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June 14, 2019 Letting

Notice to Bidders, Specifications and Proposal

Contract No. 78695
JACKSON County
Section D9 TRAFFIC SIGNAL 2019-1
Route FAP 331
District 9 Construction Funds

Prepared by

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Checked by

(Printed by authority of the State of Illinois)

Illinois Department of Transportation

NOTICE TO BIDDERS

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 10:00 a.m. June 14, 2019 prevailing time 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. 78695
   JACKSON County
   Section D9 TRAFFIC SIGNAL 2019-1
   Route FAP 331
   District 9 Construction Funds

INSTALLING CONDUIT, FIBER OPTIC CABLE, CONTROLLER AND NETWORK EQUIPMENT ON IL 13 FROM STRIEGEL ROAD TO REED STATION ROAD IN CARBONDALE.

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 readvertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Omer Osman,
Acting Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2019

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

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 4-1-16) (Revised 1-1-19)

SUPPLEMENTAL SPECIFICATIONS

RECURRING SPECIAL PROVISIONS

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

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STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction, Adopted April 1, 2016, 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 331 (IL 13), Section D9 Traffic Signal 2019-1, Jackson County, Contract No. 78695 and in case of conflict with any part, or parts, of said Specifications, the said Special Provisions shall take precedence and shall govern.

LOCATION OF PROJECT

The project is located along Illinois 13 in Carbondale, IL from the Striegel Road intersection to the Reed Station Road intersection.

DESCRIPTION OF PROJECT

The intent of the project is to install conduit and fiber optic cable for the purpose of traffic coordination and remote traffic signal phasing and timing modification capabilities and to upgrade traffic signal controller equipment to be fiber optic compatible along the Illinois 13 corridor.

UTILITIES

Add the following after the first paragraph of Article 105.07 of the Standard Specifications:

Existing utility location information **IS NOT SHOWN** on the plan sheets. The Contractor shall verify the location of all utilities and privately-owned facilities prior to installation of any components. Verification of locations of underground utilities prior to commencing work on the project will be the responsibility of the Contractor. The following utility companies have facilities within the project limits which **MAY** require adjustment:

Name and Address of Utility	Type	Location	Estimated Adjustment Status
Ameren Illinois 1800 W. Main Marion, IL 62959 ATTN: Gullett Mike Tel: (618) 993-4635 Cell: (618) 579-5031 Email: MGullett@ameren.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Carbondale, City of P.O. Box 2047 Carbondale, IL 62902 ATTN: Henry Sean Tel: (618) 457-3270 EXT 271 Cell: (618) 527-7567 Email: shenry@ci.carbondale.il.us		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Clearwave Communications 2 North Vine Street Floor #2 / P.O. Box 808 Harrisburg, IL 62946 ATTN: Roth Clayton Tel: (618) 294-8078 Cell: (618) 841-2600 Email: rclayton@corp.clearwave.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Egyptian Electric Cooperative 1732 Finney Rd Murphysboro, IL 62266 ATTN: Shane Hermetz Tel: (618) 965-3434 Cell: Email: shermetz@eeca.coop		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Extenet ATTN: Tim Asta Tel: (630) 505-3845 Cell: (630) 776-3769 Email: tasta@extenetsystems.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION

Frontier Communications 208 West Union Marion, IL 62959 ATTN: Rick Shaw Tel: (618) 997-0253 Cell: (618) 967-5540 Email: rick.shaw@ftr.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Hamilton County Telephone ATTN: Bill Hermitz Tel: (618) 736-1019 Cell: (618) 925-6676 Email: billh@hamiltoncom.net		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Illinois Network Alliance 10024 Office Center Ave. Suite 201 St. Louis, MO 63128 ATTN: Brian Duffner Tel: (314) 270-8732 Cell: (314) 651-0141 Email: brian.duffner@bluebirdnetwork.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Lakeside Water District 3384 Dillinger Rd. Carbondale, IL. 62901 ATTN: Joe Snyder Tel: (618) 457-5547 Cell: Email:		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
MCI 7719 West 60th Place Summit, IL 60501 ATTN: Todd Jim Tel: (708) 458-6410 Cell: (219) 771-2672 Email: jimtodd@ameritech.net		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Mediacom 1603 E. DeYoung St. Marion, IL. 62959 ATTN: Craig Thompson Tel: (270) 703-9490 Cell: Email: cthompson@mediacomcc.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION

Windstream 102 E Shafer St Forsyth, IL 62535 ATTN: Jerome Light Tel: Cell: (217) 254-0252 Email: jerome.light@windstream.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Zayo Group 810 Jorie Blvd Oak Brook, IL 60523 ATTN: Timothy Payment Tel: (630) 203-8003 Cell: (630) 991-7258 Email: timothy.payment@zayo.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION
Zito Media 1718 Barlow Road Wickliffe, KY 42087 ATTN: Darryl Caldwell Tel: Cell: (814) 445.1584 Email: darryl.caldwell@zitomedia.com		THROUGHOUT	BEFORE OR DURING CONSTRUCTION

The above represents the best information the Department has available and is only included for the convenience of the bidder. The applicable provisions of Section 102 and Articles 105.07, 107.20, 107.37, 107.38, 107.39, 107.40, and 108.02 of the applicable edition of the Standard Specifications for Road and Bridge Construction shall apply.

Additional utility information may be obtained by calling the "Joint Utility Location Information for Excavators" phone number, 800-892-0123. This project is located in the Carbondale Township.

Add the following after the first paragraph of Article 107.39 of the Standard Specifications:

The Contractor is advised that this project includes areas of highway illumination and/or signalized intersections. These areas have underground cable or conduit throughout which is to remain in service. Before driving any posts or beginning any excavation operations, the Contractor shall locate, uncover by hand and relocate any wiring which conflicts with the proposed work. Any cable or conduit which is damaged as a result of the Contractor's operations shall be replaced by him at his expense. Replacement material and methods shall meet or exceed the original specifications for the wiring. Splicing will not be permitted.

TRAFFIC CONTROL PLAN
Effective 1985 Revised 2/10/17

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

Special attention is called to Articles 107.09 and 107.14 of the Standard Specifications for Road and Bridge Construction and the following traffic control related (1) Highway Standards; (2) Supplemental Specifications and Recurring Special Provisions; (3) other Special Provisions; and (4) Plan Details which are included in this contract:

1. Standards:

701001	701006	701101	701106	701301	701421
701422	701601	701602	701701	701801	701901

2. Supplemental Specifications and Recurring Special Provisions:

3. Special Provisions: None

4. Plan Details: None

Traffic control standards shall be applied as directed by the Engineer. Suggested applications for each standard are as follow:

Standard 701001 This standard shall be used for off-road operations (2L, 2W) more than 15' from the edge of pavement.

Standard 701006 This standard shall be used for off-road operations (2L, 2W) from 15' to 24" from the edge of pavement.

Standard 701101 This standard shall be used for off-road operations (Multilane) from 15' to 24" from the edge of pavement.

Standard 701106 This standard shall be used for off-road operations (Multilane) more than 15' from the edge of pavement.

Standard 701301 This standard shall be used for lane closures (2L.2W) for short term operations.

Standard 701421 This standard shall be used when construction requires a lane closure (Multi-Lane speeds $\geq$ 45 mph to 55 mph) for daytime operations only.

Standard 701422 This standard shall be used for lane closures (Multilane, speeds ≥ 45 mph to 55 mph) for daylight operations exceeding one day.

Standard 701601 This standard shall be used when construction requires a lane closure. (Urban, Multi-Lane w/nontraversable median)

Standard 701602 This standard shall be used when construction requires a lane closure. (Urban, Multi-Lane 2W w/bidirectional turn lane)

Standard 701701 This standard shall be used for construction within the limits of intersections in regard to lane closures and quadrant protections.

Standard 701801 This standard shall be used when pedestrian traffic must be rerouted due to work being performed.

During the entire construction period, the road shall be kept open to traffic as follows:

(a) IL 13 through lanes between New Era Road and Giant City Road, eastbound and westbound, must be open to at least two lanes of traffic in each direction at all times or a monetary assessment of $1,000 for each hour will be charged. All lane closures will be accomplished using the traffic control standards as shown in the plan details.

(b) Access to all public roads and private entrances shall be maintained during all stages of the work.

If at any time the signs are in place but not applicable, they shall be turned from the view of motorists or covered as directed by the Engineer.

COOPERATION BETWEEN CONTRACTORS
Revised 2/10/17

The Contractor is to be aware that traffic control limits of this contract may overlap those of other project(s) that may be under construction along IL 13 concurrently with this work. The Contractor shall coordinate his/her work with the other Contractors to minimize any possible conflicts. The Contractor shall also notify the Engineer five (5) working days in advance of any work that may affect other adjacent contracts.

Adjacent Project, Contract No. 78295 & 78627

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 110 kg/ha (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 300 kg/ha (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 contract bid price for UNDERGROUND CONDUIT, COILABLE NONMETTALIC CONDUIT, 1 1/2" DIA.

UNDERGROUND CONDUIT, COILABLE NONMETALLIC CONDUIT, 1½" DIA.
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 for Road and Bridge Construction 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 (3) 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 contract bid price for UNDERGROUND CONDUIT, COILABLE NONMETTALIC CONDUIT, 1 1/2" DIA.

The 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 traffic signal cabinets 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.

Under this pay item the contractor shall supply and install 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.

In all existing cabinets, 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 6 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 incidental.

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 minimum 5 times checked with an OTDR.
- 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.

This work shall be paid for at the contract unit cost each for MODIFY EXISTING CONTROLLER CABINET and shall include all labor and materials necessary for the complete installation and operation of the distribution enclosures and star couplers as described herein and no additional compensation will be allowed.

COMMUNICATIONS VAULT

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 polymer concrete.

The following items are approved for use in District Four:

Hubbel, Quazite, Part Numbers: PG2436HA00 (Cover) and PG2436BA30 (Box).

The communications vault and lid shall conform to the following specifications:

Cover:
Material: Polymer Concrete
Nominal Dimensions: 24"W x
36"L
Gasketed, Heavy Duty Lid with 2 Bolts
Design/Test Load: 15,000/22,500 lbs.
ANSI Tier: 15
Gasketed Box:

Material: Polymer Concrete
Nominal Dimensions: 24"W x 36"L x
42"D Open Bottom
Design/Test Load: 22,500/33,750 lbs.
ANSI Tier: 22

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. (25 mm) 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 the vault at between 33" and 36" and 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 15 and 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 through the use of 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 of each for COMMUNICATIONS VAULT, which shall be payment in full for all labor, equipment, and materials required to provide and install the equipment described above, complete.

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 bid price for COMMUNICATIONS VAULT.

ROUTING, LAYOUT AND DOCUMENTATION

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

After the fiber optic cable plant has been installed, two (2) 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 lump sum price for CONSTRUCTION LAYOUT which shall be payment in full for all labor, equipment, and materials required to complete the work described above, complete.

ETHERNET MANAGE SWITCH

Description. This work shall consist of furnishing, installing, and testing network communications equipment and associated infrastructure (e.g., power supply(ies), SFP modules, etc.) in existing IDOT building as designated by the Engineer, complete with all of the hardware and accessories required for the intended use of the equipment.

Materials. The Cisco Catalyst 3850 Series Ethernet network communications equipment or approved equal and ancillary materials shall be provided as depicted in the table below at the IDOT District 9 (D9) building location identified herein and as shown on the plans. The Ethernet switch with power supply(ies) shall be installed within the equipment rack and connected to other equipment using the small form-factor pluggable (SFP) transceiver modules noted and the copper ports within the switch as shown on the plans and as directed by the Engineer. The Contractor shall also provide all equipment and items listed including any ancillary material (fiber optic cable jumpers, Ethernet patch cables, connectors, mounting hardware, labels, cable ties, equipment grounding connection, etc.) required for successfully connecting between the Cisco Ethernet network communications equipment, switches, and fiber optic termination panels without the use of adapters or gender changer ("gender benders") at each identified location and as shown on the plans. In addition, the Contractor shall supply one (1) spare fiber optic cable jumper and Ethernet patch cable with the required connector type and of appropriate length per each Cisco Ethernet switch shown below as well.

Equipment

ITEM NUMBER	DESCRIPTION	QUANTITY
WS-C3850-24XU-S	CISCO CAYTALYST 3850 24 PORT DATA IP SERVICES	1
CON-SNTP-WSC3852X	Cisco SMARTnet extended service agreement	1
CAB-TA-NA	NORTH AMERICA AC TYTPE A POWER CABLE	2
PWR-C1-715WAC	715W AC CONFIG 1 POWER SUPPLY	2
S3850UK9-3-OSE	CAT38850 UNIVERSAL	1
NETWORK MODULE		
C3850-NM-8x10G	CISCO CATALYST 38504 X IOGE NETWORK MODULE	1
SFP MODULE		
GLC-LX-SM-RGD=	1000BASE-LX/LH 10km/SMF	5

Construction Requirements.

