

108

Letting January 17, 2025

Notice to Bidders, Specifications and Proposal



**Contract No. 76R78
ST CLAIR County
Section (130,130-1, 130-2)TS-3,82-5TS
Route FAP 600, FAI 64
Project CMAQ-HSIP-4U5N(249)
District 8 Construction Funds**

Prepared by

Checked by

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(Printed by authority of the State of Illinois)



- 1. TIME AND PLACE OF OPENING BIDS.** Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). All bids must be submitted to the iCX system prior to 12:00 p.m. January 17, 2025 at which time the bids will be publicly opened from the iCX SecureVault.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 76R78
ST CLAIR County
Section (130,130-1, 130-2)TS-3,82-5TS
Project CMAQ-HSIP-4U5N(249)
Route FAP 600, FAI 64
District 8 Construction Funds**

Modernization of 16 traffic signals along IL 159 from the intersection of Ludwig/Salem Avenue to the intersection of IL 161/N. Belt West Road. Limits of this project also includes I-64 from IL 159 westward to milepost 10.8.

- 3. INSTRUCTIONS TO BIDDERS.** (a) This Notice, the invitation for bids, proposal and letter of award shall, together with all other documents in accordance with Article 101.09 of the Standard Specifications for Road and Bridge Construction, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

(b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.
- 4. AWARD CRITERIA AND REJECTION OF BIDS.** This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to re-advertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Omer Osman,
Secretary

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

INDEX
 FOR
 SUPPLEMENTAL SPECIFICATIONS
 AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2025

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS and frequently used RECURRING SPECIAL PROVISIONS.

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 1-1-22) (Revised 1-1-25)

SUPPLEMENTAL SPECIFICATIONS

<u>Std. Spec. Sec.</u>	<u>Page No.</u>
202 Earth and Rock Excavation	1
204 Borrow and Furnished Excavation.....	2
207 Porous Granular Embankment	3
211 Topsoil and Compost	4
406 Hot-Mix Asphalt Binder and Surface Course	5
407 Hot-Mix Asphalt Pavement (Full-Depth)	7
420 Portland Cement Concrete Pavement	8
502 Excavation for Structures	9
509 Metal Railings	10
540 Box Culverts	11
542 Pipe Culverts	31
550 Storm Sewers	40
586 Granular Backfill for Structures	47
630 Steel Plate Beam Guardrail	48
632 Guardrail and Cable Road Guard Removal	49
644 High Tension Cable Median Barrier	50
665 Woven Wire Fence	51
701 Work Zone Traffic Control and Protection	52
781 Raised Reflective Pavement Markers	54
782 Reflectors	55
801 Electrical Requirements	57
821 Roadway Luminaires	60
1003 Fine Aggregates	61
1004 Coarse Aggregates	62
1010 Finely Divided Minerals	63
1020 Portland Cement Concrete	64
1030 Hot-Mix Asphalt	67
1040 Drain Pipe, Tile, and Wall Drain	68
1061 Waterproofing Membrane System	69
1067 Luminaire	70
1097 Reflectors	77
1102 Hot-Mix Asphalt Equipment	78

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

RECURRING SPECIAL PROVISIONS

The following RECURRING SPECIAL PROVISIONS indicated by an "X" are applicable to this contract and are included by reference:

<u>CHECK SHEET #</u>	<u>PAGE NO.</u>
1 X Additional State Requirements for Federal-Aid Construction Contracts	79
2 X Subletting of Contracts (Federal-Aid Contracts)	82
3 X EEO	83
4 Specific EEO Responsibilities Nonfederal-Aid Contracts	93
5 Required Provisions - State Contracts	98
6 Asbestos Bearing Pad Removal	104
7 Asbestos Waterproofing Membrane and Asbestos Hot-Mix Asphalt Surface Removal	105
8 Temporary Stream Crossings and In-Stream Work Pads	106
9 Construction Layout Stakes	107
10 Use of Geotextile Fabric for Railroad Crossing	110
11 Subsealing of Concrete Pavements	112
12 Hot-Mix Asphalt Surface Correction	116
13 Pavement and Shoulder Resurfacing	118
14 Patching with Hot-Mix Asphalt Overlay Removal	119
15 Polymer Concrete	121
16 Reserved	123
17 Bicycle Racks	124
18 Temporary Portable Bridge Traffic Signals	126
19 Nighttime Inspection of Roadway Lighting	128
20 English Substitution of Metric Bolts	129
21 Calcium Chloride Accelerator for Portland Cement Concrete	130
22 X Quality Control of Concrete Mixtures at the Plant	131
23 X Quality Control/Quality Assurance of Concrete Mixtures	139
24 Reserved	155
25 Reserved	156
26 Temporary Raised Pavement Markers	157
27 Restoring Bridge Approach Pavements Using High-Density Foam	158
28 Portland Cement Concrete Inlay or Overlay	161
29 Portland Cement Concrete Partial Depth Hot-Mix Asphalt Patching	165
30 Longitudinal Joint and Crack Patching	168
31 Concrete Mix Design – Department Provided	170
32 Station Numbers in Pavements or Overlays	171

TABLE OF CONTENTS

LOCATION OF PROJECT	1
DESCRIPTION OF PROJECT	1
SUBMITTAL OF EEO/LABOR DOCUMENTATION	2
MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION	4
TRAFFIC CONTROL PLAN	5
PEAK HOUR RESTRICTIONS	6
SEEDING, MINOR AREAS	7
UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT	7
SIDEWALK REMOVAL AND REPLACEMENT	8
MODIFY EXISTING CONTROLLER CABINET	8
FULL ACTUATED CONTROLLER AND CABINET	12
COMMUNICATIONS VAULT, 24"X36"	15
COMMUNICATIONS VAULT SPACING	16
ROUTING, LAYOUT AND DOCUMENTATION	17
FIBER OPTIC CABLE SPLICE	17
FIBER OPTIC CABLE IN CONDUIT, SINGLE MODE	22
FIBER OPTIC UTILITY MARKER	27
RELOCATE EXISTING TRAFFIC SIGNAL EQUIPMENT	29
REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT	30
DRILL EXISTING FOUNDATION	31
DRILL EXISTING HANDHOLE	31
AS-BUILT DOCUMENTATION	31
TRAFFIC SIGNAL SYSTEM SHUTDOWN	31
VIDEO VEHICLE DETECTION SYSTEM COMPLETE	32
PEDESTRIAN PUSH-BUTTON POST	38
CABINET, MODEL 334	40
SYSTEM IMPLEMENTATION, EQUIPMENT INTEGRATION AND SUPPORT	42
TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN	43
EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C	65
CONCRETE FOUNDATION, PEDESTRIAN POST	65
REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES	65
STATUS OF UTILITIES TO BE ADJUSTED	71
ETHERNET SWITCH	72
ETHERNET MANAGE SWITCH	75
CLOSED CIRCUIT TELEVISION DOME CAMERA, HD	76

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
PROJECT CMAQ-HSIP-4U5N(249)
SECTION (130,130-1,130-2)TS-3, 82-5TS
ST. CLAIR COUNTY
CONTRACT NO. 76R78

ACCESSIBLE PEDESTRIAN SIGNALS (APS) (BDE)	78
AUTOMATED FLAGGER ASSISTANCE DEVICES (BDE).....	79
CEMENT, FINELY DIVIDED MINERALS, ADMIXTURES; CONCRETE, AND MORTAR (BDE).....	80
COMPENSABLE DELAY COSTS (BDE).....	90
CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE).....	93
DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)	95
REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (BDE)	97
SEEDING (BDE)	99
SHORT TERM AND TEMPORARY PAVEMENT MARKINGS (BDE).....	104
SIGN PANELS AND APPURTENANCES (BDE).....	107
SOURCE OF SUPPLY AND QUALITY REQUIREMENTS (BDE)	107
SPEED DISPLAY TRAILER (BDE).....	108
STEEL COST ADJUSTMENT (BDE).....	109
SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)	111
SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE).....	112
SUBMISSION OF BIDDERS LIST INFORMATION (BDE).....	112
SUBMISSION OF PAYROLL RECORDS (BDE).....	113
VEHICLE AND EQUIPMENT WARNING LIGHTS (BDE)	114
WEEKLY DBE TRUCKING REPORTS (BDE).....	114
WORK ZONE TRAFFIC CONTROL DEVICES (BDE)	115
WORKING DAYS (BDE).....	116

STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2022, the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways," and the "Manual of Test Procedures for Materials" in effect on the date of invitation for bids, and the Supplemental Specifications and Recurring Special Provisions indicated on the Check Sheet included herein which apply to and govern the construction of FAP Route 600 and FAI Route 64 (IL 159 and I-64), Project CMAQ-HSIP-4U5N(249), Section (130,130-1,130-2)TS-3, 82-5TS, St. Clair County, Contract No. 76R78, and in case of conflict with any part or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

FAP Route 600 and FAI Route 64 (IL 159 and I-64)
Project CMAQ-HSIP-4U5N(249)
Section (130,130-1,130-2)TS-3, 82-5TS
St. Clair County
Contract No. 76R78

LOCATION OF PROJECT

This project is in St. Clair County along IL 159 from the intersection of Ludwig/Salem Avenue to the intersection of IL 161/N. Belt West Road. Limits of this project also includes I-64 from IL 159 westward to milepost 10.8.

DESCRIPTION OF PROJECT

This project consists of modernizing 16 traffic signals along the IL 159 corridor in Fairview Heights and Swansea. Intersections with protected-permissive phasing will utilize flashing yellow arrow signal heads. Eight of the traffic signals in Fairview Heights will be interconnected and will connect into IDOT's existing ITS network by tying into the existing DMS board on I-64 at MP 10.8. This project includes all collateral work necessary to complete project as shown on the plans and as described herein.

SUBMITTAL OF EEO/LABOR DOCUMENTATION

Effective: April 2016

This work shall be done in accordance with Check Sheets No. 1, 3, and 5 of the IDOT Supplemental Specifications and Recurring Special Provisions and the Weekly DBE Trucking Reports (BDE) special provision, except as here-in modified.

PAYROLL AND STATEMENT OF COMPLIANCE:

Certified payroll (FORM SBE 48 OR AN APPROVED FACSIMILE) and the Statement of Compliance (FORM SBE 348) shall be submitted by two methods:

1. By Mail (United States Postal Service): The ORIGINAL of the certified payroll and the Statement of Compliance for the Prime Contractor and each Subcontractor shall be submitted by mail to the Regional Engineer for District 8.
2. Electronically: Scan both the ORIGINAL of the certified payroll and the Statement of Compliance to the same PDF file, and email to the District at the email address designated by the District EEO Officer.

SBE 48 and SBE 348 forms shall be submitted weekly and will be considered late if received after midnight seven business days after the payroll ending date.

WEEKLY DBE TRUCKING REPORT:

The Weekly DBE Trucking Report (FORM SBE 723) shall be submitted electronically. Scan the form to a PDF file, and email to the District at the email address designated by the District EEO Officer.

SBE 723 forms shall be submitted weekly and will be considered late if received after midnight ten business days following the reporting period.

MONTHLY LABOR SUMMARY & MONTHLY CONTRACT ACTIVITY REPORTS:

The Monthly Labor Summary Report (MLSR) shall be submitted by one of two methods:

1. For contractors having IDOT contracts valued in the aggregate at \$250,000 or less, the report may be typed or clearly handwritten using Form D8 PI0148. Submit the ORIGINAL report by mail to the Regional Engineer for District Eight. Contractors also have the option of using the method #2 outlined below.
2. For contractors having IDOT contracts valued in the aggregate at more than \$250,000, the report must be submitted in a specific "Fixed Length Comma Delimited ASCII Text File Format". This file shall be submitted by e-mail using specific file formatting criteria provided by the District EEO Officer. Contractors must submit a sample text file to District 8 for review at least 14 days prior to the start of construction.

The Monthly Contract Activity Report (MCAR) may be typed or clearly handwritten using Form D8 PI0149.

The MLSR and the MCAR shall be submitted concurrently. If the method of transmittal is method #1 above, then both the MLSR and the MCAR shall be mailed together in the same envelope. If the method of transmittal is method #2 above, then the MCAR shall be scanned to a .pdf file and attached to the email containing the MLSR .txt file.

The MLSR and MCAR must be submitted for each consecutive month, for the duration of the project, and will be considered late if received after midnight ten calendar days following the reporting period.

REQUEST FOR APPROVAL OF SUBCONTRACTOR:

The ORIGINAL and one copy of the Request for Approval of Subcontractor (FORM BC 260A) shall be submitted to the District at the IDOT Preconstruction Conference.

SUBSTANCE ABUSE PREVENTION PROGRAM CERTIFICATION:

The ORIGINAL and one copy of the Substance Abuse Prevention Program Certification (FORM BC 261) shall be submitted to the District at the IDOT Preconstruction Conference.

The Contractor is required to follow submittal procedures as provided by the EEO Officer at the preconstruction conference and to follow all revisions to those procedures as issued thereafter.

If a report is rejected, it is the Contractor's responsibility to make required adjustments and/or corrections and resubmit the report. Reports not submitted and accepted within the established timeframes will be considered late.

Disclosure of this information is necessary to accomplish the statutory purpose as outlined under 23CFR part 230 and 41CFR part 60.4 and the Illinois Human Rights Act. Disclosure of this information is REQUIRED. **Failure to comply with this special provision may result in the withholding of payments to the Contractor and/or cancellation, termination, or suspension of the contract in whole or part.**

This special provision must be included in each subcontract agreement.

ALL HARD COPY FORMS TO BE SUBMITTED TO:

Region 5 Engineer
Illinois Department of Transportation
ATTN: EEO/LABOR OFFICE
1102 Eastport Plaza Drive
Collinsville, IL 62234-6198

Compliance with this special provision shall be included in the cost of the contract, and no additional compensation will be allowed for any costs incurred.

MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION

General. Full maintenance responsibility shall start as soon as the Contractor begins any physical work on the contract or any portion thereof. If contract work is started prior to a traffic signal inspection, maintenance of the traffic signal installations will be transferred to the Contractor without an inspection.

This item shall include the maintenance of all traffic signal equipment and other connected and related equipment such as emergency vehicle pre-emption equipment, master controllers, UPS and batteries, PTZ cameras, vehicle detection, handholes, lighted signs, telephone service installations, communication cables, conduits to adjacent intersections, and other traffic signal equipment. Regional transit, county, and other agencies may also have equipment connected to existing traffic signal or peripheral equipment such as PTZ cameras, switches, transit signal priority (TSP and BRT) servers, radios, and other devices that shall be included with traffic signal maintenance at no additional cost to the contract.

The Contractor is advised that the existing and/or span wire traffic signal installation must remain in operation during all construction stages, except for the most essential downtime.

The Contractor shall provide immediate corrective action when any part or parts of the system fail to function properly. Two far side heads facing each approach shall be considered the minimum acceptable signal operation pending permanent repairs. When repairs at a signalized intersection require that the controller be disconnected or otherwise removed from normal operation and power is available, the Contractor shall place the traffic signal installation on flashing operation. The signals shall flash RED for all directions unless a different indication has been specified by the Engineer. The Contractor shall be required to place stop signs at each approach of the intersection as a temporary means of regulating traffic if no power is available for normal/flashing operation.

The Contractor shall provide the Engineer with two 24-hour telephone numbers for the maintenance of the traffic signal installation and for emergency calls by the Engineer.

Traffic signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of the Standard Specifications and these special provisions.

The Contractor shall respond to all emergency calls from the Department or others within one hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the Contractor at no additional charge to the contract. The Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the traffic signal installation in proper operating condition or if the Engineer cannot contact the Contractor's designated personnel, the Engineer shall have the State's electrical maintenance contractor perform the maintenance work.

Any proposed activity in the vicinity of a highway-rail grade crossing must adhere to the guidelines set forth in the current edition of the MUTCD regarding work in temporary traffic control zones in the vicinity of highway-rail grade crossings which states that lane restrictions, flagging, or other

operations shall not create conditions where vehicles can be queued across the railroad tracks. If the queuing of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger shall be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.

Equipment included in this item that is damaged or not operating properly from any cause shall be replaced with new equipment meeting current District Eight traffic signal specifications and provided by the Contractor at no additional cost to the contract and/or owner of the traffic signal system. Final replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted. Cable splices outside the controller cabinet shall not be allowed.

Automatic traffic enforcement equipment, such as red-light enforcement cameras, detectors, and peripheral equipment, damaged or not operating properly from any cause shall be the responsibility of the municipality or the automatic traffic enforcement company per permit agreement.

The Contractor shall be responsible to clear snow, ice, dirt, debris, or other condition that obstructs visibility of any traffic signal display or access to traffic signal equipment.

The Contractor shall maintain the traffic signal in normal operation during short- or long-term loss of utility or battery back-up power at critical locations designated by the Engineer. Critical locations may include traffic signals interconnected to railroad warning devices, expressway ramps, intersection with an SRA route, critical corridors or other locations identified by the Engineer. Temporary power to the traffic signal must meet applicable NEC and OSHA guidelines and may include portable generators and/or replacement batteries. Temporary power to critical locations shall not be paid for separately but shall be included in the contract.

Temporary replacement of damaged or a knockdown mast arm pole assembly shall require construction of a full or partial span wire signal installation or other method approved by the Engineer to assure signal heads are located overhead and over traveled pavement. Temporary replacement of mast arm mount signals with post mount signals will not be permitted.

Basis of Payment. This work will be paid for at the contract unit price per EACH for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION. Each intersection will be paid for separately.

TRAFFIC CONTROL PLAN

Effective: July 12, 1993

Revised: May 12, 1997

Traffic control shall be in accordance with the applicable sections of the Standard Specifications for Road and Bridge Construction, the applicable guidelines contained in the National Manual on Uniform Traffic Control Devices for Streets and Highways, Illinois Supplement to the National Manual of Uniform Traffic Control Devices, these special provisions, and any special details and highway standards contained herein and in the plans.

The Contractor shall provide two weeks' notice to the Department prior to any lane closures.

Special attention is called to Sections 107, 701, and 703 of the Standard Specification, the Supplemental Specifications, Recurring Special Provisions, the special provisions contained herein, and the following highway standards relating to traffic control:

701001	701006	701106	701301	701400	701401
701428	701446	701456	701601	701602	701701
701801	701901				

In addition, the following special provisions will also govern traffic control for this project:

- Peak Hour Restrictions
- Short Term and Temporary Pavement Markings
- Work Zone Traffic Control Devices (BDE)
- Speed Display Trailer (BDE)
- Traffic Spotters
- Vehicle and Equipment Warning Lights

PEAK HOUR RESTRICTIONS

The Contractor shall have all lanes open to traffic during peak hours in each direction along IL 159 and I-64. The Contractor shall not be permitted to conduct any type of operation that would impede the flow of traffic during peak hours. The Contractor shall be permitted to have lane closures through the weekends without peak hour restrictions, except for those holiday weekends specified in Article 107.09. The Contractor will notify the Engineer at least 72 hours in advance of closing any route to traffic.

Peak Hours:

Peak hours for westbound I-64 are 5:00 AM to 9:00 PM.

Peak hours for northbound and southbound IL 159 are 5:00 AM to 9:00 PM.

If the Contractor fails to have all lanes of traffic open during peak hours or conducts operations that will impede the flow of traffic during peak hours, a monetary penalty shall be assessed in the amount of \$1500.00 for each 15-minute period during peak hours. This penalty will also be assessed if the Contractor extends the interstate closure beyond the allocated 15-minute, short-term closure periods.

SEEDING, MINOR AREAS

Seeding and fertilizing shall be done in accordance with Article 250 of the Standard Specifications, except for the following revisions: All areas disturbed by the work performed shall be seeded, fertilized, and mulched in accordance with Article 251.03(a) and as directed by the Engineer.

The seed mixture shall be applied at 100 pounds/acre. All seeds shall meet the mixture, purity and noxious weed requirements of Article 1081.04 of the Standard Specifications and be approved by the Engineer. The fertilizer nutrients shall be applied at a rate of 270 pounds/acre. The fertilizer furnished shall be ready mixed material having a ratio of (1-1-1).

The Contractor shall provide the Engineer with the test results from the seed container and the chemical analysis of the fertilizer nutrients.

Basis of Payment. The seed and fertilizer placed at all disturbed areas will not be measured for payment but will be included in the cost for underground conduit, coilable nonmetallic conduit.

UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT

Revised: March 22, 2018

This work shall consist of furnishing and installing a conduit of the type and size specified in accordance with Sections 810 and 1088.01(b) or 1088.01(c) of the Standard Specifications, except as described herein.

Coilable Nonmetallic Conduit, Augured: The term augured shall cover both the pushed and bored method of installing conduit. Because of differences in equipment and techniques, the Contractor may use either method to install the conduit for the term augured.

If subsurface conditions are encountered which prevent conduit from being augured or pushed through an entire conduit run in three sincere attempts, as determined by the Engineer, compensation for the proposed conduit run will be as follows:

1. The Department will delete the contract specified method of payment for the subject conduit run.
2. The Department will pay for the installation of the conduit run and the three unsuccessful attempts to install the conduit run under Article 109.04 of the Standard Specification on a force account basis.
3. The Engineer will determine the method to be utilized to install the conduit run.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for CONDUIT, of the size and type specified, which price shall be payment in full for furnishing and installing the complete conduit run, including all fittings.

SIDEWALK REMOVAL AND REPLACEMENT

Required removal and replacement of existing sidewalk due to the placement of conduit and/or communication vaults will not be paid for separately but shall be included in the cost for underground conduit, PVC in any size. This work shall be in accordance with applicable portions of Sections 424 and 440 of the Standard Specifications.

MODIFY EXISTING CONTROLLER CABINET

This work shall consist of the modification of the existing DMS controller cabinet at the locations shown in the plans. The work shall be in accordance with applicable portions of Sections 857, 864, and 895 of the Standard Specifications.

The Contractor shall furnish and install a new fiber optic distribution enclosure, install an Ethernet switch, install a matching SFP at the layer III switch at the traffic signal cabinet at I-64 and IL-159, and relocate the existing wireless cellular modem from the previous DMS cabinet to the proposed.

The SFP's for the DMS shall be equal to or exceed Cisco GLC-LH-SMD=.

Contractor shall supply all necessary duplex LC fiber patch cords and Cat 6 Ethernet jumpers as necessary to connect equipment to the new fiber optic network.

The distribution enclosure shall be a wall mount with type LC duplex adapters equal to or exceed for fusion splicing of individual pigtails. The pigtails shall be mounted on 12 port panels using type LC optical connectors unless otherwise approved by the Engineer. The new fiber optic distribution enclosure shall be Corning Single Panel Housing (SPH) Pigtailed 12 F, LC Duplex, Single Mode (OS2), Single fiber, 250-micron meter, Multilink, Inc, or an approved equivalent. All the mounting hardware and cable management (spool for slack storage, adapter plate plugs, documentation labels, etc.) shall be included in the modifying of the existing controller cabinet.

The Contractor shall use type LC duplex adapters only unless otherwise specified in the plans or as directed by the Engineer. The optical connectors shall comply with the following:

- All connectors shall be factory installed LC compatible connectors. Field installed connectors shall not be allowed.
- Maximum attenuation 0.4dB, typical 0.2dB.
- No more than 0.2dB increase in attenuation after 1000 insertions.
- Attenuation of all connectors will be checked and recorded at the time of installation with an insertion test checked with an OTDR a minimum of five times.
- Terminated fibers as shown on the plans shall be connectorized at each end as directed by the Engineer. Unterminated fibers shall be capped and coiled neatly in the splice tray.
- Applicable fiber strands, as shown on the plans, shall be terminated at a fiber patch panel. The Contractor shall coordinate with the Engineer before any fibers are connected to IDOT network equipment. No additional terminations or splicing shall be done by the Contractor without direction from the IDOT.
- Unused fibers will be protected with a plastic cap to eliminate dust and moisture.

- All connectors shall comply with the TIA/EIA -568-A and TIA/EIA-604 standards, as applicable, and are tested according to the Telcordia/Bellcore GR326-CORE standard.
- When tested according to the TIA and EIA's Fiber Optic Test Procedure (FOTP)- 171 (TIA/EIA-455-171), ensure that the connectors test to an average insertion loss of less than or equal to 0.4 dB.

Pre-terminated Connector Assemblies (Pigtails). Pre-terminated cable assemblies shall consist of 12-strand fiber optic cable with factory-installed and tested connectors on one end of the cable and unterminated optical fiber on the other. Each strand of the pre-terminated cable assembly shall not exceed a maximum attenuation 0.4dB. The pre-terminated cable assembly shall be fusion spliced to the connector panel within the fiber optic distribution enclosure. All buffer tubes and fibers shall be appropriately protected once the attachment of pre-terminated connector assemblies is complete. In addition, the pigtails shall comply with the following:

- The pigtails shall consist of a section of single fiber, jacketed cable equipped with optical connectors at both ends.
- The factory installed connector furnished as part of the pigtail shall meet or exceed the requirements for approved connectors specified herein. The fiber portion of each pigtail shall have optical properties identical to the optical cable furnished under the contract.

Buffer Tube Fan-Out Kits. A buffer tube fan-out kit can be installed when fiber optic cables are terminated if approved by the Engineer. The kit shall be compatible with the fiber optic cable being terminated and shall be color-coded to match the optical fiber color scheme. The buffer tube fan-out kit shall support 12 fiber strands and the output tubing, and the fiber strands contained therein shall be of sufficient length for routing and attachment of fiber optic cable to connected electronics or as directed by the Engineer. The kit and the connectors shall be supplied by the same manufacturer.

All panels shall be furnished with splice trays, heat shrinks, strain relief, mounting hardware, and any miscellaneous hardware required to facilitate the lateral cable termination at the controller cabinet.

Construction Requirements. The Contractor shall install the fiber optic distribution enclosure along with associated hardware including any ancillary material items as shown on the plans and as directed by the Engineer. All cables shall be neatly dressed, labeled, and fastened to the corresponding equipment with the appropriate hardware. Tie wraps are not permitted. Hook and loop bundling straps shall be used for cable management. In addition, the Contractor shall also supply and install the necessary material to properly ground and bond the equipment in accordance with the NEC, telecommunications industry standards (ANSI/TIA/BICSI/IEEE), and manufacturer's requirements.

Prior to inspecting, testing, and connecting fiber optic jumpers or patch cables to the bulkheads within the fiber optic distribution enclosure, all LC connectors require proper cleaning using lens grade and lint free tissues and a 98% isopropyl alcohol cleaning solution unless another method and material is approved by the Engineer. Rubbing alcohol and medical wipes shall not be used and are not appropriate as both may contain oil or water, both of which leave residue. The Contractor shall wipe each connector twice with a moistened and dry tissue area, and failure to wipe the connector immediately with the dry tissue area will result in needing to redo the entire process.

Testing. The Contractor shall submit detailed test procedures for approval to the Engineer. All fibers (terminated and un-terminated) shall be tested bi-directionally at both 1310 nm and 1550 nm with both an OTDR and a power meter with an optical source. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

Fibers which are not to be terminated shall be tested with a temporary fusion spliced pigtail fiber.

Mechanical splice or bare fiber adapters are not acceptable.

The Contractor shall provide the date, time, and location of any tests required by this specification to the Engineer at least five working (seven calendar) days before performing the test. Included with the notification shall be a record drawing of the installed fiber optic cable system. The drawings shall indicate actual installed routing of the cable, the locations of splices, and locations of cable slack with slack quantities identified.

Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers for continuity, events above 0.1 dB, and total attenuation of the cable. The test procedure shall be as follows:

A certified technician utilizing an OTDR and optical source/power meter shall conduct the installation test. The test equipment used shall have been calibrated within the year. Documentation shall be provided. The technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

A fiber ring or fiber box, commonly known as a launch kit, shall be used to connect the OTDR to the fiber optic cable under test at both the launch and receive ends. The tests shall be conducted at 1310 and 1550 nm for all fibers bi-directionally.

All test results shall be provided on or the day following the test date. A copy of the test results on a CD ROM shall be submitted. At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Engineer. The test documentation shall be submitted as three CD ROM copies and shall include the following:

Cable & Fiber Identification:

• Cable ID	• Operator name
• Fiber ID, including tube and fiber color	• Date & time
• Pulse width (OTDR)	• Setup parameters
• Cable location -beginning and end point	• Range (OTDR)
• Wavelength	• Scale (OTDR)
• Refractory index (OTDR)	• Setup option chosen to pass OTDR "dead zone"

Test results shall include:

- OTDR Test Results-Including the raw test results file and the results in a .pdf format.

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

- Total Fiber Trace
- Measured Length (Cable Marking)
- Total Length (OTDR)
- Optical Source/Power Meter Total Attenuation (dB/km)
- Splice Loss/Gain
- Events > 0.10 dB
- OTDR Fiber Trace Viewer Software Details

Sample Power Meter Tabulation:

Power Meter Measurements (dB)									
Location		Fiber No.	Cable Length (km)	A to B		B to A		Bidirectional Average	
A	B			1310 nm	1550 nm	1310 nm	1550 nm	1310 nm	1550 nm
		1							
		2							
Maximum Loss									
Minimum Loss									

A copy of the test equipment manufacturer's software to read the test files, OTDR, and power, shall be provided to IDOT. These results shall also be provided in tabular form. See sample below:

Sample OTDR Summary					
Cable Designation	TCF-1K-03	OTDR Location:	Pump Sta. 67	Date:	1/1/00
Fiber Number	Event Type	Event Location	Event Loss (dB)		
			1310 nm	1550 nm	
1	Termination	23500 Ft.	.082	.078	
1	Termination	29000 Ft.	.075	.063	
2	Termination	29000 Ft.	.091	.082	
3	Termination	26000 Ft.	.072	.061	
3	Bend	27000 Ft.	.010	.009	

The following shall be the criteria for the acceptance of the cable:

The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable's published production loss. However, no event shall exceed 0.10 dB. If any event is detected above 0.10 dB, the Contractor shall replace or repair the fiber including that event point.

The total loss of the cable (dB), less events, shall not exceed the manufacturer's production specifications as follows: 0.4 dB/km at 1310 nm and 0.5 dB/km at 1550 nm. If the total loss exceeds these specifications, the Contractor shall replace or repair the cable run at no additional cost to the department for both labor and materials.

Basis of Payment. This work will be paid for at the contract unit price per EACH for MODIFY EXISTING CONTROLLER CABINET.

FULL ACTUATED CONTROLLER AND CABINET

The work shall be in accordance with applicable portions of Sections 857 and 864 of the Standard Specifications, except as revised by this special provision.

A traffic actuated solid state digital controller shall comply with the requirements of NEMA Standards for Traffic Control Systems, TS2-2016. This unit shall be capable being used as a master or local controller. One possible start up mode shall be an all-red display for a minimum of 15 seconds.

The controllers supplied shall be the Econolite Cobalt Series for integration into the existing District 8 Traffic Signal system and shall be fully compatible with the District's ATMS software.

The controller shall be capable of telemetry for controller to controller and controller to computer system or solo operation data transfer. Through telemetry, the system or solo operation shall be capable of being monitored on an IBM AT or compatible personal computer. Typically, the controller shall be completely uploaded or downloaded through telemetry either from a remote location or side by side from the computer. The latest computer software shall be provided so data, including all timing parameters, can be transferred. The controller will use non-volatile EEPROM memory. All harnesses shall be furnished, if different than provided previously, for the controller to controller and controller to computer data transfer. The controller shall contain all normal connectors and any special connectors required for data transfer. The controller's "D" connector termination panel and all other connectors shall be completely terminated, even if not required in this application. The twisted shielded field cables should remain shielded to within 1" of the cabinet terminals.

A slide out shelf shall be provided below the standard shelf and above the back panel terminal board. The pull out shelf should be mounted as far left as possible. The cabinet shall be equipped with an IP addressable power strip. A standard TS-2 detector card rack shall be provided. The cabinet shall have a thermostat controller heater.

During conflict monitor flash, a means shall be provided to restart the controller at the beginning of startup, just as if the power had been removed, and reset the monitor with a momentary pulse. The signal to restart/reset shall be delivered by telemetry and/or a momentary switch, labeled RESET, located in the police door. The pulse shall only be functional while the signals are in a monitor flash mode. Jumpers shall be installed in the unused load switch sockets to prevent false red fail reports. Hardwiring of this feature on the back panel will not be permitted. The cabinet series/parallel surge protector shall be the plug in type. The controller cabinet shall be a TS-2, type 1 equipped with a 16 load switch, load bay using a conflict monitor capable of operating with 16 or 12 channels.

The conflict monitor shall be a malfunction management unit meeting NEMA TS2-2016 standards and capable of supporting flashing yellow arrow (FYA) operation and also be equipped with IP addressable network capability. The conflict monitor shall be capable of providing modes in both TS-2 and TS-1 cabinet configurations. The conflict monitor shall provide error sensing of two

+24Vdc cabinet supplies and the controller power supplies via +24V MONITOR I, +24V MONITOR II, and Controller Voltage Monitor (CVM) inputs respectively. The conflict monitor shall use a programmable alpha-numeric LCD to show monitor status and two icon based LCDs to show field signal channel and fault status.

