

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

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

A.	General - Federal JSP-09-02J	1
B.	Contract Liquidated Damages JSP-13-01C	1
C.	Work Zone Traffic Management	2
D.	Emergency Provisions and Incident Management JSP-90-11A	7
E.	Project Contact for Contractor/Bidder Questions JSP-96-05	8
F.	Utilities JSP-93-26F	8
G.	SUE (Subsurface Utility Engineering) Information within Electronic Deliverables	11
H.	Ameren's Dusk to Dawn Lighting Work	11
I.	Pot Holing Utility Facilities	12
J.	Concrete Manhole Apron	13
K.	Concrete Adjacent to Ameren Composite Poles	13
L.	Liquidated Damages Specified – Right Turn off-ramps from I-70 to Route N JSP-93-28	14
M.	Liquidated Damages Specified – Drainage Work on St. Ann's Lane JSP-93-28	14
N.	Liquidated Damages Specified – Drainage Work south of Bernhardt Avenue JSP-93-28	15
O.	Liquidated Damages Specified – Work Within Temporary Easements JSP-93-28	15
P.	Liquidated Damages for Pedestrian Impacts	16
Q.	MoDOT's Construction Workforce Program NJSP-15-17A	17
R.	Contractor Quality Control NJSP-15-42	22
S.	Winter Months Requirements JSP-15-07A	24
T.	Modified Airport Requirements	24
U.	Possession of Right of Way – Parcel 17 and Parcel 32	25
V.	Liquidated Damages related to Property Owner Agreements	26
W.	Property Owner Agreements	26
X.	Property Owner Notification	30
Y.	Access to Commercial and Private Entrances	30
Z.	Existing Irrigation Systems	30
AA.	Traffic Management Coordination with Other Projects	31
BB.	Coordination with St. Louis County Department of Transportation	31
CC.	Bus Service	31
DD.	Parked Vehicles	32
EE.	Coordination with Metro Transit	32
FF.	Expiration of Temporary Construction Easements	34
GG.	Site Restoration	34
HH.	Low-Tracking or Non-Tracking Tack Coat	35
II.	Asphalt Coldmilling / Paving Requirement	35
JJ.	Asphalt for Wedging	35
KK.	Guardrail Requirements	36
LL.	Shaping Slopes Class III (Modified Material Requirements) NJSP-20-03B	36
MM.	Pedestrian Fence (Structures)	37
NN.	ADA Compliance and Final Acceptance of Constructed Facilities JSP-10-01C	37
OO.	Median Island Cut-Throughs – St. Louis District Version 10-18-23	39
PP.	ADA Curb Ramp – St. Louis District Version 01-17-24	40
QQ.	Concrete Sidewalk and Curb Jointing at Utility Poles	42
RR.	ADA Material Testing Frequency Modifications JSP-23-01	42
SS.	Drainage Maintenance During Construction	43

Job No.: J6S3599

Route: N

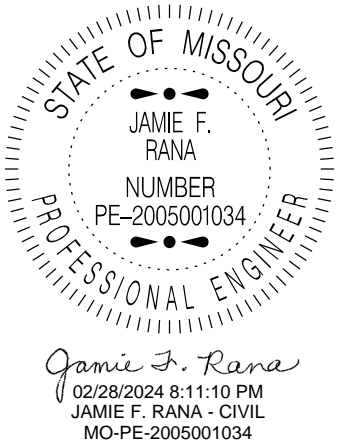
County: St. Louis

TT.	Metropolitan Sewer District of St. Louis Permit No. 23MSD-00482	43
UU.	Metropolitan Sewer District of St. Louis As-Built Submittals (Permit No. 23MSD-00482)	43
VV.	Manhole Reconstruction	44
WW.	Drainage Flume	45
XX.	Special Drainage Structures	45
YY.	Replace Inlet Top to New Grade	46
ZZ.	Class 4 & Class 5 Concrete Pipe	46
AAA.	Concrete Encasement of Pipes	47
BBB.	Additional Aggregate Base for Sidewalks Around Curb Inlets	47
CCC.	Adjusting Manholes, Valves and Pullboxes	48
DDD.	ATG (Adjust to Grade) Type T-Inlet Top	49
EEE.	ATG (Adjust to Grade) MSD Brick Inlet	49
FFF.	Lump Sum Temporary Traffic Control JSP-22-01A	50
GGG.	ADA Compliant Movable Barricades	52
HHH.	Contractor Designed, Furnished and Installed Steel Plates	52
III.	Contractor Designed, Furnished and Installed Shoring for Excavation	53
JJJ.	Concrete Barrier Transition Sections	54
KKK.	Modified Curb & Gutter	55
LLL.	Pavement Marking Removal	55
MMM.	18 Inch Island Tubular Marker	56
NNN.	Curb Reflectors	56
OOO.	Pavement Marking Layout	57
PPP.	Thermoplastic Pavement Markings	57
QQQ.	Lane Reduction Arrows	57
RRR.	Bike Pavement Markings	58
SSS.	8 In. White Pavement Markings	59
TTT.	Disposition of Existing Signal/Lighting and Network Equipment JSP-15-05A	59
UUU.	Existing Power Supply and Lighting Controller Cabinets – SW Corner of I-70 and Route N Interchange	60
VVV.	Maintenance of Roadway Lighting	61
WWW.	Temporary Generator	61
XXX.	Signal Cabinet Base Wrap and Cabinet Shift	61
YYY.	Temporary Traffic Signals	62
ZZZ.	Existing Traffic Signal Bases at Bermuda/St. Ann's Lane	62
AAAA.	Advanced Traffic Controller	63
BBBB.	MoDOT TS2 Type 1 Cabinet Assembly	63
CCCC.	Countdown Pedestrian Signal Heads	67
DDDD.	Audible Pedestrian Pushbuttons and Signing	68
EEEE.	Pedestrian Push Button Stanchion	70
FFFF.	Rectangular Rapid Flashing Beacon Assembly	71
GGGG.	Passive Pedestrian Detection for RRFBS	74
HHHH.	Installation of Mid-block Crossings	75
IIII.	Advance Warning Flasher	75
JJJJ.	Network Connected Signal Monitor	76
KKKK.	Signal Cabinet Modifications	77
LLLL.	Coordination with MoDOT Signal Shop for Cabinet Entry	81
MMMM.	Partial Acceptance of Signalized Intersections	81
NNNN.	Traffic Signal Maintenance and Programming	82
OOOO.	Pad Mounted 120V/240V Signal Power Supply & Lighting Controller with Uninterruptible Power Supply	84
PPPP.	Combination Pad Mounted 120V/240V Power Supply and Lighting Controller	91

Job No.: J6S3599
Route: N
County: St. Louis

QQQQ.	SL District Traffic Signal Detection System	91
RRRR.	Top Mount Luminaire	98
SSSS.	Top Mount Light Pole	99
TTTT.	Dual Top Mount Lighting Bracket	99
UUUU.	Flood Lighting at I-70 Interchange	99
VVVV.	30 FT. Decorative Lighting along Route N	100
WWWW.	New Underpass Lighting at I-70 Interchange	101
XXXX.	Luminaires within Residential Areas	101
YYYY.	Bridge Lighting – Vertical Ceiling Mount	101
ZZZZ.	Removal and Delivery of Existing Signs JSP-12-01C	101
AAAAA.	Remove and Relocate Existing Ground Mount Sign	102
BBBBB.	Removal and Replacement of Traffic Signs	103
CCCCC.	Signs in Concrete	103
DDDDD.	Overhead Signs	103
EEEE.	ITS Pull Box	104
FFFF.	ITS Conduit	104
GGGGG.	Fiber Optic Cable Installation, Relocation and Replacement	107
HHHHH.	Contractor-Furnished and Installed Closed Circuit Television (CCTV) Assembly	113
IIII.	Removal Of Existing Fiber Optic Cables	115
JJJJJ.	Relocate Existing Communication Equipment	116
KKKKK.	Coordination with ITS Staff and Utility Locates	118
LLLL.	ITS Asset Management Tool	118
MMMMM.	ITS Equipment within the Project Limits	119
NNNNN.	Adjust to Grade ITS Pull Boxes	120
OOOOO.	MoDOT ITS Assets Relocation	121
PPPPP.	Install MoDOT Furnished IP-Addressable Power Strip	123
QQQQQ.	Remove and Reinstall Landscaping Brick Pavers used for Retaining Walls	124
RRRRR.	Temporary Pedestrian Walkway	124
SSSSS.	Construction Requirements	125
TTTTT.	2.5" PSST Posts	127
UUUUU.	Special Consideration of Change Orders and Value Engineering JSP-21-07	127
VVVVV.	Concrete Block Mat	127
WWWWW.	Linear Grading Class 2 – Modified	128
XXXXX.	METRO Bus Pad	129
YYYYY.	Optional Pavements JSP 06-06H	129
ZZZZZ.	Supplemental Revisions JSP-18-01AB	130

Job No.: J6S3599
Route: N
County: St. Louis

 <i>Jamie F. Rana</i> 02/28/2024 8:11:10 PM JAMIE F. RANA - CIVIL MO-PE-2005001034	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: J6S3599 ST. LOUIS COUNTY., MO DATE PREPARED: FEBRUARY28 TH , 2024
	ADDENDUM DATE:

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

JOB
SPECIAL PROVISION

A. General - Federal JSP-09-02J

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

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

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

General Provisions & Supplemental Specifications

Supplemental Plans to July 2023 Missouri Standard Plans
For Highway Construction

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

B. Contract Liquidated Damages JSP-13-01C

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

2.0 Period of Performance. Prosecution of work is expected to begin on the date specified below in accordance with Sec 108.2. Regardless of when the work is begun on this contract, all work 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.

Job No.: J6S3599
Route: N
County: St. Louis

Notice to Proceed Date: June 3, 2024
Contract Completion Date: June 1, 2026

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
J6S3599	N/A	\$3,200

3.0 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 **\$2,000** per calendar day for each calendar day, or partial day thereof, that the work is not fully completed. For projects in combination, these damages will be charged in full for failure to complete one or more projects within the above specified 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

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 to 15 minute or above threshold. If disruption of the traffic flow occurs and traffic is backed up in queues of 15 minute delays or longer, 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.

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 (KC Scout TMC at #816-347-2250 or 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:

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

3.1.2 Except for emergency work, as determined by the engineer, and long term lane closures required by project phasing, the contractor's working hours could be restricted for the Special Events at UMSL (University of Missouri-St. Louis). These special events will be coordinated with the contractor by the Engineer once the project begins, but are not expected to last more than a couple of days. All lanes shall be scheduled to be open to traffic during these Special Events.

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 Any work requiring a reduction in the number of through lanes of traffic shall be completed during the following working hours: It shall be the responsibility of the engineer to determine weekend hours and if the work hours noted below may be modified.

Route N Non-resurfacing work:

Route N – from University Place Drive north to Brotherton Lane:

Min. 1 Lane of Route N open in each direction
Monday to Sunday: All hours of the day
Temporary Traffic Control picked up when workers are not present

Route N – Rest of the corridor south of University Place Drive to Route 115:

Min. 1 Lane of Route N open in each direction
Monday to Sunday: All hours of the day
Temporary Traffic Control left in place per Plans and as described below:

The contractor shall permanently close lanes on Route N by restriping Route N to allow for 1 lane open in each direction. This restriping is from north of Arnold B. Grobman Drive to Route 115 (Natural Bridge). As a condition of this plan, during either stage of construction, when both directions of travel are placed temporarily in either the SB or NB lanes, the contractor shall allow for parking along the side of Route N being worked on in order to provide access for residents to their property while their narrow entrances are reconstructed. Thus, the contractor shall take the appropriate steps to plan work that allows multiple residents to access each of their properties. Any plan shall include buffer area between the actual work area/equipment and parking.

Route N Resurfacing Work:

Route N from Brotherton Lane to Route 115:

Min. 1 Lane of Route N open in each direction
Monday to Sunday: All hours of the day

If the contractor chooses to resurface Route N during the day, the contractor shall provide access to entrances along the roadway as more traffic is expected during daytime hours than at nighttime.

Route N Pipe Work south of Bernhardt Avenue

Min. 1 Lane of Northbound Route N open all all times
Monday to Sunday: All hours of the day
½ of Entrance to Parcel #7 Shall Remain open at all times

Per JSP – Liquidated Damages Specified – Drainage Work South of Bernhardt, the contractor will be allowed to close the far right lane of Northbound Route N at all times for 3 weeks to install new pipe and inlets in this area.

St. Ann's Lane Pipe Work:

Per JSP - Liquidated Damages Specified – St. Ann's Lane Reconstruction, the contractor will be allowed to close St. Ann's Lane entirely for 3 weeks due to the new drainage and pavement to be installed on St. Ann's Lane. Route N shall remain open at all times during this work but right and left turns from Route N to St. Ann's Lane may be closed. Access to the businesses/properties from St. Ann's Lane shall remain open at all times.

I-70 off-ramps – Right Turns to Route N Work:

Per JSP - Liquidated Damages Specified – Right Turn off-ramps from I-70 to Route N, the contractor will be allowed to close **each** of the right turns from the I-70 off-ramps to Route N for 1 month due to the reconstruction/new alignment of the right turns. Both ramps will not be allowed to be closed at the same time.

3.3 It shall be the responsibility of the engineer to determine if the above work hours may be modified. Working hours for weekends and holidays will be determined by the engineer.

3.4 Any work requiring a reduction in the number of through lanes of traffic shall be completed within the working hours above listed in Section 3.2.

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 **\$250 per 15 minute increment** for each 15 minutes that the temporary lane closures are in place and not open to traffic in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of unapproved closure time.

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

4.0 Detours and Lane Closures.

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

for use on DMS shall be approved and authorized by the TMC at least 72 hours in advance of the work.

4.2 At least one lane of traffic in each direction on Route N 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 Allowable Work Zone Posted Speed Reductions

5.1 The current posted speed limit shall be used for erection and placement of all work zone temporary traffic control measures.

5.2 The Contractor shall be allowed to reduce the posted speed limit by 10 miles per hour in segments of the project approved by the Engineer.

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. All authorized changes in the traffic control plan shall be provided for as specified in Sec 616.

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

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

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

Missouri Highway Patrol 636-300-2800
St. Louis County Police: 636-529-8210
City of Normandy Police: 314-385-3300
Northeast Ambulance and Fire Protection District: 314-382-1501

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

Job No.: J6S3599
Route: N
County: St. Louis

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.

Jamie Rana, P.E.
Transportation Project Manager – St. Louis District
1590 Woodlake Dr.
Chesterfield, MO 63017

Telephone Number: (314) 624-5035
Email: Jamie.Rana@modot.mo.gov

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

F. Utilities JSP-93-26F

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

<u>Utility Name</u>	<u>Known Required Adjustment</u>	<u>Type</u>
Ameren Missouri Brian Berghoefer Phone: (618) 406-1488 Email: BBerghoefer@ameren.com	Yes See Section 2	Power
AT&T Distribution Tonya Wells Phone: (636) 448-9607 Email: tw2745@att.com	Yes See Section 3	Communications
Charter Communications John Danowski Phone: (636) 262-0395 Email: john.danowski@charter.com	Yes See Section 4	Communications

Everstream John Klebe Phone: (636) 697-2648 Email: jklebe@everstream.net	Yes See Section 5	Communications
Lumen Rich Obremski Phone: (314) 378-9931 Email: Richard.Obremski@Lumen.com	Yes See Section 6	Communications
Missouri American Water Co Dave Pruitt Phone: (314) 996-2396 Email: dave.pruitt@amwater.com	No	Water
Spire Nick Eggert Phone: 314-330-5720 Email: Nicholas.Eggert@spireenergy.com	Yes See Section 7	Gas
St Louis Metropolitan Sewer (MSD) Andy Day Phone: (314) 768-2799 Email: aday@stmsd.com	No	Sewer

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: Ameren has poles and overhead facilities that are in conflict with proposed roadway improvements at the St. Anne's and Emerling intersections. Ameren anticipates having these conflicts adjusted before the contractor receives Notice to Proceed.

2.1 Ameren Overhead Power lines: The contractor is advised that the proposed scope of work for this project will require working within tight vertical clearances from overhead power lines throughout the corridor in general and at St. Ann's Lane specifically. The contractor should use caution when constructing items near these facilities. Contractors and their employees working in the vicinity of Ameren's power lines will adhere to the Missouri Overhead Power Line Act as set forth in Missouri Revised Statutes section 319, particularly the safety requirements in sections 319.075 through 319.090.

2.1.1 The contractor shall discuss the planned work as it relates to any energized power lines with Ameren Missouri and coordinate with Ameren Missouri for the installation of any insulation

covers over the lines and/or any other designated requirements. The contractor is advised to contact Ameren Missouri regarding the current policy and so the anticipated cost to the contractor can be estimated and when payment is required. The Contractor shall contact Ameren Missouri at least two weeks in advance of when construction work is scheduled to begin to request covers to be placed at a given location. The contractor will need to contact Ameren at (314) 992 -6619 to coordinate this work with their schedule. **The contractor is responsible for any charges from Ameren Missouri for this provision and payment will be directly to Ameren Missouri.**

2.2 Ameren Power Service Request: Utility connections will be required for the construction improvements in the plans. The contractor shall contact the MoDOT District Utility Coordinator (DUC), Dave Brunjes at (314) 439 -6297, at least 2 weeks in advance of the planned work to arrange to have the adjusted power supplies connected/old power supplies disconnected by Ameren.

2.3 Ameren Substation Work: Ameren has major permit work along the Rte. N project limits. Ameren is permitting for the building of a new substation approximately from STA. 191+50 to STA. 194+00, south of Evans Avenue along the east side of Route N. The contractor should be aware that this work is scheduled to take place at the same time as this project. The Contractor shall coordinate their work and cooperate with Ameren's contractors as laid out in Sec. 105.6 of the Standard Specifications. In addition, please see JSP – Construction Requirements, regarding sidewalk and entrance work near Ameren's new substation.

2.3.1 The contractor is advised that Ameren Missouri is looking to replace their electric substation along Evans Avenue west of Route N with a new site south of Parcel #7 on the east side of Route N. The proposed sidewalk and entrance quantified in the plans at this site may be eliminated through change order depending on Ameren Missouri's final site plan. Drainage work in this area is expected to be kept in the job regardless of Ameren Missouri's final site plan. No additional pay shall be made to the contractor if this area's work is modified by the Engineer and eliminated in the contract.

2.4 Composite Poles. Ameren has not finished with their design of the substation work; it is probable that they will utilize composite poles in this project due to Right of Way concerns. The contractor shall coordinate with the DUC for the location of any composite pole on this project. Ameren requires 1" of separation between the new sidewalk and composite poles. The Contractor is required to double up ½ mastic (flex board) around each composite pole prior to pouring any adjacent concrete to the composite poles.

3.0 AT&T Distribution: AT&T's existing facilities in project limits are primarily aerial along most of the corridor. AT&T also has several underground lines coming off Ameren's poles at intersections. AT&T will have to cut over their facilities after Ameren has moved their poles. AT&T advises they plan to complete the aerial work on conflict poles three (3) weeks after Ameren installs the new poles.

4.0 Charter Communications: Charter's existing facilities in project limits are primarily aerial along most of the corridor. Charter also has several underground lines coming off Ameren's poles at intersections. Charter will have to cut over their facilities after Ameren has moved their

poles. Charter advises they plan to complete the aerial work on conflict poles three (3) weeks after Ameren installs the new poles.

5.0 Everstream: Everstream's existing facilities are buried throughout the project corridor. Everstream's facilities are in conflict with the proposed drainage improvements at the intersection of Rte. N and St Ann's, see sheet 16. Everstream advises that they plan to be relocated before the contractor receives Notice to Proceed.

6.0 Lumen: Lumen's existing facilities are buried throughout the project corridor. These facilities are in conflict with the proposed roadway improvements at the intersection of Rte. N and I-70, see sheet 9. Lumen advises that they plan to be relocated before the contractor receives Notice to Proceed.

7.0 Spire: Spire's existing facilities are buried throughout the project corridor. These facilities are in conflict with the proposed drainage improvements at the intersection of Rte. N and St. Ann's Lane. I-70, see sheet 16. Spire advises that they plan to verify the conflict and relocate if needed before the contractor receives Notice to Proceed.

8.0 Missouri American Water Co and MSD: The mentioned Utility Companies have facilities within the project limits. These Companies advises that they do not anticipate any utility conflicts on the road project.

9.0 If utility facilities are discovered the contractor shall contact the MoDOT Area Utility Coordinator, Dave Brunjes at (314) 439-6297. The engineer will determine whether relocation of the utility is necessary to accommodate construction or if the work can be installed in accordance with Missouri Standard Plans for Highway Construction for the item of work specified.

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

G. SUE (Subsurface Utility Engineering) Information within Electronic Deliverables

The contractor shall be advised that within the Electronic Deliverables for J6S3599 there are documents pertaining to SUE work for locating & potholing utilities at a few locations along the corridor including south of Evans Avenue; at Bermuda/St. Ann's Lane intersection; and along NB Route N north of Route 115. The contractor shall review JSP – Utilities, for additional information.

H. Ameren's Dusk to Dawn Lighting Work

1.0 Description. Ameren will need to add and remove existing Dusk to Dawn lights on their poles along the project limits. Ameren plans are included in the electronic deliverables "for information purposes only". Some of Ameren's proposed lights cannot be installed until the contractor removes some existing CL lights on MoDOT's traffic signals. Ameren plans to not install any new dusk to dawn lights until soon after the preconstruction meeting. Ameren's advised

they have approximately three weeks of work on this project to get all the new lights installed. Coordination between the contractor and Ameren is expected to minimize any period of time where lighting is not operational.