The Contractor shall procure and install all components above in the equipment rack as shown on the plans and as directed by the Engineer in accordance with the manufacturer's installation requirements. The equipment shall be permanently and securely mounted within the equipment rack, and all corresponding power and communications cables shall be neatly dressed, labeled, and fastened to the equipment rack with the appropriate hardware. Tie wraps are not permitted. The Contractor shall perform all network switch and corresponding communications equipment connections in the presence of the Engineer. When all equipment is installed and connected, the Contractor shall test and demonstrate the performance of the installed network communications equipment in order to ensure that data is being transmitted to the IDOT D9 building.

All equipment shall be warranted and guaranteed against defects and failure in design and materials for a minimum of three (3) years from the date of delivery, as recorded by the Engineer. The warranty period shall not begin until the date the Engineer issues and records final acceptance of all materials listed above. The Contractor shall transfer all manufacturer warranty information to the Engineer prior to final acceptance notification by the Engineer. In the event that a manufacturers standard warranty does not cover the entire period of the warranty required by IDOT, the Contractor shall procure and furnish to IDOT an extended manufacturer's warranty or provide its own warranty covering the additional time.

The Contractor shall submit the warranty terms as part of the submittals for each material item. The warranty shall provide that, in the event of malfunction during the warranty period, the defective system component shall be replaced with a new component by the Contractor or their representative within five (5) working days. Any component that, in the opinion of the Engineer, fails three (3) times prior to the expiration of the warranty will be judged as unsuitable and shall be replaced by the Contractor or representative with a new component of the same type at no additional cost or expense to IDOT. The unsuitable component shall be permanently removed from the project by the Contractor.

Basis of Payment: This work will be paid for at the contract unit price of Each for ETHERNET MANAGE SWITCH, which shall be payment in full for all labor, equipment, and materials required to provide and install the equipment described above, complete.

DATA NETWORK PORT ADAPTER

Description. This item shall consist of furnishing and installing a data network port adapter in the IDOT District 9 Building as shown on the plans as designated by the Engineer, complete with all of the hardware and accessories required for the intended use of the equipment.

Materials. The data network port adapter shall consist of a double gang box, 4-port Category 6 Female to Female Ethernet wall plate, and ¾" Electric Metallic Tube (EMT) conduit along with mounting hardware.

Construction Requirements.

The Contractor shall mount the double gang box with 4-port Category 6 Female to Female Ethernet wall plate on the existing wall of the IDOT District 9 Building at location as approved by the Engineer. The ¾" EMT conduit shall be installed with approved conduit hangers above drop-down T-bar type ceiling from the equipment rack location then fastened or attached using approved conduit straps to the outside of existing wall into the double gang box. The Contractor shall verify that there are no conflicts with existing electrical wire, pipes, or other building infrastructure prior to installation.

Basis of Payment: This work will be paid for at the contract unit price of each for DATA NETWORK PORT ADAPTER, which shall be payment in full for all labor, equipment, and associated materials required to provide and install the equipment described above, complete.

FIBER OPTIC CABLE SPLICE

Description. This work shall consist of splicing two (2) 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 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
(1) Loose Tube Dome Closure for 144 fiber count
(4) Splice Tray kit with 36 count splice blocks

FIBER OPTIC SPLICE - MAINLINE
(1) Loose Tube Dome Closure for 144 fiber count
(4) Splice Tray kit with 36 count splice blocks

FIBER OPTIC SPLICE – LATERAL:
(1) Loose Tube Dome Closure
(1) Splice Tray kit with 12 count splice blocks

Splice enclosures and splice 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 and 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 reentered 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 inches to 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 70 kPa (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.

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

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 Optical Time Domain Reflectometer (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 5 working (7 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 Optical Time Domain Reflectometer (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 form of 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 Project Engineer. The test documentation shall be submitted as (3) three CD ROM copies, and shall include the following:

Cable & Fiber Identification:

- Cable ID
- Fiber ID, including tube and fiber color
- Pulse width (OTDR)
- Cable Location -beginning and end point
- Wavelength
- Refractory index (OTDR)
- Operator Name
- Date & Time
- Setup Parameters
- Range (OTDR)
- Scale (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:

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 the no additional cost to the IDOT, both labor and materials.

Basis of Payment: This work shall be paid for at the contract unit price per each as follows:

FIBER OPTIC SPLICE shall consist of 48 fibers spliced, tested and accepted by the Engineer on splices between the FIBER OPTIC CABLE, SINGLE MODE, ARMORED, 48 FIBERS and FIBER OPTIC CABLE, SINGLE MODE, ARMORED, 144 FIBERS as detailed in the plans.

FIBER OPTIC SPLICE – MAINLINE shall consist of 144 fibers spliced, tested and accepted by the Engineer on splices between two (2) FIBER OPTIC CABLE IN CONDUIT, SINGLE MODE and/or ONE (1) FIBER OPTIC CABLE IN CONDUIT, SINGLE MODE AND ONE (1) HQ FIBER OPTIC CONNECTIVITY where required as detailed in the plans.

FIBER OPTIC SPLICE – LATERAL shall consist of 12 fibers spliced, tested and accepted by the Engineer on splices between the FIBER OPTIC CABLE, SINGLE MODE, ARMORED, 12 FIBERS and FIBER OPTIC CABLE, SINGLE MODE, ARMORED, 144 FIBERS OR FIBER OPTIC CABLE, SINGLE MODE, ARMORED, 48 FIBERS 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.

ATMS INTEGRATION

Description. This item consists of ATMS network integration, monitoring, inventory management and documentation of the ATMS configuration, installation, including remote access for IDOT and City of Carbondale. All components of the task include 36 months of service.

Materials. The remote service shall include 100 MBPS Download and 10 MBPS Upload data services, including availability of 5 static IPs. The service shall terminate in the ATMS equipment rack within IDOT D9 building.

Construction Requirements.

Assignment of IPs shall occur in coordination with IDOT D9 Staff. IPs shall be assigned using a logical number scheme to be as directed and approved by IDOT at time of installation.

The Contractor shall provide coordination of remote access service installation. The service shall terminate in the ATMS equipment rack. Remote access, after provider installation, will be tested using the ATMS laptop off site, and by testing access with City of Carbondale. City of Carbondale internet access and PC or laptop availability is not part of this contract. The Contractor will update the IDOT network switch to support the ATMS software module and optimize security of the connection for remote access users.

Documentation Requirements.

- IP Schema and Port Assignment document for the network hardware
- Fiber/patch panel assignments
- Hardware inventory
    - Serial number, make, model, version, firmware
    - Support contact information
    - Warranty data
- ATMS Software inventory
    - Serial number, make, model, version, firmware
    - Support contact information
    - Warranty data
- Network and ATMS Support Plan
    - Network associate phone, text and email information
    - Account manager (or other backup to the network associate) phone, text and email information
    - ATMS software contracts - phone, text and email information
    - Network hardware support phone, text and email information
    - Workstation and laptop support phone, text and email information

ATMS Integration includes support of the network troubleshooting during the ATMS Core Module installation. This includes diagnosis of equipment errors and warranty replacement and associated configuration of the network.

The Contractor shall provide remote network monitoring to ensure ATMS system health. ATMS System health shall include identification and remote diagnosis of ATMS network issues. Updates to network equipment firmware including critical patches are required. Critical patches for the network switch shall be installed within 20 business days. Non-critical patches shall be installed annually. Network monitoring is constrained to the intersections and associated network equipment connected within this project.

Network health shall be monitored using Nagios or an approved equivalent. Network outage notifications shall be provided to up to 5 IDOT staff via email initially, with disposition of the outage to occur within 4 business hours. A monthly report of outage information and resolution steps shall be provided to IDOT defined staff. Additionally, configuration updates shall be included in the inventory documents. Monthly reporting shall include documentation of any changes to the network, including security, firmware, monitoring strategies, and documentation updates. The network support personnel shall have at least 3 years of progressive network management experience with at least 3 network projects, including one project that includes at least 50 nodes. The support personnel shall have Cisco Certified Network Associate (CCNA) certification.

Basis of Payment: This work will be paid for at the contract unit price of Lump Sum for ATMS INTEGRATION, which shall be payment in full for all hardware, software, services, labor, equipment, and materials required to meet all of the requirements described above. The Contractor will receive progress payments for this work according to the following schedule:

Twenty-five percent (25%) of the contract unit price will be paid upon system acceptance.

Twenty-five percent (25%) of the contract unit price will be paid one year to date after system acceptance.

Twenty-five percent (25%) of the contract unit price will be paid two years to date after system acceptance.

The final twenty-five percent (25%) of the contract unit price will be paid three years to date after system acceptance.

CAT. 6 ETHERNET CABLE

Description. This item shall consist of furnishing and installing Ethernet cable inside the IDOT District 9 Building as shown on the plans.

Materials. Category 6 cable shall comply with the following standards:

ANSI/TIA/EIA-568-C.2-Category 6
UL 444, Safety Vol. 1, Sec 13
ISO/IEC 11801 Class E
ETL Verified
RoHS 2002/95/EC
E196163-P
EN71-3, EPA 3050B
PVC: CMR: CSA, CMG, FT4; Plenum: CMP, FT6

Category 6 cable to be comprised of four (4) unshielded twisted pairs of wires using 23 AWG solid tinned copper conductors. The cable shall have a nominal impedance of 100 ohms and a maximum attenuation of 19.7 Db/ 100 meters at 100 MHz and 32.8 db/100 meters at 250 MHz;

Category 6 cable shall meet the following properties.
Rating Temperature Voltage – 167 F (75 C); 300V
Maximum frequency of 550 MHz

Construction Requirements.

The Contractor shall terminate each end of the Category 6 cable. After termination the Contractor shall perform a wire map test to ensure continuity of the wires, absence of shorts, grounding, or any other wire pulling or termination problems or errors. Each cable shall be clearly labeled at each end. The label shall contain information in regards to the location where the cable is going to or coming from.

Method of Measurement. Ethernet cable will be measured for payment by the linear foot furnished, installed and tested in place.

Basis of Payment: This work will be paid for at the contract unit price per foot for CAT. 6 ETHERNET CABLE, which shall be payment in full for all labor, equipment, and materials required to provide and install the equipment described above, complete.

FIBER OPTIC PATCH PANEL, 144 PORT, RACK MOUNT

Description. This work shall consist of furnishing and installing a 19" rack mounted fiber optic patch panel, splice housing, and associated connection hardware (e.g., bulkheads, splice trays, splice sleeves, blank panels, bonding/grounding, etc.) in the equipment rack at the existing IDOT District 9 (D9) building as shown on the plans and as directed by the Engineer, complete with all of the hardware and accessories required for the intended use of the equipment.

Materials. The Contractor shall provide a 19" rack mounted fiber optic connector patch panel housing which shall be able to accept a minimum of 144 single-mode fibers and shall be about 4 standard rack units high. The Contractor shall also provide a 19" rack mounted splice and storage module with splice trays to store excess fiber and splicing of individual pigtails. The pigtails shall be mounted on 6 port bulkhead sleeves using type LC optical connectors unless otherwise approved by the Engineer. The housing and storage enclosure along with ancillary and accessory materials shall be Corning Cable Systems Closet Connector Housing Part No. CCH-04U that holds up to twelve connector panels and Splice/Slack Cassette Part No. CCH respectively or approved equivalents. All mounting hardware and cable management (strain relief brackets, routing clips/guides, documentation labels, etc.) shall be incidental.

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 minimum 5 times checked with an OTDR.
- 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.
- Termination shall be facilitated by splicing factory OEM pigtails on the end of the bare fiber utilizing the fusion splicing method. The maximum splice loss shall not be greater than 0.1 dB per event, as defined elsewhere in this document. The splice loss shall be tested at the time of splicing.
- Pigtails shall be a minimum of (20) twenty feet in length, unless otherwise approved by the Engineer.

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 both ends of the cable. Each strand of the pre-terminated cable assembly shall not exceed a maximum attenuation 0.4dB. The pre-terminated cable assembly shall be cut in half and fusion spliced to the bulkhead sleeves within the rack mounted connector panel housing. 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.

Construction Requirements.

The Contractor shall install the fiber optic patch panel along with associated hardware including any ancillary material items required for properly installing the fiber optic patch panel and splice housing within the 19” equipment rack at the IDOT D9 building 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. 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 manufacturers requirements within the IDOT D9 building.

Prior to inspection, testing, and connecting fiber optic jumpers or patch cables to the bulkheads within the fiber optic patch panel, 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 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 by the Engineer. All fibers (terminated and un-terminated) shall be tested bi-directionally at both 1310 nm and 1550 nm with both an Optical Time Domain Reflectometer (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 5 working (7 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 Optical Time Domain Reflectometer (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 Project Engineer. The test documentation shall be submitted as (3) three CD ROM copies, and shall include the following:

Cable & Fiber Identification:

- Cable ID
- Fiber ID, including tube and fiber color
- Pulse width (OTDR)
- Cable Location -beginning and end point
- Wavelength
- Refractory index (OTDR)
- Operator Name
- Date & Time
- Setup Parameters
- Range (OTDR)
- Scale (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:

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	*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 the no additional cost to the IDOT, both labor and materials.