Communication. Controller shall be designed to communicate in two formats. Controller shall communicate in NTCIP format in full compliance with standard NTCIP 1201. Controller shall communicate in the format of the District's legacy controllers, Siemens traffic signal controller models M01, M10, M30, M40, M50. The communication format may be altered by installation of an alternate firmware version. Both firmware versions shall reside on the controller hardware at the same time, be fully licensed, and available for use.

Controller shall have the following communication ports at a minimum:

- USB
- (1)RJ-45
- 25 pin RJ-232 ports for serial communication
- Flat format 37 pin D-Connector with FSK modem

The USB port shall offer the following capabilities to a standard USB storage device that can be purchased at any big box store. The number of files eligible for access to the thumbdrive shall be limited by the storage size of the USB storage device.

- Save data from/load data to controller
- Update controller firmware

Controller shall be capable of communicating to the central office software over the following mediums: IP, FSK over copper, phone modem, and serial over fiber. Controller shall be capable of communication in a closed-loop system with an existing master controller.

Interface. Controller display screen shall be in a menu format with a minimum of 16 lines of display. The interface shall be capable of displaying at least two active status screens from the menu of active status screen choices. Controller shall offer at least five favorites keys which store a display for easy access.

General Capabilities. Controller shall support the following functions:

- 4 rings and 16 phases
- Dynamic max timers
- Four phase banks - an alternate set of phase data selectable by time of day command
- Eight overlaps in formats standard, FYA, timed and pedestrian
- Detector diagnostics – three measurements, two levels activated by time of day
- FYA support for any NEMA cabinet manufacturer format
- 64 vehicle detectors
- 8 special detectors
- 8 pedestrian detectors
- 6 pre-empt detectors

The cabinet shall include a new fiber optic distribution enclosure. The distribution enclosure shall be of adequate capacity to accommodate the number of fibers to be terminated in the cabinet as noted in the plans.

The enclosure shall be a wall mount with type LC duplex adapters for fusion splicing of individual pigtails. The pigtails shall be mounted on minimum six port panel using type LC optical connectors unless otherwise approved by the Engineer. The new fiber optic distribution enclosure shall be Multilink, Inc. or approved equivalent. All of the mounting hardware and cable management (spool for slack storage, adapter plate plugs, documentation labels, etc.) shall be included.

The Contractor shall use type LC duplex adapters only unless otherwise specified in the plans or as directed by the Engineer. The optical connectors shall comply with the following:

- All connectors shall be factory installed LC compatible connectors. Field installed connectors shall not be allowed.
- Maximum attenuation 0.4dB, typical 0.2dB.
- No more than 0.2dB increase in attenuation after 1000 insertions.
- Attenuation of all connectors will be checked and recorded at the time of installation with insertion tests checked with an OTDR at a minimum five times.
- Terminated fibers as shown on the plans shall be connectorized at each end as directed by the Engineer. Unterminated fibers shall be capped and coiled neatly in the splice tray.
- Applicable fiber strands, as shown on the plans, shall be terminated at a fiber patch panel. The Contractor shall coordinate with the Engineer before any fibers are connected to IDOT network equipment. No additional terminations or splicing shall be done by the Contractor without direction from IDOT.
- Unused fibers will be protected with a plastic cap to eliminate dust and moisture.
- All connectors shall comply with the TIA/EIA -568-A and TIA/EIA-604 standards, as applicable, and are tested according to the Telcordia/Bellcore GR326-CORE standard.
- When tested according to the TIA and EIA's Fiber Optic Test Procedure (FOTP)- 171 (TIA/EIA-455-171), ensure that the connectors test to an average insertion loss of less than or equal to 0.4 dB.

Pre-terminated Connector Assemblies (Pigtails). Pre-terminated cable assemblies shall consist of 12-strand fiber optic cable with factory-installed and tested connectors on one end of the cable and unterminated optical fiber on the other. Each strand of the pre-terminated cable assembly shall not exceed a maximum attenuation 0.4dB. The pre-terminated cable assembly shall be fusion spliced to the connector panel within the fiber optic distribution enclosure. All buffer tubes and fibers shall be appropriately protected once the attachment of pre-terminated connector assemblies is complete. In addition, the pigtails shall comply with the following:

- The pigtails shall consist of a section of single fiber, jacketed cable equipped with optical connectors at both ends.
- The factory installed connector furnished as part of the pigtail shall meet or exceed the requirements for approved connectors specified herein. The fiber portion of each pigtail shall have optical properties identical to the optical cable furnished under the contract.

Buffer Tube Fan-Out Kits. A buffer tube fan-out kit can be installed when fiber optic cables are terminated if approved by the Engineer. The kit shall be compatible with the fiber optic cable being terminated and shall be color-coded to match the optical fiber color scheme. The buffer tube fanout kit shall support 12 fiber strands, and the output tubing and the fiber strands contained therein shall be of sufficient length for routing and attachment of fiber optic cable to connected electronics or as directed by the Engineer. The kit and the connectors shall be supplied by the same manufacturer.

The controller shall be provided with an RS232 Port 3 as well as an RS232 Port 2. Connections on the "D" panel, Aux. one output should be connected to red rest. Aux. three should be connected to the special status 3 inputs. Special status 1 shall be connected to report if the cabinet door is open.

A door open switch shall be provided. The controller's "D" connector termination panel shall be provided and fully connected to provide information to the controller of manual or monitor flash status. A slide out shelf shall be provided below the standard shelf and above the back panel terminal board. The pullout shelf should be mounted as far left as possible.

During conflict monitor flash, a means shall be provided to restart the controller at the beginning of startup just as if the power had been removed and reset the monitor with a momentary pulse. The signal to restart/reset shall be delivered by telemetry and/or a momentary switch, labeled RESET, located in the police door. The pulse shall only be functional while the signals are in a monitor flash mode. Jumpers shall be installed in the unused load switch sockets to prevent false red fail reports. Hardwiring of this feature on the back panel will not be permitted. The cabinet series/parallel surge protector shall be the plugin type. The controller cabinet shall be equipped with a 16 load switch bay using a 12 channel conflict monitor.

The phasing for the new cabinet shall be as shown in the plans.

The traffic signal controller will not be approved for installation until the requirements of Articles 801.10(b) and 801.07 are satisfied. The Contractor shall prepare traffic signal materials at a suitable location meeting the approval of the Engineer. The cabinet shall be tested and approved by IDOT at the Contractor's shop before moving it to the jobsite.

Basis of Payment. This work will be paid for at the contract unit price per EACH for FULL-ACTUATED CONTROLLER and FULL-ACTUATED CONTROLLER of the type of cabinet specified.

COMMUNICATIONS VAULT, 24"X36"

This work shall be in accordance with Sections 814 and 1088 of the Standard Specifications, except as modified herein. This work shall consist of furnishing and installing a communications vault constructed of a polymer concrete stackable assembly.

The 24" x 36" communications vault and lid shall conform to the following specifications:

Cover:

Material: polymer concrete
Nominal Dimensions: 24" x 36"
Single lid construction gasketed, heavy duty lid with two bolts.
Design/Test Load: 22,500/33,750 lbs. ANSI Tier: 22

Box:

Material: polymer concrete
Nominal Dimensions: 24" W x 36" L x 36" D

Open bottom,
Design/Test Load: 22,500/33,750 lbs. ANSI Tier: 22

The handhole lid shall be supplied with pull slots and stainless-steel security bolts and washers. The box shall be equipped with 12" cable racks to secure the fiber optic cable and splice closures off the bottom of handhole. Handhole lid shall have a standard logo design stamped into the lid as directed by the Engineer.

The location of the handhole shall be excavated so that the top of the handhole is set flush with the sidewalk, paved surface, or ground line. When installed in earth shoulder away from the pavement edge, the top surface of the handhole shall be 1" in. above the finished grade. The excavation shall be deep enough to accommodate the depth of the box and french drain.

The french drain shall be constructed underneath the proposed handhole according to Article 601.06 of the Standard Specifications and in accordance with Highway Standard 814006.

The conduits shall enter through the bottom of the vault. No conduits will be allowed to enter through the side wall of the vault. The Contractor shall install 6 inches of CA 5 or CA 7 in the bottom of the vault.

The Contractor shall submit testing reports to verify that the communications vaults and lids meet the requirements of ANSI Tier 22 loading.

A fiber optic marker shall be installed next to each communication vault. The locating cable shall be continuous and accessible on the outside of each communication vault using a locating cap that is installed on top of the fiber optic marker.

The Contractor shall utilize appropriate corrosion resistant hardware (stainless-steel) and connections to the locating wire. The Contractor shall submit material and installation methods to the Department for review.

Basis of Payment. This work will be paid for at the contract unit price per EACH for COMMUNICATIONS VAULT, 24"x36".

COMMUNICATIONS VAULT SPACING

The Contractor may submit a revised communication vault spacing plan to the Department for review and approval. Depending upon the fiber installation equipment used and the conduit reel sizes that are available, the communication vault spacing may be altered for optimum fiber installation. Optimum fiber installation essentially means continuous runs with no or minimal splice points unless otherwise shown on plans. However, the Department will still require that the Contractor install communication vaults at or near intersecting roadways.

Basis of Payment. This work will not be paid for separately but shall be included in the cost of the communications vault.

ROUTING, LAYOUT AND DOCUMENTATION

The Contractor shall layout and stake the proposed conduit route for review and approval by the Engineer a minimum of one week in advance of anticipated construction or at a different time frame as approved by the Engineer.

After the fiber optic cable plant has been installed, two complete sets of operation and maintenance documentation shall be provided. The documentation shall as a minimum include the following:

- Complete and accurate as-built diagrams showing the entire fiber optic cable plant including locations of all splices.
- The Contractor shall locate the fiber optic cable in 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 route (including all communication vaults, junction boxes and splice points) and a complete listing of all map coordinates in an electronic format. The format shall be compatible for viewing and importing into Arc GIS and Google Earth (kml or kmz). Each communication vault and fiber optic cable splice shall be numbered and clearly labeled when displayed in both software programs.
- Final copies of all approved test procedures.
- Complete performance data of the cable plant showing the losses at each terminal connector.
- Complete parts list including names of vendors.

Basis of Payment. This work will be paid for at the contract unit price per LUMP SUM for FIBER LAYOUT.

FIBER OPTIC CABLE SPLICE

Description. This work shall consist of splicing two fiber optic cables by means of fusion splicing with the number of fibers at locations as shown on the plans and as directed by the Engineer. No other splicing in the field shall be allowed without written direction from the Engineer. Fiber splicing in the field shall be done using in-ground splice closures as shown on the plans and/or as directed by the Engineer.

Two distinct type of fusion splices that are identified. A fiber optic cable splice and fiber optic cable splice mainline includes all fibers in the cable sheath. In a lateral fiber optic cable splice, the buffer tubes in the mainline fiber optic cable are dressed out so that those fibers designated on the plans can be accessed and fusion spliced or joined to the 12-fiber lateral single mode cables.

Materials. All fiber optic connection hardware (splice closures, organizers, cable end preparation tools, etc.) shall be compatible with the fiber optic cable manufacturers installation practices and procedures and shall be approved by the Engineer.

Fiber Optic Splice

- One loose tube dome closure for 144 fiber count
- Four splice tray kit with 36 count splice blocks

Fiber Optic Splice - Mainline

- One loose tube dome closure for 144 fiber count
- Four splice tray kit with 36 count splice blocks

Fiber Optic Splice – Lateral:

- One loose tube dome closure
- One splice tray kit with 12 count splice blocks

Splice enclosures and trays shall meet the following minimum requirements as below.

Splice closures. All optical fiber splices in the field shall be contained within a splice closure. The closures provide storage for splices, fiber, and buffer tubes; restores the mechanical and environmental integrity of the fiber optic cable; encases the sheath opening in the cable; and organizes and stores optical fiber. All hinges and latching devices shall be stainless-steel, and the closure shall be airtight and prevent water intrusion. The splice closure shall be able to accommodate pressurization and the ability to be re-entered without requiring specialized tools or equipment. The closure shall provide fiber and splice organizers including splice trays and strain relief. The splice closure shall be hermetically sealed to protect internal components from environmental hazards such as moisture, insects, and UV light.

The splice closure shall provide space for future expansion equal to 100% of the initial utilization. Fiber optic cable penetration end caps shall be provided to accommodate a minimum installation of two trunk fiber optic cables and two fiber optic drop cables. The closure end caps shall be factory-drilled to the proper diameter to accept and seal the fiber optic cable entries. The cable entry locations shall be able to accommodate an assortment of cables with outside diameters ranging from 0.45-0.55 inches, plus 10%, without jeopardizing the waterproof characteristics of the closure.

In addition, fiber optic splice closures shall meet the following requirements:

Mechanical
Resist compression deformation to a maximum of 400 pounds.
Withstand an impact energy to a maximum of 40 foot-pounds at 0°F.
Axial Tension: 100 pounds for 30 minutes.
Cable Torsion: ten 90-degree rotations.
Cable Flexing: ten 90-degree bends.
Environmental
Hydrostatic Pressure Head: Up to 10 pounds per square inch.
Withstand 40 freeze/thaw temperature cycles.
Ultraviolet resistant during a maximum 30-day exposure in compliance with the requirements detailed in the ASTM B 117 standard.
Chemical
Withstand a 90-day exposure to solutions of 3% sulfuric acid, 0.2 normal of sodium hydroxide, 10% Igepal®, kerosene, and be fungus resistant as required in the ASTM G21 standard.

Splice Trays. The splice trays shall be securely attached and accessible and provide sufficient storage for the fiber cable. The splice trays shall provide access to individual fibers without

disrupting other fibers in the tray. The splice trays shall hold the buffer tubes rigidly in place and provide protection for fusion splices. The Contractor shall ensure that the raceway accommodates the minimum bend radius of the fiber. The splice trays shall allow visible inspection of the fiber and include a cover with a locking mechanism to hold it in place.

Construction Requirements. All optical fiber splicing shall be performed using the fusion splicing technique and according to the latest version of the manufacturer's cable installation procedures; industry accepted installation standards, codes, and practices; or as directed by the Engineer. A fusion splice machine shall be used to splice all optical fiber. All splicing equipment shall be cleaned and calibrated according to the manufacturer's recommendations prior to each splicing session at each location.

Where a fiber cable is to be accessed for lateral or drop signal insertion, only the buffer tube containing the fiber to be accessed shall be opened and only the actual fiber to be accessed shall be cut. If a fiber end is not intended for use, the fiber shall be cut to a length equal to that of the fiber to be used and neatly laid into the splice tray. Any fibers exposed during splicing shall be treated with a protective coating and placed in a protective sleeve or housing to protect the fiber from damage or contaminants.

All splicing shall be performed as shown on the plans. All splice locations must be identified in the record drawings.

Splicing Requirements. All fiber optic cable splices shall be performed using a fusion splicer. Mechanical splicing of fiber optics strands shall not be permitted. After completing a fusion splice, the Contractor shall protect all the fused fibers with the appropriate transparent single mode fiber optic heat shrink tube with stainless-steel support rod. Once the splice has been completed and shrink been allowed to cool, all spliced fibers shall be neatly trained in splice trays housed in splice closures, splice enclosures, or termination panels.

Splicing shall be performed only at locations shown in the approved Cable-Pulling Plan. Any other splices shall be permitted only with the approval of the Engineer. Fiber optic splices at location shown on the plans will be paid for under separate pay items. Fiber optic splices and underground splice closures required for end-of-reel splices will not be paid for separately but shall be included cost of fiber optic cable. All splice locations shall be identified in the Record Drawings. Cable runs which dead-end at a handhole or communications vault shall be dead ended in an underground splice closure.

Slack Storage of Fiber Optic Cables. Included as a part of this item, slack fiber shall be supplied as necessary to allow splicing of the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored underground in handholes or in the raised base adapters of ground mounted cabinets in accordance with the fiber optic cable manufacturer's guidelines. Fiber optic cable slack shall be 100 feet for each cable at each splice location or communication vault, above or below ground. Fiber optic cable slack shall be 50 feet for each cable heavy duty handholes and access points, above or below ground, where splicing is not involved. If the innerduct is cut, the ends of the innerduct should extend beyond the first vertical rack so that they can be secured at that point. This slack shall be measured for payment.

Fiber optic cable shall be tagged inside handholes with yellow self-laminating fiber optic cable marker tag containing the text: "CAUTION - FIBER OPTIC CABLE."

The splice loss for a single mode fiber fusion splice shall not exceed a maximum bi-directional average of 0.1 dB per splice. Any splices that exceed allowable attenuation shall be repaired or replaced at no cost to the Department.

Testing Requirements. The Contractor shall submit detailed test procedures for approval by the Engineer. All fibers (terminated and un-terminated) shall be tested bi-directionally at both 1310 nm and 1550 nm with both an OTDR and a power meter with an optical source. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

Fibers which are not to be terminated shall be tested with a temporary fusion spliced pigtail fiber. Mechanical splice or bare fiber adapters are not acceptable.

The Contractor shall provide the date, time, and location of any tests required by this specification to the Engineer at least five working (seven calendar) days before performing the test. Included with the notification shall be a record drawing of the installed fiber optic cable system. The drawings shall indicate actual installed routing of the cable, the locations of splices, and locations of cable slack with slack quantities identified.

Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers for continuity, events above 0.1 dB, and total attenuation of the cable. The test procedure shall be as follows:

A certified technician using an OTDR and optical source/power meter shall conduct the installation test. The test equipment used shall have been calibrated within the year in accordance with manufacturer specifications, and documentation in the form of a calibration certificate shall be provided. The technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

A fiber ring or fiber box, commonly known as a launch kit, shall be used to connect the OTDR to the fiber optic cable under test at both the launch and receive ends. The tests shall be conducted at 1310 and 1550 nm for all fibers, bi-directionally.

All test results shall be provided on or the day following the test date. A copy of the test results on a CD ROM shall be submitted. At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Engineer. The test documentation shall be submitted as three CD ROM copies and shall include the following:

Cable & Fiber Identification:

• Cable ID	• Operator name
• Fiber ID, incl. tube and fiber color	• Date & time
• Pulse width (OTDR)	• Setup parameters
• Cable location -beginning and end point	• Range (OTDR)
• Wavelength	• Scale (OTDR)
• Refractory index (OTDR)	• Setup option chosen to pass OTDR "dead zone"

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

Test results shall include:

- OTDR Test Results-Including the raw test results file and the results in a .pdf format.
- Total Fiber Trace
- Measured Length (Cable Marking)
- Total Length (OTDR)
- Optical Source/Power Meter Total Attenuation (dB/km)
- Splice Loss/Gain
- Events > 0.10 dB
- OTDR Fiber Trace Viewer Software details

Sample Power Meter Tabulation:

Power Meter Measurements (dB)									
Location		Fiber No.	Cable Length (km)	A to B		B to A		Bidirectional Average	
A	B			1310 nm	1550 nm	1310 nm	1550 nm	1310 nm	1550 nm
		1							
		2							
Maximum Loss									
Minimum Loss									

A copy of the test equipment manufacture's software to read the test files, OTDR and power, shall be provided to IDOT. These results shall also be provided in tabular form. See sample below:

Sample OTDR Summary					
Cable Designation	TCF-IK-03	OTDR Location:	Pump Sta. 67	Date:	1/1/00
Fiber Number	Event Type	Event Location	Event Loss (dB)	1310 nm	1550 nm
1	Splice	23500 Ft.	.082	.078	
1	Splice	29000 Ft.	.075	.063	
2	Splice	29000 Ft.	.091	.082	
3	Splice	26000 Ft.	.072	.061	
3	Bend	27000 Ft.	.010	.009	

The following shall be the criteria for the acceptance of the cable. The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable's published production loss. However, no event shall exceed 0.10 dB. If any event is detected above 0.10 dB, the Contractor shall replace or repair the fiber including that event point.

The total loss of the cable (dB), less events, shall not exceed the manufacturer's production specifications as follows: 0.4 dB/km at 1310 nm and 0.5 dB/km at 1550 nm. If the total loss

exceeds these specifications, the Contractor shall replace or repair the cable run at no additional cost to the IDOT including both labor and materials.

Basis of Payment. This work shall be paid for at the contract unit price per EACH for FIBER OPTIC CABLE SPLICE – LATERAL, which price shall consist of 12 fibers spliced, tested, and accepted by the Engineer on splices between the fiber optic cable 12 fibers, single mode and fiber optic cable 144 fibers, single mode as detailed in the plans. All materials, labor, equipment, testing, and documentation required for fiber optic cable splicing shall be included and will not be paid separately. Payment shall not be made until the cable is installed, spliced, tested, and accepted by the Engineer in compliance with these special provisions.

FIBER OPTIC CABLE IN CONDUIT, SINGLE MODE

This work shall be in accordance with Sections 801, 864, 871, 873, and 1076 of the Standard Specifications, except as modified herein. All fibers shall be fusion spliced and terminated as shown in plans details. All terminated fibers shall be clearly labeled. Fibers not being used shall be labeled "spare".

All ancillary components required to complete the fiber optic cable plant including, but not limited to, moisture and water sealants, cable caps, fan-out kits, boots, cable trays, etc., shall be supplied under this pay item and will not be paid for separately. These items shall be submitted to the Department for approval.

The fiber optic cable shall be clearly marked in each vault and cabinet with a brightly colored (orange or yellow) weather resistant label securely attached to the cable. The weather resistant self-laminating fiber optic cable marker tag shall contain the text: "CAUTION - FIBER OPTIC CABLE."

Materials. The single-mode, fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall be an accepted product of the USDA Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1999 for a single sheathed, armored cable and shall be new, unused, and of current design and manufacture.

Single mode optical fibers shall comply with EIA/TIA 492-CAAA, except otherwise note herein. Fiber optic cable buffer tubes and strands shall be color coded per EIA/TIA-598-B. Fiber optic cable shall be a single jacket cable assembly with a corrugated steel armor system.

Fiber optic cable shall have identification and date marking every 2 feet indented, embossed, surface printed the entire length of the cable. The identification shall indicate that it's an optical cable, the manufacturer's trade name, hand set symbol if the cable is suitable for direct burial, sequential length numbered, and cable ends sealed to prevent moisture entry.

The cable shall utilize either a water blocking gel or a dry block tape.

Experience Requirements. Personnel involved in the installation, splicing, and testing of the fiber optic cables shall meet the following requirements:

A minimum of three years experience in the installation of fiber optic cables, including splicing, terminating, and testing single mode fibers.

Install two systems where fiber optic cables are outdoors in conduit and where the systems have been in continuous satisfactory operation for at least two years. The Contractor shall submit as proof photographs or other supporting documents and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the installed fiber optic systems.

One fiber optic cable system (which may be one of the two in the preceding paragraph), which the Contractor can arrange for a demonstration to the Department and the Engineer.

Installers shall be familiar with the cable manufacturer's recommended procedures for installing the cable. This shall include knowledge of splicing procedures for and equipment being used on this project and knowledge of all hardware such as breakout (furcation) kits and splice closures. The Contractor shall submit documented procedures to the Engineer for approval and to be used by Construction inspectors.

Personnel involved in testing shall have been trained by the manufacturer of the fiber optic cable test equipment to be used in fiber optic cable testing procedures. Proof of this training shall be submitted to the Engineer for approval. In addition, the Contractor shall submit documentation of the testing procedures for approval by the Engineer.

Installation in Raceways

Preinstall Integrity Test. To check and confirm the integrity of the existing conduit and ensure it is airtight and free of obstruction, the Contractor shall pressurize the duct prior to actual cable installation by installing a small amount of lubricant into the duct and blowing a foam carrier of sufficient size through the conduit run using the required material and equipment (e.g., hydraulic power system, air compressor, conduit couplers, foam carrier, etc.). All unused ducts shall be capped with blow string left in place.

Installation Plan. Prior to installation, the Contractor shall provide a cable-installation plan. The plan shall include the following information:

1. Identify where each cable will enter the underground system and the direction of each install
2. Identify locations where the cable is pulled out of a communications vault, coiled in a figure eight, and installed back into the communications vault
3. The plan shall address the physical protection of the cable during installation and during periods of downtime.
4. Identify the location of slack storage locations
5. Identify the locations of splices
6. Identify distances between fiber access points and crossings

The cable-installation plan shall be provided to the Engineer and shall be approved prior to the start of installation. The Engineer's approval shall be for the operation on the IDOT materials and does not include an endorsement of the proposed construction methods or procedures. The Contractor is responsible for the technical adequacy of the proposed construction methods and installation procedure.

Blowing. Fiber optic cable blowing is the most efficient and safe means of installing fiber optic cable. To minimize the exposure of the backbone cable and to facilitate the longer lengths of the fiber optic cable, the Contractor shall use a "blown cable" (pneumatically assisted) technique to place the fiber optic cable. Either the high airspeed blowing (HASS) method or the piston method shall be used. When using the HASS method, the volume of air passing through the conduit shall not exceed 600 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive. When using the piston method, the volume of air passing through the conduit shall not exceed 300 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive. A compressed air cooler shall be used when ambient air temperatures reach 90°F or more.

During cable installation operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and install operations. Unless specified otherwise by the fiber optic cable manufacturer, the outside bend radius of the cable during installation shall be no less than 20 times the outside diameter of the fiber optic cable. Entry guide chutes shall be used to guide the cable into the communications vault conduit ports where applicable. Lubricating compound shall be used to minimize friction. Corner rollers (wheels), if used, shall not have radii less than the minimum installation bending radius of the cable. A series array of smaller wheels can be used for accomplishing the bend if the cable manufacturer specifically approves the array.

Where figure-eight techniques are used during cable installation, the cable shall be handled manually and stored on the ground. The cable shall be placed on tarps to prevent damage from gravel, rocks, or other abrasive surfaces. Tarps should also be used in muddy conditions to keep the cable clean. Enough area to accommodate the cable length to be stored and sufficient personnel to maintain the required minimum bending diameter as well as avoid kinking or otherwise damaging the cable shall be provided. If the cable has been figure-eighted in preparation for a forward feed, the figure-eight must be flipped over to access the outside cable end. Sufficient personnel shall be provided to avoid kinking the cable as the figure-eight is flipped over. When removing the cable from the figure-eight, use care to avoid kinking the cable and violating the minimum bending diameter. Power assisted or figure-eight eliminator equipment, which is used to eliminate manual figure-eight procedures, shall not be used unless specifically allowed by the cable manufacturer in writing and approved by the Engineer.

Standard electronic controls shall be used during installation to monitor the cable blowing system and display the cable and tractor drive speeds so installation can be immediately stopped for problematic situations such as cable slippage or stoppage, over-speed, a duct blockage detected, etc. in an attempt to potentially prevent cable damage during installation.

Factory and Cable Reel Testing. Factory test results shall be performed prior to shipping the fiber optic cable and results submitted by the Contractor. In addition and prior to installation, the fiber optic cable shall then be OTDR tested on the reel by the Contractor to verify that no strands were damaged during shipment, the cable has the proper length, and the measured attenuation matches the cable datasheet.

Testing Requirements. Testing shall be in accordance with Article 801.13. The Contractor shall submit detailed test procedures for approval by the Engineer. All continuous fiber runs shall be tested bi-directionally at both 1310 nm and 1550 nm with a power meter and optical source. For testing, intermediate breakout fibers may be concatenated and tested end-to-end. Any

discrepancies between the measured results and these specifications will be resolved to the satisfaction of the Engineer.

The Contractor shall provide the date, time, and location of any tests required by this specification to the Engineer at least five days before performing the test. Upon completion of the cable installation, splicing, and termination, the Contractor shall test all fibers in each link for continuity and attenuation. The test procedure shall be as follows:

A certified technician using an OTDR and optical source/power meter shall conduct the installation test. The test equipment used shall have been calibrated within the year in accordance with manufacturer's specifications and documentation in form of a calibration certificate shall be provided. The technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

A fiber ring or fiber box, commonly known as a launch kit, shall be used to connect the OTDR to the fiber optic cable under test at the launch end. The tests shall be conducted at 1310 and 1550 nm for all fibers, bi-directionally.

All test results shall be provided on or the day following the test date. A copy of the test results on a CD ROM shall be submitted. At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Engineer. The test documentation shall be submitted as three CD ROM copies and shall include the following:

Cable & Fiber Identification:

• Cable ID	• Operator Name
• Fiber ID, including tube and fiber color	• Date & Time
• Pulse width (OTDR)	• Setup Parameters
• Cable Location -beginning and end point	• Range (OTDR)
• Wavelength	• Scale (OTDR)
• Refractory index (OTDR)	• Setup Option chosen to pass OTDR "dead zone"

Test results shall include:

- OTDR Test Results-Including the raw test results file and the results in a .pdf format.
- Total Fiber Trace
- Measured Length (Cable Marking)
- Total Length (OTDR)
- Optical Source/Power Meter Total Attenuation (dB/km)
- Splice Loss/Gain
- Events > 0.10 dB
- OTDR Fiber Trace Viewer Software Details

Sample Power Meter Tabulation:

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

Power Meter Measurements (dB)									
Location		Fiber No.	Cable Length (km)	A to B		B to A		Bidirectional Average	
A	B			1310 nm	1550 nm	1310 nm	1550 nm	1310 nm	1550 nm
		1							
		2							
Maximum Loss									
Minimum Loss									

A copy of the test equipment's manufacturer's software to read the test files, OTDR and power, shall be provided to IDOT. These results shall also be provided in tabular form. See sample below:

Sample OTDR Summary				
Cable Designation	TCF-IK-03	OTDR Location:	Pump Sta. 67	Date: 1/1/00
Fiber	Event	Event	Event Loss (dB)	
Number	Type	Location	1310 nm	1550 nm
1	Splice	23500 Ft.	.082	.078
1	Splice	29000 Ft.	.075	.063
2	Splice	29000 Ft.	.091	.082
3	Splice	26000 Ft.	.072	.061
3	Bend	27000 Ft.	.010	.009

The following shall be the criteria for the acceptance of the cable:

The test results shall show that the dB/km loss does not exceed +3% of the factory test or 1% of the cable's published production loss. However, no event shall exceed 0.10 dB. If any event is detected above 0.10 dB, the Contractor shall replace or repair the fiber including that event point.

The total loss of the cable (dB), less events, shall not exceed the manufacturer's production specifications as follows: 0.4 dB/km at 1310 nm and 0.5 dB/km at 1550 nm. If the total loss exceeds these specifications, the Contractor shall replace or repair the cable run at the no additional cost to the Department, including both labor and materials.

At the completion of the test, the Contractor shall provide two copies of documentation of the test results to the Engineer. The test documentation shall be bound and shall include the following:

Cable & Fiber Identification:

- Cable ID
- Cable Location - beginning and end point
- Fiber ID, including tube and fiber color
- Operator Name
- Date & Time Setup Parameters
- Wavelength

- Pulse Width (OTDR)
- Refractory Index (OTDR)
- Range (OTDR)
- Scale (OTDR)
- Setup option chosen to pass OTDR “dead zone”

Test Results:

- Optical Source/Power Meter
- Total Attenuation (dB/km)

These results shall be provided in tabular form.

Elevated attenuation due to exceeding the pulling tension during installation shall require the replacement of the cable run at the Contractor's expense, including labor and materials. The Contractor shall label the destination of each trunk cable onto the cable tag in each handhole and termination panel.

Slack Storage of Fiber Optic Cables. Included as a part of this item, slack fiber shall be supplied as necessary to allow splicing the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored underground in handholes or in the raised base adapters of ground mounted cabinets in accordance with the fiber optic cable manufacturer's guidelines. Fiber optic cable slack shall be 100 feet for each cable at each splice location or communication vault, above or below ground. Fiber optic cable slack shall be 50 feet for each cable communication vaults, heavy duty handholes, and access points, above or below ground, where splicing is not involved. If the innerduct is cut, the ends of the innerduct should extend beyond the first vertical rack so that they can be secured at that point. This slack shall be measured for payment.

A waterproof, simplex, fiber optic, split plug with bushing assembly of appropriate size or approved equivalent shall be installed around the fiber optic cable to seal around the ducts for the conduits entering all communication vaults and is included as part of the fiber optic cable pay item and will not be paid for separately.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for FIBER OPTIC CABLE 12 FIBERS, SINGLE MODE, or FIBER OPTIC CABLE 144 FIBERS, SINGLE MODE.

FIBER OPTIC UTILITY MARKER

This work shall be in accordance with the applicable portions of Sections 810 and 1088 of the Standard Specifications with the following modifications:

Fiber optic utility marker shall be furnished in orange color and incorporate a premium UV inhibitor package to resist harmful effects to the sun. The post shall be capable of withstanding multiple directional impacts and provide a long lasting and extremely durable product requiring little field maintenance. The post shall have a minimum 0.20" wall thickness, shall stand up straight in all weather conditions, and self-right to straight upon impact. Top of post hat shall be removable, partially flattened, and transition to round to afford 360-degree visibility. The post materials shall

include an anchor, test plate, a non-mechanical flexible joint, fiber optic innerduct split plugs, and a round delineator post.