I. Pot Holing Utility Facilities

1.0 Pot Holing Utility Facilities. The contractor shall notify the utility prior to pot holing the utilities marked facility. Some utility companies may want to have a representative on site to observe the contractor's pot hole work. The contractor shall be responsible to "pot hole" any existing utility facility under the pavement or outside the pavement, to verify the utilities depth and location for all the contractor's needs to construct the project. Core drilling pavement prior to pot holing for utilities may be necessary. Any pot holed utility facility determined to be in conflict with construction of the work for the project, shall be brought immediately to the attention of MoDOT's area utility coordinator and the engineer for the project. The engineer will determine whether relocation of the utility is necessary to accommodate construction of the project or if the proposed work can be adjusted to avoid any utility relocation. The contractor is responsible for the costs to repair any utility facility damaged by the contractors work to pot hole the utility.

An utility pothole unit shall be defined for this project as a single continuous excavation effort, by the contractors chosen method, to expose a buried utility at the location marked by the utilities locator and approved by the engineer. The excavation limits of a single pothole unit shall be any excavation taking place within a 2ft radius around the center of the locate mark provided by the utilities locator, to a depth where either the utility has been satisfactorily exposed for the engineer to see or to a depth where the search for the marked utility is terminated by the engineer and the pothole location abandoned without exposing the utility.

2.0 Signal Bases. For this contract, the Contractor shall field verify that the proposed traffic signal base locations will not need to be shifted to avoid utilities prior to ordering the traffic signal equipment. The Contractor shall be proactive in the discovery of potential utility conflicts. The Contractor shall submit One Call tickets where existing utilities are located in close proximity to proposed signal base locations and coordinate with the utility company and the Engineer to determine if a conflict will be encountered due to the work proposed in the contract. If a conflict is anticipated, the Contractor shall perform test holes to field verify no conflicts exist with proposed traffic signal base locations.

If a conflict is determined, the Contractor shall shift the signal base location, as approved by the Engineer. The Contractor shall coordinate construction activities with the utilities and take measures to ensure the integrity of the existing facilities are not disturbed during construction.

The contractor will be compensated for the additional mast arm length if required. The Contractor shall not order materials until measurements are field verified.

3.0 Basis of Payment. All labor, equipment, materials and restoration necessary to pot hole buried utilities shall be paid for under:

	Pay Item Number	Unit
902-99.01	Pot Holing Utility Facilities	Lump Sum

J. Concrete Manhole Apron

1.0 Description. The Contractor shall install a reinforced concrete apron 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 apron 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 aprons 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 an apron 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 apron 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 MoDOT Standard Specification 613.3.3, the contractor shall seal the joint between the asphalt surface and the new concrete apron along with seal any overcut created from the sawcutting operation when removing the portion of pavement to be replaced with manhole apron 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 apron will be made per each.

5.0 Basis of Payment. Payment for the installation of a reinforced concrete manhole apron, 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 – Adjusting Manholes, Valves and Pullboxes for additional details regarding the adjustment to grade for those items.

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

K. Concrete Adjacent to Ameren Composite Poles

1.0 Description. Ameren Missouri may use composite poles to make adjustments to the overhead power lines along Route N within the project limits of Job J6S3599. The number of composite poles to be used are not yet determined, however, if used, Ameren requires 1" of separation between the new sidewalk and composite poles. Ameren is requiring the Contractor to double up ½ mastic (flex board) around each composite pole prior to pouring the concrete sidewalk adjacent to the composite poles.

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

L. Liquidated Damages Specified – Right Turn off-ramps from I-70 to Route N JSP-93-28

1.0 Description. If the reconstructed right turn from EB I-70 to SB Route N or the reconstructed right turn from WB I-70 to NB Route N, is not completed and open to traffic **within 1 month** of when **the specified right turn** is closed to traffic, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **\$2,000 per day** for each full day that **each ramp** is not reconstructed 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 Each ramp will have its own liquidated damages specified. The contractor will be given 1 month to reconstruct each right turn ramp. In addition, the contractor **shall not close both right turn ramps** at the same time. Access for the left turns on to Route N from I-70 shall not be impacted by this work. All lanes for those left turns on to Route N shall remain open at all times.

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

M. Liquidated Damages Specified – Drainage Work on St. Ann's Lane JSP-93-28

1.0 Description. If the installation of the new pipe and drainage structures on St. Ann's Lane is not completed and all lanes of St. Anne's Lane open to traffic **within 3 weeks** of when **St. Ann's Lane** is first closed to traffic, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **\$1,000 per day** for each full day that the pavement on **St. Ann's Lane** is not reconstructed, the pipes installed and St. Ann's Lane open to traffic including at the Route N intersection 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 During the reconstruction of St. Ann's Lane, access to the businesses on either side shall remain open to and from St. Ann's Lane. Route N shall be open at all times during reconstruction of St. Ann's Lane, however, the left and right turns from Route N into St. Ann's Lane may be closed.

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

N. Liquidated Damages Specified – Drainage Work south of Bernhardt Avenue JSP-93-28

1.0 Description. If the installation of new pipe and drainage structures within the far right lane of Northbound Route N south of Bernhardt Avenue along with pavement reconstructed above the new pipes, is not completed and open to traffic **within 3 weeks** of when **temporary barrier is first installed to close the far right lane of Northbound Route N**, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **\$1,000** per day for each full day that **the far right lane of Northbound Route N** is not reconstructed 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 During the drainage work south of Bernhardt Lane, access to the entrance for Parcel #7 shall remain open at all times. **Access to Ameren Missouri's entrance south of entrance to Parcel #7 for their new transmission substation may be closed during this 3 week time period.**

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

O. Liquidated Damages Specified – Work Within Temporary Easements JSP-93-28

1.0 Description. The temporary construction easements (TCE's) acquired by the Commission are a valid property right for a two-year period. Beyond two years, the temporary property right acquired by the Commission will expire. If the temporary property right acquired by the Commission expires prior to the Contractor completing work within the limits of any TCE, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **\$500** per day for each full day that the work within any temporary easement is not complete within 2 years of the notice to proceed date for the project. It shall be the responsibility of the engineer to determine the quantity of excess work time.

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

P. 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 Route N 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 Route N 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 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.

Q. 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

Job No.: J6S3599
Route: N
County: St. Louis

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).

R. 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.

S. 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.

T. Modified Airport Requirements

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

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

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

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

2.2 If the contractor's height of equipment and the improvement itself is at or below the assumed height as indicated in Sec 2.0, the contractor shall immediately notify the engineer when the sign truss have all been constructed to full height so that MoDOT can complete the 7460-2, Part 2 form used to comply with FAA regulations. The following aeronautical studies of new lights along the Route N corridor are the following:

2023-ACE-7151-OE
2023-ACE-7152-OE

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

U. Possession of Right of Way – Parcel 17 and Parcel 32

1.0 Description. The contractor's attention is directed toward the following parcels which could be subject to delayed possession, Parcel 17 and 32.

- (a) **Parcel 17** (7604 Florissant Road) – C & C Auto Parts of Normandy, Inc. – The Permanent Sidewalk Easement (PCE) is being acquired to reconstruct the sidewalk and driveways between Station 257+32.6 to Station 259+19.9 on the west side of Route N. The contractor shall not enter or proceed with physical construction across said Parcel 17 until authorization is granted by the Engineer. The Contractor shall 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 07/15/2024. This possession date is estimated and is not warranted, and a later possession date is equally possible.
- (b) **Parcel 32** (7401 Florissant Road) – The German St. Vincent Orphan Association – The Permanent Sidewalk Easement (PCE) and Temporary Construction Easement (TCE) are being acquired to reconstruct the sidewalk and driveways between Station 267+91.43 to Station 275+27.59 on the east side of Route N. The Contractor shall not enter or proceed with physical construction across said Parcel 32 until authorization is granted by the Engineer. The Contractor shall 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 03/01/2024. 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.

V. Liquidated Damages related to Property Owner Agreements

1.0 Description. After the pre-construction meeting, the contractor shall work with the Engineer so that a meeting can be scheduled with MoDOT Right-of-Way staff to walk through the job and identify parcels noted in JSP – Property Owner Agreements. **The contractor shall not begin construction until such a meeting is held.**

1.1 If the agreements, listed in JSP – Property Owner Agreements, are not followed to the satisfaction of the Engineer, the Commission and the impacted property owner will be damaged in various ways, including but not limited to, increased construction administration cost and potential liability, 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 **\$1,000 per case** for each case that the agreement listed in JSP – Property Owner Agreements, is not followed to the satisfaction of the Engineer. It shall be the responsibility of the engineer to determine the number of cases where the agreement was not followed.

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

W. Property Owner Agreements

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

(a) **Parcels 12 to 14** (7624 Florissant Road)

- (1) The contractor shall complete the sidewalk in front of Parcels 12 through 14 within **21** days and **only impact each entrance to the buildings for 3 consecutive days** within that **21** day time period. There are 4 total entrances to the buildings for these parcels along Route N as shown on the special sheet. 2 entrances are for the primary residence and 2 are for the business. Work associated with the 3 consecutive days impacted for each entrance includes the removal of existing sidewalk; the grading and placement of new aggregate base; the construction and curing of the new sidewalk and any other incidental activities to close/reopen the entrance to pedestrian access.
- (2) The contractor shall use its reasonable efforts to minimize disruption to and interference with the Parcel owner's property and any business operations thereon.
- (3) The contractor shall use reasonable care when removing and installing new sidewalk next to the aesthetic planter boxes and along the fence/retaining wall. Next to the aesthetic planter boxes, the contractor shall hand dig the final 6" (minimum) of sidewalk to be removed as this area will become space where the contractor will place forms for the new sidewalk. Prior to removing or installing sidewalk, the contractor shall cover the existing aesthetic planter boxes with a heavy clear plastic tarp to protect them due to construction activities. Plants within these aesthetic planter boxes shall not be disturbed/covered by this plastic tarp. Plants outside the aesthetic planter box near the existing fence may be disturbed as part of construction activities.
- (4) Once the new sidewalk has been installed and cured, the 6" minimum gap between the new sidewalk and the aesthetic planter boxes shall be graded and filled with mulch.
- (5) The contractor shall provide a temporary pedestrian walkway per JSP – Temporary Pedestrian Walkway to allow for access at all times with the following conditions:
 - a. To the Primary Residence using either Entrance #1 or Entrance #2, as labeled on the special sheet.
 - b. To the Business using either Entrance #3 or Entrance #4, as labeled on the special sheet.
 - c. Entrance #1 is the main entrance to the primary residence.
 - d. Entrance #3 is the main entrance to the business.
 - e. Entrances may have an aggregate base temporary walkway as long as existing sidewalk/conditions for Entrance #1 and Entrance #3 are still present or a temporary pedestrian walkway is provided based upon a. & b. above.
- (6) The railroad tie landscaping near entrances #1 and #2 labeled on the special sheet shall be removed during construction. Plants in this area may also be removed due to construction activities. Plants outside the aesthetic planter box near the existing fence may also be disturbed as part of construction activities.
- (7) The contractor shall notify the Parcel owner **3 days in advance** before beginning work near Parcels 12, 13 or 14. The contractor shall contact the Parcel owner at

the following number:

Dr. Bryce Goman – Normandy Animal Hospital: 314-383-4677

(b) **Parcel 25** (7440 Florissant Road)

- (1) The contractor shall provide 2-week advanced notice to the property owner before setting up either Stage 1 or Stage 2 workzones as shown in the plans. Parking access shall be provided during both stages of construction as outlined within JSP – Workzone Traffic Management. The contractor shall contact the Parcel owner at the following number:

Pamela Mason 314-603-3997
Email: pmflowers@aol.com

(c) **Parcel 26** (7436 Florissant Road)

- (1) The contractor shall remove and reinstall the existing brick paver retaining wall as necessary for reconstructing the sidewalk and entrance on this parcel per JSP - Remove and Reinstall Landscaping Brick Pavers used for Retaining Walls.
- (2) The contractor shall provide 2-week advanced notice to the property owner before setting up either Stage 1 or Stage 2 workzones as shown in the plans. Parking access shall be provided during both stages of construction as outlined within JSP – Workzone Traffic Management. The contractor shall contact the Parcel owner at the following number:

David Owens 314-516-3326

(d) **Parcel 27** (7430 Florissant Road)

- (1) The contractor shall provide 2-week advanced notice to the property owner before setting up either Stage 1 or Stage 2 workzones as shown in the plans. Parking access shall be provided during both stages of construction as outlined within JSP – Workzone Traffic Management. The contractor shall contact the Parcel owner at the following number:

Carlton Hall 314-621-4347 or 314-482-9970.

(e) 1605 & 1611 S. Florissant Road)

- (1) The contractor shall be made aware that no new right of way or easements are being purchased for 2 parcels along SB Route N south of Evans Avenue. The contractor shall still communicate/coordinate with the property owners and work with each to reduce disruption to their businesses by using high-early strength concrete for the new entrance tying into existing sidewalk. The maximum time that the contractor shall close each entrance is 24-hours.

(f) **Parcel 28** (7426 Florissant Road)

- (1) The contractor shall remove and reinstall the existing brick paver retaining wall as necessary for reconstructing the sidewalk and entrance on this parcel per JSP -

Job No.: J6S3599
Route: N
County: St. Louis

Remove and Reinstall Landscaping Brick Pavers used for Retaining Walls.

- (2) The contractor shall provide 2-week advanced notice to the property owner before setting up either Stage 1 or Stage 2 workzones as shown in the plans. Parking access shall be provided during both stages of construction as outlined within JSP – Workzone Traffic Management. The contractor shall contact the Parcel owner at the following number:

Christal Hampton 314-761-3957

(g) **Parcel 29** (7422 Florissant Road)

- (1) The contractor shall provide 2-week advanced notice to the property owner before setting up either Stage 1 or Stage 2 workzones as shown in the plans. Parking access shall be provided during both stages of construction as outlined within JSP – Workzone Traffic Management. The contractor shall contact the Parcel owner at the following number:

Barbara Robinson 314-381-2532

(h) **Parcel 30** (7418 Florissant Road)

- (1) The contractor shall ensure that the existing water valve located at Sta. 271+00.1 shall be adjusted to grade to match the new sidewalk elevation along Route N in front of this parcel.
- (2) The contractor shall provide 2-week advanced notice to the property owner before setting up either Stage 1 or Stage 2 workzones as shown in the plans. Parking access shall be provided during both stages of construction as outlined within JSP – Workzone Traffic Management. The contractor shall contact the Parcel owner at the following:

Vincent Tillman 314-605-4560
Adrienne Tillman 314-605-4566
E-mail: adriennebenny@aol.com

(i) **Parcel 31** (7400 Florissant Road)

- (1) The contractor shall remove and reinstall the existing brick paver retaining wall as necessary for reconstructing the sidewalk and entrance on this parcel per JSP - Remove and Reinstall Landscaping Brick Pavers used for Retaining Walls.
- (2) The contractor shall provide 2-week advanced notice to the property owner before setting up either Stage 1 or Stage 2 workzones as shown in the plans. Parking access shall be provided during both stages of construction as outlined within JSP – Workzone Traffic Management. The contractor shall contact the Parcel owner at the following number:

Donald Mosley 314-537-6638

2.0 Basis of Payment. Payment for the above-mentioned items are to be completely paid for under the unit bid prices. If there are no bid items for the above-mentioned work, the work will be considered incidental and there will be no direct payment.

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 and parking lot 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. Access to Commercial and Private Entrances

1.0 Description. While working 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. On all commercial entrances or private entrances greater than 20' wide, 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 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.

2.1 The contractor shall complete the entrances as quickly as possible and shall take no longer than 4 weeks to complete any one entrance over 20' wide. The contractor shall take no longer than 5 days to complete any one private or commercial entrance with a width less than 20'.

3.0 Property Owner Agreements. Agreements made with property owners during the negotiations of easements and rights of way listed in the Property Owner Agreements special provision shall be adhered to and shall supersede the requirements in the Access to Commercial and Private Entrances special provision.

4.0 Basis of Payment. No direct payment will be made to the contractor for any expenses incurred for compliance with this provision.

Z. Existing Irrigation Systems

The contractor shall be made aware that existing residents and businesses along Route N and the cross streets may have irrigation systems which extend into existing MoDOT Right of Way. In addition, there is an existing irrigation system operated by the University of Missouri-St. Louis (UMSL) at the I-70 interchange and there may be other irrigation along Route N near the UMSL campus. The contractor may contact the residents, businesses or UMSL to have the existing irrigation pipes located in the field as they are not part of the MO 1 Call System, however, they

may be unresponsive. The contractor shall then exercise reasonable care installing any new equipment (signals, signing, ITS etc.) as shown in the plans. Should any of the UMSL irrigation systems, or private/commercial irrigation systems within MoDOT easements be damaged by the contractor, then the contractor shall replace the damaged portion within a 2-week period. Irrigation systems that are discovered on MoDOT Right of Way that are damaged shall be capped by the contractor at the Right of Way Line. If this occurs, the contractor shall notify the property owners and inform them the irrigation system will need to be repaired at the property owner's expense and kept of MoDOT's Right of Way. No direct payment shall be provided for compliance with this provision.

AA. Traffic Management Coordination with Other Projects

1.0 Description. The contractor shall coordinate traffic management between the following projects within the same project limits:

MoDOT Job Number J6M0288 (New Retaining Wall on Route N at Emerling)

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

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.

BB. Coordination with St. Louis County Department of Transportation

1.0 Description. St. Louis County maintains several roadways near MoDOT Job J6S3599, including Bermuda Road, University Place Drive and Brotherton Lane.

2.0 Requirements. The contractor shall contact the St. Louis County Department of Transportation 7 days in advance of beginning work near any of the roadways mentioned above so that St. Louis County can adjust any maintenance activities or work with the contractor to coordinate St. Louis County work in the same general vicinity as Job J6S3599. The St. Louis County representative is Adam Spector, Area Engineer at 314-615-8563 or aspector@stlouisco.com.

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

CC. Bus Service

1.0 The contractor shall be aware Metro Bus Service operates several different routes along various portions of Route N with bus stops located along the entire corridor. The contractor shall maintain pedestrian access to each bus stop at all times, unless approved by the Engineer and Metro. All active bus stop signs shall remain visible at all times during construction. Should any

of the existing bus stop signs or posts be damaged by the contractor's negligence, they shall be replaced at the contractor's expense. The contractor shall contact Roderick Thomas of Metro at 314-923-3000 (office), 314-280-3622 (mobile), or rhthomas@metrostlouis.org regarding the requirements of this section.

2.0 The Ferguson-Florissant School District and the Normandy Schools Collaborative may have bus stops located along Route N within the project limits. The contractor shall contact the school districts 2 weeks prior to beginning work so temporary bus stop locations can be identified.

Kevin Pirrung
Ferguson-Florissant School District - Director of Transportation
Office: 506-9370
Email: kpirrung@ferqflor.org

Benita Weaver
Normandy Schools Collaborative – Coordinator of Transportation
314-493-0116

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

DD. Parked Vehicles

1.0 Description. Along certain portions of the project, on-street parking is permitted. It will be necessary for the contractor to coordinate with the various police departments in the area along with MoDOT Maintenance to arrange for proper posting of temporary "No Parking" signs, and for any required towing of vehicles to allow the project to be completed in a sequential manner.

In addition to the on-street parking, there are numerous parking lots and car dealerships along the project with parked vehicles. If any of these vehicles interferes with the work, the Contractor shall notify, in writing, the owners of such vehicles, advising them of the nature of the interference and shall arrange and cooperate with them for the protection or disposition of such vehicles. The Contractor shall furnish the Engineer with copies of such notifications and with copies of any agreement between the Contractor and the property owners concerning such protection or disposition.

The Contractor shall take all necessary precautions for the protection of the parked vehicles contiguous to the work.

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 documents.

EE. Coordination with Metro Transit

1.0 Description. The contractor shall be required to coordinate with Metro Transit where construction operations will involve work on or around existing transit stops. It is requested that the coordination begin prior to the project Preconstruction Conference to ensure minimal disruption in service on Metro's system.

2.0 Construction Requirements. All Metro Transit stops within the project limits shall remain open and operational throughout the duration of the project. In locations where the contractor's operations will involve work in proximity to a transit stop location, the contractor shall notify Metro Transit 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 transit users to construction hazards in proximity to all transit stops that are in service during work operations.

2.1 Project Contacts. The contractor shall notify the following contacts at Metro Transit coordinate scheduling throughout the project with them or their designated representative(s).

Mr. Roderick Thomas, Senior Planner
Office: (314) 923-3000
Email: rthomas@metrostlouis.org

Ms. Natalie Siebert, Senior Planner Transit Operations
Office: (314) 982-1400 x1816
Cell: (314) 497-4916
Email: nmsiebert@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 transit 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 shall be coordinated with Metro Transit. All temporary transit stops shall be located in proximity to the existing stop it is representing, accessible, clear and conspicuous to both the transit rider and facility operator, and be located where it is safe from hazards within the work area.

4.0 Permanent Facilities.

4.1 Bus Stops. Locations for proposed bus stops are identified in the contract plans. The contractor shall furnish a flush-mount anchor that is to be drilled into the concrete pad per manufacturer's recommendations. Metro Transit will install the new bus stop sign and post.

4.2 Bus Shelters. Locations for proposed bus shelters are identified in the contract plans. The contractor shall construct the concrete pad for the shelters. Shelters will be furnished and installed by Metro upon completion of the pads.

5.0 Basis of Payment. No direct payment will be made for any labor, equipment, materials, and time required to comply with this provision.

FF. Expiration of Temporary Construction Easements

1.0 Description. The temporary construction easements (TCE's) acquired by the Commission are a valid property right for a two-year period. Beyond two years, the temporary property right acquired by the Commission will expire. The two-year period begins on the day Commission provides the notice to proceed.

2.0 Construction Requirement. The contractor shall have all work requiring access to the TCE's completed within a two-year period.

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. If work is incomplete and the contractor needs access to TCE's past the two-year period, the Contractor shall be responsible for all costs associated with obtaining a new temporary construction easement by others.

GG. Site Restoration

1.0 Description. Restore to its original condition any disturbed area at sites including, but not limited to, guardrail, 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 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.

