highway Construction. There shall be no permitted excuse for delay of the work, including weather.

2.6 The curb ramps to be modified per this provision vary in size. It is the contractor's responsibility to verify actual quantities needed to satisfy this provision.

2.7 The truncated domes shall come from Pre-Qualified List FS-1067 Table 1.

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

4.0 Basis of Payment. The accepted quantity of ADA compliant curb ramps will be paid at the contract unit price for:

Item No.	Description	Unit
608-99.02	ADA Curb Ramps	Each
608-10.12	Truncated Domes	SQ FT

No direct payment will be made for any excavating or preparing of the subgrade, furnishing or installing reinforcement, any incidental work required for furnishing and installing tie bars, tinting of concrete surface as required in the plans, truncated domes, sod or seeding, or asphalt mill and fill required to transition the new ramp to existing pavement or to drain the sidewalk, warping sidewalk to meet existing sidewalk sections, relocating or resetting granite curb, relocating existing pedestrian push buttons on signal poles, the removal and replacement of existing curb/curb and gutter, the removal of existing concrete slabs, saw cuts, or other work necessary in the satisfactory completion of this provision.

O. Testing Modifications

1.0 Description. The predominant use of base rock on this project is for entrances, sidewalks, and ADA curb ramps. Concrete base and pavement are patchwork. Paved approaches, sidewalks, and curb will frequently be poured from the same truckload of concrete at a frequency of one or two trucks per day. This JSP revises the Inspection and testing Plan (ITP). Specifically, it revises some of the QC testing frequencies to better match the nature of work and not cause an undue burden on the contractor.

2.0 Compaction test on base rock in the field. (Revises Sec 304.3.4) The required frequency of one per day will be modified to one per 600 tons.

3.0 Gradation test on base rock. (Revises Sec 304.4.1) The standard ITP requires one test per 250 tons with a minimum of one per week. The required frequency will be modified to one per 500 tons.

4.0 Concrete Plan Checklists. (Revises Sec 501) Submittal of the 501 Concrete Plant Checklist will be modified from once per day to once per week.

5.0 Concrete Base and Pavement. (Revises Sec 502) No cores will be taken. Formwork will be checked to verify pavement thickness. Pavement strength will be tested using cylinders or maturity meters under the masonry concrete specification. The concrete base and pavement will be required to reach 4,000 PSI within 20 days. No bonuses will be given for strength or thickness.

6.0 Concrete Median, Median Strip, Sidewalk, Curb Ramps and Paved Approaches. (Revises Sec 608) The required testing of one from the first truckload and each 100 CUYDs for air and slump will remain per specification. Strength will be verified by use of cylinders or maturity meters at a minimum rate of one per 100 CUYD.

7.0 Curb Concrete. (Revises Sec 609) The required frequency will be the same as Sec 5.0 above.

8.0 Basis of Payment. No direct payment will be made to the contractor to fulfill the above provision.

P. Additional Aggregate Base for Sidewalks Around Curb Inlets

1.0 Description. The contractor shall install a thicker rock base material adjacent to all utility structures within the width of the sidewalk and curb ramps to limit differential settlement of the pedestrian path over the structure. Structures include but are not limited to stormwater inlets, manholes, and valves.

An additional two-inch depth of rock base shall be placed for 12 feet on either side of each structure totaling six inches over the 4 inch pay quantity.

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

3.0 Basis of payment. The accepted quantity of Additional Aggregate Base for Sidewalks Around Curb Inlets will be paid at the contract unit price for the pay items in the plan. No additional payment will be made to fulfill the requirements above.

Item Number	Unit	Description
304-05.06	Sq Yd	Type 5 Aggregate for Base (6 in. Thick)
608-99.02	Each	ADA Concrete Curb Ramp

Q. ADA Compliant Moveable Barricades

1.0 Description. This work shall consist of providing moveable barricades to satisfy the requirements of the pedestrian traffic control plans as shown in the bidding documents. The contractor will be responsible for moving the pedestrian barricades to coincide with their planned order of work.

2.0 Construction Requirements. The contractor shall use a movable barricade that meets the requirements as established by the ADA. The pedestrian barricades shall be of self-supporting type having a minimum length of 6 feet per unit. The face of the barricade shall not extend into adjacent sidewalk considered open for pedestrian use. The contractor will be responsible for setting and maintaining the pedestrian barricades until all of the proposed improvements have been constructed.

3.0 Method of Measurement. Measurement for ADA Compliant Moveable Barricade will be made per each for each 6 feet (min.) unit provided.

4.0 Basis of Payment. Payment for all work necessary to fulfill the requirements noted above shall be considered completely covered in the contract unit price for Temporary traffic control will be paid for at the contract lump sum price for Item:

Item No.	Unit	Description
616-99.01	Lump Sum	Lump Sum Temporary Traffic Control

4.1 No direct payment will be made for any necessary relocation of the ADA compliant barricade.

R. Site Restoration

1.0 Description. Restore to its original condition any disturbed area at sites including, but not limited to items such as, pavement markings, guardrail, sidewalk, ramp, bus stop pad, sprinklers, pull box, conduit, and pole base installations. Restoration shall be accomplished by placing material equivalent to that of the adjacent undisturbed area. Disturbed unpaved areas shall be fertilized and either seeded and mulched or sodded as directed by the engineer. The engineer will have the final authority in determining the acceptability of the restoration work.

2.0 Materials. Any areas of concrete paved ditch, pavement, and shoulders as well as any similar improvements shall be replaced with improvements of similar composition and thickness. Removals shall be achieved by means of full depth saw cut, the resulting subgrade compacted to minimum density requirements and topped with 4 inches of compacted aggregate base course prior to replacement of surface materials. Concrete materials used in replacement shall be approved by the engineer. A commercial asphalt mix may be used for replacement of asphaltic surfacing upon approval of the engineer.

2.1 Unless quantities and pay items for removal and subsequent replacement of improvements are contained in the plans for a specific location of removal work, no direct payment will be made for full depth saw cutting and the removal and subsequent replacement of asphalt, pavement, shoulders etc. This work will be considered as included in the various unit bid prices established in the contract, and no additional payment will be made.

2.2 If the contractor elects and receives approval from the engineer for alternate trench and/or pull box locations, any areas of concrete slope protection, sidewalk, pavement, shoulders, islands and medians – as well as any similar improvements consisting of asphaltic concrete materials – removed in conjunction with their construction shall be replaced with improvements of similar composition and thickness. Removals shall be achieved by means of full depth saw cuts, the resulting subgrade compacted to minimum density requirements and topped with 4 inches of compacted aggregate base course prior to replacement of surface materials. Concrete materials used in replacement, shall be approved by the engineer. A commercial asphalt mix may be used for replacement of asphaltic surfacing upon approval of the engineer.

2.3 Any sidewalks and curb ramps that are disturbed as described in this provision shall be replaced to meet current ADA standards.

2.4 All guardrail post holes remaining from the removal of existing guardrail posts in existing concrete or asphalt pavement or ditch shall be backfilled with a granular material and sealed with a ½ inch hot-poured elastic type material in accordance with Section 1057 or as approved by the Engineer. Any concrete or asphalt pavement or ditch damaged in the process of fulfilling this provision shall be replaced in kind and considered incidental to the installation of the new guardrail at the disturbed location

2.5 Areas that are used by the contractor for jobsite trailers, equipment and materials storage, or used for project staging areas that are disturbed shall be cleaned up and restored to a condition that is both acceptable to the engineer and, at a minimum, equivalent to the existing site condition.

3.0 Basis of Payment. The cost of restoration of disturbed areas will be incidental to the unit price of the items associated with the disturbance. No direct payment will be made for any materials, equipment, time, or labor, which is performed under this provision.

S. Construction Impacts to Privately Owned Sprinkler Systems

1.0 This work includes relocation or replacement of all sprinkler heads and sprinkler system pipes that are impacted by construction activities and installation of improvements.

2.0 The contractor is advised that various properties along the project length have irrigation systems whose sprinkler heads and associated pipe systems are located within or in close proximity to the proposed sidewalk. The contractor shall relocate undamaged sprinkler heads or replace damaged sprinkler heads as directed by the engineer.

2.1 The contractor shall check with individual property owners to shut off watering as necessary and be aware of the location of said systems. Any damage to the watering system, sprinkler heads, etc. will be repaired or replaced at the contractor's expense and at no direct cost to MoDOT.

2.2 The contractor is strongly advised to field check the project to determine the extent of impact to the existing sprinkler systems located along the route and adjust the bid accordingly.

3.0 Method of Measurement: No measurement shall be made.

4.0 Basis of Payment: No direct payment will be made for the relocation or replacement of sprinkler systems located along the project limits. All costs associated with this work shall be considered incidental to other pay items provided in the contract.

T. Coordination with Bi-State

1.0 Description. The contractor shall be required to coordinate with Bi-State where construction operations will involve work on or around existing Metro Bus Stops.

2.0 Construction Requirements.

2.1 The contractor shall submit their tentative construction schedule to Bi-State prior to the Preconstruction conference to begin coordination efforts.

2.2 All Metro Bus stops within the project limits shall remain open and operation throughout the duration of the project. In locations where the contractor's operations will involve work at or near a bus stop location, the contractor shall notify Bi-State through the contacts listed below, not later than 72 hours prior to beginning work at that location. The contractor shall also take care to minimize exposure of Metro users to construction hazards near all bus stops that are in service during and outside of work operations.

2.3 Project Contacts. The contractor shall notify the following contacts at Bi-State and coordinate with them through the duration of the project or their designated representative(s).

Ms. Natalie Siebert, Senior Planner Transit Operations
Office: (314) 982-1400 x1816
Cell: (314) 497-4916
Email: nsiebert@metrostlouis.org

Mr. Lance Peterson, Director of Service Planning
Office: (314) 982-1520
Cell: (314) 220-6756
Email: llpeterson@metrostlouis.org

3.0 Temporary Facilities. In locations where the contractor's operations may affect a bus stop location, a temporary stop may be required. Signage of the temporary stop shall be in accordance with Specification Section 104.10.2, and placement of the temporary stop shall be coordinated with Bi-State. All temporary bus stops shall be located near the existing stop it is representing, accessible, clear, and conspicuous to both the bus rider and operator, and be located where it is safe from hazards.

4.0 Permanent Facilities

4.1 Bus Stop Landing Pad. Locations for proposed bus stops are identified on the contract plans. The contractor shall construct the new landing pads as shown on the plans with 8-in concrete sidewalk. Bi-State or Bi-State's contractor shall furnish and install the new bus stop sign and post.

5.0 Basis of Payment. No direct payment shall be made to the contractor for the labor, equipment, material, or time required to comply with this provision unless otherwise provide in the plan.

U. Coordination with City of Creve Coeur

1.0 Description. The contractor shall contact Jim Heines with City of Creve Coeur three weeks prior to sidewalk work at Woodfield and Lindbergh so that they can relocate stop/street sign. Contact info is (314) 872-2538 or jheines@crevecoeurmo.gov.

V. Access to Commercial and Private Entrances

1.0 Description. While work on entrances or adjacent properties, the contractor shall make every reasonable effort to minimize any interference to the properties and to complete the work diligently. Under no circumstances shall the contractor block ingress/egress to and from businesses during the normal business hours of each business unless as approved by the property owner and engineer.

2.0 Construction Requirements.

2.1 Commercial Entrances. On all commercial entrances, the contractor shall keep one-half of the entrance open at all times. On commercial entrances less than 20' wide, it may be necessary for the contractor to provide temporary aggregate to provide access to the property. The contractor shall remove and dispose of the temporary aggregate following the completion of the entrance. For properties with more than one entrance, the contractor may construct one entire entrance at a time with the approval of the property owner and the engineer. Some businesses have already agreed to allowed full driveway closures, see **Right of Way Requirements provisions** for those locations.

2.1.1 The contractor shall complete the entrances as quickly as possible and shall take **no longer than 4 Weeks** to complete any one entrance.

2.2 Private Entrances. The contractor shall complete the entrances as quickly as possible and shall **take no longer than seventy-two (72) hours** to complete any one entrance, unless otherwise approved by the engineer and the property owner. This may require the use of concrete strength accelerators.

2.2.1 Entrances 20 feet or wider may be constructed half at a time. One half of the entrance shall be open at all times and the contractor shall take **no longer than 10 days** to complete the entrance.

3.0 Basis of Payment. No direct payment shall be made to the contractor for the labor, equipment, material, or time required to comply with this provision.

W. Property Owner Agreements

1.0 Description. During the negotiations of easements and right of way, the Commission has entered into agreements with certain property owners. The contractor shall abide by the following commitments.

a) Parcel 6: Lou Fusz Properties, LLC

(1) Contractor will be required to complete all work within the temporary easements on this parcel within 4 weeks of commencement of construction within said easements.

b) Parcel 17: Southwestern Bell Telephone Co.

(1) Contractor shall complete all construction within the Temporary Construction Easement before April 23, 2024, at which time the Temporary Construction Easement shall expire.

(2) Contractor shall provide notice of construction commencement to Jim Mendenhall (jm383k@att.com), Matt Long (ml1984@att.com), and Tim Bruns (tb5141@att.com) one week prior to the start of construction. Any other information regarding construction shall be conveyed to Jim Mendenhall.

(3) Any excavation will be done following Owner's reasonable guidelines, which shall include, but not be limited to, hand digging over any cables present on Owner's land.

c) Parcel 20: Kries' Restaurant, Inc.

(1) Contractor shall limit any impacts to Grantor's parking spaces within the temporary easement to 9 consecutive months.

(2) Contractor shall complete all construction within the Temporary Construction Easement before April 30, 2025, at which time the Temporary Construction Easement shall expire.

d) Parcel 22: Frontenac Property Owner, LLC

(1) Contractor to provide written notice to: Jim Adkins (JAdkins@bcblawlc.com) and Jason Olt (JOlt@bucksbaumrp.com) at least 15 days prior to beginning construction.

(2) Contractor shall repair and/or replace any damages done to irrigation on Owner's property.

e) Parcel 24: James E. Schneithorst Revocable Trust

(1) Contractor shall indemnify, defend and protect Grantor and hold Grantor harmless from any and all loss, cost, damage, expense and/or liability incurred in connection with, or arising from, the work of such contractor(s) within the

temporary construction easement described in Exhibit A. Grantee's contractor shall name Grantor as an additional insured in such contractor's insurance policy.

f) Parcel 25: James E. Schneithorst Revocable Trust

(1) Contractor shall indemnify, defend and protect Grantor and hold Grantor harmless from any and all loss, cost, damage, expense and/or liability incurred in connection with, or arising from, the work of such contractor(s) within the temporary construction easement described in Exhibit A. Grantee's contractor shall name Grantor as an additional insured in such contractor's insurance policy.

g) Parcel 26: Plaza Frontenac Acquisition, LLC

(1) Contractor is not to work on/obstruct parcel's entrances during the months of November and December.

h) Parcel 27: St. Louis County Library

(1) Contractor shall provide notice to begin work at least 30 days in advance of begin date. Contact is Steve Hunter 314.994.3300ext 2154 or email shunter@slcl.org.

(2) Contractor shall construct entrances one at a time, keeping the other entrance fully open during construction.

i) Parcel 30: Special School District

(1) All work within the easements on this parcel must be performed during the months of June and July

(2) Entrance at Station 463+10 shall be constructed ½ at a time.

j) Parcel 44: MLSE II LLC

(1) There shall be an exception to the "Standard Access to Commercial Entrances" JSP. The entrance at Station 550+80 shall only be closed in the area marked for TCE. The remainder of the entrance shall remain open at all times.

(2) Contractor shall provide at least 14 days' notice prior to beginning construction on this parcel. Notice shall be given to property owner, Matt Renner, at (314) 878-5545 and also to tenant representative, Mark Johns, at (720) 530-1461.

X. Property Owner Notification

1.0 Description. It shall be the contractor's responsibility to inform and notify the adjacent property owner 48 hours prior to starting any construction activities that may impact driveway access or occur along the frontage of the property owner's parcel. Notification shall be in written form and include the contractor's contact information, the engineer's contact information, and an estimated schedule of work and the associated impacts.

2.0 Basis of Payment. No direct payment will be made to the contractor for the labor, equipment, material, or time required to comply with this provision.

Y. Possession of Right of Way

1.0 Description. The contractor's attention is directed toward the following parcels which could be subject to delayed possession, Parcel Number 42, LINCOLN INVESTMENT COMPANY.

1.1 The contractor shall not enter or proceed with physical construction across said Parcel Number 42, LINCOLN INVESTMENT COMPANY, until authorization is granted by the engineer. The contractor will take no action that will result in unnecessary inconvenience, disproportionate injury, or any other action coercive in nature to the business or operations thereon. Possession is anticipated to be obtained by July 31, 2023. This possession date is estimated and is not warranted, and a later possession date is equally possible.

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

1.3 The contractor and the Commission understand and agree that by executing this contract, the contractor releases the Commission from any possible liability under this contract or for a possible breach of this contract for failing to make the job site available until the possession of the parcel is authorized by the engineer, and for all direct and indirect, incidental, or consequential damages or losses the contractor may suffer from this delay in making the job site available or issuing a timely authorization. The contractor further waives any right the contractor may have by contract, at law or in equity to challenge the validity or enforceability of the contract, in return for the award of this contract to the contractor at its stated contract prices as bid for the required work. It is provided, however, as contractors SOLE REMEDY for any delay in possession of the above parcel that the completion date of this contract may be extended, day for day, for each day that delayed possession actually interferes with the major items of work as determined by the engineer.

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

Z. Liquidated Damages / Liquidated Savings Specified for Completion of Bridge No A9151

1.0 Description.

1.1 Deer Creek Bridge Reconstruction. The contractor shall be permitted a full closure (all lanes) of Route 67 for a period of no more than 60 consecutive calendar days. This full closure of Route 67 shall only be permitted between May 20, 2024 and July 31, 2024.

1.2 If the Deer Creek Bridge Reconstruction is not complete and open to traffic prior to the end of the 60 consecutive calendar day closure period, the Commission, the traveling public, and

state and local police and governmental authorities will be damaged in various ways, including but not limited to potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public.

2.0 Liquidated Damages Specified for Failure to Complete Work on Time. These costs are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **$10,000.00 per day** for each full day that the Deer Creek Bridge Reconstruction is not complete and **open to all lanes of traffic** in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of excess closure time.

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

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

3.0 Liquidated Savings Specified for Early Completion. The contractor may receive an incentive payment from the Commission, in addition to all other sums earned under the contract, if the contractor completes the Deer Creek Bridge Reconstruction. To qualify for this incentive payment, the Deer Creek Bridge Reconstruction must be completed including barrier/guardrail and ADA connections and open to traffic. An incentive payment of **$10,000.00 will be paid per day** for each full day that the work described above is completed prior to the 60 consecutive calendar day closure period. The maximum amount paid as liquidated savings will not exceed 15 days or $150,000.00 for Job No. J6S3280.

3.1 In the event of an excusable delay, including differing site conditions, an extension of the contract completion time will not extend the time specified for determining any liquidated savings or incentive, except that, in its discretion, the Commission may extend the time specified should the delay be directly caused by the Commission. Further, in the event of an excusable delay, if the contractor completes the work providing for liquidated savings or incentive on or before the milestone or other date, that shall not constitute a basis to claim acceleration costs in addition to the liquidated savings or incentive that may be earned.

3.2 The incentive payment described above is made, not as a bonus or gift, but as stipulated compensation in full for reduced risks, delay and inconvenience experienced by the traveling public, and for other reduced costs to the Commission and public resulting from early completion.

AA. Liquidated Damages Specified for Entrance Closures

1.0 Construction and Closure of Paved Approaches. The contractor shall provide ingress and egress at all times for each property owner along the project either by constructing the new approach half at a time or by providing temporary access as approved by the engineer. Businesses with two or more entrances shall have only one entrance closed at a time, unless otherwise noted in the special provision for **"Right of Way Requirements"**. However, in the case of a property having one approach used exclusively as an entrance and another approach used exclusively as an exit, the approaches shall be built one half at a time to provide for safe traffic movement into and out of the properties. See special provision **"Access to Commercial**

and Private Entrances" for further details. Commercial entrances shall be completed within 4 weeks from when construction of the entrance begins. Private entrances shall be completed within seventy-two (72) hours from when construction of the entrance begins. Private entrances that can be constructed half at a time, entrances 20 feet or wider, shall be completed within 10 days from when construction of the entrance begins. If each entrance, once construction has started, is not completely constructed to plan design within the fore mentioned times, of beginning construction on the entrance and open to traffic, the City, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **$500 per day per entrance for each full day** that the entrance is not fully complete and open to traffic, in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of excess closure time.

1.1 The said liquidated damages specified will be assessed regardless if whether it would otherwise be charged as liquidated damages under the Missouri Standard Specification for Highway Construction.

BB. Liquidated Damages for Pedestrian Impacts

1.0 Description. Providing work zone protection for pedestrians will be a primary component of this project. This work shall consist of staging/managing construction timelines to minimize the project's impacts to pedestrian traffic where construction activities make walkways impassible. Nothing in this provision shall be construed to limit contractor innovation in mitigating pedestrian traffic impacts.

2.0 Prosecution of Work. At locations where construction makes walkways impassible, the contractor shall have all necessary personnel, equipment, and materials at hand for all work at each location before the work begins so that work may proceed without delay. Work requiring the mitigation of pedestrian traffic impacts includes, but shall not be limited to, removal of sidewalk, curb ramp, or other paved pedestrian pathway.

3.0 Time of Disruption of Pedestrian Facilities. Regardless of construction methods chosen, once a section of sidewalk has been closed to pedestrian traffic, the contractor shall prosecute the work as to minimize delays and inconvenience to the traveling public. The contractor, with approval from the engineer, shall specify the length of a given sidewalk section to be reconstructed. Once a corner has been closed to pedestrian traffic, the contractor shall have a maximum of three weeks, regardless of weather or other delays, to reopen that corner/section to pedestrian traffic.

4.0 Work Area Safety. The contractor shall maintain a work area that is safe for pedestrians. In order to provide this, the contractor shall work on only one side of US67 at a given time to improve the sidewalks along either the north or south sides and to allow a walkable path on the other side during construction. The areas adjacent to the contractor's physical work site shall also be maintained to provide access to adjoining properties, regardless of whether a detour route is in place. All holes shall be covered with secured plywood or steel plates, and the work area walkways shall be free of trip hazards, loose debris, vehicles, materials, and equipment when the contractor is not in the work area. A 3' minimum path shall be maintained on any

used-in-place walkway needed for access. The contractor shall not be permitted to park on any walkway.

5.0 Liquidated Damages. If work associated with new sidewalk or curb ramps along a given side of US67 begins, but is not complete and open to pedestrian traffic within 3 weeks of commencement, 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, and pedestrian delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **$500.00 per day** of delay that closes a walkway in excess of **3 weeks**. The contractor's superintendent and the engineer shall be on site at the time of any closures and shall both record an agreed time when the walkway was closed. It shall be the responsibility of the engineer to determine the quantity of excess closure time.

5.1 The said liquidated damages specified will be assessed regardless of whether it would otherwise be charged as liquidated damages under the Missouri Standard Specification for Highway Construction. There shall be no permitted excuse for delay of the work, including weather.

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

CC. Linear Grading Class 2 - Modified

1.0 Description. Modified Linear Grading, Class 2 shall consist of any necessary clearing and grubbing in accordance with Sec 201, preparing the subgrade for shoulder, pavement widening, sidewalk, curb and gutter, roadside retaining wall, or other roadside appurtenance by excavating, compacting, fine-grading, and shaping existing shoulder and ditch fore-slope, conforming to the typical section shown on the plans. It may be necessary to haul material.

2.0 Construction Requirements. The shoulder, pavement widening, sidewalk, curb and gutter, roadside retaining wall, or other roadside appurtenance shall be excavated and graded as shown on the typical section with minimal disturbance of the existing sub-grade and fore slope. Density shall be obtained from reasonable compactive efforts consisting of no less than three passes with a roller until no further visible compaction can be achieved, or by other methods approved by the Engineer. Subgrade preparation and compaction shall also be in accordance with Sec 203, 209, and 210.