The Contractor shall furnish and install fiber optic cable markers at each communication vault and every 500 feet along roadways and interchanges. Sign panels shall be non-reflective, 18" (L) x 18" (W), and shall be in accordance with Sections 1090-1092 of the Standard Specifications.

The marker shall have a 6-foot tall, 3-1/2" diameter post (white), and orange slide over poly- dome marker (3-1/2" OOD and 16" length) containing the following text: "Warning – Fiber Optic Cable", "IDOT District 9 (618) 549-2171".

The marker shall be designed to self erect after vehicle impact. Marker installation should be adequate so that marker cannot be pulled out or removed manually.

The Contractor shall submit catalog cut sheets for signs and markers for review by the Department prior to ordering materials.

Contractor shall furnish the Department with 50 additional complete markers to be used for maintenance and repair.

Markers shall be installed so that all lengths of installed fiber optic cables in new conduit have a minimum of one marker. A minimum of two markers shall be installed along each fiber optic cable path in new conduit so that one forward and one behind are always visible. A marker shall be installed at each point along the fiber optic cable path where a 45° or greater change in direction occurs. Markers shall be installed at a maximum of 24 inches lateral displacement from the actual placement of the conduit and fiber optic cabling and shall be installed no later than three days following the installation of conduit that contains fiber optic cables or of direct buried fiber optic cables. The Contractor shall safeguard the conduit and cables during the installation of the markers and remove and replace any conduit or cables that are damaged during marker installation at no additional cost to the Department.

Test plate (terminal board) shall be pre-configured 11-hole terminal board easily accessible by removing the cap from the fiber optic marker. The ground wire and fiber cable shields shall be extended from the communications vault and terminated on the test plate. The fiber cable shields shall be labeled as shown in the plans. The label material shall be weather resistant, and the markings shall be non-fading.

The Contractor shall furnish and install all materials required for marker installation. The Contractor shall restore the ground to its original condition including topsoil, sand, concrete, or other required materials and dispose of surplus materials.

Basis of Payment. This work will be paid for at the contract unit price per EACH for FIBER OPTIC UTILITY MARKER.

RELOCATE EXISTING TRAFFIC SIGNAL EQUIPMENT

Description. This item shall consist of relocating the existing traffic signal equipment and associated installation listed below and as shown on plans. This item shall include all hardware and components needed to successfully relocate the equipment. New homerun cable to the traffic signal cabinet shall be paid for under a separate pay item. Any work necessary inside the cabinet for correct operation for the traffic signal equipment shall be included in this pay item.

IL Route 159 & Ludwig Drive/Salem Place

- 4 Each EVP Detector
- 4 Each EVP Confirmation Beacon
- 1 Each EVP Detector Card

IL Route 159 & I-64 WB Ramp

- 2 EACH EVP Detector
- 1 EACH EVP Detector Card

IL Route 159 & I-64 EB Ramp

- 2 EACH EVP Detector
- 1 EACH EVP Detector Card

IL Route 159 & Market Place/St. Clair Square

- 2 Each EVP Detector
- 2 Each EVP Confirmation Beacon
- 1 Each EVP Detector Card

IL Route 159 & Fairview Heights Center

- 2 Each EVP Detector
- 2 Each EVP Confirmation Beacon
- 1 Each EVP Detector Card

IL Route 159 & Lincoln Highway/Lincoln Trail

- 4 Each EVP Detector
- 2 Each EVP Confirmation Beacon
- 1 Each EVP Detector Card

IL Route 159 & Lincoln Place Shopping Center

- 2 Each EVP Detector
- 1 Each EVP Detector Card

IL Route 159 & Longacre Drive/Ashland Avenue

- 4 Each EVP Detector
- 4 Each EVP Confirmation Beacon
- 1 Each EVP Detector Card

IL Route 159 & Chateau Drive

- 2 Each EVP Detector

- 2 Each EVP Confirmation Beacon
- 1 Each EVP Detector Card

Green Haven Drive

- 2 Each EVP Detector
- 2 Left Turn Sign
- 2 Street Sign

Huntwood Road

- 2 Each EVP Detector
- 3 Signal Heads, 1 Section mast arm mounted
- 1 Left Turn Sign
- 2 Street Sign

Rosewood Village Drive

- 2 Each EVP Detector

Fullerton Road

- 4 Each EVP Detector
- 4 Left Turn Sign
- 2 Street Sign

Metro Way

- 1 Each EVP Detector
- 4 Signal Head, 1 Section mast arm mounted
- 3 Signal Head, 1 Section mast arm mounted
- 1 APS
- 1 Ped Signal Head

Basis of Payment. This item shall be paid for at the contract unit price per EACH for RELOCATE EXISTING TRAFFIC SIGNAL EQUIPMENT. Each intersection will be paid for separately.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT

Description. In addition to the requirements of Section 895 of the Standard Specifications, this work shall consist of removing the existing traffic signal equipment at the intersections as noted in the plans. The supports, including hardware, shall become the property of the Contractor. The bid price shall reflect any salvage value for the supports and hardware.

Basis of Payment. This work will be paid for at the contract unit price per EACH for REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT. The price shall be payment in full for removing the equipment, storing, salvaging, and/or disposing of it as required.

DRILL EXISTING FOUNDATION

This work shall consist of drilling all the proper sized holes at a specified foundation to complete conduit installation in accordance with Section 879. Each hole drilled will be considered as a unit. The method for drilling shall be approved by the Engineer to prevent the signal cabinet components from being covered/damaged from concrete debris/dust.

This work will be paid for at the contract unit price per EACH for DRILL EXISTING FOUNDATION.

DRILL EXISTING HANDHOLE

This work shall consist of drilling all the proper sized holes at a specified existing traffic signal handhole to complete conduit installation in accordance with Section 879. Each hole drilled will be considered as a unit. The method for drilling shall be approved by the Engineer to prevent the signal cabinet components from being covered/damaged from concrete debris/dust.

This work will be paid for at the contract unit price per EACH for DRILL EXISTING HANDHOLE.

AS-BUILT DOCUMENTATION

The Contractor shall locate all new conduit and communication vaults 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 (Google Earth KML or KMZ shape file).

Basis of Payment. This work will not be paid for separately but shall be included in the cost for underground conduit, coilable nonmettalic conduit.

TRAFFIC SIGNAL SYSTEM SHUTDOWN

Before any traffic signal shutdown, both District 8 Bureau of Operations and the local police department shall be notified 48 hours in advance. The police department shall also be given the anticipated duration of the shutdown.

The existing system may be shut down for one working day to switch over to the new traffic signal cabinet. During the shutdown, the Contractor shall maintain flashing red lights at each intersection. The Contractor shall also provide and erect stop signs while signals are in the red flashing mode.

At all intersections where the signal cabinets are to be modified and the controller replaced, the Contractor shall install as much of the fiber optic equipment as possible with the signals in operation before switching over to red flash to keep the shutdown to a minimum.

VIDEO VEHICLE DETECTION SYSTEM COMPLETE

This work consists of a video detection system that detects vehicles, bicycles, and motorcycles on a roadway by processing video images and that provides vehicle presence, traffic flow data, event alarms, and full-motion video for real-time traffic control and management systems.

System Hardware. The video detection system shall be comprised of two major hardware components: a video sensor and a communications interface panel. An optional wired input/output card shall be available for certain cabinet types.

Video Sensor. The video detection system shall include a video sensor that integrates a HD camera with an embedded processor for analyzing the video and performing detection.

Camera and Processor. The camera shall be a color CMOS imaging array and shall have HD resolution of at least 720p (1280x720 pixels). The camera shall include a minimum 10X optical zoom.

It shall be possible to zoom the lens as required to satisfy across-the-intersection detection objectives, including stop line and advance detection and to zoom the lens remotely from the TMC for temporary traffic surveillance operations or to inspect the cleanliness of the faceplate.

The camera shall have direct, real-time iris and shutter speed control by the integrated processor. The processor shall support H.264 video compression for streaming output.

Video Sensor Enclosure Assembly. The camera and processor shall be housed in a sealed IP-67 enclosure.

The faceplate of the enclosure shall be glass and shall have hydrophilic coating on the exterior surface to reduce debris accumulation and maintenance. The faceplate shall have a thermostatically-controlled indium tin oxide (ITO) heater applied directly on the interior surface to keep the faceplate clear of condensation, snow, ice, and frost. An adjustable aluminum visor shall shield the faceplate from the sun and extraneous light sources.

An integral aiming sight shall assist in aiming the camera for the detection objectives. A removable rear cap and cable strain relief shall seal the power connection. The rear cap shall be tethered to the enclosure to avoid dropping the cap during installation. The rear cap shall be fastened to the body of the video sensor with a single, captive bolt. The rear cap and enclosure shall include gore breathers to equalize internal and external pressure.

The sensor shall be self-supporting on manufacturer's mounting brackets for easier fastening during installation.

It shall be possible to rotate the field-of-view 360° without changing the angle of the visor.

Power and Communications. Power and communications for the video sensor shall be carried over a single three-conductor cable. Termination of the three-conductor cable shall be inside the rear cap of the enclosure on a three-position, removable Phoenix terminal block. Each conductor shall be attached to the Phoenix plug via a screw connection.

The video sensor shall operate normally over an input voltage range of 89 to 265 VAC at 50 or 60 Hz.

Power consumption shall be no more than 16 watts typical.

No supplemental surge suppression shall be required outside the cabinet.

All communications to the video sensor shall be broadband-over-power via the same three conductor cable that powers the unit. Coaxial cable shall not be required.

Communications Interface Panel. The video detection system shall include an interface panel in the traffic cabinet that manages communications between the video sensors, the traffic management center, a maintenance technician, and the traffic cabinet itself.

Video Sensor Connection. The communications interface panel shall provide connection points for four video sensors. Each sensor connection shall be a 3-pole terminal block, which supplies power and broadband over-power communications to the sensor.

The broadband-over-power communications shall provide a throughput of 70 to 90 Mbps, and the broadband-over-power connection shall support at least 1,000 feet of cabling to the video sensor.

Each video sensor connection shall include a power switch.

There shall be an LED for each video sensor to indicate the state of the power to the sensor and an LED for each video sensor to indicate the status of communications.

Each video sensor connection shall contain a resettable fuse. Each video sensor connection shall provide high-energy transient protection.

Traffic Management Center (TMC) Communications. An Ethernet port shall be provided to connect to a remote TMC. The TMC connection shall support 10/100/1000 Mbps Ethernet communication.

The communications interface panel shall proxy all network requests that arrive on the TMC connection to avoid unwanted network traffic from reaching the broadband-over-power network between the communications interface panel and the video sensors.

All communications to the video detection system through the TMC connection shall be to a single IP address.

Local User Communications. A wired Ethernet port shall be provided to connect the technician at the cabinet to the video detection system for setup and maintenance purposes. The maintenance port shall support 10/100/1000 Mbps Ethernet communication.

All communications to the video detection system through the maintenance port shall be to a single IP address. The maintenance port shall support DHCP to automatically assign an IP address to the user's computer, if desired.

An 802.11g Wi-Fi access point shall allow wireless connection to the video detection system at the cabinet for setup and maintenance purposes. All communications to the video detection system through the Wi-Fi access point shall be to a single IP address. The Wi-Fi access point shall support DHCP to automatically assign an IP Address to the user's computer.

The Wi-Fi access point shall include a dipole, omnidirectional antenna. A momentary pushbutton shall allow the user to turn the Wi-Fi access point on or off. The Wi-Fi access point shall turn itself off automatically after a period of inactivity from connected devices. An LED shall indicate when the Wi-Fi access point is enabled.

The Wi-Fi access point shall operate simultaneously with the wired maintenance port and with the TMC connection.

Traffic Controller Connection The communications interface panel shall provide one connection to communicate to the traffic controller through the cabinet.

The traffic controller connection shall support a TS2 type 1 compatible SDLC interface. The traffic controller connector shall be a 15-pin female metal shell D sub- miniature type connector to support a standard NEMA TS2 or TEES SDLC cable. The traffic controller connection shall support a protocol interface to SDLC-capable traffic controllers (NEMA or TEES).

The traffic controller connection shall support the NEMA TS2 SDLC protocol to include up to 64 detector outputs and 32 inputs. The traffic controller connection shall be able to connect to a wired input/output card, which supports wired I/O in cabinets without a SDLC-capable controller. The wired I/O data communications link shall support at least 24 outputs and 16 inputs.

It shall be possible to connect and use both SDLC communications and communication to the wired input/output card simultaneously.

USB Ports. The communications interface panel shall include two USB 2.0 ports.

If a communications interface panel fails to start and run due to a software or operating system failure, it shall be possible to reinstall all system and application software from a USB memory stick without necessitating removal of the communications interface panel from the cabinet.

Power. The communications interface panel shall accept input voltage in the range of 89-265 VAC, 50/60 Hz power from the transient-protected side of the cabinet. The communications interface panel shall be protected by two slow blow fuses. Spares shall be attached to the panel.

Wired Input/Output Card. The video detection system shall support an optional wired input/output card that communicates with the communications interface panel for real-time detection states and other I/O to the traffic controller. The card may reside in a standard detector rack or shelf-mount enclosure with power module.

The optional wired input/output card shall comply with the form factor and electrical characteristics to plug directly into a NEMA type C or D detector rack or Caltrans TEES Input File.

The card shall occupy two slots of the detector rack.

The card shall provide four detector outputs on its rear-edge connector.

A front connector shall provide communication to the communications interface panel. A front connector shall allow 16 inputs and 24 contact-closure detector outputs for wiring into the cabinet. A front panel LED for each of the 16 inputs and 24 outputs shall indicate the state of the input or output.

The wired input/output card shall support optional expansion cards in other slots. Each expansion card shall support four outputs to the back edge of the card. The wired input/output card shall support optional harnesses for connection to Input Files or C1, C4, C11, and C12 ports to support Type 170 or Type 2070 controllers.

System Software. The video detection system shall include management software for configuration, monitoring, and data collection purposes.

Management Software. Management software shall be a Windows-based application. The software shall be compatible with Windows 7 and Windows 10 operating systems. The software shall communicate with the video detection system via Ethernet.

The management software shall automatically determine all video sensors and communications interface panels available on the local network and populate a list of all devices. The management software shall provide the user a means to name individual video sensors and communications interface panels.

The management software shall provide a means for the user to zoom the camera optics while viewing a live video stream and provide a means for the user to calibrate distances in the field of view.

The management software shall provide the user a means to create four-sided detection zones in the field of view using either a still snapshot or live video. The management software will overlay an outline of each detection zone over the background image. It shall be possible for the user to place detection zones anywhere in the field of view for stop line detection and/or advance detection.

It shall be possible for the user to set the desired color of both the on and off states of the detection zone overlay. It shall be possible for the user to alter the size and shape of any previously created zone. It shall be possible for the user to overlap zones, either partially or fully.

It shall be possible for the user to name each zone uniquely and for the user to assign each zone to detect vehicles, bicycles, or both, as well as to specify different outputs for each type. It shall be possible for the user to assign the same output to multiple zones such that the output will be on if any of the zones are detecting a vehicle or bicycle. It shall be possible for the user to assign a single zone to more than one output such that if a vehicle or bicycle is detected, all the assigned outputs shall be turned on.

The management software shall be capable of creating at least 99 detection zones per video sensor.

It shall be possible for the management software to retrieve all configuration parameters from video sensors or communications interface panels. It shall be possible for the user to save all the settings for a video sensor or a communications interface panel to a laptop file. The management

software shall provide a means to read or import all the settings from a previously saved configuration file for a video sensor or a communications interface panel.

The management software shall be able to download a new version of the application software into a communications interface panel and its attached video sensors.

The management software shall provide a screen to monitor operation of a video sensor. The monitoring screen shall include a live video stream from the video sensor with at least HD 1280 x 720 pixel resolution.

The monitoring screen shall show indications of detection in real time by changing the color of the detection zone.

It shall be possible for the user to configure different indications for vehicle detections vs. bicycle detections when both are configured for the same zone.

The monitoring screen shall include the following optional, configurable objects.

- It shall be possible for the user to size and position them anywhere on the screen and to change the color and size of text.
- An indication of when an output is on or off, along with a user-configurable name for that indicator.
- The current time in the video sensor. A user-configurable title or name.
- The version number of the video sensor software.

It shall be possible for the user to turn the overlay graphics on or off with a single setting.

The management software shall provide a screen to monitor operation of the intersection with a quad-view video stream from the communications interface panel. The quad-view video stream shall have a resolution of at least HD 1280 x 720 pixels, where each of the sensor videos comprising the quad-view shall be at least 640 x 360 pixels.

It shall be possible for the user to configure the order that the sensor videos appear in the quad-view. The real-time quad-view video stream shall be capable of displaying the overlay graphics for all four sensors simultaneously. While monitoring the video of a single video sensor or of the quad-view, it shall be possible for the user to request a "snapshot" or single-frame image and record a period of the video to save to a named file on a laptop.

System Functionality. The video detection system shall provide the following features and functionality.

Detection Performance. The video detection system shall detect the presence of vehicles in defined zones and turn on the assigned output when the vehicle is present in the zone.

Stop Line Detection. For detection zones placed at the stop line, the probability of not detecting the presence of a vehicle shall be 1% or less under all operating conditions when the video sensor is installed and configured properly. For detection zones placed at the stop line, the probability of falsely detecting a vehicle that is not present shall be 3% or less under all operating conditions when the video sensor is installed and configured properly.

Advance Detection. It shall be possible to place advance detector zones such that the farthest point of the zone is up to 600 feet from the video sensor. Advance detector zone placement shall

include 2-3 car lengths of field-of-view beyond the farthest point of the zone. To ensure statistical significance for the above detection performance specifications, the data shall be collected over 24-hour time intervals (to avoid a single lighting condition) and will contain a minimum of 100 vehicles per lane. The calculations of detection performance will not include turning movements where vehicles do not pass through the detectors, vehicle lane-change anomalies, or where they stop short or stop beyond the combined detection zones.

Failsafe Mode. The video detection system shall provide three failsafe options during optical contrast loss.

The default shall be maximum recall. The end-user may choose to use minimum recall or fixed recall in which a user-defined number of seconds may be implemented to hold call during green. The video sensor shall continuously monitor the overall contrast in the video. If the overall contrast falls below a preset level (such as caused by dirty faceplate, severe glare, extreme fog, or temporary ice/snow on the faceplate), the sensor shall enable the chosen failsafe mode. When sufficient contrast is restored in the video, the sensor will exit the failsafe mode.

The communications interface panel shall continuously monitor the connectivity status of the attached video sensors. If any video sensor goes offline due to either electrical failure or internal software failure, the communications interface panel shall enable the failsafe mode for that video sensor. If the video sensor comes back online, failsafe mode shall end.

Data Collection. The video detection system shall automatically collect and store traffic flow data in non-volatile memory for later retrieval and analysis. No additional hardware or software shall be necessary. The data shall include:

- Vehicle counts.
- Vehicle average speeds.

The management software shall be able to retrieve collected data for a specified time period or for all currently stored data and save into a standard CSV file.

Operations Log. The communications interface panel and each video sensor shall maintain a time-stamped operations log of routine and special events in non-volatile memory for later retrieval and analysis.

Time Synchronization. The video detection system and management software shall provide three methods to synchronize the time of day clocks in the communication interface panel and the video sensors, as follows:

- Manual time synchronization operation by the user, which sets the time to the current time on the laptop where the management software is running.
- A configuration setting to allow the communications interface panel to automatically obtain time from the NEMA TS2 protocol on the SDLC channel and broadcast it to the video sensors.
- A configuration setting to allow the communications interface panel to automatically obtain time from up to five Network Time Protocol (NTP) sources and broadcast it to the video sensors.

Video Streaming. In addition to the ability to view video streams in the management software, it shall be possible to view video from individual sensors or to view the quad-view from the

communications interface panel using a third-party video player application on a tablet, smartphone, or laptop computer. Video bitrate is user-definable between 100 Kbps-5000 Kbps. The default shall be 2048 Kbps. All bitrates shall provide 30 fps.

Installation and Setup. The video detection system hardware shall be designed for flexible, fast, and easy installation and setup. Install the video sensor on a traffic signal post or mast arm, as mentioned above, as shown on the plans, and as per the applicable portions of Section 880.03 of the Standard Specifications.

No special tools or extra equipment, other than a laptop for configuration, will be required. Once all hardware is installed, connected and functional, it shall be possible to configure the video detection system for a typical four-approach, eight-phase intersection in 15 minutes or less.

Warranty, Service and Support. The video detection system shall be provided with the following warranty, service, and support options. The manufacturer shall warrant the video detection system for a minimum of three years. An option for up to six years of warranty shall be available.

Service. Ongoing software support by the manufacturer will include software updates of the video sensor, communications interface panel, and management software. These updates will be provided free of charge during the warranty period. The manufacturer will maintain a program for technical support and software updates following expiration of the warranty period. This program will be available to the contracting agency in the form of a separate agreement for continuing support.

Support. A quick-start guide, installation guide, application notes, and other materials shall be available from the manufacturer to assist in product installation and setup for various applications. In addition, training online or in person shall be available.

Training shall be available to personnel of the contracting agency in application design, operation, setup, and maintenance of the video detection system.

Manufacturer shall provide a tech support website and an 800 number for technical support.

Basis of Payment. The work will be paid for at the contract unit price per EACH for VIDEO VEHICLE DETECTION SYSTEM COMPLETE.

PEDESTRIAN PUSH-BUTTON POST

Description. This work shall consist of furnishing and installing a metal pedestrian push-button post. All installations shall meet the requirements of the details shown on the plans.

Materials.

General. The pedestrian signal post shall be designed to support the traffic signal loading shown on the plans. The design and fabrication shall be according to the Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, as published by AASHTO.

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
PROJECT CMAQ-HSIP-4U5N(249)
SECTION (130,130-1,130-2)TS-3, 82-5TS
ST. CLAIR COUNTY
CONTRACT NO. 76R78

Post. The post shall be made of steel or aluminum and have an outside diameter of 4 1/2 in. The post shall be threaded for assembly to the base. Aluminum posts shall be according to the specifications for Schedule 80 aluminum pipe. Steel posts shall be according to the specifications for Schedule 40 steel pipe. The post shall have a safety tether connected to the anchor rod.

Base. The base of a steel post shall be cast iron, and the base of an aluminum post shall be aluminum. The base shall be threaded for the attachment to the threaded post. The base shall be approximately 10 in. high and 6 3/4 in. square at the bottom. The bottom of the base shall be designed to accept four 5/8 in. diameter anchor rods evenly spaced in a 6 in. diameter circle. The base shall be true to pattern with sharp clean cutting ornamentation and equipped with access doors for cable handling. The door shall be fastened to the base with stainless steel screws. A grounding lug shall be provided inside the base.

Anchor Rods. The anchor rods shall be 5/8 in. in diameter, 16 in. long, and shall be according to Article 1006.09. The anchor rods shall be threaded approximately 6 in. at one end and have a bend at the other end. The first 12 in. at the threaded end shall be galvanized. One galvanized nut and washer each shall be furnished with each anchor rod. The washer shall be properly sized to fully engage and sit flush on all sides of the slot of the base plate.

The aluminum post and base shall be drilled at the third points around the diameter, and 1/4 in. by 2 in. stainless steel bolts shall be inserted to prevent the post from turning and wobbling.

Finish. The steel post, steel post cap, and the cast iron base shall be hot-dipped galvanized according to AASHTO M 111. If the post and the base are threaded after the galvanization, the bare exposed metal shall be immediately cleaned to remove all cutting solvents and oils and then spray painted with two coats of an approved galvanized paint. The aluminum post, post cap, and base shall be clear anodized.

Installation. The pedestrian signal post shall be erected plumb, securely bolted to a concrete foundation, and grounded to a ground rod according to the details shown on the plans. No more than 3/4 in. of the post threads shall protrude above the base.

A post cap shall be furnished and installed on the top of the post. The post cap shall match the material of the post. The Contractor shall apply an anti-seize paste compound on all nuts and bolts prior to assembly.

Prior to the assembly, the Contractor shall apply two additional coats of galvanized paint on the threads of the post and the base. The Contractor shall use a fabric post tightener to screw the post to the base.

Basis of Payment. This work will be paid for at the contract unit price per EACH for PEDESTRIAN PUSH- BUTTON POST.

CABINET, MODEL 334

Description. This work shall consist of furnishing and installing a Model 334 cabinet for field equipment including fiber optic communications, inductive loop detector stations, changeable message signs, and CCTV dome camera as shown on the plans and as hereinafter provided.

Materials

General. Cabinet, Model 334 shall be an aluminum, durable, weatherproof enclosure with nominal outside dimensions of 66 in high X 24 in wide X 30 in deep. Cabinet, Model 334 shall consist of the following components: double door each equipped with a lock for front and rear cabinet entry, housing, mounting cage, service panel, thermostatically controlled fan, all necessary mounting hardware and wiring, and other equipment as shown on the plans and specified in these provisions. All bolts, nuts, washers, screws, hinges, and hinge pins that are subject to corrosion shall be stainless steel unless otherwise specified. All equipment under this item shall be in accordance with Section 1074.03 of the Standard Specifications, except as modified herein.

Cabinet Components. The housing and the mounting cage assembly shall conform to those of the Model 334 cabinet provisions of the "Traffic Signal Control Equipment Specifications" (TSCES) issued by the State of California's Department of Transportation and to all addenda thereto current at the time of project advertising. The housing shall be rainproof with the top of the enclosure crowned to prevent standing water. All exterior seams for the enclosure and doors shall be continuously welded and smooth. The housing shall have no provisions for a police panel or door.

The cabinet shall have single front and rear doors, each equipped with a lock. The enclosure door frames shall be double flanged out on all four sides and shall have strikers to hold tension on and form a firm seal between the door gasketing and the frame. The front and rear doors shall be provided with catches to hold the door open at both 90° and 180° ±10°. Gasketing shall be provided on all door openings and shall be dust tight. For horizontal support and bolt attachment, cage bottom support mounting angles shall be provided on either side, level with the bottom edge of the door.

The latching handles on the doors shall have provisions for padlocking in the closed position. When the door is closed and latched, the door shall be locked. The locks and handles shall be on the right side of the front door and left side of the rear door. The lock and lock support shall be rigidly mounted to the door. The locks shall be Corbin #2, and two keys shall be supplied to the Department with each lock. The keys shall be removable in the locked position only.

The front and rear doors shall be provided with louvered vents. A removable and reusable air filter shall be housed behind the door vents. The filter filtration area shall cover the vent opening area, and the filter shell shall be provided to fit over the filter providing mechanical support for the filter. The shell shall be louvered to direct the incoming air downward.

The intake (including filter with shell) and exhaust areas shall pass a minimum of 60 cubic feet of air per minute for housing #1 and 26 cubic feet of air per minute for housing #2. The thermostatically controlled fan with ball or roller bearings shall be mounted within the housing and be vented. The fan shall provide a capacity of at least 150 cubic feet of free air delivery per minute

of ventilation. The fan shall be thermostatically controlled and activated when the temperature inside the cabinet exceeds 75°F and shut off when the temperature is less than 64°F. In addition, the fan shall be manually adjustable for automatic turning on and off. The fan circuit shall be protected at 125% of the fan motor ampacity.

The housing shall, also, be equipped with a heating element installed in the bottom front of the cabinet and mounted along the side of the rack. The heating element shall draw 500 watts and have an output of at least 1,700 BTU/hr. The heater shall have a built-in quick response thermostat with sealed contacts that has a temperature control range of 40°F to 100°F and have a built-in thermal cut-off to automatically shut-off the heater in the event of overheating.

All subassemblies shall be mounted in removable 19 in EIA self-standing rack assemblies. The EIA rack portion of the cage shall consist of two pairs of continuous, adjustable, equipment mounting angles that comply with Standard EIA RS-310-B. The cage shall be centered within the cabinet and bolted to the cabinet at four points.

Each cabinet shall be equipped with two shelves and one slide out keyboard tray. Shelves shall be the full width of the rack and 12" in. deep. The shelves shall be designed to support a minimum of 50 pounds.

The cabinet shall be equipped with one rack mounted 96 fiber enclosure equipped with 96 single mode ST ferrules.

Each cabinet shall be equipped with one fluorescent lighting fixture mounted to the inside top front portion of the cabinet. The fixture shall have an F-15-T-8 cool white lamp; operated from a normal power factor, UL listed cold weather ballast. A door-activated switch shall be installed to turn the cabinet light on when the front door is opened. The door switch shall be on a separate circuit by itself and used only to turn on the cabinet light.

Each cabinet shall be supplied with a heavy-duty plastic envelope to store plans, wiring diagrams, schematics, etc. This envelope shall have metal grommets, so that it hangs from the door hooks. The envelope shall have minimum dimensions of 10 in x 15 in.

Foundations shall conform to those shown on the plan sheets.

Construction Requirements. The Contractor shall deliver the Cabinet Model 334 mounted on a plywood-shipping pallet that is bolted to the cabinet base. The cabinet shall be enclosed in a slipcover cardboard packaging shell. The housing doors shall be blocked to prevent movement during transportation to the site.

The Contractor shall securely fasten the cabinet onto the new concrete foundation at the locations shown on the plans. The Contractor shall confirm the orientation of the cabinet installation and its front door side with the Engineer prior to installation. Stainless-steel bolted connections shall be provided with lock-washers, locking nuts, or other approved means to prevent the connection nuts from backing off. Dissimilar materials shall be isolated from one another by stainless steel fittings.

The Contractor shall make all power connections to the cabinet in accordance with the plans and as required. The neutral bus shall be isolated from the cabinet and equipment ground. It shall terminate at the neutral lug ultimately attached to the meter pedestal. All conductors used in cabinet wiring shall terminate with properly sized non-insulated (if used, for DC logic only) or clear

insulated spring-spade type terminals, except when soldered to a through-panel solder lug on the rear side of the terminal block or as specified otherwise. All conductors, except those which can be readily traced, shall be labeled. Labels attached to each end of the conductor shall identify the destination of the other end of the conductor. Cabling shall be routed to prevent conductors from being in contact with metal edges. Cabling shall be arranged so that any removable assembly may be removed without disturbing conductors not associated with that assembly.

Cabinet Acceptance Test - In addition to the environmental and design approval tests specified in the FHWA Type 170 Traffic Signal Control System Hardware Specification, the following water spray test shall be performed for each type of cabinet:

Spray water from a point directly overhead at an angle of 60° from the vertical axis of the cabinet. Repeat for each of eight equally spaced positions around the cabinet for a period of five minutes in each position. The water shall be sprayed using a domestic type- sprinkling nozzle at a rate of no less than 10 gal/min per minute per square foot of surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

Documentation: Shop drawings and wiring showing the proposed layout of each type of cabinet shall be submitted to the Engineer for approval prior to the start of fabrication. Wiring lists for the internal manufacturer cut sheets for all electrical equipment included in each type of cabinet shall be included in the submission.

Four copies of drawings showing the wiring for each cabinet shall be provided. One copy shall be placed in the clear plastic envelope furnished as part of the cabinet. The other three copies shall be delivered to the Engineer.

Method of Measurement: Cabinet, Model 334 will be measured as a unit, completely installed and operational.

Basis of Payment. This work will be paid for at the contract unit price per EACH for CABINET, MODEL 334.

SYSTEM IMPLEMENTATION, EQUIPMENT INTEGRATION AND SUPPORT

The Contractor shall install the ITS components at the locations indicated on the plans. The Contractor shall be responsible for installing the proposed ITS components in accordance with the plans, specifications, and manufacturers recommended practices.

All ITS components shall be subject to a 30-day burn-in period. During the "burn-in" period, all components shall perform continuously without any interruption of operation. In the event that there are operational problems during the burn-in period, the burn-in period shall reset back to day one.

The Department will program the ITS components and integrate them into the existing ITS system.

This work will not be paid for separately but shall be included in the cost for truss mounted LED dynamic message sign.

TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN

Description. This work consists of the complete removal/replacement of the existing DMS on SB I- 55 at milepost 21.7 north of Goshen Rd in Edwardsville, WB I-55/70 at milepost 12.4 northeast of Beltline Rd. in Collinsville, and EB I-55/64 at milepost 1.4 near 4th Street in East St. Louis. The removal may be accomplished by removing the truss, the DMS, or a method approved by the Engineer. It also consists of providing and installing the LED DMS as described within this provision and as directed by the Engineer. Truss mounted dynamic message sign assembly includes the TMDMS enclosure, communication cables, conduits, and associated mounting hardware and software as described in this contract. It also includes operational TMDMS software that remotely provides access to the functionality and performance specified herein.

TMDMS Manufacturer Qualifications. The TMDMS manufacturer shall submit references as specified below. Reference data shall include current name and address of organization, the current name and telephone number of an individual from the organization who can be contacted to verify system operation, and date of system installation.

Experience Requirements. The TMDMS manufacturer shall submit at least two references, preferably from other state departments of transportation, that are successfully operating a highway LED full matrix TMDMS system supplied by this manufacturer under the current corporate name that meets this specification for a period of no less than two years. The LED TMDMS systems submitted shall be full-matrix and able to display at least three lines of 18 characters per line, 18" characters, and have walk-in access housings.