2.1 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 or concrete slope protection, sidewalk, pavement, shoulders, islands, medians, sod and the required dowel and tie bars removed and replaced by the contractor as a result of his election to vary the location of conduit runs and pull boxes. This work will be considered as included in the various unit bid prices for conduit and pull boxes established in the contract, and no additional payment will be made.

2.2 Sidewalks and sidewalk ramps that are disturbed as described in this provision shall be replaced to meet current ADA standards at the contractor's expense.

2.2 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 guardrail, pole base, conduit, and/or pull box. No direct payment will be made for any materials or labor, which is performed under this provision.

HH. Low-Tracking or Non-Tracking Tack Coat

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 Material. The tack coat shall be a hard penetration asphalt emulsion (SS-1vh) with the material properties in accordance with Sec 1015.20.5.4.

3.0 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.

4.0 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 407-99.12, Misc. Tack Coat – Low-tracking or Non-tracking.

II. Asphalt Coldmilling / Paving Requirement

1.0 Description. Asphalt coldmilling / paving requirement for the project.

2.0 Construction Requirements. Asphalt coldmilled pavement areas shall be filled with the corresponding asphaltic concrete mixture during the same work shift.

2.1 The contractor shall provide a material transfer vehicle during asphalt paving operations to ensure a consistent temperature of the asphalt throughout paving and to prevent segregation of the mix in order to produce an uniform final product.

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.

JJ. Asphalt for Wedging

1.0 Description. Asphalt Wedging Material shall be used as directed by the Engineer. The Asphalt Wedging Material will be used to improve paved approach transitions to driveways, parking lots, side street transitions and similar applications.

2.0 Material. Asphalt Wedging Material shall be Bituminous Pavement Mixture PG64-22, (BP-1) mix or equivalent approved by the Engineer.

2.1 Material testing and construction acceptance testing shall be based upon Sec 402, Plant Mix Bituminous Surface Leveling.

3.0 Basis of Payment. Payment for Asphalt Wedging Material shall be at contract unit price per ton.

Item No.	Type	Description
403-99.10	Ton	Asphalt for Wedging

KK. Guardrail Requirements

1.0 Safety Devices. Before any guardrail, bridge approach transition sections, crashworthy end terminals or end anchors are installed, the contractor shall layout the proposed alignment in the field to ensure that each of these items can indeed be installed properly based upon the standard plans and the manufacturer's recommendations. The contractor shall notify the engineer when that field inspection will take place as to allow the engineer to be present at that time. In order to ensure that the crashworthy end terminal or crash cushion selected by the contractor can indeed be installed at each of the locations listed in the plans, the field inspection meeting mentioned above shall take place before the ordering of any crashworthy end terminal.

1.1 The length of the crashworthy end terminal is estimated in the plans to be 50 foot in length. If a length of crashworthy end terminal selected by the contractor has a length of less than 50 foot, than the contractor shall inform the Engineer as it may require the length of guardrail to be extended a short distance to meet design requirements.

2.0 Basis of Payment. The accepted guardrail, bridge approach transition sections, crashworthy end terminals and end anchors, complete in place, will be paid for by the contract unit bid price for the following items and will be full compensation for all labor, equipment and material to complete the above described work:

Item Number	Type / Description	Unit
606-10.61	MGS Guardrail, 8 FT. Posts, 6 FT – 3 IN. Spacing	L.F.
606-10.80	MGS End Anchor	Each
606-30.14	Type A Crashworthy End Terminal (MASH)	Each

LL. Shaping Slopes Class III (Modified Material Requirements) NJSP-20-03B

Delete Sec 215.1.3 and 215.1.3.1 and substitute the following:

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

215.1.3.1 Material Requirements. Rock fill material used for Shaping Slopes, Class III, shall consist of a durable crushed stone, shot rock or broken concrete, with a predominant size of 3 inches and a maximum size of 6 inches. Acceptance by the engineer will be made by visual inspection.

215.4 Basis of Payment. The accepted quantity will be paid at the contract unit bid price for 215-99.10 Misc. Shaping Slopes Class III – Modified Material Requirement, per 100F.

MM. Pedestrian Fence (Structures)

1.0 Description. This work shall consist of constructing Pedestrian Fence (Structures) on new 42" tall concrete traffic barriers at the locations shown in the plans.

2.0 Material. Material shall be as specified in Sec. 607.10.2.

3.0 Construction Requirements. The Pedestrian Fence (Structures) shall be constructed as detailed in the plans and in accordance with Sec 607.10.3. The fence should be attached to the new barrier using an anchor bolt detailed in the plan sheets.

4.0 Method of Measurement. Pedestrian Fence (Structures) will be measured to the nearest linear foot, measured along the slope of the fabric.

5.0 Basis of Payment. The accepted quantity of pedestrian fence, complete in place, will be paid for at the contractor unit price for the following pay item. No direct payment will be made for connector plates, grout, anchor bolts or other ancillary items necessary to complete the work.

Item Number	Type / Description	Unit
607-99.03	30 In. Pedestrian Fence (Structures)	L.F.

NN. 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:

<https://www.modot.org/forms-contractor-use>

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.

OO. Median Island Cut-Throughs – St. Louis District Version 10-18-23

1.0 Description. This work shall consist of providing a median or median island cut-through that is compliant with current Americans with Disabilities Act (ADA) and MoDOT guidelines at locations shown on the plans and as directed by the Engineer.

2.0 Construction Requirements. The contractor shall be responsible for removing the existing median and if necessary, the existing pavement and base prior to installing the new cut-through as shown in the plans and as per Section 608 in both the Standard Plans and Standard Specifications. If new pavement/sidewalk is to be installed, it shall be minimum 7" Concrete Sidewalk on a 4" Type 5 Aggregate Base with new median island doweled into this new sidewalk. Truncated domes installed within the island or median cut-throughs shall be placed flush with the face of the curb/island.

2.1 ADA Ramps. If there is an actual ramp that provides access to the raised portion of the island or median instead of cutting through a portion of the island or median, then that area of concrete will be paid for separately as an ADA Curb Ramp, per each, and not per quantities noted below.

2.2 Cross Slope through Cut-Throughs. The contractor shall meet ADA requirements regarding cross slope through the cut-through.

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 for each item listed in the Basis of Payment.

4.0 Basis of Payment. Payment for furnishing and installing a new median or median island cut-through shall include all excavation, base compaction, saw cuts, removal of existing pavement and median island, new sidewalk and base, new median island, new truncated domes, and all materials, equipment, tools, labor, and work incidental thereto, and shall be considered to be completely covered by the contract unit price for items listed below as indicated in the plans.

Pay Item Number	Type / Description	Unit
202-20.10	Removal of Improvements	Lump Sum
304-05.04	Type 5 Aggregate for Base (4 In. Thick)	S.Y.
608-60.07	Concrete Sidewalk, 7 In.	S.Y.
608-10.00	Concrete Median	S.Y.
608-10.12	Truncated Domes	S.F.

PP. ADA Curb Ramp – St. Louis District Version 01-17-24

1.0 Description. This work shall consist of constructing new concrete curb ramps 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.

1.1 The contractor shall ensure that the persons establishing the grades of the ADA facilities have a copy of ADA related provisions at hand for reference. 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 of the Standard Specifications shall apply to the construction of the curb ramps.

2.1 The following shall be included in the cost of a new ADA ramp:

- Excavation and preparing of the subgrade prior to placement of the aggregate base
- 4" Type 5 Aggregate Base underneath the new ramp
- Everything shown in the various figures of ADA ramp curb types on Standard Plan 608.50 shall be poured as 7" concrete. This includes all area of ramp, level landing pads and any flares included in the per each ADA Ramp.
- Variable height curb along the roadway within the limits of the new ADA ramp
- Variable height curb along the backside of the new ADA ramp
- Concrete median used to separate direction of travel within a dual perpendicular ramp
- Furnishing and installing any reinforcement needed as shown in the plans for curbs taller than 8"
- Tinting of concrete surface as required in the plans
- Saw Cuts needed for the removal of the existing concrete area where the new ADA ramp is being constructed
- Removal of the existing concrete area where the new ADA ramp is being constructed

2.1.1 Regardless of the number of ramp areas or surfaces having a maximum ramp slope of 1V:12H (8.33%) that are constructed for a particular type of ADA Curb Ramp, the contractor **will not** be paid for additional number of ramps at that location. See special sheet for curb ramp pay limits. Exception: **Dual Perpendicular Ramps and Blended Transitions** will be paid as 2 each.

2.2 The following shall be paid for separately in the cost of a new ADA ramp:

- Truncated Domes

2.2.1 Detectable warning surfaces shall be provided, where a curb ramp, landing, or blended transition connects to a street. Where commercial or private driveways are provided with traffic control devices or otherwise are permitted to operate like public streets, detectable warnings should be provided at the junction between the pedestrian route and the street. See plans for additional details.

2.2.2 The truncated domes shall come from Materials' Pre-Qualified List FS-1067 Table 1 from the following link:

<https://www.modot.org/materials>

2.3 Gutter Correction. The contractor shall establish the grade of the flow line of the gutter before establishing the grades of ADA facilities. The gutter line shall be free flowing with no ponding next to the curb. Under-performing gutters shall be replaced with a concrete curb and gutter or a minimum 1.75-inch thick asphalt mill and fill. Running or standing storm water shall not be pushed out into the roadway where it may be splashed on pedestrians by passing vehicles or cause a hydroplaning hazard. An 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 another surface asphalt mix is 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.

2.4 Design Plans

2.4.1 Recommendations for the design type of each curb ramp to be built on this project are shown on the plans. Curb ramps constructed by the contractor may vary from the original design, with approval from the engineer, 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. No additional pay will be made to the contractor if the original design is adjusted, and a different ramp type is constructed instead of the recommended/suggested in the plans.

2.4.2 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 contractor shall not place any ADA exceptions without consulting the Engineer on a case-by-case basis.

2.4.3 Special Sheet. A special sheet shows the pay limits for each standard ADA ramp type used by MoDOT. This special sheet is not intended to replace the Standard Plans, Standard specifications or MoDOT's ADA checklist but is intended only to provide consistency regarding pay lengths/limits within the St. Louis District.

As shown on this special sheet, **15** feet beyond the landing is considered part of the ADA ramp. Payment for the ramp will be **15** feet beyond the landing and no adjustment in sidewalk length/quantity will be made if this **15**-foot ramp length is adjusted by the contractor in the field.

2.4.4 When a project **is only** replacing ADA Curb Ramps at intersections, a warping panel shall be included and considered incidental to the cost of the new ADA Curb Ramp. When a project is also constructing new sidewalk tied into the new ADA Curb Ramp, this warping panel shall be paid for within the sidewalk pay item. A warping panel consists of tying in an ADA compliant cross slope to an existing cross slope.

2.5 Median or Median Island Cut-throughs. If there is an actual ramp with a slope not exceeding 8.33% (1V:12H) that provides access to the **raised portion** of the island or median instead of cutting through a portion of the island or median, then that area of concrete will be paid for separately as an ADA Curb Ramp, per each, as noted below. If the pedestrian path cuts

through an island or median, then this area is not considered a ramp and will be paid for with individual items necessary to construct this pedestrian path.

2.6 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.

3.0 Method of Measurement. Final measurement will not be made for each ramp 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 the following items:

Pay Item Number	Type / Description	Unit
608-10.12	Truncated Domes	SF
608-99.02	ADA Curb Ramp	Each

QQ. Concrete Sidewalk and Curb Jointing at Utility Poles

1.0 Description. Contractor shall provide longitudinal and transverse jointing for concrete sidewalk and concrete curbing to direct pedestrians around utility poles. The longitudinal and transverse jointing shall be completed to provide separation from the pedestrian access route on the sidewalk from utility poles.

2.0 Construction Requirements. At each utility pole located within the sidewalk or curbing adjacent to sidewalk, concrete jointing/edging shall be provided to a depth of ¾-inch. The jointing shall be as per direction of Engineer.

2.1 Jointing to be completed to guide sidewalk users around utility poles. The length of longitudinal joints shall be a length of 10-feet (maximum length of 15-feet) at each utility pole. Transverse short jointing shall be completed within the longitudinal joint at 12-inch intervals.

2.2 Jointing pattern shall be approved by Engineer as part of the pre-concrete placement conference.

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

RR. ADA Material Testing Frequency Modifications JSP-23-01

1.0 Description. This provision revises the Inspection and Testing Plan (ITP) for the construction of ADA compliant features to better match the nature of the work. The Quality Control (QC) testing frequency for the Sections identified below are to be revised as specified.

2.0 Compaction Test on Base Rock Under Sidewalk, Curb Ramps and Paved Approaches. (Revises ITP Sec 304.3.4) The required test frequency will be one per 600 tons.

3.0 Gradation Test on Base Rock Under Sidewalk, Curb Ramps and Paved Approaches. (Revises ITP Sec 304.4.1) The required frequency will be one per 500 tons.

4.0 Concrete Plan Checklists. (Revises ITP Sec 501) Submittal of the 501 Concrete Plant Checklist will be once per week when the contractor is only pouring curb, sidewalk, paved approaches, and curb ramps.

5.0 Concrete Median, Median Strip, Sidewalk, Curb Ramps, and Curb. (Revises ITP Sec 608) The required frequency will be the first truckload for the project and each 100 CUYDs for air and slump thereafter. Strength will be verified by use of cylinders or maturity meters at a minimum rate of one per 100 CUYD.

6.0 Paved Approaches. (ITP Sec 608) The required testing of one test from the first truckload per day and each 100 CUYDs for air and slump will remain per ITP. 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 ITP 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 requirements.

SS. 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.

TT. Metropolitan Sewer District of St. Louis Permit No. 23MSD-00482

1.0 Description. Metropolitan St. Louis Sewer District (MSD) has issued permit 23MSD-00482 for improvements associated with project J6S3599. Copy of the approved plans and permit requirements are available for download at <https://aca3.accela.com/STLMSD/>.

2.0 The Contractor shall comply with all General Construction Permitting Requirements indicated in the approved permit to include payment of all permit fees.

3.0 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.

UU. Metropolitan Sewer District of St. Louis As-Built Submittals (Permit No. 23MSD-00482)

1.0 Description. Metropolitan St. Louis Sewer District (MSD) requires as-built drawings of the constructed drainage facilities to be submitted for their records. The contractor shall perform all work necessary to produce and submit the final as-built drainage plans to MSD, per MSD's as-built submittal requirements. The contractor shall submit the MSD as-built drawings for MSD P No. 23MSD-00482 and subsequent revisions after all drainage structures related to the project have been constructed or adjusted.

1.1 MSD Electronic Plans Submittal Process. MSD requires that permits be submitted electronically using their new online paperless system Accela. The contractor will be required to login on to this system and upload as-builts and/or shop drawings as necessary. Additional information can be found here:

<https://msdprojectclear.org/doing-business/development-review/>

A direct link to the new online system can be found here:

<https://aca3.accela.com/STLMSD/Login.aspx>

In order to access the permit, the contractor will first need to call MSD in order to obtain access for the particular job mentioned above.

1.2 The contractor shall provide a copy of the as-built drainage plans to the MoDOT engineer at the time of the MSD submittal.

2.0 The Contractor shall comply with all General Construction Permitting Requirements indicated in the approved permit, which includes payment of all permit fees.

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

VV. Manhole Reconstruction

1.0 Description. This work shall consist of removing and replacing a section of concrete manhole per the special sheet shown in the plans. The majority of the manhole shall remain in place but the alternate top section (approximately 2 feet in height) with a Type 4 Manhole Frame and Cover shall be removed and replaced to grade.

2.0 Material. Material shall be as specified in Sections 604, 614 and 731 of the Standard Specifications.

3.0 Construction Requirements. Work to remove and replace a section of manhole shall conform to Sections 604, 614 and 731 of the Standard Specifications.

3.1 Contractor shall remove approximately 2 feet of the existing manhole top, including the existing manhole frame and cover. Contractor shall rebuild the structure to grade as a manhole in accordance with MoDOT standard details and specifications.

4.0 Method of Measurement. Measurement of the manhole reconstruction will be made per linear foot.

5.0 Basis of Payment. The accepted quantity of removing and replacing the alternate top

section of manhole, complete in place, will be paid for at the contract unit price for the following and shall include all removal, reinforcement, steps, labor, material or other incidental items required to complete the work. The Type 4 Manhole frame and cover will be paid for separately for this reconstruction as will the Class 3 Excavation:

Item Number	Item Name	Units
614-30.14	Manhole Frame and Cover, Type 4	Each
731-99.03	Precast Concrete Alternate Manhole Section	L.F.

WW. Drainage Flume

1.0 Description. This work shall consist of constructing drainage flumes to carry pedestrian over the openings to existing drainage inlets at the locations shown on the plans.

2.0 Material requirements. All materials shall be in accordance with Sec 703 & 706 except as noted on the plans.

3.0 Construction Requirements. All work performed shall be done in accordance with Sec 703 and 706 except as noted on the plans.

4.0 Basis of Payment. All labor, equipment, and materials necessary to comply with the provisions above shall be completely compensated at the contract unit price for:

ITEM NUMBER	DESCRIPTION	UNIT
706-99.02	7 FT. x 4 FT. Drainage Flume	Each
706-99.02	7 FT. x 8 FT. Drainage Flume	Each
706-99.02	9 FT. x 4 FT. Drainage Flume	Each

XX. Special Drainage Structures

1.0 Description. This work shall consist of furnishing and installing precast concrete drainage structures at the locations shown in the plans that allow for elliptical pipes to be connected into the side of the given structure. No additional payment shall be made to provide a precast concrete drainage structure that meets this requirement where needed.

1.1 In addition, the contractor shall place 2 – 2x2 Precast Drop Inlets side-by-side as shown in the plans with curved vane grates. Due to how the curved vane grate is situated per the Standard Plans, the contractor will not be allowed to substitute a 2x4 drop inlet in place for the 2 – 2x2 drop inlets at that location. The contractor may substitute a 2x4 Precast Concrete Drop Inlet but it shall have an reinforced intermediate wall in between so that the grates can sit on top and be driven upon without damage. If the contractor uses the 2 – 2x2 Precast Drop Inlets, the opening (or pipe) between the structures will be incidental and no direct payment shall be made to allow flow between the structures.

1.2 No additional payment shall be made to comply with this provision regarding Sections 1.0 to 1.2. All pay items to be used are included within the plans.

2.0 MSD Precast Concrete Manhole. The contractor shall also install a new precast concrete MSD manhole following MSD specifications for Structure 1-5MH.

3.0 Method of Measurement. Measurement of the new MSD precast manhole will be made per linear foot.

4.0 Basis of Payment. The accepted quantity of constructing, installing a new MSD precast manhole, complete in place, will be paid for at the contract unit price for the following and shall include all reinforcement, steps, manhole frame with locking lid, labor, material or other incidental items required to complete the work. Class 3 Excavation for the new manhole will be paid separately from the item listed below:

ITEM NUMBER	DESCRIPTION	UNIT
731-99.03	MSD Precast Concrete Manhole – 60"	L.F.

YY. Replace Inlet Top to New Grade

1.0 Description. This work shall consist of **removing and replacing** existing inlet tops, curved vane grates, bearing plates and surrounding concrete due to the installation of either 2'x2', 2'x3' or 2'x4' grates and inlet tops along Route N. The existing inlets shall remain in place. The locations of adjusting inlets to grade are shown within the plans.

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

3.0 Method of Measurement. Measurement for replacing drop inlet tops will be per each and will include **full depth saw cutting**, removing pavement, removing existing inlet tops, grates, bearing plates and any necessary surrounding concrete as well as furnishing and installing the new inlet tops and grates and bearing plates.

4.0 Basis of Payment. Payment for furnishing the labor, materials, equipment, and excavation necessary to install the new inlet top and grates and bearing plates shall be paid for by the contract unit price for the following pay items:

Item No.	Type	Description
731-99.02	Each	Replace Inlet Top to New Grade

ZZ. Class 4 & Class 5 Concrete Pipe

1.0 Description. This work shall consist of furnishing and installing horizontal elliptical reinforced concrete pipe culvert and circular reinforced concrete pipe culvert, Class 5, laid upon a bed, and backfilled as specified on the plans or as directed by the engineer. This work shall be in accordance with Sec 726 and accompanying provisions except as modified herein.

2.0 Material. All material, unless specified otherwise in this specification, shall be in accordance with Division 1000, Material Details, and specifically as follows:

Section 1026, Reinforced Concrete Culvert Pipe
Section 1034, Reinforced Concrete Elliptical Culvert Pipe

3.0 Construction Requirements. The construction requirements shall conform to Sec 724.2 and 726.3.

4.0 Method of Measurement. The quantities will be paid for in accordance with Section 724.4

5.0 Basis of Payment. Section 724.5 is supplemented by the following.

The cost of all materials, labor and equipment necessary for the complete in place installation shall be included in the unit bid price for:

Item Number	Item Name	Units
726-99.03	14 In. x 23 In. Class IV Reinforced Concrete Elliptical Pipe	L.F.
726-99.03	12 In. Class V Reinforced Concrete Pipe	L.F.
726-99.03	15 In. Class V Reinforced Concrete Pipe	L.F.
726-99.03	24 In. Class Reinforced Concrete Pipe	L.F.

AAA. Concrete Encasement of Pipes

1.0 Description. The contractor is advised that a portion of new pipes to be installed on this project shall be encased in concrete as shown in the details on the special sheet included within the plans. Concrete encasement complete in place, will be paid for at the contract unit price for the following pay items and will be full compensation for all labor, equipment and material to complete the described work and shall also include all backfilling around the existing pipes:

Item Number	Item Name	Units
703-20.02	Class B Concrete (Misc.)	C.Y.

BBB. 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.

1.1 An additional two-inch depth of rock base shall be placed for 12 feet 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 fulfil the requirements above.