2.1 All ditches shall be graded to drain and maintain existing flow capacity, unless approved by the engineer. If fill material for the shoulder widening work impacts the ditch capacity, the contractor shall re-grade the backslope to maintain the flow capacity of the ditch. Fore slopes and back slopes shall be constructed at a 3:1 unless approved otherwise by the engineer.

2.2 It may be necessary to go outside the limits of the right of way to obtain additional material or to dispose of excess material. All costs for providing additional material or disposing of excess material shall be included at the contract unit price for pay item 207-99.09, Modified Linear Grading, Class 2. All contractor furnished material shall be approved by the Engineer

prior to being incorporated into the project. Quarry screenings will not be considered an approved contractor furnished material.

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

3.0 Method of Measurement. Measurement will be made to the nearest 1/10 station separately for the length of pavement edge along each side of the roadway, measured along centerline of the traveled way and totaled to the nearest Station for the sum of all segments in accordance with Section 207.

4.0 Basis of Payment. Payment for Modified Linear Grading, Class 2 as described in this provision will be made at the contract unit price for Item 207-99.00, Linear Grading, Class 2 - Modified.

DD. Low-Tracking or Non-Tracking Tack Coat NJSP-15-15H

1.0 Description. This work shall consist of preparing and treating an existing bituminous or concrete surface with a low-tracking or non-tracking tack coat material prior to an asphalt overlay in accordance with Section 407, except as revised by this specification.

2.0 Low-Tracking or Non-Tracking Requirements. Products accepted for use as low-tracking or non-tracking tack shall not stick to the tires, tracks or other parts of paving equipment or vehicles such that the surface to be overlaid becomes visible or void of tack prior to the placement of the asphaltic concrete pavement mixture. The tack material shall exhibit a low-tracking or non-tracking characteristic within 30 minutes of being applied to the roadway. Products accepted for use shall exhibit a laboratory "no-pick-up" time of 60 minutes or less per TM-87. The product shall bond the two pavements. Products accepted for use shall exhibit a laboratory bond strength greater than or equivalent to a standard SS-1h tack material. The test method used may be any AASHTO TM method or other approved research test methods.

2.1 Optional Application. In lieu of applying a Low-Tracking or Non-Tracking Tack, a Polymer Modified Emulsion Tack may be placed immediately ahead of the asphalt pavement as defined below in section 4.0 Optional Polymer Modified Emulsion Tack.

3.0 Equipment and Construction Requirements. All equipment and construction requirements shall be in accordance with Section 407; except as revised as follows:

3.1 Storage and Handling. All guidelines and instructions about storage and handling of the non-tracking tack product shall be followed in accordance with the product manufacturer. A copy of this in formation shall be provided to the engineer. The information shall include the application and maximum allowable temperatures for the product and the particle charge.

3.2 Distributor. The distributor shall have the full circulating and heating capabilities in the tank. If the particle charge of the low-tracking or non-tracking tack is different from the particle charge of the emulsion that was previously used then the tank shall be thoroughly cleaned prior to use, since some products are not compatible.

3.3 Curing. The low-tracking or non-tracking tack shall be allowed to cure prior to any

construction traffic driving on the surface. A minimum of 15 minutes of cure time shall be allowed prior to driving on the tacked surface, unless less cure time is successfully demonstrated and approved by the engineer.

3.4 Supplier Information. The low-tracking or non-tracking tack materials are a different type of product compared to the conventional tack used in Missouri. *There may be multiple products that can meet the low-tracking or non-tracking tack requirements. All products that achieve equivalent field performance will be allowed.*

3.5 Material Requirements. All material shall be in accordance with Section 1015 of the Standard Specifications and specifically as follows:

Emulsion Properties for Low-Tracking or Non-Tracking Tack Coat			
Tests	Method	Min	Max
Viscosity, Saybolt Furol @ 25°C (77°F), s	AASHTO T 59	10	100
Storage Stability Test, 24 hr, percent	AASHTO T 59	--	1.0
Sieve Test, percent	AASHTO T 59	--	0.30
Residue by Distillation, percent	AASHTO T 59	50	
Oil Distillate by Distillation, percent	AASHTO T 59	--	1
Test on Residue from Distillation			
Penetration 25°C, 100 g, 5 s	AASHTO T 49	--	90
Solubility in Trichloroethylene, %	AASHTO T 44	97.5	--

OR

The following requirements are not intended to govern emulsified products.

PG Graded Products for Low-Tracking or Non-Tracking Tack Coat			
Tests	Method	Min	Max
Rotational Viscosity (Pa-sec) @ 302° F	AASHTO T 316 302°F	100	300
Penetration 25°C, 100 g, 5 s	AASHTO T 49	--	90
In addition to the table above, when using PG Graded Binders as tack, a certification shall be supplied to the engineer which includes test results demonstrating that the PG binder component meets the minimum requirements of a PG 58 or greater on the high end and a -22 or lower on the low end in accordance with AASHTO M320. The PG binder component shall account for at least 97% of the total product composition by volume. If using 100% PG binders, then the products shall be in accordance with Section 1015.10.			

All products that meet a laboratory "no-pick-up" time of 60 min or less and a field "no-pick-up" time of 30 min or less shall be accepted per TM-87.

4.0 Optional Polymer Modified Emulsion Tack.

4.1 Description. In lieu of using a low-tracking or non-tracking tack coat material, a Polymer Modified Emulsion Tack may be placed prior to a bituminous overlay of hot asphaltic concrete pavement. The Polymer Modified Emulsion Tack shall be spray applied immediately prior to the application of the hot asphaltic concrete pavement so as to produce a homogeneous surface in

accordance with Secs 401, 402, or 403. This option will not be required solely if low tracking tack products fail to perform in the field.

4.2 Materials. The Polymer Modified Emulsion Tack shall be in accordance with Sec 1015.20.5.1.1 or Sec 1015.20.6.2.

4.3 Construction Requirements. The asphaltic concrete pavement shall be placed in accordance with Secs 401, 402, or 403, except as modified herein.

4.4 Equipment. No wheel, track or other part of the paving machine or any hauling equipment shall come in contact with the Polymer Modified Emulsion Tack before the asphaltic concrete pavement mixture is applied.

4.5 Application of Polymer Modified Emulsion Tack.

4.5.1 The Polymer Modified Emulsion tack shall be sprayed at a temperature of 120 - 180° F. The sprayer shall accurately and continuously monitor the application rate and provide a uniform coverage across the entire width to be overlaid. The application rate of the asphalt emulsion tack shall be applied at the same rate as the low-tracking or non- tracking tack coat material in accordance with Sec 407. The Engineer may make adjustments to the application rate based upon the existing pavement surface conditions and the recommendations of the Polymer Modified Emulsion Tack supplier.

4.5.2 Water may be added to SS-1hp and CSS-1hp by the emulsion manufacturer and shipped to the jobsite. No dilution shall be allowed in the field. When water is added to SS-1HP or CSS-1HP, the resulting mixture shall contain no more than 20 percent of added water. The contractor shall notify the engineer of the use of a diluted emulsion. The exact quantity of added water shall be indicated on the manufacturer's bill of lading, manifest or truck ticket. The application rate of the resulting mixture shall be adjusted such that the original emulsion will be spread at the specified rate. No water shall be added to the CPEM-1 or PEM-1.

5.0 Method of Measurement. Measurement of asphalt emulsion to the nearest gallon shall be made as specified in Sec 1015. The measurement of asphalt emulsion shall be based upon undiluted material.

6.0 Basis of Payment. The accepted quantity of low-tracking or non-tracking tack coat or polymer modified emulsion tack will be paid for at the contract unit price 407-10.07, Tack Coat – Low or Non-tracking.

EE. Concrete Manhole Collar

1.0 Description. The Contractor shall install a reinforced concrete collar around a manhole frame and cover or utility valve as indicated in the plans and as approved by the Engineer.

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

Item	Section
Reinforcing Steel for Concrete	1036

2.1 Concrete used for manhole collars shall be the same used for full depth pavement repairs as specified in Section 613.10 of the Standard Specifications.

3.0 Construction Requirements. Manhole collars shall be provided in locations within the plans or as directed by the Engineer but generally shall be located where a manhole is adjusted to grade due to the cold-milling and overlaying of an existing roadway. The use of a collar can also be considered for new installations within new full depth asphalt pavement.

3.1 Steel Plate. If approved by the Engineer, a steel plate may be installed over the void created by the removal of pavement next to a manhole or utility valve prior to the installation of the manhole collar concrete. Asphalt wedging surrounding the steel plate shall be included when using a steel plate. No direct payment shall be made to provide this steel plate and asphalt wedging.

3.2 Joint Sealing. Per Sec 613.3.3 , the contractor shall seal the joint between the asphalt surface and the new concrete collar along with seal any overcut created from the sawcutting operation when removing the portion of pavement to be replaced with manhole collar concrete. This joint shall be filled with either an expansive mortar, epoxy, polyester, or joint material as approved by the Engineer. In addition, the contractor shall install tar paper between the new concrete and the existing manhole frame and cover as directed by the Engineer.

4.0 Method of Measurement. Measurement for installation of a reinforced concrete manhole collar will be made per each.

5.0 Basis of Payment. Payment for the installation of a reinforced concrete manhole collar, including all materials, equipment, labor, saw cuts before and/or after installation and all necessary work shall be completely covered by the contract unit price paid for the item listed below. Adjusting to grade the actual frame and cover shall be paid for separately. Please see JSP – “Adjust to Grade Items” for additional details regarding the adjustment to grade for those items.

Item No.	Type	Description
604-99.02	Each	Concrete Manhole Collar

FF. Island Tubular Marker

1.0 Description. Tubular markers shall be mounted on raised islands at the locations indicated in the plans.

2.0 Requirements. Shall have a height of 18 inches, 2 reflective bands with super high intensity prismatic sheeting in accordance with Sec 1042, and be constructed from thermoplastic polyurethane. Color of the island tubular marker and reflective bands shall match the pavement marking in which it is placed. Post shall be in the shape of a “T” with a width of 3 inches and depth of 2 inches. Post shall be capable of recovering from repeated vehicle impacts. Post shall insert and be secured into the plastic base with horizontal locking pins. When the post is no longer serviceable, it shall be able to be removed and a new post can be manually inserted and locked into the existing base.

3.0 Construction Requirements. Shall be surface mounted on the radius points of the island noses. The roadway shall be cleaned of dirt and gravel before installation. Island tubular marker shall be mounted using proper sized anchor bolts according to manufacturer's instructions.

4.0 Method of Measurement. Measurement for installation of tubular marker with base will be made per each.

5.0 Basis of Payment. Payment for all labor, equipment, and materials necessary to install these markers shall be made and considered completely covered by the contract unit price bid for:

Item No.	Type	Description
608-99.02	Each	Island Tubular Marker

JJ. Curb Reflectors

1.0 Description. This work consists of furnishing, transporting, and installing curb reflectors of the type and spacing specified in the roadway plans. All work shall comply with Sec 620 and include cost of equipment, labor, materials, and time required to complete said work.

1.1 General. The surface of the curb to which the reflector shall be applied shall be free of dirt, curing compound, moisture, paint, or any other material which would adversely affect the bond of the adhesive. Cleaning of the surface shall be to the satisfaction of the Engineer. An adhesive meeting the reflector manufacturer's specifications shall be placed either on the surface or the bottom of the reflector in sufficient quantity to ensure complete coverage of the contact area with no voids present and with a slight excess after the reflector is pressed firmly in place. The installed height of the prismatic curb reflectors shall be a maximum of 3/4 in. above the mounting surface. The unit shall have one reflective surface that is placed approximately perpendicular to the mounting surface.

2.0 Basis of Payment. This work shall be paid for at the contract unit price for Item Number 620-99.02 "Curb Reflectors" per each.

KK. Lump Sum Temporary Traffic Control JSP-22-01

1.0 Delete Sec 616.11 and insert the following:

616.11 Method of Measurement. Measurement for relocation of post-mounted signs will be made to the nearest square foot of sign area only for the signs designated for payment on the plans. All other sign relocations shall be incidental. Measurement for construction signs will be made to the nearest square foot of sign area. Measurement will be made per each for each of the temporary traffic control items provided in the contract.

616.11.1 Lump Sum Temporary Traffic Control. No measurement will be made for temporary traffic control items grouped and designated to be paid per lump sum. The list of lump sum items provided in the plans or contract is considered an approximation and may be subject to change based on field conditions. This is not a complete list and may exclude quantities for duplicate work zone packages used in simultaneous operations. The contractor shall provide all traffic control devices required to execute the provided traffic control plans for each applicable

operation, stage, or phase. No measurement will be made for any additional signs or devices needed except for changes in the traffic control plan directed by the engineer.

2.0 Delete Sec 616.12 and insert the following:

616.12 Basis of Payment. All temporary traffic control devices authorized for installation by the engineer will be paid for at the contract unit price for each of the pay items included in the contract. Whether the devices are paid individually, or per lump sum, no direct payment will be made for the following:

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

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

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

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

(e) Worker apparel.

(f) Flaggers, AFADs, PFDs, pilot vehicles, and appurtenances at flagging stations.

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

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

(i) Provide and maintaining work zone lighting and work area lighting.

616.12.1 Lump Sum Temporary Traffic Control. Traffic control items grouped together in the contract or plans for lump sum payment shall be paid incrementally per Sec 616.12.1.1. Alternately, upon request from the contractor, the engineer will consider a modified payment schedule that more accurately reflects completion of traffic control work. No payment will be made for any additional signs or devices needed except for changes in the traffic control plan directed by the engineer. Additional items directed by the engineer will be paid for in accordance with Sec 109.4. No adjustment to the price will be made for overruns or underruns of other work or for added work that is completed within existing work zones.

616.12.1.1 Partial payments. For purposes of determining partial payments, the original contract amount will be the total dollar value of all original contract line items less the price for Lump Sum Temporary Traffic Control (LSTTC). If the contract includes multiple projects, this determination will be made for each project. Partial payments will be made as follows:

(a) The first payment will be made when five percent of the original contract amount is earned. The payment will be 50 percent of the price for LSTTC, or five percent of the original contract amount, whichever is less.

(b) The second payment will be made when 50 percent of the original contract amount is earned. The payment will be 25 percent of the price for LSTTC, or 2.5 percent of the original contract amount, whichever is less.

(c) The third payment will be made when 75 percent of the original contract amount is earned. The payment will be 20 percent of the price for LSTTC, or two percent of the original contract amount, whichever is less.

(d) Payment for the remaining balance due for LSTTC will be made when the contract has been accepted for maintenance or earlier as approved by the engineer.

616.12.1.2 Temporary traffic control will be paid for at the contract lump sum price for Item:

Item No.	Unit	Description
616-99.01	Lump Sum	Misc. Lump Sum Temporary Traffic Control

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(d) All LED displays and control circuitry shall be operational from -20 F (-29 C) to 120 F (50 C). The LED's shall have a rated life of 100,000 hours. The LED's shall be ITE amber in color on a flat black background.

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

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

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

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

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

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

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

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

4.0 Basis of Payment. All expenses incurred by the contractor in integrating, maintaining, relocating, operating, and protecting the changeable message signs as outlined above shall be paid for at the contract unit price for Item 616-99.02, NTCIP Compliant Changeable Message Sign (Contractor Furnished and Retained), per each.

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

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

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

MM. Removal and Delivery of Existing Signs JSP-12-01B

1.0 Description. All Commission-owned signs removed from the project shall remain the property of the Commission and shall be disassembled and delivered as specified herein.

2.0 Disassembly and Delivery. All Commission-owned signs, not to include abandoned billboard signs, designated for removal in the plans, and any other signs designated by the engineer, shall be removed by the contractor and delivered to the address below. The

contractor shall call the phone number listed below 48 hours prior to delivery and make arrangements for delivery during normal business hours.

Michael Love, Signing/Striping Supervisor
Office: (314) 205-7310
Cell: (314) 624-3318

2.1 Signs shall be removed from sign supports and structures prior to delivery. Sign supports and structures shall become the property of the Contractor and removed from the project. Any oversized sign panels shall be disassembled or cut into widths of 8-feet or less with no restriction on length. Signs shall be stacked neatly in bins provided by MoDOT at the delivery site.

3.0 Basis of Payment. All costs associated with removing, disassembling, storing, and transporting of signs shall be considered as completely covered by the contract unit price for Item No. 202-20.10, "Removal of Improvements", per lump sum.

NN. Monolithic Sidewalk/Retaining Wall at Tealwood Drive

1.0 Description. This work shall consist of constructing a monolithic retaining wall with drainage features facing Lindbergh Boulevard at #33 Tealwood Drive.

2.0 Construction Requirements. The monolithic retaining wall and drainage system shall be constructed per the drawings and bid items in the plan.

2.1 Positive flow shall be maintained in the perforated pipe to direct the stormwater to the connecting pipes. Aggregate shall be placed around the perforated pipe and wrapped in a geotextile filter fabric prior to placement of the Type 2 Ditch Liner. Aggregate shall meet the requirements of Section 1009.3.3 or 1009.3.4 of the standard specifications, Aggregate for Drainage – Grade 3 or Grade 4 using Gradation B.

2.2 The contractor shall determine the supplier fittings needed to make the connections from the 10 inch perforated pipe to 12 inch Group A pipe.

2.2 The existing flagstone wall remnants may be left in place where practical then capped with Type 2 ditch Liner once the monolithic wall has gained strength by the direction of the engineer.

2.3 A 4-inch Type 5 Aggregate base is required beneath the sidewalk and retaining wall.

2.4 The existing concrete Type A Gutters running under the property fence shall be saw cut and removed at the right of way line unless directed otherwise by the Engineer.

3.0 Basis of Payment. The accepted quantity of Monolithic Sidewalk/Retaining Wall will be paid at the contract unit price for the pay items in the plan as shown below. No additional payment for materials, labor, equipment will be made to fulfill the requirements above, including but not limited to trenching, clean rock around the perforated pipe, drainage junction boxes, and fittings required to connect the perforated pipe to the existing storm system on US67.

Item Number	Description	Unit
304-05.04	Type 5 Aggregate Base (4 Inches Thick)	Square Yard
609-60.20	Furnishing Type 2 Rock Ditch Liner	Cubic Yard
609-60.42	Placing Type 2 Rock Ditch Liner	Cubic Yard
627-40.00	Contractor Furnished Surveying and Staking	Lump Sum
703-20.02	Class B Concrete	Cubic Yard
710-10.00	Reinforcing Steel (Epoxy Coated)	Pound
726-10.12	12 Inch Group A Pipe	Linear Foot
726-99.03	Smooth Wall Perforated Pipe with Filter Sock	Linear Foot

OO. Manhole Top Replacement

1.0 Description. This work shall consist of removing the existing manhole and cover up to 24 inches deep and replacing with the manhole cover offset to one side to allow space for a new ADA sidewalk and curb ramp as shown in the plans. This structure is located on the north side of Ladue Road and west of Route 67. Work, at the discretion of the contractor, may involve hand forming the new manhole top.

2.0 Construction Requirements. The contractor shall be responsible for removing the existing concrete lid with manhole frame and cover, cut the top down to remove a portion of the manhole structure. Existing rebar that remains intact and protruding from the sawcut manhole may be utilized to reform the new lid connection. The contractor shall then rebuild the manhole top as per the special sheet in the plans to the existing elevation in accordance with Section 604.

3.0 Basis of Payment. Payment for replacing the top of the manhole shall include all excavation, materials, equipment, tools, labor, and work incidental thereto, and shall be considered completely covered by the contract unit price as indicated in the plans for:

Item Number	Unit	Description
731-99.02	EACH	Misc. Manhole Top Replacement
614-30.14	EACH	Manhole Frame and Cover, Type 4

PP. Grated Inlet Repair/Replacement

1.0 Description. This work shall consist of removing the deteriorated or otherwise unacceptable top of an existing drop inlet as directed by the engineer and rebuilding as per the plans. The work shall include replacement of the frame and grate and any surrounding concrete and rebar in the gutter section.

2.0 Construction Requirements. The contractor shall be responsible for removing the existing grate and bearing plate, and a minimum of 6 inches from the top of the existing inlet, or down to sound material as per the Engineer. The contractor shall then rebuild the inlet top as per the plans to the existing elevation and as per Section 604. The contractor shall field verify the size of the inlet and required grate opening prior to ordering the corresponding curved vane grate, drop inlet top, grates and bearing plates. The contractor shall saw cut the existing pavement or shoulder around the inlet to provide a concrete pad and shall adjust to grade.

2.1 Measurement and payment for grated inlet repair/replacement includes the frame and grate and all concrete work including removal, forming, and reinforcing necessary to replace the inlet top. No direct payment will be made for epoxy coated reinforcing steel, dowel bars, tie bars, or manhole frame and covers and shall be included in the measurement and payment of Grated Inlet Repair/Replacement.

3.0 Basis of Payment. Payment for replacing the top of the inlet shall include all excavation, materials, equipment, tools, labor, and work incidental thereto, and shall be considered completely covered by the contract unit price as indicated in the plans for:

Item Number	Unit	Description
604-99.02	EACH	Misc. Grated Inlet Repair/Replacement

QQ. Curb Inlet Top Repair/Replacement

1.0 Description. This work shall consist of removing the deteriorated or otherwise unacceptable top of an existing curb inlet as directed by the engineer and rebuilding as per the plans.

2.0 Construction Requirements. The contractor shall be responsible for removing and replacing the existing inlet top, saw cutting and repairing the existing inlet wall so that it may be adjusted to plan elevation and as per Sec 604. A minimum of 6 inches from the top of the existing inlet structure, or down to sound material as per the Engineer. Items may include repairing part of the structure that will require additional structural steel and dowels to tie the existing structure together.

2.1 The existing inlet top within areas of new sidewalk and curb ramps shall be adjusted to the final grade of the adjacent proposed sidewalk or curb ramp so that the cross-slope of the inlet surface shall be less than 2% in all directions to meet ADA standards.

2.2 Measurement and payment for curb inlet top repair/replacement includes all concrete work including removal, forming, and reinforcing necessary to replace or repair the curb inlet top. Grates and bearing plates in the gutter section shall be included in the measurement and payment of Curb Inlet Top Repair/Replacement.

3.0 Examples of Existing Cast-In-Place Inlets

4.0 Basis of Payment. Payment for repairing the inlet shall include all saw cuts, excavation, materials, equipment, tools, labor, and work incidental thereto, and shall be considered to be completely covered by the contract unit price for**:**

Item Number	Unit	Description
604-99.02	EACH	Misc. Curb Inlet Top Repair/Replacement

RR. Adjust to Grade Items

1.0 Description. This work shall consist of adjusting basins/inlets, manholes, valves, and pull boxes as well as relocating pull boxes that are within areas where either new sidewalks, curb ramps, approaches or pavements are to be constructed as shown on the plans. The contractor shall verify the type of frame and cover in the field before performing the work. The adjustment shall be made to match the final proposed grade.

2.0 Construction Requirements. Adjusting manholes and adjusting basins or inlets shall be done in accordance with Sec 604 except as modified herein.

2.1 Adjustments, extensions, and/or lowering of utility and any related excavation and backfill shall be constructed as approved by the Engineer. For MoDOT owned facilities, adjustments shall conform to current Missouri Standard Specifications for Highway Construction. For MSD owned facilities, adjustments shall conform to the 2018 MSD Construction Specifications for Sewer and Drainage Facilities and the 2009 MSD Standard Detail Sheets. Adjustments for inlets require the top lid slopes to be adjusted to less than 2% slope in all directions and some of these inlets need to be raised to the final sidewalk grade. These locations are to be determined in the field by the Engineer. Adjustments shall be completed so that the finished sidewalk, ramp, approach, or pavement meets current ADA standards.

3.0 Basis of Payment. All costs for materials, equipment, labor, and installation shall be included in the cost for adjusting basins/inlets, manholes, valves, and pull boxes as well as relocating pull boxes.