References. The TMDMS manufacturer shall submit three references, preferably from other state departments of transportation, that are successfully operating a multi-unit, multilane state or interstate highway, permanently-mounted, overhead, dynamic message sign system supplied by this manufacturer under the current corporate name for a period of no less than five years.

Materials.

General. The TMDMS shall be a full matrix full color LED display (32,000 distinct colors using red, green, and blue LEDs) in a walk-in weatherproof cabinet. The TMDMS shall provide approaching motorists with a clear readable message in all normally encountered weather and lighting conditions. The TMDMS shall be capable of displaying messages with three lines, 21 characters per line, at an 18-inch character height.

The sign shall be designed for a minimum life of 20 years. All materials furnished, assembled, fabricated, or installed under this item shall be new, corrosion resistant, and in strict accordance with the details shown in the plans and as detailed in this specification. All details and functionality listed in this specification will be thoroughly inspected and tested by the Department. Failure to meet all details and functionality detailed in this specification shall be grounds for rejection of the equipment.

The equipment design and construction shall utilize the latest available techniques with a minimum number of different parts, subassemblies, circuits, cards, and modules to maximize standardization and commonality. The equipment shall be designed for ease of maintenance. All

component parts shall be readily accessible for inspection and maintenance. Test points shall be provided for checking essential voltages.

The sign shall be designed and constructed to present a clean and neat appearance.

All cables shall be securely clamped/tied in the sign housing. No adhesive attachments will be allowed.

The performance of the sign, such as visibility and legibility of the display, shall not be impaired due to continuous vibration caused by wind, traffic, or other factors.

The TMDMS hardware, along with the sign controller hardware, software, and firmware, shall support all TMDMS functionality described throughout the remaining specification sections.

The TMDMS assembly shall be listed by an accredited third party testing organization for conformance to UL Standards 48 (Standard for Electric Signs) and 1433 (Control Centers for Changing Message Signs). Proof of this conformance shall be provided with submittal materials.

Environmental Requirements. The TMDMS shall withstand the following environmental conditions for 24 hours or more with no functional or performance degradation, permanent deformation, or other damages:

- Temperature: -40 °F+140 °F
- Humidity: 0 to 100 %
- Wind: To at least 90 mph with a 30% gust factor
- Ice: Front face ice load of 4 pounds per square foot

All field equipment enclosures shall be designed to withstand the effects of sand, dust, and hose-directed water. All connections shall be watertight.

Functional Requirements. The TMDMS shall be capable of accepting commands, displaying messages, and returning status as required by the current version (v2) National Transportation Communications for ITS Protocol (NTCIP) Specifications applicable for TMDMS and as specified in these special provisions. The TMDMS shall communicate without error and be compliant for all of the applicable NTCIP standards. The TMDMS shall support all mandatory objects of all mandatory conformance groups of NTCIP for TMDMS.

The TMDMS shall enable the display of text consisting of a string of alphanumeric and other characters. Each character shall be formed by a matrix of luminous pixels. The matrix of a standard character shall consist of 35 pixels over five columns and seven rows. Each TMDMS shall be minimum 54 pixel high x 250 pixel wide (with pixel pitch range from 20 mm to 35 mm), full matrix, and capable of displaying three lines of text using a standard 5 wide x 7 high font size. All display elements and modules shall be solid state. No mechanical or electromechanical elements or shutters shall be used.

All characters, symbols, and digits shall be 18" nominal character size and shall be clearly visible and legible at a distance of 1100' within a minimum 30° cone of vision centered around the optical axis of the pixel.

The sign shall be capable of displaying the following:

- A static message

- A flashing message
- Alternating messages, either flashing or static

The changing from one message to another shall be instantaneous.

For message creation, the TMDMS field controller and TMDMS control software shall support the storage and use of a minimum of three alphanumeric character font files comprising the ASCII character set and including eight directional arrows. Software shall provide the ability to create and maintain message libraries containing up to 255 messages.

The sign shall be able to reproduce standard MUTCD colors per 23 CFR 655. These colors include:

- Black (no pixels on)
- White
- Blue
- Brown
- Green
- Light Blue
- Orange
- Purple
- Red
- Yellow
- Fluorescence Pink
- Fluorescence Yellow- Green

Software. The Contractor shall supply three licenses of remote control and sensing software used to control and interrogate the signs. This software shall provide inter-operability with all other signs supplied under this contract and shall be designed to run on a workstation under Windows 10 and Windows Server 2016, either remotely using the communications link connected to the TMDMS; or locally from a laptop computer connected to the sign controller communications port. The software shall display the message to be downloaded to operators exactly as it will appear on the destination TMDMS and shall provide verification back to the operators that the actual message has been visibly displayed on the destination TMDMS on an individual pixel basis.

The software shall include functionality for message scheduling (based on date and time), message priority queuing, and DMS diagnostics. The software shall be capable of sending multiple messages to multiple signs based on a user programmable time schedule. Communications shall be by cellular wireless service. The cellular modem and service will be paid for under a separate pay item.

TMDMS control software shall support the creation of user ID's and passwords for up to 25 potential system users. User creation, as well as individual user access rights, shall be assignable only by a "system administrator".

Before a system operator can use the TMDMS control software, the software shall request a username and user password. If the correct username and password are not provided, access to the software shall be declined.

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

An 8-bit identification code shall be assignable to each controller via switches located inside the controller enclosure. The software shall control a network of at least 250 variable message signs.

The software shall have the following functionality:

Display Control:	<ul style="list-style-type: none"> • View, group, and monitor DMS in real time • Controls any NTCIP-compliant DMS (Any DMS configuration and portable NTCIP message displays) • Powerful list view or map view • Pre-schedule event scenarios • Scheduled status polling of DMS
Messaging:	<ul style="list-style-type: none"> • Full suite of message and graphic tools • Message changing depending on time and date • Adjust message duration and priority • Time based scheduled DMS polling
Communications:	<ul style="list-style-type: none"> • Run nearly unlimited signs at once from traffic management centers with client-server architecture • Supports Ethernet and serial (COM Port) connections • Supports modem pools
Diagnostics:	<ul style="list-style-type: none"> • Log events and alert TMC staff via email • Locate pixel failures instantly with an in-software visual representation test • View status, errors, and problem codes of all DMS subsystems • Verify and troubleshoot at the pixel level
Security:	<ul style="list-style-type: none"> • Real-time verification of "on" pixels • Username/password restricted access to functional areas • Built-in security levels for easy setup • Prohibited words list

If the software is not capable of operating on a laptop that is connected directly to the DMS sign, the Contractor shall provide ten additional licenses of software that can be used in the field to manage the DMS and perform sign diagnostics.

The vendor shall furnish updated copies of all software during the warranty period at no charge to the Department.

Software Documentation. Full documentation for all software and associated protocols shall be supplied to the Department on a CD-ROM. The Department reserves the right to provide this documentation to other parties who may be contracted with in order to provide overall integration or maintenance of this item.

Performance Requirements. TMDMS messages shall be clearly visible and legible from in-vehicle viewing distances between 150 and 1100 feet. While using an 18 in character height, the TMDMS shall be capable of simultaneously displaying up to 18 characters in each of three lines with spaces between characters, using 5 horizontal X 7 vertical (or larger) pixel matrices.

The TMDMS controller shall be capable of storing a minimum of 32 three-line full width messages. The controller shall be capable of downloading a minimum of eight additional messages and commands from the communications interface.

The sign shall provide a RS-232 communications interface in the sign control cabinet suitable for wireless, PSTN, cellular, and fiber optic communications with the sign controller. Additionally, an RS-232 serial port and Ethernet port shall be provided in the control cabinet for full sign operation by means of a laptop computer. Each serial port shall support data rates of 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, and 1200 bps.

Optical Requirements. All mandatory NTCIP sign functions shall be available and message effects shall be visible from the ground-mounted sign control cabinet.

The viewing angle of each discrete LED-formed pixel shall be a minimum cone of 30° around a line normal to the TMDMS viewing surface. The intensity of each pixel shall not decrease more than 30% over the 20 year life of the sign.

If pulse-width modulation is used for intensity control, the sign drive electronics shall use a refresh or repetition rate of 100 Hz or greater.

The TMDMS walk-in cabinet shall mount three or more light sensors, one angled in a northerly direction away from nearby lighting scaled for 100 lux and two normal to the sign face pointing in opposite directions and scaled for 100,000 lux. Each sensor shall have an adjustable aiming angle. The TMDMS shall be capable of automatic dimming.

Characters Displayed. The sign shall be capable of displaying ASCII characters 32 through 126 and the following characters at any location in the message line:

- Interstate shield symbol
- "A" thru "Z"- all upper-case letters.
- "0" thru "9"- all decimal digits.
- Space (i.e., ASCII code 0x20).
- Punctuation marks shown in brackets [. , ! ? - ' ' " " / ()]
- Special characters shown in brackets [# & * + < >]
- 3 pixel wide dash

The separation between the last column of one display module and the first column of the next shall be equal to the horizontal distance between the columns of a single display module.

The characters shall be legible under all light conditions at a distance of 1100' within a 30° cone of vision centered around the optical axis of the pixel. The sign shall be the proper brightness in all lighting conditions for optimum legibility. It shall be bright enough to have a good target value but not to the point where the pixels bloom, especially in low ambient light level conditions. The brightness and color of each pixel shall be uniform over the entire face of the sign within the 15° cone of vision from 1100' to 200' in all lighting conditions. Non-uniformity of brightness or color over the face of the sign under these conditions shall be cause for rejection of the sign.

Electronic Materials and Components. All electronic components, except printed circuit boards, shall be commercially available, easily accessible, replaceable, and individually removable using

conventional electronics repair methods. All electronic assemblies shall meet or exceed IPC 610A workmanship standards.

Each pixel shall have a device attached to the printed circuit board (PCB) to hold and protect the LEDs. These devices shall:

- Hold the LEDs perpendicular to the display modules within 0.5°,
- Prevent the LEDs from being crushed or bent during handling,
- Protect the LEDs from damage when the display module is laid on the front surface (The side that the LED lamps are located.),
- Not put any stress on the LEDs due to differentials of expansion and contraction between the device and the LEDs over the herein specified temperature range,
- Not become loose or fall off during handling or due to vibrations,
- Not block airflow over the leads of the LEDs,
- Securely hold each LED while allowing a gap between the device and a minimum of 95% of the body of each LED for airflow,
- Not block the light output of the LEDs at the required viewing angle,
- Be black in color to maximize contrast.

The LEDs shall be protected from the outside environmental conditions, including moisture, snow, ice, wind, dust, dirt, and UV rays.

PCB design shall be such that components may be removed and replaced without damage to boards, traces, or tracks.

Only FR-4 0.062-inch minimum thickness material shall be used. Intercomponent wiring shall be copper clad track having a minimum weight of 2 ounces per square foot with adequate cross section for current to be carried. Jumper wires will not be permitted, except from plated- through holes to component. The maximum number of jumper wires allowed per circuit board is two.

All PCBs, except for the power supply PCBs, UPS PCBs, modem PCBs, and sign controller PCBs, shall be completely conformal coated with a silicone resin conformal coat. All PCBs shall be finished with a solder mask and a component identifier silk screen.

Capacitors. The DC and AC voltage ratings as well as the dissipation factor of a capacitor shall exceed the worst case design parameters of the circuitry by 50%.

A capacitor which can be damaged by shock or vibration shall be supported mechanically by a clamp or fastener.

Capacitor encasements shall be resistant to cracking, peeling, and discoloration.

Resistors. Any resistor shall not be operated more than 50% of its power rating.

Semiconductor Devices. All transistors, integrated circuits, and diodes shall be a standard type listed by EIA and clearly identifiable.

Connectors. All PCB edge connectors and cable connectors except for those found in the power supply, UPS, modem, and sign controller shall be base plated with nickel and finished with 30 micro-inches of gold.

Mechanical Components. All external screws, nuts, and locking washers shall be stainless steel. No self-tapping external screws shall be used. All parts shall be made of corrosion resistant materials, such as plastic, stainless steel, or aluminum. All materials used in construction shall be resistant to fungus growth and moisture deterioration. Dissimilar metals shall be separated by an inert dielectric material.

Main Power Supply and Energy Distribution. The sign and its controller shall be designed for use on the following:

- Power Line Voltage-120/240 VAC nominal, single-phase power, 40 amperes per leg. The system shall operate within a voltage range of 95VAC to 135VAC.
- Frequency – 60Hz +/- 3Hz

Under normal operation, the drop in voltage between no load and full load of the sign and its controller shall not exceed 10% of the nominal voltage. The system shall be protected by transient suppression devices including MOVs, RIS, and spark gap arrestor.

The system shall report any power failures to the main controller when system power returns. Power protection shall be provided by a thermal magnetic circuit breaker associated with a 5 mA ground fault circuit interruption (GFI) device. A GFI device shall protect all service outlets.

The sign shall have a 40 A two-pole (common trip) main, 120/240 VAC, single phase, four wire load center with 20 circuit capability. Each circuit in the sign shall be powered from a separate circuit breaker. The power cables shall be as required by the NEC for acceptable voltage drop to supply AC power to the sign. The power required for sign operation shall not exceed 7000 watts for the sign housing including fans, heaters, sign controller, communication equipment, and all pixels illuminated at 100% brightness.

Two conduits shall connect the controller cabinet with the walk-in sign display; one for power and one for communications, unless communications between the two is by optical fiber.

The TMDMS manufacturer shall provide two earth ground lugs that are electrically bonded to the TMDMS housing. Lugs shall be installed near the lower left and lower right corners of the TMDMS housing's rear wall. The TMDMS Contractor shall provide the balance of materials and services needed to properly earth ground the TMDMS to all four ground rods at each site.

The sign shall be equipped with surge suppression circuitry for AC power conductors and external RS-232 data lines to protect them from electrical spikes and transients. The presence of power transients or electromagnetic fields, including those created by any components of the system, shall have no deleterious effect on the performance of the system.

The system shall not conduct or radiate signals which will adversely affect other electrical or electronic equipment including, but not limited to, other control systems, data processing equipment, audio, radio, and industrial equipment.

Surge Protection. The system power shall be protected by two stages of transient voltage suppression devices including MOVs and spark gap arrestor. Tripping of each stage (or both if tripped simultaneously) of the surge protection shall cause the sign controller to report the error condition to the DMS remote monitoring software.

DMS Power Supplies. TMDMS shall be provided with redundant DC power supplies. These shall be rated for a minimum of 50% spare capacity over that required to light every pixel on a line to full intensity and shall automatically pick up the load if one unit fails, while sending an error indication to the TMDMS controller. All electrical components operating on more than 24 V shall be UL listed.

The power supplies shall be continuously monitored for proper operation by the sign controller. If the voltage drops below its nominal operating value, an error message shall be generated and transmitted to the DMS client software or laptop computer onsite at local control box location automatically.

Display Modules. Display modules consisting of nominal 18" high characters shall be assembled to form the specified full matrix message configuration. These circuit boards shall be designed and constructed to allow a single service technician to troubleshoot, isolate, remove, and replace these boards with minimal impact to the overall operation of the sign.

All LED boards shall be fully interchangeable and not require any address switches or adjustment when interchanged or placed in service. Module addressing, where required, shall be accomplished in the connector. The DMS manufacturer shall document all LED testing for color so that replacement LED boards shall match existing color.

Pixel status and diagnostics shall include string failure, pixel failure, and failed pixel location (line, module, row, and column numbers). Replacement of a complete display module shall be possible using only simple hand tools. Interconnection of modules shall be through connectors only. All connectors shall be keyed to preclude improper hookups.

The display modules shall be approximately $\frac{3}{4}$ " behind the lens panel assembly.

LED and Pixel Characteristics. Each pixel shall be a maximum of 1-3/8" in diameter. The LEDs in each pixel shall be clustered to maximize long range visibility. The average light intensity of the LEDs in each pixel shall be 3 candela minimum. All pixels in the sign shall have equal color and on-axis intensity. All pixels shall have a minimum on-axis intensity of 40 candela @ 20 mA forward current with an overbright capability of 60 cd.

All pixels in all signs in this project, including the spare parts, shall have equal color and on-axis intensity. The pixel strings shall be powered from a regulated DC power source, and the LED current shall be maintained at the LED manufacturer's specified nominal operating current to maximize life of the pixel. The failure of an LED in one string within a pixel shall not affect the operation of any other string or pixel. Pixel power drawn from the DC supplies shall not exceed 1.5 W per pixel, including the driving circuitry.

The LEDs shall be individually mounted directly to a PCB, shall be easily replaceable, and individually removable using conventional electronic repair methods.

The LEDs shall be protected from the outside environmental conditions, including, but not limited to, moisture, snow, ice, wind, dust, dirt, and UV rays.

TMDMS pixels shall be constructed with discrete LEDs manufactured by the Toshiba Corporation or Agilent Technologies (formerly known as Hewlett-Packard). Substitutes will not be accepted. Discrete LEDs shall conform to the following specifications:

- LED's shall be non-tinted, non-diffused, high-intensity, solid-state lamps that utilize AllnGAP OR InGaN semiconductor technology.
- LED lenses shall be fabricated from UV light resistant epoxy.
- The LED lens diameter shall be 0.2 inches.
- Red LEDs shall be AllnGAP with a peak wavelength of 626 nm.
- Green LEDs shall be InGaN with a peak wavelength of 525 nm.
- Blue LEDs shall be InGaN with a peak wavelength of 475 nm.
- LEDs shall be obtained from a one-bin luminous intensity sort.
- LEDs shall have a minimum half-power viewing angle of 15
- LED package style shall be through-hole flush-mount. LED's with standoffs and surface mount LED's will not be accepted.
- All LED's used in all TMDMS provided for this contract shall be from the same manufacturer and have the same part number.

The sign shall have a minimum intensity of 12,400 cd/m².

All LED display modules, as well as the LED pixel boards and driver circuit boards, shall be identical and interchangeable throughout the TMDMS. LED arrays shall not share a circuit board with the display drive electronics but shall be easily connected and disconnected from the driver board using plugs, sockets, and simple hand tools while excluding soldering operations.

The state of the LEDs (full on or off) in each pixel of the sign shall be read by the sign controller when it is polled or when a message is downloaded from the DMS client software, existing ATMS software, or laptop computer onsite at local control box location and shall allow the DMS Client software or laptop computer onsite at local control box location show the actual message that is visibly displayed on the sign in a WYSIWYG format, including any full-out or fully stuck on pixels.

All PCBs, except the LED circuit board, shall be conformal coated. The LED board shall be conformal coated except at the pixels. All PCBs, including the LED circuit board, shall have a solder mask and a component identifier silk screen. The display modules shall be assembled in a full matrix configuration.

LED intensity shall be automatically adjusted to match ambient lighting conditions. This automatic control shall be provided with an override operated through the TMDMS controller communications channel.

Front face panels shall provide a high-contrast background for the TMDMS display matrix. The aluminum portion of each panel shall be painted black and shall contain a circular or square opening for each LED pixel. Openings shall be large enough to not block any portion of the LED-viewing angle.

The front panel shall be heated to prevent fogging and condensation. A minimum 8 watt- per-foot, self-regulating, heat tape shall be provided along the bottom of the message area between the glazing and the display modules. The TMDMS controller shall control the heat tape. All heat tape terminal blocks shall be covered for safety.

Structural Requirements.

Walk-in TMDMS Display Cabinet. The TMDMS display cabinet shall allow replacement of any display component from the walkway within the sign, excluding the sign display cover. The removal of any display module shall not reduce the structural integrity of the walk-in cabinet.

The maximum weight of the TMDMS display and walk-in enclosure shall not exceed 4000 lb and shall conform to the structural loading capabilities of the sign structure. Dimensions of the TMDMS walk-in enclosure shall not exceed 31 feet long by 9 feet high by 3 feet wide (nominal dimensions).

The walk-in housing dimensions and total weight shall be as shown in this specification or in the plans. The walk-in housing shall protect all internal components from rain, ice, dust, and corrosion in accordance with NEMA enclosure type 3R standards as described in NEMA Standards Publication 2501997, Enclosures for Electrical Equipment (1000 Volts Maximum).

The sign housing shall be engineered and PE certified to 2001 AASHTO and NCHRP Report 411 Specifications for AASHTO's basic wind speeds. The sign housing shall also be engineered and PE certified to withstand group loading combinations as outlined in 2001 AASHTO including: sign weight, repair personnel and equipment, ice and wind loads, and the strength requirements for truck-induced gusts as specified in NCHRP Report 412. The sign housing shall be engineered to withstand snow loading (40 PSF) for applicable geographical regions.

The internal structural members shall be extruded aluminum and shall accommodate both display module mounting and air distribution. They shall retain the display modules in a manner to facilitate easy and rapid removal of each display module without disturbing adjacent display modules.

The external fascia panels shall be extruded aluminum and shall be designed to keep heat conduction to a minimum between the exterior surfaces and the interior components. They shall incorporate provisions for retaining and sealing the modular lens panels and have a closed cell resilient gasket. They shall be finished with a matte black, KYNAR 500 or approved equal and be removable from within the main sign housing. The external fascia perimeter panels shall be a minimum of 12" wide. The external fascia panels shall be thermally isolated from the rest of the sign housing. There shall be a minimum amount of metal contact between the external fascia panels and the rest of the sign housing.

The lens panel assembly shall be modular in design, interchangeable without misalignment of the lens panel and the LED pixels ,and removable from within the main sign housing.

The lens panel aluminum mask shall be 0.040" minimum thick and panel interiors contain 0.236-inch-polycarbonate sheeting. It shall be perforated to provide an aperture for each pixel on the display modules. Each aperture shall be as small as possible without blocking the LED light output at the required viewing angle. The lens panel clear glazing shall be 90% UV opaque, non-breakable, polycarbonate GE LEXAN XL, 1/4" minimum thick, and clear in color. The glazing shall

be laminated to the inside surface of the lens panel aluminum mask using an acrylic foam tape joining system, 3M Scotch VHB or approved equal, to form the lens panel assembly.

The face shall be finished with a matte black, factory applied PVDF resin. All other exterior and all interior surfaces shall be a natural aluminum mill finish. No painted surfaces will be allowed.

Inside the sign housing, all 120 VAC service lines shall be independently protected by a thermal magnetic circuit breaker at the housing entry point. All 120 VAC wiring shall be in conduit, pull boxes, raceways, or control cabinets. No 120 VAC wiring shall be exposed to the inside or outside of the sign housing. The sign housing shall not be considered as a raceway or control cabinet.

The bottom panel of the housing shall have a minimum of four drain holes with replaceable drain filter plug inserts.

A three-point lockable aluminum access door shall be provided at the end of the housing as shown in the plans to enable easy access to the walk-in housing. This access door shall be 6'-8" X 2'-0" minimum. The door shall have a handle-operated locking mechanism, closed cell neoprene gasket, and a stainless-steel hinge. The locking mechanism shall be a heavy-duty, industrial-strength, three-point, dead bolt, center-case lock with a zinc finish. There shall be a handle on both the inside and the outside of the door. Handles shall be heavy-duty, industrial strength with a zinc finish on the inside handle and a chrome plated finish on the outside handle. The outside handle shall be pad lockable. Included in the door assembly shall be a device to hold the door open at 90°.

For moving and installation purposes, multiple steel lifting eyebolts shall be attached to the top of the TMDMS housing. Eyebolts shall attach directly to the TMDMS housing structural frame and shall be installed at the TMDMS factory. All eyebolt-mounting points shall be sealed to prevent water from entering the TMDMS housing. Lifting eyebolts, as well as the housing frame, shall be designed so that the TMDMS can be shipped and handled without damage or undue stress being applied to the housing prior to or during TMDMS installation on its support structure.

The sign housing shall have a continuous 18-inch wide walkway extending the full length of the sign. The walkway shall be made of 1/8-inch, diamond tread, 6061-T6 or 3003-H22 aluminum. All edges of the walkway grating shall be finished to eliminate sharp edges or protrusions. The walkway shall be capable of supporting a total load of 1000 lb. within any 10-ft section of the walkway.

The sign housing shall be a minimum of 30 inches wide to allow adequate room inside the sign housing for maintenance personnel. There shall be 18 inches of clear area between all equipment along the entire length of the sign housing from the 18-inch walkway and upwards 6 feet.

The sign shall be designed and constructed to present a clean and neat appearance. Poor quality work shall be cause for rejection of the sign. The equipment within the sign housing shall be protected from moisture, dust, dirt, and corrosion. The sign shall be constructed of aluminum alloy 3003-H14, 5052-H32, or an approved equal which shall not be less than 1/8 inch thick. Framing structural members shall be made of aluminum alloy 6061-T6, 6063-T5, or approved equal.

All welding shall be by an inert gas process in accordance with the American Welding Society (AWS) Standards, ANSI/AWS D1.2-97. The LED TMDMS manufacturer's welders and welding

procedures shall be certified by an ANSI/AWS Certified Welding Inspector to the 1997 ANSI/AWS D1.2-97 Structural Welding Code for Aluminum.

The sign enclosures shall be capable of withstanding wind loadings of 120 mph without permanent deformation.

The performance of the signs, including visibility and legibility of the signs, shall not be impaired due to continuous vibration caused by wind, traffic, or other factors.

The ventilation system shall be a positive-pressure, filtered, forced-air system which cools both the display modules and the sign housing interior. The sign housing shall have at least two exhaust ports. Each exhaust port shall be filtered and protected by an aluminum hood assembly.

The ventilation system shall have a minimum of two fans. Air shall be drawn into the sign housing through hoods near the top of the housing and then filtered before reaching the fan units. There shall be one aluminum hood assembly and one inlet filter for each fan. The filters shall be 1" thick, permanent, and reusable. These filters shall be easily removable from within the sign housing without the use of tools. Each sign shall include a complete set of replacement filters.

All duct work that impedes access to any sign components shall be easily removable, without tools, for servicing of these components. Ductwork shall be 0.040 in minimum thick aluminum and shall be designed for minimal pressure drops throughout the system.

Multiple temperature sensors shall activate the ventilation system. There shall be a minimum of one sensor located near the middle of the sign at the top of the display area. There shall be an additional temperature sensor located to accurately measure the ambient temperature outside the sign housing. The temperature sensors shall have an accuracy of +/- 3 °F or better and a range from -40 °F to 155 °F or greater. The temperatures from the sensors shall be continuously measured and monitored by the sign controller. A temperature reading greater than a user selectable critical temperature shall cause the sign to go to blank. The TMDMS controller shall report this error message to the central controller.

The ventilation system shall be equipped with a manual override timer to provide ventilation for service personnel. The timer will have a maximum on time of 1 hour.

The LED modules and electronic equipment shall be protected by a fail-safe, back-up fan control system in the event of an electronic fan control failure or shutdown of the sign controller.

The sign housing shall be furnished with a minimum of four florescent lights equipped with cold weather ballasts. The lamps shall be spaced evenly above the walkway and shall be fitted with protective guards. The light switch shall be located near the door and shall include a timer to turn off the lights after a specified time period.

The sign housing shall be equipped with two 15 amp, 120V (+/- 10%), grounded, GFCI protected, duplex electrical receptacles to accommodate inspection and maintenance requirements. One of these receptacles shall be located at each end of the sign housing. Additionally, the sign housing shall be equipped with a sufficient and readily available power source to accommodate a fiber optic modem and all other necessary communications equipment required to transmit data from the sign to nearest controller cabinet with fiber optic communications for the backbone. The sign

housing and display panel shall be designed to minimize any visible internal light from the outside of the DMS when the internal DMS lighting is on during nighttime maintenance activities.

An effective, field-proven, defogging and anti-condensation system shall be incorporated into the overall functionality of the sign. The face shall be heated to prevent fogging, frost, and condensation.

A humidity sensor shall be provided and monitored by the sign controller from 0 to 100% relative humidity in 1% or fewer increments. The sensor shall operate and survive from 0 to 100% relative humidity. The sensor shall have an accuracy that is better than +/- 5% relative humidity.

The sign controller shall read the internal temperature sensors, external ambient temperature sensor, and the humidity sensor. The sign controller shall use these readings in an algorithm that turns on the heater and/or the fans at the appropriate times to reduce both frost on the face of the sign and condensation on the display modules and other electronic circuitry.

Baseboard heaters shall be included in the sign housing. These heaters shall be capable of remote start up in anticipation of winter field service.

The interior of the sign shall include a fold-down shelf for a laptop computer.

Sign Controller. The sign controller shall include a minimum of two serial communications I/O ports, one RS-232, one RS-485, and one Ethernet port.

The sign controller shall be programmed to receive NTCIP-compliant sign control commands from the central controller (DMS client software) or laptop computer, transmit NTCIP-compliant responses as requested to the central controller (DMS client software or existing ATMS) or laptop computer, monitor sign, and message status and control sign operation and message displays.

The controller will have power-up and auto-restart capabilities with a programmable default message (including a blank message) when recovering from a power off condition.

The sign controller shall be programmed to receive sign control commands from the master controller, transmit responses as requested to the master controller, and control sign operation and message displays. The sign controller shall be able to receive and send messages and data via IEEE 802.3 (Ethernet), fiber optic modem, and cellular CDPD, CDMA, or GSM/GPRS. Transmission speed shall be a minimum of 9.6 kbps. A test pattern shall be provided in the DMS controller.

The sign controller shall be designed for fail-safe prevention of improper information display in the case of a system malfunction. Failure of any sign shall not affect operation of any other sign in the system. The sign controller shall consist, but not be limited to, the following.

Local control panel status indicators, including:

- Power on/off
- Communication status with the electronics in the walk-in housing
- Sign display power supply status
- Controller address
- Power supply module

- Central processor module
- Input/output circuits

The sign controller shall have power-up and auto-restart capabilities with automatic sign blanking when recovering from a power-off condition. A watch-dog circuit shall be utilized to provide automatic shut down of the sign in the event of power or sign controller failure.

Connections from the controller shall be accomplished via industry standard, keyed type connectors with a retaining mechanism.

The sign controller shall communicate with the display modules via the system interface circuit consisting of data bus drivers and line address decoders. Communication and control lines between the sign controller and the system interface circuits shall be surge protected.

The sign controller shall be controlled from the DMS client software, existing ATMS software, or the laptop computer, which shall specify the appropriate display. The sign controller and its software shall perform the following functions:

- Display a message, including:
 - Static messages
 - Flashing messages
 - Alternating messages
- Double brush stroke messages for maximum legibility
- Full-Matrix type displays

It shall be possible to separately vary the flashing and alternating frequency. The flashing and alternating frequency shall vary between 0.5 and 5 seconds in 0.1 second increments.

It shall be possible to flash any character or set of characters in a static or alternating message. In the case of alternating message, the flashing period shall be a sub-multiple of the alternating on time it is associated with.

The sign controller shall report errors and failures, including, but not limited to:

- Data transmission error
- Receipt of invalid data
- Communications failure recovery
- AC power failure
- Power recovery
- Pixel status
- Fan status
- Temperature status
- Power supply status

The sign controller shall issue an SNMP trap under the following conditions:

- Power Supply Failure—when the AC power supply at a DMS has failed.
- Power Restoration—whenever it detects restoration of AC power at the sign controller.
- Temperature Limit—whenever internal DMS temperature initially exceeds a programmed safety limit. A new trap will not be issued until the temperature once again falls below the safety limit and then exceeds it.

- Door Open—whenever the door of the DMS housing or the door of the controller cabinet is opened.
- Message and status monitoring:

The sign controller shall transmit a return message to the DMS client software and existing ATMS software whenever it receives a valid request for status. The return message shall contain the following:

- Address of the sign controller
- Actual message that is visibly displayed on the sign on an individual pixel basis
- Current sign illumination level
- Error and failure reports
- Temperature readings
- Power supply operational status
- Origin of display message transmission (laptop, manual, central, etc)
- Beacon status (for possible future enhancement)
- Uninterruptible power supply status

The sign controller shall blank any message displayed in the event of power or sign controller failure.

The sign shall normally display single stroke (5 X 7) characters, compressed (4 X 7), expanded (6 X 7), or double-stroke (7 X 7) character fonts. Each font shall be fully customizable, and modifications to a font may be downloaded to the sign controller from the DMS client software and existing ATMS software or laptop computer at any time without any software or hardware modifications. The sign shall be capable of displaying a different font and character spacing on each line.

The sign controller shall monitor the photocell circuits in the sign and convert the measured light intensity into the desired pixel brightness. The photo circuit readings shall be correlated with a brightness table in the sign controller. The brightness table shall have a minimum of 255 brightness levels. Automatic adjustment of the LED driving waveform duty cycle shall occur in small enough increments so that brightness of the sign changes smoothly with no perceivable brightness change between adjacent levels. The brightness levels shall be adjustable from the DMS client software.

The operational status of each pixel in the sign shall be automatically tested once a day and tested when a pixel test is requested from the DMS client software and existing ATMS software or laptop computer. A list of defective pixels shall then be transmitted to the DMS client software and existing ATMS software or laptop computer and logged into the log file listing pixel status, module number, column number, and pixel number. This pixel status test shall distinguish the difference between full out and fully stuck on pixels. This test shall not affect the displayed message for more than 0.5 seconds.