Basis of Payment: This work will be paid for at the contract unit price of Each for FIBER OPTIC PATCH PANEL, 144 PORT, RACK MOUNT, which shall be payment in full for all labor, equipment, materials, and documentation required to provide and install the equipment described above, complete. Payment shall not be made until the panel is installed, terminated, tested by the Contractor and accepted by the Engineer.

HQ FIBER OPTIC CONNECTIVITY

Description. This work shall consist of furnishing and installing all necessary infrastructure and associated materials (e.g., conduit, equipment rack, etc.) to install the 144 single mode non-armored fiber optic cable at the IDOT District 9 Building as shown on the Plans and as directed by the Engineer, complete with all of the hardware and accessories required for the intended use of the corresponding equipment. This work shall also consist of furnishing and installing the non-armored, loose-tube 144 single-mode fiber optic cable as shown on the Plans and as directed by the Engineer.

The termination of the fiber optic cable and corresponding equipment housed in the equipment rack will be paid for separately under the FIBER OPTIC PATCH PANEL, 144 PORT, RACK MOUNT pay item. Also, the Ethernet managed network switch and associated equipment will also be paid for separately under the Ethernet Manage Switch pay item.

Materials. This item shall include 144 single mode non-armored fiber optic cable, a 4” fiber smart conduit body (LB), 2” Electrical Metallic Conduit (EMT), reducer conduit bushings compatible with rigid-galvanized steel and EMT conduits, couplers, conduit hangers and straps, an equipment rack with cooling fans, 24-port Category 6 patch panel, and all hardware (e.g., cable management, grounding/bonding, etc.) necessary for installation. In addition, the Contractor shall also provide the ancillary material items (e.g., hangers, straps, etc.) required to properly install the EMT conduit within the existing drop-down T-bar ceiling or other appropriate support structures at the IDOT District 9 building as shown on the plans and/or as directed by the Engineer.

The Contractor shall furnish a non-armored, all dielectric, dry-filled, loose tube, dispersion-unshifted, single-mode fiber optic cable with low water peak, gel free, and suitable for outdoor underground (e.g., in conduit) and indoor plant installation. The cable shall comply with the standards requirements of RUS 7 CFR1755 (PE-90), ANSI/ICEA S-87-640, and Telecordia GR-20 for a single sheathed non-armored cable, and shall be new, unused, and of current design and manufacture. The non-armored single mode fiber optic cable shall also be splice-compatible with the armored single-mode fiber optic cable being supplied as part of Fiber Optic Cable In Conduit, Single Mode pay item. The Contractor shall ensure that all components that comprise a single length of cable are continuous and of the same material using only commercial off-the-shelf materials, equipment, and components.

The 4” fiber smart conduit LB body shall be from Madison Electric Products or an approved equivalent with a minimum bend radius of ANSI/TIA/EIA 568 & NECA/FOA, and be suitable for indoor/outdoor (OSP)applications to connect with both EMT and rigid galvanized steel conduits.

The equipment rack shall be a deep cabinet enclosure with sides and back that meets and includes the following:

- Minimum dimensions: 600mm (Width), 1200mm (Depth)
- Rack Height of 42U
- 19” Rack
- RoHS compliant
- UL Listed
- Environmental Protection Class: IP 20
- Perforated front and rear doors
- Full-height side panels (removable)
- Cable access slots in roof of rack
- Castors and leveling feet
- Adjustable vertical mounting rails
- Keyed alike door handles
- Bolt-down brackets
- Reliable metered rack power distribution (PDU) assembly (100-240V/20A)
- Horizontal/Vertical cable management
- Pull-out shelf/drawer
- Fixed shelf capable of supporting 50 lbs
- 120V AC 1U cooling fan tray with 6 fans and min 500 CFM
- M6 hardware kit (nuts, nylon washers, screws)
- Bonding/Grounding rack kit
- 24-Port Category 6 fully loaded patch panel with RJ45 jacks or couplers

Construction Requirements.

A pre-installation site visit to the IDOT District 9 building shall be conducted by the Contractor along with the Engineer a minimum of two (2) weeks in advance of the Contractor scheduling the associated work for the purpose of planning and inspecting the work to be completed at this site.

The fiber smart conduit body (LB) shall be attached to the exterior of the IDOT District 9 building and shall transition from the galvanized steel conduit attached to structure to the EMT conduit into the IDOT District 9 Building. The penetration of the exterior wall shall be sealed and water-tight with appropriate material.

The 2" EMT conduit shall be attached to existing ceiling joists within the drop down T-bar ceiling along the conduit path as shown on the plans and as directed by the Engineer in order to provide a permanent pathway for the fiber optic cable within IDOT District 9 Building. The EMT conduit for the fiber optic cable will be required from the point of building entry to directly above the equipment rack in which the associated equipment (e.g., fiber patch panel, Ethernet manage switch, etc.) is being installed. Drilling of the existing cinder block walls within the IDOT District 9 Building to get between these rooms shall be included in this pay item.

The installation of the single mode non armored fiber optic cable shall be in accordance with and installed per manufacturers installation guidelines and recommendations, which shall not exceed the cable bending radius both during installation and once completed. The single mode fiber optic cable installation shall be from the nearest communications vault outside of the IDOT District 9 building to the equipment rack inside of the IDOT District 9 building.

The installation location for the equipment rack shall be approved by the Engineer. The equipment rack shall be installed level and bolted to the floor of the building in accordance with manufacturer instructions. The Contractor shall also ground the equipment rack to a building ground per NEC and Telecommunications Industry Standards (ANSI/TIA/BICSI/IEEE). All equipment shall be permanently and securely mounted within the equipment rack by the Contractor and all power and communications cables including patch cables shall be neatly dressed, labeled, and fastened to the equipment rack with the appropriate hardware. Tie wraps are not permitted and all equipment and cables shall be labeled.

Basis of Payment: This work will be paid for at the contract unit price of Lump Sum for HQ FIBER OPTIC CONNECTIVITY, which shall be payment in full for all hardware, labor, equipment, and materials required to meet all of the requirements described above, complete.

ETHERNET SWITCH
Revised: March 22, 2018

Description:

This work shall include supplying, installing and powering ethernet switches at locations designated in the plans for the purpose of interfacing with fiber optic network(s).

The Contractor shall locate shelf space or other suitable mounting location in the traffic signal cabinets or as identified on the plans. The Contractor shall secure the Ethernet Switch as appropriate and approved by the engineer.

The Contractor shall install all necessary patch cords, optical transceivers, connectors, power supplies, communication transformers, or auxiliary equipment necessary to complete the communication circuits at full functional potential. The Contractor shall connect the switch to the field devices as indicated on the plans.

When requested by the Contractor, the Engineer will provide the necessary IP address assignments and port assignments, including the necessary port provisioning. The contractor shall be responsible for all network programming of the network switches and communicating elements within the traffic signal cabinet.

The Contractor will demonstrate that the switches are correctly installed and configured as specified in other special provisions for this project.

The Ethernet Switch shall meet the following material specifications:

1. Overall switch station capacity and flexibility: Managed Gigabit Ethernet switch with 7 10/100BaseT(X) ports, and 3 10/100/1000BaseT(X) or 100/1000BaseSFP combo ports, with -40 to 75°C operating temperature. In addition, the switch shall include a SFP module with 2 1000BaseLX port with LC connector for 10 km transmission, with -40 to 85°C operating temperature. The SFP module shall be fully compatible with the SFPs furnished and installed as part of Ethernet Manage Switch provided at the IDOT District 9 building to ensure communications to equipment in field cabinets”
2. Cabling options: The switch shall be able to utilize a variety of connecting interfaces including 10/100Base(T)X, 10/100/1000Base(T)X, and 1000BaseSX/LX/LHX/ZX (LC connector).
3. Port configuration options: Port configurations shall be accessible via a standard web browser without requiring special vendor software. Port configuration changes shall be possible by personnel without special IT training. The configuration can be done via a console UI, telnet connection or command line interface. All T(X) ports shall provide cable autocross capability.

The Ethernet Switch shall be compatible with following network and software requirements:

1. Networking and Software: The Ethernet switches shall be IEEE802.3/802.3u/802.3ab/ 802.3z/802.3x/802.1D-2004/802.1w/802.1s/802.1Q/802.1p/802.1X/802.3ad compliant. The switch shall support the following standards and software interfaces:
    a. Redundant fast/Gigabit Ethernet ring capability
    b. IGMP Snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
    c. Supports IEEE 802.1Q VLAN and GVRP protocol to ease network planning
    d. Supports QoS-IEEE 802.1p/1Q and TOS/DiffServ to increase determinism
    e. Supports 802.3ad, LACP for optimum bandwidth utilization
    f. Supports TACACS+, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
    g. Support EtherNet/IP, PROFINET, and Modbus/TCP protocols for device management and monitoring
    h. SNMPv1/v2c/v3 for different levels of network management security
    i. Bandwidth management to prevent unpredictable network status
    j. Lock port for authorized MAC address access only
    k. Port mirroring for online debugging
    l. Automatic warning by exception through e-mail, relay output
    m. Digital inputs to integrate a sensor and alarm with an IP network
    n. Automatic recovery of connected device IP addresses
    o. Line-swap fast recovery
2. Port Trunking for Flexible Network Connection: Maximum of four trunk groups for all Gigabit ports with maximum of 8 trunk ports for each trunk group shall be available. The user shall be able to either choose the type of the trunk group to be “Static” or “LACP.”
3. IP Addressing Approach Options: IP addresses shall be set over the network using BootP/DHCP. The user shall have the capability to disable BootP or DHCP network based IP address changes. In addition, the switch shall support both a serial port and web page based manual (static) addressing approach.
4. Ethernet Packet Transfer Accuracy and Capacity: The switch shall be capable of forwarding valid Ethernet frames using the store and forward method or equivalent method and the address table shall have a maximum capacity of 8192 addresses.
5. Quality of Service Functions Enhance Determinism: The switches shall be able to read IEEE 802.1Q VLAN priority tags, and support a minimum of a low, normal, medium and high priority buffer. High priority messages shall be able to process before low priority messages. It also shall support QoS-IEEE 802.1p/1Q and TOS/DiffServ.
6. SNMP Traps: The switches shall support sending SNMP messages to maximum 2 SNMP “Trap” server and The SNMP traps IP addresses shall be settable through a web browser interface.
7. Multicast Message Control for Filtering Multicast Traffic: The switches shall be able to support IEEE 802.1D-1998 GMRP (GARP Multicast Registration Protocol), and IGMP (Internet Group Management Protocol).
8. Port Access Control Enhances User Authentication: The switches shall support IEEE 802.1X and Static Port Lock for Port-Base Access Control.

9. Accessible IP Settings: It shall allow the user to add or remove “Legal” remote host IP addresses to prevent unauthorized access. Access to switch shall be controlled by IP address. That is, if a host’s IP address is in the accessible IP table, then the host shall be allowed access to the switch.
10. Additional network and software requirements shall be met:
    a. IEEE 802.1X, HTTPS, and SSH to Enhance Network Security
    b. Bandwidth Management Prevents Unpredictable Network Status
    c. Port mirroring for Online Debugging
    d. Automatic Warning by Exception through Email and Relay Output
    e. Digital Inputs to Integrate Sensors and Alarms with IP Networks
    f. Automatic Recovery of Connected Device’s IP Addresses
    g. Line-swap Fast Recovery
    h. Support EDS-SNMP OPC Server Pro
    i. Software based IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
    j. DHCP Option 82 for IP address assignment with different policies
    k. Modbus/TCP / EtherNet/IP / PROFINET industrial Ethernet protocols supported
    l. Supports LLDP (Link Layer Discovery Protocol)
    m. Turbo Ring™ and Turbo Chain™ (< 20ms recovery time for fast Ethernet ports and < 50 ms recovery time for Gigabit Ethernet ports at full load) and STP/RSTP (IEEE 802.1w/D)

The Ethernet Switch shall meet the following general installation requirements:

1. Mounting: The switch shall be DIN-Rail or wall mountable
2. Power supply: Low voltage ranges: 12/24/48 VDC (9.6-60 VDC). In addition, a provision shall be made such that the loss of a power supply may be user configurable to trigger a hardware (i.e. relay contact), SNMP, e-mail and web page alarms.
3. Environmental specifications: Temperature & humidity - The switch shall have operating temperature ranges of -10 to 60°C or -40 to 75°C. In addition, the switch shall be rated to withstand a maximum continuous operating humidity of 95% without condensation.
4. Electronical Noise Immunity: The switch will conform to the IEC61000-4-2 to 4-8 series of noise specifications as specified below:
    IEC 61000-4-2Electrostatic Discharge: Criterion A
    IEC 61000-4-3Radiated Noise Immunity: Criterion A
    IEC 61000-4-4Fast Transient (Burst) Withstand: Criterion A
    IEC 61000-4-5Surge Voltage: Criterion A
    IEC 61000-4-6Conducted Noise Interference: Criterion A
    IEC 61000-4-8Electromagnetic Field withstand: Criterion A
    IEC 61000-4-12
    IEC 61000-4-29
5. Shock & Vibration: The operating shock rating shall conform to IEC60068-2-27 and withstand a 15 g, 11 ms duration, and 18 shocks. In addition, the operating vibration spec shall conform to IEC60068-2-6 (Criterion 3) at 1 mm, 2 Hz - 13.2 Hz, 90 min.; 0.7g, 13.2 Hz - 100 Hz, 90 min.; 3.5 mm, 3 Hz - 9 Hz, 10 cycles, 1 octave/min.; 1g, 9 Hz - 150 Hz, 10 cycles, 1 octave/min.
6. Switch shall be compliant with IEC 62443-4-2.