Item Number	Unit	Description
608-99.02	EACH	ADA Curb Ramp
304-05.04	SQ YD	Type 5 Aggregate for Base (4 In. Thick)

CCC. Adjusting Manholes, Valves and Pullboxes

1.0 Description. This work shall consist of adjusting water valves, water meters, basins/inlets, manholes, lighting pull boxes, and signal 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 adjustments shall be made to match the final proposed grade. Various pull boxes are called out to be relocated and adjusted to grade. The relocation of these pull boxes is included in the adjust to grade pay item. Adjusting rings shall not exceed 12 inches in height.

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 are called out in the plans as “adjust inlet top”. Adjustments shall be completed so that the finished sidewalk, ramp, approach, or pavement meets current ADA standards.

2.1 Concrete Collars. Damaged concrete collars on manholes shall be replaced as directed by the engineer. The replacement concrete collars shall be 4 inches deep and 18 inches wide around the manhole.

3.0 The contractor is advised that Metropolitan St. Louis Sewer District, MoDOT, MAWC, and Spire Gas have manholes and valves, located within the islands/roadway/sidewalk that will require adjustments. The Contractor shall adjust these facilities to grade as necessary. The Contractor shall contact the respective utility regarding any questions regarding the adjustment of these facilities.

3.1 The contractor shall notify the engineer if manholes or pull boxes belonging to utilities other than Metropolitan St. Louis Sewer District or MoDOT, are encountered that will require adjustment. The contractor shall coordinate work with the affected utility to ensure that the completed facilities meet ADA requirements.

3.2 No direct payment will be made for any required hauling, cutting, joining, backfilling, or adjusting rings, or any other requirements necessary to fulfill this provision. No direct payment will be made to recover the cost of equipment, labor, materials, or time required to fulfill the above provision.

3.3 Basis of Payment. All costs associated with compliance with this special provision for all material, equipment, and labor shall be completely covered by the contract unit price for:

Item Number	Type	Description
604-99.02	Each	Adjusting Manholes, Valves and Pull Boxes to Grade
604-99.02	Each	Adjusting MSD Sanitary or Storm Sewer Manholes to Grade

4.0 Pull boxes, valves or manholes not owned by MoDOT or specified as required work by the Contractor may require adjustment due to work in the contract. The Contractor shall contact the respective utility owners regarding any questions about the adjustment of these facilities. The Contractor shall contact the respective utility owner, at least 3 weeks prior to adjustment of these facilities to allow the utility owner to make necessary adjustments. The Contractor shall coordinate with the respective utility owners for scheduling and providing the necessary grade requirements for each adjustment. Payment for all necessary work required for the coordination for the scheduling, grade requirements and adjustments of these utility facilities shall be at no direct pay.

Contractor shall directly contact Utility companies to verify location of facilities and status of relocation/adjustment work. The contractor shall coordinate construction activities with Utility Companies and take measures to ensure the integrity of the existing facilities are not disturbed until such time as the Utility Companies have completed the adjustment work.

DDD. ATG (Adjust to Grade) Type T-Inlet Top

1.0 Description. The contractor shall replace the inlet tops, MSD or MoDOT style, labeled in the plan sheets with tops that match the existing inlet size. The top shall be replaced with either a Type 'T' inlet top or type as indicated in the plans. The contractor will have the option to either tie the new top into the existing inlet with steel reinforcing rebar or shall instead build a larger structure that surrounds the existing inlet. All details of the inlet top adjustments are shown within the special plan sheets.

2.0 Basis of Payment. Payment for the removal and replacement of the area inlet top as shown in the plans shall be considered full compensation for all contractor-provided equipment, hardware, labor, removal and material including new concrete, reinforcement, grate and bearing plate, and manhole frame and cover to complete the described work. Payment will be made as follows:

Item No.	Type	Description
731-99.02	Each	ATG (Adjust to Grade) Type T-inlet Top

EEE. ATG (Adjust to Grade) MSD Brick Inlet

1.0 Description. As indicated in the plans, the contractor shall adjust to grade an existing brick MSD area inlet along with removing and replacing the existing inlet top (stone) of the inlet. Prior to replacing the inlet stone, the contractor shall provide an additional opening for storm water to enter into the inlet. The area inlet will go from having 2 open sides to having 3 open sides once construction is complete. The top elevation of the inlet top stone is not expected to change from existing conditions. All details of the area inlet top are shown within the provided special plan sheets. The contractor shall follow the Standard Specifications of MSD provided by the link within JSP – Metropolitan Sewer District of St. Louis Permit 23MSD-00482.

2.0 Basis of Payment. Payment for the removal and replacement of the area inlet top as shown in the plans shall be considered full compensation for all contractor-provided equipment, hardware, labor, removal and material including new concrete, reinforcement, inlet stone, and manhole frame and cover to complete the described work. Payment will be made as follows:

Item No.	Type	Description
731-99.02	Each	ATG (Adjust to Grade) MSD Brick Inlet

FFF. Lump Sum Temporary Traffic Control JSP-22-01A

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

GGG. ADA Compliant Movable 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 Movable Barricade will be made per each for each 6 foot (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 the following. No direct payment will be made for any necessary relocation of the ADA compliant barricade.

Item No.	Unit	Description
616-99.02	Each	Misc. ADA Compliant Movable Barricade

HHH. Contractor Designed, Furnished and Installed Steel Plates

1.0 Description. The Contractor may elect to utilize steel plating to cover open trenches on Route N or in adjacent paved areas to mitigate overnight roadside hazards. Steel plates shall be secured from lateral movement while in use. Steel plates shall withstand H-20 traffic loading.

2.0 Materials. All materials shall be in accordance with Division 1000, Material Details, as specified in the Missouri Highway and Transportation Commission's current edition of Missouri Standard Specifications for Highway Construction.

3.0 Construction Requirements.

3.1 Contractor shall provide asphalt wedging transitions for traffic and pedestrians at plate edges as detailed in the plans. Asphalt wedging transition for pedestrians shall comply with ADA pedestrian access routes as identified by Engineer. No direct pay for asphalt wedging or tack coat.

3.2 Contractor shall document by evidence of registered professional engineer's seal, signature, and date in accordance with appropriate state licensing requirements showing the design and placement of the steel plating meets loading requirements.

3.3 The Contractor shall conduct a pre-installation conference with the Engineer to review methods and procedures related to excavation support and protection. The pre-installation conference will address:

- Existing utilities and subsurface conditions.

- Proposed excavations.
- Proposed equipment.
- Monitoring of excavation support and protection system.
- Working area location and stability.
- Coordination with traffic control movements of general public.
- Removal of plating systems.

4.0 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. Utilization of steel plating, asphalt wedging and tack cost is considered incidental to the Lump Sum Temporary Traffic Control pay item.

III. Contractor Designed, Furnished and Installed Shoring for Excavation

1.0 Description. This Section addresses sheeting, bracing, and all operations necessary for the preparation of trenches for bedding of pipes and pipe appurtenances, conduit, and buried cable.

2.0 Materials. All materials shall be in accordance with Division 1000.

3.0 Execution. Where selecting an option for excavation, trenching, and shoring in compliance with local, state, or federal safety regulations such as "OSHA Part 1926" or successor regulations, which require design by a registered professional engineer, submit (for information only and not for Engineer approval) the following:

- A. Copies of design calculations and notes for sloping, benching, support systems, shield systems, and other protective systems prepared by or under the supervision of a professional engineer legally authorized to practice in the jurisdiction where the Project is located.
- B. Documents provided with evidence of registered professional engineer's seal, signature, and date in accordance with appropriate state licensing requirements.
- C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
- D. Shore, support, and protect utilities encountered.
- E. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
- F. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Engineer and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- G. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- H. Monitor excavation support and protection systems daily during excavation progress

and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

- I. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

4.0 Quality Assurance. The contractor shall conduct a pre-installation meeting at the project site to review methods and procedures related to excavation support and protection systems including, but not limited to:

- a. Existing utilities and subsurface conditions.
- b. Proposed excavations.
- c. Proposed equipment.
- d. Monitoring of excavation support and protection system.
- e. Working area location and stability.
- f. Coordination with traffic control movements of general public.

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.

JJJ. Concrete Barrier Transition Sections

1.0 Description. This work shall consist of constructing standard Concrete Traffic Barrier, Type 'C' or Type 'D', and barrier transition sections for Type 'C' or Type 'D' barrier as shown in the plans.

2.0 Material. All material shall be in accordance with Division 1000, Material Details, and as specifically detailed within Section 617 of the Standard Specifications.

3.0 Construction Requirements. Construction of concrete barrier and/or transition sections shall be in accordance with Section 617 of the Standard Specifications and as shown on the special plan sheets or as directed by the Engineer.

4.0 Method of Measurement. Measurement of the concrete barrier will be made to the nearest linear foot as noted below.

5.0 Basis of Payment. The accepted quantity of barrier, including all steel reinforcement complete in place and including all material, labor, and equipment for installation, will be paid for at the contract unit price for the following pay items below included in the contract. 18" of concrete below the Type D barrier shall be included in the cost of the barrier or its transition section. 7.5 inches of non-reinforced concrete pavement and aggregate base shall be paid separately from either Type 'C' barrier or its transition section.

Item 617-30.00	Concrete Traffic Barrier, Type 'C'	LF
Item 617-31.00	Concrete Traffic Barrier, Type 'D'	LF
Item 617-99.03	Concrete Traffic Barrier, Type C Barrier Height Transition Section	LF
Item 617-99.03	Concrete Traffic Barrier, Type D Barrier Height Transition Section	LF

KKK. Modified Curb & Gutter

1.0 Description. There are a number of locations on the project where gutter widths vary and are either narrower or wider than standard. In those locations, Modified Curb and Gutter shall be used. The width to be constructed by the contractor will be provided within the quantity sheets.

2.0 Construction Requirements. All materials and work performed for this item shall be in accordance with Sec 609.

3.0 Method of Measurement. Measurement will be made in accordance with Sec 609.

4.0 Basis of Payment. Payment for the accepted quantity for the Modified Curb and Gutter will be made in accordance with the contract unit bid price for the item listed below and includes all labor, equipment, materials, and time required to comply with this provision.

Item No.	Unit	Description
609-99.03	Linear Foot	Modified Type B Curb and Gutter
609-99.03	Linear Foot	Modified Type A Curb and Gutter

LLL. Pavement Marking Removal

1.0 Description. The first sentence of Sec 620.50.3.2 shall be removed and replaced with the following:

Where required, measurement for the removal of pavement markings will be made to the nearest linear foot per 4-inches of width. No additional pay factor, based upon 4-inches of width, shall be included for removals unless the striping width is greater than 6-inches. 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.

2.0 Pavement Marking Removal shall be in accordance with Section 620.50 and specifically as follows with the exception in Section 1.0 above.

3.0 Construction Requirements. Removal of all pavement marking within the project limits shall be as shown on the plans or as approved by the engineer. Pavement marking shall be completely removed to the satisfaction of the engineer with minimal damage to the pavement. The contractor shall use an approved **water blasting method** to remove the pavement marking on concrete surfaces. No more than five percent of the existing marking shall remain. The pavement surface shall not be left scarred with an image that might mislead traffic. Any excess damage or scarring of the pavement shall be repaired at the contractor's expense. It shall be the contractor's responsibility to determine what type of material needs to be removed.

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

5.0 Basis of Payment. The accepted quantity of pavement marking removal including all labor, equipment, and material necessary to remove the existing marking will be paid for at the contract unit price for the following pay item:

Item Number	Type / Description	Unit
620-70.01	Pavement Marking Removal	L.F.
620-70.02	Pavement Marking Removal (Symbols)	EA

MMM. 18 Inch Island Tubular Marker

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

2.0 Requirements. Island tubular markers shall have a height 18-inches as noted on plans, 2 reflective bands with super high intensity prismatic sheeting in accordance to 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 markers 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. All labor, equipment and materials necessary to install these markers will be paid for under:

Item Number	Type	Description
620-99.02	Each	18 IN. Yellow Island Tubular Marker
620-99.02	Each	18 IN. White Island Tubular Marker

NNN. Curb Reflectors

1.0 Description. This work shall consist of furnishing and installing a curb reflector that provides a continuous ribbon of reflectivity at the nose of each island specified in the plans. All work shall comply with Section 620 of the Standard Specifications.

2.0 Construction Requirements. 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 of 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 inch

above the mounting surface or as directed by the manufacturer's specifications. The unit shall provide a continuous reflective surface for the island nose and this surface shall provide reflectivity perpendicular to the mounting surface.

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

Item Number	Type	Description
620-99.03	L.F.	Curb Reflectors

OOO. Pavement Marking Layout

1.0 Description. The striping lane lines on sections of roadway with multiple traffic lanes in one direction shall be placed in a manner in which the start and stop points for all intermittent lane lines match and line up even transversely across all traffic lanes. For all installations of intermittent pavement markings care should be taken to align the skips longitudinally to consistently match the spacing of the existing UIP intermittent lane lines at both start and end points of the improvement section.

2.0 Construction Requirements. The contractor shall submit to the Engineer for review and approval a pavement marking installation plan. This plan will include the contractor's proposal for installing the intermittent pavement markings to meet the requirements outlined above.

2.1 Final striping will not begin until the contractor has received approval of the pavement marking installation plan.

3.0 Basis of Payment. All cost and expenses incurred by the contractor in fulfilling the requirements of the provision shall be considered incidental to pavement marking cost.

PPP. Thermoplastic Pavement Markings

1.0 Description. This work shall consist of installing a minimum of **1.5 inch black outside contrast border** surrounding any **pavement marking arrow or stop bar** installed on existing or proposed concrete pavement.

2.0 Basis of Payment. Payment for installing the 1.5 inch black outside contrast border shall be included in the cost of the pavement marking arrow or stop bar included in the plans.

QQQ. Lane Reduction Arrows

1.0 Description. This work shall consist of installing special pavement markings as shown in the plans.

2.0 Lane reduction arrows shown in the plans shall be in accordance with MUTCD Figure 3B-24F and shall be preformed thermoplastic pavement marking in accordance with Section 620 of the Standard Specifications. The lane reduction arrows installed on concrete pavement shall have a minimum of 1.5 inch black outside contrast border surrounding the lane reduction arrow.

This black contrast border shall be either preformed thermoplastic paint or acrylic waterborne paint.

3.0 Basis of Payment. Payment for furnishing and installing the pavement markings noted above, including all materials, equipment, tools, labor, and work incidental thereto (including the 1.5 inch black outside border), and shall be considered to be completely covered by the contract unit prices for the following:

Item No.	Type	Description
620-99.02	Each	Lane Reduction Arrow, Preformed Thermoplastic Pavement Marking

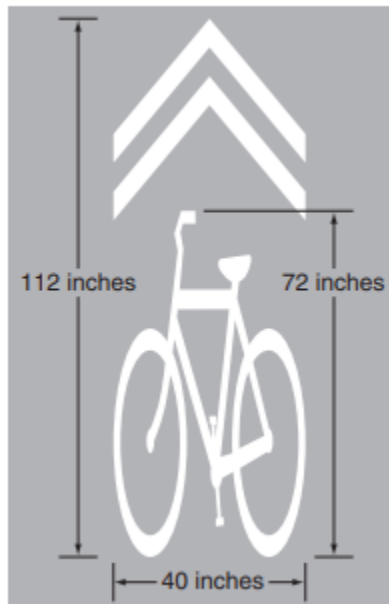
RRR. Bike Pavement Markings

1.0 Description. This work shall consist of installing bike lane symbols and shared use lane sharrows in the center of the lane as shown in the plans.

2.0 Materials. The contractor's work shall consist of furnishing and placing thermoplastic markings for the bike lane symbols and sharrows as shown in the plans and in accordance with Section 620 of the Standard Specifications.

3.0 Construction Requirements. Per the 2009 MUTCD, Figure 9C-9, the contractor shall install the following at locations noted in the plans.

Figure 9C-9. Shared Lane Marking



4.0 Basis of Payment. Payment for furnishing and installing the bike lane symbols and sharrow symbol, each individual items, shall include all materials, equipment, tools, labor, and work incidental thereto, and shall be considered to be completely covered by the contract unit prices for:

Job No.: J6S3599
Route: N
County: St. Louis

Item No.	Unit	Description
620-99.02	Each	Bike Lane Preformed Thermoplastic Pavement Marking (Bike Symbol)
620-99.02	Each	Bike Lane Preformed Thermoplastic Pavement Marking (Shared Use Sharrow)

SSS. 8 In. White Pavement Markings

1.0 Description. This work shall consist of installing either 8-Inch White Preformed Thermoplastic pavement markings or 8-Inch White Waterborne Pavement Marking Paint with Type 'P' beads at locations shown in the plans or as instructed by the Engineer.

2.0 Materials. Materials shall be in accordance with Sec 620 and Division 1000.

3.0 Construction Requirements. The contractor shall be responsible for installing 8-Inch pavement markings as shown in the plans and as per Section 620 of the Standard Specifications and Standard Plans.

4.0 Basis of Payment. Payment for installing 8-Inch White pavement markings shall include all surface preparation, materials, equipment, tools, labor, and work incidental thereto, and shall be considered to be completely covered by the contract unit price.

Item Number	Type / Description	Unit
620-99.03	Preformed Thermoplastic Pavement Marking, 8 In. White	LF
620-99.03	8" White Waterborne Pavement Marking Paint, Type 'P' Beads	LF

TTT. Disposition of Existing Signal/Lighting and Network Equipment JSP-15-05A

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, 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.

UUU. Existing Power Supply and Lighting Controller Cabinets – SW Corner of I-70 and Route N Interchange

1.0 Description. The contractor shall provide a sticker label within in each cabinet in the SW corner of the I-70 and Route N interchange denoting the function of each cabinet. There are 8 existing cabinets that supply power or control lighting in this corner of the interchange. Each sticker shall denote the voltage of the cabinet and what it controls/operates.

1.1 The contractor shall remove existing signal pull boxes labeled as #4 and #7 in the signal plans for the I-70 interchange and as noted in the quantity sheets under Removal of Improvements due to the realignment of the right turns from I-70 to Route N. These two pullboxes house the old loop detectors for these right turns ramps. The signals for these right turns have already been removed but the contractor shall remove the bases of the poles as part of this project. Prior to removing these two pullboxes, the contractor shall investigate and let the Engineer know if any additional wire/fiber etc. runs north of pull box #4 and south of pull box #7 along Route N. If nothing of significance extends past these pull boxes, no replacements will be necessary. Replacement pull boxes are shown in the plans in case they are necessary to continue runs further north and south.

2.0 The contractor is advised that the existing power supply for MoDOT's signals at University Place Drive is located in this SW corner of the interchange but is being removed and a new UPS (Uninterruptible Power Supply) being installed closer to that intersection.

2.1 The contractor is advised that the existing power supply for MoDOT's signals at the I-70 Interchange underneath the I-70 Bridge is located in this SW corner of the interchange but is being removed and a new UPS (Uninterruptible Power Supply) being installed in the same general area as this bank of cabinets.

2.2 The contractor is advised that a new combination power supply and lighting controller for new lighting attached to the I-70 Bridge over Route N is being located in this SW corner of the interchange within the same general area as this bank of cabinets.

3.0 Basis of Payment. No direct payment shall be made to provide and install the labeled sticker in each of the cabinets in the SW corner of the I-70 and Route N interchange.

VVV. Maintenance of Roadway Lighting

1.0 Description. This work shall consist of maintaining the operation of the existing roadway lighting during the construction of the project.

2.0 Construction Requirements. Contractor shall schedule/stage work such as to minimize the duration that any roadway lighting will not be operational. Contractor shall provide a schedule of when the roadway lighting will not be operational to the Engineer for review and approval.

2.1 Temporary Lighting. The contractor shall provide temporary lighting to ensure all existing locations that are currently lit at the I-70 interchange stay that way during construction and that all islands (existing and new) and signalized intersections have lighting when open to traffic.

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

WWW. Temporary Generator

1.0 Description. The contractor shall maintain signal operations at all times at the I-70 interchange and at the University Place Drive intersection when the power is switched over from the existing power supply in the SW quadrant of the I-70 interchange to the new power supply for each intersection as noted in the plans.

1.1 Construction Requirements. The contractor will be responsible for providing a temporary generator to operate the existing signal cabinet at the intersection(s) noted above while Ameren connects the power from its transformer to the new power supply. The contractor shall discuss with the Engineer and Ameren any issues pertaining to the installation of the power supply and transformer prior to the switch over to the new power.

2.1 All construction items listed in this provision shall conform to the Ameren Electrical Service Manual.

3.0 Method of Measurement. Method of measurement shall be made per each installed temporary generator regardless of the time needed to operate the generator at each location.

4.0 Payment. Payment for a temporary generator, including all equipment, fuel, time and labor shall be made at the contract unit price for the following:

Item No.	Type	Description
902-99.02	Each	Temporary Generator for Signal Power

XXX. Signal Cabinet Base Wrap and Cabinet Shift

1.0 Description. Where required, an existing concrete signal base shall be widened on all sides in order to provide additional conduits in addition to an existing cabinet as detailed in the plans.

2.0 Existing Cabinet Assembly. The existing cabinet assembly shall be kept in operation at all times during the base widening procedure, except for a brief amount of time needed to shift the cabinet off of the existing base.

3.0 Construction Requirements. Construction requirements shall conform to Sec 902.15.2.

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

5.0 Basis of Payment. Payment for signal cabinet base wrap and cabinet shift shall be considered full compensation for all contractor-provided equipment, connection cables, installation of non-contractual items, labor, and material to complete the described work. Payment will be made as follows:

Item No.	Type	Description
902-99.02	Each	Signal Cabinet Base Wrap and Cabinet Shift

YYY. Temporary Traffic Signals

1.0 Description. This work shall consist of maintaining the operation of existing traffic signals during the construction of the new traffic signals at each intersection. This includes any necessary temporary traffic signal devices, removing/relocating signal equipment to keep the intersection signalized, staging traffic signal construction/equipment, any necessary temporary signage, and any other equipment/devices and work to keep the operation of the existing signalized intersections during construction.

2.0 Construction Requirements. Work shall be in accordance with Sec 902 and the manufacturer's recommendations regarding any temporary signals if needed.