When the sign controller is polled and when a message is downloaded from the DMS client software and existing ATMS software or laptop computer, each pixel in the sign shall be read with its current state for the current displayed message and returned to the DMS client software and existing ATMS software to show either on a laptop computer or the controller itself the actual message that is visibly displayed on the sign on an individual pixel basis in a WYSIWYG format.

The operational status of the fans shall have the ability to be automatically tested once a day and tested on command from the DMS client software and existing ATMS software or laptop computer. Any failure shall cause an error message to be sent to the DMS client software, existing ATMS software, or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software, or laptop computer.

Temperature sensors shall be continuously measured and monitored by the sign controller. A temperature greater than a user selectable critical temperature shall cause the sign message to go to blank. An error message shall be sent to the DMS client software, existing ATMS software, or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software, or laptop computer. This user selectable critical temperature shall be capable of being changed by the DMS client software, existing ATMS software (if available), or laptop computer. The DMS client software, existing ATMS software (if available), laptop computers shall have the ability to read all temperature measurements from the sign controller. When the sign reaches an internal temperature of 130 °F, it shall cut the LED intensity to half of its normal brightness to keep the sign from reaching the critical temperature and shutting down.

When the display time of a message has expired, the controller shall set the sign to neutral. A sign is considered to be neutral when the sign is blank.

In the event of a communications failure with the DMS client software or existing ATMS software, the sign controller shall set the sign to neutral after a user-defined number of minutes (1 to 60) unless communications have been restored within this period. This function shall apply only when the sign controller is in the master control mode.

All LED module power supplies shall be continuously monitored by the sign controller. A low voltage reading shall cause an error message to be sent to the DMS client software, existing ATMS software, or laptop computer when the sign controller is polled by the DMS client software, existing ATMS software, or laptop computer.

There shall be no perceivable flicker or ghosting of the pixels during sign erasure and writing periods. Message additions, deletions, and changes in the sign controller shall be made from either the DMS client software, existing ATMS software, or the laptop computer.

In the event of an AC power loss, all non-volatile memory shall be retained for a minimum of 30 days. AC power failure shall cause the sign controller to notify the DMS client software and existing ATMS software and display an error message on the DMS client software and existing ATMS software

CRT. For cellular operation, the sign controller shall immediately access the modem to notify the DMS client software and existing ATMS of the AC power failure.

Failure of any sign shall not affect the operation of any other sign in the system.

The sign controller internal time clock shall ensure that a message is taken down at the correct time, even in the event of communications loss. The sign controller shall maintain its internal clock during power outages of less than four hours and display the proper message when power is restored.

The sign controller shall be able to put a self-updating time, temperature, and/or date display on the sign.

Flashing Beacons. The TMDMS shall be equipped with two 12" diameter yellow flashing beacons that can be programmed to operate through the sign controller and remote access software. The beacons shall be located at the top of the sign on each end and shall flash alternately. The beacons shall be equipped with tunnel visors to maximize visibility.

Construction Requirements. Sign construction and installation shall be coordinated with the Engineer. TMDMS shall be transported and erected in a manner recommended by the manufacturer, provide a minimum clearance of 17.5 ft. above the pavement, and a horizontal appearance to motorists once fully installed as shown on the plans.

Technical Assistance. The DMS manufacturer's technical representative shall provide onsite technical assistance in following areas:

- Sign to structure installation
- Controller cabinet installation
- Sign housing to ground control cabinet cable termination
- Initial sign turn on and stand alone test

The initial powering up of the signs shall not be executed without the permission of the DMS manufacturer's technical representative.

Any special or proprietary cables shall be provided by the DMS manufacturer to the Contractor.

Testing. The Contractor shall certify in writing to the Engineer that each TMDMS installation is fully compliant with the NTCIP standards as stated herein. All mandatory objects and the optional objects mentioned in this provision shall be certified for each sign and provided to the Department. Following installation, the Contractor shall perform a site test of each sign, demonstrating the functionality and performance required according to this special provision to the Engineer. The Contractor shall give the Engineer a minimum of two weeks notice before performing the site test.

Testing Requirements. The Department has the right to require performance testing of materials and equipment not previously tested and approved. If technical data are not considered adequate for approval, samples may be requested for testing.

The DMS manufacturer shall provide five copies of all factory acceptance tests, stand-alone system tests, and 90 day test procedures and data forms for the Department's approval at least 60 calendar days prior to the day the tests are to begin. The test procedures shall include the sequence in which the tests will be conducted. The test procedures shall have the Department's approval prior to submission of equipment for tests.

The DMS manufacturer shall perform the factory acceptance, stand-alone, and system tests. The DMS manufacturer shall furnish data forms containing all the data taken, as well as quantitative results for all tests. The data forms shall be signed by an authorized representative (company official) of the equipment manufacturer. At least one copy of the data forms shall be sent to the Department within 14 days of the test's conclusion.

The Department reserves the right to have a representative to witness all tests. The results of each test shall be compared with the requirements specified herein. Failure to conform to the

requirements of any test shall be counted as a defect, and the equipment shall be subject to rejection by the Department. Rejected equipment may be offered again for a retest provided that all non-compliances have been corrected and retested by the DMS manufacturer and evidence thereof submitted to the Department.

Each of the tests on all or one type of equipment must be completed within five working days of each other. Any delays in performing all these tests may result in the DMS manufacturer paying the additional costs of providing additional testing time.

Final inspection and acceptance of equipment shall be made after installation at the designated location as shown on the installation plans.

The DMS manufacturer shall be responsible for providing the test fixtures and test instruments for all the tests.

The stand-alone and system tests are separate tests. However, they may be performed by the DMS manufacturer during the same visit.

Consequences of Test Failures. If any unit fails to pass its test, the unit shall be corrected or another unit substituted in its place, and the test successfully repeated.

If a unit has been modified because of a test failure, a report shall be prepared and delivered to the Department prior to shipment of the unit. The report shall describe the nature of the failure, and the corrective action taken. If a failure pattern develops, the Department may direct that design and construction modifications be made to all units at no additional cost or extension of the contract period.

Factory Acceptance Tests. The manufacturer shall be responsible for conducting demonstration tests on all units at the manufacturer's facility. These tests shall be performed on each unit supplied. The Department shall be notified a minimum of 30 calendar days before the start of tests. At a minimum, all equipment shall have passed the following individual tests:

- Examination of Product: Each TMDMS unit shall be examined carefully to verify that the materials, design, construction, markings, and quality of work comply with the requirements of these project specifications.
- Continuity Tests: The wiring shall be checked to determine conformance with the requirements of the appropriate paragraphs in these project specifications.
- Operational Test: Each TMDMS unit shall be operated long enough to permit equipment temperature stabilization and to check and record an adequate number of performance characteristics to ensure compliance with the requirements of these project specifications.
- NTCIP Test: A NTCIP test shall be performed at the manufacturer's facility. The Department may elect to perform and/or witness this test. The specifics of this factory acceptance test shall be proposed by the manufacturer to the Department for approval.
- Stand-Alone Tests: The manufacturer shall conduct an approved stand-alone test of the equipment installation at the field site. The test shall, as a minimum, exercise all stand-alone (non-network) functional operations of the field equipment with all the equipment installed as per the contract.

Approved data forms shall be completed and turned over to the Department as the basis for review and rejection or acceptance. At least 30 working days notice shall be given prior to all tests to permit the Department to observe each test.

System Tests. After the installation of the TMDMS system is completed and the successful completion of the system test, the TMDMS system shall be subjected to one continuous 72-hour full operating test prior to a 90 day test period. The test shall consist primarily of exercising all control, monitor, and communications functions of the field equipment by the central management software.

The 90 days test period shall commence on the first day after the successful completion of the approved 72-hour continuous full operating test period. During the 90 days test period, downtime due to mechanical, electrical, and/or other malfunctions shall not exceed five working days. The Engineer may extend the 90 days test period by a number of days equal to the downtime in excess of five working days.

The Engineer will furnish the TMDMS vendor with a letter of approval stating the first day of the 90 days test period.

Maintenance Services. The Contractor shall provide complete maintenance services for the entire TMDMS assembly until the final acceptance. All labor, travel, replacement parts, and associated costs necessary to maintain the TMDMS assembly shall be included in the contract at no additional cost to the Department.

The Contractor shall correct all failures in the TMDMS assembly within 48 hours of notification from the Department until final acceptance. A failure of a sign installation shall be defined as the inability of the sign to function as per these specifications and the sign becoming unreadable or illegible as determined by the Department.

Final System Acceptance. Final system acceptance will be defined as when all work and materials provided have been furnished and completely installed by the manufacturer, all parts of the work have been approved and accepted by the Department, and the DMS system has been operated continuously and successfully for 90 calendar days with no more than five calendar days downtime due to mechanical, electrical, and/or other malfunctions as specified herein.

The warranty period will begin upon final acceptance.

Operator's Manuals. A manual containing a general description and detailed operating and installation instructions shall be provided for each different type or model of equipment. One copy of the manual shall be provided and kept in the sign cabinet. An additional ten copies of the manual shall be submitted to the Department for each model of equipment. An additional copy of the manual shall be submitted to the Department on CD for each model of equipment. The manual shall include the following information.

- A general description of the equipment including all information necessary to describe the basic use or function of the system components. This shall include a general block diagram presentation of the equipment. Where auxiliary equipment is required, tabular charts shall be included listing such equipment. These charts shall include the nomenclature physical and electrical characteristics and functions of the auxiliary equipment unless such information is contained elsewhere in an associated manual. In

the latter case, a reference shall be made to the location of the information pertaining to the auxiliary equipment.

- The theory of operation of the system components in a clear, concise manner supported by simplified schematics, logic, data flow diagrams, one-function diagrams, etc. Timing and waveform diagrams and voltage levels shall be shown as required. A logical development shall be used starting with a system block level and proceeding to a circuit analysis. Circuit analysis shall be detailed whenever circuits are not normally found in standard textbooks. The application of new theoretical concepts shall be fully described. Where the design allows operation in several different modes, an operational description of each mode shall be included.
- In simple, clear language, the routine of operation from necessary preparations for placing the equipment into operation to securing the equipment after operation. This section shall contain appropriate illustrations with the sequence of operations presented in tabular form wherever feasible. This section shall also contain a list of applicable test instruments, aids, and tools required in the performance of necessary measurements and technique of each system component. In addition, set-up test and calibration procedures shall be described.
- Schematic diagrams shall be complete and accurate as required to supplement the text material and to allow the books to be a self-contained technical information source. Maximum size of these diagrams should be limited to allow their use in proximity of the equipment, in the classroom, etc. Part reference symbols, test voltages, waveforms, and other aids to understanding of the circuit's function shall be included on the diagrams. Test voltages, waveforms, and other aids to understanding of the circuit's function may be shown on both the simplified schematics and other drawings (as required in the above sections) on theory of operation or maintenance or on the schematic diagrams required for this section. The overall scope of information shall not be less, however, than that stated for the schematic diagrams.

Software Manuals. The manufacturer shall provide manuals and data for the computer software system and components thereof. One copy of the manual shall be provided and kept in the sign cabinet. Ten additional copies of the manual shall be submitted to the Department for each version of software. One copy of the manual shall be provided on CD. As software is upgraded, updated versions of the manual shall be provided. This submittal shall include the following:

- Software user's manuals shall be supplied including instructions for performing a backup of all software and message libraries.
- Two copies of source programs for master and sign controller software shall be provided on CD-ROM. The Department shall have the right to duplicate the sign controller software as needed for use in controlling signs under its' jurisdiction.
- The manufacturer's NTCIP MIB (Management Information Base) shall be provided to the Department.
- Warranty information.
- Preventive maintenance and maintenance information.

Maintenance Manuals. A manual containing a general description and detailed maintenance instructions shall be provided for each different type or model of equipment. One copy of the manual shall be provided and kept in the sign cabinet. An additional ten copies of the manual

shall be submitted to the Department for each model of equipment. One copy of the manual shall be provided on CD. The manual shall include the following information:

- The manufacturer's recommended procedures and checks necessary for preventive maintenance. This shall be specified for pre-operation, weekly, monthly, quarterly, semi-annual, annual, and "as required" checks as necessary to assure reliable equipment operation. Specifications, including tolerances, for all electrical, mechanical, and other applicable measurement, adjustments, or both shall be listed. The manufacturer shall provide the Department with a sample preventive maintenance schedule.
- Data necessary for isolation and repair of failures or malfunctions, assuming the maintenance technicians to be capable of analytical reasoning using the information provided above. Accuracies, limits, and tolerances for all electrical, physical, or other applicable measurements shall be described. General instructions shall be included for disassembly, overhaul, and reassembly, including shop specifications or performance requirements.
- Detailed instructions shall be given only where failure to follow special procedures would result in damage to the equipment, improper operation, or danger to operating or maintenance personnel.
- The parts list shall contain all information required to describe the characteristics of the individual parts, as required for identification. It shall include a list of all equipment within a group and list of all assemblies, subassemblies, and replacement parts of units. The tabular arrangement shall be in alphanumeric order of the schematic reference symbols and shall give the associated description, manufacturer's name, and part number. A table of contents or some other convenient means, e.g., appropriate grouping, shall be provided for the purpose of identifying major components, assemblies, etc.

As-Built Documentation. The manufacturer shall provide to the Department the following documentation of the complete installed equipment prior to final payment. Sufficient documentation shall be provided to reflect "as-built" conditions and to facilitate operation, maintenance, modification, and expansion of the system or any of its individual components. Manufacturer supplied documentation which covers the intent of this requirement may be used, subject to the approval of the Department:

The manufacturer shall prepare and submit the following detailed drawings for each sign:

- TMDMS character set as detailed herein,
- All non-catalog or custom-made components,
- Sign housing assembly details, including the component location details and a layout of all the display elements, complete with dimensions,
- Sign housing structural details, including member details, support mechanism details required for installation of the TMDMS onto the sign truss, welding details, and miscellaneous hardware details, complete with dimensions and sizes,
- Sign mounting bracket structural details, including miscellaneous members and hardware required to attach the TMDMS to the sign truss, complete with dimensions and sizes, and
- Wiring schematics.

Final documentation shall reflect all field changes and software modifications and shall be provided before final payment is made.

The manufacturer shall coordinate and take the lead on this effort with the Contractor.

This documentation shall include drawings of conduit layouts, cable diagrams, wiring lists, cabinet layouts, wiring diagrams, and schematics for all elements of the communications system. This shall also include detailed drawings identifying by cable type, color code and function, and the routing of all conductors (pairs) in the communications system.

Four copies of each as-built installation shall be delivered to the Department with one complete copy to be placed in the equipment cabinet at each TMDMS location. Drawings left in the truss mounted LED DMS shall be attached to the door with stainless steel fasteners and protected from weather with a waterproof enclosure.

Warranty. The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation unless other warranty requirements prevail. Any parts or equipment found to be defective and/or determined to be a failure in design, materials, and workmanship during the warranty period shall be replaced free of charge. The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. The depot location shall be in the United States. Repairs shall not require more than two weeks from date of receipt, and the provider of the warranty shall be responsible for all return shipping costs. The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service. A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall be for a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. Company contact information and warranty dates should be clearly shown on the warranty certificate. The Department shall have the right to transfer this service to other private parties who may be contracted to perform overall maintenance of the facility.

Method of Measurement. Truss mounted changeable message sign shall be measured as each truss mounted LED dynamic message sign complete, in place, tested, and accepted by the Engineer.

Basis of Payment. This work will be paid for at contract unit price per EACH for TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN, which price includes the removal and disposal of the existing TMDMS and the existing hardware.

EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C

This work shall consist of furnishing and installing lead-in cable for light detectors installed at existing and/or proposed traffic signal installations as part of an emergency vehicle priority system. The work includes installation of the lead-in cables in existing and/or new conduit. The electric cable shall be shielded and have three stranded conductors colored blue, orange, and yellow with a stranded tinned copper drain wire. The cable shall meet the requirements of the vendor of the emergency vehicle priority system equipment.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for EMERGENCY VEHICLE PRIORITY SYSTEM LINE SENSOR CABLE, NO. 20 3/C.

CONCRETE FOUNDATION, PEDESTRIAN POST

This item shall be according to Section 878 of the Standard Specifications. No foundation is to be poured until the Engineer gives his/her approval as to the depth of the foundation.

Basis of Payment. This work will be paid for at the contract unit price per FOOT for CONCRETE FOUNDATION, TYPE A 12-INCH DIAMETER.

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES

Description This work shall consist of the removal and disposal of regulated substances according to Section 669 of the Standard Specifications as revised below.

Contract Specific Work Areas For stationing, the lateral distance is measured from centerline, and the farthest distance is the offset distance or construction limit, whichever is less.

The following contract specific work areas shall be monitored by the environmental firm for soil contamination and workers protection.

ISGS Site 4513-1. ROW, I-64 between M.M. 10.5 and 12.2, Fairview Heights, St. Clair Co.

- Station 32+55 to Station 34+80, 0 to 100 ft LT of I-64 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminant of concern sampling parameter: Lead.
- Station 34+80 to Station 36+95, 0 to 100 ft LT of I-64 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminant of concern sampling parameter: Arsenic, Iron, Manganese, and Lead .
- Station 36+95 to Station 39+05, 0 to 100 ft LT of I-64 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminants of concern sampling parameters: Lead.

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
PROJECT CMAQ-HSIP-4U5N(249)
SECTION (130,130-1,130-2)TS-3, 82-5TS
ST. CLAIR COUNTY
CONTRACT NO. 76R78

- Station 33+00 to Station 35+90, 0 to 100 ft RT of I-64 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 35+90 to Station 38+90, 0 to 100 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminants of concern sampling parameters: Lead.
- Station 38+90 to Station 42+10, 0 to 100 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminants of concern sampling parameters: Benzo(a)pyrene and Lead.
- Station 35+40 to Station 38+55, 0 to 100 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- Station 38+10 to Station 39+60, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- Station 500+15 to Station 504+75, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- Station 504+75 to Station 507+55, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminant of concern sampling parameter: Lead.
- Station 507+55 to Station 507+90, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(6). Contaminant of concern sampling parameter: Cadmium, Manganese, and Lead.
- **Work Zone monitoring will be required at this property at the above location because of hazardous waste concentrations of cadmium.**
- Station 507+90 to Station 510+50, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminant of concern sampling parameter: Lead.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-29. Bob Evans, 10 Ludwig Drive, Fairview Heights, St. Clair Co.

- Station 39+60 to Station 45+05, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-30. Vacant Land, 6900 block of N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 42+40 to Station 45+15, 0 to 100 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters: Iron, Lead, and pH.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-38. ROW, N. Illinois Street at Market Place / St. Clair Square, Fairview Heights, St. Clair Co.

- Station 31+00 to Station 32+55, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters: Benzo(a)pyrene and Iron.
- Station 31+00 to Station 33+00, 0 to 70 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Arsenic, Manganese, and Iron. ISGS Site 3513-39. Taco Bell, 6599 N. Illinois Street, Fairview Heights, St. Clair Co.
- Station 28+10 to Station 29+75, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters: Benzo(a)pyrene, Iron, and Lead.
- Station 29+75 to Station 30+80, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Arsenic, Manganese, and Iron.
- Station 30+80 to Station 31+00, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters: Benzo(a)pyrene and Iron.
- **Material not anticipated to be reused onsite.**

ISGS Site 4513-40. Commercial Building, 6520 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 28+35 to Station 29+15, 0 to 75 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminants of concern sampling parameters: Benzo(a)pyrene.
- Station 29+15 to Station 31+00, 0 to 75 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Arsenic, Manganese, and Iron.
- **Work Zone monitoring will be required at this property at the above location due to exceedences of construction worker ingestion for manganese.**
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-41. Raising Canes, 6565 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 25+40 to Station 27+65, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters: Iron and Manganese.
- Station 27+65 to Station 28+10, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters: Benzo(a)pyrene, Iron, and Lead.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-42. Associated Bank, 6550 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 25+35 to Station 26+95, 0 to 75 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters: Iron, Manganese, and Arsenic.
- Station 26+95 to Station 28+35, 0 to 75 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminants of concern sampling parameter: Benzo(a)pyrene.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-43. Chase Bank, 6535 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 22+70 to Station 25+40, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminant of concern sampling parameter: Iron.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-44. Commercial Building, 6530 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 22+70 to Station 25+35, 0 to 75 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters: Iron and Manganese.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-46. Red Robin, 6500 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 20+10 to Station 22+70, 0 to 100 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(c). Contaminants of concern sampling parameters: Iron and Manganese.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-48. St. Clair Crossing, 6403 – 6415 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 324+35 to Station 324+55, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminant of concern sampling parameter: Arsenic, Iron, and Manganese.
- Station 324+55 to Station 326+45, 0 to 700 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminants of concern sampling parameters: Benzo(a)pyrene and Lead.
- Station 326+45 to Station 328+15, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(2). Contaminant of concern sampling parameter: Lead.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-49. BP Gasoline Station, 6400 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 326+67 to Station 328+26, 0 to 100 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-51. Chili's, 6311 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 322+10 to Station 324+35, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Arsenic, Manganese, and Iron.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-54. Lincoln Place Shopping Center, 6109 – 6211 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 319+45 to Station 322+10, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-58. Chick-Fil-A, 6203 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 316+45 to Station 317+75, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Manganese and Thallium
- Station 317+75 to Station 319+45, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-59. Commercial Building, 6118 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 315+50 to Station 317+50, 0 to 50 ft RT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminants of concern sampling parameters: Iron and Lead.
- **Material not anticipated to be reused onsite.**

ISGS Site 4513-60. Longhorn Steakhouse, 6115 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 314+75 to Station 316+45, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Arsenic, Manganese, and Iron.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-62. PopShelf, 6101 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 311+10 to Station 312+60, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Arsenic, Manganese, and Iron.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-65. Popeyes, 6011 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 310+00 to Station 311+00, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Arsenic, Manganese, and Iron.
- Station 309+30 to Station 310+00, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Material not anticipated to be reused onsite.**

ISGS Site 4513-67. Valvoline, 6001 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 308+15 to Station 309+30, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Material not anticipated to be reused onsite.**

ISGS Site 4513-70. Commercial Building, 5949-5961 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 306+10 to Station 308+15, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-72. Lincoln Place, 5905-6105 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 305+70 to Station 306+10, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-74. Commercial Building, 5909-5917 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 303+70 to Station 303+95, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminant of concern sampling parameter: Arsenic, Iron, Manganese, and Pentachlorophenol.
- Station 303+95 to Station 305+70, 0 to 70 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(3). Contaminant of concern sampling parameter: Benzo(a)pyrene.
- **Eligible material anticipated to be reused onsite.**

ISGS Site 4513-76. Regions, 5901 N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 302+00 to Station 303+70, 0 to 100 ft LT of IL-159 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(5). Contaminants of concern sampling parameters: Arsenic, Manganese, Iron, and Pentachlorophenol.
- **Material not anticipated to be reused onsite.**

ISGS Site 4513-108. Commercial Building, N. Illinois Street, Fairview Heights, St. Clair Co.

- Station 101+350 to Station 101+415, 0 to 80 ft RT of I-59 Centerline. The Engineer has determined this material meets the criteria of and shall be managed in accordance with Article 669.05(a)(1). Contaminant of concern sampling parameter: Iron.
- **Eligible material anticipated to be reused onsite.**

Work Zones. Three distinct OSHA HAZWOPER work zones (exclusion, decontamination, and support) shall apply to projects adjacent to or within sites with documented leaking underground storage tank (LUST) incidents or sites under management in accordance with the requirements of the Site Remediation Program (SRP); Resource Conservation and Recovery Act (RCRA); or Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); or as deemed necessary. For this project, the work zones apply for the following ISGS PESA Sites: **ISGS Site 4513-40 (Commercial Building) and ISGS Site 4513-1 (ROW)**

Additional information on the contract specific work areas listed above collected during the regulated substances due-diligence process is available through the District's Environmental Studies Unit (DESU).

STATUS OF UTILITIES TO BE ADJUSTED

NO UTILITIES TO BE ADJUSTED

The above represents the best information of the Department and is only included for the convenience of the bidder. The applicable provisions of Sections 102 and 103 and Articles 105.07 and 107.20 of the Standard Specifications for Road and Bridge Construction shall apply.

If any utility adjustment or removal has not been completed when required by the Contractor's operation, the Contractor should notify the Engineer in writing. A request for an extension of time will be considered to the extent the Contractor's operations were affected.

ETHERNET SWITCH

Description. This work shall consist of furnishing and installing a Layer II Ethernet switch used to transmit data from one traffic signal cabinet to another traffic signal cabinet containing a Layer II switch or a Layer III (Network) switch.

Materials. The Layer II switch shall be environmentally hardened with a minimum of 2 100Mbps SFP ports and 8 100Mbps copper RJ45 ports. Two SFP ports shall be populated with environmentally hardened optical modules capable of transmitting for 10 Km on single-mode fiber optic cable. An environmentally hardened power supply with input of 120 VAC and sufficient wattage for the switch shall be provided.

The switch shall conform to the following minimum specifications:

- Forwarding Bandwidth 3.8Gbps
- Switching Bandwidth 7.6Gbps
- Forwarding rate: 5.66Mpps with 64-byte packets (Line-rate at all packet sizes)
- Egress buffer: 2 MB
- Unicast MAC addresses: 8000
- Internet Group Management Protocol (IGMP) multicast groups: 255
- Virtual LANs (VLANs): 1005
- IPv4 MAC security ACEs: 384 (default Ternary Content-Addressable Memory [TCAM] template)
- Bidirectional, 128 NAT translation entries
- IPv4 routing: 3500 routes, IPv6 routing: 1750 routes
- Layer 2 switching: IEEE 802.1, 802.3, 802.3at, 802.3af standard (see Table 8), VTPv2, NTP, UDLD, CDP, LLDP, Unicast MAC filter, Resilient Ethernet Protocol (REP), Media Redundancy Protocol (MRP) Ring (IEC 62439-2)
- Security: SCP, SSH, SNMPv3, TACACS+, RADIUS Server/Client, MAC Address Notification, BPDU Guard, SPAN session
- Multicast: IGMPv1, v2, v3 Snooping, IGMP filtering, IGMP Querier

Safety certifications:

- UL/CSA 60950-1
- EN 60950-1
- CB to IEC 60950-1 (with country deviations)
- NOM to NOM-019-SCF1 (through partners and distributors)
- CE Marking

Hazard location:

- ANSI/ISA 12.12.01 (Class1, Div2 A-D)
- EN 60079-0, -15 ATEX Certificate (Class 1, Zone2 A-D)
- EMC emissions and immunity compliance:
- FCC 47 CFR Part 15 Class A
- EN 55022A Class A
- VCCI Class A

- RoHS compliance
- AS/NZS CISPR 22 Class A, AS/NZS CISPR 24
- CISPR11 Class A, CISPR22 Class A
- ICES 003 Class A
- CE Marking
- IEC/EN/EN61000-4-2 (Electro Static Discharge), 15kV air/8kV contact
- IEC/EN 61000-4-3 (Radiated Immunity, 10 and 20 V/m)
- IEC/EN 61000-4-4 (Fast Transients - 4kV power line, 4kV data line)
- IEC/EN 61000-4-5 (Surge 2 kV/1 kV)
- IEC/EN 61000-4-6 (Conducted Immunity, 10 V/emf)
- IEC/EN 61000-4-8 (Power Frequency Magnetic Field Immunity)
- IEC/EN 61000-4-9 (Pulse Magnetic Field Immunity)
- IEC/EN 61000-4-10 (Oscillatory Magnetic Field Immunity)
- IEC/EN 61000-4-11 (AC power Voltage Immunity)
- IEC/EN 61000-4-29 (Voltage Dips Immunity)
- IEC/EN 61000-6-1 (Immunity for Light Industrial Environments)
- IEC/EN 61000-6-2 (Immunity for Industrial Environments)
- IEC/EN 61000-6-4 Class A
- EN 61326

Shock and vibration:

- IEC 60068-2-27 (Operational Shock: 30G 11ms, half sine)
- IEC 60068-2-27 (Non-Operational Shock 55-70G, trapezoidal)
- IEC 60068-2-6, IEC 60068-2-64, EN 61373 (Operational Vibration)
- IEC 60068-2-6, IEC 60068-2-64, EN 61373 (Non-operational Vibration)

Industry standards:

- UL508
- CSA C22.2 No. 142
- EN 61131-2 (EMC/EMI, environmental, mechanical)
- Substation KEMA (IEEE 1613, IEC 61850-3)
- EN50121-3-2 o EN50121-4
- NEMA TS-2 (EMC, environmental, mechanical)
- ABB Industrial IT certification
- IP30
- ODVA Industrial Ethernet/IP support
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Corrosive testing:

- ISO-12944-6
- IEC-60068-2-60

Humidity:

- IEC 60068-2-52 (salt fog mist, test Kb) marine environments
- IEC 60068 -2-3
- IEC 60068-2-30
- Relative humidity: 5% to 95% non-condensing

Operating temperature:

- -40C to +70C (vented enclosure - 40 LFM Air Flow) -40C to +60C (sealed enclosure – 0 LFM Air Flow)
- -34C to +75C (fan or blower-equipped enclosure – 200 LFM Air Flow)
- -40C to +85C (IEC 60068-2-2 Environmental Type Testing – 16 hours)

Operational altitude: Up to 15,000 ft

Storage temperature:

- -40 C to +85 C (storage temperature)
- IEC 60068-2-14

Storage altitude: Up to 15,000 ft

Mean time between failure: 374,052 hours (42.7 years)

Warranty: Five-year

The Cisco IE-2000-8TC-B Industrial Ethernet Switch is compliant with this specification. Other manufacturers that comply with this specification are allowed.

The Layer II switch and its power supply shall be mounted to either a standard DIN rail or an equipment mounting channel in the cabinet. The power supply shall be hard-wired to the cabinet power, not plugged into one of the traffic signal cabinet power outlets.

Configuration Design Document. A configuration design document shall be submitted within 60 days after contract award. It shall be prepared by a designer with a minimum of CCNP certification – and shall include proof of currently active CCNP credentials. The document shall contain actual configuration files for each switch to be delivered under this contract.

The Layer II switch shall be configured to be compatible with the IDOT D8 field network design. High level guidance (IP Scheme / VLANs / routing protocols, etc.) will be provided by IDOT but the integration, functionality and compatibility with the existing network are the responsibility of the contractor.

The configuration design document shall meet the acceptance of the IDOT engineer. Contractor to coordinate with IDOT Electric Maintenance Contractor and Network engineer for proper set up and IP configuration.

Basis of Payment. This work will be paid for at the contract unit price per each for ETHERNET SWITCH, the price of which shall include all equipment, materials, and labor required to furnish, configure and install the switch, including all necessary connectors, cables, fiber optic jumpers, hardware, software, and other peripheral equipment required to place the switch in operation to the satisfaction of the Engineer.

ETHERNET MANAGE SWITCH

Description. This work shall consist of furnishing and installing a Layer III Ethernet switch used to transmit data from one traffic signal cabinet to another traffic signal cabinet containing a Layer II switch or a Layer III (Network) switch.

Materials. The Layer III switch shall be environmentally hardened with a minimum of 16 1Gbps SFP ports and 12 1Gbps copper RJ45 ports. All SFP ports shown on the plans shall be populated with environmentally hardened optical modules capable of transmitting the appropriate distance as shown on the plans on single-mode fiber optic cable. An environmentally hardened power supply with input of 120 VAC and sufficient wattage for the switch shall be provided.