The Ethernet Switch shall meet the following hardware based diagnostics and user interfaces requirements:

1. Alarm contact: The switch shall contain an alarm contact that can be configured via standard web browser to annunciate the drop out of either or both power supply inputs and/or to annunciate the active link status of any combination of ports. A Fault LED will be provided to indicate the status of the alarm contact.
2. LED Indications
3. Diagnostic display for internal switch status
4. Serial Port: The switch shall include a USB serial port that can be accessed by computers with hyper terminal or equivalent capability. The serial console connection manner shall require a short USB cable applied to connect the switch to a PC's USB port.

The Ethernet switch shall meet the following security requirements:

1. Port Disable: unused ports shall be able to be disabled to prevent unauthorized access.
2. It shall support IEEE 802.1X and SSL to enhance network security.
3. Switch configuration password protection
4. https/SSL

The Ethernet switch shall have following communication redundancy:

1. The switch shall be able to detect and compensate for the failure of another switch, cable disruption or hardware failure of one or more ports.
2. IEEE standards based redundancy, including IEEE 802.1D/W spanning tree
   Turbo Ring: Gigabit Ethernet redundant ring capability (Turbo Ring V2: recovery time <20ms for fast Ethernet ports; < 50 ms for Gigabit Ethernet ports). Ring coupling function to integrate different Turbo Ring for distributed application
3. Turbo Chain function for a multiple-ring architecture (recovery time <20ms for fast Ethernet ports; <50 ms for Gigabit Ethernet ports)

The Ethernet switch shall be compatible with following software suite that assists with installation, operation, maintenance, and diagnostics of the existing network:

1. The switch must be compliant with a mass configuration tool:
   a. The tool must contain a security wizard for convenient setup of security-related parameters.
   b. The tool must allow for topology analysis to eliminate manual setting errors
   c. The tool must contain a configuration overview for efficient management
2. The switch shall be compliant with network management software (NMS).
   a. The NMS must allow for auto-discovery of network devices and physical connections.
   b. The NMS must allow for event playback for quick troubleshooting
   c. The NMS must allow for color-coded VLAN/IGMP groups and other visualized network data.
   d. The NMS must allow for a security view for the security status of network devices.
   e. The NMS must support a mobile app for remote monitoring and notification.

3. The switch must be compliant with a stand-alone data collection tool to take network snapshots for quick troubleshooting.
    a. The collection tool must allow for the ability to compare network and device data and then highlight the differences.

Basis of Payment:

This work will be paid for at the contract unit price per each for ETHERNET SWITCH which price shall be payment in full for all labor, materials, and equipment required and as detailed in this special provision.

FULL ACTUATED CONTROLLER AND TYPE IV 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.

The installation of the New Era/IL 13 cabinet shall include removing the existing UPS battery cabinet, service meter, disconnect switch and disconnecting the UPS and reinstalling them on/in the new cabinet. The existing cabinet print is BTP2323.

A traffic actuated solid state digital controller shall comply with the requirements of NEMA Standards for Traffic Control Systems, TS1-1983, Sections 1, 2, 13 and 14. 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 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.

The controller(s) supplied shall be the Siemens M60 Series for integration into the existing District 9 Eagle Signal system and shall be fully compatible with the District’s Tactics software.

Cabinet Capability. Controller shall be designed to be relocated into a traffic signal cabinet formatted NEMA TS-1, NEMA TS-2 Type 1, or NEMA TS-2 Type 2 controller.

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 legacy controllers of the District, 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:

- (1) USB
- (1)RJ-45
- (2) 25 pin RJ-232 ports for serial communication
- (1) 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, 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
- 4 Phase Banks - an alternate set of phase data selectable by Time of Day command
- 8 overlaps in formats Standard, Flashing Yellow Arrow (FYA), Timed and Pedestrian
- Detector Diagnostics – 3 measurements, 2 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

Coordination. Controller shall offer a minimum of 255 unique patterns.

Minor changes to a coordination plan (+/- 5 seconds) in offset or split values shall be adjusted for in the next upcoming plan cycle without incurring a major adjustment or disruption to the coordinated traffic or sideroad traffic.

A coordination plan shall be allowed to include a pedestrian walk plus don't walk time that exceeds the phase split time. Upon servicing that pedestrian movement, the coordination algorithm shall maintain the coordination plan splits and if the offset start time of the coordination phase window is missed at the top of the cycle, the coordination algorithm shall make adjustments the following cycle according to the user-chosen transition method.

Coordination plan programming shall allow user to insert recalls (minimum, maximum, and pedestrian) on a pattern choice basis.

Coordination transition options shall include at minimum two versions of Dwell and three versions of Shortway.

Controller shall have at least 6 user-selectable formats for defining coordination window split start and stop points. Controller shall have a feature to adjust the user-selectable formats with a stop control of window length or latest possible window point. On a cycle-to-cycle basis, Controller shall be able to reassign phase green time unused by a non-coordinated phase to a following non-coordinated phase.

Pre-emption. Controller shall have a pre-emption algorithm with a minimum of 10 available pre-empt plans. Pre-emption plan activation shall be upon activation of any user-assigned detector – 80 standard detectors and 6 pre-empt detectors.

Pre-emption shall accommodate the following conditions. Each pre-empt condition shall be a unique choice to each of the 10 pre-empt plans.

- Allow the user to define exit conditions for a timed overlap – Standard overlap or Timed
- Alternate unique yellow, red, walk and don't walk time for Select and Return Intervals
- Left Turn Trap Protection routine for Select and Return intervals
- Railroad Pre-emption
- Emergency Vehicle Pre-emption
- Ability to release from the pre-empt dwell interval directly into the correct coordination plan display window.
    - No coordination plan transition occurs
    - Exit is correctly performed according to detector activity, dual entry, and active recalls

- Ability to extend the pre-empt dwell interval and respond to a new pre-empt call occurring during that programmed extend.
- Ability to cycle phases during the pre-empt dwell interval.
    - Some active phases of the cycle interval shall be able to be excluded
    - The controller will establish coordination during the dwell interval if the coordinated phases are included in the cycle during dwell plan
- Unique per pre-empt plan
    - Select
        - Minimum Green
        - Walk
        - Don't walk
        - Yellow
        - All Red
    - Return
        - Minimum Green
        - Walk
        - Don't walk
        - Yellow
        - All Red
    - Minimum Dwell
    - Exit phases

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 6 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 incidental.

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 minimum 5 times checked with an OTDR.

- 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.

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 loadswitch bay using a 12 channel conflict monitor.

The phasing for the new cabinet will be phase 1- EB left, phase 2-EB, phase 4-SB, phase 5- WB left, phase 6- WB & phase 8- NB. The pedestrian crossing on the East side of the road will be split with the North half of the median being phase 4 and the South half being phase 8.

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 personnel at the contractors shop before moving it to the job site.

This work will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER AND TYPE IV CABINET of the type specified which price shall be payment in full for furnishing and installing the controller complete with the necessary connections for proper operation.

FULL-ACTUATED CONTROLLER IN EXISTING CABINET

The installation of a Traffic Actuated Controller shall meet the requirements 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, TS1-1983, Sections 1, 2, 13 and 14.

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 utilizing the new fiber optics being installed on this project.

The controller(s) supplied shall be the Siemens M60 Series for integration into the existing District 9 Eagle Signal system and shall be fully compatible with the District’s Tactics software.

The full-actuated traffic signal controller (Controller) shall meet all the following requirements.

Cabinet Capability. Controller shall be designed to be relocated into a traffic signal cabinet formatted NEMA TS-1, NEMA TS-2 Type 1, or NEMA TS-2 Type 2 controller.

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 legacy controllers of the District, 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:

- (1) USB
- (1)RJ-45
- (2) 25 pin RJ-232 ports for serial communication
- (1) 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, 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
- 4 Phase Banks - an alternate set of phase data selectable by Time of Day command
- 8 overlaps in formats Standard, Flashing Yellow Arrow (FYA), Timed and Pedestrian
- Detector Diagnostics – 3 measurements, 2 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

Coordination. Controller shall offer a minimum of 255 unique patterns.

Minor changes to a coordination plan (+/- 5 seconds) in offset or split values shall be adjusted for in the next upcoming plan cycle without incurring a major adjustment or disruption to the coordinated traffic or sideroad traffic.

A coordination plan shall be allowed to include a pedestrian walk plus don't walk time that exceeds the phase split time. Upon servicing that pedestrian movement, the coordination algorithm shall maintain the coordination plan splits and if the offset start time of the coordination phase window is missed at the top of the cycle, the coordination algorithm shall make adjustments the following cycle according to the user-chosen transition method.

Coordination plan programming shall allow user to insert recalls (minimum, maximum, and pedestrian) on a pattern choice basis.

Coordination transition options shall include at minimum two versions of Dwell and three versions of Shortway.

Controller shall have at least 6 user-selectable formats for defining coordination window split start and stop points. Controller shall have a feature to adjust the user-selectable formats with a stop control of window length or latest possible window point. On a cycle-to-cycle basis, Controller shall be able to reassign phase green time unused by a non-coordinated phase to a following non-coordinated phase.

Pre-emption. Controller shall have a pre-emption algorithm with a minimum of 10 available pre-empt plans. Pre-emption plan activation shall be upon activation of any user-assigned detector – 80 standard detectors and 6 pre-empt detectors.

Pre-emption shall accommodate the following conditions. Each pre-empt condition shall be a unique choice to each of the 10 pre-empt plans.

- Allow the user to define exit conditions for a timed overlap – Standard overlap or Timed
- Alternate unique yellow, red, walk and don't walk time for Select and Return Intervals
- Left Turn Trap Protection routine for Select and Return intervals
- Railroad Pre-emption
- Emergency Vehicle Pre-emption

- Ability to release from the pre-empt dwell interval directly into the correct coordination plan display window.
    - No coordination plan transition occurs
    - Exit is correctly performed according to detector activity, dual entry, and active recalls
- Ability to extend the pre-empt dwell interval and respond to a new pre-empt call occurring during that programmed extend.
- Ability to cycle phases during the pre-empt dwell interval.
    - Some active phases of the cycle interval shall be able to be excluded
    - The controller will establish coordination during the dwell interval if the coordinated phases are included in the cycle during dwell plan
- Unique per pre-empt plan
    - Select
        - Minimum Green
        - Walk
        - Don’t walk
        - Yellow
        - All Red
    - Return
        - Minimum Green
        - Walk
        - Don’t walk
        - Yellow
        - All Red
    - Minimum Dwell
    - Exit phases

Basis of Payment:

This work will be paid for at the contract unit price per each for FULL-ACTUATED CONTROLLER IN EXISTING CABINET which price shall be payment in full for all labor, materials, and equipment required and as detailed in this special provision.

INDUCTIVE LOOP DETECTOR, RACK MOUNTED

The inductive loop detectors shall be rack mount. Each card shall have two channels. Each barrier shall have a separate power supply. Each rack shall be labeled on the shelf as shown below. Each detector amplifier shall have both call delay and call extend features. The delay defeat should only be active during the green of that phase.

Rack Mounted Loop Amplifiers Labeled as follows:

IL 13 @ New Era Rd.

02 EB CALL	06 WB CALL	01 WBLT SL	05 EBLT SL	04 SB SL LT	04 SB RT	08 NB SL LT	08 NB RT
02 SEB ADV	06 WB ADV	01 WBLT ADV	05 EBLT ADV	04 SB SL RT	04 SB ADV	08 NB SL RT	08 NB ADV

FIBER OPTIC UTILITY MARKER

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

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, 1091, and 1092 of the Standard Specifications.

The marker shall have a six foot tall, 3-1/2" diameter post (white), and orange slide over poly-dome marker (3-1/2" OOD, 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.

The Contractor shall furnish the Department with fifty 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-degree 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 3 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.

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 which price shall be payment in full for all labor, materials, and equipment required and as detailed in this special.