3.0 Basis of Payment. Payment for temporary traffic signals shall be considered to be completely covered by the contract unit price for Item Number 902-94.00, "Temporary Traffic Signals," per lump sum as indicated in the plans. This pay item pertains to every signalized intersection along the project limits. There will be no additional payment for any temporary removals and relocations that may be necessary.

ZZZ. Existing Traffic Signal Bases at Bermuda/St. Ann's Lane

1.0 Description. Due to the close proximity of underground utilities to the proposed traffic signal bases as described in JSP – Utilities and shown in the plans, the contractor should consider the possibility of removing the entire existing signal bases at this intersection, and installing new traffic signal bases in the same location as a way to avoid underground utilities per JSP – Contractor Verification of Signal Base Locations. No additional pay shall be made to completely remove the existing signal base, which per old standard plans and as-builts, is estimated to be 8' below the existing top of ground.

AAAA. Advanced Traffic Controller

1.0 Description. The Commission's St. Louis District is utilizing TransCore's TransSuite software (TSC) as their Advanced Traffic Management System (ATMS), therefore all signal controllers must be able to interface with their TCS program.

2.0 Material. All traffic signal controllers purchased and installed on this project shall be selected from the list below and match the cabinet type and connections indicated on the D-37C sheet for each intersection(s). The controllers on the list below are the only controllers that are tested, fully functional, and approved with the version of TransSuite that the St. Louis District is currently operating (TransSuite version 19.4):

Controller/Firmware Type	Firmware Supported	Cabinet Type (Match in field)
Econolite Cobalt	32.65.10 or newer	NEMA TS2 Type 1 or 2
Econolite ASC/3	2.66	NEMA TS2 Type 1 or 2
McCain Omni EX	1.11	NEMA TS2 Type 1 or 2
Intelight X3	MaxTime 2.1.1	NEMA TS2 Type 1 or 2

3.0 Construction Requirements. Contractor shall ensure that the signal controller as noted above is programmed to be compatible with the previously mentioned version of TransSuite TCS system.

4.0 Acceptance Testing. All controllers shall be tested per the Commission's specifications. Programming and testing should be done prior to any installation and approved by the Commission's engineer or representative. The contractor shall provide a copy of the signal programming to the engineer via an USB Flash drive.

5.0 Documentation. Contractor shall provide the engineer with an electronic copy of the manufacturer's signal controller manual or link to the website where the manual can be downloaded in .pdf format.

6.0 Basis of Payment. Measurement and paywork for work covered by this specification shall include all equipment, tools, and materials necessary and shall be paid for at the contract unit price as follows:

No.	Item	Type	Description
902-99.02		Each	ATC Traffic Signal Controller

BBBB. 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). One 8-outlet IP-addressable power strip shall be provided and Commission-furnished. 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 Detection 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 APL.

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 item number 902-42.83, "Controller Assembly Housing, NEMA TS2 Controller", 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 to provide conformance. Payment also includes connection of NEMA TS2 Controller to existing power source. **Modifications required for connection to the existing power source shall be at no direct pay.**

Item Number	Type	Description
902-42.83	Each	Controller Assembly Housing, NEMA TS2 Controller

CCCC.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:

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 housings 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" symbol shall be illuminated with a filled, Portland orange LED module. The "WALKING PERSON" symbol shall be illuminated with a filled, white LED module. The "Countdown" display numbers shall be illuminated with a Portland orange LED module. The LED modules 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 "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 Number	Type	Description
902-99.02	Each	Countdown Pedestrian Signal Head, Type 1S

DDDD. 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 Basis of Payment. Payment for the audible signals will be for each unit per bid item, 902-99.02, “Audible Pedestrian Pushbutton and Signing with Verbal Walk Message”, per each. This will include all wiring, power adaptors, pusbuttons and installation hardware needed. Payment for signing and mounting hardware will be included in the pay item for audible pedestrian pushbutton. All costs incurred for complying with this provision including labor shall be considered completely covered by the contract unit price for:

Item Number	Type	Description
902-99.02	EA	Audible Pedestrian Pushbutton and Signing with Verbal Walk Message

EEEE. Pedestrian Push Button Stanchion

1.0 Description. This work shall consist of installing pedestrian push button stanchions at the locations shown on the plans.

2.0 Requirements. Posts used for pedestrian push button stanchions shall be 48-inch long 4-inch diameter (4.5-inch O.D) schedule 40 aluminum pipe.

3.0 Construction Requirements. The post for the pedestrian push button stanchion shall be installed on top of a breakaway pedestal base mounted to a foundation in the sidewalk. The

sidewalk foundation shall be constructed as part of the sidewalk and have an 18-inch diameter and 12-inch depth. The breakaway pedestal base shall be mounted to the sidewalk foundation using proper sized anchor bolts according to manufacturer's instructions.

A slip form connection shall be provided on the wiring in the breakaway pedestal base to sever the connection in the event that the pedestrian push button stanchion is struck by a vehicle. Access to wiring shall be provided through an access panel in the breakaway pedestal base as well as the pipe post cap. The cap shall be secured and weather proofed when it is not opened for access.

The final product shall meet or exceed Americans with Disabilities Act (ADA) requirements for pedestrian facilities.

4.0 Method of Measurement. Final measurement of pedestrian push button stanchions will be made per each.

5.0 Basis of Payment. Payment for furnishing all labor, equipment, materials, labor, and tools necessary to place pedestrian push button stanchions shall be completely covered by the contract unit price for:

Pay Item Number	Type / Description	Unit
902-99.02	Pedestrian Push Button Stanchion	Each

FFFF. Rectangular Rapid Flashing Beacon Assembly

1.0 Description. Rectangular Rapid Flashing Beacon (RRFB) Assemblies shall be installed at the locations indicated in the plans. Rectangular Rapid Flashing Beacon Assemblies shall consist of one signal post with pedestrian crossing signs and rapid flashing beacons (RRFBs) facing traffic. Each pedestrian crossing shall have two RRFB assemblies, one on each side, as shown on the plans. **Crossings with median islands, may have two RRFB assemblies for each direction.**

2.0 Beacon Requirements.

2.1 General Conditions. RRFB assemblies shall meet requirements set forth by this JSP and in the MUTCD and found at:

http://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/fhwamemo.htm

An RRFB assembly shall consist of two rapidly and alternately flashed rectangular yellow indications having LED-array based pulsing light sources, and shall be designed, located, and operated in accordance with the detailed requirements specified below.

- Each post shall have front facing signs.
- Power for the RRFBs shall be supplied from solar panel and battery capable of supplying the appropriate power sufficient for 4 RRFBs per post. The solar panel and battery shall be installed on the same post.
- The two yellow warning signs shall be fluorescent yellow-green signs.
- One solar-powered crosswalk illuminator that operates upon pedestrian actuation during times with low ambient light shall also be included at each RRFB location. The illuminator

and the crosswalk it lights shall be evaluated after installation by the Contractor and the Engineer at night to access how it functions with other light sources in the area. The illuminator may require adjustment or even eliminated as directed by the Engineer after this evaluation.

2.2 Restrictions.

- (a) An RRFB shall only be used to supplement a W11-2 (Pedestrian) with a diagonal downward arrow (W16-7p) plaque, located at or immediately adjacent to a marked crosswalk.
- (b) An RRFB shall not be used for crosswalks across approaches controlled by YIELD signs, STOP signs, or traffic control signals. This prohibition is not applicable to a crosswalk across the approach to and/or egress from a roundabout.
- (c) An RRFB shall not be installed independent of the crossing signs for the approach the RRFB faces. The RRFB shall be installed on the same support as the associated W11-2 (Pedestrian) and plaque.

2.3 Beacon Dimensions and Placement in Sign Assembly.

- (a) Each RRFB shall consist of two rectangular-shaped yellow indications, each with an LED-array based light source. Each RRFB indication shall be a minimum of approximately 5 inches wide by approximately 2 inches high.
- (b) The two RRFB indications shall be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of approximately seven inches (7 in), measured from inside edge of one indication to inside edge of the other indication.
- (c) The outside edges of the RRFB indications, including any housings, shall not project beyond the outside edges of the W11-2 sign.
- (d) As a specific exception to 2003 MUTCD Section 4K.01 guidance, the RRFB shall be located between the bottom of the crossing warning sign and the top of the supplemental downward diagonal arrow plaque (or, in the case of a supplemental advance sign, the AHEAD plaque), rather than 12 inches above or below the sign assembly. (See example photo at: http://mutcd.fhwa.dot.gov/resources/interim_approval/ia11/fhwamemo.htm#image).

2.4 Beacon Flashing Requirements.

- (a) When activated, the two yellow indications in each RRFB shall flash in a rapidly alternating "wig-wag" flashing sequence (left light on, then right light on).
- (b) As a specific exception to 2003 MUTCD Section 4K.01 requirements for the flash rate of beacons, RRFBs shall use a much faster flash rate. Each of the two yellow indications of an RRFB shall have 70 to 80 periods of flashing per minute and shall have alternating but approximately equal periods of rapid pulsing light emissions and dark operation. During each of its 70 to 80 flashing periods per minute, one of the yellow indications shall emit two rapid pulses of light and the other yellow indication shall emit three rapid pulses of light.
- (c) The flash rate of each individual yellow indication, as applied over the full on-off sequence of a flashing period of the indication, shall not be between 5 and 30 flashes per second, to avoid frequencies that might cause seizures.

- (d) The light intensity of the yellow indications shall meet the minimum specifications of Society of Automotive Engineers (SAE) standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005.

2.5 Beacon Operation.

- (a) The RRFB shall be normally dark, shall initiate operation only upon pedestrian actuation, and shall cease operation at a predetermined time after the pedestrian actuation. The length of actuation shall be programmable and changeable.
- (b) All RRFBs associated with a given crosswalk (including those with an advance crossing sign, if used) shall, when activated, simultaneously commence operation of their alternating rapid flashing indications and shall cease operation simultaneously.
- (c) A pedestrian instruction sign with the legend PUSH BUTTON TO TURN ON WARNING LIGHTS should be mounted adjacent to or integral with each pedestrian pushbutton. Push buttons shall meet American's with Disabilities Act (ADA) requirements in both location and design with both visible and audible feedback when pushed, as well as the requirements set forth in the JSP titled "Audible Pedestrian Signals and Signing."
- (d) The duration of a predetermined period of operation of the RRFBs following each actuation should be based on the MUTCD procedures for timing of pedestrian clearance times for pedestrian signals.
- (e) A small light directed at and visible to pedestrians in the crosswalk will be installed integral to the RRFB or push button to give confirmation that the RRFB is in operation.
- (f) In addition to the push button used to activate the RRFB, the contractor shall install a passive pedestrian detection system, per JSP – Passive Pedestrian Detection for RRFBs, which allows the RRFB to be activated when the installed system detects a pedestrian near the new midblock crossing per the selected manufacturer's equipment and specification.

2.6 Crosswalk Illuminator.

Upon activation by pedestrian during times of low ambient light, the controllers shall activate all crosswalk illuminators in the crosswalk system simultaneously and then cease operation after a programmable timeout coordinated with the flashing beacons.

- (a) The crosswalk illuminator shall be Tapco SafeWalk Crosswalk Illuminator.
- (b) Shall operate in conjunction with the crosswalk controller and intelligent warning devices.
- (c) Shall activate when less than 10 lux of ambient light is present (when activated by a pedestrian).
- (d) Designed to provide at least 20 vertical lux at 5 feet for a standard 2 lane crosswalk.
- (e) Activate with a 0.5 second soft start.
- (f) Allow for multiple brightness options for each of illuminator
- (g) Be housed in its own IP66 type enclosure.
- (h) Be made of weather resistant materials (aluminum or stainless steel).
- (i) Be able to be adjusted and aimed both horizontally and vertically.
- (j) Be independently replaceable.
- (k) Operate between the temperatures of -40° to +176°F (-40° to +80°C).

- (l) Mounting height and illumination angle should be considered when selecting RRFB pole height.

2.7 Other.

- (a) Except as otherwise provided above, all other provisions of the MUTCD applicable to Warning Beacons shall apply to RRFBs.
- (b) The signs shall meet the requirements of Sec 903. The minimum height of the lowest sign shall be seven feet if mounted in sidewalk to meet ADA requirements.
- (c) The post shall meet MoDOT signal standards in Sec 902. The post will be located so that a minimum of four feet of walkable sidewalk is maintained.
- (d) The Engineer and the District Traffic Engineer or his/her designee must approve the site for the RRFB installation. The Engineer, Contractor and District Traffic Engineer or designee shall field check the location together at least 7 days before the planned installation date. The contractor should coordinate with them in advance and follow their instructions and recommendations. Contact information is below:

Brian Umfleet
(314) 275-1540

3.0 Method of Measurement. Measurement for installation of RRFBs will be made per each assembly. No measurement will be made for individual items that make up the RRFB assembly.

4.0 Basis of Payment. All labor, equipment, and materials necessary to install the beacons, signs, pedestrian actuation, post, foundation, solar panels, batteries, and other equipment to have a fully operational RRFB system will be included in the pay item below.

Item No.	Unit	Description
902-99.02	Each	Rectangular Rapid Flashing Beacon Assembly

GGGG. Passive Pedestrian Detection for RRFBs

1.0 Description. The contractor shall select a passive pedestrian detection system from one of the following manufacturer's to be incorporated into the new RRFB setup at the new midblock crossing of Route N north of Arnold B. Grobman Drive:

TAPCO

MS SEDCO

FLIR

1.1 The selected system shall be either a video detection system, an infrared radar detection system, a thermal imaging detection system or a microwave sensor detection system that automatically activates the RRFB without a pedestrian pushing the push button to cross Route N. The selected system shall work in tandem with the installed push button detectors.

1.2 The manufacturer of the selected system shall provide an onsite representative when the contractor installs the passive pedestrian detection system. This onsite representative shall provide training to MoDOT staff just prior to the system being operational.

2.0 Basis of Payment. Payment for the passive pedestrian detection system, including all material, components, labor and testing of the system selected by the contractor for the RRFBs shall be included in the cost of the Rectangular Rapid Flashing Beacon Assembly per JSP – Rectangular Rapid Flashing Beacon Assembly.

HHHH. Installation of Mid-block Crossings

1.0 Description. Prior to installing any signal equipment for the Rectangular Rapid Flashing Beacon north of Arnold B. Grobman Drive, the contractor shall have any widening of Route N completed and shall have temporary striping in place for the lane shifts through this section of roadway. The contractor shall also have all sidewalk, advanced signing, lighting and the concrete median island installed prior to installing and making the beacon operational. In addition, the advanced warning beacon south of the pedestrian bridge for traffic on NB Route N approaching the beacon shall also be functional before turning on the rectangular rapid flashing beacon.

1.1 Prior to turning on the rectangular rapid flashing beacon, the contractor shall notify the Engineer 2 weeks prior to allow for the following:

1.1.1 Notification to the ATE – MoDOT’s Area Traffic Engineer in order for that person to check the timing and general setup of the RRFB (Rectangular Rapid Flashing Beacon).

1.1.2 Notification to the AE – MoDOT’s Area Engineer and Public Relations staff so they can prepare a public outreach plan for the new crossing.

2.0 No direct payment shall be made to the contractor to comply with this provision.

IIII. Advance Warning Flasher

1.0 Description. An AWF installation for Job J6S3599 is the addition of a sign with a continuous flashing yellow beacon to alert drivers approaching the new RRFB (Rectangular Rapid Flashing Beacon). While typically used on high speed roadways it may also be used at locations that have limited site distance of the signal indications or in this case approaching the RRFB. The purpose of this AWF system is to: 1) inform the driver in advance of a required drive decision (prepare to stop) to the new mid-block crossing of the RRFB. Only one AWF is being installed on this project – for NB Route N traffic south of the pedestrian bridge over Route N.

1.1 The Advance Warning Flasher shall operate based upon the 2023 (11th Edition) MUTCD, Chapter 4S – Flashing Beacons.

1.2 The advance warning flasher shall be used in conjunction with signs to warn and control traffic at locations as shown on plans or as designated by Engineer (paid for separately). The flasher shall be installed at location(s) as shown on plans.

1.3 The contractor shall notify the traffic engineer at least 24 hours before advance warning flasher signal activation. Contact information is below:

Eddie Watkins

(314) 275-1543, Cell: (314) 650-5461

2.0 Beacon Requirements.

2.1 General Conditions. AWF assemblies shall meet requirements set forth by this JSP and in the MUTCD and found at:

https://mutcd.fhwa.dot.gov/pdfs/11th_Edition/part4.pdf

An AWF assembly shall consist of one continuous flashing yellow beacon indication having LED-array based pulsing light sources, and shall be designed, located, and operated in accordance with the detailed requirements specified below.

- (a) Power for the AWFs shall be supplied from solar panel and battery capable of supplying the appropriate power sufficient for 1 AWF per post with continuous operation. The solar panel and battery shall be installed on the same post.
- (b) The one yellow warning sign shall be a fluorescent yellow-green sign.

2.3 Beacon Flashing Requirements.

- (a) Per 2023 MUTCD Section 4S.01 requirements for the flash rate of beacons, AWFs shall use flasher rate between 50 and 60 times per minute.

2.4 Beacon Operation.

- (a) The AWF shall flash at all times regardless of whether the RRFB that traffic is approaching has been activated by a pedestrian.

2.5 Other.

- (a) The signs shall meet the requirements of Sec 903. The minimum height of the lowest sign shall be seven feet as shown in the plans.
- (b) The post shall be meet MoDOT signal standards in Sec 902.

3.0 Method of Measurement. Measurement for installation of Advanced Warning Flasher Assemblies will be made per each assembly. No measurement will be made for individual items that make up the AWF assembly.

4.0 Basis of Payment. All labor, equipment, and materials necessary to install the beacons, signs, post, foundation, solar panels, batteries, and other equipment to have a fully operational AWF system will be included in the pay item below.

Item No.	Unit	Description
902-99.02	Each	Advanced Warning Flasher Assembly

JJJJ. Network Connected Signal Monitor

1.0 Description. The Commission's signal cabinet shall have a flashing yellow arrow compatible monitor installed with an internal RJ-45 plug for 10/100 Ethernet communication that is connected to the Commission's computer network through Commission furnished Ethernet switch and allow a remote user running the monitor's software to interface with any specific monitor.

2.0 Performance.

2.1 Inputs. If video detection is used, inputs into controller shall be via SDLC port. Signal cabinet to be TS2 Type 2 setup with 3 ea. SDLC connectors and the monitor to be a Malfunction Management Unit (MMU).

2.2 Status and Event Logging. Monitor shall be able to remotely communicate, at a minimum, active status, current faults, and event logs for at least the previous 7 days.

2.3 Flashing Yellow Arrow. Monitor shall be capable of operating a flashing yellow arrow for left turns by utilizing unused yellow channels on the pedestrian load switches.

2.4 Software and Configuration. Software needed to communicate to any network-enabled monitor shall be provided to the Commission for an unlimited number of users.

3.0 Construction Requirements.

3.1 Requirements. Construction requirements shall conform to Sections 902 and 1092.

3.2 Setup and Training. A minimum of one day of training shall be provided in the operation, setup communication and maintenance of the monitors.

3.3 Acceptance Testing. Contractor shall demonstrate that all network-connected monitors are remotely communicating and individually addressable via supplied software and Commission furnished devices from the Commission's St. Louis Traffic Management Center in order to satisfy the requirements of this provision. No direct payment will be made for this testing.

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

5.0 Basis of Payment. No direct payment will be made for the software. Payment will be considered full compensation for all labor, equipment, and material to complete the described work other than Commission furnished devices needed to complete the network connections. Payment will be made as follows:

Item No.	Type	Description
902-99.02	Each	Network Connected Signal Monitor

KKKK. Signal Cabinet Modifications

1.0 Definition. This work will include modifying the cabinets to provide new Special and Standard Overlaps to accommodate Flashing Yellow Arrow (FYA) installation and programming either by adding FYA signal indications or adding pedestrain head indications, where FYA signal indications exist, as detailed on the plan sheets. The installation, cabinet modification, and programming of 3-section permissive only FYA, 4-section protected/permissive FYA signal heads, pedestrain heads, and new FYA signs will vary by intersection. The contractor shall refer to the plans for more details.

The following intersections have been identified as a cabinet modification:

- University Place Drive Intersection – Adding 2 new crosswalks (4 new pedestrian head indications). 1 new FYA signal indications and a new right turn signal head for southbound Route N to University Place Drive.

1.2 Default Load Switch Assignment – 12 position cabinets

1.2.1 Description. The contractor shall apply 12 compact Flashing Yellow Arrow installation method on all 12-position traffic signal cabinets. The NEMA Load Switch assignment for 12compact FYA installation method is as follows:

12-position cabinet FYA NEMA Load Switch Assignments											
1	2	3	4	5	6	7	8	9	10	11	12
OLA FYA	Phase 2	OLB FYA	Phase 4	OLC FYA	Phase 6	OLD FYA	Phase 8	Phase 1/ Ped 2	Phase3/ Ped 4	Phase 5/ Ped 6	Phase7/ Ped 8

1.2.2 Wiring. The contractor shall use the following color code for the installation of Flashing Yellow Arrow:

If separate 7conductor cable is present for the existing Left Turn signal head:

- Red Wire = Load Switch 1, 3, 5, or 7 Red output = 4-section Red Left Arrow
- Orange Wire = Load Switch 1, 3, 5, or 7 Yellow output = 4-section Steady Yellow Arrow
- Black/White Wire = Load Switch 1, 3, 5, or 7 Green output = 4-section Flashing Yellow Arrow
- Green Wire = Load Switch 9, 10, 11, or 12 Yellow output = 4-section Green Arrow

If no separate 7conductor cable present for the existing, permissive only, Left Turn signal head:

- Black Wire = Load Switch 1, 3, 5, or 7 Red output = 3-section Red Left Arrow
- Blue Wire = Load Switch 1, 3, 5, or 7 Yellow output = 3-section Steady Yellow Arrow
- Black/White Wire = Load Switch 1, 3, 5, or 7 Green output = 3-section Flashing Yellow Arrow

If existing cabinet wiring does not allow the described color code to be met, the contractor shall tag all wires with assigned phases and direction used for the successful completion of the installation of Flashing Yellow Arrow.