The switch shall conform to the following minimum specifications:

- Forwarding bandwidth: 28 Gbps (line rate/non-blocking)
- Switching bandwidth: 56 Gbps(Switching bandwidth is full-duplex capacity)
- Forwarding rate: 41.67 mpps with 64 byte packets (line rate for all ports and packet sizes)
- Number of queues: 4 egress
- Unicast MAC addresses: 16,000
- IGMP multicast groups: 1000
- Number of VLANs: 1000
- IPv4 MAC security ACEs: 1000 with default TCAM template
- NAT translation: Bidirectional, 128 unique subnet NAT translation entries, which can expand to tens of thousands of translated entries if designed
- Warranty: Five-year
- Layer 2 switching: IEEE 802.1, 802.3, 802.3at, 802.3af standard, VTPv2, NTP, UDLD, CDP, LLDP, Unicast Mac filter, Flexlink, VTPv3, EtherChannel, Voice VLAN, QinQ tunneling
- Security: SCP, SSH, SNMPv3, TACACS+, RADIUS Server/Client, MAC Address Notification, BPDU Guard, Port-Security, Private VLAN, DHCP Snooping, Dynamic ARP Inspection, IP Source Guard, 802.1x, Guest VLAN, MAC Authentication Bypass, 802.1x Multi-Domain Authentication, Storm Control, Trust Boundary, Cisco TrustSec@security, FIPS 140-2, ACT2, Secure Boot, Full flexible Netflow1
- Layer 2 multicast: IGMPv1, v2, v3 Snooping, IGMP filtering, IGMP Querier
- Quality of Service (QoS): Ingress Policing, Rate-Limit, Egress Queueing/shaping, AutoQoS, Modular QoS CLI (MQC)
- Layer 2 IPv6: IPv6 Host support, HTTP over IPv6, SNMP over IPv6
- Layer 3 routing: IPv4 Static Routing
- Layer 2 switching with 1:1 static Network Address Translation (NAT)
- Utility: IEEE 1588v2 PTP Power Profile, dying gasp, GOOSE messaging, SCADA protocol classification, MODBUS TCP/IP Memory Maps, utility SmartPort macro, BFD, Ethernet OAM, IEEE 802.3ah, CFM (IEEE 802.1ag)
- Redundancy:
 - Redundancy Ethernet Protocol ring (REP)
 - Parallel Redundancy Protocol (PRP)
 - High Availability Seamless Redundancy (HSR), PTP over HSR
- Media Redundancy Protocol (MRP) ring, MRP Auto Manager (MAM)

- IP multicast: PIM Sparse Mode (PIM-SM), PIM Dense Mode (PIM-DM), and PIM sparsedense mode
- IP unicast routing protocols: OSPF, EIGRP, BGPv4, IS-IS, RIPv2, Policy-Based Routing (PBR), HSRP
- IPv6 routing: RIPng, OSPFv6, and EIGRPv6 support Security: IEEE 802.1AE MACsec (including PSK based MKA support), Cisco TrustSec®, SGT inline tagging and SGACL, Full flexible Netflow

The Cisco IE-4010-16S12P Industrial Ethernet Switch is compliant with this specification. Other manufacturers that comply with this specification are allowed.

The Layer III switch and its power supply shall be mounted to either a standard DIN rail or an equipment mounting channel in the cabinet. The power supply shall be hard-wired to the cabinet power, not plugged into one of the traffic signal cabinet power outlets.

Configuration Design Document. A configuration design document shall be submitted within 60 days after contract award. It shall be prepared by a designer with a minimum of CCNP certification – and shall include proof of currently active CCNP credentials. The document shall contain actual configuration files for each switch to be delivered under this contract.

The Layer III switch shall be configured to be compatible with the IDOT D8 field network design. High level guidance (IP Scheme / VLANs / routing protocols, etc.) will be provided by IDOT but the integration, functionality and compatibility with the existing network are the responsibility of the contractor.

The configuration design document shall meet the acceptance of the IDOT engineer. Contractor to coordinate with IDOT Electric Maintenance Contractor and Network engineer for proper set up and IP configuration.

Basis of Payment. This work will be paid for at the contract unit price per each for LAYER III NETWORK SWITCH, the price of which shall include all equipment, materials, and labor required to furnish, configure and install the switch, including all necessary connectors, cables, fiber optic jumpers, hardware, software, and other peripheral equipment required to place the switch in operation to the satisfaction of the Engineer.

CLOSED CIRCUIT TELEVISION DOME CAMERA, HD

Description. This work shall consist of furnishing and installing an IP based remote controlled video system at a location shown in the plans. The work shall include a color camera, dome assembly, all mounting hardware, connectors, cables, power injectors, and related equipment necessary to complete the installation according to the manufacturer's specifications.

Materials. The PTZ camera shall be one of the following approved models:

- TKH Security Solutions PD1103Z2-E
- AXIS Q6055-E
- Cohu 4220HD

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
PROJECT CMAQ-HSIP-4U5N(249)
SECTION (130,130-1,130-2)TS-3, 82-5TS
ST. CLAIR COUNTY
CONTRACT NO. 76R78

The Contractor shall furnish the required number of power injectors for the camera make and model selected, including operation of the camera heater, as well as all required mounting hardware, connectors, patch cables, and power supplies. The system shall have anonymous FTP capabilities disabled by the vendor/equipment supplier or provide a feature for the user to disable the functionality through the standard internal menu.

Installation. The camera shall be installed as shown on the plans, either on the luminaire arm near the luminaire, or on the combination mast arm assembly pole, angled toward the center of the intersection using a mounting bracket compatible with the camera and procured from one of the approved camera manufacturers. When installed on the pole, the camera shall be mounted to provide a minimum of 12 inches clear space between face of the pole and the camera housing. When installed on the luminaire arm, the camera shall be installed with a 30-degree tilt-adjustable bracket. The camera and any external hardware and housing shall be installed with stainless steel straps.

All holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent the chafing of wires.

The Contractor shall contact the Traffic Engineer prior to installing the camera and associated wiring, to receive final approval on the camera location. If the Remote Controlled Video System will be connected to the Gigabit Ethernet network, then a Layer II (Datalink) Switch and/or a Layer III (Network) Switch shall be required. Layer II and Layer III switches shall be installed as shown on the plans. Contractor to coordinate with IDOT Electric Maintenance Contractor and Network engineer for proper set up and IP configuration.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOTE CONTROLLED VIDEO SYSTEM, The unit price shall include all associated equipment, hardware, cables, materials and labor required to install the complete system in place and in operation to the satisfaction of the Engineer.

ACCESSIBLE PEDESTRIAN SIGNALS (APS) (BDE)

Effective: April 1, 2003

Revised: January 1, 2022

Description. This work shall consist of furnishing and installing accessible pedestrian signals (APS). Each APS shall consist of an interactive vibrotactile pedestrian pushbutton with speaker, an informational sign, a light emitting diode (LED) indicator light, a solid-state electronic control board, a power supply, wiring, and mounting hardware. The APS shall meet the requirements of the MUTCD and Sections 801 and 888 of the Standard Specifications, except as modified herein.

Electrical Requirements. The APS shall operate with systems providing 95 to 130 VAC, 60 Hz and throughout an ambient air temperature range of -29 to +160 °F (-34 to +70 °C).

The APS shall contain a power protection circuit consisting of both fuse and transient protection.

Audible Indications. A pushbutton locator tone shall sound at each pushbutton and shall be deactivated during the associated walk indication and when associated traffic signals are in flashing mode. Pushbutton locator tones shall have a duration of 0.15 seconds or less and shall repeat at 1-second intervals. Each actuation of the pushbutton shall be accompanied by the speech message "Wait".

If two accessible pedestrian pushbuttons are placed less than 10 ft (3 m) apart or placed on the same pole, the audible walk indication shall be a speech walk message. This message shall sound throughout the WALK interval only. The verbal message shall be modeled after: "Street Name. Walk Sign is on to cross "Street Name." For signalized intersections utilizing exclusive pedestrian phasing, the verbal message shall be "Walk sign is on for all crossings". In addition, a speech pushbutton information message shall be provided by actuating the APS pushbutton when the WALK interval is not timing. This verbal message shall be modeled after: "Wait. Wait to cross 'Street Name' at 'Street Name'".

Where two accessible pedestrian pushbuttons are separated by at least 10 ft (3 m), the walk indication shall be an audible percussive tone. It shall repeat at 8 to 10 ticks per second with a dominant frequency of 880 Hz.

Automatic volume adjustments in response to ambient traffic sound level shall be provided up to a maximum volume of 100 dBA. Locator tone and verbal messages shall be no more than 5 dB louder than ambient sound.

At locations with railroad interconnection, an additional speech message stating "Walk time shortened when train approaches" shall be used after the speech walk message. At locations with emergency vehicle preemption, an additional speech message "Walk time shortened when emergency vehicle approaches" shall be used after the speech walk message.

Pedestrian Pushbutton. Pedestrian pushbuttons shall be at least 2 in. (50 mm) in diameter or width. The force required to activate the pushbutton shall be no greater than 3.5 lb (15.5 N).

A red LED shall be located on or near the pushbutton which, when activated, acknowledges the pedestrians request to cross the street.

Signage. A sign shall be located immediately above the pedestrian pushbutton and parallel to the crosswalk controlled by the pushbutton. The sign shall conform to one of the following standard MUTCD designs: R10-3, R10-3a, R10-3e, R10-3i, R10-4, and R10-4a.

Tactile Arrow. A tactile arrow, pointing in the direction of travel controlled by a pushbutton, shall be provided on the pushbutton.

Vibrotactile Feature. The pushbutton shall pulse when depressed and shall vibrate continuously throughout the WALK interval.

Method of Measurement. This work will be measured for payment as each, per pushbutton.

Basis of Payment. This work will be paid for at the contract unit price per each for ACCESSIBLE PEDESTRIAN SIGNALS.

AUTOMATED FLAGGER ASSISTANCE DEVICES (BDE)

Effective: January 1, 2008

Revised: April 1, 2023

Description. This work shall consist of furnishing and operating automated flagger assistance devices (AFADs) as part of the work zone traffic control and protection for two-lane highways where two-way traffic is maintained over one lane of pavement in segments where no sideroads or entrances require deployment of additional flaggers. Use of these devices shall be at the option of the Contractor.

Equipment. AFADs shall be the STOP/SLOW or Red/Yellow Lens type mounted on a trailer or moveable cart meeting the requirements of the MUTCD and NCHRP 350 or MASH 2016, Category 4.

General. AFADs shall be placed at each end of the traffic control, where a flagger is shown on the plans. The AFAD shall be setup within five degrees of vertical.

Flagger symbol signs as shown on the plans shall be replaced with "BE PREPARED TO STOP" signs when the AFAD is in operation.

Personal communication devices shall not be used to operate the AFAD.

Flagging Requirements. Flaggers and flagging requirements shall be according to Article 701.13 of the Standard Specifications and the following.

Each AFAD shall be operated by a flagger trained to operate the specific AFAD to be deployed. A minimum of two flaggers shall be on site at all times during operation. Each flagger shall be positioned outside the lane of traffic and near each AFAD's location.

Flagging equipment required for traditional flagging shall be available near each AFAD location in the event of AFAD equipment malfunction/failure.

For nighttime flagging, the AFAD and flagger shall be illuminated according to Article 701.13 of the Standard Specifications.

When not in use, AFADs will be considered non-operating equipment and shall be stored according to Article 701.11 of the Standard Specifications.

Basis of Payment. This work will not be paid for separately but shall be considered as included in the cost of the various traffic control items included in the contract.

CEMENT, FINELY DIVIDED MINERALS, ADMIXTURES; CONCRETE, AND MORTAR (BDE)

Effective: January 1, 2025

Revise the first paragraph of Article 285.05 of the Standard Specifications to read:

“285.05 Fabric Formed Concrete Revetment Mat. The grout shall consist of a mixture of cement, fine aggregate, and water so proportioned and mixed as to provide a pumpable slurry. Fly ash or ground granulated blast furnace (GGBF) slag, and concrete admixtures may be used at the option of the Contractor. The grout shall have an air content of not less than 6.0 percent nor more than 9.0 percent of the volume of the grout. The mix shall obtain a compressive strength of 2500 psi (17,000 kPa) at 28 days according to Article 1020.09.”

Revise Article 302.02 of the Standard Specifications to read:

“302.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Hydrated Lime	1012.01
(d) By-Product, Hydrated Lime	1012.02
(e) By-Product, Non-Hydrated Lime	1012.03
(f) Lime Slurry	1012.04
(g) Fly Ash	1010
(h) Soil for Soil Modification (Note 1)	1009.01
(i) Bituminous Materials (Note 2)	1032

Note 1. This soil requirement only applies when modifying with lime (slurry or dry).

Note 2. The bituminous materials used for curing shall be emulsified asphalt RS-2, CRS-2, HFE 90, or HFE 150; rapid curing liquid asphalt RC-70; or medium curing liquid asphalt MC-70 or MC-250.”

Revise Article 312.07(c) of the Standard Specifications to read:

“(c) Cement1001”

Add Article 312.07(i) of the Standard Specifications to read:

“(i) Ground Granulated Blast Furnace (GGBF) Slag1010”

Revise the first paragraph of Article 312.09 of the Standard Specifications to read:

“312.09 Proportioning and Mix Design. At least 60 days prior to start of placing CAM II, the Contractor shall submit samples of materials to be used in the work for proportioning and testing. The mixture shall contain a minimum of 200 lb (120 kg) of cement per cubic yard (cubic meter). Cement may be replaced with fly ash or ground granulated blast furnace (GGBF) slag according to Article 1020.05(c)(1) or 1020.05(c)(2), respectively, however the minimum cement content in the mixture shall be 170 lbs/cu yd (101 kg/cu m). Blends of coarse and fine aggregates will be permitted, provided the volume of fine aggregate does not exceed the volume of coarse aggregate. The Engineer will determine the proportions of materials for the mixture according to the “Portland Cement Concrete Level III Technician Course” manual. However, the Contractor may substitute their own mix design. Article 1020.05(a) shall apply, and a Level III PCC Technician shall develop the mix design.”

Revise Article 352.02 of the Standard Specifications to read:

“352.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement (Note 1)	1001
(b) Soil for Soil-Cement Base Course	1009.03
(c) Water	1002
(d) Bituminous Materials (Note 2)	1032

Note 1. Bulk cement may be used for the traveling mixing plant method if the equipment for handling, weighing, and spreading the cement is approved by the Engineer.

Note 2. The bituminous materials used for curing shall be emulsified asphalt RS-2, CRS-2, HFE 90, or HFE 150; rapid curing liquid asphalt RC-70; or medium curing liquid asphalt MC-70 or MC-250.”

Revise Article 404.02 of the Standard Specifications to read:

“404.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate	1003.08
(d) Bituminous Material (Tack Coat)	1032.06
(e) Emulsified Asphalts (Note 1) (Note 2)	1032.06
(f) Fiber Modified Joint Sealer	1050.05
(g) Additives (Note 3)	

Note 1. When used for slurry seal, the emulsified asphalt shall be CQS-1h according to Article 1032.06(b).

Note 2. When used for micro-surfacing, the emulsified asphalt shall be CQS-1hP according to Article 1032.06(e).

Note 3. Additives may be added to the emulsion mix or any of the component materials to provide the control of the quick-traffic properties. They shall be included as part of the mix design and be compatible with the other components of the mix.

Revise the last sentence of the fourth paragraph of Article 404.08 of the Standard Specifications to read:

“When approved by the Engineer, the sealant may be dusted with fine sand, cement, or mineral filler to prevent tracking.”

Revise Note 2 of Article 516.02 of the Standard Specifications to read:

“Note 2. The sand-cement grout mix shall be according to Section 1020 and shall be a 1:1 blend of sand and cement comprised of a Type I, IL, or II cement at 185 lb/cu yd (110 kg/cu m). The maximum water cement ratio shall be sufficient to provide a flowable mixture with a typical slump of 10 in. (250 mm).”

Revise Note 2 of Article 543.02 of the Standard Specifications to read:

“Note 2. The grout mixture shall be 6.50 hundredweight/cu yd (385 kg/cu m) of cement plus fine aggregate and water. Fly ash or ground granulated blast furnace (GGBF) slag may replace a maximum of 5.25 hundredweight/cu yd (310 kg/cu m) of the cement. The water/cement ratio, according to Article 1020.06, shall not exceed 0.60. An air-entraining admixture shall be used to produce an air content, according to Article 1020.08, of not less than 6.0 percent nor more than 9.0 percent of the volume of the grout. The Contractor shall have the option to use a water-reducing or high range water-reducing admixture.”

Revise Article 583.01 of the Standard Specifications to read:

“**583.01 Description.** This work shall consist of placing cement mortar along precast, prestressed concrete bridge deck beams as required for fairing out any unevenness between adjacent deck beams prior to placing of waterproofing membrane and surfacing.”

Revise Article 583.02(a) of the Standard Specifications to read:

“(a) Cement1001”

Revise the first paragraph of Article 583.03 of the Standard Specifications to read:

“ **583.03 General.** This work shall only be performed when the air temperature is 45 °F (7 °C) and rising. The mixture for cement mortar shall consist of three parts sand to one part cement by volume. The amount of water shall be no more than that necessary to produce a workable, plastic mortar.”

Revise Note 2/ in Article 1003.01(b) of the Standard Specifications to read:

“2/ Applies only to sand. Sand exceeding the colorimetric test standard of 11 (Illinois Modified AASHTO T 21) will be checked for mortar making properties according to

Illinois Modified ASTM C 87 and shall develop a compressive strength at the age of 14 days when using Type I, IL, or II cement of not less than 95 percent of the comparable standard.

Revise the second sentence of Article 1003.02(e)(1) of the Standard Specifications to read:

“The test will be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.90 percent or greater.”

Revise the first sentence of the second paragraph of Article 1003.02(e)(3) of the Standard Specifications to read:

“The ASTM C 1293 test shall be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.80 percent or greater.”

Revise the second sentence of Article 1004.02(g)(1) of the Standard Specifications to read:

“The test will be performed with Type I, IL, or II portland cement having a total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) of 0.90 percent or greater.”

Revise Article 1017.01 of the Standard Specifications to read:

“1017.01 Requirements. The mortar shall be high-strength according to ASTM C 387 and shall have a minimum 80.0 percent relative dynamic modulus of elasticity when tested by the Department according to Illinois Modified AASHTO T 161 or AASHTO T 161 when tested by an independent lab. The high-strength mortar shall have a water-soluble chloride ion content of less than 0.40 lb/cu yd (0.24 kg/cu m). The test shall be performed according to ASTM C 1218, and the high-strength mortar shall have an age of 28 to 42 days at the time of test. The ASTM C 1218 test shall be performed by an independent lab a minimum of once every five years, and the test results shall be provided to the Department. Mixing of the high-strength mortar shall be according to the manufacturer’s specifications. The Department will maintain a qualified product list.”

Revise the fourth sentence of Article 1018.01 of the Standard Specifications to read:

“The ASTM C 1218 test shall be performed by an independent lab a minimum of once every five years, and the test results shall be provided to the Department.”

Revise Article 1019.02 of the Standard Specifications to read:

“1019.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate for Controlled Low-Strength Material (CLSM)	1003.06
(d) Fly Ash	1010
(e) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(f) Admixtures (Note 1)	

Note 1. The air-entraining admixture may be in powder or liquid form. Prior to approval, a CLSM air-entraining admixture will be evaluated by the Department. The admixture shall be able to meet the air content requirements of Mix 2. The Department will maintain a qualified product list.”

Revise Article 1019.05 of the Standard Specifications to read:

“**1019.05 Department Mix Design.** The Department mix design shall be Mix 1, 2, or 3 and shall be proportioned to yield approximately one cubic yard (cubic meter).

Mix 1	
Cement	50 lb (30 kg)
Fly Ash – Class C or F, and/or GGBF Slag	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2900 lb (1720 kg)
Water	50-65 gal (248-322 L)
Air Content	No air is entrained

Mix 2	
Cement	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2500 lb (1483 kg)
Water	35-50 gal (173-248 L)
Air Content	15-25 %

Mix 3	
Cement	40 lb (24 kg)
Fly Ash – Class C or F, and/or GGBF Slag	125 lb (74 kg)
Fine Aggregate – Saturated Surface Dry	2500 lb (1483 kg)
Water	35-50 gal (179-248 L)
Air Content	15-25 %”

Revise Article 1020.04, Table 1, Note (8) of the Standard Specifications to read:

“(8) In addition to the Type III portland cement, 100 lb/cu yd of ground granulated blast-furnace slag and 50 lb/cu yd of microsilica (silica fume) shall be used. For an air temperature greater than 85 °F, the Type III portland cement may be replaced with Type I, IL, or II portland cement.”

Revise Article 1020.04, Table 1 (Metric), Note (8) of the Standard Specifications to read:

“(8) In addition to the Type III portland cement, 60 kg/cu m of ground granulated blast-furnace slag and 30 kg/cu m of microsilica (silica fume) shall be used. For an air temperature greater than 30 °C, the Type III portland cement may be replaced with Type I, IL, or II portland cement.”

Revise the second paragraph of Article 1020.05(a) of the Standard Specifications to read:

“For a mix design using a portland-pozzolan cement, portland blast-furnace slag cement, portland-limestone cement, or replacing portland cement with finely divided minerals per

Articles 1020.05(c) and 1020.05(d), the Contractor may submit a mix design with a minimum portland cement content less than 400 lbs/cu yd (237 kg/cu m), but not less than 375 lbs/cu yd (222 kg/cu m), if the mix design is shown to have a minimum relative dynamic modulus of elasticity of 80 percent determined according to AASHTO T 161. Testing shall be performed by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete.”

Revise the first sentence of the first paragraph of Article 1020.05(b) of the Standard Specifications to read:

“Corrosion inhibitors and concrete admixtures shall be according to the qualified product lists.”

Delete the fourth and fifth sentences of the second paragraph of Article 1020.05(b) of the Standard Specifications.

Revise the third sentence of the second paragraph of Article 1020.05(b)(5) of the Standard Specifications to read:

“The qualified product lists of concrete admixtures shall not apply.”

Revise second paragraph of Article 1020.05(b)(10) of the Standard Specifications to read:

“When calcium nitrite is used, it shall be added at the rate of 4 gal/cu yd (20 L/cu m) and shall be added to the mix immediately after all compatible admixtures have been introduced to the batch. Other corrosion inhibitors shall be added per the manufacturer’s specifications.”

Delete the third paragraph of Article 1020.05(b)(10) of the Standard Specifications.

Revise Article 1020.15(b)(1)c. of the Standard Specifications to read:

“c. The minimum portland cement content in the mixture shall be 375 lbs/cu yd (222 kg/cu m). When the total of organic processing additions, inorganic processing additions, and limestone addition exceed 5.0 percent in the cement, the minimum portland cement content in the mixture shall be 400 lbs/cu yd (237 kg/cu m). For a drilled shaft, foundation, footing, or substructure, the minimum portland cement may be reduced to as low as 330 lbs/cu yd (196 kg/cu m) if the concrete has adequate freeze/thaw durability. The Contractor shall provide freeze/thaw test results according to AASHTO T 161, and the relative dynamic modulus of elasticity of the mix design shall be a minimum of 80 percent. Testing shall be performed by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete. Freeze/thaw testing will not be required for concrete that will not be exposed to freezing and thawing conditions as determined by the Engineer.”

Revise Article 1021.01 of the Standard Specifications to read:

“**1021.01 General.** Admixtures shall be furnished in liquid or powder form ready for use. The admixtures shall be delivered in the manufacturer's original containers, bulk tank trucks or such

containers or tanks as are acceptable to the Engineer. Delivery shall be accompanied by a ticket which clearly identifies the manufacturer, the date of manufacture, and trade name of the material. Containers shall be readily identifiable as to manufacturer, the date of manufacture, and trade name of the material they contain.

Concrete admixtures shall be on one of the Department's qualified product lists. Unless otherwise noted, admixtures shall have successfully completed and remain current with the AASHTO Product Eval and Audit Concrete Admixture (CADD) testing program. For admixture submittals to the Department; the product brand name, manufacturer name, admixture type or types, an electronic link to the product's technical data sheet, and the NTPEP testing number which contains an electronic link to all test data shall be provided. In addition, a letter shall be submitted certifying that no changes have been made in the formulation of the material since the most current round of tests conducted by AASHTO Product Eval and Audit. After 28 days of testing by AASHTO Product Eval and Audit, air-entraining admixtures may be provisionally approved and used on Departmental projects. For all other admixtures, unless otherwise noted, the time period after which provisionally approved status may be earned is 6 months.

The manufacturer shall include the following in the submittal to the AASHTO Product Eval and Audit CADD testing program: the manufacturing range for specific gravity, the midpoint and manufacturing range for residue by oven drying, and manufacturing range of pH. The submittal shall also include an infrared spectrophotometer trace no more than five years old.

For air-entraining admixtures according to Article 1021.02, the specific gravity allowable manufacturing range established by the manufacturer shall be according to AASHTO M 194. For residue by oven drying and pH, the allowable manufacturing range and test methods shall be according to AASHTO M 194.

For admixtures according to Articles 1021.03, 1021.04, 1021.05, 1021.06, 1021.07, and 1021.08, the pH allowable manufacturing range established by the manufacturer shall be according to ASTM E 70. For specific gravity and residue by oven drying, the allowable manufacturing range and test methods shall be according to AASHTO M 194.

All admixtures, except chloride-based accelerators, shall contain a maximum of 0.3 percent chloride by weight (mass) as determined by an appropriate test method. To verify the test result, the Department will use Illinois Modified AASHTO T 260, Procedure A, Method 1.

Prior to final approval of an admixture, the Engineer reserves the right to request a sample for testing. The test and reference concrete mixtures tested by the Engineer will contain a cement content of 5.65 cwt/cu yd (335 kg/cu m). For freeze-thaw testing, the Department will perform the test according to Illinois Modified AASHTO T 161. The flexural strength test will be performed according to AASHTO T 177. If the Engineer decides to test the admixture, the manufacturer shall submit AASHTO T 197 water content and set time test results on the standard cement used by the Department. The manufacturer may select their lab or an independent lab to perform this testing. The laboratory is not required to be accredited by AASHTO.

Random field samples may be taken by the Department to verify an admixture meets specification. A split sample will be provided to the manufacturer if requested. Admixtures that do not meet specification requirements or an allowable manufacturing range established by the manufacturer shall be replaced with new material."

Revise Article 1021.03 of the Standard Specifications to read:

“1021.03 Retarding and Water-Reducing Admixtures. The admixture shall be according to the following.

- (a) Retarding admixtures shall be according to AASHTO M 194, Type B (retarding) or Type D (water-reducing and retarding).
- (b) Water-reducing admixtures shall be according to AASHTO M 194, Type A.
- (c) High range water-reducing admixtures shall be according to AASHTO M 194, Type F (high range water-reducing) or Type G (high range water-reducing and retarding).”

Revise Article 1021.05 of the Standard Specifications to read:

“1021.05 Self-Consolidating Admixtures. Self-consolidating admixture systems shall consist of either a high range water-reducing admixture only or a high range water-reducing admixture combined with a separate viscosity modifying admixture. The one or two component admixture system shall be capable of producing a concrete that can flow around reinforcement and consolidate under its own weight without additional effort and without segregation.

High range water-reducing admixtures shall be according to AASHTO M 194, Type F.

Viscosity modifying admixtures shall be according to AASHTO M 194, Type S (specific performance).”

Revise Article 1021.06 of the Standard Specifications to read:

“1021.06 Rheology-Controlling Admixture. Rheology-controlling admixtures shall be capable of producing a concrete mixture with a lower yield stress that will consolidate easier for slipform applications used by the Contractor. Rheology-controlling admixtures shall be according to AASHTO M 194, Type S (specific performance).”

Revise Article 1021.07 of the Standard Specifications to read:

“1021.07 Corrosion Inhibitor. The corrosion inhibitor shall be according to one of the following.

- (a) Calcium Nitrite. Corrosion inhibitors shall contain a minimum 30 percent calcium nitrite by weight (mass) of solution and shall comply with either the requirements of AASHTO M 194, Type C (accelerating) or the requirements of ASTM C 1582. The corrosion inhibiting performance requirements of ASTM C 1582 shall not apply.
- (b) Other Materials. The corrosion inhibitor shall be according to ASTM C 1582.

For submittals requiring testing according to ASTM M 194, Type C (accelerating), the admixture shall meet the requirements of the AASHTO Product Eval and Audit CADD testing program according to Article 1021.01.

For submittals requiring testing according to ASTM C 1582, a report prepared by an independent laboratory accredited by AASHTO re:source for portland cement concrete shall be provided. The report shall show the results of physical tests conducted no more than five years prior to the time of submittal, according to applicable specifications. However, ASTM G 109 test information specified in ASTM C 1582 is not required to be from an independent accredited lab. All other information in ASTM C 1582 shall be from an independent accredited lab. Test data and other information required to be submitted to AASHTO Product Eval and Audit according to Article 1021.01, shall instead be submitted directly to the Department.”

Add Article 1021.08 of the Standard Specifications as follows:

“1021.08 Other Specific Performance Admixtures. Other specific performance admixtures shall, at a minimum, be according to AASHTO M 194, Type S (specific performance). The Department also reserves the right to require other testing, as determined by the Engineer, to show evidence of specific performance characteristics.

Initial testing according to AASHTO M 194 may be conducted under the AASHTO Product Eval and Audit CADD testing program according to Article 1021.01, or by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete. In either case, test data and other information required to be submitted to AASHTO Product Eval and Audit according to Article 1021.01, shall also be submitted directly to the Department. The independent accredited lab report shall show the results of physical tests conducted no more than five years prior to the time of submittal, according to applicable specifications.”

Revise Article 1024.01 of the Standard Specifications to read:

“1024.01 Requirements for Grout. The grout shall be proportioned by dry volume, thoroughly mixed, and shall have a minimum temperature of 50 °F (10 °C). Water shall not exceed the minimum needed for placement and finishing.

Materials for the grout shall be according to the following.

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fine Aggregate	1003.02
(d) Fly Ash	1010
(e) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(f) Concrete Admixtures	1021”

Revise Note 1 of Article 1024.02 of the Standard Specifications to read:

“Note 1. Nonshrink grout shall be according to Illinois Modified ASTM C 1107.

The nonshrink grout shall have a water-soluble chloride ion content of less than 0.40 lb/cu yd (0.24 kg/cu m). The test shall be performed according to ASTM C 1218, and the grout shall have an age of 28 to 42 days at the time of test. The ASTM C 1218 test shall be performed by an independent lab a minimum of once every five years, and the test results shall be provided to the Department. Mixing of the nonshrink grout shall be according to the manufacturer’s specifications. The Department will maintain a qualified product list.”

Revise Article 1029.02 of the Standard Specifications to read:

“ **1029.02 Materials.** Materials shall be according to the following.

Item	Article/Section
(a) Cement.....	1001
(b) Fly Ash	1010
(c) Ground Granulated Blast Furnace (GGBF) Slag	1010
(d) Water.....	1002
(e) Fine Aggregate.....	1003
(f) Concrete Admixtures	1021
(g) Foaming Agent (Note 1)	

Note 1. The manufacturer shall submit infrared spectrophotometer trace and test results indicating the foaming agent meets the requirements of ASTM C 869 in order to be on the Department’s qualified product list. Submitted data/results shall not be more than five years old.”

Revise the second paragraph of Article 1103.03(a)(4) the Standard Specifications to read:

“The dispenser system shall provide a visual indication that the liquid admixture is actually entering the batch, such as via a transparent or translucent section of tubing or by independent check with an integrated secondary metering device. If approved by the Engineer, an alternate indicator may be used for admixtures dosed at rates of 25 oz/cwt (1630 mL/100 kg) or greater, such as accelerating admixtures, corrosion inhibitors, and viscosity modifying admixtures.”

Revise the first two sections of Check Sheet #11 of the Supplemental Specifications and Recurring Special Provisions to read:

“Description. This work shall consist of filling voids beneath rigid and composite pavements with cement grout.

Materials. Materials shall be according to the following Articles of Division 1000 - Materials of the Standard Specifications:

Item	Article/Section
(a) Cement	1001
(b) Water	1002
(c) Fly Ash	1010
(d) Ground Granulated Blast Furnace (GGBF) Slag.....	1010
(e) Admixtures	1021
(f) Packaged Rapid Hardening Mortar or Concrete	1018”

Revise the third paragraph of Materials Note 2 of Check Sheet #28 of the Supplemental Specifications and Recurring Special Provisions to read:

“The Department will maintain a qualified product list of synthetic fibers, which will include the minimum required dosage rate. For the minimum required fiber dosage rate based on

the Illinois Modified ASTM C 1609 test, a report prepared by an independent laboratory accredited by AASHTO re:source for Portland Cement Concrete shall be provided. The report shall show results of tests conducted no more than five years prior to the time of submittal.”

COMPENSABLE DELAY COSTS (BDE)

Effective: June 2, 2017

Revised: April 1, 2019

Revise Article 107.40(b) of the Standard Specifications to read:

“(b) Compensation. Compensation will not be allowed for delays, inconveniences, or damages sustained by the Contractor from conflicts with facilities not meeting the above definition; or if a conflict with a utility in an unanticipated location does not cause a shutdown of the work or a documentable reduction in the rate of progress exceeding the limits set herein. The provisions of Article 104.03 notwithstanding, compensation for delays caused by a utility in an unanticipated location will be paid according to the provisions of this Article governing minor and major delays or reduced rate of production which are defined as follows.

- (1) Minor Delay. A minor delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two hours, but not to exceed two weeks.
- (2) Major Delay. A major delay occurs when the work in conflict with the utility in an unanticipated location is completely stopped for more than two weeks.
- (3) Reduced Rate of Production Delay. A reduced rate of production delay occurs when the rate of production on the work in conflict with the utility in an unanticipated location decreases by more than 25 percent and lasts longer than seven calendar days.”

Revise Article 107.40(c) of the Standard Specifications to read:

“(c) Payment. Payment for Minor, Major, and Reduced Rate of Production Delays will be made as follows.

- (1) Minor Delay. Labor idled which cannot be used on other work will be paid for according to Article 109.04(b)(1) and (2) for the time between start of the delay and the minimum remaining hours in the work shift required by the prevailing practice in the area.

Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4).

- (2) Major Delay. Labor will be the same as for a minor delay.

