

## **If you plan to submit a bid directly to the Department of Transportation**

### **PREQUALIFICATION**

Any contractor who desires to become pre-qualified to bid on work advertised by IDOT must submit the properly completed pre-qualification forms to the Bureau of Construction no later than 4:30 p.m. prevailing time twenty-one days prior to the letting of interest. This pre-qualification requirement applies to first time contractors, contractors renewing expired ratings, contractors maintaining continuous pre-qualification or contractors requesting revised ratings. To be eligible to bid, existing pre-qualification ratings must be effective through the date of letting.

### **REQUESTS FOR AUTHORIZATION TO BID**

Contractors wanting to bid on items included in a particular letting must submit the properly completed "Request for Authorization to Bid/or Not For Bid Status" (BDE 124INT) and the ORIGINAL "Affidavit of Availability" (BC 57) to the proper office no later than 4:30 p.m. prevailing time, three (3) days prior to the letting date.

### **WHO CAN BID ?**

Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction.

**WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?:** When a prospective prime bidder submits a "Request for Authorization to Bid/or Not For Bid Status"(BDE 124INT) he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued an **Authorization to Bid or Not for Bid Report**, approved by the Central Bureau of Construction that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Authorization to Bid or Not for Bid Report** will indicate the reason for denial.

**ABOUT AUTHORIZATION TO BID:** Firms that have not received an authorization form within a reasonable time of complete and correct original document submittal should contact the department as to status. This is critical in the week before the letting. These documents must be received three days before the letting date. Firms unsure as to authorization status should call the Prequalification Section of the Bureau of Construction at the number listed at the end of these instructions.

**ADDENDA AND REVISIONS:** It is the contractor's responsibility to determine which, if any, addenda or revisions pertain to any project they may be bidding. Failure to incorporate all relevant addenda or revisions may cause the bid to be declared unacceptable.

Each addendum will be placed with the contract number. Addenda and revisions will also be placed on the Addendum/Revision Checklist and each subscription service subscriber will be notified by e-mail of each addendum and revision issued.

The Internet is the Department's primary way of doing business. The subscription server e-mails are an added courtesy the Department provides. It is suggested that bidders check IDOT's website at <http://www.dot.il.gov/desenv/delett.html> before submitting final bid information.

### ***IDOT IS NOT RESPONSIBLE FOR ANY E-MAIL FAILURES.***

Addenda Questions may be directed to the Contracts Office at (217)782-7806 or [D&Econtracts@dot.il.gov](mailto:D&Econtracts@dot.il.gov)

Technical Questions about downloading these files may be directed to Tim Garman (217)524-1642 or [Timothy.Garman@illinois.gov](mailto:Timothy.Garman@illinois.gov).

**WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?:** Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond
2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

**ABOUT SUBMITTING BIDS:** It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

**WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?**

<b>Questions Regarding</b>	<b>Call</b>
Prequalification and/or Authorization to Bid	217/782-3413
Preparation and submittal of bids	217/782-7806
Mailing of plans and proposals	217/782-7806

**ADDENDUMS AND REVISIONS TO THE PROPOSAL FORMS**

Planholders should verify that they have received and incorporated any addendum and/or revision prior to submitting their bid. Failure by the bidder to include an addendum or revision could result in a bid being rejected as irregular.

RETURN WITH BID

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Proposal Submitted By
Name
Address
City

Letting June 11, 2010

BIDDERS NEED NOT RETURN THE ENTIRE PROPOSAL  
(See instructions inside front cover)

**NOTICE TO PROSPECTIVE BIDDERS**

This proposal can be used for bidding purposes by only those companies that request and receive written AUTHORIZATION TO BID from IDOT's Central Bureau of Construction.