1.2.3 Signal Monitor programming. The contractor shall use 12 channel programming mode for the signal monitor. The contractor shall use the vendor provided programming software to program the signal monitor. Front panel programming shall not be utilized.

1.2.4 The contractor shall notify the engineer 24 hours after any successful modification to the load switch assignment, wiring, Controller and signal monitor programming described in this document.

1.3 Default Load Switch Assignment – 16 position cabinet

1.3.1 Description. The contractor shall apply 16 standard Flashing Yellow Arrow installation method on all 16-position traffic signal cabinets. The NEMA Load Switch assignment for 16 standard FYA installation method is as follows:

16-position cabinet FYA NEMA LOAD SWITCH ASSIGNMENTS															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7	PHASE 8	OLA FYA	OLB FYA	OLC FYA	OLD FYA	Ph 2 PED	Ph 4 PED	Ph 6 PED	Ph 8 PED

1.3.2 Wiring. The contractor shall use the following color code for the installation of Flashing Yellow Arrow:

If separate 7 conductor cable is present for the existing Left Turn signal head:

- Red Wire = Load Switch 9, 10, 11, or 12 Red output = 4-section Red Left Arrow
- Orange Wire = Load Switch 9, 10, 11, or 12 Yellow output = 4-section Steady Yellow Arrow
- Black/White Wire = Load Switch 9, 10, 11, or 12 Green output = 4-section Flashing Yellow Arrow
- Green Wire = Load Switch 1, 3, 5, or 7 Yellow output = 4-section Green Arrow

If no separate 7 conductor cable present for the existing, permissive only, Left Turn signal head :

- Black Wire = Load Switch 9, 10, 11, or 12 Red output = 3-section Red Left Arrow
- Blue Wire = Load Switch 9, 10, 11, or 12 Yellow output = 3-section Steady Yellow Arrow
- Black/White Wire = Load Switch 9, 10, 11, or 12 Green output = 3-section Flashing Yellow Arrow

If existing cabinet wiring does not allow the described color code to be met, the contractor shall tag all wires with assigned phases and direction used for the successful completion of the installation of Flashing Yellow Arrow.

1.3.3 Signal Monitor programming. The contractor shall use 16 channel programming mode for the signal monitor. The contractor shall use the vendor provided programming software to program the signal monitor. Front panel programming of the signal monitor shall not be utilized.

1.3.4 The contractor shall notify the engineer within 24 hours after any successful modification to the load switch assignment, wiring, Controller and Signal Monitor programming described in this document.

1.4 The contractor shall perform every FYA installation as outlined in the instructions on the modified D37 plan sheets. All unaccounted for signal problems shall be resolved by the contractor and approved by the engineer for a successful installation and operation of the signal and Flashing Yellow Arrow.

1.5 D-Plug. The contractor shall install a jumper wire between M-12 and DT B1 to activate Special Status 6 on the signal cabinet back panel.

1.6 Cabinet prints. Once work has been accepted, the contractor will provide four full sized sets of revised cabinet hard copy prints (22" x 34"), one electronic copy per intersection in the MicroStation format ".dgn", and one electronic copy in the PDF format, from the cabinet manufacturer to reflect the finished condition of the cabinet and the work done.

1.7 Installation of additional conduit/7-conductor cables. The contractor shall first successfully install additional 7-conductor 16-gauge cables, as detailed in the plans, prior to installation of Flashing Yellow Arrows at the intersections noted in the plans.

1.8 If the existing signal conduit is damaged or does not have enough capacity to accept additional 7-conductor cables, the contractor shall push conduit as noted within the plans and paid for under the contract unit price for the following:

Item 902-73.00	Conduit, 3 Inch, Pushed with Tracer Wire	L.F.
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1.9 Autoscope Detection. Detection for FYA movements with Autoscope Detection will need to be changed in the Autoscope detector file from Option 9 'moving detection' to Option 3 'stop line detection'. The new detector file shall then be uploaded in the field.

2.0 Modify Existing Cabinet.

2.1 Description. The existing signal cabinet shall be modified to allow for proper operation of the Flashing Yellow Arrow indications and pedestrian head indications as shown on the plans and still maintain existing features such as pre-emption, audible pedestrian signals, or FYA indications. Contractor shall determine and complete all appropriate wiring and programming associated with this work as recommended by the cabinet manufacturer. Contractor shall provide electronic documentation including, but not limited to:

- updated signal cabinet prints indicating all modified back panel wiring
- load switch wiring
- controller programming
- signal monitor programming
- revised plan sheets
- other documentation as requested by the engineer

2.2 Load Switches and Flasher Relays. The existing cabinet, as noted on the plans as to be used in place but modified, may require the removal of the existing load switches and the installation of new load switches, particularly when working on a 12-position cabinet needing to add either FYAs or pedestrian signal heads. Existing load switch assignments have been shown on the signal 'D' sheets included within the plan set and modifications shall be based upon notes included on those sheets and as specified in Section 1092.4.1.5 within the Standard Specifications. In addition, flash transfer relays may also need to be installed and wired into the cabinet to allow for the intersection to be placed on flashing mode. As with the load switches, Section 1092.4.1.5 within the Standard Specifications shall be used as a guide for this work. Typically, a cabinet will need two flashers and four flash transfer relays as noted within Section 1092.4.2.4 of the Standard Specifications.

3.0 Basis of Payment. Payment for the cabinet modifications, shall be made per each intersection and shall be considered full compensation for all contractor-provided equipment, connection cables, signal monitor programming, labor and material needed to complete the described work.

Removing existing and installing new load switches, flasher circuits (typically 2 per cabinet) and flash transfer relays (typically 4 per cabinet) as needed for full signal operation are included in the cabinet modification pay item per intersection. Cabinet modification shall be considered full compensation for all contractor-provided equipment, connection cables, labor, removals and material needed to complete the described work. Payment will be made as follows:

Item No.	Type	Item Description
902-99.02	Each	Cabinet Modification – University Place Drive Intersection

LLLL. Coordination with MoDOT Signal Shop for Cabinet Entry

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

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

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

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

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

MMMM. Partial Acceptance of Signalized Intersections

1.0 Description. This work shall consist of maintaining operational signals and detection (both stopbar and advanced) throughout the construction staging, in accordance with Sec 902 and except as approved by the engineer. At the engineer's option, MoDOT may accept intersections for maintenance prior to final acceptance.

1.1 Once an intersection is complete, including but not limited to completion of construction, acceptance of all ADA facilities, and successful testing and operation of signal equipment, the engineer may partially accept that intersection for MoDOT's maintenance prior to Final Acceptance of the entire project.

2.0 Basis of Payment. No direct payment will be made for the cost of equipment, labor, materials or time required to fulfill this provision.

NNNN. 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.

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

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

2.1.1.2 Controller Programming: Ability to hand program Phase, TBC, and Coordination levels of various advanced traffic controllers.

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

2.2 The contractor will be required to submit the name(s) of proposed traffic engineer(s) and the name(s) of other personnel on their proposed staff along with detailed experience in the 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, who does not satisfy the requirements set forth within this Job Special Provision. A list of potential traffic engineers can be submitted for review to the Project Manager prior to bid.

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

2.3.1 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 ACTRA system and the ability to interface with the noted signals on this project.

3.0 Existing Traffic Signals and Communication System

3.1 The contractor shall notify the engineer 3 weeks prior to the date any signal improvements including modifications for pedestrian accommodations are planned to begin.

3.2 Once work begins at any signalized intersection on Route N, the contractor shall then be solely responsible for the following signals' controller programming until work has been completed and Route N improvements are complete.

3.2.1 Once detours are in place for work on the I-70/Route N interchange off-ramps, the contractor shall then be solely responsible for the following signals' controller programming until a given ramp is completely re-opened to traffic based upon the plans:

- a) Route U at I-70
- b) Route U at San Diego Avenue / Lillian Avenue
- c) Route N at University Place Drive (allow for u-turn from SB to NB during construction)

3.3 The engineer shall provide to the approved contractor's traffic engineer a report on the existing phasing and timing of each traffic signal within the Route 180 project corridor at the Pre-Construction Meeting. 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. Once the approved contractor's traffic engineer 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 approved contractor's traffic engineer will 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.

3.5 The approved contractor's traffic engineer shall be solely responsible for maintaining the coordination at any affected signal to the satisfaction of the engineer or representative until paragraph 5.0 below has been satisfied. 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 spelled out in the Work Zone Traffic Management.

4.0 Existing Traffic Signal Maintenance and Response.

4.1 The approved contractor's traffic engineer 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. 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 Sec 108.9 and deducted from the payments due the contractor.

4.1.1 Responding to a signal timing complaint shall be defined as the following: Arrive on site, make observations, and, if appropriate, implement changes; OR utilizing the Commission's ITS network to observe and/or implement changes. Immediately following their response, the approved contractor's traffic engineer shall follow-up with the engineer and the originator of the complaint, if different, with their observation and analysis of the complaint and whether any changes were made. The Commission's ITS network should only be used if the affected signals can be adequately viewed remotely.

4.1.2 The contractor must supply the contact name and phone number of the approved contractor's traffic engineer who will be responsible for receiving and responding to signal timing complaints from the engineer. These complaints may be forwarded directly to the contractor by someone other than the engineer (i.e. MoDOT's Customer Service representatives) and will not relieve the contractor from properly responding based on the response times of this Provision.

The contractor shall submit to the engineer a weekly report of complaints received and remedies performed throughout the duration of this project.

5.0 Signal Controller Programming and Acceptance.

5.1 The contractor will be responsible for proposing and implementing signal timing and coordination plans after completion of improvements along the Route N project corridor. The engineer shall provide the contractor with the existing controller files so that the contractor can propose new programming and timing plans for Route N. The contractor will be relieved of signal programming maintenance for Route N once 48 consecutive hours have passed without a programming malfunction. If an agency desires any changes from an original plan, the agency will assume immediate maintenance of the signal in order to implement desired changes.

5.2 In addition to 5.1, The Contractor's traffic engineer shall compile/install the new signal timing at the Cool Valley Elementary and Bermuda/St. Ann's Lane intersections.

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

7.1 Covering Signal Heads and Adjusting Signal Indications. Any covering of signal heads and adjustments or changes to signal indications necessary for safe traffic operations along Route N when traffic is being routed through the work zone shall be the responsibility of the contractor as directed by Engineer. Any changes to or covering of existing signal heads shall be coordinated with both the Engineer and the contractor's traffic engineer prior to making any of these adjustments. The contractor shall also be responsible for uncovering any covered signal heads and restoring any adjusted signal indications that were changed prior to re-opening the roadway(s) to traffic. No direct payment will be made for compliance with this specification.

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

9.0 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

0000. Pad Mounted 120V/240V Signal Power Supply & Lighting Controller with Uninterruptible Power Supply

1.0 Description. This work shall consist of furnishing and installing combination 120/240 volt signal and lighting power supply with uninterruptible power supply (UPS).

2.0 UPS Requirements. See the plans for which signalized intersections include an “Uninterruptible Power Supply” to be specifically constructed and it shall be NEMA approved for traffic signal operations.

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-5 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 connections from the UPS to the D-plug panel in the 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 the appropriate pin on the D-Panel (normally 17) 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. (Set at 40%) The normally open contact should be wired to provide logic ground to the appropriate pin on the D Panel (normally pin 18) when the UPS is in Low Battery mode. This should indicate a Special Status 3 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 inverter mode for **3** hours. The normally closed contact should be wired in series with Controller Voltage Monitor (CVM) to allow for the circuit to open after **3** hours and bring the signal to flash. The CAT-5 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.

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 $\pm 10\%$ in line mode.
- (b) The output voltage of the UPS shall be 120 VAC $\pm 6\%$ in backup mode.
- (c) The output frequency of the UPS shall be 60Hz $\pm 5\%$ in line mode.

- (d) The output frequency of the UPS shall be 60Hz \pm 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:
 - (i) ON BATTERY. The relay is energized whenever the UPS switches to battery power.
 - (ii) 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.
 - (iii) 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.
 - (iv) ALARM. The relay is activated after a specific or general alarm is detected. The alarm conditions include: line frequency, low output voltage, no temperature probe, overload, unconnected batteries, high temperature (>55°C) and low temperature (<-20°C).

(v) FAULT. The relay is activated after a specific or general fault is detected. These faults include: short circuit, low battery voltage (<41VDC), high battery voltage (> 59VDC), overload and over temperature (>75°C).

(vi) OFF. The relay is disabled and will not activate under any condition.

(viii) TIMER 2. Same as TIMER 1.

(ix) TIMER 3. Same as TIMER 1.

(x) 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.

(xi) 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 approved by the Engineer.

(b) The UPS shall have six (6) user programmable dry contact relay terminal blocks on the front panel. The terminal blocks shall be approved by the Engineer.

(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 approved by the Engineer.

(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 approved by the Engineer.

(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 MPS shall 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 $\pm 100\text{mV}$ 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 shall 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 No.	Type	Description
902-99.02	Each	Pad Mounted 120V/240V Signal Power Supply & Lighting Controller with Uninterruptible Power Supply

PPPP. Combination Pad Mounted 120V/240V Power Supply and Lighting Controller

1.0 Description. This work shall consist of furnishing and installing combination 120/240 Volt signal & lighting power supply and multi-circuit type lighting control station. Available units are listed in the lighting section of the MoDOT approved products list under Pad Mounted Lighting Controllers. Control stations shall be installed in accordance with the plans and by direction of the engineer.

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

Item No.	Type	Description
901-99.02	Each	Combination Pad Mounted 120V/240V Power Supply & Lighting Controller

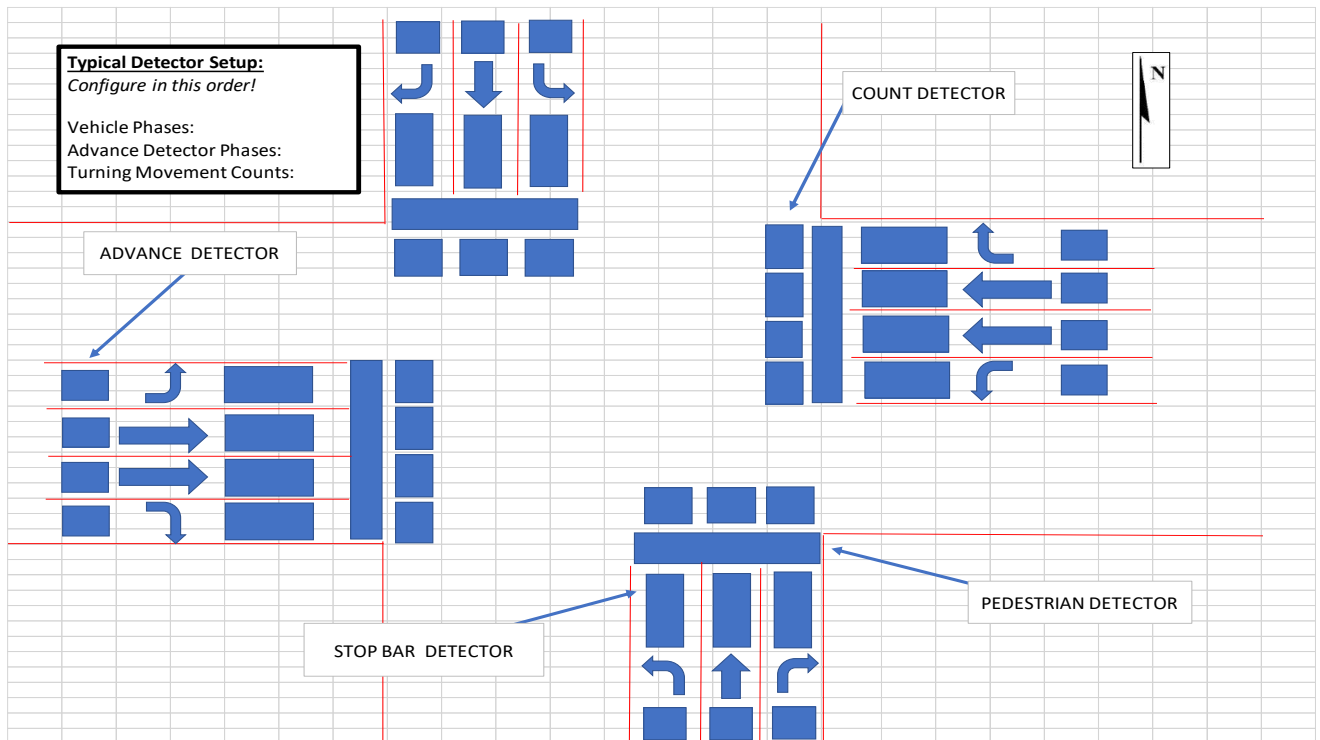
QQQQ. SL District Traffic Signal Detection System

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:

- Stop Bar Detection

- Advance Upstream (Performance Measures)
- Dilemma Zone
- Turn Counts
- Advance Video Zones (if applicable)
- Radar Zones (if applicable)
- Advance Data Collector (if applicable)
- Bicycle/Pedestrian (see Section 2.2)



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

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:

- Speed
- Volume
- Lane Occupancy
- Vehicle Classification
- 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:

- Induction Loop
- Video Image
- 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.

- Autoscope Vision
- Iteris Vantage Next
- 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 per the manufacturer's recommendations, unless otherwise indicated on the plans or approved by the Engineer. The video detection system shall not be installed on pedestal signal unless otherwise directed by the Engineer. The video detection system shall not be installed on a 15' luminaire arm unless otherwise directed by the Engineer.

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.

For 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.

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.

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.

- WAVETRONIX SmartSensor
 - Matrix

Provide a radar detection system with the following features.

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

- WAVETRONIX SmartSensor
 - Advance
 - Advance Extended
- 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.

- Power and communications cabling shall be installed per manufacturer specifications
- The radar sensor shall operate at 24 VDC
- Power consumption shall be no more than 38 watts
- 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:

- at a height that is within the manufacturer's recommended mounting heights.
- The radar shall be positioned so that all detection zones needed for an approach can be captured.
- 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} **or** {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 Contractor shall provide five copies of the operation and maintenance manuals for the CTAD system.

4.3.4.3 Contractor shall 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 (currently through TransSuite). 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

RRRR. Top Mount Luminaire

1.0 Description. This work shall consist of furnishing and installing LED Top Mounted Luminaires as indicated in the plans.

2.0 Construction Requirements. Luminaires shall be vertical top mount type (pole top mount) with a slip-fitter that accommodates a standard 2" top mount. Available types are listed on the MoDOT approved products list and must meet all MoDOT Specifications along with additional requirements noted in the additional sections below. The contractor shall coordinate the pole top mount size with the luminaire mount to ensure compatibility. All luminaires for this project shall allow for a tilt angle to be adjusted in the field dependent upon the placement of the pole. All necessary mounting brackets and hardware shall be included in the payment for the luminaire.

2.1 LED luminaires shall not be equipped with a Photo Control Receptacle.

2.2 LED Luminaires shall have a terminal block for easy installation of a two wire Line/neutral circuit (no wire nuts for termination of field/luminaire circuit).

2.3 LED luminaires shall have an easy access point for future repairs to the driver.

2.4 LED luminaires shall have pole adaptors which are capable of feeding wires through without disassembling the knuckle.

3.0 Basis of Payment. Payment for furnishing and installing top mounted luminaries shall include all materials, equipment, tools, labor, and work incidental thereto, and shall be considered completely covered by the contract unit price for:

Item Number	Item Name	Units
901-99.02	103W Top Mounted Led-A Luminaire	Each
901-99.02	170W Top Mounted LED-B Luminaire	Each

SSSS. Top Mount Light Pole

1.0 Description. This work shall consist of furnishing and installing top mount poles as indicated in the plans.

2.0 Construction Requirements. Top mount poles shall conform to the Type AT lighting poles and shall be fabricated with a circumferentially welded top mount and top plate to accept top mounted luminaires. The top mount shall extend 4" above the top of the pole and meet AASHTO loading requirements for the luminaires provided. The top mount shall be made of the same material as the pole shaft, be constructed as a one-piece pole and top mount unit by the manufacturer and have an outside diameter that accepts the appropriate luminaire slip-fitter. Pole and top mount shall conform to all MoDOT specifications and material requirements. Bridge mounted poles shall be constructed to match the existing bolt pattern.

3.0 Basis of Payment. Payment for furnishing and installing top mount poles shall include all excavation, materials, equipment, tools, labor, and work incidental thereto, and shall be considered completely covered by the contract unit price for:

Item Number	Item Name	Units
901-99.02	30 Ft. Top Mount Light Pole	Each
901-99.02	45 Ft. Top Mount Light Pole	Each

TTTT. Dual Top Mount Lighting Bracket

1.0 Description. As part of this project, the contractor shall remove the light within the median island on **Evans Avenue** separating directions of travel and shall replace this light by removing the existing single top mount light bracket in the SW corner of the intersection and installing a dual top mount lighting bracket capable of housing 2 top mount luminaires installed on this one bracket.

2.0 Construction Requirements. The dual bracket shall fit the existing top mount pole and shall be capable of allowing the luminaires, paid for separately, to be adjusted to the proper location and angle to light the roadway as it currently does today as approved by the Engineer.

3.0 Basis of Payment. Payment for furnishing and installing the dual top mount lighting bracket on the existing top mount pole shall include all materials, equipment, tools, labor, and work incidental thereto, and shall be considered completely covered by the contract unit price for:

Item Number	Item Name	Units
901-99.02	Dual Top Mount Lighting Bracket	Each

UUUU. Flood Lighting at I-70 Interchange

1.0 Description. The contractor shall replace the existing flood lighting with new flood lighting under the I-70 Bridge over Route N as shown in the plans. The contractor shall also install new junction boxes (conduit bodies) next to the new flood lights as a way to access the circuiting from the main lighting conduit and circuit.