Item No.	Description	Unit
604-20.10	Adjusting Manhole	Each
604-20.20	Adjusting Basin or Inlet	Each
604-99.02	Adjusting Valves	Each
902-99.02	Utility Frame Replacement and Cover	Each
902-99.02	Relocating Pull Boxes	Each

SS. Additional Coldmilling at Curb Opening Inlets

1.0 Description. This work shall consist of milling the existing pavement to an additional depth in the vicinity adjacent to curb opening inlets prior to placing new pavement. The clear opening at the curb line shall provide a minimum of 6 inches depth to allow proper stormwater flow into the inlets.

2.0 Construction Requirements. The contractor shall be responsible for removing an additional depth of pavement to provide the required six-inch minimum clear opening at all inlets within the project limits. The milling shall include a depression leading to and through the curb opening as directed by the Engineer. The milling shall take place prior to the placement of any new asphalt material for paving operations.

2.1 Examples of inlets that do not currently provide an acceptable clear opening are shown below.

3.0 Basis of Payment. The cost of restoring clear opening depth at curb opening inlets will be incidental to the unit price of the items associated with the disturbance. No direct payment will be made for materials, equipment, time, or labor, which is performed under this provision.

TT. Drainage Maintenance During Construction

1.0 Description. The contractor's attention is called to the drainage construction. The contractor is required to maintain drainage during construction and to ensure that the existing drainage system continues to convey all storm water until the new structures and pipes are in place.

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

UU. Curb Ramp, Concrete Barrier, and Entrance Construction at NW Quadrant of A9151

1.0 Description. This work shall consist of modifying the sidewalk connection and concrete barrier extension at the northwest corner of bridge A9151 to meet ADA and roadside design requirements. The sidewalk shall be transitioned to the roadway pavement elevation by placing the ADA curb ramp within the limits of the bridge as shown in the bridge plans. The southernmost Forshaw entrance and bridge approach slab is within the limits of the standard barrier moment slab. The reinforcing steel shall be truncated short of the bridge approach slab. The bridge barrier shall be extended with a curved Type D Concrete Traffic Barrier with Moment Slab placed monolithic with the Forshaw entrance as shown in the plan and as directed by the engineer.

2.0 Construction Requirements. The contractor shall be aware of the tight space requirements for constructing the ADA curb ramp, bridge barrier curb and curved extension of concrete barrier curb with moment slab. The moment slab is within the limits of both the bridge approach slab and the Forshaw entrance. The contractor may fully close the entrance during the entrance reconstruction but shall follow specifications for "Access to Commercial and Private Entrances" and "Property Owner Notification". It is the intent of the engineer to place the reinforcing steel for the moment slab monolithically with the 8-inch paved approach.

2.3 Measurement and payment for completing the sidewalk, concrete barrier and commercial entrance shall be completely covered by the items listed below and includes but is not limited to the hand forming and finishing concrete, reinforcing in the moment slab, additional equipment, or materials to complete the work, and removal of features not listed in removal of improvements. No measurement or direct payment will be made for items other than those

listed in basis of payment. Measurement and payment for the moment slab steel and Type D Concrete Traffic Barrier shall be combined. All concrete flatwork within the limits of the entrance, including the barrier footing shall be included in the 8-inch paved approach.

3.0 Basis of Payment. Payment for all work required to install the concrete barrier with moment slab, and paved approach shall include all excavation, materials, equipment, tools, labor, and work incidental thereto, and shall be considered completely covered by the contract unit price as indicated in the plans for:

Item Number	Unit	Description
202-20-10	L.S.	Removal of Improvements
608-50.08	S.Y.	Paved Approach, 8 in.
617-31.03	L.F.	Concrete Traffic Barrier, Type D (Moment Slab)

VV. MoDOT TS2 Type 1 Cabinet Assembly

1.0 Description. The cabinet assembly shall meet, as a minimum, all applicable sections of the latest revisions as found in the NEMA TS2 Standard Publication and sections 902 and 1092 of the Missouri Standard Specifications for Highway Construction Manual. Where differences occur, this specification shall govern.

2.0 Materials.

2.1 Cabinet. The cabinet shall be constructed from aluminum with a minimum thickness of 0.125 inches. The cabinet shall be designed and manufactured with materials that will allow rigid mounting, whether intended for pole, base, or pedestal mounting. All mounting points where the cabinet is bolted to the foundation shall be reinforced at the factory by welding in an additional layer of material equal to the thickness of the material that the cabinet is constructed from. Triangular gussets are also required when the base plate and cabinet walls are welded together vs. continuous rolled material. A rain channel shall be incorporated into the design of the main door opening to prevent liquids from entering the enclosure. All external hardware shall be stainless steel. Unless otherwise specified, the cabinet exterior shall be supplied with a natural aluminum finish. Sufficient care shall be taken in handling to ensure that scratches are minimized. All surfaces shall be free from weld flash. Welds shall be smooth, neatly formed, free from cracks, blowholes and other irregularities. All sharp edges shall be ground smooth. The cabinet shall be equipped with (2) lifting brackets for installation and removal purposes.

2.2 Cabinet Doors. The cabinet shall include front and rear doors of NEMA type 3R construction with rain tight gaskets. A stiffener plate shall be welded across the inside of the main door to prevent flexing. Doors shall include a mechanism capable of holding the door open at approximately 90 and 165 degrees under windy conditions. Manual placement of the mechanism shall not be required by field personnel. Only the main door shall have ventilation louvers. A plaque designation “Traffic Control” shall be affix to each main cabinet door.

2.3 Door Alarm. The front and rear doors shall be equipped with switches wired to the traffic signal controller alarm **with** 1 input for logging and reporting of a door open condition. This should indicate a Special Status 1 alarm in the signal controller alarm screen.

2.4 Shelves. No less than (2) shelves shall be provided and each shall have the ability to be independently removed, relocated, and adjusted. The front edge of each shelf shall have holes

predrilled at a spacing of no greater than 8 inches to accommodate tie-wrapping to secure cables/harnesses.

2.5 Mounting Rails. A minimum of one set of vertical "C" channels shall be mounted on each interior wall of the cabinet for the purpose of mounting the cabinet components. The channels shall accommodate spring mounted nuts or studs. All mounting rails shall extend to within 7 inches of the top and bottom of the cabinet.

2.6 Pull-out Drawer. The cabinet shall be equipped with a pull-out drawer/shelf assembly. A 1½ inch deep drawer shall be provided in the cabinet, mounted directly beneath the controller support shelf. The drawer shall have a hinged top cover and shall be capable of accommodating one complete set of cabinet prints and manuals. This drawer shall support 50 pounds in weight when fully extended. The drawer shall open and close smoothly. The drawer dimensions shall make maximum use of available depth offered by the controller shelf and be a minimum of 18 inches wide.

2.7 Police Door. The police door shall contain only (1) switch used for flash/auto operations. The ability to turn field indications off from the police panel will not be permitted.

2.8 Lighting. The cabinet shall include no less than (3) field replaceable LED light assemblies along the top and sides of the cabinet. The LED panels shall be controlled by a manually activated toggle switch on the tech panel.

2.9 Fans/Ventilation. The components of the system as well as the CFM requirements shall be in compliance with the MoDOT 902 & 1092 specifications.

2.10 Heater. The cabinet shall be supplied with a 200 Watt fan heater with thermostat control that is designed to protect electronics from the effects of low temperatures such as corrosion, freezing or condensation, which can damage critical components within a control enclosure. Housing shall be constructed of aluminum. Overall dimensions including mounting areas shall be approximately: 4inch depth, 4inch width, 5.50inch height.

2.11 Switch Guards. All switches shall include switch guards. All switches shall be clearly labeled.

2.12 Receptacles and power strip(s). An 8-outlet IP addressable power strip will be furnished by the Commission and installed by the contractor. The installation of the power strip shall be included in the cost of the cabinet assembly. The main door tech panel shall contain a 15 amp duplex GFI receptacle. A separate grounded service outlet shall be provided in the controller cabinet for supplying power to the video detection monitor. The monitor shall be installed to automatically power on when the cabinet door is opened and automatically power off when the cabinet door is closed. The use of the grounded service outlet located on the cabinet door will not be permitted for this function. A manual on/off switch shall also be provided and mounted to the main door tech panel.

2.13 16-Position Back Panel Wiring. All new signal cabinets shall have a 16-position load switch back panel and conform to the following specifications. Regardless of the number of phases specified on the plans, all load switch positions shall be completely wired for use. The load switch back panel shall be configured for NEMA Configuration “A” or “G” as designated on the signal plans. Vehicle phases, overlaps (including FYA configurations), and pedestrian

phases shall be wired such that it must work with a Type 16 MMU. The cabinet shall include both a DT panel and a CTB (SDLC) panel with 6 harnesses.

2.14 Detection Configuration.

2.14.1 For all Detector Types. Detection configuration shall be in accordance with the configuration prescribed in the SL District Traffic Signal Detection System JSP.

2.14.*2* Intersections with Video Detection. For intersections with video detection, the cabinet shall be wired to automatically power on the video monitor when the cabinet door is open.

2.15 Load Switch. The front of the load switch shall be provided with (3) indicators to show the input signal from the controller to the load switch and (3) indicators to show the output to the field devices. The full complement of load switches shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

2.16 SDLC. All connection points shall be protected by a BIU 15 pin surge suppressor used for the protection of any devices on Port 1 Synchronous Data Link Control (SDLC). Each cabinet shall be provided with a SDLC hub assembly and (6) SDLC cables unless otherwise noted on the order form. All mechanical connections shall be soldered.

2.17 Surge Protection. Surge protection shall be a modular plug in type product as listed in the MoDOT Traffic Approved Product List.

2.18 AC line filter. The AC line filter shall protect equipment from malfunctions due to conducted interference coming into the equipment from line, especially line to ground (common mode) noise and transients. Overall dimensions including mounting areas shall be approximately: 4.17inch width and 3.53inch height.

2.19 Signal Buss Relay. The relay shall be a direct “drop-in” replacement for existing mercury displacement relays. The relay shall be a single pole solid state or hybrid relay. Overall dimensions including mounting areas shall be approximately: 2.5inch depth, 2inch width, 5 inch height.

2.20 Field Wiring termination. All field wires shall be attached to the back panel terminal strips via a mechanical copper lug, which can accommodate wire sizes from 14AWG - 6AWG. Lugs shall be provided for all field outputs to maximize the cabinet design.

2.21 Flash Transfer Relays. The full complement of relays shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

2.22 Cabinet Wiring Prints. Paper cabinet prints as well as electronic media shall be provided with each cabinet. (4) paper copies shall be provided (22” X 34”) and (1) electronic copy in pdf and dgn format. All flash program wiring configurations shall be represented on the cabinet print (Red, Amber, No Flash, FYA, Ped, FYA & Ped).

2.23 Generator Attachment. A generator plug shall be installed on each cabinet unless otherwise noted. The access door shall be hinged, lockable and watertight. The plug shall conform to the (NEMA L5-30 configuration). An automatic transfer switch shall be provided which will switch power to/from “line”, “UPS” or “generator” when power from one of the sources has been lost or gained. The unit shall be rated for 30 amps and shall contain either a LCD

display or indicator lights that validate the following: Line in, Line out, UPS in, UPS out and "from" generator. The unit shall contain a main breaker (on/off switch), a UPS bypass breaker (switch) and a Generator breaker (switch). To minimize the impact of the presence of the auto transfer switch, the dimensions shall be no greater than 12" wide X 6" deep X 4" high. The unit shall be constructed of either aluminum or stainless steel.

3.0 Testing.

3.1 Each controller and cabinet assembly shall be tested as a complete entity under signal load in accordance with Missouri Standard Specifications Section 902 for a minimum of 30 days after installation.

3.2 Each assembly shall be delivered with a signed document detailing the cabinet final tests performed. The cabinet shall be assembled and tested by the controller manufacturer or authorized local distributor to ensure proper component integration and operation.

4.0 Warranty and Training.

4.1 If a Controller and/or Malfunction Management Unit are ordered with a cabinet assembly, the Controller and Malfunction Management Unit shall be warranted by the manufacturer against mechanical and electrical defects for a period of 2 years from date of shipment. The manufacturer's warranty shall be supplied in writing with each cabinet and controller. Second party extended warranties are not acceptable.

4.2 The cabinet assembly and all other components shall be warranted for a period of one year from date of shipment. Any defects shall be corrected by the manufacturer or supplier at no cost to the owner.

4.3 MoDOT may require training on the maintenance and operation of NEMA TS2 cabinet assemblies. Maintenance and operation personnel shall be trained on troubleshooting, maintenance and repair of cabinets and all serviceable equipment. Training shall include field level troubleshooting and bench repair. This training shall be for a minimum of sixteen hours over two days. Training shall be conducted at a time and location mutually agreeable by the contractor and the signal shop traffic supervisor or as directed by MoDOT.

5.0 Method of Measurement. Method of measurement shall conform to Sections 902 and 1092 of the Standard Specifications.

6.0 Basis of Payment. Payment included with cost of pay item 902-42.83 (Controller Assembly Housing, NEMA TS2 Controller) paid per each. Payment will be considered full compensation for all labor, equipment, and material to complete the described work as shown on the plans. No additional payment will be made for installation of the power strip mentioned in 2.12. No additional payment will be made to provide conformance.

WW. SL District Traffic Signal Detection System

1.0 Description. This work shall consist of providing detectors for signalized installations that will support advance traffic signal performance measures (ATSPM) on the Commission's St. Louis District roadways. Detectors shall be in accordance with the Missouri Standard Specifications for Highway Construction (latest version) and installed to provide detection at

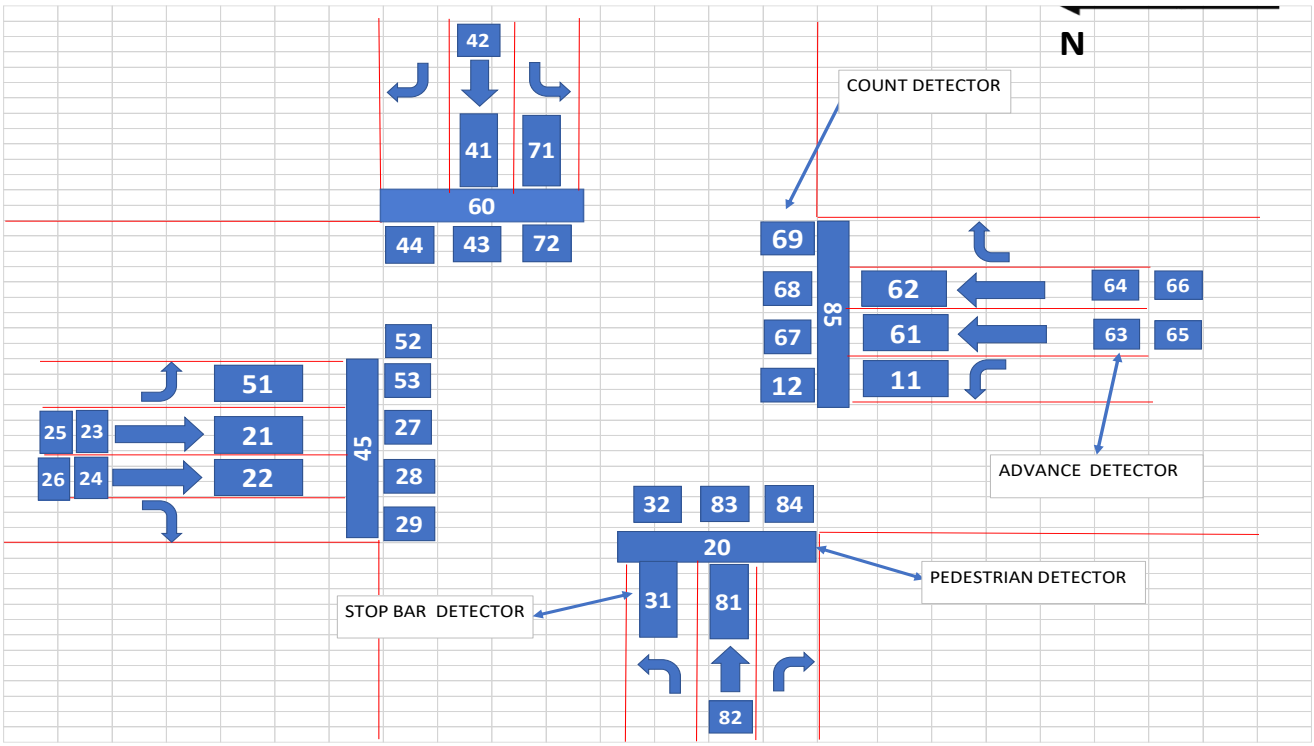
locations as shown on the plans or as directed by the Engineer in accordance with Section 902. If any information conflicts between Section 902 and this JSP, the JSP shall supersede.

2.0 Detector Zones. The following detector zones shall be placed as shown in the plans:

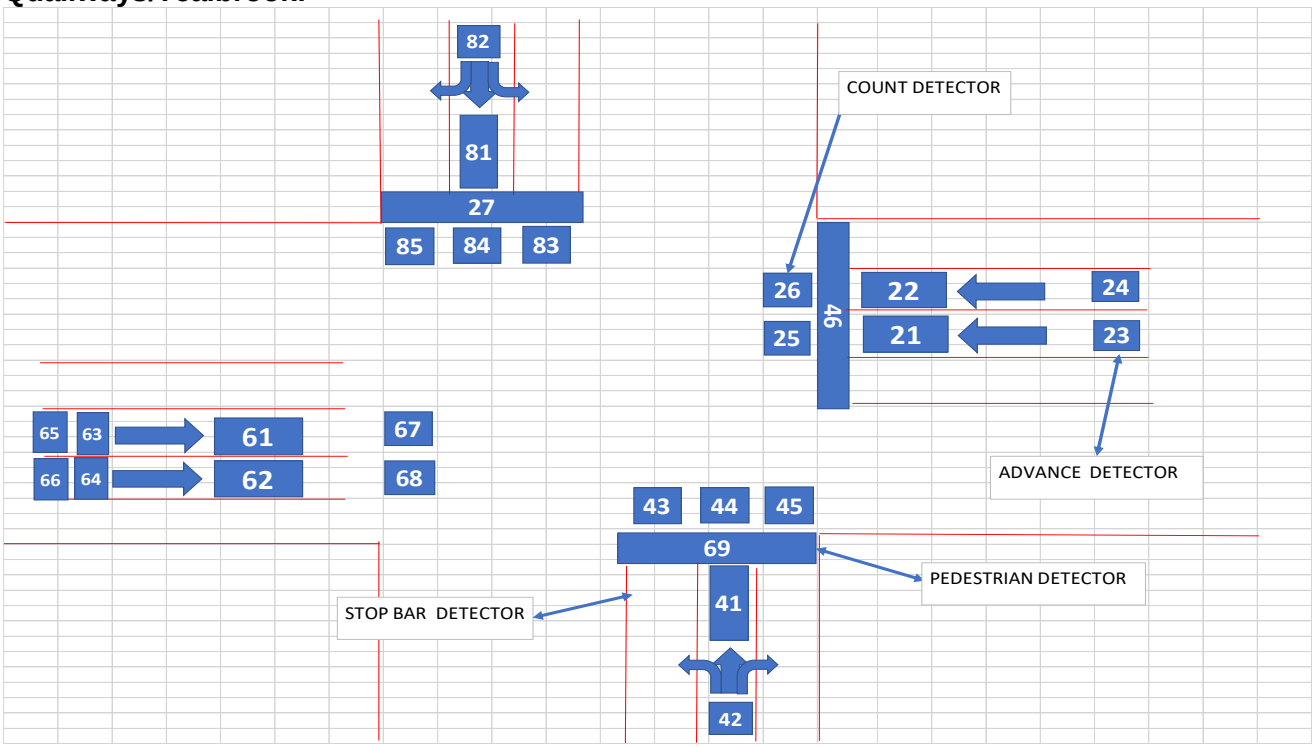
a) Stop Bar Detection
b) Advance Upstream (Performance Measures)
c) Dilemma Zone
d) Turn Counts
e) Advance Video Zones (if applicable)
f) Radar Zones (if applicable)
g) Advance Data Collector (if applicable)
h) Bicycle/Pedestrian (see Section 2.2)

Job No.: J6S3280
Route: 67
County: St. Louis

Schuetz/Baur:

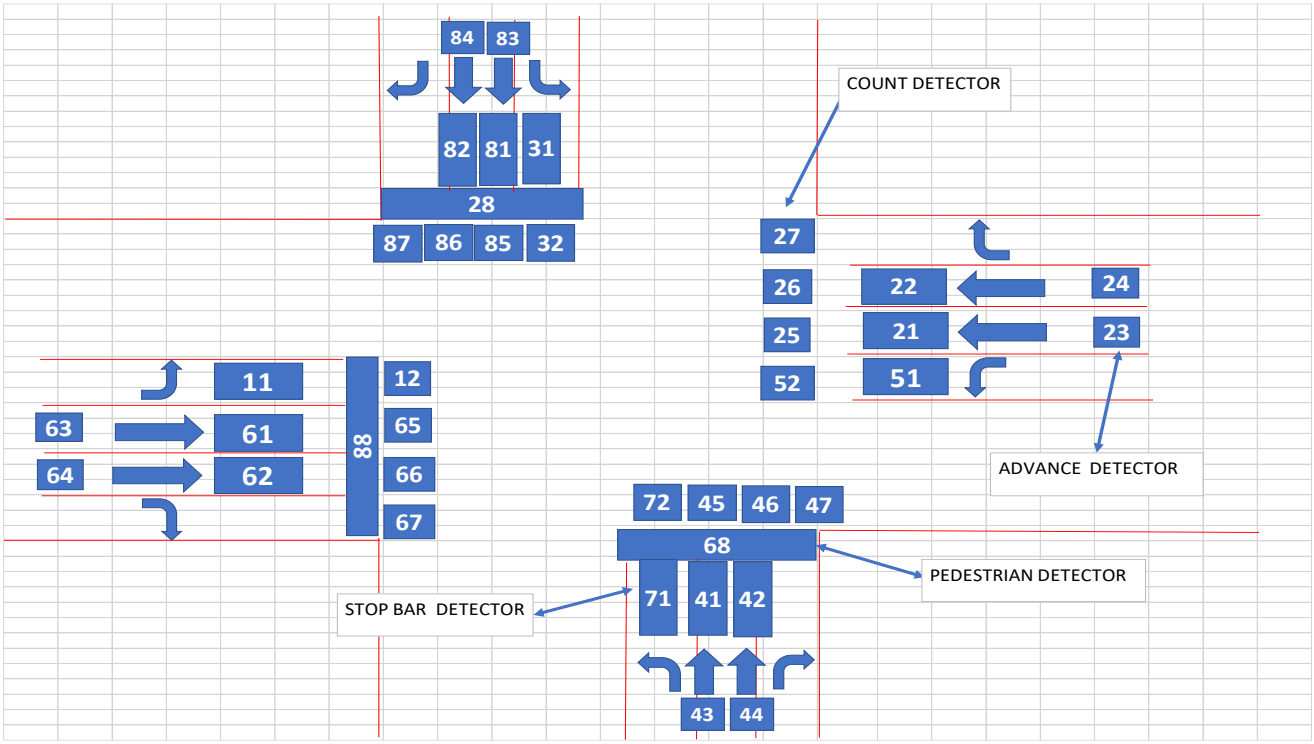


Quailways/Tealbrook:

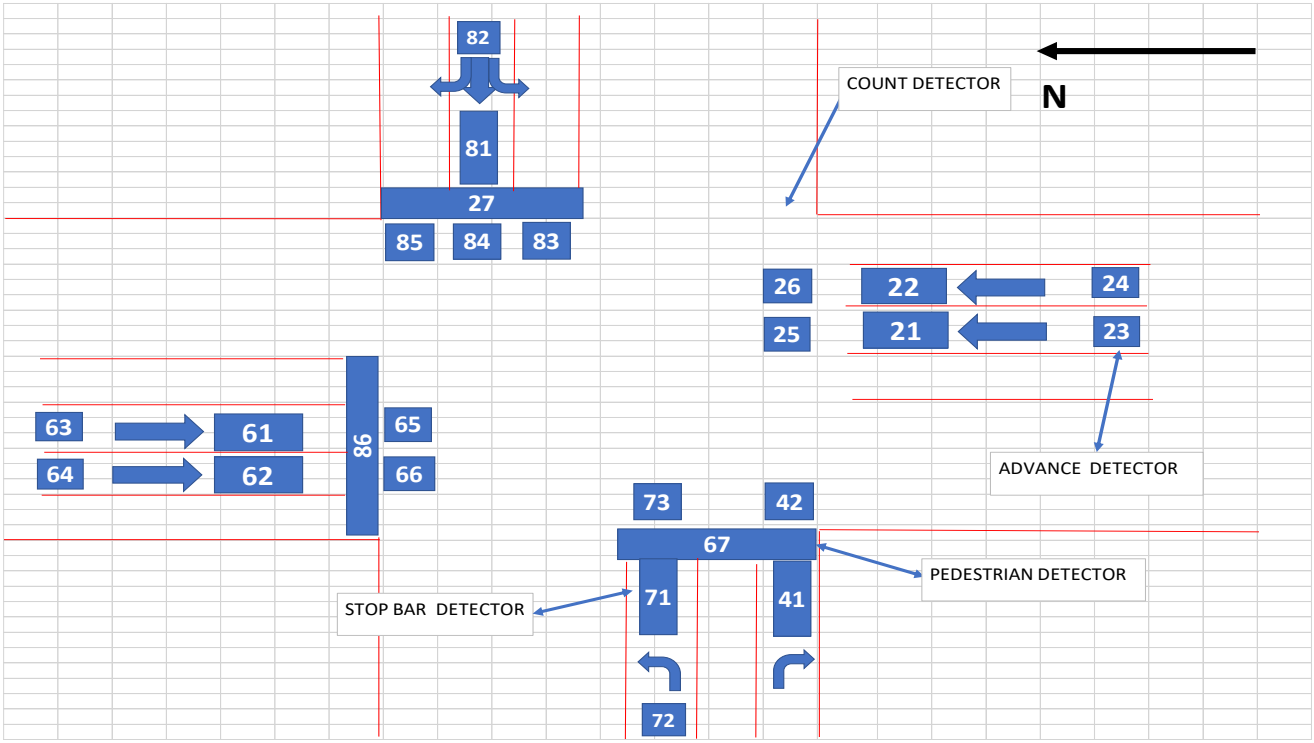


Job No.: J6S3280
Route: 67
County: St. Louis

Ladue Rd:

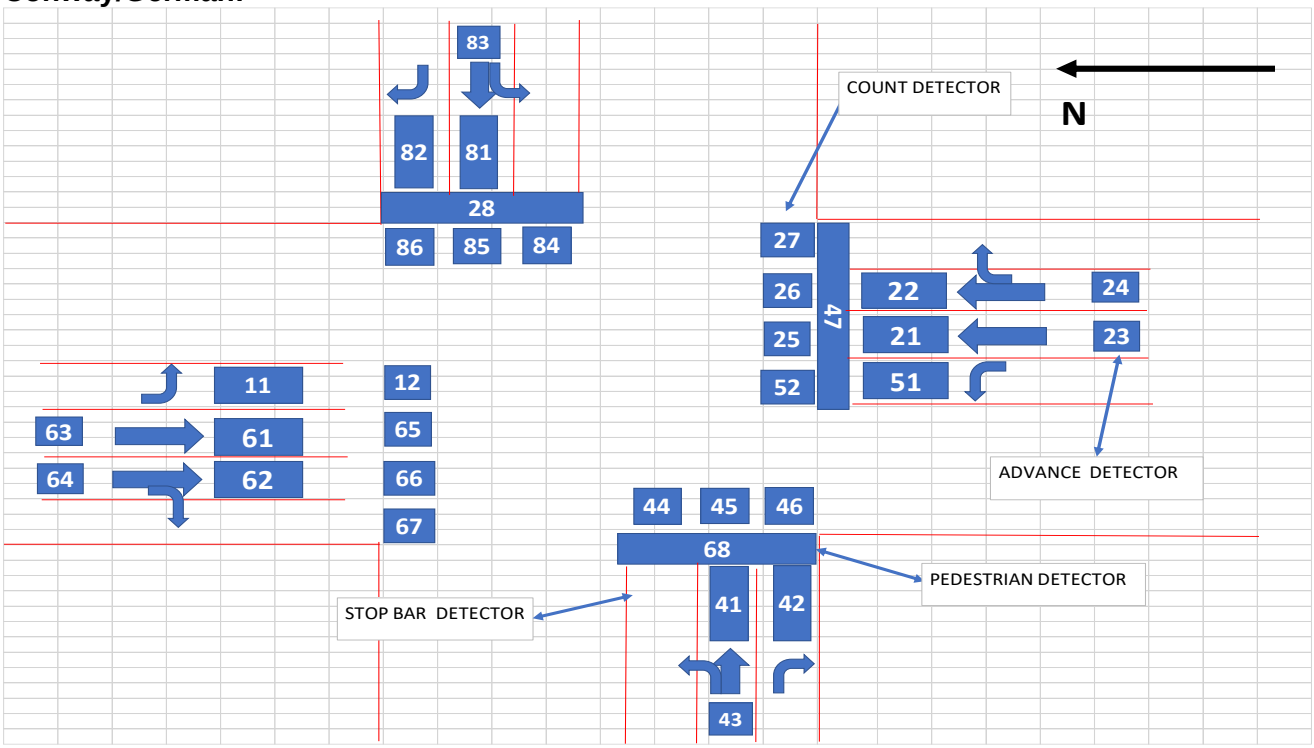


Chaminade Dr:



Job No.: J6S3280
Route: 67
County: St. Louis

Conway/German:



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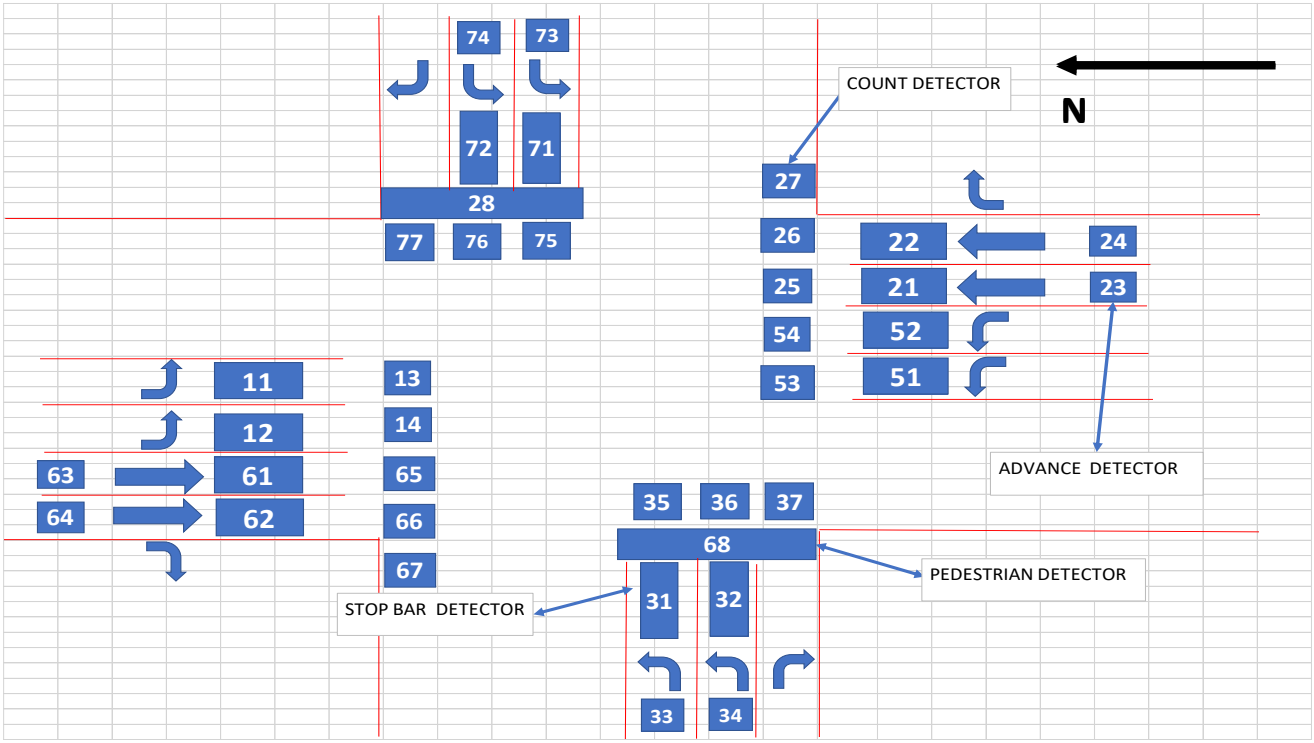
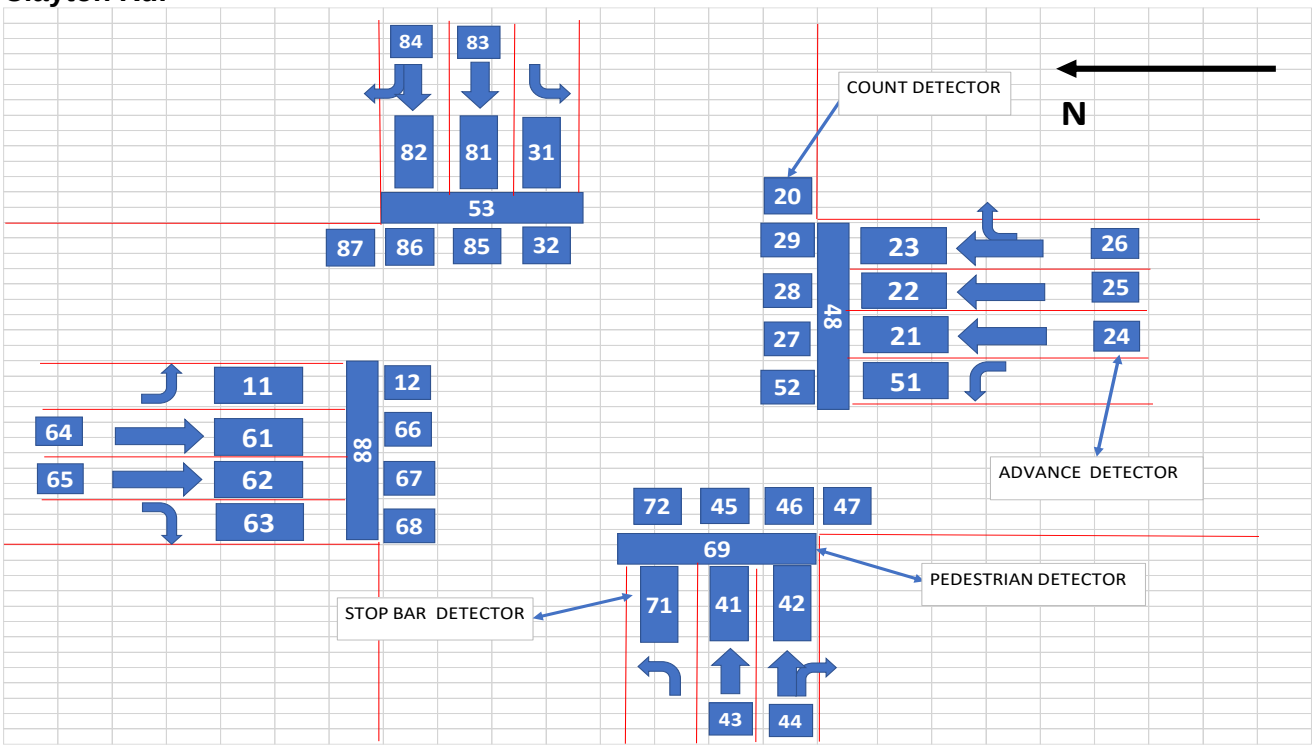
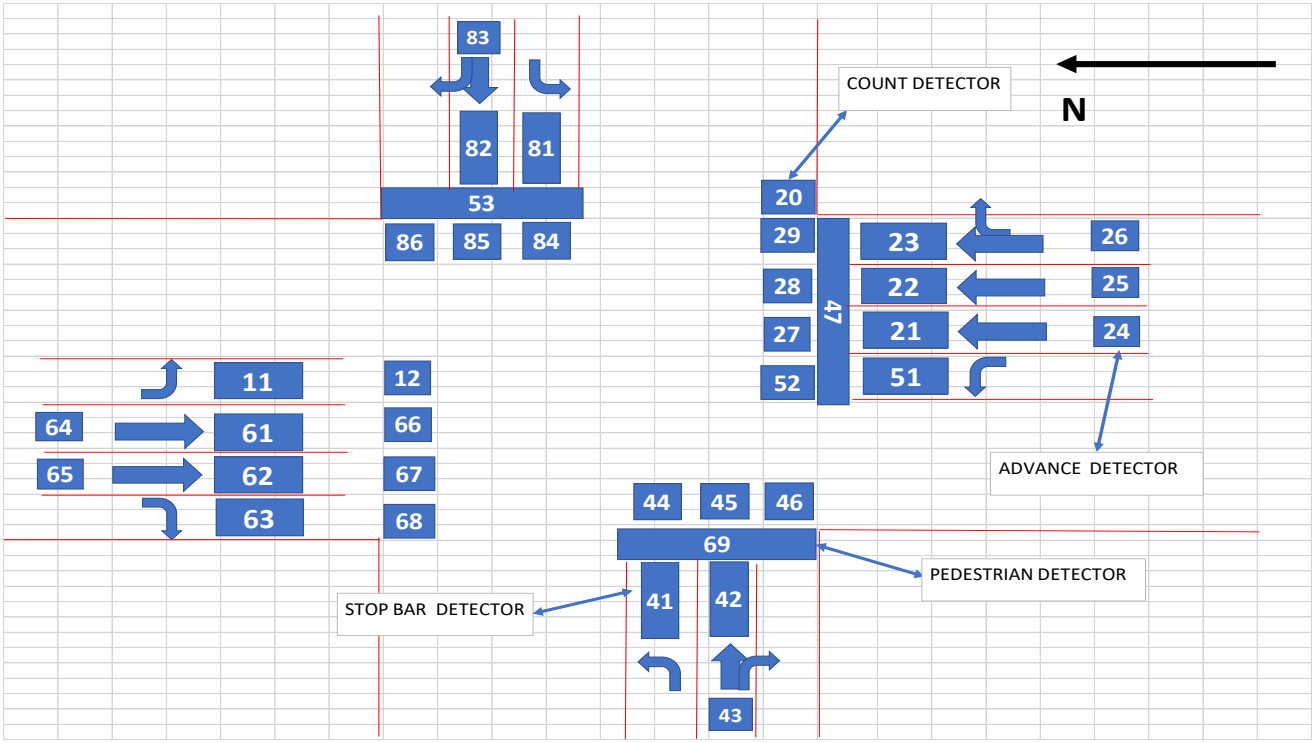


Job No.: J6S3280
Route: 67
County: St. Louis

Clayton Rd:

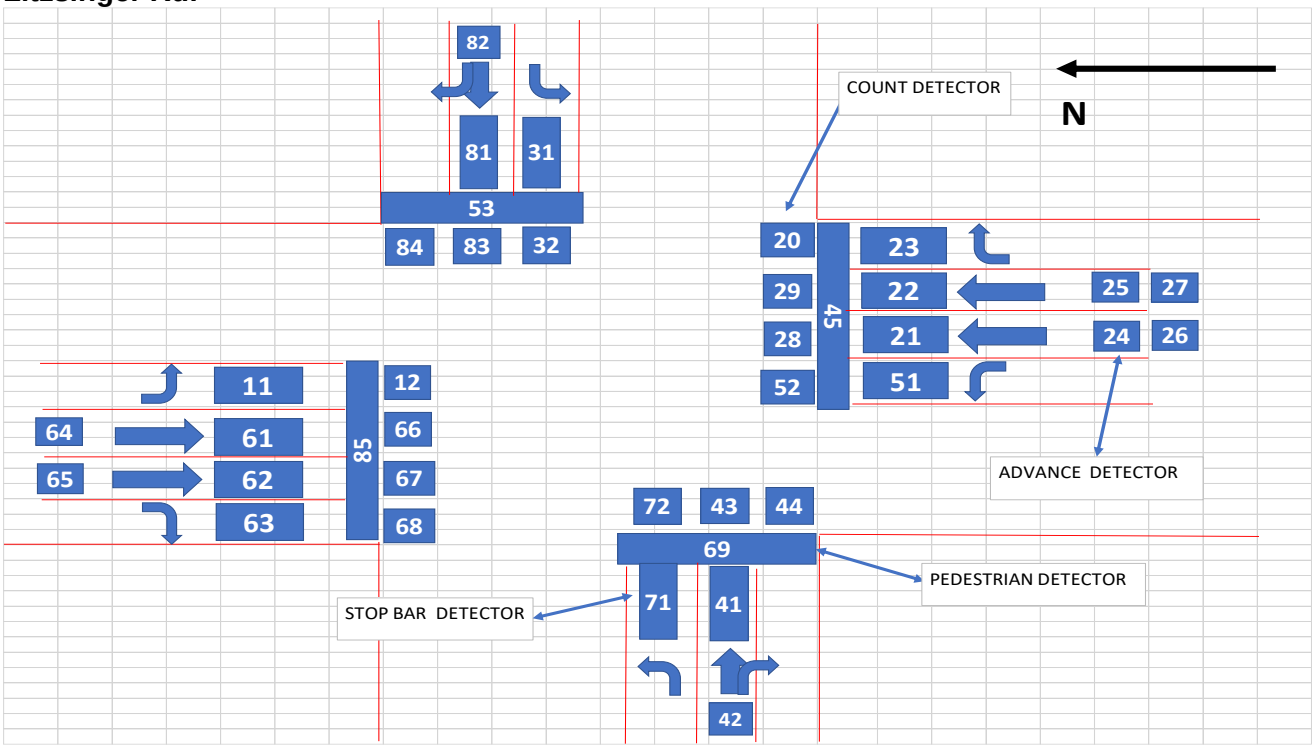


Plaza Frontenac:

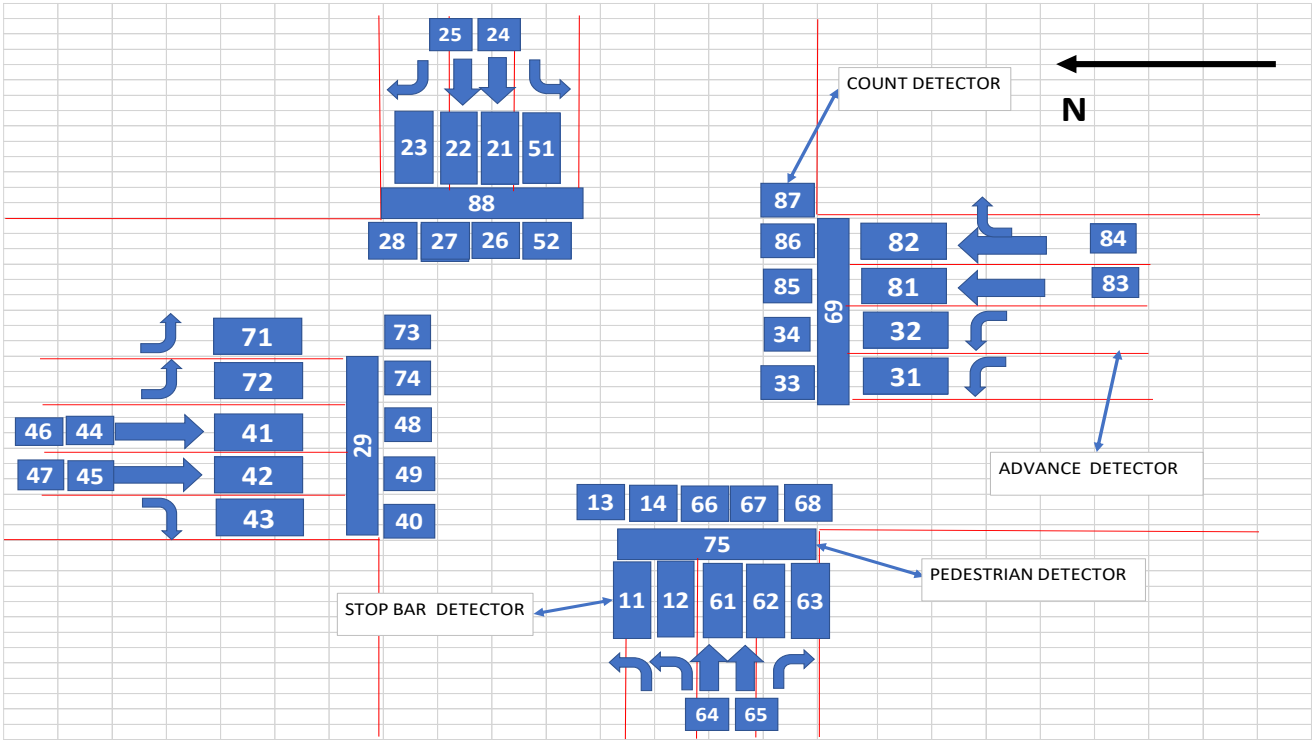


Job No.: J6S3280
Route: 67
County: St. Louis

Litzsinger Rd:



Route 100/Manchester Rd:



2.1 Dilemma Zones. Dilemma zone detection shall be required for the following approaches for high speed dilemma zone detection:

a) US 67 NB @ Schuetz/Baur
b) US 67 SB @ Schuetz/Baur
c) US 67 SB @ Quailways/Tealbrook
d) US 61/67 NB @ Litzsinger
e) US 61/67 SB @ Route 100

Dilemma zone detectors shall be placed at 5 secs and 8 seconds travel time before stop bar per below Table unless directed otherwise in the plans or by the Engineer.

Approach Speed (MPH)	Advance Detector Placement 5 secs Travel time	Advance Detector Placement 8 seconds travel time
35 mph	260	415
40 mph	295	470
45 mph	330	530
50 mph	370	590
55 mph	405	645
60 mph	440	705

2.2 Bicycle/Pedestrian Zones. Bicycle and/or pedestrian zones (if applicable) shall be provided as directed by the Engineer. Specific zone placement and description as required by vendor shall be reviewed and approved by the Engineer.

3.0 Performance Measures. In addition to presence detection, the detection system shall be capable of providing data to an advanced traffic signal controller that can perform at a minimum the following calculations in real time for each detection zone without the addition of another device:

a) Speed
b) Volume
c) Lane Occupancy
d) Vehicle Classification
e) Other available performance measures

For speed calculations thru movements are required for all detection installations. Turning movement measurements are required for all detection installations. For volume measurements/calculations both mainline thru and all turning movements are required. All values are to be assigned to detector channels within the controller. Other performance measures must be clearly defined. In all cases all performances measures must be ultimately available in an easily usable, exportable format. Turning movement counts shall be installed per the detector setup diagram(s) above to include all lanes. The Contractor shall provide documentation to the Engineer to confirm the volumes are configured and operational through the detection system. The Contractor shall also provide a final schedule of detector assignments in the .pdf format to the Engineer and the Commission's signal maintenance supervisor. Performance measurement data must be configured and fed into the Commission's ATSPM platform with data storage confirmed, see Section 5.0. If utilized on the project, the Contractor's Traffic Engineer shall assist in this task.

4.0 Material. The Contractor can choose from the following list of detector types according to the exceptions noted below:

a) Induction Loop
b) Video Image
c) Radar

Reference each detection type's subsection for specific allowable models. Unless otherwise specified on the plans, the Contractor may supply more than one type of detector and customize the installation based on field conditions, as approved by the Engineer.

4.1 Induction Loops. Induction loops, if selected, shall be in accordance with the Missouri Standard Specifications for Highway Construction (latest version) and shall be installed to provide detection at locations as shown on the plans or as directed by the Engineer in accordance with Section 902. Detector channels shall be assigned as per the layout in this JSP or as directed by the Engineer.

4.2 Video Detection. If video detection is selected, the following provisions shall also apply.

4.2.1 Description. The Contractor shall furnish and install all equipment, materials, software, and other miscellaneous items that are required to provide a fully functional Video Detection System for the control of vehicular and pedestrian traffic signals.