Equipment will be the same as for a minor delay, except Contractor-owned equipment will be limited to two weeks plus the cost of move-out to either the Contractor’s yard or

another job and the cost to re-mobilize, whichever is less. Rental equipment may be paid for longer than two weeks provided the Contractor presents adequate support to the Department (including lease agreement) to show retaining equipment on the job is the most economical course to follow and in the public interest.

- (3) Reduced Rate of Production Delay. The Contractor will be compensated for the reduced productivity for labor and equipment time in excess of the 25 percent threshold for that portion of the delay in excess of seven calendar days. Determination of compensation will be in accordance with Article 104.02, except labor and material additives will not be permitted.

Payment for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be determined according to Article 109.13.”

Revise Article 108.04(b) of the Standard Specifications to read:

“(b) No working day will be charged under the following conditions.

- (1) When adverse weather prevents work on the controlling item.
- (2) When job conditions due to recent weather prevent work on the controlling item.
- (3) When conduct or lack of conduct by the Department or its consultants, representatives, officers, agents, or employees; delay by the Department in making the site available; or delay in furnishing any items required to be furnished to the Contractor by the Department prevents work on the controlling item.
- (4) When delays caused by utility or railroad adjustments prevent work on the controlling item.
- (5) When strikes, lock-outs, extraordinary delays in transportation, or inability to procure critical materials prevent work on the controlling item, as long as these delays are not due to any fault of the Contractor.
- (6) When any condition over which the Contractor has no control prevents work on the controlling item.”

Revise Article 109.09(f) of the Standard Specifications to read:

“(f) Basis of Payment. After resolution of a claim in favor of the Contractor, any adjustment in time required for the work will be made according to Section 108. Any adjustment in the costs to be paid will be made for direct labor, direct materials, direct equipment, direct jobsite overhead, direct offsite overhead, and other direct costs allowed by the resolution. Adjustments in costs will not be made for interest charges, loss of anticipated profit, undocumented loss of efficiency, home office overhead and unabsorbed overhead other than as allowed by Article 109.13, lost opportunity, preparation of claim expenses and other consequential indirect costs regardless of method of calculation.

The above Basis of Payment is an essential element of the contract and the claim cost recovery of the Contractor shall be so limited.”

Add the following to Section 109 of the Standard Specifications.

“109.13 Payment for Contract Delay. Compensation for escalated material costs, escalated labor costs, extended project overhead, and extended traffic control will be allowed when such costs result from a delay meeting the criteria in the following table.

Contract Type	Cause of Delay	Length of Delay
Working Days	Article 108.04(b)(3) or Article 108.04(b)(4)	No working days have been charged for two consecutive weeks.
Completion Date	Article 108.08(b)(1) or Article 108.08(b)(7)	The Contractor has been granted a minimum two week extension of contract time, according to Article 108.08.

Payment for each of the various costs will be according to the following.

(a) Escalated Material and/or Labor Costs. When the delay causes work, which would have otherwise been completed, to be done after material and/or labor costs have increased, such increases will be paid. Payment for escalated material costs will be limited to the increased costs substantiated by documentation furnished by the Contractor. Payment for escalated labor costs will be limited to those items in Article 109.04(b)(1) and (2), except the 35 percent and 10 percent additives will not be permitted.

(b) Extended Project Overhead. For the duration of the delay, payment for extended project overhead will be paid as follows.

(1) Direct Jobsite and Offsite Overhead. Payment for documented direct jobsite overhead and documented direct offsite overhead, including onsite supervisory and administrative personnel, will be allowed according to the following table.

Original Contract Amount	Supervisory and Administrative Personnel
Up to \$5,000,000	One Project Superintendent
Over \$ 5,000,000 - up to \$25,000,000	One Project Manager, One Project Superintendent or Engineer, and One Clerk
Over \$25,000,000 - up to \$50,000,000	One Project Manager, One Project Superintendent, One Engineer, and One Clerk
Over \$50,000,000	One Project Manager, Two Project Superintendents, One Engineer, and One Clerk

(2) Home Office and Unabsorbed Overhead. Payment for home office and unabsorbed overhead will be calculated as 8 percent of the total delay cost.

- (c) Extended Traffic Control. Traffic control required for an extended period of time due to the delay will be paid for according to Article 109.04.

When an extended traffic control adjustment is paid under this provision, an adjusted unit price as provided for in Article 701.20(a) for increase or decrease in the value of work by more than ten percent will not be paid.

Upon payment for a contract delay under this provision, the Contractor shall assign subrogation rights to the Department for the Department’s efforts of recovery from any other party for monies paid by the Department as a result of any claim under this provision. The Contractor shall fully cooperate with the Department in its efforts to recover from another party any money paid to the Contractor for delay damages under this provision.”

CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)

Effective: June 1, 2010

Revised: January 1, 2025

The reduction of emissions of particulate matter (PM) for off-road equipment shall be accomplished by installing retrofit emission control devices. The term “equipment” refers to diesel fuel powered devices rated at 50 hp and above, to be used on the jobsite in excess of seven calendar days over the course of the construction period on the jobsite (including rental equipment).

Contractor and subcontractor diesel powered off-road equipment assigned to the contract shall be retrofitted according to the table below.

Horsepower Range	Model Year and Older
50-99	2003
100-299	2002
300-599	2000
600-749	2001
750 and up	2005

The retrofit emission control devices shall achieve a minimum PM emission reduction of 50 percent and shall be:

- a) Included on the U.S. Environmental Protection Agency (USEPA) *Verified Retrofit Technology List* (<https://www.epa.gov/verified-diesel-tech/verified-technologies-list-clean-diesel>), or verified by the California Air Resources Board (CARB) (<http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>); or
- b) Retrofitted with a non-verified diesel retrofit emission control device if verified retrofit emission control devices are not available for equipment proposed to be used on the project, and if the Contractor has obtained a performance certification from the retrofit

device manufacturer that the emission control device provides a minimum PM emission reduction of 50 percent.

Note: Large cranes (Crawler mounted cranes) which are responsible for critical lift operations are exempt from installing retrofit emission control devices if such devices adversely affect equipment operation.

Diesel powered off-road equipment with engine ratings of 50 hp and above, which are unable to be retrofitted with verified emission control devices or if performance certifications are not available which will achieve a minimum 50 percent PM reduction, may be granted a waiver by the Department if documentation is provided showing good faith efforts were made by the Contractor to retrofit the equipment.

Construction shall not proceed until the Contractor submits a certified list of the diesel powered off-road equipment that will be used, and as necessary, retrofitted with emission control devices. The list(s) shall include (1) the equipment number, type, make, Contractor/rental company name; and (2) the emission control devices make, model, USEPA or CARB verification number, or performance certification from the retrofit device manufacturer. Equipment reported as fitted with emissions control devices shall be made available to the Engineer for visual inspection of the device installation, prior to being used on the jobsite.

The Contractor shall submit an updated list of retrofitted off-road construction equipment as retrofitted equipment changes or comes on to the jobsite. The addition or deletion of any diesel powered equipment shall be included on the updated list.

If any diesel powered off-road equipment is found to be in non-compliance with any portion of this special provision, the Engineer will issue the Contractor a diesel retrofit deficiency deduction.

Any costs associated with retrofitting any diesel powered off-road equipment with emission control devices shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall not be grounds for a claim.

Diesel Retrofit Deficiency Deduction

When the Engineer determines that a diesel retrofit deficiency exists, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be \$1,000.00 for each deficiency identified.

The deficiency will be based on lack of diesel retrofit emissions control.

If a Contractor accumulates three diesel retrofit deficiency deductions for the same piece of equipment in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of the contract time, waiver of penalties, or be grounds for any claim.

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)

Effective: September 1, 2000

Revised: January 2, 2025

1. OVERVIEW AND GENERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR Part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory. Award of the contract is conditioned on meeting the requirements of 49 CFR Part 26, and failure by the Contractor to carry out the requirements of Part 26 is a material breach of the contract and may result in the termination of the contract or such other remedies as the Department deems appropriate.
2. CONTRACTOR ASSURANCE. All assurances set forth in FHWA 1273 are hereby incorporated by reference and will be physically attached to the final contract and all subcontracts.
3. CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. The Department has determined the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies and that, in the absence of unlawful discrimination and in an arena of fair and open competition, DBE companies can be expected to perform 5.00% of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work in accordance with the requirements of 49 CFR 26.53 and SBE Memorandum No. 24-02.
4. IDENTIFICATION OF CERTIFIED DBE. Information about certified DBE Contractors can be found in the Illinois UCP Directory. Bidders can obtain additional information and assistance with identifying DBE-certified companies at the Department's website or by contacting the Department's Bureau of Small Business Enterprises at (217) 785-4611.
5. BIDDING PROCEDURES. Compliance with this Special Provision and SBE Policy Memorandum 24-02 is a material bidding requirement. The following shall be included with the bid.
 - (a) DBE Utilization Plan (form SBE 2026) documenting enough DBE participation has been obtained to meet the goal, or a good faith effort has been made to meet the goal even though the efforts did not succeed in obtaining enough DBE participation to meet the goal.
 - (b) Applicable DBE Participation Statement (form SBE 2023, 2024, and/or 2025) for each DBE firm the bidder has committed to perform the work to achieve the contract goal.

The required forms and documentation shall be submitted as a single .pdf file using the "Integrated Contractor Exchange (iCX)" application within the Department's "EBids System".

The Department will not accept a bid if it does not meet the bidding procedures set forth herein and the bid will be declared non-responsive. A bidder declared non-responsive for failure to meet the bidding procedures will not give rise to an administrative reconsideration. In the event the bid is declared non-responsive, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty and may deny authorization to bid the project if re-advertised for bids.

6. UTILIZATION PLAN EVALUATION. The contract will not be awarded until the Utilization Plan is approved. All information submitted by the bidder must be complete, accurate, and adequately document the bidder has committed to DBE participation sufficient to meet the goal, or that the bidder has made good faith efforts to do so, in the event the bidder cannot meet the goal, in order for the Department to commit to the performance of the contract by the bidder.

The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful DBE work to meet the contract goal or the Department determines, based upon the documentation submitted, that the bidder has made a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A and the requirements of SBE 2026.

If the Department determines that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan of that determination in accordance with SBE Policy Memorandum 24-02.

7. CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work the bidder commits to have performed by the specified DBEs and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments made for the work actually performed by DBE firms. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR Part 26.55(c) on questions of commercially useful functions as it affects the work. Specific guidelines for counting goal credit are provided in 49 CFR Part 26.55. In evaluating Utilization Plans for award the Department will count goal credit as set forth in Part 26 and in accordance with SBE Policy Memorandum 24-02.
8. CONTRACT COMPLIANCE. The Contractor must utilize the specific DBEs listed to perform the work and supply the materials for which each DBE is listed in the Contractor's approved Utilization Plan, unless the Contractor obtains the Department's written consent to terminate the DBE or any portion of its work. The DBE Utilization Plan approved by SBE is a condition-of-award, and any deviation to that Utilization Plan, the work set forth therein to be performed by DBE firms, or the DBE firms specified to perform that work, must be approved, in writing, by the Department in accordance with federal regulatory requirements. Deviation from the DBE Utilization Plan condition-of-award without such written approval is a violation of the contract and may result in termination of the contract or such other remedy the Department deems appropriate. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan.

- (a) NOTICE OF DBE PERFORMANCE. The Contractor shall provide the Engineer with at least three days advance notice of when all DBE firms are expected to perform the work committed under the Contractor's Utilization Plan.
- (b) SUBCONTRACT. If awarded the contract, the Contractor is required to enter into written subcontracts with all DBE firms indicated in the approved Utilization Plan and must provide copies of fully executed DBE subcontracts to the Department upon request. Subcontractors shall ensure that all lower tier subcontracts or agreements with DBEs to supply labor or materials be performed in accordance with this Special Provision.
- (c) PAYMENT TO DBE FIRMS. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goal has been paid to the DBE. The Contractor shall document and report all payments for work performed by DBE certified firms in accordance with Article 109.11 of the Standard Specifications. All records of payment for work performed by DBE certified firms shall be made available to the Department upon request.
- (d) FINAL PAYMENT. After the performance of the final item of work or trucking, or delivery of material by a DBE and final payment to the DBE by the Contractor, but not later than 30 calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Agreement (form SBE 2115) to the Engineer. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Utilization Plan and after good faith efforts are reviewed, the Department may deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages.
- (g) ENFORCEMENT. The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (BDE)

Effective: January 1, 2024

Revised: April 1, 2024

Revise the first paragraph of Article 669.04 of the Standard Specifications to read:

“669.04 Regulated Substances Monitoring. Regulated substances monitoring includes environmental observation and field screening during regulated substances management activities. The excavated soil and groundwater within the work areas shall be managed as either uncontaminated soil, hazardous waste, special waste, or non-special waste.

As part of the regulated substances monitoring, the monitoring personnel shall perform and document the applicable duties listed on form BDE 2732 “Regulated Substances Monitoring Daily Record (RSM DR)”.”

Revise the first two sentences of the nineteenth paragraph of Article 669.05 of the Standard Specifications to read:

“The Contractor shall coordinate waste disposal approvals with the disposal facility and provide the specific analytical testing requirements of that facility. The Contractor shall make all arrangements for collection, transportation, and analysis of landfill acceptance testing.”

Revise the last paragraph of Article 669.05 of the Standard Specifications to read:

“The Contractor shall select a permitted landfill facility or CCDD/USFO facility meeting the requirements of 35 Ill. Admin. Code Parts 810-814 or Part 1100, respectively. The Department will review and approve or reject the facility proposed by the Contractor based upon information provided in BDE 2730. The Contractor shall verify whether the selected facility is compliant with those applicable standards as mandated by their permit and whether the facility is presently, has previously been, or has never been, on the United States Environmental Protection Agency (U.S. EPA) National Priorities List or the Resource Conservation and Recovery Act (RCRA) List of Violating Facilities. The use of a Contractor selected facility shall in no manner delay the construction schedule or alter the Contractor's responsibilities as set forth.”

Revise the first paragraph of Article 669.07 of the Standard Specifications to read:

“669.07 Temporary Staging. Soil classified according to Articles 669.05(a)(2), (b)(1), or (c) may be temporarily staged at the Contractor’s option. All other soil classified according to Articles 669.05(a)(1), (a)(3), (a)(4), (a)(5), (a)(6), or (b)(2) shall be managed and disposed of without temporary staging to the greatest extent practicable. If circumstances beyond the Contractor’s control require temporary staging of these latter materials, the Contractor shall request approval from the Engineer in writing.

Topsoil for re-use as final cover which has been field screened and found not to exhibit PID readings over daily background readings as documented on the BDE 2732, visual staining or odors, and is classified according to Articles 669.05(a)(2), (a)(3), (a)(4), (b)(1), or (c) may be temporarily staged at the Contractor’s option.”

Add the following paragraph after the sixth paragraph of Article 669.11 of the Standard Specifications.

“The sampling and testing of effluent water derived from dewatering discharges for priority pollutants volatile organic compounds (VOCs), priority pollutants semi-volatile organic compounds (SVOCs), or priority pollutants metals, will be paid for at the contract unit price per each for VOCS GROUNDWATER ANALYSIS using EPA Method 8260B, SVOCs GROUNDWATER ANALYSIS using EPA Method 8270C, or RCRA METALS GROUNDWATER ANALYSIS using EPA Methods 6010B and 7471A. This price shall include transporting the sample from the job site to the laboratory.”

Revise the first sentence of the eight paragraph of Article 669.11 of the Standard Specifications to read:

“Payment for temporary staging of soil classified according to Articles 669.05(a)(1), (a)(3), (a)(4), (a)(5), (a)(6), or (b)(2) to be managed and disposed of, if required and approved by the Engineer, will be paid according to Article 109.04.”

SEEDING (BDE)

Effective: November 1, 2022

Revise Article 250.07 of the Standard Specifications to read:

“250.07 Seeding Mixtures. The classes of seeding mixtures and combinations of mixtures will be designated in the plans.

When an area is to be seeded with two or more seeding classes, those mixtures shall be applied separately on the designated area within a seven day period. Seeding shall occur prior to placement of mulch cover. A Class 7 mixture can be applied at any time prior to applying any seeding class or added to them and applied at the same time.

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

TABLE 1 - SEEDING MIXTURES		
Class - Type	Seeds	lb/acre (kg/hectare)
1 Lawn Mixture 1/	Kentucky Bluegrass	100 (110)
	Perennial Ryegrass	60 (70)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	40 (50)
1A Salt Tolerant Lawn Mixture 1/	Kentucky Bluegrass	60 (70)
	Perennial Ryegrass	20 (20)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	20 (20)
	<i>Festuca brevipilla</i> (Hard Fescue)	20 (20)
	<i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass)	60 (70)
1B Low Maintenance Lawn Mixture 1/	Turf-Type Fine Fescue 3/	150 (170)
	Perennial Ryegrass	20 (20)
	Red Top	10 (10)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	20 (20)
2 Roadside Mixture 1/	<i>Lolium arundinaceum</i> (Tall Fescue)	100 (110)
	Perennial Ryegrass	50 (55)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	40 (50)
	Red Top	10 (10)
2A Salt Tolerant Roadside Mixture 1/	<i>Lolium arundinaceum</i> (Tall Fescue)	60 (70)
	Perennial Ryegrass	20 (20)
	<i>Festuca rubra</i> ssp. <i>rubra</i> (Creeping Red Fescue)	30 (20)
	<i>Festuca brevipilla</i> (Hard Fescue)	30 (20)
	<i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass)	60 (70)
3 Northern Illinois Slope Mixture 1/	<i>Elymus canadensis</i> (Canada Wild Rye) 5/	5 (5)
	Perennial Ryegrass	20 (20)
	Alsike Clover 4/	5 (5)
	<i>Desmanthus illinoensis</i> (Illinois Bundleflower) 4/ 5/	2 (2)
	<i>Schizachyrium scoparium</i> (Little Bluestem) 5/	12 (12)
	<i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/	10 (10)
	<i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass)	30 (35)
	Oats, Spring	50 (55)
	Slender Wheat Grass 5/	15 (15)
	Buffalo Grass 5/ 7/	5 (5)
	3A Southern Illinois Slope Mixture 1/	Perennial Ryegrass
<i>Elymus canadensis</i> (Canada Wild Rye) 5/		20 (20)
<i>Panicum virgatum</i> (Switchgrass) 5/		10 (10)
<i>Schizachyrium scoparium</i> (Little Blue Stem) 5/		12 (12)
<i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/		10 (10)
<i>Dalea candida</i> (White Prairie Clover) 4/ 5/		5 (5)
<i>Rudbeckia hirta</i> (Black-Eyed Susan) 5/		5 (5)
Oats, Spring		50 (55)

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

Class – Type	Seeds	lb/acre (kg/hectare)
4 Native Grass 2/ 6/	<i>Andropogon gerardi</i> (Big Blue Stem) 5/	4 (4)
	<i>Schizachyrium scoparium</i> (Little Blue Stem) 5/	5 (5)
	<i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/	5 (5)
	<i>Elymus canadensis</i> (Canada Wild Rye) 5/	1 (1)
	<i>Panicum virgatum</i> (Switch Grass) 5/	1 (1)
	<i>Sorghastrum nutans</i> (Indian Grass) 5/	2 (2)
	Annual Ryegrass	25 (25)
	Oats, Spring	25 (25)
	Perennial Ryegrass	15 (15)
	4A Low Profile Native Grass 2/ 6/	<i>Schizachyrium scoparium</i> (Little Blue Stem) 5/
<i>Bouteloua curtipendula</i> (Side-Oats Grama) 5/		5 (5)
<i>Elymus canadensis</i> (Canada Wild Rye) 5/		1 (1)
<i>Sporobolus heterolepis</i> (Prairie Dropseed) 5/		0.5 (0.5)
Annual Ryegrass		25 (25)
Oats, Spring		25 (25)
Perennial Ryegrass		15 (15)
4B Wetland Grass and Sedge Mixture 2/ 6/		Annual Ryegrass
	Oats, Spring	25 (25)
	Wetland Grasses (species below) 5/	6 (6)
<u>Species:</u>	<u>% By Weight</u>	
<i>Calamagrostis canadensis</i> (Blue Joint Grass)	12	
<i>Carex lacustris</i> (Lake-Bank Sedge)	6	
<i>Carex slipata</i> (Awl-Fruited Sedge)	6	
<i>Carex stricta</i> (Tussock Sedge)	6	
<i>Carex vulpinoidea</i> (Fox Sedge)	6	
<i>Eleocharis acicularis</i> (Needle Spike Rush)	3	
<i>Eleocharis obtusa</i> (Blunt Spike Rush)	3	
<i>Glyceria striata</i> (Fowl Manna Grass)	14	
<i>Juncus effusus</i> (Common Rush)	6	
<i>Juncus tenuis</i> (Slender Rush)	6	
<i>Juncus torreyi</i> (Torrey's Rush)	6	
<i>Leersia oryzoides</i> (Rice Cut Grass)	10	
<i>Scirpus acutus</i> (Hard-Stemmed Bulrush)	3	
<i>Scirpus atrovirens</i> (Dark Green Rush)	3	
<i>Bolboschoenus fluviatilis</i> (River Bulrush)	3	
<i>Schoenoplectus tabernaemontani</i> (Softstem Bulrush)	3	
<i>Spartina pectinata</i> (Cord Grass)	4	

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

Class – Type	Seeds	lb/acre (kg/hectare)
5	Forb with Annuals Mixture (Below)	1 (1)
	Annuals Mixture 2/ 5/ 6/ Forb Mixture (Below)	10 (10)
	Annuals Mixture - Mixture not exceeding 25 % by weight of any one species, of the following:	
	<i>Coreopsis lanceolata</i> (Sand Coreopsis)	
	<i>Leucanthemum maximum</i> (Shasta Daisy)	
	<i>Gaillardia pulchella</i> (Blanket Flower)	
	<i>Ratibida columnifera</i> (Prairie Coneflower)	
	<i>Rudbeckia hirta</i> (Black-Eyed Susan)	
	Forb Mixture - Mixture not exceeding 5 % by weight PLS of any one species, of the following:	
	<i>Amorpha canescens</i> (Lead Plant) 4/	
	<i>Anemone cylindrica</i> (Thimble Weed)	
	<i>Asclepias tuberosa</i> (Butterfly Weed)	
	<i>Aster azureus</i> (Sky Blue Aster)	
	<i>Symphotrichum leave</i> (Smooth Aster)	
	<i>Aster novae-angliae</i> (New England Aster)	
	<i>Baptisia leucantha</i> (White Wild Indigo) 4/	
	<i>Coreopsis palmata</i> (Prairie Coreopsis)	
	<i>Echinacea pallida</i> (Pale Purple Coneflower)	
	<i>Eryngium yuccifolium</i> (Rattlesnake Master)	
	<i>Helianthus mollis</i> (Downy Sunflower)	
	<i>Heliopsis helianthoides</i> (Ox-Eye)	
	<i>Liatris aspera</i> (Rough Blazing Star)	
	<i>Liatris pycnostachya</i> (Prairie Blazing Star)	
	<i>Monarda fistulosa</i> (Prairie Bergamot)	
	<i>Parthenium integrifolium</i> (Wild Quinine)	
	<i>Dalea candida</i> (White Prairie Clover) 4/	
	<i>Dalea purpurea</i> (Purple Prairie Clover) 4/	
	<i>Physostegia virginiana</i> (False Dragonhead)	
	<i>Potentilla arguta</i> (Prairie Cinquefoil)	
	<i>Ratibida pinnata</i> (Yellow Coneflower)	
	<i>Rudbeckia subtomentosa</i> (Fragrant Coneflower)	
	<i>Silphium laciniatum</i> (Compass Plant)	
	<i>Silphium terebinthinaceum</i> (Prairie Dock)	
	<i>Oligoneuron rigidum</i> (Rigid Goldenrod)	
	<i>Tradescantia ohiensis</i> (Spiderwort)	
	<i>Veronicastrum virginicum</i> (Culver's Root)	

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

Class – Type	Seeds	lb/acre (kg/hectare)
5A Large Flower Native Forb Mixture 2/ 5/ 6/	Forb Mixture (see below)	5 (5)
	<u>Species:</u>	<u>% By Weight</u>
	<i>Aster novae-angliae</i> (New England Aster)	5
	<i>Echinacea pallida</i> (Pale Purple Coneflower)	10
	<i>Helianthus mollis</i> (Downy Sunflower)	10
	<i>Heliopsis helianthoides</i> (Ox-Eye)	10
	<i>Liatris pycnostachya</i> (Prairie Blazing Star)	10
	<i>Ratibida pinnata</i> (Yellow Coneflower)	5
	<i>Rudbeckia hirta</i> (Black-Eyed Susan)	10
	<i>Silphium laciniatum</i> (Compass Plant)	10
	<i>Silphium terebinthinaceum</i> (Prairie Dock)	20
	<i>Oligoneuron rigidum</i> (Rigid Goldenrod)	10
5B Wetland Forb 2/ 5/ 6/	Forb Mixture (see below)	2 (2)
	<u>Species:</u>	<u>% By Weight</u>
	<i>Acorus calamus</i> (Sweet Flag)	3
	<i>Angelica atropurpurea</i> (Angelica)	6
	<i>Asclepias incarnata</i> (Swamp Milkweed)	2
	<i>Aster puniceus</i> (Purple Stemmed Aster)	10
	<i>Bidens cernua</i> (Beggarticks)	7
	<i>Eutrochium maculatum</i> (Spotted Joe Pye Weed)	7
	<i>Eupatorium perfoliatum</i> (Boneset)	7
	<i>Helenium autumnale</i> (Autumn Sneezeweed)	2
	<i>Iris virginica shrevei</i> (Blue Flag Iris)	2
	<i>Lobelia cardinalis</i> (Cardinal Flower)	5
	<i>Lobelia siphilitica</i> (Great Blue Lobelia)	5
	<i>Lythrum alatum</i> (Winged Loosestrife)	2
	<i>Physostegia virginiana</i> (False Dragonhead)	5
	<i>Persicaria pensylvanica</i> (Pennsylvania Smartweed)	10
	<i>Persicaria lapathifolia</i> (Curlytop Knotweed)	10
	<i>Pycnanthemum virginianum</i> (Mountain Mint)	5
	<i>Rudbeckia laciniata</i> (Cut-leaf Coneflower)	5
	<i>Oligoneuron riddellii</i> (Riddell Goldenrod)	2
	<i>Sparganium eurycarpum</i> (Giant Burreed)	5
6 Conservation Mixture 2/ 6/	<i>Schizachyrium scoparium</i> (Little Blue Stem) 5/ <i>Elymus canadensis</i> (Canada Wild Rye) 5/ Buffalo Grass 5/ 7/ Vernal Alfalfa 4/ Oats, Spring	5 (5) 2 (2) 5 (5) 15 (15) 48 (55)
6A Salt Tolerant Conservation Mixture 2/ 6/	<i>Schizachyrium scoparium</i> (Little Blue Stem) 5/ <i>Elymus canadensis</i> (Canada Wild Rye) 5/ Buffalo Grass 5/ 7/ Vernal Alfalfa 4/ Oats, Spring <i>Puccinellia distans</i> (Fults Saltgrass or Salty Alkaligrass)	5 (5) 2 (2) 5 (5) 15 (15) 48 (55) 20 (20)
7 Temporary Turf Cover Mixture	Perennial Ryegrass Oats, Spring	50 (55) 64 (70)

Notes:

- 1/ Seeding shall be performed when the ambient temperature has been between 45 °F (7 °C) and 80 °F (27 °C) for a minimum of seven (7) consecutive days and is forecasted to be the same for the next five (5) days according to the National Weather Service.
- 2/ Seeding shall be performed in late fall through spring beginning when the ambient temperature has been below 45 °F (7 °C) for a minimum of seven (7) consecutive days and ending when the ambient temperature exceeds 80 °F (27 °C) according to the National Weather Service.
- 3/ Specific variety as shown in the plans or approved by the Engineer.
- 4/ Inoculation required.
- 5/ Pure Live Seed (PLS) shall be used.
- 6/ Fertilizer shall not be used.
- 7/ Seed shall be primed with KNO₃ to break dormancy and dyed to indicate such.

Seeding will be inspected after a period of establishment. The period of establishment shall be six (6) months minimum, but not to exceed nine (9) months. After the period of establishment, areas not exhibiting 75 percent uniform growth shall be interseeded or reseeded, as determined by the Engineer, at no additional cost to the Department.”

SHORT TERM AND TEMPORARY PAVEMENT MARKINGS (BDE)

Effective: April 1, 2024

Revised: April 2, 2024

Revise Article 701.02(d) of the Standard Specifications to read:

“(d) Pavement Marking Tapes (Note 3)1095.06”

Add the following Note to the end of Article 701.02 of the Standard Specifications:

“Note 3. White or yellow pavement marking tape that is to remain in place longer than 14 days shall be Type IV tape.”

Revise Article 703.02(c) of the Standard Specifications to read:

“(c) Pavement Marking Tapes (Note 1)1095.06”

Add the following Note to the end of Article 703.02 of the Standard Specifications:

“Note 1. White or yellow pavement marking tape that is to remain in place longer than 14 days shall be Type IV tape.”

Revise Article 1095.06 of the Standard Specifications to read:

“**1095.06 Pavement Marking Tapes.** Type I white or yellow marking tape shall consist of glass spheres embedded into a binder on a foil backing that is precoated with a pressure sensitive adhesive. The spheres shall be of uniform gradation and distributed evenly over the surface of the tape.

Type IV tape shall consist of white or yellow tape with wet reflective media incorporated to provide immediate and continuing retroreflection in wet and dry conditions. The wet retroreflective media shall be bonded to a durable polyurethane surface. The patterned surface shall have approximately 40 ± 10 percent of the surface area raised and presenting a near vertical face to traffic from any direction. The channels between the raised areas shall be substantially free of exposed reflective elements or particles.

Blackout tape shall consist of a matte black, non-reflective, patterned surface that is precoated with a pressure sensitive adhesive.

- (a) Color. The white and yellow markings shall meet the following requirements for daylight reflectance and color, when tested, using a color spectrophotometer with 45 degrees circumferential/zero degree geometry, illuminant D65, and two degree observer angle. The color instrument shall measure the visible spectrum from 380 to 720 nm with a wavelength measurement interval and spectral bandpass of 10 nm.

Color	Daylight Reflectance %Y
White	65 min.
Yellow *	36 - 59

*Shall match Aerospace Material Specification Standard 595 33538 (Orange Yellow) and the chromaticity limits as follows.

x	0.490	0.475	0.485	0.530
y	0.470	0.438	0.425	0.456

- (b) Retroreflectivity. The white and yellow markings shall be retroreflective. Reflective values measured in accordance with the photometric testing procedure of ASTM D 4061 shall not be less than those listed in the table below. The coefficient of retroreflected luminance, R_L , shall be expressed as average millicandelas/footcandle/sq ft (millicandelas/lux/sq m), measured on a 3.0 x 0.5 ft (900 mm x 150 mm) panel at 86 degree entrance angle.

Coefficient of Retroreflected Luminance, R_L , Dry					
Type I			Type IV		
Observation Angle	White	Yellow	Observation Angle	White	Yellow
0.2°	2700	2400	0.2°	1300	1200
0.5°	2250	2000	0.5°	1100	1000

Wet retroreflectance shall be measured for Type IV under wet conditions according to ASTM E 2177 and meet the following.

Wet Retroreflectance, Initial R_L	
Color	R_L 1.05/88.76
White	300
Yellow	200

- (c) Skid Resistance. The surface of Type IV and blackout markings shall provide a minimum skid resistance of 45 BPN when tested according to ASTM E 303.
- (d) Application. The pavement marking tape shall have a precoated pressure sensitive adhesive and shall require no activation procedures. Test pieces of the tape shall be applied according to the manufacturer's instructions and tested according to ASTM D 1000, Method A, except that a stiff, short bristle roller brush and heavy hand pressure will be substituted for the weighted rubber roller in applying the test pieces to the metal test panel. Material tested as directed above shall show a minimum adhesion value of 750 g/in. (30 g/mm) width at the temperatures specified in ASTM D 1000. The adhesive shall be resistant to oils, acids, solvents, and water, and shall not leave objectionable stains or residue after removal. The material shall be flexible and conformable to the texture of the pavement.
- (e) Durability. Type IV and blackout tape shall be capable of performing for the duration of a normal construction season and shall then be capable of being removed intact or in large sections at pavement temperatures above 40 °F (4 °C) either manually or with a roll-up device without the use of sandblasting, solvents, or grinding. The Contractor shall provide a manufacturer's certification that the material meets the requirements for being removed after the following minimum traffic exposure based on transverse test decks with rolling traffic.
- (1) Time in place - 400 days
 - (2) ADT per lane - 9,000 (28 percent trucks)
 - (3) Axle hits - 10,000,000 minimum

Samples of the material applied to standard specimen plates will be measured for thickness and tested for durability in accordance with ASTM D 4060, using a CS-17 wheel and 1000-gram load, and shall meet the following criteria showing no significant change in color after being tested for the number of cycles indicated.