(SEE INSTRUCTIONS ON THE INSIDE OF COVER)

**Notice to Bidders,  
Specifications,  
Proposal, Contract  
and Contract Bond**



**Illinois Department  
of Transportation**

Springfield, Illinois 62764

**Contract No. 60K06  
WILL County  
Section 2009-139 SG  
Route FAI 55  
Project CMI-055-6(243)252  
District 1 Construction Funds**

PLEASE MARK THE APPROPRIATE BOX BELOW:

- A Bid Bond is included.
- A Cashier's Check or a Certified Check is included

Prepared by

Checked by

F

(Printed by authority of the State of Illinois)

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## INSTRUCTIONS

**ABOUT IDOT PROPOSALS:** All proposals issued by IDOT are potential bidding proposals. Each proposal contains all Certifications and Affidavits, a Proposal Signature Sheet and a Proposal Bid Bond required for Prime Contractors to submit a bid after written **Authorization to Bid** has been issued by IDOT's Central Bureau of Construction. In addition, this proposal contains new statutory requirements applicable to the use of subcontractors and, in particular, includes the State Required Ethical Standards Governing Subcontractors to be signed and incorporated into all subcontracts.

**WHO CAN BID?:** Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction. To request authorization, a potential bidder must complete and submit Part B of the Request for Authorization to Bid/or Not For Bid Status form (BDE 124 INT) and submit an original Affidavit of Availability (BC 57).

**WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?:** When a prospective prime bidder submits a "**Authorization to Bid or Not for Bid**" form, he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued a **Authorization to Bid or Not for Bid Report**, approved by the Central Bureau of Construction, that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Authorization to Bid or Not for Bid Report** will indicate the reason for denial. If a contractor has requested to bid but has not received a **Authorization to Bid or Not for Bid Report**, they should contact the Central Bureau of Construction in advance of the letting date.

**WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?:** Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond
2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

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Questions Regarding	Call
Prequalification and/or Authorization to Bid	217/782-3413
Preparation and submittal of bids	217/782-7806

RETURN WITH BID



PROPOSAL

TO THE DEPARTMENT OF TRANSPORTATION

1. Proposal of \_\_\_\_\_  
\_\_\_\_\_

Taxpayer Identification Number (Mandatory) \_\_\_\_\_

for the improvement identified and advertised for bids in the Invitation for Bids as:

**Contract No. 60K06  
WILL County  
Section 2009-139 SG  
Project CMI-055-6(243)252  
Route FAI 55  
District 1 Construction Funds**

**Fiber optic cable installation for highway surveillance on I-55 from I-80 to Naperville Road (Shorewood to Romeoville).**

2. The undersigned bidder will furnish all labor, material and equipment to complete the above described project in a good and workmanlike manner as provided in the contract documents provided by the Department of Transportation. This proposal will become part of the contract and the terms and conditions contained in the contract documents shall govern performance and payments.



**RETURN WITH BID**

6. **COMBINATION BIDS.** The undersigned further agrees that if awarded the contract for the sections contained in the following combination, he/she will perform the work in accordance with the requirements of each individual proposal comprising the combination bid specified in the schedule below, and that the combination bid shall be prorated against each section in proportion to the bid submitted for the same. If an error is found to exist in the gross sum bid for one or more of the individual sections included in a combination, the combination bid shall be corrected as provided in the specifications.

**When a combination bid is submitted, the schedule below must be completed in each proposal comprising the combination.**

**If alternate bids are submitted for one or more of the sections comprising the combination, a combination bid must be submitted for each alternate.**

**Schedule of Combination Bids**

Combination No.	Sections Included in Combination	Combination Bid	
		Dollars	Cents

7. **SCHEDULE OF PRICES.** The undersigned bidder submits herewith, in accordance with the rules and instructions, a schedule of prices for the items of work for which bids are sought. The unit prices bid are in U.S. dollars and cents, and all extensions and summations have been made. The bidder understands that the quantities appearing in the bid schedule are approximate and are provided for the purpose of obtaining a gross sum for the comparison of bids. If there is an error in the extension of the unit prices, the unit prices shall govern. Payment to the contractor awarded the contract will be made only for actual quantities of work performed and accepted or materials furnished according to the contract. The scheduled quantities of work to be done and materials to be furnished may be increased, decreased or omitted as provided elsewhere in the contract.
8. **AUTHORITY TO DO BUSINESS IN ILLINOIS.** Section 20-43 of the Illinois Procurement Code (30 ILCS 500/20-43) provides that a person (other than an individual acting as a sole proprietor) must be a legal entity authorized to do business in the State of Illinois prior to submitting the bid.