4.2.2 Material. The video detection system shall consist of power supply, hard-wired video cameras, all necessary video and power cabling with end connectors, mounting brackets, surge protection as recommended by the manufacturer, video detection processors/extension modules capable of processing the number of camera and phase combination video sources shown on the project plans. The video detection system will be defined as the complete assembly of all required equipment and components for detection of vehicles. Each video detection system shall consist of the video camera(s), lightning arrester for video cabling, processor unit(s), control device (track ball or keypad; no mouse allowed), software and license for system control via a computer (if applicable), communication components, and a color monitor. The video detection system shall have the most current available firmware installed. All camera views shall be obtainable without requiring the disconnection and reconnection of cables within the system. The video detection systems in the list below are the only systems that are tested, fully functional, and approved for use in the St. Louis District.

a) Autoscope Vision
b) Iteris Vantage Next
c) Aldis Gridsmart Smart mount Camera (Performance Module to be included)

4.2.3 Installation Requirements. The video detection system shall be installed per the manufacturer's recommendations. The installer shall be certified by the video detection system's manufacturer to install the system. All CAT5 cable runs (if used) shall be continuous without splice from the cabinet to the camera. If requested by the engineer, a factory certified representative from the supplier shall be available for on-site assistance for a minimum of one day during installation. The bottom of the video camera shall be mounted a minimum of 30 feet (9.0 m) above the pavement, unless otherwise indicated on the plans or approved by the Engineer.

4.2.3.1 A separate grounded 120 VAC service outlet shall be provided in the controller cabinet for supplying power to the parts of the video detection system requiring AC power. Use of the

grounded service outlet located on the cabinet door will not be permitted. The video detection system must integrate/be compatible with an Advanced Transportation Signal Controller (ATC).

4.2.4 Detection Zones. The detection zones shall be created by drawing the detection zones on the video image. A graphical user interface shall be built into the video detection system and displayed on a video monitor or computer. It shall be possible to edit previously defined detector configurations to fine-tune detection zone placement. When a vehicle is detected by crossing a detection zone, there shall be a visual change on the video display, such as a flashing symbol or a change in color or intensity to verify proper operation of the video detection system.

4.2.5 Performance. Overall performance of the video detection system shall be comparable to inductive loops. Using camera optics and in the absence of occlusion, the video detection system shall be able to detect vehicle presence with 98% accuracy under normal day and night conditions with only slight deterioration in performance under adverse weather conditions, including fog, snow, and rain. When visibility exceeds the capabilities of the camera, the video detection system shall default to placing a call on all detectors. Supportive documentation is required to meet this specification and shall be provided to the Engineer before installation.

4.2.6 Monitor. The monitor shall be an LCD active matrix with a minimum 7” diagonal screen color monitor, an NTSC-M system and BNC video in-out connections built into the housing. The unit shall be compact and lightweight, securely mounted to the cabinet shelving, have low power consumption, constructed to operate under extreme temperature conditions, and run on AC power. AC adaptor shall be included. The monitor shall be installed to automatically power on when the cabinet door is opened and automatically power off when the cabinet door is closed. A manual on/off switch shall be provided.

4.2.7 Video Camera and Housing. The camera shall produce a color video image of vehicles during daylight hours, with an optional production of black and white images during nighttime hours. The video shall produce a clear image for scenes with a luminance from a minimum range of 0.18 to 929 foot-candles (2.0 to 10,000 lux). The camera shall provide a minimum resolution of 430 lines horizontal (TVL) and 350 lines vertical under NTSC operation. The camera shall include an electronic shutter or auto iris control based on average scene luminance and shall be equipped with an auto iris lens. sun shield that prevents sunlight from directly entering the lens. The sun shield shall include a provision for water diversion to prevent water from flowing in the camera field of view and shall be able to slide forward and back.

4.2.8 Video Detection System Connections. All bus connections in the video detection system shall be corrosion resistant. Serial communications to a computer shall be through an RS-232/RS-422 serial port through a subminiature “D” connector with a computer running supplied system software. The port shall have the capability to access detection system data as well as the real-time imagery needed to show detector actuations. The processor shall have a RJ-45 plug using Ethernet 10/100 protocols. The equipment shall be provided with either a NEMA TS1 or NEMA TS2 interface as shown on the plans.

4.3.8.1 TS1 systems, the video detection system shall be equipped with a TS1 detector interface for a minimum of 32 detector outputs. Logic output levels shall be compatible with the TS1. A subminiature "D" connector on the video detection system shall be used for interfacing to these outputs.

4.2.8.2 For TS2 systems, the video detection system shall be equipped with a TS2 Type 1 detector interface, where detector information is transmitted serially via an RS-485 data path. A

15-pin subminiature "D" connector, meeting the requirements of the TS2 standard, shall be used for the serial detector output. A minimum of 32 detector outputs is required, with the capability of expansion to 64 outputs if required based on the design plans.

4.2.8.3 The contractor shall be responsible for any changes or additions to either an existing or new cabinet in order to provide a properly functional video detection system and monitor display. This may include, but is not limited to, additional SDLC connectors, an MMU (malfunction management unit), shelf relocation and component reorganization. No direct pay for any changes or additions. All required connections will be considered part of the video detection system installation.

4.2.9 Documentation. The contractor shall provide one bound copy and one electronic version (.pdf format) of the user's manual.

4.3 Radar Detection. If radar detection is selected, the following provisions shall also apply.

4.3.1 Description. Provide, install, and test Continuous Tracking Advance Detector (CTAD) units and cabinet interface to detect range, speed, and vehicle Estimated Time of Arrival (ETA) to the stop bar for vehicles or clusters of vehicles moving in the user selected direction of travel. The CTAD shall also detect instantaneous roadway efficiency. This specification sets forth the provisions for a radar detection system that detects vehicles, pedestrians, bicycles, and motorcycles on roadways and provides vehicle presence and full-motion tracking.

4.3.2 Material

4.3.2.1 Stop Bar Detector. The radar detection systems in the list below are the only systems approved for use in the St. Louis District. Installation of radar detection systems shall follow both the below specifications and the manufacturer's instructions.

a) WAVETRONIX SmartSensor
b) Matrix
c) Iteris Vector

Provide a radar detection system with the following features.

d) Shall be able to track/detect a minimum of 64 objects
e) Shall be able to operate in a temperature range between -30 degrees and 165 degrees F.
f) The detection zones shall be configurable based off several factors' such as classification, ETA, speed, presence, and delay.
g) The radar sensor shall be forward fire
h) The sensor shall operate in the 25 GHz band
i) The sensor shall be housed in a sealed IP-67 enclosure

4.3.2.2 Advance Detector. The radar detection systems in the list below are the only systems approved for use in the St. Louis District. Installation of radar detection systems shall follow both the below specifications and the manufacturer's instructions.

a) WAVETRONIX SmartSensor
b) Advance
c) Advance Extended
d) Iteris Vector

In addition to the specifications listed in Section 4.3.2.1, the detection range shall also cover the dilemma zone distances prescribed in section 2.1.

4.3.2.3 Power and Communications.

a) Power and communications cabling shall be installed per manufacturer specifications
b) The radar sensor shall operate at 24 VDC
c) Power consumption shall be no more than 38 watts
d) If required, the advance detection System shall include all equipment to communicate wirelessly.

4.3.2.4 Contact Closure Card. Any contact closure card shall be compatible with a NEMA detector rack and shall be installed per manufacturer specifications.

4.3.2.5 Lightning Surge Protection. The CTAD shall include surge protection hardware installed per manufacturer specifications. The hardware shall be accepted by the engineer before installation in the cabinet.

4.3.3 Construction Requirements.

4.3.3.1 Mounting Location. All mounting hardware shall be installed per manufacturers specifications. The CTAD shall be mounted as follows:

a) at a height that is within the manufacturer's recommended mounting heights.
b) The radar shall be positioned so that all detection zones needed for an approach can be captured.
c) in a forward-fire position, looking towards either approaching or departing traffic.

4.3.3.2 Induction Card Rack Interface. Install the contact closure card in the existing induction card rack if available, otherwise install a 4-position induction card rack with power supply and configure based on manufacturer's instructions to provide all needed detection outputs. Any power supply cards for the induction card rack needed for proper operation of the CTAD shall be provided and installed by the contractor.

4.3.3.3 Support. A factory certified representative from the supplier shall be available for on-site assistance for a minimum of one day during installation and shall provide two (2) days of local training after the CTAD has been installed and are operational.

4.3.3.4 Acceptance Testing. The contractor shall develop a proposed test procedure for the CTAD and submit it to the Engineer for approval. It must include visual verification of vehicle detections being received. Each detector shall be tested separately. Revise the proposed test procedure until it is acceptable to the Engineer. Provide all equipment and personnel needed to safely conduct the tests. Arrange for the Engineer's representative to witness the tests. Give the Engineer a report documenting the result of the tests.

4.3.4 Documentation and Software.

4.3.4.1 Prior to purchasing the CTAD system, the contractor shall submit five copies of catalog cut sheets and the environmental testing results to the Engineer for approval.

4.3.4.2 The contractor shall provide five copies of the operation and maintenance manuals for the CTAD system.

4.3.4.3 Contractor shall provide one copy of the software and any cables needed to interface with the system.

4.3.4.4 Contractor shall provide the CTAD installation kit, if applicable, to the Commission upon completion and acceptance of the project.

5.0 Communication with Advanced Transportation Management System (ATMS). The detection systems and all performance measure data should be fed directly into the Commission's current ATSPM platform. All data must be online and verified by contractor to be fully operational and available for data output reporting via the Commission's ATSPM platform. In addition, the data storage for long-term storage use should be configured properly on the Commission's ATSPM platform. The Contractor shall be responsible for ensuring the firmware of all detection works with the Commission's ATSPM platform. If utilized on the project, the Contractor's Traffic Engineer shall assist in this task.

6.0 Technical Support for Detection System. The detection system(s) chosen for installation shall be free of defects in material and workmanship. For five (5) years, technical support from factory certified personnel or factory certified installers shall be available from the supplier. Ongoing software support by the supplier shall include updates for the processor unit and computer software and shall be provided at no cost during this two-year period. The update of the processor unit software to be NTCIP compliant shall be included. Detection system(s) must not be within 5 years of end of support or sale by manufacturer.

7.0 Construction Requirements. Construction requirements shall conform to Sec 902.

8.0 Method of Measurement. Method of measurement shall conform to Sec 902.

9.0 Basis of Payment. Measurement and payment for work covered by this specification shall include all equipment, materials, tools, labor, programming, testing, and documentation necessary to provide a detection system **per intersection** and shall be paid at the contract unit price as follows:

Item No.	Type	Description
902-99.02	Each	SL District Traffic Signal Detection System

XX. Disposition of Existing Signal/Lighting and Network Equipment

1.0 Description. All controllers, cabinets, cabinet equipment, network equipment, DMS equipment, antennas, radios, modems, and other equipment noted in the plans shall be removed by the contractor.

2.0 Signal Equipment. All equipment other than network communication devices noted in 3.0 are to be transported to the Commission's maintenance lot located at 2309a Barrett Station Road, Ballwin, Missouri 63021. The contractor shall notify the Commission's representative 24 hours prior to each delivery by calling:

Mr. Dennis Hixson, Traffic Supervisor, Preventive Maintenance/ITS
Cell: (314) 565-6726

Mr. Ron Mize, Traffic Supervisor, Emergency Signal Maintenance
Cell: (314) 565-6727

Mr. Brian Ducote, Interim Lighting and Locate Supervisor
Cell: (314) 681-8395

3.0 Network Communication Devices. Devices such as CCTV cameras and domes, video encoders, device servers, Ethernet switches, media converters, and radio assemblies are to be transported to the Commission's TMC in Chesterfield. The contractor shall notify the Commission's representative 24 hours prior to each delivery by calling 314-275-1526 and providing details for the delivery.

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

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

YY. Coordination with ITS Staff and Utility Locates

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

1.1 MoDOT is a member of MO-One-Call System. Prior to any excavation or work within MoDOT Right-Of-way, the contractor must contact MO-One Call at 1-800-DIG-RITE and request for Utility Locates within noted project limits. If the scope of work contains modification, addition and/or expansion of existing underground MoDOT ITS, lighting, or signal facilities, the contractor must notify the MoDOT Utilities Locate staff prior to any work, in order for MoDOT to update MoDOT utility location records with Missouri One Call.

2.0 Contact. The contractor shall notify the ITS group via an email to SLITS@modot.mo.gov at least 2 days before any work that may impact the existing network communications. The contractor shall include the Job#, location and brief scope of work in the email's subject line. The engineer shall be notified prior to making contact with ITS staff. For MoDOT Utility location updates, the contractor must contact MoDOT TMC at 314-275-1500 and ask for Utility Locate Section at least seven calendar days before performing any work.

3.0 The ITS and network devices located within the project limits are a crucial part of the traffic operation system for this area. It is imperative that the downtime be kept to a minimum when

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

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

ZZ. Buried Cable Driveable Delineator Post MoDOT

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

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

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

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

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

Item No.	Type	Description
910-99.02	Each	MODOT Buried Cable Driveable Delineator Post

AAA. Fiber Optic Cable Installation and Relocation

1.0 Description. This work shall consist of installing, splicing, and terminating fiber optic cables. The fiber optic cable may be new or existing cable relocated as shown on the plans. Fiber optic cable relocation requires existing cable to be removed from an existing conduit system and installed in a new conduit system. Relocated cable must be carefully removed from the existing conduit system without being damaged.

2.0 Materials. Some of the below noted materials may not be applicable on this project. See the plans and below quantities for applicable materials.

2.1 Cable. Fiber optic cable shall be of loose tube construction. Provide certification by an independent testing laboratory that the cable meets all requirements of Rural Utilities Service Bulletin 1753F-601a *Minimum Performance Specification for Fiber Optic Cables* (https://www.rd.usda.gov/files/UTP_Bulletins_1753F-601a.pdf). The cable shall be gel free, all dielectric, and have 12 fibers per tube. The cable sheath shall have length markings in feet, and shall indicate that the unit of measure is feet. The cable shall have single mode fibers whose attenuation does not exceed 0.35 dB/km and 0.25 dB/km for 1310 nm and 1550 nm signals, respectively. The optical fibers used in the cable shall meet or exceed the International Telecommunication Union ITU-T G.652.D requirements.

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 the LC type with ceramic ferrules, unless a different connector is required to mate with the equipment or an existing panel. 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. 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. Length shall suffice to provide approximately five feet of slack after installation.

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

The enclosure shall be made of powder-coated metal. It shall have provisions for cable strain relief and for connector labeling. The enclosure's patch panel shall have at least 24 positions. Provide enough splice trays for all splices made in the interconnect center. Provide patch panel modules that are compatible with the connectors specified in section 2.3 of this provision.

2.6.1 Wall-Mounted Interconnect Center. The enclosure shall be designed for wall or panel mounting and occupy no more than 350 square inches of wall space. It shall have a gasketed, hinged door. It shall hold at least six splice trays. These enclosures are typically used in signal cabinets.

2.6.2 Rack-Mounted Interconnect Center. The enclosure shall have brackets and all other hardware required for rack mounting in an EIA standard 19-in. equipment rack. It shall take up no more than three rack units (1¾ inch each) in the cabinet. It shall have front and rear doors. It shall hold at least four splice trays. These enclosures are typically used in ITS device cabinets.

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

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

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

2.8 Rack-Mounted Patch Panel Enclosure. The enclosure shall have brackets and all other hardware required for rack mounting in an EIA standard 19-in. equipment rack. However, alternate forms of mounting will be permitted if more practical at a particular location. The enclosure shall take up no more than five rack units (1¾ inch each) in the cabinet. It shall be made of powder-coated aluminum. Provide patch panel modules that are compatible with the connectors specified in section 2.3 of this provision, as needed. These enclosures are typically used in network node cabinets.

2.9 Underground Splice Closure. Closures for underground fiber splices include all materials necessary to make, organize, and protect the splices.

2.9.1 The closure shall supply environmental protection of cable and splices from water and dirt. It shall be designed for splicing fiber-optic cables underground in pull boxes and to be submersed in water.

2.9.2 Provide certification by an independent testing laboratory that the closure meets all requirements of Telcordia GR-771 for environmentally sealed closures for buried installation.

2.9.2 The closure shall be re-enterable without any special tools.

2.9.3 The closure shall be able to accommodate at least four fiber optic cables.

2.9.4 The closure shall accommodate 144 single mode fiber splices.

2.9.5 It shall be possible to remove any splice tray without disturbing the others.

2.9.6 Splice trays in the closure need not be of the type specified in 2.2, above.

2.9.7 Designed for butt splicing.

2.9.8 No encapsulated materials shall be allowed.

2.10 Tracer Wire. A jacketed #14 AWG XHHW-2 standard blue tracer wire (also known as the locator wire) shall be provided in the conduit within the project limits unless it exists.

3.0 Construction Requirements.

3.1 Pre-Installation Cable Inspection and Testing. Prior to installation, confirm that the cable is in good condition and complies with the specifications. The contractor shall perform fiber testing (see below requirements) of new fiber on the reel and existing fiber before it is removed. Notify the SLITS Group about any fiber anomalies and submit fiber testing reports to the SLITS Group for review and approval. Any defects found after installation will be deemed the fault of the contractor.

3.2 Cable Installation.

3.2.1 Remove existing cable to be relocated and install 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.

3.2.2 Before any cable installation is performed, provide the engineer with four copies or an electronic copy, as required by the engineer, 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.

3.2.3 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.

3.2.4 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.

3.2.5 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 cabinet clean of cable lubricant with a cloth before leaving the pull box, junction box, or cabinet.

3.2.6 When installing new fiber optic cable store 30 feet of slack fiber in every intermediate pull box, unless otherwise noted on plans. Additional slack storage, as indicated on the plans, is required in designated pull boxes. At cabinet locations, where cable runs from the pull box directly to an equipment cabinet, store 60 feet of slack fiber optic cable in the pull box, unless otherwise noted on plans. Additionally, treat the cable returning from the cabinet to the pull box as a separate cable, and store 60 feet of slack for these links, unless otherwise noted on plans. Store slack cable neatly on the walls of the pull box using racking hardware acceptable to the engineer. If the length of fiber optic cable being relocated does not allow for fully meeting these slack requirements, maximize fiber slack at cabinets before providing slack in pull boxes.

3.2.7 While pulling and until splicing seal the fiber optic cable ends to prevent the escape of filling compound and the entry of water.

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

3.3.1 Make all splices using a fusion splicer that automatically positions the fibers using the Light Injection and Detection (LID) system or the High-resolution Direct Core Mounting (HDCM) system. Provide all equipment and consumable supplies.

3.3.2 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.

3.3.3 Prior to splicing to a fiber installed by others, measure and record the optical loss over that fiber. See section 4.0 of this provision.

3.3.4 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.

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

3.5 Tracer Wire. The contractor shall install a jacketed #14 AWG XHHW-2 standard blue tracer wire (also known as the locator wire) in conduit with new or replaced fiber optic cable(s). In the pull box nearest to the ITS or signal cabinet connect the tracer wire to a ground rod with a ground rod clamp and provide five feet of slack, as shown on the ITS pull box detail. In other fiber pull boxes provide five feet of slack, but a ground rod shall not be installed. Secure the tracer wire slack in individual coils to the inside wall of each pull box. If the tracer wire already exists, the contractor shall ensure it is connected to the ground rod properly in the pull box nearest to the ITS or signal cabinet and demonstrate a locate signal will transmit along the tracer wire. When fiber optic cable is relocated, existing tracer wire may be reused.

3.6 Fiber Management. Fiber in splice trays along with pigtails and buffer tubes in the interconnect center or splice closures shall be neatly looped and restrained following telecom industry standard fiber and cable management practice and enclosure manufacturer's recommendations. Shown below are examples of acceptable and unacceptable fiber and cable management. Work will not be accepted unless good fiber management practices are followed.

Acceptable

Unacceptable

3.7 Required Fiber Splicing, Installation and Testing Experience. Submit resumes, certificates and references detailing fiber installation, splicing, and testing for on-site personnel to the engineer for approval. Subcontractors used on the project are considered part of the contractor's team and are also required to submit resumes, certificates, and references. Submit to the engineer references including client project manager, phone number and project experience. Demonstrate successful completion of fiber optic cable installation and splice training courses by providing certificates of completion. Failure to comply may result in a declaration of noncompliance.

3.7.1 In addition, ensure a number of the contractor's team approved by the engineer that has at least two years of experience in the installation, splicing and testing of the fiber optic cable is on site at all times during the fiber optic cable installation and fiber optic splicing work until successful completion of the work. Receive approval from the engineer for any substitution of this individual. The engineer may stop the work activity on this project as a result of the absence of these on-site personnel from the project and may continue to charge time to the contractor and will not grant a time extension.

3.8 Existing Fiber Replacement. When plans show new fiber being installed to replace existing fiber, the existing fiber should remain in service until the new fiber is installed and is ready for splicing to minimize network downtime.

3.9 Fiber Relocation. The fiber optic cable is a crucial part of the traffic operation system. It is imperative that the downtime be kept to a minimum when relocating fiber optic cable. When existing fiber is disconnected for relocation, the relocation and fiber splicing of the relocated fiber shall progress continuously to minimized downtime.

4.0 Acceptance Testing.

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

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

(a) If the link includes fiber installed by others, use an optical loss test set to measure and record the optical loss over that portion of the link before it is spliced to new fiber.

(b) Calculate the maximum allowable loss for the completed link, both at 1310 nm and at 1550 nm. Use the following formula:

Maximum link loss = Measured loss over portion installed by others
+ (Fiber length in km) x (0.35 for 1310 nm and 0.25 for 1550 nm)
+ (Number of fusion splices) x (0.05)
+ (Number of mechanical splices [for temp. connection]) x (0.3)
+ (Number of connections) x (0.5)

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

(c) Calibrate an optical loss test set and provide evidence satisfactory to the engineer that the set produces accurate results at both wavelengths. This can be a demonstration that the set correctly measures the loss of a test fiber whose loss is known.

(d) Use the test set to measure the loss of the link under test. Record the result at both 1310 nm and 1550 nm. Arrange for the engineer or his representative to witness these tests.

(e) If the measured loss exceeds the calculated maximum, 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 report showing all of the links tested in this project. For the portions installed in this project, show the equipment 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 an electronic copy of the report to the engineer, along with the calculations for the maximum allowable loss. Submit the report including 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. New 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 Basis of Payment. Measurement and payment for items covered by this specification include the acceptance testing and guarantee, in addition to all materials and equipment necessary for a fully operational system. Payment will be made as follows:

Item No.	Type	Description
910-99.02	Each	Fiber Optic Pigtail
910-99.02	Each	Fiber Optic Jumper
910-99.02	Each	Wall-Mounted Interconnect Center
910-99.03	Linear Foot	Fiber Optic Cable, 24 Strand, Single Mode
910-99.03	Linear Foot	Relocate Fiber Optic Cable, 24 Strand, Single Mode

BBB. Install or Relocate Existing Communication Equipment

1.0 Description. The contractor shall install MoDOT furnished ethernet network switch(s) or relocate all existing network equipment from existing ITS or signal cabinet into new cabinet, make necessary connections and test for proper network connection. This work shall be coordinated with MoDOT SLITS Group via an email to SLITS@modot.mo.gov.

2.0 Materials.

2.1 The Contractor shall install MoDOT furnished Ethernet network switch(es) or relocate the existing Ethernet network switch(es), video encoders, cellular modem and other existing or new network devices inside the new ITS or signal cabinet as shown on the detail communication plans. These will include power cables and network device surge arresters. Relocating the existing CCTV camera(s) and network radios(s) shall be paid under separate pay items.

2.2 The Contractor shall furnish and install any other cables such as Category 5E patch cords, coax patch cords, and short serial cables, etc. as required for the new location connections.

3.0 Construction Requirements.

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

3.2 The Contractor shall NOT move any cables from port to port on the network switches without prior MoDOT approval. 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 Commission approved 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.