2.0 Construction Requirements. The contractor may proposed a different item than those noted below but any modifications shall be approved by the Engineer. Removals for the lights shall be covered and denoted within the Removal of Improvements. The cutting/splicing/removal of the existing main lighting conduit to install the junction boxes/conduit bodies shall be included in the cost of the new item.

3.0 Basis of Payment. All costs for purchasing and installing the new flood lights along with the junction boxes/conduit bodies based upon this provision shall be considered completely covered by the contract unit price for:

Item Number	Type	Description
901-99.02	Each	Halex 1/2 Inch Rigid Type C Conduit Body with Cover and Gasket
901-99.02	Each	LED Flood Light – Selectable CCT and Wattage – Knuckle Mount – Superbrightleds.com Product FLCKM2-SW3B60-BRK

VVVV. 30 FT. Decorative Lighting along Route N

1.0 Description. The contractor shall remove and replace existing luminaires as directed by the Engineer for 30-foot tall light poles located along Route N south of I-70 down to Arnold B. Grobman Drive. The new luminaires will be supplied by one of the following contacts listed below. The contractor shall contact the following 2-weeks prior to removing and installing the new luminaires

Todd Burgess Todd.Burgess@modot.mo.gov
314-348-9470

James P. Starkey starkeyjp@umsl.edu

2.0 Basis of Payment. All costs for removing and installing the new luminaries within the existing 30-foot tall decorative lights based upon this provision shall be considered completely covered by the contract unit price for:

Item Number	Type	Description
901-99.02	Each	Remove and Install Decorative Light Luminaire

WWWW. New Underpass Lighting at I-70 Interchange

1.0 Description. The contractor shall provide new underpass lighting as shown in the plans that allows for the luminaire to be rotated so that the angle at which illuminates the roadway and sidewalk on Route N under I-70 does not create issues with visibility for the signals at the single-point interchange. Prior to acceptance of the items included within the contract, the contractor shall provide a light meter test of the new underpass lighting to the Engineer. Adjustments to the underpass lighting system may be requested by the Engineer before accepting the new system. The contractor shall make adjustments as requested by the Engineer which may include adjusting the angle of the new lights, adjusting the brightness of the lights and possibly removing a luminaire from the system as to not impact the existing signal system. No additional pay shall be made to the contractor to make adjustments to the system at the Engineer's request.

XXXX. Luminaires within Residential Areas

1.0 Description. The contractor shall provide a luminaire in residential areas listed below that shields as much light from being directed into private homes. No additional pay shall be made to the contractor to comply with this provision. The locations that need to meet the requirement in this provision include:

New Lighting at Route N & Bermuda/St. Ann's Lane intersection

YYYY. Bridge Lighting – Vertical Ceiling Mount

1.0 Description. This work shall consist of furnishing and installing a bracket and its LED light, between 70 watts and 110 watts, that can be attached to the I-70 bridge above Route N. See Bridge plans for the exact locations and additional details. The LED lights shall light an area directly below the mount. The lights shall work with a 240V power system.

2.0 Material Requirements. The LED light and its conduit and wiring shall conform to all specifications in Sec. 901.

3.0 Construction Requirements. All construction requirements shall conform to Sec. 901. Contractor shall follow JSP – New Underpass Lighting at I-70 Interchange before acceptance is made by the Engineer.

4.0 Basis of Payment. Payment for furnishing and installing a LED light and its bracket shall include all materials, equipment, tools, labor, and work incidental thereto, and shall be considered to be completely covered by the contract unit price for the following pay item:

Item Number	Type	Description
901-99.02	Each	LED Light – Ceiling/Bridge Mount – Vertical Illuminance

ZZZZ. Removal and Delivery of Existing Signs JSP-12-01C

1.0 Description. All Commission-owned signs removed from the project shall be disassembled, stored, transported, and disposed of as specified herein. Sign supports, structures and hardware removed from the project shall become the property of the contractor.

2.0 Disassembly and Delivery.

2.1 All Commission-owned signs, (excluding abandoned billboard signs), designated for removal in the plans, or any other signs designated by the Engineer, shall be removed from the sign supports and structures, disassembled, stored, transported, and delivered by the contractor to the recycling center for destruction.

2.2 The contractor shall coordinate and make arrangements with the recycling center for delivery of the signs. Sign panels shall be disassembled and/or cut into sizes as required by the recycling center.

2.3 The contractor shall provide the Engineer with a "Sign Delivery Certification" attesting to completion of delivery of all existing sign material from the project to the recycler. In addition, the contractor shall provide to the Engineer a final "Sign Certification of Destruction" from the recycler that documents the total pounds of scrap sign material received from the project and attests that all such material will not be re-purposed and will be destroyed in a recycling process. The contractor can locate the required certification statements from the Missouri Department of Transportation website:

<https://www.modot.org/forms-contractor-use>

2.4 Funds received from the disposal of the signs from the recycling center shall be retained by the Contractor.

3.0 Basis of Payment. All costs associated with removing, disassembling and/or cutting, storing, transporting, and disposing 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.

AAAAA. Remove and Relocate Existing Ground Mount Sign

1.0 Description. This item provides for relocating and mounting existing signs, including any existing backing bars, of various sizes to new posts at locations shown on the plans. The Contractor shall be responsible for all existing signs, including any existing backing bars, to be relocated. During construction, if any sign, including any backing bars, to be relocated is lost, stolen, or damaged in any way, the Contractor shall be responsible for all costs.

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

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

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

BBBBB. Removal and Replacement of Traffic Signs

1.0 Description. Existing traffic signs that have to be removed prior to proposed traffic signs being installed and that are determined essential to the safe and orderly flow of traffic by the Engineer shall be temporarily re-erected immediately by the Contractor at temporary locations in a manner approved by the Engineer. The existing signs shall remain temporarily erected until the final permanent signing has been installed. The Contractor shall maintain the existing signs in a straight and neat condition for the duration of the temporary mounting.

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

CCCCC. Signs in Concrete

1.0 Description. There are proposed signs located in areas to be covered with new concrete (concrete islands, concrete medians, concrete approaches, concrete sidewalks, etc.). It is recommended to the Contractor that he/she install the sign post anchor or footing prior to covering the area with new concrete. If the Contractor elects to cover the area with the new concrete prior to installing the proposed sign post anchor or footing, there will be no direct payment for the work required to cut or drill a hole in the new concrete in order to install the proposed sign post anchor or footing.

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

DDDDD. Overhead Signs

1.0 Description. This work shall consist of temporarily covering 'Exit Only' panels on existing sign trusses and any additional signs listed in the contract along with installing 'Closed' sign plaques on the existing signs as well. Uncovering of the signs and the removing of the 'Closed' plaques shall be included within the cost of this pay item. The contractor shall uncover signs and remove 'Closed' plaques once the traffic control stage is completed for each roadway/bridge which has signs to be covered and plaques to be installed.

2.0 Basis of Payment. The accepted quantity of covering/uncovering existing signs and installing/removing 'Closed' plaques on existing signs will be paid at the contract unit price for the pay item included in the contract. All labor, equipment and material cost required to fulfill this requirement shall be included in the unit price for the following pay item:

Item No.	Type	Description
903-99.02	Each	Cover Existing Overhead Signs

EEEE. ITS Pull Box

1.0 Description. Furnish and install Class 5 ITS Pull Boxes as shown on the plans.

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

3.0 Basis of Payment. Measurement and payment for ITS Pull Boxes includes excavation, materials, construction, backfill and all miscellaneous hardware required for a fully operational system.

Item No.	Type	Description
910-88.11	Each	Pull Box, Preformed Class 2
910-88.16	Each	Pull Box, Preformed Class 5

FFFF. ITS Conduit

1.0 Description.

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

2.0 Materials.

2.1 Use PVC conduit meeting the requirements of Sec 1060.

2.2 Use HDPE conduit meeting the requirements of Sec 1060. Use orange conduit for communication cable and black for power cable.

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

3.0 Construction Requirements.

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

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

3.1.3 HDPE duct shall not be spliced. All runs shall be continuous.

3.1.4 Use an impact mole to install conduit under existing sidewalk unless otherwise indicated or unless the crossing is part of a longer bore or unless otherwise indicated in the plans. The portion installed using a mole will be paid for at the same price per foot as trenched conduit.

3.2 Directional Drilling.

3.2.1 Preliminary Site Work. Determine all utility locations near the path of the proposed bore, including depth. Use this information to avoid damage to utilities and/or facilities within the work area. Provide this information, including the sources, to the engineer a minimum of five working

days prior to boring. Do not bore until the engineer approves that submittal. Prior to boring, expose all utilities for which it is customary and safe to do so.

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

3.2.3 Drilling Fluid (“Slurry”). The use of water and other fluids in connection with the drilling operation will be permitted only to the extent necessary to lubricate cuttings. Jetting will not be permitted, and the use of water alone as a drilling fluid will not be permitted. Use a drilling fluid consisting of at least 10% high grade, processed Bentonite to consolidate excavated material, seal the walls of the hole, and furnish lubrication for subsequent removal of material and immediate installation of the pipe.

Provide a means of collecting and containing drilling fluid that returns to the surface, such as slurry pit, or a method approved by the engineer. Provide measures to prevent drilling fluids from entering storm sewer systems. Prevent drilling fluid from accumulating on or flowing onto sidewalks, other pedestrian walkways, driveways, or streets. Immediately remove any slurry that is inadvertently deposited on pedestrian walkways. Transport waste drilling slurry from the site and dispose of it. Do not allow slurry to enter wetlands. Protect wetlands using appropriate soil erosion control measures approved by the engineer. This requirement also applies to slurry resulting from vacuum excavation to locate underground utilities.

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

3.3 Intercept Existing Conduit with Proposed Pull Box.

3.3.1 Determine whether the conduit is occupied. If so, disconnect the cables at one end of the cables and pull them back so that they are not damaged when the conduit is cut. Alternatively, they can be removed entirely and replaced with new, identical cables. Notify the engineer if any of the cables appear to be in poor condition.

3.3.2 Excavate a pit big enough for the pull box and drain material, with at least an additional foot on each side with conduit.

3.3.3 Install the drain material. From the top of the drain material, measure the vertical distance to the bottom the conduit at the points corresponding to the walls of the box.

3.3.4 If the conduit is PVC or metal, cut it in two places such that the distance between the cuts is longer than the box. Be sure the ends are cut squarely. If the conduit is HDPE, cut it in the center of the pit. Ensure that the pit is long enough that the conduit can be bent out of the way when the box is installed, and can be bent enough to insert the conduit through the wall of the box.

3.3.5 Make a hole in the wall of the box at each point that the conduit will enter. Use the distances measured earlier to determine how far from the box's bottom to make the holes.

3.3.6 Set the pull box in the pit with the holes aligned with the conduits.

3.3.7 Pass the conduits through the wall of the box so that they end about one inch inside the wall. For PVC conduit, extend the existing conduit using a short length of new PVC conduit that includes a socket end. For metal conduit, thread the existing conduit, apply a threaded coupling, and add a short length of new conduit. For HDPE, bend the existing conduit to pass through the box wall, then cut it to length inside the box.

3.3.8 Use non-shrink grout to completely fill the space between the conduit and box wall.

3.3.9 Backfill the pit and restore the area as with any pull box installation.

3.3.10 Reinstall, reconnect, and test the cables that were pulled back at the beginning of the procedure. Alternatively, replace them in kind and test them.

3.4 Install Conduit into Existing Pull Box.

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

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

3.4.3 Install the conduit.

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

3.4.5 Backfill shall be carefully tamped in place. All disturbed areas shall be restored.

4.0 Basis of Payment.

4.1 All surface-mounted junction boxes, fittings, liquid-tight flexible conduits, hangers, supports, resin anchor systems, and all hardware are incidental to the cost of conduit.

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

4.3 Payment for Intercept Conduit with Pull Box includes only that work that would not be incurred in a normal pull box installation. The cost of the box and its installation will be paid for separately.

4.4 Measurement and payment for work covered by this specification includes equipment, tools, materials, necessary to install conduit. It includes excavation and site restoration. Payment will be made as follows:

Item No.	Type	Description
910-99.03	Linear Foot	Conduit, HDPE, Trench, 2"
910-99.03	Linear Foot	Conduit, HDPE, Drill, 2"
910-99.02	Each	Intercept Conduit with Pull Box

GGGGG. Fiber Optic Cable Installation, Relocation and Replacement

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 either a new or existing conduit system per plans. Relocated cable must be carefully removed from the existing conduit system without being damaged. No direct pay shall be paid for relocating the existing fiber optic cable into new ITS or signal cabinet unless the Relocate Fiber Optic Cable pay item is included the plans. If the existing fiber cable is removed, that length shall be paid separately per plans.

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 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 network 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.

2.2.2 In case of fiber optic cable replacement, all new fiber cable must be installed, spliced, terminated and go online before removing the old cable.

3.2.3 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.

3.2.4 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.

3.2.5 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.

3.2.6 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.

3.2.7 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.

3.2.8 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.

3.2.9 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.

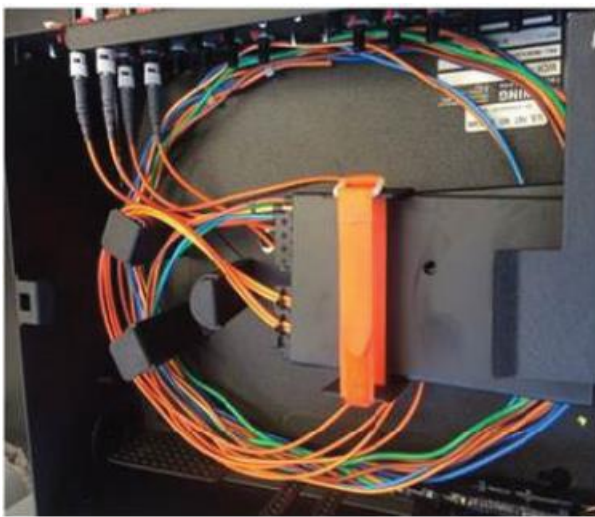
3.3.4 Use a different splice tray for each buffer tube color. If an enclosure contains multiple buffer tubes of the same color, but none of the fibers in one of the tubes are spliced to fibers in other tubes of the same color, use a separate splice tray for that tube.

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.

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:

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

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 new or relocated fiber optic cable, acceptance testing, in addition to all materials, labor and equipment necessary for a fully operational system. Payment will be made as follows:

Item No.	Type	Description
910-99.03	Linear Foot	Fiber Optic Cable, 24 Strand Single Mode
910-99.02	Each	Fiber Optic Pigtail, SM, Furnish and Install
910-99.02	Each	Fiber Optic Jumper, SM, Furnish and Install
910-99.02	Each	Wall-Mounted Interconnect Center, Furnish and Install
910-99.02	Each	SM Fiber Optic Fusion Splice

HHHHH. Contractor-Furnished and Installed 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.

2.1 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.

2.2 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 current MoDOT ATMS (Advanced Traffic Management System):

CCTV Manufacturer	Model	Connection Type
CostarHD (formerly known as Cohu)	4220HD RISE 3 Dome	Outdoor cat5e
Axis	Q6155-E Dome	Outdoor cat5e
Bosch	Autodome 7000i	Outdoor cat5e

2.3 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).

2.4 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 μ s)
- 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	Install CCTV Camera Assembly
910-99.03	L.F.	CCTV Camera Cable

IIII. Removal Of Existing Fiber Optic Cables

1.0 Description. This work shall consist of removing existing fiber optic cables and the tracer wire, if applicable, that are no longer connected to the MoDOT fiber network as well as removing and installing new fiber optic cables as shown below and in the plans. This work is shown in the plans as occurring at the location(s) listed below:

1.1 Beginning at the intersection of Route N at Brotherton Lane (City of Ferguson maintained signal), continuing to the south towards the intersection at Evans Avenue.

2.0 Construction Requirements. The removal of existing fiber optic cables be completed as approved by the Engineer and shall conform to current Missouri Standard Specifications for Highway Construction.

2.1 Signal conduit, pull box, or other signal cable damage by construction activity shall be replaced by the contractor at the contractor's expense.

2.2 Existing, unused fiber optic cable and tracer wire shall be removed south of the existing City of Ferguson Signal at Brotherton Lane.

2.3 MoDOT's ITS Asset Management Tool (currently the Nexus system) shall be updated to indicate the removal of the existing, unused fiber optic cable.

2.3.1 See separate Job Special Provision for specific guidance regarding update to the MoDOT ITS Asset Management Tool.

2.4 Any unused pull box, owned by MoDOT, in between Brotherton Lane (City of Ferguson maintained signal) and Evans Avenue intersections, shall be removed and filled properly.

3.0 Contact Information. In addition to coordinating work with the Commission's Engineer, the Contractor shall coordinate all work associated with this provision with St. Louis County staff, specifically the individuals listed below.

Additionally, these individuals shall be invited to the project Pre-Construction Meeting.

3.1 Shirley Cobb and Leon Jackson with the City of Ferguson:

3.1.1 Phone (office): 314-524-5191

3.1.1 Email: scobb@fergusoncity.com

3.1.2 Email: ljackson@fergusoncity.com

4.0 Acceptance Testing. Contractor shall demonstrate that all existing fiber has been removed and all original connection points at the upstream intersection are clean and free of obstruction. No direct payment will be made for this testing.

5.0 Measurement and Payment. All costs associated with this work shall be considered completely covered by the following pay item. Please see the above noted segments and the plans for details.

Item No.	Type	Description
910-99.01	Lump Sum	Removal of Existing Fiber Optic Cables

JJJJJ. 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, the 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	Relocate Existing Communication Equipment

KKKKK. 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 workzones.

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

LLLLL. ITS Asset Management Tool

1.0 Description. For all locations where any MoDOT and other agency's ITS (Intelligent Transportation System) components are modified or added, the contractor shall be responsible for populating and updating Commission's ITS Asset Management Tool to reflect the final

condition of the entire ITS system within the project limits as shown on the plans. 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

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

NNNNN. Adjust to Grade ITS Pull Boxes

1.0 Description. This work shall consist of adjusting to grade existing ITS pull boxes as directed and approved by engineer. If it is unfeasible to adjust the existing ITS pull box to grade, the contractor shall replace the ITS pull box while maintaining all existing fiber connections as per other special provisions. All ITS Pull Box adjustments to grade shall be completed where indicated on drawings and directed by Engineer. ITS Pull boxes within the pedestrian access route shall be placed at grades compliant with ADA.

2.0 Material. All materials and construction requirements shall conform to Sec 910 and Division 1000.

3.0 Construction Requirements. This item shall consist of furnishing and installing "Adjust to Grade Pull Box", complete, in place. All of the following is considered part of this work: ITS, connections, maintaining ITS network, grounding, electrical connections, wiring, foundations, covers, connectors, etc. required to the complete the ITS Pull Box Adjust to Grade.

All construction shall be completed according to Missouri Department of Transportation standards.

4.0 Basis of Payment. Payment for furnishing all labor, equipment, materials, and incidentals necessary to Adjust ITS Pull Boxes to Grade shall be completely covered by the contract unit price for the following pay item:

Item Number	Type	Description
910-99.02	Each	Adjust to Grade ITS Pull Box

There shall be No Direct Pay for adjusting ITS connections, electrical connections, wiring, or other adjustments to the ITS infrastructure except as identified by other pay items within this contract.

OOOOO. MoDOT ITS Assets Relocation

1.0 Description. The work consists of relocating existing MoDOT Intelligent Transportation System (ITS) facilities (conduit, cable, and/or pull boxes) that may be in conflict with this project construction sections as noted in the plans.

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

3.0 Construction Requirements. The Contractor shall be aware there are numerous utilities present along the route in this contract. Utility locates were not performed during the design phase of the project; therefore, the extent of conflicts with utilities are unknown.

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

- a) Non-Emergency: Contractor will have 4 hours to propose a repair plan to the Engineer for a complete repair within 3 business days.
- b) Emergency: Upon notification of the damage, Contractor must immediately submit a repair plan to the Engineer which will take no more than 4 hours to respond on-site and complete repairs within 48 hours of notification of damage.
- c) In either case, if the proposed plan is unacceptable for any reason to MoDOT, repairs will be made by MoDOT with all costs billed to the Contractor.

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

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

3.4 In the case of a conduit conflict, the Contractor shall trench an area beyond the in-ground work limits, install one or two conduits (must be the same quality as the existing conduit) using

Split Duct Method, relocate the existing cables into the new conduit, and seal the conduit joints per manufacturer specifications.

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

3.6 The contractor shall perform a fiber testing (see below requirements) before and after relocating MoDOT fiber cables at the nearest Node Cabinet at each site as shown on the plans and submit that report to the SLITS Group for review and approval.

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

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

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

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

- (h) 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.
- (i) 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.
- (j) 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.

3.6.02 Test Result Documentation. Prepare a diagram 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 5 copies of this diagram to the engineer, along with the calculations for the maximum allowable loss. Submit the diagrams and calculations in an electronic format acceptable to the engineer.

3.6.03 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.

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

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

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

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

Basis of Payment. Payment for "MoDOT ITS Assets Relocation" shall be paid as Linear Feet and shall include the trenching, conduit installation, conduit coupling, pull boxes, sealing materials, cable relocation, needed fiber testing, restoration of all disturbed area, all labor and work incidental thereto, and shall be considered to be completely covered by the contract unit price for the following pay item:

Item No.	Unit	Description
910-99.03	Linear Feet	MoDOT ITS Assets Relocation

PPPPP. Install MoDOT Furnished IP-Addressable Power Strip

1.0 Description. The contractor shall install the Commission furnished and programmed IP-Addressable Power Strip(s) in the ITS and/or Signal Cabinets as shown of the plans.