ILLINOIS DEPARTMENT OF TRANSPORTATION  
 SCHEDULE OF PRICES  
 CONTRACT  
 NUMBER -

60K06

State Job # - C-91-344-10  
 PPS NBR - 1-77861-0000  
 County Name - WILL - -  
 Code - 197 - -  
 District - 1 - -  
 Section Number - 2009-139 SG

Project Number  
 CMI-0556/243/252

Route  
 FAI 55

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X0323907	COMMUNICATIONS VAULT	EACH	74.000				
X0323914	FOC SPLICE - LATERAL	EACH	43.000				
X0323917	CABINET MODEL 334	EACH	29.000				
X0323957	FOC SPLICE - MAINLINE	EACH	18.000				
X0324234	2070 LITE CONTROLLER	EACH	29.000				
X0324245	CONC FDN SURV CAB 334	EACH	29.000				
X0324248	DETECTOR RACK	EACH	29.000				
X0325040	FO INNERDUCT 1 1/4"	FOOT	172,350.000				
X0325702	NIGHT WORK ZONE LIGHT	L SUM	1.000				
X0326122	ECA C EPRTC 2C 6 #8G	FOOT	1,990.000				
X0326266	ETHERNET SWITCH	EACH	49.000				
X0326465	MOD EX VID DSTN SYS	L SUM	1.000				
X0326939	ETHERNET SWTCH 12P =>	EACH	1.000				
X0326940	SP SS RDR VHDT SYS RS	EACH	3.000				
X0326941	TYPE 3 CCTV CABINET	EACH	14.000				



ILLINOIS DEPARTMENT OF TRANSPORTATION  
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 County Name - WILL - -  
 Code - 197 - -  
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Project Number  
 CMI-0556/243/252

Route  
 FAI 55

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X0326942	MOD EX CCTV INST FO F	EACH	10.000				
X0326943	MOD EX CCTV INST FO E	EACH	10.000				
X0326944	ATMS INTEGRATION	L SUM	1.000				
X7011015	TR C-PROT EXPRESSWAYS	L SUM	1.000				
X8040310	ELECT SERV DISCONNECT	EACH	30.000				
X8710035	FIB OPT CBL 96F SM	FOOT	189,875.000				
X8710036	FIB OPT CBL 12F SM	FOOT	10,605.000				
X8710052	FO TERM PANEL 12F	EACH	43.000				
X8730312	EC C LEAD 18 4C TW SH	FOOT	20,380.000				
X8850102	INDUCTION LOOP	FOOT	4,935.000				
67000400	ENGR FIELD OFFICE A	CAL MO	2.000				
67100100	MOBILIZATION	L SUM	1.000				
70100420	TRAF CONT-PROT 701411	EACH	5.000				
70100800	TRAF CONT-PROT 701401	L SUM	1.000				
70102620	TR CONT & PROT 701501	L SUM	1.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION  
 SCHEDULE OF PRICES  
 CONTRACT  
 NUMBER -

60K06

State Job # - C-91-344-10  
 PPS NBR - 1-77861-0000  
 County Name - WILL - -  
 Code - 197 - -  
 District - 1 - -  
 Section Number - 2009-139 SG

Project Number  
 CMI-0556/243/252

Route  
 FAI 55

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
80400200	ELECT UTIL SERV CONN	L SUM	1.000				
81000600	CON T 2 GALVS	FOOT	3,790.000				
81016600	CON T 2 HDP COIL	FOOT	5,510.000				
81018500	CON P 2 GALVS	FOOT	15,795.000				
81018900	CON P 4 GALVS	FOOT	2,020.000				
81101005	CON AT ST 4 PVC GALVS	FOOT	1,455.000				
81300960	JUN BX SS AS 42X36X12	EACH	32.000				
81400200	HD HANDHOLE	EACH	94.000				
81900200	TR & BKFIL F ELECT WK	FOOT	92,985.000				
87000130	ECA C EPRTC 2C 4 #10G	FOOT	4,760.000				
87000138	ECA C EPRTC 2C 1 #8G	FOOT	2,215.000				
87000140	ECA C EPRTC 2C 2 #8G	FOOT	3,815.000				
87301305	ELCBL C LEAD 14 1PR	FOOT	3,760.000				
87800200	CONC FDN TY D	FOOT	56.000				
88500100	INDUCTIVE LOOP DETECT	EACH	130.000				