3.4 Cisco Ethernet Switch. Prior to the beginning of the project, the Contractor shall verify the correct switch type and model including any additional necessary Cisco supported equipment with MoDOT St. Louis ITS department. Additional equipment may include but is not limited to the power supply, DIN rails, and any applicable Cisco supported SFPs (Small Form-factor Pluggable transceivers), or expansion modules. For signal cabinets, the switch shall be mounted on the left side panel above the 120V IP Power Strip. Attach unit to 2 rails of the side panel, with the power cable facing away from the cabinet door. The Cisco switch shall be powered from the 120V IP Power Strip. The Cisco Ethernet Switch including the additional Cisco supported equipment shall be delivered to Commission's ITS Engineer for programming at least 2 weeks prior to the field installation.

3.5 Cellular Modem. If present, **t**he contractor shall provide before and after documents on cellular modem signal strength. The new cellular modem signal strength shall be equivalent or better than existing. Contractor shall be responsible for installation or relocation of cellular antenna to achieve acceptable signal strength.

3.6 Other Agency's Devices on MoDOT Right-Of-Way and Facilities. If other agency's devices such as emergency pre-emption system, CCTV Camera, etc. exist within MoDOT Right-Of-Way and must be relocated onto the new MoDOT facilities, the contractor must notify MoDOT SLITS Group via an email to SLITS@modot.mo.gov and MoDOT area traffic engineer in the early stage of the construction. MoDOT SLITS Group and MoDOT area traffic engineer will coordinate the removal and re-installation of those devices with responsible agency.

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, documentation, and all miscellaneous hardware required for a safe, fully operational system. Payment will be made as follows:

Item No.	Type	Description
910-99.02	Each	Install or Relocate Existing Communication Equipment

CCC. ITS Management Tool

1.0 Description. For all locations where any ITS (Intelligent Transportation System) components are modified or added, the contractor shall be responsible for populating and updating Commission's ITS Assets Management Tool. fiber management tool to reflect the final condition of the entire ITS system within the project limits as shown on the plans. Updating shall be performed by Commission approved staff (currently NexusWorx).

2.0 Construction Requirements.

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

2.2 Other agency's ITS assets such as conduit, fiber cable, Cat-E cable, cabinet, pull box, etc. within MoDOT Right-Of-Way shall be highlighted including in a polygon in the ITS Asset Management Tool so it can be clearly identified for future references.

2.3 The contractor shall furnish to Commission approved staff a copy of the final plans relevant to all of the ITS components in Visio and/or Microstation formats, if relevant.

2.4 The contractor shall be provided one licensed read-only access login by Commission before work begins.

3.0 Acceptance Testing.

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

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

4.0 Measurement and Payment. Measurement and Payment for items covered by this specification include the population and acceptance testing, in addition to all materials and equipment necessary for a fully operational system.

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

DDD. Contractor-Furnished and Install Closed Circuit Television (CCTV) Assembly

1.0 General

1.1 Description. The contractor shall remove the existing CCTV Camera Assembly at the noted intersections (if applicable) and install a Contractor furnished IP (Internet Protocol) closed circuit television (CCTV) assembly on a new 4" x 20' extension metal pole (if there is no CL type pole at the noted location; this pole shall be paid separately) which will be mounted to the signal up-right pole (see detail drawing), and install a Contractor furnished power supply and surge protection in the new signal cabinet. Provide cable connecting the camera to the equipment in the cabinet and to ground, set up the camera assembly, and test for proper operation.

1.2 Compatibility. The St. Louis District is utilizing TransSuite as their Advanced Traffic Management System (ATMS) and all CCTV cameras must be able to integrate with the software and its related interfaces.

2.0 Materials Camera assembly, mounting bracket, power supply, and surge suppressors will be provided by the Contractor. The cable connecting the camera to the cabinet will also be provided by the contractor.

2.1 CCTV Camera. All CCTV cameras purchased and installed on this project shall be selected from the list below. These are the only CCTV cameras that are tested and fully functional with the version of TransSuite that the St. Louis District is currently operating (TransSuite version 19.4):

CCTV Manufacturer	Model	Connection Type
CostarHD (formerly known as Cohu)	4220HD RISE Dome	Outdoor cat5e
WTI	Viper H.264 HD30L	Outdoor cat5e
Axis	Q6155-E Dome	Outdoor cat5e
Bosch	MIC 7000i	Outdoor cat5e

2.2 POE Injector. The Power Over Ethernet (POE) injector shall be of a make and model produced by the manufacturer of the camera. The POE injector shall operate on standard 120 VAC at 60 Hz electrical service and shall not be affected by transient voltages, surges, and sags normally experienced on commercial power lines. The POE injector shall have an operating temperature range of -40 degrees F (-40 degrees C) to 158 degrees F (70 degrees C).

2.3 Surge Protection. The cable between the POE injector and the camera assembly shall be protected by a surge protection device in the cabinet that meets the following requirements:

a) UL listed and labeled to current editions of UL 497B and UL 497C
b) Operating Temperature: -20 degrees F (- 28 degrees C) to 122 degrees F (50 degrees C)
c) Operating Humidity: 95% RH non-condensing
d) Wall, DIN rail or 19" rack mountable
e) Three stage protection
f) Maximum Continuous Operating Voltage: 44-52 V

g) Data Rate: >100 Mbps
h) Frequency: 125 MHz
i) Surge Capacity: 10kA per mode (8x20 µs)
j) Maximum Let-Through Voltage <90Vpk

2.5 Cables. Provide CAT 5e outdoor rated cable to carry power, video, and camera control between the camera and POE injector. Between the POE injector and the Ethernet switch an outdoor rated CAT 5e patch cable with factory terminated connectors shall be used. These cables shall meet requirements of applicable manufacturers listed in Section 2.2 above.

2.6 Banding. 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.

3.0 Construction Requirements.

3.1 The contractor shall coordinate this work as well as any ITS (Intelligent Transportation System) network changes with MoDOT St Louis District ITS Group in advance via an email to SLITS@modot.mo.gov.

3.2 The contractor shall use the latest manufacture camera firmware.

3.3 Install the dome so that the pole does not block the camera's view of traffic. Unless directed differently by the engineer, install the camera in the same position as the existing camera.

3.4 To confirm the existing camera pole is properly grounded, use a device that measures resistance to ground using the three-point fall-of-potential method to ensure that the resistance from the pole to ground does not exceed 8 ohms. If resistance exceeds the 8 ohms threshold report to the engineer.

3.5 Terminate all the cables on surge protectors, install the Contractor furnished power supply in the cabinet, and connect the camera power circuit to the power supply. Connect POE injector port to the existing Ethernet switch in the cabinet.

3.6 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. The camera should have clear view of all approaching traffic lanes. 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.

3.7 Apply a rain repellent coating to the outside of the lower dome, following the coating manufacturer's instructions. The coating must be recommended by the CCTV manufacturer for use on their equipment.

4.0 Acceptance Testing.

4.1 Upon delivery of a shipment of camera assemblies, the Contractor 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 Contractor 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 used when the camera assemblies were delivered. In addition, demonstrate that the agreed upon viewing restrictions have been implemented. 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 at Contractor's expense. Except for costs borne by the manufacturer under their warranty agreement, the cost of replacement shall be borne entirely by the contractor.

4.3 SLITS Group shall inspect this CCTV assembly installation as well as the related network devices for proper operations prior to acceptance.

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

Item No.	Type	Description
910-99.02	Each	CCTV Camera Assembly
910-99.02	Each	CCTV Camera Assembly, Installed
9109903	Linear Feet	Cable for CCTV Camera (CAT-5e)

EEE. MoDOT ITS Equipment within Project Limits

1.0 Description. MoDOT owned fiber optic cable and conduit, critical MoDOT power supplies and power cables, and pull boxes for fiber and power cabling and other above and underground ITS (Intelligent Transportation System) facilities are present within the limits of this project. Damage or interruption of these items can cause extensive outages to the MoDOT network.

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

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

troubleshooting to investigate outages can occur, even with minor changes to existing connections within the cabinet.

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

3.1 The MoDOT Engineer will also have the option of issuing a work order for MoDOT's on-call ITS Maintenance contractor to make repairs, if it is the Engineer's opinion that the contractor creating the damage will not be able to make repairs in a timely manner. Contractor's reimbursement for MoDOT expense for this option shall be in addition to the liquidated damages.

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

FFF. Remove In-Pavement Wireless Detection System

1.0 Description. The contractor shall remove the existing Sensys Travel Time Access Points (AP), repeaters and related devices inside the signal cabinet(s) at the below noted intersections, tag them properly and deliver those to MoDOT SL District Signal Shop at the Barrett Station Road Complex. All Sensys Travel Time related cables shall be removed and disposed properly by the contractor. If the existing Sensys In-Pavement Sensors are being impacted by this project's pavement improvements, those pucks must be removed, disposed and the whole shall be filled properly by the contractor. If the pavement improvement is not impacting those In-pavement sensors, they can be left-in-place or covered by the new pavement.

a) Route 67 at Ladue
b) Route 67 at German
c) I-64 at Route 67
d) Route 67 at Plaza Frontenac – Driftwood
e) U Route S 67 at Litzsinger

2.0 Construction Requirements.

2.1 The contractor **shall remove the existing** Sensys Travel Time Access Points (AP), repeaters and related devices inside the signal cabinet(s) at the noted intersections, tag them properly and deliver those to MoDOT SL District Signal Shop at the Barrett Station Road Complex. This work shall be coordinated with MoDOT SL District Signal Shop Supervisor.

2.2 The existing Sensys Intersection Detection or Bluetooth Systems shall NOT be disturbed unless otherwise noted in the plans.

5.0 Measurement and Payment.

5.1 Measurement and payment for items covered by this specification include the training, documentation, and acceptance testing, in addition to all materials and equipment necessary to restore the system to be fully operational. No direct pay for installation of any device or any epoxy required by the manufacturer to construct a fully functional system.

Item Number	Type	Description
910-99.02	Each	Remove In-Pavement Wireless Detection System per intersection

GGG. Backfilling of Utility Locates

1.0 Description. This work shall consist of backfilling all areas excavated for the purpose of locating underground utilities.

2.0 Construction Requirements. The contractor shall be responsible for backfilling all cavities and voids in areas excavated for the purpose of locating underground utilities in paved areas with flowable backfill as per Section 621.

2.1 If the excavated area is less 2 square foot, any existing asphalt or concrete removed from the existing roadway, islands, shoulders, sidewalks, or medians, including underlying pavement, for the purpose of locating underground utilities shall be completely replaced in like kind by the contractor as directed by the engineer.

2.2 If the excavated area is larger than 2 square foot, the contractor shall repair it as directed by the engineer.

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

HHH. ITS Pull Box

1.0 Description. Furnish and install ITS Pull Boxes with concrete pads as shown on the plans.

2.0 Materials.

2.1 Pull Box. ITS pull boxes shall meet the requirements in Section 1062 of the Missouri Standard Specifications for Highway Construction.

2.2 Ground Rod. Ground rods shall be listed according to UL requirements as detailed in the standard UL 467, Grounding and Bonding Equipment, and meet the requirements of NEC 250. Use electrodes that are solid copper or copper-bonded steel.

2.3 Concrete Pad. The contractor shall install a non-reinforced concrete pad around the ITS pull box as shown in the plans. The concrete used shall be a Class ‘B’ concrete as described within Sec 501 of the Standard Specifications.

3.0 Construction. Install ITS pull boxes as shown in the plans. Provide a concrete pad around the pull boxes as shown in the plans. Install a ground rod in the Class 5 pull boxes nearest ITS or signal cabinets.

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

Item No.	Type	Description
910-99.02	Each	ITS Pull Box with Concrete Pad, Preformed Class 2
910-99.02	Each	ITS Pull Box with Concrete Pad, Preformed Class 5

III. Traffic Signal Maintenance and Programming

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

2.0 Qualified Traffic Engineer

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

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

2.2.1 Response. The contractor's traffic Engineer shall have the ability to be on site within 1 hour of being requested.

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

2.2.3 Controller Programming: Ability to program by hand and by software Phase, TBC, and Coordination levels of Siemens controllers along with NTCIP-compatible controllers.

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

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

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

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

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

3.0 Existing Traffic Signals and Communication System

3.1 The contractor shall meet with the Engineer to discuss their traffic mitigation plan at least 1 week before the date of the first closure and as needed between construction stages. Traffic mitigation plan should at a minimum include:

a) Proposed Timing Plan changes and any models
b) Anticipated locations of concern
c) A map in electronic format displaying the locations and names of the signals and owning agency as detailed in Paragraphs 3.2 and 3.3 below.
d) Other traffic mitigation efforts

3.2 If any part of an existing traffic signal or its controller within the limits of this project has otherwise been modified or adjusted by the contractor, or the contractor makes any roadway changes to reduce the traffic capacity through a signalized intersection within the limits of the project, or the contractor begins work at an intersection with signals already in operation, the contractor shall then be solely responsible for that signal's controller programming and all signal maintenance as specified in 902.2 and 902.3, except for power costs, until Final Acceptance of the project. Traffic signal maintenance and timing responsibilities shall be broken down in accordance with the below schedules:

3.2.1 Signals Affected:

a) Schuetz Drive
b) Quailways Drive
c) Ladue Road
d) Chaminade Drive
e) German Blvd
f) I-64
g) Clayton Road
h) Plaza Frontenac/St. Louis County Library (Full Reconstruction)
i) Litzsinger Road
j) Manchester Road

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

3.4 The contractor shall notify the Engineer or representative of the changes no later than 1 working day after changes are programmed if unable to provide advance notice as specified in

902.2. In addition, the Contractor shall notify the Engineer and the Commission's Traffic Engineers within one (1) hour of successful implementation of the detour plan.

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

4.0 Existing Traffic Signal Maintenance and Response

4.1 The contractor shall respond to any signal timing complaints or malfunction complaints for those locations detailed in Section 3.0 of this provision and as specified in Section 902.21.1. Response time shall be 1 hour for complaints received by the contractor between 6:00 a.m. and 6:00 p.m. on non-holiday weekdays, and 2 hours for all other times. For some cases (due to travel times or other extenuating circumstances) additional time may be acceptable within reason, but must be approved by the engineer. These timeframes will replace the '24 hour' response time in Section 105.14 for any signal-related incidents, where the entire cost of the work, if performed by MoDOT personnel or a third party, will be computed as described in Section 108.9 and deducted from the payments due the contractor.

4.2 The contractor must supply a contact name and phone number who will be responsible for receiving signal timing complaints for the Engineer. These complaints may be forwarded directly to the contractor by someone other than the Engineer's representative and will not relieve the contractor from properly responding based on the response times of this Provision. The contractor shall respond to the Engineer and notify the Commission's Traffic Engineers and the representative within 12 hours of the complaint as to the remedy. The contractor shall submit to the Engineer's representative a weekly report of complaints received and remedies performed throughout the duration of the project.

5.0 Original Signal Controller Programming and Acceptance

5.1 The contractor will be responsible for restoring the original signal controller programming at existing intersections and coordination plans for each intersection immediately upon ramp re-opening. The Engineer shall preserve and house the original controller files and provide the contractor with access to those files to perform the restoration of the original plans. Normal plan restoration can be done by a manual command in the signal control system or a preprogrammed time-of-day command change. For any locations rendered offline at the time of re-opening, these locations shall be returned to normal operation by hand. The Contractor shall notify the Engineer and the Commission's Traffic Engineers within one (1) hour of removal of the detour plans. The contractor will be relieved of signal programming maintenance at an existing restored intersection once 48 consecutive hours have passed without a programming malfunction, including restoring normal signal programming to the satisfaction of the Commission. If an agency desires any changes from an original plan, the agency will assume immediate maintenance of the signal to implement desired changes.

6.0 Post Project Report

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

7.0 Deliverables

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

a) Experience submittal
b) Preliminary Traffic Mitigation Plan
c) Notification of Detour Implementation
d) Time Base Reports, As Needed
e) Complaint Resolutions
f) Notification of Restoration to Normal Operations
g) Post Project Report

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

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

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

Item No.	Type	Description
902-99.01	Lump Sum	Traffic Signal Maintenance & Programming

JJJ. Combination Pad Mounted 120V/240V Power Supply and Lighting Controller with Uninterruptible Power Supply (UPS) – TS2 Traffic Signal Cabinet

1.0 Description. This work shall consist of furnishing and installing combination 120/240-volt signal and lighting power supply and Uninterruptible Power Supply (UPS) at signalized intersections utilizing a TS2 traffic signal control cabinet.

2.0 UPS Requirements. The traffic signal being constructed on the intersection listed below shall include an "Uninterruptible Power Supply" specifically constructed and NEMA approved for traffic signal operations.

(a) Plaza Frontenac/St. Louis County Library

2.1 UPS Location and Cabling. The UPS shall be installed separately from the signal cabinet and shall be installed in the same cabinet as the power supply and lighting controller station. In addition to the power cables from the UPS to the signal cabinet, the contractor will route but not connect an outdoor rated CAT-6 cable between the UPS RJ-45 port and the Ethernet switch in the signal cabinet. The contractor shall also install a 7-conductor serial cable and make the appropriate connections from the UPS to the traffic signal cabinet. The **On battery** contact (C-1) on the inverter should be programmed to energize when the UPS provides battery backup. The

normally open contact should be wired to provide logic ground to Alarm 2 when the UPS is in battery backup mode. This should indicate a Special Status 2 alarm in the signal controller alarm screen. The **Low Battery** contact (C-2) on the inverter should be programmed to energize when the UPS drops below a preset voltage level, typically set at 40%. The normally open contact should be wired to provide logic ground to Test Point A when the UPS is in Low Battery mode. This should indicate a Special Status 3 alarm in the signal controller alarm screen. The **Arrestor** contact should be wired to provide logic ground to Test Point B and generate a Special Status 4 alarm in the signal controller alarm screen. The **Timer #1** contact (C-4) on the inverter should be programmed to energize after the UPS is in inverter mode for **three (3)** hours. The normally closed contract should be wired in series with the remote flash output to allow for the circuit to open after **three (3)** hours and bring the signal to flash after the side streets service. The remote flash parameters shall be programmed to red/red flash, unless directed otherwise by the Engineer. The CAT-6 cable and serial cable will be run in a separate conduit from the power cables into the cabinet. All conduits will be internal and not visible from the exterior of either the UPS or signal cabinet. The contractor shall verify all control wiring with the manufacture of the traffic signal cabinet assembly for accuracy and compatibility and perform test to ensure proper operation. The contractor shall be responsible for all controller programming to mask the TS2 features to this setup. Upon completion of all controller programming, contractor shall notify contractor's or Commission's traffic engineer (depending on assignment) for uploading into Commission's central signal control system.

2.2 UPS Input Specifications. Each UPS system shall have the following input requirements:

(a) A nominal input voltage of 120 VAC.
(b) An input voltage range of 85 to 175 VAC.
(c) Two (2) input voltage boost modes.
(d) Boost-1 shall increase the input voltage from 94 to 115 VAC.
(e) Boost-2 shall increase the input voltage from 85 to 101 VAC.
(f) Two (2) input voltages buck modes.
(g) Buck-1 shall decrease the input voltage from 154 to 124 VAC.
(h) Buck-2 shall decrease the input voltage from 175 to 142 VAC.

A user configurable power quality (PQ) option with default values of:

(a) High line disqualify shall be 130 VAC.
(b) High line qualify shall be 128 VAC.
(c) Low line qualify shall be 105 VAC.
(d) Low line disqualify shall be 100 VAC.
(e) Input current shall be less than 16A with nominal voltage, full load on the output and charger set at 10A.
(f) 50/60Hz automatic frequency detection with built-in class A EMI filter and transient suppression.

2.3 UPS Output Specifications. Each UPS system shall have the following output requirements:

(a) The output voltage of the UPS shall be 120 VAC ±10% in line mode.
(b) The output voltage of the UPS shall be 120 VAC ±6% in backup mode.
(c) The output frequency of the UPS shall be 60Hz ±5% in line mode.
(d) The output frequency of the UPS shall be 60Hz ±5% in backup mode.
(e) The output waveform of the UPS shall be sinusoidal.
(f) The output voltage total harmonic distortion (THD) shall be less than 3% with a resistive load.
(g) The efficiency of the UPS at nominal line voltage shall be greater than 98%.

(h) The efficiency of the UPS in backup mode shall be greater than 84%.
(i) The step-load response of the UPS shall be full recovery in ½-cycle @ 50% change with a resistive load.
(j) The transfer time of the UPS line to back up and backup to line shall be 5ms typical.
(k) The line qualification time of the UPS shall be user selectable at 3, 10, 20, 30, 40 and 50 seconds.
(l) The line qualification time of the UPS default shall be three (3) seconds.

2.4 UPS Battery and Charger Specifications. Each UPS system shall have the following specifications for the battery and charger:
(a) The nominal battery voltage of the UPS shall be 48 VDC.
(b) The battery charger current of the UPS shall be user programmable for 3, 6, and 10 A.
(c) The battery charger current default setting for the UPS shall be 6A.
(d) The battery charger in the UPS shall turn OFF when the battery temperature is 50°C.
(e) The UPS shall have a user programmable temperature compensated battery charger with setting for -2.5, -4, -5 and -6 mV/°C/Cell.
(f) The UPS shall have a temperature compensated battery charger with a default setting of -5 mV/°C/Cell.
(g) The UPS shall have a battery charge with a float voltage of 56VDC maximum.
(h) The UPS shall have a user configurable low battery warning.
(i) The UPS shall have a default low battery warning set at 47VDC to indication 40% remaining battery capacity.
(j) The UPS shall have a low battery shutdown set for 42VDC (10.5VDC per battery).

2.5 UPS Protection Specifications. Each UPS system shall have the following specifications for protection:
(a) The UPS shall have a 250VAC @ 20A input circuit breaker.
(b) The UPS shall have a 50A battery circuit breaker.
(c) The UPS shall have electronic short circuit protection when operating in backup mode.
(d) The UPS shall indicate an overload warning with a flashing alarm LED when the load is between 95% and 105% of the rated output for the UPS.
(e) The UPS shall shutdown in two (2) minutes when operating in backup mode when the load is between 106% and 115% of the rated output for the UPS, and the fault LED shall turn ON. The fault LED shall clear when the overload is removed and the utility line power returns.
(f) The UPS shall shutdown in one (1) minute when operating in backup mode when the load is greater than 115% and the fault LED shall turn ON. The fault LED shall clear when the overload is removed and the utility line power returns.
(g) The UPS shall disable the backup mode function when operating in line mode if the load exceeds 115% of the rated output for the UPS. The alarm shall be reset when the overload condition is removed.
(h) The UPS shall display an alarm LED if the battery ambient temperature is greater than 75°C and disable the backup mode function. The alarm shall clear when the battery ambient temperature is less than 70°C.
(i) The UPS shall display a fault LED when operating in backup mode and shutdown the inverter if the internal temperature is greater than 110°C. The fault shall clear when the utility power returns and the internal temperature is less than 90°C.
(j) The UPS shall have output over-voltage protection to electronically shutdown the UPS if the output voltage exceeds 132VAC.

(k) The UPS shall disable the battery charger in two (2) seconds and display an alarm LED if the battery voltage exceeds 59VDC. The alarm shall be cleared and charge enabled when the battery voltage drops to less than 57VDC.
(l) The UPS shall limit the charger voltage to 52VDC in the event the battery probe is not installed.
(m) The UPS shall have a battery circuit breaker with reverse polarity protection. The battery circuit breaker shall trip in the event the battery polarity is wired incorrectly.
(n) The UPS shall have protection for electrical backfeed to the utility that meets UL 1778 and CSA C22.2 No. 107.1.3 requirements.
(o) The UPS shall have user-selectable settings that are password protected.
(p) The UPS shall be cooled by a variable speed fan that is microprocessor and PWM controlled.
(q) The fan shall be OFF when the ambient temperature is less than 40°C.
(r) The UPS shall display an alarm LED to indicate the fan is enabled but not turning.
(s) The UPS shall have a fan that is field replaceable.