Test	Type I	Type IV	Blackout
Minimum Initial Thickness, mils (mm)	20 (0.51)	65 (1.65) ^{1/} 20 (0.51) ^{2/}	65 (1.65) ^{1/} 20 (0.51) ^{2/}
Durability (cycles)	5,000	1,500	1,500

- 1/ Measured at the thickest point of the patterned surface.
- 2/ Measured at the thinnest point of the patterned surface.

The pavement marking tape, when applied according to the manufacturer's recommended procedures, shall be weather resistant and shall show no appreciable fading, lifting, or shrinkage during the useful life of the marking. The tape, as applied, shall be of good appearance, free of cracks, and edges shall be true, straight, and unbroken.

- (f) Sampling and Inspection.

- (1) Sample. Prior to approval and use of Type IV pavement marking tape, the manufacturer shall submit a notarized certification from an independent laboratory, together with the results of all tests, stating that the material meets the requirements as set forth herein. The independent laboratory test report shall state the lot tested, the manufacturer's name, and the date of manufacture.

After initial approval by the Department, samples and certification by the manufacturer shall be submitted for each subsequent batch of Type IV tape used. The manufacturer shall submit a certification stating that the material meets the requirements as set forth herein and is essentially identical to the material sent for qualification. The certification shall state the lot tested, the manufacturer's name, and the date of manufacture.

- (2) Inspection. The Contractor shall provide a manufacturer's certification to the Engineer stating the material meets all requirements of this specification. All material samples for acceptance tests shall be taken or witnessed by a representative of the Bureau of Materials and shall be submitted to the Engineer of Materials, 126 East Ash Street, Springfield, Illinois 62704-4766 at least 30 days in advance of the pavement marking operations."

SIGN PANELS AND APPURTENANCES (BDE)

Effective: January 1, 2025

Revise the third paragraph of Article 720.02 of the Standard Specifications to read:

"Steel support channels shall be according to ASTM A 653 (A 653M) (mild strip), Standard 720001, and galvanized according to AASHTO M 232, Class B 2 after forming."

Revise the fifth paragraph of Article 720.02 of the Standard Specifications to read:

"The stainless steel banding for mounting signs or sign support channels to light or signal standards shall be according to ASTM A 240 (A 240M) Type 302 stainless steel."

SOURCE OF SUPPLY AND QUALITY REQUIREMENTS (BDE)

Effective: January 2, 2023

Add the following to Article 106.01 of the Standard Specifications:

"The final manufacturing process for construction materials and the immediately preceding manufacturing stage for construction materials shall occur within the United States. Construction materials shall include an article, material, or supply that is or consists primarily of the following.

- (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) Lumber;
- (e) Drywall.

Items consisting of two or more of the listed construction materials that have been combined through a manufacturing process, and items including at least one of the listed materials combined with a material that is not listed through a manufacturing process shall be exempt."

SPEED DISPLAY TRAILER (BDE)

Effective: April 2, 2014

Revised: January 1, 2022

Revise the last paragraph of Article 701.11 of the Standard Specifications to read:

"When not being utilized to inform and direct traffic, sign trailers, speed display trailers, arrow boards, and portable changeable message boards shall be treated as nonoperating equipment."

Add the following to Article 701.15 of the Standard Specifications:

"(m) Speed Display Trailer. A speed display trailer is used to enhance safety of the traveling public and workers in work zones by alerting drivers of their speed, thus deterring them from driving above the posted work zone speed limit."

Add the following to Article 701.20 of the Standard Specifications:

"(k) When speed display trailers are shown on the Standard, this work will not be paid for separately but shall be considered as included in the cost of the Standard.

For all other speed display trailers, this work will be paid for at the contract unit price per calendar month or fraction thereof for each trailer as SPEED DISPLAY TRAILER."

Add the following to Article 1106.02 of the Standard Specifications:

"(o) Speed Display Trailer. The speed display trailer shall consist of a LED speed indicator display with self-contained, one-direction radar mounted on an orange see-through trailer. The height of the display and radar shall be such that it will function and be visible when located behind concrete barrier.

The speed measurement shall be by radar and provide a minimum detection distance of 1000 ft (300 m). The radar shall have an accuracy of ± 1 mile per hour.

The speed indicator display shall face approaching traffic and shall have a sign legend of "YOUR SPEED" immediately above or below the speed display. The sign letters shall be

between 5 and 8 in. (125 and 200 mm) in height. The digital speed display shall show two digits (00 to 99) in mph. The color of the changeable message legend shall be a yellow legend on a black background. The minimum height of the numerals shall be 18 in. (450 mm), and the nominal legibility distance shall be at least 750 ft (250 m).

The speed indicator display shall be equipped with a violation alert that flashes the displayed detected speed when the work zone posted speed limit is exceeded. The speed indicator shall have a maximum speed cutoff. On roadway facilities with a normal posted speed limit greater than or equal to 45 mph, the detected speeds of vehicles traveling more than 25 mph over the work zone speed limit shall not be displayed. On facilities with normal posted speed limit of less than 45 mph, the detected speeds of vehicles traveling more than 15 mph over the work zone speeds limit shall not be displayed. On any roadway facility if detected speeds are less than 25 mph, they shall not be displayed. The display shall include automatic dimming for nighttime operation.

The speed indicator measurement and display functions shall be equipped with the power supply capable of providing 24 hours of uninterrupted service.”

STEEL COST ADJUSTMENT (BDE)

Effective: April 2, 2004

Revised: January 1, 2022

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate with their bid whether or not this special provision will be part of the contract. Failure to indicate “Yes” for any item of work will make that item of steel exempt from steel cost adjustment.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

- Metal Piling (excluding temporary sheet piling)
- Structural Steel
- Reinforcing Steel

Other steel materials such as dowel bars, tie bars, welded reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in have a contract value of \$10,000 or greater.

The adjustments shall apply to the above items when they are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply when the item is added as extra work and paid for at a lump sum price or by force account.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

- (a) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.
- (b) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

$$SCA = Q \times D$$

Where: SCA = steel cost adjustment, in dollars
Q = quantity of steel incorporated into the work, in lb (kg)
D = price factor, in dollars per lb (kg)

$$D = MPI_M - MPI_L$$

Where: MPI_M = The Materials Cost Index for steel as published by the Engineering News-Record for the month the steel is shipped from the mill. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

MPI_L = The Materials Cost Index for steel as published by the Engineering News-Record for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price,. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

The unit weights (masses) of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the MPI_M will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the MPI_L and MPI_M in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(MPI_L - MPI_M) \div MPI_L\} \times 100$$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

FAP ROUTE 600 AND FAI ROUTE 64 (IL 159 AND I-64)
 PROJECT CMAQ-HSIP-4U5N(249)
 SECTION (130,130-1,130-2)TS-3, 82-5TS
 ST. CLAIR COUNTY
 CONTRACT NO. 76R78

Attachment

Item	Unit Mass (Weight)
Metal Piling (excluding temporary sheet piling)	
Furnishing Metal Pile Shells 12 in. (305 mm), 0.179 in. (3.80 mm) wall thickness	23 lb/ft (34 kg/m)
Furnishing Metal Pile Shells 12 in. (305 mm), 0.250 in. (6.35 mm) wall thickness	32 lb/ft (48 kg/m)
Furnishing Metal Pile Shells 14 in. (356 mm), 0.250 in. (6.35 mm) wall thickness	37 lb/ft (55 kg/m)
Other piling	See plans
Structural Steel	See plans for weights (masses)
Reinforcing Steel	See plans for weights (masses)
Dowel Bars and Tie Bars	6 lb (3 kg) each
Welded Reinforcement	63 lb/100 sq ft (310 kg/sq m)
Guardrail	
Steel Plate Beam Guardrail, Type A w/steel posts	20 lb/ft (30 kg/m)
Steel Plate Beam Guardrail, Type B w/steel posts	30 lb/ft (45 kg/m)
Steel Plate Beam Guardrail, Types A and B w/wood posts	8 lb/ft (12 kg/m)
Steel Plate Beam Guardrail, Type 2	305 lb (140 kg) each
Steel Plate Beam Guardrail, Type 6	1260 lb (570 kg) each
Traffic Barrier Terminal, Type 1 Special (Tangent)	730 lb (330 kg) each
Traffic Barrier Terminal, Type 1 Special (Flared)	410 lb (185 kg) each
Steel Traffic Signal and Light Poles, Towers and Mast Arms	
Traffic Signal Post	11 lb/ft (16 kg/m)
Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft (9 - 12 m)	14 lb/ft (21 kg/m)
Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft (13.5 - 16.5 m)	21 lb/ft (31 kg/m)
Light Pole w/Mast Arm, 30 - 50 ft (9 - 15.2 m)	13 lb/ft (19 kg/m)
Light Pole w/Mast Arm, 55 - 60 ft (16.5 - 18 m)	19 lb/ft (28 kg/m)
Light Tower w/Luminaire Mount, 80 - 110 ft (24 - 33.5 m)	31 lb/ft (46 kg/m)
Light Tower w/Luminaire Mount, 120 - 140 ft (36.5 - 42.5 m)	65 lb/ft (97 kg/m)
Light Tower w/Luminaire Mount, 150 - 160 ft (45.5 - 48.5 m)	80 lb/ft (119 kg/m)
Metal Railings (excluding wire fence)	
Steel Railing, Type SM	64 lb/ft (95 kg/m)
Steel Railing, Type S-1	39 lb/ft (58 kg/m)
Steel Railing, Type T-1	53 lb/ft (79 kg/m)
Steel Bridge Rail	52 lb/ft (77 kg/m)
Frames and Grates	
Frame	250 lb (115 kg)
Lids and Grates	150 lb (70 kg)

SUBCONTRACTOR AND DBE PAYMENT REPORTING (BDE)

Effective: April 2, 2018

Add the following to Section 109 of the Standard Specifications.

“109.14 Subcontractor and Disadvantaged Business Enterprise Payment Reporting.
 The Contractor shall report all payments made to the following parties:

- (a) first tier subcontractors;
- (b) lower tier subcontractors affecting disadvantaged business enterprise (DBE) goal credit;
- (c) material suppliers or trucking firms that are part of the Contractor’s submitted DBE utilization plan.

The report shall be made through the Department’s on-line subcontractor payment reporting system within 21 days of making the payment.”

SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)

Effective: November 2, 2017

Revised: April 1, 2019

Replace the second paragraph of Article 109.12 of the Standard Specifications with the following:

“This mobilization payment shall be made at least seven days prior to the subcontractor starting work. The amount paid shall be at the following percentage of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor’s work.

Value of Subcontract Reported on Form BC 260A	Mobilization Percentage
Less than \$10,000	25%
\$10,000 to less than \$20,000	20%
\$20,000 to less than \$40,000	18%
\$40,000 to less than \$60,000	16%
\$60,000 to less than \$80,000	14%
\$80,000 to less than \$100,000	12%
\$100,000 to less than \$250,000	10%
\$250,000 to less than \$500,000	9%
\$500,000 to \$750,000	8%
Over \$750,000	7%”

SUBMISSION OF BIDDERS LIST INFORMATION (BDE)

Effective: January 2, 2025

In accordance with 49 CFR 26.11(c) all bidders for federally assisted contracts shall submit bidders list information with their bid or initial response to a procurement solicitation. Submission of the bidders list information is a material bidding requirement, and failure to comply with this requirement may render the bid non-responsive.

The bidders list information shall be provided for each firm from whom the bidder receives any bid as a subcontractor. This requirement is not limited to DBE subcontractor bids but applies to all DBE and non-DBE firms from whom the bidder has received a quote or bid to work as a subcontractor, whether or not the bidder has relied upon that bid in placing its bid as the prime contractor. The bidders list information shall contain the following.

- (a) Firm name;
- (b) Firm address including ZIP code;
- (c) Firm's status as a DBE or non-DBE;
- (d) Race and gender information for the firm's majority owner;
- (e) NAICS code applicable to each scope of work the firm sought to perform in its bid;

- (f) Age of the firm; and
- (g) The annual gross receipts of the firm (this may be provided by indicating whether the firm's annual gross receipts are less than \$1 million; \$1-3 million; \$3-6 million; \$6-10 million; etc.).

The bidders list information shall be submitted with the bid using the link provided within the "Integrated Contractor Exchange (iCX)" application of the Department's "EBids System".

SUBMISSION OF PAYROLL RECORDS (BDE)

Effective: April 1, 2021

Revised: November 2, 2023

FEDERAL AID CONTRACTS. Revise the following section of Check Sheet #1 of the Recurring Special Provisions to read:

"STATEMENTS AND PAYROLLS

The payroll records shall include the worker's name, social security number, last known address, telephone number, email address, classification(s) of work actually performed, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof), daily and weekly number of hours actually worked in total, deductions made, and actual wages paid.

The Contractor and each subcontractor shall submit certified payroll records to the Department each week from the start to the completion of their respective work, except that full social security numbers, last known addresses, telephone numbers, and email addresses shall not be included on weekly submittals. Instead, the payrolls need only include an identification number for each employee (e.g., the last four digits of the employee's social security number). The submittals shall be made using LCPTracker Pro software. The software is web-based and can be accessed at <https://lcptracker.com/>. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option ("No Work", "Suspended", or "Complete") selected."

STATE CONTRACTS. Revise Item 3 of Section IV of Check Sheet #5 of the Recurring Special Provisions to read:

- "3. Submission of Payroll Records. The Contractor and each subcontractor shall, no later than the 15th day of each calendar month, file a certified payroll for the immediately preceding month to the Illinois Department of Labor (IDOL) through the Illinois Prevailing Wage Portal in compliance with the State Prevailing Wage Act (820 ILCS 130). The portal can be found on the IDOL website at <https://www2.illinois.gov/idol/Laws-Rules/CONMED/Pages/Prevailing-Wage-Portal.aspx>. Payrolls shall be submitted in the format prescribed by the IDOL.

In addition to filing certified payroll(s) with the IDOL, the Contractor and each subcontractor shall certify and submit payroll records to the Department each week from

the start to the completion of their respective work, except that full social security numbers shall not be included on weekly submittals. Instead, the payrolls shall include an identification number for each employee (e.g., the last four digits of the employee's social security number). In addition, starting and ending times of work each day may be omitted from the payroll records submitted. The submittals shall be made using LCPtracker Pro software. The software is web-based and can be accessed at <https://lcptracker.com/>. When there has been no activity during a work week, a payroll record shall still be submitted with the appropriate option ("No Work", "Suspended", or "Complete") selected."

VEHICLE AND EQUIPMENT WARNING LIGHTS (BDE)

Effective: November 1, 2021

Revised: November 1, 2022

Add the following paragraph after the first paragraph of Article 701.08 of the Standard Specifications:

"The Contractor shall equip all vehicles and equipment with high-intensity oscillating, rotating, or flashing, amber or amber-and-white, warning lights which are visible from all directions. In accordance with 625 ILCS 5/12-215, the lights may only be in operation while the vehicle or equipment is engaged in construction operations."

WEEKLY DBE TRUCKING REPORTS (BDE)

Effective: June 2, 2012

Revised: January 2, 2025

The following applies to all Disadvantaged Business Enterprise (DBE) trucks on the project, whether they are utilized for DBE goal credit or not.

The Contractor shall notify the Engineer at least three days prior to DBE trucking activity.

The Contractor shall submit a weekly report of DBE trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) to the Engineer on Department form "SBE 723" within ten business days following the reporting period. The reporting period shall be Sunday through Saturday for each week reportable trucking activities occur.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

WORK ZONE TRAFFIC CONTROL DEVICES (BDE)

Effective: March 2, 2020

Revised: January 1, 2025

Add the following to Article 701.03 of the Standard Specifications:

“(q) Temporary Sign Supports1106.02”

Revise the third paragraph of Article 701.14 of the Standard Specifications to read:

“For temporary sign supports, the Contractor shall provide a FHWA eligibility letter for each device used on the contract. The letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device. The signs shall be supported within 20 degrees of vertical. Weights used to stabilize signs shall be attached to the sign support per the manufacturer’s specifications.”

Revise the first paragraph of Article 701.15 of the Standard Specifications to read:

“ **701.15 Traffic Control Devices.** For devices that must meet crashworthiness standards, the Contractor shall provide a manufacturer’s self-certification or a FHWA eligibility letter for each Category 1 device and a FHWA eligibility letter for each Category 2 and Category 3 device used on the contract. The self-certification or letter shall provide information for the set-up and use of the device as well as a detailed drawing of the device.”

Revise the first six paragraphs of Article 1106.02 of the Standard Specifications to read:

“ **1106.02 Devices.** Work zone traffic control devices and combinations of devices shall meet crashworthiness standards for their respective categories. The categories are as follows.

Category 1 includes small, lightweight, channelizing and delineating devices that have been in common use for many years and are known to be crashworthy by crash testing of similar devices or years of demonstrable safe performance. These include cones, tubular markers, plastic drums, and delineators, with no attachments (e.g. lights). Category 1 devices shall be MASH compliant.

Category 2 includes devices that are not expected to produce significant vehicular velocity change but may otherwise be hazardous. These include vertical panels with lights, barricades, temporary sign supports, and Category 1 devices with attachments (e.g. drums with lights). Category 2 devices shall be MASH compliant.

Category 3 includes devices that are expected to cause significant velocity changes or other potentially harmful reactions to impacting vehicles. These include crash cushions (impact attenuators), truck mounted attenuators, and other devices not meeting the definitions of Category 1 or 2. Category 3 devices manufactured after December 31, 2019 shall be MASH compliant. Category 3 devices manufactured on or before December 31, 2019, and compliant with NCHRP 350, may be used on contracts let before December 31, 2029. Category 3 devices shall be crash tested for Test Level 3 or the test level specified.

Category 4 includes portable or trailer-mounted devices such as sign supports, speed feedback displays, arrow boards, changeable message signs, temporary traffic signals, and area lighting supports. It is preferable for Category 4 devices manufactured after December 31, 2019 to be MASH-16 compliant; however, there are currently no crash tested devices in this category, so it remains exempt from the NCHRP 350 or MASH compliance requirement.

For each type of device, when no more than one MASH compliant is available, an NCHRP 350 compliant device may be used, even if manufactured after December 31, 2019.”

Revise Articles 1106.02(g), 1106.02(k), and 1106.02(l) to read:

“(g) Truck Mounted/Trailer Mounted Attenuators. The attenuator shall be approved for use at Test Level 3. Test Level 2 may be used for normal posted speeds less than or equal to 45 mph.

(k) Temporary Water Filled Barrier. The water filled barrier shall be a lightweight plastic shell designed to accept water ballast and be on the Department’s qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings.

(l) Movable Traffic Barrier. The movable traffic barrier shall be on the Department’s qualified product list.

Shop drawings shall be furnished by the manufacturer and shall indicate the deflection of the barrier as determined by acceptance testing; the configuration of the barrier in that test; and the vehicle weight, velocity, and angle of impact of the deflection test. The Engineer shall be provided one copy of the shop drawings. The barrier shall be capable of being moved on and off the roadway on a daily basis.”

WORKING DAYS (BDE)

Effective: January 1, 2002

The Contractor shall complete the work within **115** working days.

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants /

Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA- 1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. *Wage rates and fringe benefits.* All laborers and mechanics employed or working upon the site of the work (or otherwise working in construction or development of the project under a development statute), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act ([29 CFR part 3](#))), the full amount of basic hourly wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. As provided in paragraphs (d) and (e) of 29 CFR 5.5, the appropriate wage determinations are effective by operation of law even if they have not been attached to the contract. Contributions made or costs reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act ([40 U.S.C. 3141\(2\)\(B\)](#)) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.e. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics must be paid the appropriate wage rate and fringe benefits on the wage determination for the classification(s) of work actually performed, without regard to skill, except as provided in paragraph 4. of this section. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided*, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classifications and wage rates conformed under paragraph 1.c. of this section) and the Davis-Bacon poster (WH-1321) must be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. *Frequently recurring classifications.* (1) In addition to wage and fringe benefit rates that have been determined to be prevailing under the procedures set forth in [29 CFR part 1](#), a wage determination may contain, pursuant to § 1.3(f), wage and fringe benefit rates for classifications of laborers and mechanics for which conformance requests are regularly submitted pursuant to paragraph 1.c. of this section, provided that:

(i) The work performed by the classification is not performed by a classification in the wage determination for which a prevailing wage rate has been determined;

(ii) The classification is used in the area by the construction industry; and

(iii) The wage rate for the classification bears a reasonable relationship to the prevailing wage rates contained in the wage determination.

(2) The Administrator will establish wage rates for such classifications in accordance with paragraph 1.c.(1)(iii) of this section. Work performed in such a classification must be paid at no less than the wage and fringe benefit rate listed on the wage determination for such classification.

c. *Conformance.* (1) The contracting officer must require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract be classified in conformance with the wage determination. Conformance of an additional classification and wage rate and fringe benefits is appropriate only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is used in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) The conformance process may not be used to split, subdivide, or otherwise avoid application of classifications listed in the wage determination.

(3) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken will be sent by the contracting officer by email to DBAconformance@dol.gov. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer will, by email to DBAconformance@dol.gov, refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(5) The contracting officer must promptly notify the contractor of the action taken by the Wage and Hour Division

under paragraphs 1.c.(3) and (4) of this section. The contractor must furnish a written copy of such determination to each affected worker or it must be posted as a part of the wage determination. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 1.c.(3) or (4) of this section must be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

d. *Fringe benefits not expressed as an hourly rate.*

Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor may either pay the benefit as stated in the wage determination or may pay another bona fide fringe benefit or an hourly cash equivalent thereof.

e. *Unfunded plans.* If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided*, That the Secretary of Labor has found, upon the written request of the contractor, in accordance with the criteria set forth in § 5.28, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

f. *Interest.* In the event of a failure to pay all or part of the wages required by the contract, the contractor will be required to pay interest on any underpayment of wages.

2. Withholding (29 CFR 5.5)

a. *Withholding requirements.* The contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for the full amount of wages and monetary relief, including interest, required by the clauses set forth in this section for violations of this contract, or to satisfy any such liabilities required by any other Federal contract, or federally assisted contract subject to Davis-Bacon labor standards, that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to Davis-Bacon labor standards requirements and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld. In the event of a contractor's failure to pay any laborer or mechanic, including any apprentice or helper working on the site of the work all or part of the wages required by the contract, or upon the contractor's failure to submit the required records as discussed in paragraph 3.d. of this section, the contracting agency may on its own initiative and after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with paragraph

2.a. of this section or Section V, paragraph 3.a., or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901–3907](#).

3. Records and certified payrolls (29 CFR 5.5)

a. Basic record requirements (1) Length of record retention. All regular payrolls and other basic records must be maintained by the contractor and any subcontractor during the course of the work and preserved for all laborers and mechanics working at the site of the work (or otherwise working in construction or development of the project under a development statute) for a period of at least 3 years after all the work on the prime contract is completed.

(2) Information required. Such records must contain the name; Social Security number; last known address, telephone number, and email address of each such worker; each worker's correct classification(s) of work actually performed; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act); daily and weekly number of hours actually worked in total and on each covered contract; deductions made; and actual wages paid.

(3) Additional records relating to fringe benefits. Whenever the Secretary of Labor has found under paragraph 1.e. of this section that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in [40 U.S.C. 3141\(2\)\(B\)](#) of the Davis-Bacon Act, the contractor must maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

(4) Additional records relating to apprenticeship. Contractors with apprentices working under approved programs must maintain written evidence of the registration of apprenticeship programs, the registration of the apprentices, and the ratios and wage rates prescribed in the applicable programs.

b. Certified payroll requirements (1) Frequency and method of submission. The contractor or subcontractor must submit weekly, for each week in which any DBA- or Related Acts-covered work is performed, certified payrolls to the contracting

agency. The prime contractor is responsible for the submission of all certified payrolls by all subcontractors. A contracting agency or prime contractor may permit or require contractors to submit certified payrolls through an electronic system, as long as the electronic system requires a legally valid electronic signature; the system allows the contractor, the contracting agency, and the Department of Labor to access the certified payrolls upon request for at least 3 years after the work on the prime contract has been completed; and the contracting agency or prime contractor permits other methods of submission in situations where the contractor is unable or limited in its ability to use or access the electronic system.

(2) Information required. The certified payrolls submitted must set out accurately and completely all of the information required to be maintained under paragraph 3.a.(2) of this section, except that full Social Security numbers and last known addresses, telephone numbers, and email addresses must not be included on weekly transmittals. Instead, the certified payrolls need only include an individually identifying number for each worker (e.g., the last four digits of the worker's Social Security number). The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division website at <https://www.dol.gov/sites/dolgov/files/WHDLegacy/files/wh347.pdf> or its successor website. It is not a violation of this section for a prime contractor to require a subcontractor to provide full Social Security numbers and last known addresses, telephone numbers, and email addresses to the prime contractor for its own records, without weekly submission by the subcontractor to the contracting agency.

(3) Statement of Compliance. Each certified payroll submitted must be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor, or the contractor's or subcontractor's agent who pays or supervises the payment of the persons working on the contract, and must certify the following:

(i) That the certified payroll for the payroll period contains the information required to be provided under paragraph 3.b. of this section, the appropriate information and basic records are being maintained under paragraph 3.a. of this section, and such information and records are correct and complete;

(ii) That each laborer or mechanic (including each helper and apprentice) working on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in [29 CFR part 3](#); and

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification(s) of work actually performed, as specified in the applicable wage determination incorporated into the contract.

(4) Use of Optional Form WH-347. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 will satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(3) of this section.

(5) *Signature*. The signature by the contractor, subcontractor, or the contractor's or subcontractor's agent must be an original handwritten signature or a legally valid electronic signature.

(6) *Falsification*. The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under [18 U.S.C. 1001](#) and [31 U.S.C. 3729](#).

(7) *Length of certified payroll retention*. The contractor or subcontractor must preserve all certified payrolls during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

c. *Contracts, subcontracts, and related documents*. The contractor or subcontractor must maintain this contract or subcontract and related documents including, without limitation, bids, proposals, amendments, modifications, and extensions. The contractor or subcontractor must preserve these contracts, subcontracts, and related documents during the course of the work and for a period of 3 years after all the work on the prime contract is completed.

d. *Required disclosures and access* (1) *Required record disclosures and access to workers*. The contractor or subcontractor must make the records required under paragraphs 3.a. through 3.c. of this section, and any other documents that the contracting agency, the State DOT, the FHWA, or the Department of Labor deems necessary to determine compliance with the labor standards provisions of any of the applicable statutes referenced by § 5.1, available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and must permit such representatives to interview workers during working hours on the job.

(2) *Sanctions for non-compliance with records and worker access requirements*. If the contractor or subcontractor fails to submit the required records or to make them available, or refuses to permit worker interviews during working hours on the job, the Federal agency may, after written notice to the contractor, sponsor, applicant, owner, or other entity, as the case may be, that maintains such records or that employs such workers, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available, or to permit worker interviews during working hours on the job, may be grounds for debarment action pursuant to § 5.12. In addition, any contractor or other person that fails to submit the required records or make those records available to WHD within the time WHD requests that the records be produced will be precluded from introducing as evidence in an administrative proceeding under [29 CFR part 6](#) any of the required records that were not provided or made available to WHD. WHD will take into consideration a reasonable request from the contractor or person for an extension of the time for submission of records. WHD will determine the reasonableness of the request and may consider, among other things, the location of the records and the volume of production.

(3) *Required information disclosures*. Contractors and subcontractors must maintain the full Social Security number and last known address, telephone number, and email address

of each covered worker, and must provide them upon request to the contracting agency, the State DOT, the FHWA, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or other compliance action.

4. Apprentices and equal employment opportunity (29 CFR 5.5)

a. *Apprentices* (1) *Rate of pay*. Apprentices will be permitted to work at less than the predetermined rate for the work they perform when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship (OA), or with a State Apprenticeship Agency recognized by the OA. A person who is not individually registered in the program, but who has been certified by the OA or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice, will be permitted to work at less than the predetermined rate for the work they perform in the first 90 days of probationary employment as an apprentice in such a program. In the event the OA or a State Apprenticeship Agency recognized by the OA withdraws approval of an apprenticeship program, the contractor will no longer be permitted to use apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(2) *Fringe benefits*. Apprentices must be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits must be paid in accordance with that determination.

(3) *Apprenticeship ratio*. The allowable ratio of apprentices to journeyworkers on the job site in any craft classification must not be greater than the ratio permitted to the contractor as to the entire work force under the registered program or the ratio applicable to the locality of the project pursuant to paragraph 4.a.(4) of this section. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in paragraph 4.a.(1) of this section, must be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under this section must be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(4) *Reciprocity of ratios and wage rates*. Where a contractor is performing construction on a project in a locality other than the locality in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyworker's hourly rate) applicable within the locality in which the construction is being performed must be observed. If there is no applicable ratio or wage rate for the locality of the project, the ratio and wage rate specified in the contractor's registered program must be observed.

b. *Equal employment opportunity*. The use of apprentices and journeyworkers under this part must be in conformity with

the equal employment opportunity requirements of Executive Order 11246, as amended, and [29 CFR part 30](#).

c. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeyworkers shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor must insert FHWA-1273 in any subcontracts, along with the applicable wage determination(s) and such other clauses or contract modifications as the contracting agency may by appropriate instructions require, and a clause requiring the subcontractors to include these clauses and wage determination(s) in any lower tier subcontracts. The prime contractor is responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this section. In the event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and may be subject to debarment, as appropriate. 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility. a. By entering into this contract, the contractor certifies that neither it nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of [40 U.S.C. 3144\(b\)](#) or § 5.12(a).

c. The penalty for making false statements is prescribed in the U.S. Code, Title 18 Crimes and Criminal Procedure, [18 U.S.C. 1001](#).

11. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#);

c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#); or

d. Informing any other person about their rights under the DBA, Related Acts, this part, or [29 CFR part 1](#) or [3](#).

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchpersons and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1. of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages and interest from the date of the underpayment. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or

mechanic, including watchpersons and guards, employed in violation of the clause set forth in paragraph 1. of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1. of this section.

* \$31 as of January 15, 2023 (See 88 FR 88 FR 2210) as may be adjusted annually by the Department of Labor, pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990.

3. Withholding for unpaid wages and liquidated damages

a. *Withholding process.* The FHWA or the contracting agency may, upon its own action, or must, upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor so much of the accrued payments or advances as may be considered necessary to satisfy the liabilities of the prime contractor or any subcontractor for any unpaid wages; monetary relief, including interest; and liquidated damages required by the clauses set forth in this section on this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act that is held by the same prime contractor (as defined in § 5.2). The necessary funds may be withheld from the contractor under this contract, any other Federal contract with the same prime contractor, or any other federally assisted contract that is subject to the Contract Work Hours and Safety Standards Act and is held by the same prime contractor, regardless of whether the other contract was awarded or assisted by the same agency, and such funds may be used to satisfy the contractor liability for which the funds were withheld.

b. *Priority to withheld funds.* The Department has priority to funds withheld or to be withheld in accordance with Section IV paragraph 2.a. or paragraph 3.a. of this section, or both, over claims to those funds by:

- (1) A contractor's surety(ies), including without limitation performance bond sureties and payment bond sureties;
- (2) A contracting agency for its procurement costs;
- (3) A trustee(s) (either a court-appointed trustee or a U.S. trustee, or both) in bankruptcy of a contractor, or a contractor's bankruptcy estate;
- (4) A contractor's assignee(s);
- (5) A contractor's successor(s); or
- (6) A claim asserted under the Prompt Payment Act, [31 U.S.C. 3901](#)–3907.

4. Subcontracts. The contractor or subcontractor must insert in any subcontracts the clauses set forth in paragraphs 1. through 5. of this section and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor is responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1. through 5. In the

event of any violations of these clauses, the prime contractor and any subcontractor(s) responsible will be liable for any unpaid wages and monetary relief, including interest from the date of the underpayment or loss, due to any workers of lower-tier subcontractors, and associated liquidated damages and may be subject to debarment, as appropriate.

5. Anti-retaliation. It is unlawful for any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, or to cause any person to discharge, demote, intimidate, threaten, restrain, coerce, blacklist, harass, or in any other manner discriminate against, any worker or job applicant for:

- a. Notifying any contractor of any conduct which the worker reasonably believes constitutes a violation of the Contract Work Hours and Safety Standards Act (CWHSSA) or its implementing regulations in this part;
- b. Filing any complaint, initiating or causing to be initiated any proceeding, or otherwise asserting or seeking to assert on behalf of themselves or others any right or protection under CWHSSA or this part;
- c. Cooperating in any investigation or other compliance action, or testifying in any proceeding under CWHSSA or this part; or
- d. Informing any other person about their rights under CWHSSA or this part.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;

- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and

health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.327.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.327.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

* * * * *

3. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which

this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

* * * * *

4. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

a. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(1) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(2) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(3) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

b. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or

cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS
PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY
SYSTEM OR APPALACHIAN LOCAL ACCESS**

ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.