DRILL EXISTING FOUNDATION

This work shall consist of drilling all the proper sized holes at a specified foundation to complete conduit installation. Each hole drilled will be considered as a unit. The method for drilling shall be approved by IDOT and Carbondale Traffic personnel 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 and no additional compensation will be allowed.

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.

Each cable shall be clearly labeled in each cabinet utilizing a durable computer generated label. The label shall contain information in regards to the location where the cable is going to or coming from.

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”.

Splicing of fibers will not be allowed between cabinets.

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.

Materials. The single-mode fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall conform to the requirements of RUS 7 CFR1755.900 (PE-90) for a single sheathed cable, and shall be new, unused and of current design and manufacture. Corrugated steel armor should be longitudinally applied over the cable core. The number of fibers in each cable shall be as specified on the plans.

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 (3) 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 demonstration to the Department representatives 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.).

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 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 procedures.

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 manufacturers specifically approve 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 in order 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 5 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 utilizing an Optical Source/Power Meter shall conduct the testing. 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.

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
Attenuation (dB/km)

These results shall be provided in tabular form. 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 proposed fiber and/or fusion splice and connector including that event point.

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

If the total loss exceeds these specifications, the Contractor shall replace or repair that cable run at the Contractor's expense, both labor and materials. 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 in each handhole and termination panel.

Slack Storage of Fiber Optic Cables.

A part of this pay 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 and in the traffic controller cabinets.

The amount of slack cable listed in Article 873.03 shall be revised as follows:

As listed on the plans

Basis of Payment: This work will be paid for at the contract unit price per foot for FIBER OPTIC CABLE 12 FIBERS, SINGLE MODE, FIBER OPTIC CABLE 48 FIBERS, SINGLE MODE or FIBER OPTIC CABLE 144 FIBERS, SINGLE MODE and shall be payment in full for all labor, equipment, and materials required to provide, install, terminate, splice, and test the fiber optic cable described above, complete.

LOCATION OF UNDERGROUND STATE MAINTAINED FACILITIES

The Contractor shall be responsible for locating all existing IDOT underground electrical and/or fiber optic facilities prior to performing any work at his/her own expense if required. The Contractor shall also be liable for any damage to facilities resulting from inaccurate locating. The Contractor may obtain, on request, plans of existing electrical facilities from the Department.

The Contractor shall also be responsible for locating and providing protection for facilities during all phases of construction. If at any time, the facilities are damaged, the Contractor shall immediately notify the Department and make all necessary arrangements for repair. This work shall be to the satisfaction of the Engineer. It shall be considered included in the various contract pay items and no additional compensation will be allowed.

SALVAGE EXISTING TRAFFIC SIGNAL CONTROLLERS

The existing signal cabinet at New Era Rd. shall be salvaged and delivered to the Carbondale IDOT office. All existing traffic signal controllers that are to be removed within the scope of this project shall be salvaged and delivered to the Carbondale IDOT office. The Contractor shall coordinate storage and delivery of the existing cabinet/controllers with the IDOT Traffic Section.

LOCATING UNDERGROUND UTILITIES

Description

This item shall consist of the process of exposing and determining the location of existing underground utilities to avoid “blind” or obtrusive bores. This process is commonly referred to as potholing.

The Contractor shall pothole all underground utilities within project limits to the frequency as directed by the Engineer. Prior to exposing any utilities, the Contractor shall locate all applicable existing utilities as required by JULIE law, and obtain any permits or approvals for access required to perform the work. The Contractor shall also establish traffic control if required by the Engineer according to applicable traffic control standards

Methods and Equipment

The Contractor shall provide 6” diameter minimum potholes by an approved method, either hand dug or machine dug, at the frequency and locations specified by the Engineer. All proposed utility crossings shall be exposed and potholed beyond the depth of the Contractor’s excavation of work at that location for both inspection and verification of vertical utility clearances. The Contractor shall submit any surveyed elevation data to the Engineer to be included in the As-Built plans.

Construction Requirements

The Contractor shall make efforts to protect all open potholes during construction activities. The Contractor shall notify the Engineer immediately if any utility is damaged during construction or if any utility conflicts with the proposed work.

Backfilling Requirements

All potholes made from utility exploration shall be pumped dry, and any mud or loose material within the space removed before backfilling. The potholes shall be backfilled as follows.

(1) For potholes made within 2 ft (600 mm) of pavement, curb, gutter, curb and gutter, or stabilized shoulder, the potholes shall be backfilled with controlled low-strength material (CLSM) according to Articles 593.01, 593.02, 593.03, and 593.04.

(2) For potholes made within 2 ft (600 mm) of sidewalk or aggregate surfaces, the potholes shall be backfilled with porous granular material according to Articles 207.01, 207.02, and 207.03.

(3) All other potholes shall be backfilled with select material. The select material shall be from excavation or borrow, free from large or frozen lumps, clods, or rock, meeting the approval of the Engineer. The material shall be placed in lifts not exceeding 8 in. (200 mm) in depth, loose measurement, and compacted to the satisfaction of the Engineer.

Removal and replacement of existing sidewalk, pavement and islands only for utility locating purposes will not be paid for separately but shall be included in the contract bid price for LOCATING UNDERGROUND UTILITIES.

Method of Measurement
Measurement for payment will be per foot per pothole as indicated or as agreed upon, directed by, or approved by the Engineer. Multiple potholes made to obtain the location of a singular utility facility to be crossed at the same location will be measured as foot per pothole per facility.

Basis of payment
This work will be paid for at the contract unit price per foot for LOCATING UNDERGROUND UTILITIES as measured from the existing ground surface to the top of the exposed utility. This price includes all labor, equipment and incidentals associated with the excavation including any survey, backfilling, or patching.

CONTRACT GUARANTEE

The Contractor shall guarantee all electrical equipment, apparatus, materials, and workmanship provided under the contract for a period of six (6) months after the date of final inspection according to Article 801.14. All instruction sheets required to be furnished by the manufacturer for materials and supplies and for operations shall be delivered to the Engineer prior to the acceptance of the project, with the following warranties and guarantees:

1. The manufacturer's standard written warranty for each piece of electrical equipment or apparatus furnished under the contract.

2. The Contractor's written guarantee that, for a period of six (6) months after the date of final inspection of the project, all necessary repairs to or replacement of said warranted equipment, or apparatus shall be made by the Contractor at no cost to the Department.

3. The Contractor's written guarantee for satisfactory operation of all electrical systems furnished and constructed under the contract for a period of 6 months after final inspection of the project

AS-BUILT DOCUMENTATION

The Contractor shall locate all proposed 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 contract bid price for UNDERGROUND CONDUIT, COILABLE NONMETTALIC CONDUIT, 1 1/2" DIA..

TRAFFIC SIGNAL SYSTEM SHUTDOWN

Before the New Era intersection is shutdown, both District 9 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 (1) 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.

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."

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)

Effective: September 1, 2000 Revised: March 2, 2019

FEDERAL 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 by the Department in accordance with the requirements of 49 CFR Part 26 and listed in the Illinois Unified Certification Program (IL UCP) DBE Directory.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract the Contractor signs with a subcontractor.

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 contracts funded in whole or in part with federal or state funds. 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:

(a) Withholding progress payments;

(b) Assessing sanctions;

(c) Liquidated damages; and/or

(d) Disqualifying the Contractor from future bidding as non-responsible.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR Part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE companies performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates, in the absence of unlawful discrimination and in an arena of fair and open competition, DBE companies can be expected to perform **0.00%** 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. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

(a) The bidder documents enough DBE participation has been obtained to meet the goal or,

(b) The bidder documents a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at:
http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index.

BIDDING PROCEDURES. Compliance with this Special Provision is a material bidding requirement and failure of the bidder to comply will render the bid not responsive.

The bidder shall submit a DBE Utilization Plan (form SBE 2026), and a DBE Participation Statement (form SBE 2025) for each DBE company proposed for the performance of work to achieve the contract goal, with the bid. If the Utilization Plan indicates the contract goal will not be met, documentation of good faith efforts shall also be submitted. The documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract. The required forms and documentation must 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 Utilization Plan if it does not meet the bidding procedures set forth herein and the bid will be declared not responsive. In the event the bid is declared not 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.

GOOD FAITH EFFORT PROCEDURES. 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 enough DBE participation has been obtained or document the good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will 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 bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. This means the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which, by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not successful. The Department will consider the quality, quantity, and intensity of the kinds of efforts the bidder has made. Mere *pro forma* efforts, in other words efforts done as a matter of form, are not good faith efforts; rather, the bidder is expected to have taken genuine efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

(a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases and will be considered by the Department.

(1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.

(2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Contractor might otherwise prefer to perform these work items with its own forces.

(3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.

b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable. In accordance with the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.

(5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

(7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.

(b) If the Department determines the bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided it is otherwise eligible for award. If the Department determines the bidder has failed to meet the requirements of this Special Provision or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification will also include a statement of reasons for the adverse determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period to cure the deficiency.

(c) The bidder may request administrative reconsideration of an adverse determination by emailing the Department at "DOT.DBE.UP@illinois.gov" within the five calendar days after the receipt of the notification of the determination. The determination shall become final if a request is not made on or before the fifth calendar day. A request may provide additional written documentation or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be reviewed by the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person to consider all issues of documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed 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 companies. 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 counting guidelines are provided in 49 CFR Part 26.55, the provisions of which govern over the summary contained herein.

(a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE does not count toward the DBE goals.

(b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.

(c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE does not count toward the DBE goal.

(d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contract. Credit will be given for the following:

    (1) The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.

    (2) The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission is receives as a result of the lease arrangement.

(e) DBE as a material supplier:

    (1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.

    (2) 100 percent goal credit for the cost of materials of supplies obtained from a DBE manufacturer.

(3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a DBE regular dealer or DBE manufacturer.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. 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 goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Utilization Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal. All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the DBE Participation Commitment Statement.

(a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be emailed to the Department at DOT.DBE.UP@illinois.gov.

(b) CHANGES TO WORK. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, a new Request for Approval of Subcontractor will not be required. However, the Contractor must document efforts to assure the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.

(c) SUBCONTRACT. The Contractor must provide copies of 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.

(d) ALTERNATIVE WORK METHODS. In addition to the above requirements for reductions in the condition of award, additional requirements apply to the two cases of Contractor-initiated work substitution proposals. Where the contract allows alternate work methods which serve to delete or create underruns in condition of award DBE work, and the Contractor selects that alternate method or, where the Contractor proposes a substitute work method or material that serves to diminish or delete work committed to a DBE and replace it with other work, then the Contractor must demonstrate one of the following:

(1) The replacement work will be performed by the same DBE (as long as the DBE is certified in the respective item of work) in a modification of the condition of award; or

(2) The DBE is aware its work will be deleted or will experience underruns and has agreed in writing to the change. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so; or

(3) The DBE is not capable of performing the replacement work or has declined to perform the work at a reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.

(e) TERMINATION AND REPLACEMENT PROCEDURES. The Contractor shall not terminate or replace a DBE listed on the approved Utilization Plan, or perform with other forces work designated for a listed DBE except as provided in this Special Provision. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the Department's written consent as provided in subsection (a) of this part. Unless Department consent is provided for termination of a DBE subcontractor, the Contractor shall not be entitled to any payment for work or material unless it is performed or supplied by the DBE in the Utilization Plan.

As stated above, the Contractor shall not terminate or replace a DBE subcontractor listed in the approved Utilization Plan without prior written consent. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. Written consent will be granted only if the Bureau of Small Business Enterprises agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate or replace the DBE firm. Before transmitting to the Bureau of Small Business Enterprises any request to terminate and/or substitute a DBE subcontractor, the Contractor shall give notice in writing to the DBE subcontractor, with a copy to the Bureau, of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor shall give the DBE five days to respond to the Contractor's notice. The DBE so notified shall advise the Bureau and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Bureau should not approve the Contractor's action. If required in a particular case as a matter of public necessity, the Bureau may provide a response period shorter than five days.

For purposes of this paragraph, good cause includes the following circumstances:

(1) The listed DBE subcontractor fails or refuses to execute a written contract;

(2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor;

(3) The listed DBE subcontractor fails or refuses to meet the Contractor's reasonable, nondiscriminatory bond requirements;

(4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;

(5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.

(6) The Contractor has determined the listed DBE subcontractor is not a responsible contractor;

(7) The listed DBE subcontractor voluntarily withdraws from the projects and provides written notice to the Contractor of its withdrawal;

(8) The listed DBE is ineligible to receive DBE credit for the type of work required;

(9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;

(10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE contractor was engaged or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.