2.6 UPS Displays, Controls and Diagnostics Specifications. Each UPS system shall have the following specifications for the noted features:
(a) The UPS shall have a two (2) line/20-character LCD display and control panel that can be rotated for easy user interface.
(b) The UPS shall have event and alarm logging with time/date stamping for up to 100 historical events.
(c) The UPS shall have six (6) independently programmable control relays for control and report functions.
(d) The UPS shall have two (2) independently programmable timers 0 to 8hr with two (2) time-of-day restrictions on each timer.
(e) The UPS shall be equipped with a RS-232 port, which can be connected to a laptop.
(f) The UPS shall be equipped with a SNMP Ethernet card.

2.7 Programmable Dry Contacts. Each UPS system shall have the following requirements for the noted features relating to dry contacts:
a. The UPS shall have six (6) sets of normally open (NO) and normally closed (NC) single pole double-throw (SPDT) dry contact relays rated for 250VAC @1A.
b. The UPS shall have five (5) sets of dry contact relays that are user programmable, C1 through C5, and one relay contact that is factory configured, C6.
c) The UPS shall have dry contact relays that are user programmable via either the RS-232 or (optional) Ethernet communication ports to activate under the following conditions:
d) ON BATTERY. The relay is energized whenever the UPS switches to battery power.
e) LOW BATTERY. The relay is energized when the battery has reached a user defined low battery level of remaining useful capacity. This alarm is latched when a qualified line returns or the inverter shuts down. The default setting is 47VDC (~40%) of remaining useful battery capacity.
f) TIMER 1. The relay is energized after being in backup mode for a given amount of time. This timer is adjustable from 0 to 8hr. The default setting is two (2) hours.
g) ALARM. The relay is activated after a specific or general alarm is detected. The alarm
h) conditions include: line frequency, low output voltage, no temperature probe, overload,
i) unconnected batteries, high temperature (>55°C) and low temperature (<-20°C).
j) FAULT. The relay is activated after a specific or general fault is detected. These faults
k) include: short circuit, low battery voltage (<41VDC), high battery voltage (> 59VDC), overload and over temperature (>75°C).

l) OFF. The relay is disabled and will not activate under any condition.
m) TIMER 2. Same as TIMER 1.
n) TIMER 3. Same as TIMER 1.
o) AC/DC FAN CONTROL. The relay is activated when the battery ambient temperature is greater than 35°C or at a user programmable threshold from 25 to 55°C @ 5°C increments.
p) The UPS shall have a default dry contact relay configuration of:

C1	ON BATT
C2	LOW BATT
C3	LOW BATT
C4	TIMER
C5	ALARM
C6	48VDC

2.8 Mechanical. Each UPS system shall have the following mechanical requirements:
(a) The UPS shall have AC input and AC output terminal blocks mounted on the front panel. The terminal blocks shall be a 3 pole, 35 amp, 300 volt Eurostyle socket terminal strip (22-8 AWG).
(b) The UPS shall have six (6) user programmable dry contact relay terminal blocks on the front panel. The terminal blocks shall be 3 pole, 35 amp, 300 volt PLUGGABLE TERMINAL BLOCK (12-26 AWG)
(c) The UPS shall have one (1) user input and one (1) Automatic Transfer Switch (ATS) terminal block on the front panel. The terminal blocks shall be 3 pole, 35 amp, 300 volt PLUGGABLE TERMINAL BLOCK (12-26 AWG).
(d) The UPS shall have a DE-9 RS-232 connector on the front panel.
(e) The UPS shall have an RJ45 Ethernet connector on the front panel.
(f) The UPS shall have a battery connector on the front panel. The battery connector shall be a 50 amp SB® series type battery connector (16-6 AWG).
(g) The UPS shall have a RJ14 battery temperature probe connector on the front panel.

2.9 Environmental. Each UPS system shall have the following environmental requirements:
(a) The operating temperature range of the UPS shall be -40° to 55°C with the capability of operating @ 800W for up to 2hr at 74°C ambient.
(b) The storage temperature range of the UPS shall be -40° to 75°C.
(c) The operating and storage humidity (non-condensing) range of the UPS is up to 95% RH.
(d) The altitude operating range of the UPS is up to 12,000ft with a de-rating of 2°C per 1000ft above 4500ft.
(e) The UPS shall be shipped in materials designed to meet requirements for ISTA program.
(f) The UPS shall pass electrical safety standards UL1778, CSA 22.2 No. 107.3, EN50091-1-1-2 and EN60950.
(g) The UPS shall pass emission standards FCC Subpart J Level A for conducted and radiated EMI CISPR22, EN55022 Level A for conducted and radiated EMI.
(h) The UPS shall pass Immunity standards:
EN61000-4-2: ESD (Electrostatic discharge).
EN61000-4-3: Radiated immunity.
EN61000-4-4: EFT (Electrical fast transient).
EN61000-4-5: Surge.
EN61000-4-6: Conducted (Power and signal lines).
EN61000-4-8: Power frequency magnetic.
EN61000-3-2: Harmonic distortion.

(i) The UPS shall display agency approval mark “cCSAus” on the manufacturer’s nameplate label.

2.10 Manual Bypass Switch. Each UPS system shall include a manual bypass switch (MPS). UATS assemblies that include items referenced individually need not be duplicated. The MPSshall have the following specifications:

(a) The MPS shall be a self-contained module separate from the UPS
(b) The MPS shall be shelf or rack mountable.
(c) The MPS shall have terminal blocks labeled “AC Input”, AC Output”, “To UPS” and “From UPS”.
(d) The MPS shall be a Break-Before-Make rotary switch.
(e) The MPS shall be rated at 120VAC @ 20A.
(f) The MPS shall have a 5-15R duplex receptacle connected to utility line.
(g) The MPS shall have a 5-15R receptacle labeled “Optional LA-P” to facilitate a plug-in surge suppressor.
(h) The MPS shall have a 5-15R receptacle labeled “Optional Battery Heater Mat” to provide non-standby power to a battery heater mat.
(i) The MPS shall have two (2) positions: one labeled “UPS” to connect the utility line to the UPS, and one labeled “Bypass” to connect the utility line to the load.
(j) The MPS shall have a 15A circuit breaker labeled “AC Input”.
(k) The MPS shall have a 15A circuit breaker labeled “AC Output”.

2.11 Automatic Transfer Switch. Each UPS system shall include an automatic transfer switch (ATS) with the following requirements:

(a) The ATS shall be rated for 120VAC @ 40A.
(b) The ATS shall be shelf or rack mountable.
(c) The ATS shall transfer the load to UPS when the utility line fails or is unqualified.
(d) The ATS shall transfer the load to utility line when the utility line is available and qualified.
(e) The ATS shall be activated by a 48VDC input from the UPS.
(f) The ATS shall have a terminal block labeled “L IN”, “NEUT”, “GRD” and “L OUT”.
(g) The ATS shall have a six (6) foot line cord labeled “UPS IN”.
(h) The ATS shall have a six (6) foot line cord labeled “UPS OUT”.
(i) The ATS shall have a 5-15R duplex receptacle connected to utility line.
(j) The ATS shall have a 5-15R receptacle labeled “Optional LA-P” to facilitate a plug-in surge suppressor.
(k) The ATS shall have a 5-15R receptacle labeled “Optional Battery Heater Mat” to provide non-standby power to a battery heater mat.

2.12 Automatic Bypass Switch. Each UPS system shall include an automatic bypass switch (ABS) with the following requirements:

(a) The ABS shall be rated for 120VAC @ 20 amps.
(b) The ABS shall be shelf or rack mountable.
(c) The ABS shall connect the UPS to the load to allow the UPS to continuously power the load.
(d) The ABS shall transfer the load to utility line when there is no UPS output voltage.
(e) The ABS shall be activated by the 120VAC from the UPS.
(f) The ABS shall have a terminal block labeled “L IN”, “NEUT”, “GRD” and “L OUT”.
(g) The ABS shall have a six (6) foot line cord labeled “UPS IN”.
(h) The ABS shall have a six (6) foot line cord labeled “UPS OUT”.
(i) The ABS shall have a 5-15R duplex receptacle connected to utility line.

(j) The ABS shall have a 5-15R receptacle labeled “Optional LA-P” to facilitate a plug-in surge suppressor.
(k) The ABS shall have a 5-15R receptacle labeled “Optional Battery Heater Mat” to provide non-standby power to a battery heater mat.
(l) The ABS dimensions shall be 4.6"H x 4.75"W x 6.5"D.
(m) The ABS weight shall be 4lbs.

2.13 Generator Transfer Switch. Each UPS system shall include a generator transfer switch (GTS) with the following requirements:
(a) The GTS shall sense when a portable generator is connected and transfer the load to the generator after a 30s delay.
(b) The GTS shall be rated for 120VAC @ 20A.
(c) The GTS shall be shelf or rack mountable.
(d) The GTS shall have a terminal block labeled “AC INPUT”, “AC OUTPUT” and “GENERATOR INPUT”.

2.14 UPS Batteries. The batteries for the UPS system shall meet the following requirements:
(a) The batteries shall be Gel Cell Valve Regulated Lead Acid (VRLA) type specifically designed for outdoor use.
(b) The batteries shall be designed for “Float Service” to provide 100% out-of-box runtime capacity.
(c) The batteries shall have Silver Alloy positive plates.
(d) The batteries shall have a five (5) year full replacement, non-prorated warranty.
(e) The battery capacity rating at 20hr shall be 94Ah.
(f) The battery shall be 12VDC.
(g) The number of batteries in the system shall be four (4) or eight (8).
(h) The batteries shall be connected to provide 48VDC.
(i) Batteries for each location shall provide full power for all devices shown on the plans that are powered through the signal cabinet for three (3) hours and then send the signal into all red flash and power that state for an additional three (3) hours.

2.15 Battery Heater Mat.
(a) The battery heater mats shall be available in four (4) battery and single (1) battery sizes.
(b) The single battery heater mat shall allow for a Master-Slave configuration so two (2) or more mats can be ganged together.
(c) The battery heater mats shall plug into a 120VAC/5-15 receptacle.
(d) The battery mats shall be thermally controlled, turning ON at 5°C and turning OFF at 15°C.
(e) The battery mats shall be thermally fused for 82°C to prevent thermal runaway.

2.16 Battery Charge Management System. Each UPS system shall have a battery charge management system with the following requirements:
(a) The battery charge management system shall spread the charge voltage equally across all batteries.
(b) The battery charge management system shall compensate for batteries with different internal resistances.
(c) The battery charge management system shall have a quality of final balance of ±100mV maximum between any two (2) batteries in the string.
(d) The battery charge management system shall have reversed polarity protection.
(e) The battery charge management system shall be designed to CSA C22.2 No. 107.1 and UL 1778 Standards for safe unattended operation.

2.17 Surge Suppression. Each UPS system shall have the following requirements for surge suppression:

(a) The surge suppression shall provide protection from voltage transients appearing on the utility line.
(b) The surge suppression shall be a plug-in module that is field replaceable.
(c) The surge suppression shall have a LED indicator that turns OFF when the module is no longer providing protection.
(d) The surge suppression shall have a clamping voltage of 150VAC.
(e) The surge suppression shall have a response time of less than one (1) nanosecond.

2.18 Construction Requirements. Construction requirements shall conform to Sec 902. Any exceptions to these requirements will be approved by the engineer before system installation.

3.0 Method of Measurement. Method of measurement shall conform to Sec 902.

4.0 Basis of Payment. Payment for furnishing and installing pad mounted combination units shall include all excavation, materials, equipment, tools, labor, CAT-5 cable and work incidental thereto, and shall be considered to be completely covered by the contract unit price for:

Item Number	Type	Description
910-99.02	Each	Combination Pad Mounted 120V/240V Power Supply and Lighting Controller with UPS

KKK. Pushbutton Extensions

1.0 Description. This work shall consist of furnishing and installing extensions for the new audible pushbuttons to meet Americans with Disabilities Act (ADA) guidelines at the locations shown on the plans.

2.0 Construction Requirements. The extensions shall be commercially available and manufactured with the intention of use with the standard audible, pressure activated pushbutton, (or other design as provided by the contractor and approved by the engineer before they are ordered or manufactured). Extensions up to 14 inches will be required, with various extension lengths necessary to meet ADA guidelines for pushbutton located from the front face of adjacent curbs or raised medians.

2.1 The contractor shall be responsible to measure each pushbutton location and determine extension length needed at each location. Height of push buttons shall also be measured and adjusted as needed to meet or exceed ADA requirements.

2.2 The final product shall meet or exceed ADA requirements for pedestrian facilities.

2.3 The extension shall be modified as needed to meet requirements as indicated for audible pushbuttons. This may include additional mounting hardware for signs, tactile arrows, and any other items or equipment identified in the “Audible Pedestrian Pushbuttons and Signing” job special provision included in this contract.

3.0 Method of Measurement. Final measurement of pushbutton with extensions will be made per each. This shall include the extensions of up to 14 inches, pulling cable, mounting

hardware, and all miscellaneous appurtenances to construct the pushbuttons with extensions at locations shown on the plans.

4.0 Basis of Payment. Payment for furnishing all equipment, materials, labor, and tools necessary to install pushbutton extensions shall be completely covered by the contract unit price for:

Item Number	Unit	Description
902-99.02	Each	Extensions for Pushbutton (14-Inch Max)

LLL. Audible Pedestrian Pushbuttons and Signing

1.0 Description. Audible pedestrian pushbuttons and signing will be required for all pedestrian indications at all the intersections.

2.0 Installation. Audible signals should be installed as part of a pushbutton assembly.

3.0 Equipment.

3.1 Walk Indications. Accessible pedestrian signals shall have both audible and vibrotactile walk indications.

3.2 Vibrotactile. Vibrotactile walk indications shall be provided by a tactile arrow on the pushbutton that vibrates during the walk interval. Tactile arrow shall be located on the pushbutton that vibrates during the walk interval. Tactile arrow shall be located on the pushbutton, have high visual contrast (light on dark or dark on light), and shall be aligned parallel to the direction of travel on the associated crosswalk.

3.3 Audible. Accessible pedestrian signals shall have an audible walk indication during the walk interval only. The audible walk indication shall be audible from the beginning of the associated crosswalk.

3.4 Pushbutton signage. In addition to standard pedestrian sign requirements, all pushbuttons for the locations mentioned in 1.0 shall have additional signage to indicate crosswalk direction by use of a tactile arrow and the name of the street containing the crosswalk served by the audible pedestrian signal. The sign shall be located immediately above the push button mechanism and parallel to the crosswalk controlled by the button. The street name shall be the name of the street or reasonable abbreviation whose crosswalk is controlled by the push button. Signage shall comply with ADA Accessibility Guidelines (ADAAG) 703.2 specifications for Braille and raised print.

3.4.1 Arrow. Signs shall include a tactile arrow aligned parallel to the crosswalk direction. The arrow shall be raised 0.8 mm (.03 inch) minimum and shall be 4 mm (1.5 in) minimum in length. The arrowhead shall be open at 45 degrees to the shaft and shall be 33 percent of the length of the shaft. Stroke width shall be 10 percent minimum and 15 percent maximum of arrow length. The arrow shall contrast with the background.

3.4.2 Street Name. Accessible pedestrian signals (APS) shall include street name information aligned parallel to the crosswalk direction and shall comply with Revised Draft Guidelines for

Accessible Public Rights-of-Way R409.3 or shall provide street name information in audible format.

4.0 Performance.

4.1 Audible Locator Tone. Locator tone that tells the pedestrian that the intersection is equipped with APS and where it is. Pushbutton locator tones shall have duration of 0.15 seconds or less, and shall repeat at 1-second intervals. Pushbutton locator tones shall be intensity responsive to ambient sound, and be audible 6 to 12 feet from the pushbutton, or to the building line. The locator tone shall operate during the DON'T WALK and flashing DON'T WALK intervals only and shall be deactivated when the pedestrian signal is not operative.

4.2 Verbal Wait Message. Acknowledge tone that tells the pedestrian that they have placed a call and informational message that tells the pedestrian to “Wait to cross” street name at intersecting street name.

4.3 Verbal Walk Message. The verbal messages shall provide a clear message that the walk interval is in effect, as well as to which crossing it applies. If available, the audio tone feature will not be used. The verbal message that is provided at regular intervals throughout the timing of the walk interval shall be the term “walk sign,” which will be followed by the name of the street to be crossed.

4.4 Volume. Automatic volume adjustment in response to ambient traffic sound level will be provided up to a maximum volume of 100 dB. The units shall be responsive to ambient noise level changes up to no more than 5 dB louder than ambient sound. Tone or voice volume measured at 36 inches from the unit shall be 2dB minimum and 5dB maximum above ambient noise level. At installation, signal system is to be adjusted to be audible at no more than 5 to 12 feet from the system.

5.0 Documentation and Support.

5.1 Operation and Maintenance Manuals. Two copies of the operation and maintenance manuals for each station shall be included.

5.2 USB with Audible Messages. The Contractor shall provide two copies of USB data card to the Engineer that contains files for the manufacturer’s audible messages for complete operation of all APS signals at all stations.

6.0 Construction Requirements. Construction requirements shall conform to Sec 902, 1061, and 1092.

7.0 Method of Measurement. Method of measurement shall conform to Sec 902.

8.0 Payment. Payment for the audible signals will be for each unit per bid item, 902-99.02, “Audible Pedestrian Pushbutton and Signing”, per each. This will include all wiring, power adaptors, and installation hardware needed. Payment for signing will be included in the pay item for audible pedestrian pushbutton.

MMM. Countdown Pedestrian Signal Heads

1.0 Description. This work shall consist of furnishing, installing, and placing into operation any countdown, pedestrian signal heads.

2.0 System Requirements. Delete Sec. 1092.1.9 in its entirety and substitute the following:

2.1 1092.1.9 Pedestrian Signal Heads. Pedestrian signal heads shall be in accordance with ITE specifications and standards for pedestrian traffic control signal indications and the following:

a) Pedestrian signal head housing shall be constructed of a one-piece, 0.250-inch (6 mm) thick, polycarbonate material as shown on the plans. The housing shall include an integral mounting bracket designed for side-of-pole mounting on all makes of signal poles with a terminal compartment and minimum 5-position, double-row terminal block.

b) The door, lens and any openings in the housing shall have gaskets or seals to exclude dust and moisture from the inside of the compartment.

c) Lenses shall be constructed of polycarbonate material.

d) Pedestrian signal head units shall be provided with a manufactured preformed rectangular visor or screen-type louver.

e) All plastic material shall be ultraviolet stabilized.

f) Indications shall be ITE Class 3 symbol messages. The “UPRAISED HAND” symbole shall be illuminated with a filed, Portland orange LED module. The “WALKING PERSON” symbol shall be illuminated with a filled white LED module. The “countdown” display numbers shall be in accordance with applicable portions of Sec 1092.1.

g) Pedestrian traffic control signal faces shall be constructed such that all messages are displayed from the same message-bearing surface having a black opaque background. The “countdown” display shall be located to the right of the “UPRAISED HAND” and the “WALKING PERSON” symbols, which will be overlaid.

h) Pedestrian signal heads require “Countdown” displays and shall have the following features:

    1. Display numbers must be two digits at least 9 inches in height.

    2. Shall only display the “Countdown” time during the pedestrian change interval. Time displayed shall be in seconds, and begin only at the beginning of the pedestrian change interval. The flashing “UPRAISED HAND” symbol shall be concurrently displayed during the pedestrian change interval. The total time displayed at the start of the pedestrian change interval shall be automatically adjusted by the pedestrian signal head and not require any manual settings or additional wiring to the signal cabinet.

    3. Once the “countdown” display reaches “0”, the “countdown” display shall blank-out until the next pedestrian change interval begins.

4. If the pedestrian change interval is interrupted or shortened as part of a transition into a preemption sequence, the “countdown” display shall go dark immediately upon activation of the preemption transition.

5. A test switch shall be provided in order to test the “countdown” display.

3.0 Construction Requirements. Construction requirements shall conform to Sec 902.

4.0 Method of Measurement. Method of measurement shall conform to Sec 902.

5.0 Basis of Payment. Payment for pedestrian signal heads, including all materials, equipment, labor and tools shall be made and considered completely covered by the contract unit price bid for:

Item No.	Description	Unit
902-99.02	Countdown Pedestrian Signal Head, Type 1S	Each

NNN. Conduit System Adjustment or Repair

1.0 Description. At locations noted on the plans, the contractor shall adjust the conduit system routing or repair the existing conduit system by installing new conduit and splicing it to existing conduit. When existing cabling cannot be removed, split duct conduit shall be used. Adjustments to the existing conduit system may also involve removal of existing pull boxes. Removal of existing pull boxes, when applicable, will be paid for by the removal of improvement bid item. If applicable, relocating the existing cabling into the new conduit system will be paid for by the fiber installation and relocation pay item.

2.0 Materials.

2.1 Couplings. Coupler used to join new conduits to existing shall be designed by the manufacturer to join conduits of the type and size to be joined.

2.2 Use PVC conduit meeting the requirements of Sec 1060.

2.3 Use HDPE conduit meeting the requirements of Sec 1060. Use orange conduit for communication cable and black for power cable.

2.4 Split Duct Conduit. Split duct conduit shall be designed by the manufacturer for repairing damaged conduits in a manner that will protect the cabling. The split duct material shall be approved by the Engineer.

3.0 Construction Requirements.

3.1 Construction requirements shall conform to Sec 902.16.

3.2 The Contractor shall submit in writing his anticipated method of splicing the conduit to the Engineer for approval prior to performing the work.

3.2 If the existing conduit system contains fiber optic cable, before and after fiber testing, using the OTDR (Optical Time-Domain Reflectometer) is required to ensure the existing fiber cable is not degraded. The fiber testing reports shall be submitted to ITS group via an email to SLITS@modot.mo.gov prior to refilling the construction area.

3.3 At locations where connection of a new trenched conduit to an existing conduit is shown, a watertight connection shall be made using a mechanical coupler.

3.4 If an existing pull box must be removed, the existing pull box shall be carefully broken up and removed without damaging existing conduits or cabling. Once the new conduit is installed and connected to the existing conduit, the void around the conduit shall be backfilled with Grade A crushed stone or gravel to 6 inches above the conduit. Above the stone or gravel complete backfilling with clean fill free of large stones or rubble.

3.5 Before backfilling around the adjusted or repaired conduit, the St. Louis District ITS Group must be contacted and given time to inspect the conduit. Notify the ITS group that the location is ready for inspection via email to SLITS@modot.mo.gov. Send pictures of the adjusted or repaired conduit. Based on the pictures, the ITS Group may approve backfilling or may make a site visit. Do not backfill until email approval is provided.

3.6 The contractor shall backfill excavated areas with clean fill free of large stones or rubble. The finished grade shall match the surrounding grade to maintain existing drainage patterns and the work area will be restored to match the surrounding area.

4.0 Basis of Payment. Measurement and payment for work covered by this specification includes equipment, tools, materials, necessary to install and splice existing conduit sufficient for pulling new cable. Payment will be made as follows:

Item No.	Type	Description
910-99.02	Each	Conduit System Adjustment or Repair

OOO. Protection of Missouri Eastern Railroad Facilities and Traffic

To report an emergency on the Missouri Easter Railroad call: (833) 261-7790
The project location is Milepost 13.83, DOT# 596324Y Lackland Subdivision.

1.0 Authority of Railroad Engineer and State Engineer.

1.1 The authorized representative of the Missouri Eastern Railroad, herein called "Railroad Engineer," shall have final authority in all matters affecting the safe maintenance and operation of railroad traffic.

1.2 The authorized representative of the Missouri Highways and Transportation Commission, herein called "Engineer", shall have authority over all other matters as prescribed herein and in the project specifications.

1.3 The right of way of the Missouri Eastern Railroad, herein called “Railroad,” is located within the limits of this project and care shall be taken to insure that no debris or material is dropped on the Railroad's property.

2.0 Right of Entry. The contractor shall not commence any work upon, over nor under the Railroad's right of way until contractor has obtained a Right of Entry Permit and complied with the following conditions:

2.1 At least 5 working days in advance of the date the contractor proposes to begin work upon, over or under the Railroad's right of way, the contractor shall notify the Railroad Engineer (listed below) by e-mail or written notice to the address below with a copy to the Engineer.