2.0 Installation Requirements. The contractor shall install the Commission Furnished (hardwire only) the power strip as noted below:

Inside the Signal Cabinet: Mounting shall be on the left side panel of the cabinet above the detector panel attached to the DIN rails, with the power cable facing away from the door. The hardwire interconnect panel, if present, should be removed to make room. A plastic wire tie shall secure any transformer packs plugged into this unit. The power source shall be hardwired to cabinet auxiliary breaker circuit with no plug in to any cabinet outlet allowed.

Inside the ITS Cabinet: Mounting shall be on the back side of the ITS Type 7 cabinet (or any open space of other ITS cabinets away from the door) and on any open space of the signal cabinet with the power cable facing away from the door or other devices.

The old power strip as well as any other inactive devices, if present, should be removed to make room. If the contractor has any question regarding the inactive devices inside the signal cabinet, they should contact MoDOT signal shop supervisor. In case of ITS cabinets, they shall contact the ITS group.

The power source shall be hardwired to cabinet auxiliary breaker with no plug in to any cabinet outlet allowed.

3.0 Acceptance Testing. The Contractor shall contact MoDOT St. Louis ITS staff via an email to SLITS@modot.mo.gov or 314-275-1526 to verify remote communication to the power strip upon installation and while still on-site. They also shall provide a list of devices and designated port assignments to the ITS group so they can update that port description in the Power Strip software.

All IP Addressable ITS and Signal network devices shall be plugged into the manageable (meaning it can be rebooted remotely) IP Power Strip ports Except the network switch.

4.0 Basis of Payment. Measurement and payment for Power Strip Installation includes the removal of the old and inactive power strip or other devices to make space for new power strip, installation of new power strip, grounding, testing and all miscellaneous hardware required for a safe, fully operational Power Strip. Payment will be made as follows:

Item Number	Unit	Description
910.99-02	Each	Install MoDOT Furnished IP-addressable Power Strip

QQQQQ. Remove and Reinstall Landscaping Brick Pavers used for Retaining Walls

1.0 Description. This special provision describes the removal and reinstallation of existing brick pavers used as short landscaping retaining walls at locations identified in the plans.

2.0 Construction. The contractor shall remove/unstack any existing brick pavers **as necessary** in order to reconstruct sidewalk and entrance pavement as shown in the plans. The contractor shall remove the brick pavers in a way that prevents damaging the bricks. If the contractor damages the bricks through its own operations, then the contractor shall replace them at no expense to the department. The contractor shall store the brick pavers in a safe location until they are ready to be reinstalled. The contractor shall reinstall the brick pavers back to the original layout of the existing wall. Any excess brick pavers should be returned to the property owner after the completion of the wall.

3.0 Method of Measurement. The removal and reinstallation of a landscaping retaining wall as noted in the plans will be measured by its length in linear feet.

4.0 Basis of Payment. Full compensation shall be made for removing the existing brick pavers, temporarily storing them, and then re-installing the brick pavers as a completed retaining wall, and shall include all incidentals, including material (base for foundation), grading, equipment and labor necessary to complete the work. Sodding behind the completed reinstalled retaining wall shall be paid for separately. The department will pay for measured quantity of removed and reinstalled landscaping brick paver wall at the contract unit price under the following bid item:

Item Number	Type / Description	Unit
703-99.03	Remove & Reinstall Landscaping Brick Pavers used for Retaining Walls	L.F.

RRRRR. Temporary Pedestrian Walkway

1.0 Description. The contractor shall provide an ADA compliant temporary pedestrian walkway, as approved by the Engineer, which is not constructed of aggregate base, that allows access to a private residence or business. This temporary pedestrian walkway shall be a portable system, constructed of metal, wood or a composite material, that allows a pedestrian to walk over a section of removed sidewalk or newly placed aggregate base for the proposed sidewalk to be installed later at locations identified in the plans.

2.0 Construction. The contractor shall place the temporary pedestrian walkway to provide a stable path for pedestrians over the aggregate base or excavated ground prior to pouring the new sidewalk. The contractor shall remove and reinstall the temporary walkway as many times as necessary to keep access open as denoted in JSP – Property Owner Agreements.

2.1 The temporary pedestrian walkway shall be at minimum 4 foot in width with handrails. This temporary walkway may not block pedestrian access on either side unless the section of sidewalk adjoining the walkway is completely closed to pedestrians due to construction activities.

3.0 Method of Measurement. The temporary pedestrian walkway shall be paid for at each location noted in the plans. Regardless of the number of times the pedestrian walkway is removed and reinstalled at a given location, entrance or access point noted in the plans, the pay for that location, entrance or access point will be made only one time. An access point is further defined in this provision as access to a residence or business with multiple entry ways in close proximity to one another.

4.0 Basis of Payment. Full compensation shall be made for providing a portable temporary pedestrian walkway, installing the temporary pedestrian walkway as many times necessary to provide a path to the residence/business, and shall also include all incidentals, including material, equipment and labor necessary to complete the work. The department will pay for measured quantity of temporary pedestrian walkway at a given location at the contract unit price under the following bid item:

Item Number	Type / Description	Unit
616-99.02	Temporary Pedestrian Walkway	Each

SSSSS. Construction Requirements

1.0 Description. Most areas along Route N that have new curb and gutter based upon the plans are to be constructed by constructing the curb in its same location. Also, most areas along Route N that have new sidewalk based upon the plans are to be constructed by widening towards the roadway and keeping the outer edge of sidewalk in its same location. Only locations listed below will have station/offsets listed which vary from existing conditions. Those locations include the following:

Realignment of I-70 off-ramps to Route N
Sta. 231+00 to Sta. 238+00 (near RRFB installation)
Sta. 260+00 to Sta. 273+00 (Right/West Side of Route N)

2.0 Additional Mobilization for Seeding. The contractor is advised that no seeding is being setup for this project. However, due to the amount of sodding on the job, the contractor will be paid for additional mobilizations to handle setup for sodding. Locations for additional

mobilizations are shown within the quantity sheets. No additional mobilizations will be paid unless approved by the Engineer.

3.0 Inlet Cleanouts. Existing debris and trash shall be removed from inlets listed in the plans. No flushing of the connecting culverts will be necessary unless directed by the Engineer. Inlet cleanouts will be paid for using the following pay item based upon the Standard Specifications:

Item Number	Type / Description	Unit
206-35.00	Culvert Cleanout	Each

4.0 As-built Circuiting. Included within the Electronic Deliverables are as-built plans for Metric Job J6I1220D. Circuiting for lighting, signals, sprinklers, etc. are shown within the provided plans.

5.0 Video Detection for Private Approach at Bermuda/St. Ann Intersection. The contractor shall set the the detection zone for the private approach labeled Zone 32 on Plan Sheet #162 so that a vehicle parked within the driveway will not activate the signal phase for this approach/Bermuda Road. This detection zone shall extend no further than the edge of the sidewalk or as directed by the Engineer. Specifications related to the detection used on this project are included within JSP – SL District Traffic Signal Detection System.

6.0 New Traffic Pattern for RRFB. The contractor shall install a CMS board along SB Route N south of Normandy Trace Drive a week prior to (or as directed by the Engineer) implementing the construction staging plan near the RRFB. In addition, the contractor shall provide a CMS board along SB Route N at this same location once traffic is within its final configuration from south of Normandy Trace Drive to Route 115.

7.0 New Sidewalk and Existing Fence Posts on Top of MSE Wall A6338. Within the plans, are quantities to remove and replace sidewalk along MSE Wall A6338 along the west side of Route N south of University Place Drive. An existing fence is connected to the existing sidewalk via. a plate anchored into the existing sidewalk. The contractor shall exercise care in sawcutting the existing sidewalk as to not disturb the MSE Wall straps and also to allow the fence to be used in place. The sidewalk removal is expected to be approximately 5' in width while allowing a min. of 1' of sidewalk to remain in order to allow the fence to be left in place. Before removing and replacing the entire length of sidewalk within the MSE wall limits, the contractor shall remove one 5' length of sidewalk and then receive approval from the Engineer before continuing to remove the rest of the sidewalk in this area in case any additional constraints or issues are discovered when removing this sidewalk.

8.0 Handrail Installation. The plans currently show sidewalk with varying width and no hand rail from **Sta. 227+54.8 to Sta. 229+03.3 on Plan Sheet #14.** Before installing this section of sidewalk, the contractor shall lay out this section in the field to help determine grading necessary on the backside of this new sidewalk next to a slope leading down to a ditch on the west side of Route N. If a 3:1 slope can not be constructed and tied into the existing back slope leading down towards the ditch, then the contractor shall provide a wider sidewalk that allows for a handrail to prevent pedestrians from reaching the ditch. Any changes from the plan shall be approved by the Engineer. Quantity for handrail with balusters is included in the job but may be underrun if the original plan is constructed. Quantity changes will be processed by the Engineer through change-orders.

9.0 Basis of Payment. No direct payment will be made for any labor, equipment, materials, and time required to comply with this provision.

TTTTT. 2.5" PSST Posts

1.0 Description. The contractor shall not request a VE (Value Engineering) in order to change the sign posts from 2.5" PSST to 2" PSST. The contractor shall install what is shown in the plans. MoDOT will not consider a VE in this case.

UUUUU. Special Consideration of Change Orders and Value Engineering JSP-21-07

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

Pay Item Number	Pay Item Description	Innovation
902-99.02	Rectangular Rapid Flashing Beacon Assembly	RRFB (Rectangular Rapid Flashing Beacon) within Road-Diet Section of Route N

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

2.0 Special Consideration of Change Orders and Value Engineering Change Proposals (VECP). Change ordering and/or value engineering the pay item(s) listed in section 1.0 jeopardize the ability for the Commission to receive an additional Federal Share for the overall contract value. Special consideration should be given to the change order value for removing or modifying such item(s) from the contract ensuring the benefit outweighs the cost.

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

VVVVV. Concrete Block Mat

1.0 Description. Furnish and install a ditch liner at the locations specified on the plans according to the standard specifications and installation guidelines from the manufacturer selected by the contractor.

2.0 Materials. The ditch liner shall be a concrete block mat or approved equivalent. The liner shall be a tied concrete block mat delivered in rolls or installed by hand or other means. The contractor shall provide the manufacturer with any information requested by the manufacturer to

design the size of the concrete mat blocks. The blocks will be cast around and held together with high strength polypropylene geo-grid or approved equivalent.

2.0 Construction. Prior to placing the tied concrete block mats, prepare the sub grade as detailed on the plans and in accordance with the mat manufacturer. Anchoring and/or lapping of mats shall be provided as required by the mat manufacturer. The area must be cleared of concrete and debris 6 inches or larger. Apply seed directly to the prepared soil prior to installation of the mat as per the manufacturer's recommendation or seed per project specifications as directed by the engineer. Install mats to the line and grade shown on the plans according to the manufacturer's installation guidelines. The manufacturer must provide technical assistance during the scope preparation and installation of the tied concrete block mats as needed.

4.0 Basis of Payment. The completed work, as described, shall be paid for at the contract unit price noted below. Final measurement will not be made, except for authorized changes during construction or where appreciable errors are found in the contract quantity. Where required, measurement will be made to the nearest square yard of completed concrete block mat. No measurement or allowance will be made for anchoring, lapping and/or embedment of concrete block mat, as required by the manufacturer as part of the installation.

4.1 Payment for ditch liner shall include all labor, equipment, time, materials, and incidentals to complete the work as described.

4.2 The Contractor shall provide an installation plan and product specifications for the Engineer's review prior to starting work.

Item No.	Type	Description
806-99.05	S.Y.	Concrete Block Mat

WWWWW. 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, paved approaches, 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 Sections 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, except as noted on the plans or 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 Number	Unit	Description
207-99.09	Station	Linear Grading Class 2, Modified

XXXXX. METRO Bus Pad

1.0 Description. The contractor shall construct a bus pad to be used by METRO Buses as indicated in the plans. The size is shown within the quantity sheets.

2.0 Material. Material shall be as specified in Sections 304 and 608 of the Standard Specifications.

3.0 Construction Requirements. The contractor shall provide a 4" Type 5 Aggregate Base or 4" Crushed Stone base below the new bus pad. The contractor shall follow Section 608 of the Standard Specifications regarding installing of the 4" thick concrete sidewalk to be used as the bus pad.

4.0 Method of Measurement. Measurement for each bus pad, regardless of size as indicated by the plans, will be made per each.

5.0 Basis of Payment. Payment for METRO Bus Pad, regardless of size indicated in the plans, as described in this provision and including all concrete, aggregate base, labor, tools and other incidentals will be made at the contract unit price for:

Item Number	Unit	Description
608-99.02	Each	METRO Bus Pad

YYYYY. Optional Pavements JSP 06-06H

1.0 Description. This work shall consist of a pavement composed of either Portland cement concrete or asphaltic concrete constructed on a prepared subgrade. This work shall be performed in accordance with the standard specifications and as shown on the plans or established by the engineer.

2.0 The quantities shown reflect the total square yards of pavement surface designated for each pavement type as computed and shown on the plans.

2.1 No additional payment will be made for asphaltic concrete mix quantities to construct the required 1:1 slope along the edge of the pavement, or for tack applied between lifts of asphalt.

2.2 No additional payment will be made for aggregate base quantities outside the limits of the final surface area as computed and shown on the plans. When A2 shoulders are specified, payment for aggregate base will be as shown on the plans.

2.3 The grading shown on the plans was designed for the pavement option chosen by the contractor. For projects with grading in the contract, there will be no adjustment of the earthwork quantities due to adjusting the roadway subgrade for optional pavements.

2.4 The contractor shall comply with Sections 401 through 403 for the asphalt option and Sections 501 and 502 for the concrete option.

2.5 Pavement options composed of Portland cement concrete shall have contrast pavement marking for intermittent markings (skips), dotted lines, and solid intersection lane lines. The pavement markings shall be in accordance with Section 620. No additional payment will be made for the contrast pavement markings.

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

4.0 Basis of Payment. The accepted quantity of the chosen option will be paid for at the contract unit bid price for Item 401-99.05, Optional Pavement, per square yard.

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

4.2 Price Adjustment for Fuel. If the contractor accepts the option for fuel adjustment in the bid proposal, a fuel adjustment will be applied in accordance with Sec 109.14 for the type of pavement constructed.

ZZZZZ. Supplemental Revisions JSP-18-01AB

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

The Missouri Highways and Transportation Commission shall not enter into a contract (or extend or renew a contract) using federal funds to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as substantial or as critical technology

as part of any system where the video surveillance and telecommunications equipment was produced by Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities).

Stormwater Compliance Requirements

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

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

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

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

2.1 Duties of the WPCM:

- (a) Be familiar with the stormwater requirements including the current MoDOT State Operating Permit for construction stormwater discharges/land disturbance activities; MoDOT’s statewide Stormwater Pollution Prevention Plan (SWPPP); the Corps of Engineers Section 404 Permit, when applicable; the project specific SWPPP, the Project’s Erosion & Sediment Control Plan; all applicable special provisions, specifications, and standard drawings; and this provision;
- (b) Successfully complete the MoDOT Stormwater Training Course within the last 4 years. The MoDOT Stormwater Training is a free online course available at MoDOT.org;

- (c) Attend the Pre-Activity Meeting for Grading and Land Disturbance and all subsequent Weekly Meetings in which grading activities are discussed;
- (d) Oversee and ensure all work is performed in accordance with the Project-specific SWPPP and all updates thereto, or as designated by the engineer;
- (e) Review the project site for compliance with the Project SWPPP, as needed, from the start of any grading operations until final stabilization is achieved, and take necessary actions to correct any known deficiencies to prevent pollution of the waters of the state or adjacent property owners prior to the engineer's weekly inspections;
- (f) Review and acknowledge receipt of each MoDOT Inspection Report (Land Disturbance Inspection Record) for the Project within forty eight (48) hours of receiving the report and ensure that all Stormwater Deficiencies noted on the report are corrected as soon as possible, but no later than stated in Section 5.0.

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

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

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

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

5.1 Liquidated Damages. If the Contractor fails to complete the correction of all Stormwater Deficiencies listed on the MoDOT Inspection Report within the specified time limit, the Commission will be damaged in various ways, including but not limited to, potential liability,

required mitigation, environmental clean-up, fines, and penalties. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of \$2,000 per day for failure to correct one or more of the Stormwater Deficiencies listed on the Inspection Report within the specified time limit. In addition to the stipulated damages, the stoppage of work shall remain in effect until all corrections are complete.

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

Anti-Discrimination Against Israel Certification

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

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

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

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

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

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

Table 1 – GTR Material Properties		
Property	Test Method	Criteria
Specific Gravity	ASTM D1817	1.02 to 1.20
Metal Contaminates	ASTM D5603	$\leq 0.01\%$
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 Mix G_{sb} used to determine VMA shall be calculated as follows:

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

where:

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

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

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

P_{GTR} = percent GTR by total mixture weight

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

G_{GTR} = GTR specific gravity

8.4 G_{se} shall be calculated as follows:

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

8.5 P_{be} shall be calculated as follows:

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

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

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

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

Delete Sec 403.19.2 and substitute the following:

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

Delete Sec 106.9 in its entirety and substitute the following:

106.9 Buy America Requirements.

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

106.9.1 Buy America Requirements for Iron and Steel.

On all federal-aid projects, the contractor's attention is directed to Title 23 CFR 635.410 *Buy America Requirements*. Where steel or iron products are to be permanently incorporated into the contract work, steel and iron material shall be manufactured, from the initial melting stage through the application of coatings, in the USA except for "minimal use" as described herein. Furthermore,

any coating process of the steel or iron shall be performed in the USA. Under a general waiver from FHWA the use of pig iron and processed, pelletized, and reduced iron ore manufactured outside of the USA will be permitted in the domestic manufacturing process for steel or iron material.

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

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

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

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

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

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

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

request by the engineer and retained for a period of 3 years after the last reimbursement of the material.

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

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

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

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

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

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

106.9.7 Buy America Requirements for Manufactured Products.

Manufactured products means:

- (a) Articles, materials, or supplies that have been:
 - (i) Processed into a specific form and shape; or
 - (ii) Combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.

- (b) If an item is classified as an iron or steel product, a construction material, or a section 70917(c) material under § 184.4(e) and the definitions set forth in this section, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under § 184.4(e) and paragraph (1) of this definition may include components that are construction materials, iron or steel products, or section 70917(c) materials.

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

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

Delete Sec 109.14.1 thru Sec 109.14.8 and substitute the following:

109.14.1 Monthly Fuel Index. Each month, the Monthly Fuel Index will be established as the average retail price per gallon for Ultra Low Sulfur Diesel for the Midwest (PADD 2) area as posted on the first Monday of the month by the U.S. Energy Information Administration (EIA). Should the posted price not be available for any reason, the MoDOT State Construction and Materials Engineer will use reasonable methods, at their sole discretion, to establish the Monthly Fuel Index on an interim basis until the EIA resumes its publication.

109.14.2 Fuel Adjustment Calculation.

B = Base Fuel Index = Monthly Fuel Index in the month in which the project was let
C = Current Index = Monthly Fuel Index in the month in which the work was performed
U = Units of work performed within the current pay estimate period (applicable pay units)
F = Total Fuel Usage Factor (gal./applicable pay units)

Fuel Adjustment (Dollars) = $(C - B) \times U \times F$

109.14.3 Each pay estimate period, a fuel adjustment payment or deduction will be applied for the quantity of work performed that period on each qualifying pay item. For calculation of the fuel adjustment, work performed on the first day of a month will generally be included with the second estimate in the previous month to keep fuel adjustments in sync with MoDOT's normal payment estimate period schedule. The Commission reserves the right to include work performed on the first day of the month with the current month to accommodate financial accounting termini, such as the beginning of the state and federal fiscal years (July 1 and October 1).

109.14.4 If the bidder wishes to be bound by these specifications, the bidder shall execute the acceptance form in the proposal. Failure by the bidder to execute the acceptance form will be interpreted to mean election to not participate in the price adjustment for fuel.

Disposal of Blast Media and Paint Residue

1.0 Description. Whereas Sec 1081.10 requires delivery of Blast Media and Paint Residue (BMPR) produced from bridge coating activities to The Doe Run Company for recycling, and considering the amount of BMPR produced on all active MoDOT projects statewide at any given point in time may exceed the recycling capacity of Doe Run, this provision allows for an alternate method of disposal of BMPR. The contractor, at its discretion, can choose this disposal option or the Doe Run recycle option, when both are available. When Doe Run is not currently capable or agreeable to accept the BMPR, this alternate disposal option shall be considered mandatory, and at no additional cost to the Commission.

2.0 Disposal in Landfill. In lieu of delivery to Doe Run for recycling, BMPR material shall be disposed in the appropriate type of approved landfill, as determined by Toxicity Characteristic Leaching Procedure (TCLP) testing. The material must be TCLP tested to determine if it contains a level of hazardous waste such that requires disposal in a hazardous waste landfill. A sampling plan for testing shall be submitted to MoDOT for review and concurrence. Sampling shall be performed by the contractor. MoDOT will witness the sampling to ensure it is conducted per the plan submitted.

2.1 The contractor shall submit the collected samples to a qualified third-party testing facility to perform TCLP testing. If the sample indicates that the BMPR material qualifies as hazardous waste, then the materials represented by that sample shall be delivered to a licensed hazardous waste landfill for disposal. The contractor shall be responsible for hiring a licensed hazardous waste transporter to transport the hazardous waste to the landfill. The contractor shall comply with all applicable laws and regulations for storage and shipping of the hazardous waste material. If the testing indicates that the BMPR material qualifies as a special waste, it shall be taken to a certified landfill for disposal. The contractor shall be responsible for the transportation of the special waste material to the certified landfill. The requirement to ship the BMPR material by barrels will be waived. Any alternate containers utilized shall comply with all applicable laws and regulations for shipping this type of special waste material. Copies of all shipping manifests, landfill disposal agreements, and any other legally required documentation shall be provided to the engineer.

3.0 Basis of Payment. No payment will be made for any costs associated with this landfill disposal option, including, but not limited to, sampling, testing, delivery, temporary storage, or disposal fees.