When a DBE is terminated or fails to complete its work on the Contract for any reason, the Contractor shall make a good faith effort to find another DBE to substitute for the original DBE to perform at least the same amount of work under the contract as the terminated DBE to the extent needed to meet the established Contract goal. The good faith efforts shall be documented by the Contractor. If the Department requests documentation under this provision, the Contractor shall submit the documentation within seven days, which may be extended for an additional seven days if necessary at the request of the Contractor. The Department will provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

(f) FINAL PAYMENT. After the performance of the final item of work or delivery of material by a DBE and final payment therefore 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 on Department form SBE 2115 to the Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes the work has not been satisfactorily completed. 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. The Contractor may request an administrative reconsideration of any amount deducted as damages pursuant to subsection (h) of this part.

(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.

(h) RECONSIDERATION. Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of “Good Faith Effort Procedures” of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

DISPOSAL FEES (BDE)
Effective: November 1, 2018

Replace Articles 109.04(b)(5) – 109.04(b)(8) of the Standard Specifications with the following:

“(5) Disposal Fees. When the extra work performed includes paying for disposal fees at a clean construction and demolition debris facility, an uncontaminated soil fill operation or a landfill, the Contractor shall receive, as administrative costs, an amount equal to five percent of the first $10,000 and one percent of any amount over $10,000 of the total approved costs of such fees.

(6) Miscellaneous. No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

(7) Statements. No payment will be made for work performed on a force account basis until the Contractor has furnished the Engineer with itemized statements of the cost of such force account work. Statements shall be accompanied and supported by invoices for all materials used and transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his/her stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

Itemized statements at the cost of force account work shall be detailed as follows.

a. Name, classification, date, daily hours, total hours, rate, and extension for each laborer and foreman. Payrolls shall be submitted to substantiate actual wages paid if so requested by the Engineer.

b. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.

c. Quantities of materials, prices and extensions.

d. Transportation of materials.

e. Cost of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions, and social security tax.

(8) Work Performed by an Approved Subcontractor. When extra work is performed by an approved subcontractor, the Contractor shall receive, as administrative costs, an amount equal to five percent of the total approved costs of such work with the minimum payment being $100.

(9) All statements of the cost of force account work shall be furnished to the Engineer not later than 60 days after receipt of the Central Bureau of Construction form "Extra Work Daily Report". If the statement is not received within the specified time frame, all demands for payment for the extra work are waived and the Department is released from any and all such demands. It is the responsibility of the Contractor to ensure that all statements are received within the specified time regardless of the manner or method of delivery."

EQUIPMENT PARKING AND STORAGE (BDE)
Effective: November 1, 2017

Replace the first paragraph of Article 701.11 of the Standard Specifications with the following.

"**701.11 Equipment Parking and Storage.** During working hours, all vehicles and/or nonoperating equipment which are parked, two hours or less, shall be parked at least 8 ft (2.5 m) from the open traffic lane. For other periods of time during working and for all nonworking hours, all vehicles, materials, and equipment shall be parked or stored as follows.

(a) When the project has adequate right-of-way, vehicles, materials, and equipment shall be located a minimum of 30 ft (9 m) from the pavement.

(b) When adequate right-of-way does not exist, vehicles, materials, and equipment shall be located a minimum of 15 ft (4.5 m) from the edge of any pavement open to traffic.

(c) Behind temporary concrete barrier, vehicles, materials, and equipment shall be located a minimum of 24 in. (600 mm) behind free standing barrier or a minimum of 6 in. (150 mm) behind barrier that is either pinned or restrained according to Article 704.04. The 24 in. or 6 in. measurement shall be from the base of the non-traffic side of the barrier.

(d) Behind other man-made or natural barriers meeting the approval of the Engineer."

LIGHTS ON BARRICADES (BDE)
Effective: January 1, 2018

Revise Article 701.16 of the Standard Specifications to read:

"**701.16 Lights.** Lights shall be used on devices as required in the plans, the traffic control plan, and the following table.

Circumstance	Lights Required
Daylight operations	None
First two warning signs on each approach to the work involving a nighttime lane closure and "ROUGH GROOVED SURFACE" (W8-I107) signs	Flashing mono-directional lights
Devices delineating isolated obstacles, excavations, or hazards at night (Does not apply to patching)	Flashing bi-directional lights
Devices delineating obstacles, excavations, or hazards exceeding 100 ft (30 m) in length at night (Does not apply to widening)	Steady burn bi-directional lights
Channelizing devices for nighttime lane closures on two-lane roads	None
Channelizing devices for nighttime lane closures on multi-lane roads	None
Channelizing devices for nighttime lane closures on multi-lane roads separating opposing directions of traffic	None
Channelizing devices for nighttime along lane shifts on multilane roads	Steady burn mono-directional lights
Channelizing devices for night time along lane shifts on two lane roads	Steady burn bi-directional lights
Devices in nighttime lane closure tapers on Standards 701316 and 701321	Steady burn bi-directional lights
Devices in nighttime lane closure tapers	Steady burn mono-directional lights
Devices delineating a widening trench	None
Devices delineating patches at night on roadways with an ADT less than 25,000	None
Devices delineating patches at night on roadways with an ADT of 25,000 or more	None

Batteries for the lights shall be replaced on a group basis at such times as may be specified by the Engineer."

Delete the fourth sentence of the first paragraph of Article 701.17(c)(2) of the Standard Specifications.

Revise the first paragraph of Article 603.07 of the Standard Specifications to read:

"**603.07 Protection Under Traffic.** After the casting has been adjusted and Class SI concrete has been placed, the work shall be protected by a barricade for at least 72 hours."

PAYMENTS TO SUBCONTRACTORS (BDE)
Effective: November 2, 2017

Add the following to the end of the fourth paragraph of Article 109.11 of the Standard Specifications:

"If reasonable cause is asserted, written notice shall be provided to the applicable subcontractor and/or material supplier and the Engineer within five days of the Contractor receiving payment. The written notice shall identify the contract number, the subcontract or material purchase agreement, a detailed reason for refusal, the value of payment being withheld, and the specific remedial actions required of the subcontractor and/or material supplier so that payment can be made."

PROGRESS PAYMENTS (BDE)
Effective: November 2, 2013

Revise Article 109.07(a) of the Standard Specifications to read:

"(a) Progress Payments. At least once each month, the Engineer will make a written estimate of the quantity of work performed in accordance with the contract, and the value thereof at the contract unit prices. The amount of the estimate approved as due for payment will be vouchered by the Department and presented to the State Comptroller for payment. No amount less than $1000.00 will be approved for payment other than the final payment.

Progress payments may be reduced by liens filed pursuant to Section 23(c) of the Mechanics' Lien Act, 770 ILCS 60/23(c).

If a Contractor or subcontractor has defaulted on a loan issued under the Department's Disadvantaged Business Revolving Loan Program (20 ILCS 2705/2705-610), progress payments may be reduced pursuant to the terms of that loan agreement. In such cases, the amount of the estimate related to the work performed by the Contractor or subcontractor, in default of the loan agreement, will be offset, in whole or in part, and vouchered by the Department to the Working Capital Revolving Fund or designated escrow account. Payment for the work shall be considered as issued and received by the Contractor or subcontractor on the date of the offset voucher. Further, the amount of the offset voucher shall be a credit against the Department's obligation to pay the Contractor, the Contractor's obligation to pay the subcontractor, and the Contractor's or subcontractor's total loan indebtedness to the Department. The offset shall continue until such time as the entire loan indebtedness is satisfied. The Department will notify the Contractor and Fund Control Agent in a timely manner of such offset. The Contractor or subcontractor shall not be entitled to additional payment in consideration of the offset.

The failure to perform any requirement, obligation, or term of the contract by the Contractor shall be reason for withholding any progress payments until the Department determines that compliance has been achieved."

RAILROAD PROTECTIVE LIABILITY INSURANCE (5 AND 10) (BDE)
Effective: January 1, 2006

Description. Railroad Protective Liability and Property Damage Liability Insurance shall be carried according to Article 107.11 of the Standard Specifications, except the limits shall be a minimum of $5,000,000 combined single limit per occurrence for bodily injury liability and property damage liability with an aggregate limit of $10,000,000 over the life of the policy. A separate policy is required for each railroad unless otherwise noted.

NAMED INSURED & ADDRESS	NUMBER & SPEED OF PASSENGER TRAINS	NUMBER & SPEED OF FREIGHT TRAINS
Canadian National / Illinois Central Railroad Company 17641 South Ashland Ave. Homewood, IL 60430	6@15mph	14@40mph
DOT/AAR No.: 299005M RR Division: Illinois	RR Mile Post: 308.10 RR Sub-Division: Centralia	
For Freight/Passenger Information Contact: Paul Chojenski		Phone: 708.332.3557
For Insurance Information Contact: Paul Chojenski		Phone: 708.332.3557

Approval of Insurance. The original and one certified copy of each required policy shall be submitted to the following address for approval:

Illinois Department of Transportation
Bureau of Design and Environment
2300 South Dirksen Parkway, Room 326
Springfield, Illinois 62764

The Contractor will be advised when the Department has received approval of the insurance from the railroad(s). Before any work begins on railroad right-of-way, the Contractor shall submit to the Engineer evidence that the required insurance has been approved by the railroad(s). The Contractor shall also provide the Engineer with the expiration date of each required policy.

Basis of Payment. Providing Railroad Protective Liability and Property Damage Liability Insurance will be paid for at the contract unit price per Lump Sum for RAILROAD PROTECTIVE LIABILITY INSURANCE.

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (BDE)
Effective: January 1, 2019

Revise Section 669 of the Standard Specifications to read:

"**SECTION 669. REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES**

669.01 Description. This work shall consist of the transportation and proper disposal of contaminated soil and groundwater. This work shall also consist of the removal, transportation, and proper disposal of underground storage tanks (UST), their content and associated underground piping to the point where the piping is above the ground, including determining the content types and estimated quantities.

669.02 Equipment. The Contractor shall notify the Engineer of the delivery of all excavation, storage, and transportation equipment to a work area location. The equipment shall comply with OSHA and American Petroleum Institute (API) guidelines and shall be furnished in a clean condition. Clean condition means the equipment does not contain any residual material classified as a non-special waste, non-hazardous special waste, or hazardous waste. Residual materials include, but are not limited to, petroleum products, chemical products, sludges, or any other material present in or on equipment.

Before beginning any associated soil or groundwater management activity, the Contractor shall provide the Engineer with the opportunity to visually inspect and approve the equipment. If the equipment contains any contaminated residual material, decontamination shall be performed on the equipment as appropriate to the regulated substance and degree of contamination present according to OSHA and API guidelines. All cleaning fluids used shall be treated as the contaminant unless laboratory testing proves otherwise.

669.03 Pre-construction Submittals. Prior to beginning this work, or working in areas with regulated substances, the Contractor shall submit a Regulated Substance Pre-Construction Plan (RSPCP) to the Engineer for review and approval using form BDE 2730. The form shall be signed by an Illinois licensed Professional Engineer or Professional Geologist.

As part of the RSPCP, the qualifications of Contractor(s) or firm(s) performing the following work shall be listed.

(a) On-Site Monitoring. Qualification for on-site monitoring of regulated substance work and on-site monitoring of UST removal requires either pre-qualification in Hazardous Waste by the Department or demonstration of acceptable project experience in remediation and special waste operations for contaminated sites in accordance with applicable Federal, State, or local regulatory requirements.

Qualification for each individual performing on-site monitoring requires a minimum of one-year of experience in similar activities as those required for the project.

(b) Underground Storage Tank. Qualification for underground storage tank (UST) work requires licensing and certification with the Office of the State Fire Marshall (OSFM) and possession of all permits required to perform the work. A copy of the permit shall be provided to the Engineer prior to tank removal.

The qualified Contractor(s) or firm(s) shall also document it does not have any current or former ties with any of the properties contained within, adjoining, or potentially affecting the work.

The Engineer will require up to 30 calendar days for review of the RSPCP. The review may involve rejection or revision and resubmittal; in which case, an additional 30 days will be required for each subsequent review. Work shall not commence until the RSPCP has been approved by the Engineer. After approval, the RSPCP shall be revised as necessary to reflect changed conditions in the field.

CONSTRUCTION REQUIREMENTS

669.04 Contaminated Soil and/or Groundwater Monitoring. Prior to beginning excavation, the Contractor shall mark the limits of removal for approval by the Engineer. Once excavation begins, the work and work area involving regulated substances shall be monitored by qualified personnel. The qualified personnel shall be on-site continuously during excavation and loading of material containing regulated substances. The qualified personnel shall be equipped with either a photoionization detector (PID) (minimum 10.6eV lamp), or a flame ionization detector (FID), and other equipment, as appropriate, to monitor for potential contaminants associated with volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs). The PID or FID meter shall be calibrated on-site and background level readings taken and recorded daily, and as field and weather conditions change. Any field screen reading on the PID or FID in excess of background levels indicates the potential presence of contaminated material requiring handling as a non-special waste, special waste, or hazardous waste. PID or FID readings may be used as the basis of increasing the limits of removal with the approval of the Engineer but shall in no case be used to decrease the limits.