Todd Nottmeier
Trainmaster
1027 South Main Street Suite 403
Joplin, MO 64801
tnottmeier@jag-transport.com
(612) 772-1736

2.2 Contractor shall obtain an Executed Right of Entry Permit by mail or e-mail from the Railroad Engineer to begin work upon, over or under the Railroad's right of way, such authorization will include an outline of specific conditions with which the contractor shall comply.

3.0 Insurance. The amount of work to be performed upon, over or under Railroad's right of way is estimated to be one percent of the contractor's total bid for the project. Contractor shall secure railroad protective liability insurance naming only the Railroad as the insured with a combined single limit of $2,000,000 per occurrence with a $6,000,000 aggregate, and this insurance shall conform to all the requirements as specified by Sec 107.13.4 of the Missouri Standard Specifications for Highway Construction.

4.0 Job Briefing. Contactor will contact the Railroad Engineer, Todd Nottmeier, by phone (contact number above) at least 3 working days before beginning work upon, over or under the Railroad's right of way to make arrangements for a job briefing.

4.1 Railroad Engineer will arrange a meeting with the contractor's representative and a Railroad Employee each day work is scheduled to be performed upon, over or under the Railroad's right of way. A job briefing shall be held, usually at the job site and usually in the morning, to discuss the contractor's work to be performed that day and to discuss the relevant railroad operations. The meeting shall be held before any work is done within 25 feet of the centerline of any track. If any train movements are scheduled for that day, the train moves will be made under the direct supervision of the Railroad Engineer or a Railroad Representative after the contractor has cleared the work site. Flagging services typically provided by the Railroad may not be required depending on the Railroad's schedule of operations.

5.0 Reimbursement of Flagging Costs. The Commission may reimburse the Railroad directly for the cost of flagging services associated with the highway project if flagging services are provided. Flagging costs will be deducted from the contractor's payments from the Commission. If the contractor pays the flagger directly, the contractor must notify the MoDOT Engineer of such payments for flagging.

6.0 Payment for Cost of Compliance. No separate payment will be made for any extra cost incurred on account of compliance with this special provision. All such cost shall be included in contract unit price for other items included in the contract.

7.0 No Payment by Railroad pursuant to this JSP. Railroad will not be responsible for paying the contractor for any work performed under this special provision.

8.0 The Contractor must adhere to all other policies, procedures and insurance coverage not specifically mentioned in these special provisions. These can be found in the Contractor Occupancy/Access Agreement included below.

Job No.: J6S3280
Route: 67
County: St. Louis

CONTRACTOR OCCUPANCY/ACCESS AGREEMENT

This Agreement (hereinafter "Agreement") made this **<Day>th day** of **<Month> <Year>** by and between **Missouri Eastern Railroad, LLC,** its successors, assigns or affiliated companies (hereinafter "Railroad"), whose address is 1027 South Main Street Suite 403, Joplin, MO 64801 and **<Contractor>** (hereinafter referred to as "Company"), whose address is <Contractor Address>.

WITNESSETH:

1. Upon payment of a **one-time fee of Two Thousand U.S. Dollars ($2,000)** and compliance with the provisions herein contained, Railroad hereby permits Company to enter the property of Railroad, at **Mile Post 21.04,** near **Creve Coeur, St. Louis County, Missouri**, for purpose of installation, maintenance, renewal or removal (hereinafter referred to as "Work"), of the **Resurfacing and guardrail replacement under MER in Maryland Heights, MO,** (hereinafter "Structure"). Said permit is granted for a period not to extend beyond **sixty (60) days from the date of execution of this Agreement by** Railroad. Provided, however, this permit may be canceled by Railroad at any time Company is deemed by Railroad not to be in compliance with any of the terms herein.

2. The term "Contractor" shall be used to identify the party that will perform the Work as described in Section 1, whether or not Contractor is signatory to **MER-<ContractNumber>A**. If Contractor is other than **<Contractor>,** Contractor warrants to Railroad that Contractor (hereinafter termed "Third Party"), has entered into a "Contract" with **<Contractor>** covering the Work to be performed in connection with Structure at said locations.

3. As additional consideration, Company agrees to reimburse Railroad for all cost and expense incurred by Railroad in connection with the Work. Such costs and expenses shall include, but are not limited to, furnishing of inspectors, watchmen and flagmen as Railroad deems necessary to protect its property, tracks, engines, trains and cars and the operation thereof, the installation and removal of any necessary falsework beneath the tracks of Railroad and the restoration of Railroad property. No vehicular crossing over Railroad's tracks shall be installed or used by Company without prior written permission of Railroad.

4. Company shall give Railroad at least five (5) days' notice in advance of any work done upon or adjacent to Railroad property under this Agreement. Company shall notify Railroad **General Manager** by calling **(612) 772-1736**, in advance of the start of the Work, give the General Manager notification of the date said Work is completed, and also the date the Contractor's work is accepted by Third Party. Upon completion of the Work, Company shall promptly remove from Railroad property all tools, equipment and materials placed thereon by Company and Company's agents. Company shall restore Railroad property to the same state and condition as when Company entered thereon and shall leave said property in a clean and presentable condition. Company, after completion of construction or termination of work, at its sole cost, hereby agrees to restore in a good and workman like manner all property disturbed by Company use or construction or maintenance activities from the date of execution of this document. Said restoration shall include, but not be limited to, any and all harm, damage or injury done to Railroad property and/or to any other public

or private property by acts or occurrences subject to Federal, State or local environmental enforcement or regulatory jurisdiction, and shall include necessary and appropriate testing and cleanup.

5. Company's work shall be performed in accordance with plans and specifications approved by Railroad and in such manner and at such times as shall not endanger or interfere with the safe operation of the tracks and other facilities of Railroad at said location. No materials, tools or equipment shall be stored within ten (10) feet of the centerline of any track. The regulations of Railroad and the instructions of its representatives shall be complied with relating to the proper manner of protecting the tracks, pipelines, wire lines, signals and all other property at said location, the traffic moving on such tracks and the removal of tools, equipment and materials. Provided, no bailment shall be created by the storage of any materials, tools or equipment on Railroad property.

6. Before said Work, Company shall, at its sole cost and expense, obtain all necessary authority from any public authorities having jurisdiction in the premises, and shall thereafter observe and comply with the requirements of such public authority or authorities and all applicable laws and regulations. Company shall secure written approval by Railroad of plans and/or specifications submitted to Railroad prior to the commencement of any Work.
7. The Structure shall be installed at the sole risk, cost and expense of Company, in accordance with American Railway Engineering Association Specifications or other Industry Standard Specifications as may apply or be appropriate for the use intended. Said specifications are incorporated herein and made a part hereof by reference. Approval of plans or completed work by Railroad's designated representative shall not, in itself, be considered acknowledgment that said project is in conformity with said standards.

8. COMPANY AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS RAILROAD, ITS OFFICERS, AGENTS, AND EMPLOYEES FROM AND AGAINST ANY AND ALL CLAIMS, DEMANDS, LOSSES, DAMAGES, CAUSES OF ACTION, SUITS, AND LIABILITIES OF EVERY KIND (INCLUDING REASONABLE ATTORNEYS' FEES, COURT COSTS, AND OTHER EXPENSES RELATED THERETO) FOR INJURY TO OR DEATH OF A PERSON OR FOR LOSS OF OR DAMAGE TO ANY PROPERTY, ARISING OUT OF OR IN CONNECTION WITH ANY WORK DONE, ACTION TAKEN OR PERMITTED BY COMPANY, ITS SUBCONTRACTORS, AGENTS OR EMPLOYEES UNDER THIS CONTRACT.

   LICENSEE HEREBY ASSUMES, AND SHALL AT ALL TIMES HEREAFTER RELEASE, INDEMNIFY, DEFEND AND SAVE RAILROAD HARMLESS FROM AND AGAINST ANY AND ALL LIABILITY, LOSS, CLAIM, SUIT, DAMAGE, CHARGE OR EXPENSE WHICH RAILROAD MAY SUFFER, SUSTAIN, INCUR OR IN ANY WAY BE SUBJECTED TO, ON ACCOUNT OF DEATH OF OR INJURY TO ANY PERSON (INCLUDING OFFICERS, AGENTS, EMPLOYEES OR INVITEES OF RAILROAD), AND FOR DAMAGE TO OR LOSS OF OR DESTRUCTION OF ANY PROPERTY WHATSOEVER, ARISING OUT OF, RESULTING FROM, OR IN ANY WAY CONNECTED WITH THE PRESENCE, EXISTENCE, OPERATIONS, OR USE, OF WIRELINE, EXCEPT TO THE EXTENT PROVEN TO HAVE BEEN CAUSED BY THE FAULT, OR NEGLIGENCE OF RAILROAD. HOWEVER, DURING ANY PERIOD OF ACTUAL CONSTRUCTION, REPAIR, MAINTENANCE, REPLACEMENT OR REMOVAL OF WIRELINE, WHEREIN AGENTS OR PERSONNEL OF LICENSEE ARE ON THE RAILROAD RIGHT-OF-WAY, LICENSEE'S LIABILITY HEREUNDER SHALL BE ABSOLUTE, IRRESPECTIVE OF ANY FAULT OR NEGLIGENCE OF RAILROAD.

9. Should Railroad bring suit to compel performance of or to recover for breach of any covenant or condition contained herein, Company shall pay to Railroad reasonable attorneys' fees in addition to the amount of judgment and costs.

10. Prior to the performance of any work upon or adjacent to Railroad's property under this Agreement:

    (a) Company shall furnish Railroad, at Company expense, a certified copy of a public liability and property damage liability insurance policy issued in the name of Company covering the contractual liability assumed by Company under Section 8 hereof. The form, substance and limits of said insurance policy shall be subject to the approval of Railroad and shall be in compliance with the provisions contained in the insert marked Exhibit "A", hereto attached and made a part hereof.

    (b) Company shall furnish Railroad, at Company expense, a certificate of Workers Compensation coverage, including Federal Employee Liability Act coverage if applicable, for its workers and subcontractors in accordance with the requirements of the State or States in which said work is to be performed.

    (c) Company shall furnish a policy of Railroad Protective coverage in the amount of Two million and no/100 dollars ($2,000,000.00) per occurrence, Six million and no/100 dollars ($6,000,000.00) aggregate with named insured as outlined in COMPANY OCCUPANCY/ACCESS AGREEMENT, Exhibit "A". WARNING: ONLY A POLICY OF RAILROAD PROTECTIVE INSURANCE WHICH SPECIFICALLY NAMES **Missouri Eastern Railroad, LLC** AS THE INSURED PARTIES IS ACCEPTABLE AND A COPY OF SAID POLICY MUST BE RECEIVED PRIOR TO THIS PERMIT BEING APPROVED ON BEHALF OF RAILROAD.

    Company shall keep said insurance in full force and effect until all work to be performed upon or adjacent to Railroad property under said contract is completed to the satisfaction of and accepted by Third Party and thereafter until Company has fulfilled the provisions of this agreement with respect to the removal of tools, equipment and materials from Railroad property. Said policy shall name Railroad as additional insured.

11. The permission herein given shall not be assigned by Company without the prior written consent of Railroad, except in the case of subcontractors who shall be deemed agents of Company, subject to the terms of this Agreement. Railroad Requirements for Company working on Railroad Right-of-Way are attached as Company OCCUPANCY/ACCESS AGREEMENT, Exhibit "B" and made a part hereof. Failure to comply with all of said requirements shall be grounds for cancellation of this Agreement at the sole option of Railroad.

12. CONSTRUCTION PROVISIONS: In relation to Railroad's track and Railroad operations:

    a. Company warrants it will place no bore pit closer than 25 feet from the end of the ties of the nearest track, as measured at right angles from said track; that all of the lines to be installed under Railroad's track shall be a minimum of five feet six inches below the base of the rail; that carrier pipe(s) and/or wire lines shall be encased in Steel Casing Pipe in accordance with the attached Company OCCUPANCY/ACCESS AGREEMENT, Exhibit "D" casing criteria attached hereto; and that casing shall extend a minimum of 25 feet

from the center line of the outside track on each side of said crossing, measured at a right angle to said track.

b. Company shall be solely liable for location and protection of any subgrade railroad signal wires or other railroad facilities, which may be impacted by Company Work. If same shall be damaged by said Work, Contractor shall, at its own expense, immediately cause said damage to be corrected. Contractor shall be solely liable to Railroad for any and all costs resulting for any interruption of train service resulting from Company Work.

c. Said provisions shall prevail over any lesser provision or standard set out for occupancy of adjoining or underlying lands.

THIS AGREEMENT IS hereby declared to be binding upon the parties hereto.

IN WITNESS WHEREOF, the undersigned have hereunto set their hand and seals this _____ day of _____ **20**___.

Railroad

Missouri Eastern Railroad, LLC

By: **Bruce Carswell**
Senior Vp

Signed: _____

Company

<Contractor>

By: _____

Its: _____

Signed: _____

Job No.: J6S3280
Route: 67
County: St. Louis

EXHIBIT A

The coverage afforded hereunder shall include the liability assumed by the named insured under the following indemnification provisions contained in an agreement in writing between the named insured and **Missouri Eastern Railroad, LLC**, covering work to be performed upon or adjacent to its property.

Company AGREES TO DEFEND, INDEMNIFY AND HOLD HARMLESS Railroad, ITS OFFICERS, AGENTS, AND EMPLOYEES FROM AND AGAINST ANY AND ALL CLAIMS, DEMANDS, LOSSES, DAMAGES, CAUSES OF ACTION, SUITS, AND LIABILITIES OF EVERY KIND (INCLUDING REASONABLE ATTORNEYS' FEES, COURT COSTS, AND OTHER EXPENSES RELATED THERETO) FOR INJURY TO OR DEATH OF A PERSON OR FOR LOSS OF OR DAMAGE TO ANY PROPERTY, ARISING OUT OF OR IN CONNECTION WITH ANY Work DONE, ACTION TAKEN OR PERMITTED BY Company, ITS SUBCONTRACTORS, AGENTS OR EMPLOYEES UNDER THIS CONTRACT.

IT IS THE EXPRESS INTENTION OF THE PARTIES HERETO, BOTH Company AND Railroad, THAT THE INDEMNITY PROVIDED FOR IN THIS PARAGRAPH INDEMNIFIES Railroad FOR ITS OWN NEGLIGENCE, WHETHER THAT NEGLIGENCE IS ACTIVE OR PASSIVE, OR IS THE SOLE OR A CONCURRING CAUSE OF THE INJURY, DEATH OR DAMAGE; PROVIDED THAT SAID INDEMNITY SHALL NOT PROTECT Railroad FROM LIABILITY FOR DEATH, INJURY OR DAMAGE ARISING SOLELY OUT OF THE CRIMINAL ACTIONS OF Railroad, ITS OFFICERS, AGENTS AND EMPLOYEES. IT IS STIPULATED BY THE PARTIES THAT Railroad OWES NO DUTY TO Company, ITS CLIENT, OR THEIR DIRECTORS, OFFICERS, EMPLOYEES AGENTS OR INVITEES TO PROVIDE A REASONABLY SAFE WORK PLACE AND THAT ALL PARTIES ENTERING ONTO Railroad PROPERTY DO SO AT THEIR SOLE RISK. "

The policy or policies shall provide coverage in amount of not less than Two Million Dollars ($2,000,000) combined single limit for all damages arising out of bodily injury to or death of persons and for loss of or damage to property.

The policy or policies, where applicable and available, shall contain Insurance Services Office Standard Endorsement CG 2417.

No cancellation of this policy or modification of the coverage afforded under this endorsement shall be effective until ten (10) days' notice thereof has been given to: Missouri Eastern Railroad, LLC, C/O IMGRail, 1629 Race Track Rd. Suite 206, St. John's, FL 32259, E-mail contact@imgonline.net

The policy as required in section 10(a) of the Agreement shall name Railroad as an additional insured.

The policy as required in section 10(b) shall name Railroad and affiliates as listed below as

additional insured with respect to F.E.L.A. coverage, and/or if applicable under the laws of the State in which the work is performed.

The policy as required in section 10(c) shall name **Missouri Eastern Railroad, LLC** as insured.

Railroad requires each Insurance Carrier providing coverage must be an Admitted Company in the State for which this Agreement is written and has an A.M. Best rating of "A" or better and a financial class rating of 10 or better.

EXHIBIT B

Requirements for Contractors working on Railroad Right-of-Way:

A. In order to protect Railroad's investment in its right-of-way and for the safety of persons coming onto Railroad property, Railroad has established certain requirements. The following constitute minimum requirements for all persons coming on or near Railroad right-of-way. Company is encouraged to develop their own safety rules that meet or exceed the following requirements. Company will not be allowed to occupy or work on Railroad right-of-way prior to signing and dating this Agreement and returning it to the Railroad contact person noted herein.

B. All permits and agreements must be in effect, required payments made and insurance certificates received and approved prior to Company entering Railroad right-of-way. Insurance must remain in effect during the entire project.

C. Any dewatering utilizing drains or ditches on Railroad property must be approved by Railroad.

D. Company must have approved "Construction Plans" prior to commencing work on a project. No changes will be made to "Construction Plans" without approval by all parties involved. Approved revised plans will be furnished to all parties prior to implementation of changes.

E. Company will incur all costs for track work, including flagging, etc., made necessary due to the Work.

F. Pursuant to Federal Regulation, flagging protection is always required when equipment crosses or is working within 25 feet of center of any live track. When deemed necessary by Railroad, a flagman may be required at all times while working on Railroad right-of-way.

G. Crossing of any Railroad tracks must be done at approved locations and must be over full depth timbers, rubber, etc. Any equipment with steel wheels, lugs or tracks must not cross steel rails without aid of rubber tires or other approved protection.

H. If temporary construction crossings are necessary, they must be covered by a Private Roadway and Crossing Agreement and must be barricaded when not in use. A Private Roadway and Crossing Agreement is prepared by Railroad under the same general terms as this Agreement.

I. Company must furnish details on how Company will perform work that may affect existing drainage and/or possible fouling of track ballast as well as removal of overhead bridges/structures. (Structures and bridge spans over tracks must be removed intact).

J. Absolutely no piling of construction materials or any other material, including dirt, sand, etc., within 15 feet of center on any secondary track (25 feet of Main Line and siding tracks) or on property of Railroad not covered by an existing Construction Easement, permit, lease or agreement. A 10' clear area on both sides of a main track must remain unobstructed at all times to allow for stopped train inspection.

K. **(a)** All bore pits must be a minimum of 25 feet from the nearest outside rail of any track, measured at a 90 degree angle to said track and all under track bores shall be no less than six feet below the bottom of the ties.

(b) No construction will be allowed within 15 feet of center of any track unless authorized by Railroad and as shown on plans approved by Railroad. This includes any excavation, slope encroachment and driving of sheet piles.

L. No vehicles or machines shall remain unattended within 15 feet of a secondary track or within 25 feet of a Main Line track.

M. Should Company in any way interfere with Railroad operations or damage property during construction operations over Railroad's tracks and right-of-way, Company, upon demand by Railroad to Company and/or Client, shall immediately stop work on Railroad's right-of-way for a period of not less than 48 hours to allow Railroad to investigate. Any necessary repairs shall be made by Railroad at Company's sole cost and expense. No work will proceed until authorized by Railroad.

N. Company's safety rules, including rules regarding personal Safety Equipment, must not conflict with Railroad safety policies or rules.

O. Articles included in any agreement with Railroad, which complement this document or exceed its contents, include Company OCCUPANCY/ACCESS AGREEMENT, Exhibit "C".

Company's Acknowledgement: Work Site Location

Company_____ Address:_____

By: _____ Town: _____

Title: _____ State:_____

Date: _____ Project No. _____

Railroad Contact Person:

Missouri Eastern Railroad

Todd Nottmeier **Trainmaster**
Name Title

1027 South Main Street Suite 403 **Joplin, MO 64801**

Job No.: J6S3280
Route: 67
County: St. Louis

Address City, State, Zip

(612) 772-1736 **(801) 393-7733**
Telephone Number Fax Number

tnottmeier@jag-transport.com
Email

EXHIBIT C

Statement of Conditions when Flagmen, Protective Services and Devices or other appropriate personnel will be furnished by Railroad at sole expense of Company:

A. Railroad flagmen will be required for, but not limited to, the following conditions:

1. When, in the sole opinion of Railroad, protection is necessary to safeguard Railroad's trains, engines, facilities and property.

2. When work is performed, in any way, over, under, or in close proximity to tracks or any Railroad facilities.

3. When work in any way interferes with the operation of trains at usual speeds or threatens, damages, or endangers track or Railroad facilities.

4. When any hazard is presented Railroad communications, signal, electrical, or other facilities due to persons, material, equipment, or blasting in the vicinity.

5. When and where material is being hauled across tracks. Provided, however, special clearance must be obtained from Railroad before moving heavy or cumbersome objects and equipment which might result in making the track impassable for any period of time.

B. Protective Services and Devices, Other Specialized Personnel shall be provided when, in the sole opinion of Railroad, such are necessary in addition to flagging.

COST OF FLAGGING AND OTHER PROTECTIVE SERVICES AND DEVICES

A. Flagging

1. Shall be billed a minimum of **actual cost (please verify rates with the Railroad office)** per day plus any expenses incurred for each flagman required, for each day, or for any portion thereof, for up to eight hours in one shift Monday through Friday, excepting holidays recognized by Railroad in its personnel policy manual.

2. Time worked in excess of eight hours in one shift Monday through Friday, or worked in any amount on Saturday, Sunday and on holidays recognized by Railroad in its personnel policy manual, shall be billed at the rate of **actual cost (please verify rates with the Railroad office)** per eight-hour day, per flagman required, for each day or portion thereof worked.

B. Communications Linemen, Signalmen, Protective Services and Devices

All services required shall be billed at Railroad's contracted rate with service provider plus a 20 percent Railroad administrative fee.

EXHIBIT D

MINIMUM WALL THICKNESS FOR CASING PIPES UNDER Railroad TRACKS

1. STEEL CASING PIPE (A.R.E.A. SPEC. 1964)

NOMINAL DIAMETER (Inches)	NOMINAL WALL THICKNESS (Inches)	
	PROTECTED	NOT PROTECTED*
Under 14	0.188	0.188
14 and 16	0. 219	0.281 (9/32)
18	0.250	0.312
20	0.281	0.344
22	0.312	0.375
24	0.344	0.406
26	0.375	0.438
28 and 30	0.406	0.469
32	0.438	0.500
34 and 36	0.469	0.531
38, 40 and 42	0.500	0.562

Steel Pipe to have minimum yield strength of 35,000 psi.

* When casing is installed without benefit of a protective coating and said casing is not cathode protected, the wall thickness shall be increased to the nearest standard size which is a minimum of 0.063 inches greater than the thickness shown for protected pipe except for diameters under 12.75 inch.

2. CONCRETE PIPE

All diameters of concrete pipe under main tracks shall be specified, as A.S.T.M. C-76 (Latest Revision) Table V. Concrete pipe under siding and yard tracks may be Table IV. (Either Wall "B" or "C" is acceptable.

3. CORRUGATED METAL PIPE

Table shows permissible minimum and maximum height of cover for both riveted and helical pipe.

NOMINAL DIAMETER (Inches)	16 GAGE	14 GAGE	12 GAGE
12	4-53 (ft)	4-80 (ft)	
15	4-42	4-64	
18	4-34	4-53	
21	4-28	4-45	4-79 (ft)

24	5-23	4-40	4-70
30		4-31	4-56
36		5-23	4-46
42		4-49	4-78

PPP. Supplemental Revisions JSP-18-01X

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	$\leq$ 0.01%
Fiber Content	ASTM D5603	$\leq$ 0.5%
Moisture Content	ASTM D1509	$\leq$ 1.0%*
Mineral Filler	AASHTO M17	$\leq$ 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 VMA shall be calculated as follows:

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

where:
$P_s = percent\ aggregate\ by\ total\ mixture\ weight$
$P_{GTR} = percent\ GTR\ by\ total\ mixture\ weight$
$G_{sb} = bulk\ specific\ gravity\ of\ the\ combined\ aggregate$
$G_{GTR} = GTR\ specific\ gravity$

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 within15 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 theinsurer.

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.