The qualified personnel shall document field activities using form BDE 2732 (Regulated Substances Monitoring Daily Record) including the name(s) of personnel conducting the monitoring, weather conditions, PID or FID calibration records, a list of equipment used on-site, a narrative of activities completed, photo log sheets, manifests and landfill tickets, monitoring results, how regulated substances were managed and other pertinent information.

Samples will be collected in accordance with the RSPCP. Samples shall be analyzed for the contaminants of concern (COCs), including pH, based on the property's land use history, the encountered abnormality and/or the parameters listed in the maximum allowable concentration (MAC) for chemical constituents in uncontaminated soil established pursuant to Subpart F of 35 Ill. Adm. Code 1100.605. The analytical results shall serve to document the level of contamination.

Samples shall be grab samples (not combined with other locations). The samples shall be taken with decontaminated or disposable instruments. The samples shall be placed in sealed containers and transported in an insulated container to the laboratory. The container shall maintain a temperature of 39 °F (4 °C). All samples shall be clearly labeled. The labels shall indicate the sample number, date sampled, collection location and depth, and any other relevant observations.

The laboratory shall use analytical methods which are able to meet the lowest appropriate practical quantitation limits (PQL) or estimated quantitation limit (EQL) specified in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", EPA Publication No. SW-846; "Methods for the Determination of Organic Compounds in Drinking Water", EPA, EMSL, EPA-600/4-88/039; and “Methods for the Determination of Organic Compounds in Drinking Water, Supplement III”, EPA 600/R-95/131, August 1995. For parameters where the specified cleanup objective is below the acceptable detection limit (ADL), the ADL shall serve as the cleanup objective. For other parameters the ADL shall be equal to or below the specified cleanup objective.

669.05 Contaminated Soil and/or Groundwater Management and Disposal. The management and disposal of contaminated soil and/or groundwater shall be according to the following:

(a) Soil Analytical Results Exceed Most Stringent MAC. When the soil analytical results indicate that detected levels exceed the most stringent maximum allowable concentration (MAC) for chemical constituents in uncontaminated soil established pursuant to Subpart F of 35 Illinois Administrative Code 1100.605, the soil shall be managed as follows:

(1) When analytical results indicate inorganic chemical constituents exceed the most stringent MAC but they are still considered within area background levels by the Engineer, the excavated soil can be utilized within the construction limits as fill, when suitable. If the soils cannot be utilized within the construction limits, they shall be managed and disposed of off-site as a non-special waste, special waste, or hazardous waste as applicable.

(2) When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for a Metropolitan Statistical Area (MSA) County, the excavated soil can be utilized within the construction limits as fill, when suitable, or managed and disposed of off-site as “uncontaminated soil” at a clean construction and demolition debris (CCDD) facility or an uncontaminated soil fill operation (USFO) within an MSA County provided the pH of the soil is within the range of 6.25 - 9.0, inclusive.

(3) When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for an MSA County excluding Chicago, or the MAC within the Chicago corporate limits, the excavated soil can be utilized within the construction limits as fill, when suitable, or managed and disposed of off-site as “uncontaminated soil” at a CCDD facility or an USFO within an MSA County excluding Chicago or within the Chicago corporate limits provided the pH of the soil is within the range of 6.25 - 9.0, inclusive.

(4) When analytical results indicate chemical constituents exceed the most stringent MAC but do not exceed the MAC for an MSA County excluding Chicago, the excavated soil can be utilized within the construction limits as fill, when suitable, or managed and disposed of off-site as “uncontaminated soil” at a CCDD facility or an USFO within an MSA County excluding Chicago provided the pH of the soil is within the range of 6.25 - 9.0, inclusive.

(5) When the Engineer determines soil cannot be managed according to Articles 669.05(a)(1) through (a)(4) above, the soil shall be managed and disposed of off-site as a non-special waste, special waste, or hazardous waste as applicable.

(b) Soil Analytical Results Do Not Exceed Most Stringent MAC. When the soil analytical results indicate that detected levels do not exceed the most stringent MAC, the excavated soil can be utilized within the construction limits or managed and disposed off-site as “uncontaminated soil” according to Article 202.03. However, the excavated soil cannot be taken to a CCDD facility or an USFO for any of the following reasons.

(1) The pH of the soil is less than 6.25 or greater than 9.0.

(2) The soil exhibited PID or FID readings in excess of background levels.

(c) Soil Analytical Results Exceed Most Stringent MAC but Do Not Exceed Tiered Approach to Corrective Action Objectives (TACO) Residential. When the soil analytical results indicate that detected levels exceed the most stringent MAC but do not exceed TACO Tier 1 Soil Remediation Objectives for Residential Properties pursuant to 35 IAC 742 Appendix B Table A, the excavated soil can be utilized within the right-of-way or managed and disposed off-site as “uncontaminated soil” according to Article 202.03. However, the excavated soil cannot be taken to a CCDD facility or an USFO.

(d) Groundwater. When groundwater analytical results indicate the detected levels are above Appendix B, Table E of 35 Illinois Administrative Code 742, the most stringent Tier 1 Groundwater Remediation Objectives for Groundwater Component of the Groundwater Ingestion Route for Class 1 groundwater, the groundwater shall be managed off-site as a special waste. The groundwater shall be containerized and trucked to an off-site treatment facility or may be discharged to a sanitary sewer or combined sewer when permitted by the local sewer authority. Groundwater discharged to a sewer shall be pre-treated to remove particulates and measured with a calibrated flow meter to comply with applicable discharge limits. A copy of the permit shall be provided to the Engineer prior to discharging groundwater to the sewer.

All groundwater encountered within trenches may be managed within the trench and allowed to infiltrate back into the ground. If the groundwater cannot be managed within the trench it must be removed as a special or hazardous waste. The Contractor is prohibited from managing groundwater within the trench by discharging it through any existing or new storm sewer. The Contractor shall install backfill plugs within the area of groundwater contamination.

One backfill plug shall be placed down gradient to the area of groundwater contamination. Backfill plugs shall be installed at intervals not to exceed 50 ft (15 m). Backfill plugs are to be 4 ft (1.2 m) long, measured parallel to the trench, full trench width and depth. Backfill plugs shall not have any fine aggregate bedding or backfill, but shall be entirely cohesive soil or any class of concrete. The Contractor shall provide test data that the material has a permeability of less than 10^{-7} cm/sec according to ASTM D 5084, Method A or per another test method approved by the Engineer.

The Contractor shall use due care when transferring contaminated material from the area of origin to the transporter. Should releases of contaminated material to the environment occur (i.e., spillage onto the ground, etc.), the Contractor shall clean-up spilled material and place in the appropriate storage containers as previously specified. Clean-up shall include, but not be limited to, sampling beneath the material staging area to determine complete removal of the spilled material.

The Contractor shall be responsible for transporting and disposing all material classified as a non-special waste, special waste, or hazardous waste from the job site to an appropriately permitted landfill facility. The transporter and the vehicles used for transportation shall comply with all federal, state, and local rules and regulations governing the transportation of non-special waste, special waste, or hazardous waste.

All equipment used by the Contractor to haul contaminated material to the landfill facility shall be lined with a 6 mil (150 micron) polyethylene liner and securely covered during transportation. The Contractor shall obtain all documentation including any permits and/or licenses required to transport the contaminated material to the disposal facility.

The Contractor shall provide engineered barriers, when required, and shall include materials sufficient to completely line excavation surfaces, including sloped surfaces, bottoms, and sidewall faces, within the areas designated for protection.

The Engineer shall coordinate with the Contractor on the completion of all documentation. The Contractor shall make all arrangements for collection and analysis of landfill acceptance testing. The Contractor shall coordinate for waste disposal approval with the disposal facility. After the Contractor completes these activities and upon receipt of authorization from the Engineer, the Contractor shall initiate the disposal process.

The Contractor shall provide the Engineer with all transport-related documentation within two days of transport or receipt of said document(s). The Engineer shall maintain the file for all such documentation. For management of special or hazardous waste, the Contractor shall provide the Engineer with documentation the Contractor (or subcontractor, if a subcontractor is used for transportation) is operating with a valid Illinois special waste transporter permit at least two weeks before transporting the first load of contaminated material.

The Contractor shall schedule and arrange the transport and disposal of each load of contaminated material produced. The Contractor shall make all transport and disposal arrangements so no contaminated material remains within the project area at the close of business each day. Exceptions to this specification require prior approval from the Engineer within 24 hours of close of business. The Contractor shall be responsible for all other pre-disposal/transport preparations necessary daily to accomplish management activities.

Any waste generated as a special or hazardous waste from a non-fixed facility shall be manifested off-site using the Department's county generator number. An authorized representative of the Department shall sign all manifests for the disposal of the contaminated material and confirm the Contractor's transported volume. Any waste generated as a non-special waste may be managed off-site without a manifest, a special waste transporter, or a generator number.

The Contractor shall select a landfill mandated by definition of the contaminant within the State of Illinois. The Department will review and approve or reject the facility proposed by the Contractor to use as a landfill. The Contractor shall verify whether the selected disposal facility is compliant with those applicable standards as mandated by definition of the contaminant and whether the disposal 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 Contractor shall be responsible for coordinating permits with the IEPA. The use of a Contractor selected landfill shall in no manner delay the construction schedule or alter the Contractor's responsibilities as set forth.

669.06 Non-Special Waste Certification. An authorized representative of the Department shall sign and date all non-special waste certifications. The Contractor shall be responsible for providing the Engineer with the required information that will allow the Engineer to certify the waste is not a special waste.

(a) Definition. A waste is considered a non-special waste as long as it is not:

(1) a potentially infectious medical waste;

(2) a hazardous waste as defined in 35 IAC 721;

(3) an industrial process waste or pollution control waste that contains liquids, as determined using the paint filter test set forth in subdivision (3)(A) of subsection (m) of 35 IAC 811.107;

(4) a regulated asbestos-containing waste material, as defined under the National Emission Standards for Hazardous Air Pollutants in 40 CFR 61.141;

(5) a material containing polychlorinated biphenyls (PCB's) regulated pursuant to 40 CFR Part 761;

(6) a material subject to the waste analysis and recordkeeping requirements of 35 IAC 728.107 under land disposal restrictions of 35 IAC 728;

(7) a waste material generated by processing recyclable metals by shredding and required to be managed as a special waste under Section 22.29 of the Environmental Protection Act; or

(8) an empty portable device or container in which a special or hazardous waste has been stored, transported, treated, disposed of, or otherwise handled.

(b) Certification Information. All information used to determine the waste is not a special waste shall be attached to the certification. The information shall include but not be limited to:

(1) the means by which the generator has determined the waste is not a hazardous waste;

(2) the means by which the generator has determined the waste is not a liquid;

(3) if the waste undergoes testing, the analytic results obtained from testing, signed and dated by the person responsible for completing the analysis;

(4) if the waste does not undergo testing, an explanation as to why no testing is needed;

(5) a description of the process generating the waste; and

(6) relevant material safety data sheets.

669.07 Temporary Staging. The Contractor shall excavate and dispose of all waste material as mandated by the contaminants without temporary staging. If circumstances require temporary staging, he/she shall request in writing, approval from the Engineer.

When approved, the Contractor shall prepare a secure location within the project area capable of housing containerized waste materials. The Contractor shall contain all waste material in leak-proof storage containers such as lined roll-off boxes or 55 gal (208 L) drums, or stored in bulk fashion on storage pads. The design and construction of such storage pad(s) for bulk materials shall be subject to approval by the Engineer. The Contractor shall place the staged storage containers on an all-weather gravel-packed, asphalt, or concrete surface. The Contractor shall maintain a clearance both above and beside the storage units to provide maneuverability during loading and unloading. The Contractor shall provide any assistance or equipment requested by the Engineer for authorized personnel to inspect and/or sample contents of each storage container. All containers and their contents shall remain intact and undisturbed by unauthorized persons until the manner of disposal is determined. The Contractor shall keep the storage containers covered, except when access is requested by authorized personnel of the Department. The Engineer shall authorize any additional material added to the contents of any storage container before being filled.

The Contractor shall ensure the staging area is enclosed (by a fence or other structure) to ensure direct access to the area is restricted, and he/she shall procure and place all required regulatory identification signs applicable to an area containing the waste material. The Contractor shall be responsible for all activities associated with the storage containers including, but not limited to, the procurement, transport, and labeling of the containers. The Contractor shall clearly mark all containers in permanent marker or paint with the date of waste generation, location and/or area of waste generation, and type of waste (e.g., decontamination water, contaminated clothing, etc.). The Contractor shall place these identifying markings on an exterior side surface of the container. The Contractor shall separately containerize each contaminated medium, i.e. contaminated clothing is placed in a separate container from decontamination water. Containers used to store liquids shall not be filled in excess of 80 percent of the rated capacity. The Contractor shall not use a storage container if visual inspection of the container reveals the presence of free liquids or other substances that could classify the material as a hazardous waste in the container.

The Department will not be responsible for any additional costs incurred, if mismanagement of the staging area, storage containers, or their contents by the Contractor results in excess cost expenditure for disposal or other material management requirements.

669.08 Underground Storage Tank Removal. For the purposes of this section, an underground storage tank (UST) includes the underground storage tank, piping, electrical controls, pump island, vent pipes and appurtenances.

Prior to removing an UST, the Engineer shall determine whether the Department is considered an "owner" or "operator" of the UST as defined by the UST regulations (41 Ill. Adm. Code Part 176). Ownership of the UST refers to the Department's owning title to the UST during storage, use or dispensing of regulated substances. The Department may be considered an "operator" of the UST if it has control of, or has responsibility for, the daily operation of the UST. The Department may however voluntarily undertake actions to remove an UST from the ground without being deemed an "operator" of the UST.

In the event the Department is deemed not to be the "owner" or "operator" of the UST, the OSFM removal permit shall reflect who was the past "owner" or "operator" of the UST. If the "owner" or "operator" cannot be determined from past UST registration documents from OSFM, then the OSFM removal permit will state the "owner" or "operator" of the UST is the Department. The Department’s Office of Chief Counsel (OCC) will review all UST removal permits prior to submitting any removal permit to the OSFM. If the Department is not the “owner” or “operator” of the UST then it will not register the UST or pay any registration fee.

The Contractor shall be responsible for obtaining all permits required for removing the UST, notification to the OSFM, using an OSFM certified tank contractor, removal and disposal of the UST and its contents, and preparation and submittal of the OSFM Site Assessment Report in accordance with 41 Ill. Adm. Code Part 176.330.

The Contractor shall contact the Engineer and the OSFM's office at least 72 hours prior to removal to confirm the OSFM inspector's presence during the UST removal. Removal, transport, and disposal of the UST shall be according to the applicable portions of the latest revision of the "American Petroleum Institute (API) Recommended Practice 1604".

The Contractor shall collect and analyze tank content (sludge) for disposal purposes. The Contractor shall remove as much of the regulated substance from the UST system as necessary to prevent further release into the environment. All contents within the tank shall be removed, transported and disposed of, or recycled. The tank shall be removed and rendered empty according to IEPA definition.

The Contractor shall collect soil samples from the bottom and sidewalls of the excavated area in accordance with 35 Ill. Adm. Code Part 734.210(h) after the required backfill has been removed during the initial response action, to determine the level of contamination remaining in the ground, regardless if a release is confirmed or not by the OSFM on-site inspector.

In the event the UST is designated a leaking underground storage tank (LUST) by the OSFM's inspector, or confirmation by analytical results, the Contractor shall notify the Engineer and the DESU. Upon confirmation of a release of contaminants from the UST and notifications to the Engineer and DESU, the Contractor shall report the release to the Illinois Emergency Management Agency (IEMA) (e.g., by telephone or electronic mail) and provide them with whatever information is available ("owner" or "operator" shall be stated as the past registered "owner" or "operator", or the IDOT District in which the UST is located and the DESU Manager);

The Contractor shall perform the following initial response actions if a release is indicated by the OSFM inspector:

(a) Take immediate action to prevent any further release of the regulated substance to the environment, which may include removing, at the Engineer's discretion, and disposing of up to 4 ft (1.2 m) of the contaminated material, as measured from the outside dimension of the tank

(b) Identify and mitigate fire, explosion and vapor hazards;

(c) Visually inspect any above ground releases or exposed below ground releases and prevent further migration of the released substance into surrounding soils and groundwater; and

(d) Continue to monitor and mitigate any additional fire and safety hazards posed by vapors and free product that have migrated from the UST excavation zone and entered into subsurface structures (such as sewers or basements).

The UST excavation shall be backfilled according to applicable portions of Sections 205, 208, and 550 with a material that will compact and develop stability. The material shall be approved prior to placement. All uncontaminated concrete and soil removed during tank extraction may be used to backfill the excavation, at the discretion of the Engineer.

After backfilling the excavation, the site shall be graded and cleaned.

669.09 Regulated Substance Final Construction Report. Not later than 90 days after completing this work, the Contractor shall submit a Regulated Substance Final Construction Report (RSFCR) to the Engineer using form BDE 2733 and required attachments. The form shall be signed by an Illinois licensed Professional Engineer or Professional Geologist.

669.10 Method of Measurement. Non-special waste, special waste, and hazardous waste soil will be measured for payment according to Article 202.07(b) when performing earth excavation, Article 502.12(b) when excavating for structures, or by computing the volume of the trench using the maximum trench width permitted and the actual depth of the trench.

Groundwater containerized and transported off-site for management, storage, and disposal will be measured for payment in gallons (liters).

Backfill plugs will be measured in cubic yards (cubic meters) in place, except the quantity for which payment will be made shall not exceed the volume of the trench, as computed by using the maximum width of trench permitted by the Specifications and the actual depth of the trench, with a deduction for the volume of the pipe.

Engineered Barriers will be measured for payment in square yards (square meters).

669.11 Basis of Payment. The work of preparing, submitting and administering a Regulated Substances Pre-Construction Plan will be paid for at the contract lump sum price for REGULATED SUBSTANCES PRE-CONSTRUCTION PLAN.

On-site monitoring of regulated substances, including completion of form BDE 2732 for each day of work, will be paid for at the contract unit price per calendar day, or faction thereof, for ON-SITE MONITORING OF REGULATED SUBSTANCES.

The installation of engineered barriers will be paid for at the contract unit price per square yard (square meter) for ENGINEERED BARRIER.

The work of removing a UST, soil excavation, soil and content sampling, and the excavated soil, UST content, and UST disposal will be paid for at the contract unit price per each for UNDERGROUND STORAGE TANK REMOVAL.

The transportation and disposal of soil and other materials from an excavation determined to be contaminated will be paid for at the contract unit price per cubic yard (cubic meter) for NON-SPECIAL WASTE DISPOSAL, SPECIAL WASTE DISPOSAL, or HAZARDOUS WASTE DISPOSAL.

The transportation and disposal of groundwater from an excavation determined to be contaminated will be paid for at the contract unit price per gallon (liter) for SPECIAL WASTE GROUNDWATER DISPOSAL or HAZARDOUS WASTE GROUNDWATER DISPOSAL. When groundwater is discharged to a sanitary or combined sewer by permit, the cost will be paid for according to Article 109.05.

Backfill plugs will be paid for at the contract unit price per cubic yard (cubic meter) for BACKFILL PLUGS.

Payment for temporary staging, if required, will be paid for according to Article 109.04.

Payment for accumulated stormwater removal and disposal will be according to Article 109.04. Payment will only be allowed if appropriate stormwater and erosion control methods were used.

Payment for decontamination, labor, material, and equipment for monitoring areas beyond the specified areas, with the Engineer's prior written approval, will be according to Article 109.04.

The sampling and testing associated with this work will be paid for as follows.

(a) BETX Soil/Groundwater Analysis. When the contaminants of concern are gasoline only, soil or groundwater samples shall be analyzed for benzene, ethylbenzene, toluene, and xylenes (BETX). The analysis will be paid for at the contract unit price per each for BETX SOIL ANALYSIS and/or BETX GROUNDWATER ANALYSIS using EPA Method 8021B.

(b) BETX-PNAS Soil/Groundwater Analysis. When the contaminants of concern are middle distillate and heavy ends, soil or groundwater samples shall be analyzed for BETX and polynuclear aromatics (PNAS). The analysis will be paid for at the contract unit price per each for BETX-PNAS SOIL ANALYSIS and/or BETX-PNAS GROUNDWATER ANALYSIS using EPA Method 8021B for BETX and EPA Method 8310 for PNAs.

(c) Priority Pollutants Soil Analysis. When the contaminants of concern are used oils, soil samples shall be analyzed for priority pollutant VOCs, priority pollutants SVOCs, and priority pollutants metals. The analysis will be paid for at the contract unit price per each for PRIORITY POLLUTANTS SOIL ANALYSIS using EPA Method 8260B for VOCs, EPA Method 8270C for SVOCs, and using an ICP instrument and EPA Methods 6010B and 7471A for metals.

(d) Priority Pollutant Groundwater Analysis. When the contaminants of concern are used oils, non-petroleum material, or unknowns, groundwater samples shall be analyzed for priority pollutant VOCs, priority pollutants SVOCs, and priority pollutants metals. The analysis will be paid for at the contract unit price per each for PRIORITY POLLUTANTS GROUNDWATER ANALYSIS using EPA Method 8260B for VOCs, EPA Method 8270C for SVOCs, and EPA Methods 6010B and 7470A for metals.

(e) Target Compound List (TCL) Soil Analysis. When the contaminants of concern are unknowns or non-petroleum material, soil samples shall be analyzed for priority pollutant VOCs, priority pollutants SVOCS, priority pollutants metals, pesticides, and Resource Conservation and Recovery Act (RCRA) metals by the toxicity characteristic leaching procedure (TCLP). The analysis will be paid for at the contract unit price per each for TCL SOIL ANALYSIS using EPA Method 8260B for VOCs, EPA Method 8270C for SVOCs, EPA Method 8081 for pesticides, and ICP instrument and EPA Methods 6010B, 7471A, 1311 (extraction), 6010B, and 7470A for metals.

(f) Soil Disposal Analysis. When the waste material for disposal requires sampling for disposal acceptance, the samples shall be analyzed for TCLP VOCs, SVOCs, RCRA metals, pH, ignitability, and paint filter test. The analysis will be paid for at the contract unit price per each for SOIL DISPOSAL ANALYSIS using EPA Methods 1311 (extraction), 8260B for VOCs, 8270C for SVOCs, 6010B and 7470A for RCRA metals, 9045C for pH, 1030 for ignitability, and 9095A for paint filter.

The work of preparing, submitting and administering a Regulated Substances Final Construction Report will be paid for at the contract lump sum price REGULATED SUBSTANCES FINAL CONSTRUCTION REPORT."

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%"

TRAFFIC CONTROL DEVICES - CONES (BDE)
Effective: January 1, 2019

Revise Article 701.15(a) of the Standard Specifications to read:

"(a) Cones. Cones are used to channelize traffic. Cones used to channelize traffic at night shall be reflectorized; however, cones shall not be used in nighttime lane closure tapers or nighttime lane shifts."

Revise Article 1106.02(b) of the Standard Specifications to read:

"(b) Cones. Cones shall be predominantly orange. Cones used at night that are 28 to 36 in. (700 to 900 mm) in height shall have two white circumferential stripes. If non-reflective spaces are left between the stripes, the spaces shall be no more than 2 in. (50mm) in width. Cones used at night that are taller than 36 in. (900 mm) shall have a minimum of two white and two fluorescent orange alternating, circumferential stripes with the top stripe being fluorescent orange. If non-reflective spaces are left between the stripes, the spaces shall be no more than 3 in. (75 mm) in width.

The minimum weights for the various cone heights shall be 4 lb for 18 in. (2 kg for 450 mm), 7 lb for 28 in. (3 kg for 700 mm), and 10 lb for 36 in. (5 kg for 900 mm) with a minimum of 60 percent of the total weight in the base. Cones taller than 36 in. shall be weighted per the manufacturer's specifications such that they are not moved by wind or passing traffic."

WEEKLY DBE TRUCKING REPORTS (BDE)
Effective: June 2, 2012 Revised: April 2, 2015

The Contractor shall submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit.

The report shall be submitted to the Engineer on Department form "SBE 723" within ten business days following the reporting period. The reporting period shall be Monday through Sunday 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.

WORKING DAYS (BDE)
Effective: January 1, 2002

The Contractor shall complete the work within **75** working days.

REVISIONS TO THE ILLINOIS PREVAILING WAGE RATES

The Prevailing rates of wages are included in the Contract proposals which are subject to Check Sheet #5 of the Supplemental Specifications and Recurring Special Provisions. The rates have been ascertained and certified by the Illinois Department of Labor for the locality in which the work is to be performed and for each craft or type of work or mechanic needed to execute the work of the Contract. As required by Prevailing Wage Act (820 ILCS 130/0.01, et seq.) and Check Sheet #5 of the Contract, not less than the rates of wages ascertained by the Illinois Department of Labor and as revised during the performance of a Contract shall be paid to all laborers, workers and mechanics performing work under the Contract. Post the scale of wages in a prominent and easily accessible place at the site of work.

If the Illinois Department of Labor revises the prevailing rates of wages to be paid as listed in the specification of rates, the contractor shall post the revised rates of wages and shall pay not less than the revised rates of wages. Current wage rate information shall be obtained by visiting the Illinois Department of Labor web site at http://www.state.il.us/agency/idol/ or by calling 312-793-2814. It is the responsibility of the contractor to review the rates applicable to the work of the contract at regular intervals in order to insure the timely payment of current rates. Provision of this information to the contractor by means of the Illinois Department of Labor web site satisfies the notification of revisions by the Department to the contractor pursuant to the Act, and the contractor agrees that no additional notice is required. The contractor shall notify each of its subcontractors of the revised rates of wages.