**CONTRACT NUMBER**

**60K06**

**THIS IS THE TOTAL BID**

**\$ \_\_\_\_\_**

**NOTES:**

1. Each **PAY ITEM** should have a **UNIT PRICE** and a **TOTAL PRICE**.
2. The **UNIT PRICE** shall govern if no **TOTAL PRICE** is shown or if there is a discrepancy between the product of the **UNIT PRICE** multiplied by the **QUANTITY**.
3. If a **UNIT PRICE** is omitted, the **TOTAL PRICE** will be divided by the **QUANTITY** in order to establish a **UNIT PRICE**.
4. A bid may be declared **UNACCEPTABLE** if neither a unit price nor a total price is shown.

## RETURN WITH BID

### **STATE REQUIRED ETHICAL STANDARDS GOVERNING CONTRACT PROCUREMENT: ASSURANCES, CERTIFICATIONS AND DISCLOSURES**

#### **I. GENERAL**

**A.** Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

**B.** In order to comply with the provisions of Article 50 and to carry out the duty established therein, all bidders are to adhere to ethical standards established for the procurement process, and to make such assurances, disclosures and certifications required by law. Except as otherwise required in subsection III, paragraphs J-N, by execution of the Proposal Signature Sheet, the bidder indicates that each of the mandated assurances have been read and understood, that each certification is made and understood, and that each disclosure requirement has been understood and completed.

**C.** In addition to all other remedies provided by law, failure to comply with any assurance, failure to make any disclosure or the making of a false certification shall be grounds for the chief procurement officer to void the contract, or subcontract, and may result in the suspension or debarment of the bidder or subcontractor.

#### **II. ASSURANCES**

The assurances hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder.

##### **A. Conflicts of Interest**

1. The Illinois Procurement Code provides in pertinent part:

Section 50-13. Conflicts of Interest.

(a) Prohibition. It is unlawful for any person holding an elective office in this State, holding a seat in the General Assembly, or appointed to or employed in any of the offices or agencies of state government and who receives compensation for such employment in excess of 60% of the salary of the Governor of the State of Illinois, or who is an officer or employee of the Capital Development Board or the Illinois Toll Highway Authority, or who is the spouse or minor child of any such person to have or acquire any contract, or any direct pecuniary interest in any contract therein, whether for stationery, printing, paper, or any services, materials, or supplies, that will be wholly or partially satisfied by the payment of funds appropriated by the General Assembly of the State of Illinois or in any contract of the Capital Development Board or the Illinois Toll Highway authority.

(b) Interests. It is unlawful for any firm, partnership, association or corporation, in which any person listed in subsection (a) is entitled to receive (i) more than 7 1/2% of the total distributable income or (ii) an amount in excess of the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(c) Combined interests. It is unlawful for any firm, partnership, association, or corporation, in which any person listed in subsection (a) together with his or her spouse or minor children is entitled to receive (i) more than 15%, in the aggregate, of the total distributable income or (ii) an amount in excess of 2 times the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(d) Securities. Nothing in this Section invalidates the provisions of any bond or other security previously offered or to be offered for sale or sold by or for the State of Illinois.

(e) Prior interests. This Section does not affect the validity of any contract made between the State and an officer or employee of the State or member of the General Assembly, his or her spouse, minor child or any combination of those persons if that contract was in existence before his or her election or employment as an officer, member, or employee. The contract is voidable, however, if it cannot be completed within 365 days after the officer, member, or employee takes office or is employed.

The current salary of the Governor is \$177,412.00. Sixty percent of the salary is \$106,447.20.

## RETURN WITH BID

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-13, or that an effective exemption has been issued by the Board of Ethics to any individual subject to the Section 50-13 prohibitions pursuant to the provisions of Section 50-20 of the Code and Executive Order Number 3 (1998). Information concerning the exemption process is available from the Department upon request.

### **B. Negotiations**

1. The Illinois Procurement Code provides in pertinent part:

Section 50-15. Negotiations.

(a) It is unlawful for any person employed in or on a continual contractual relationship with any of the offices or agencies of State government to participate in contract negotiations on behalf of that office or agency with any firm, partnership, association, or corporation with whom that person has a contract for future employment or is negotiating concerning possible future employment.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-15, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

### **C. Inducements**

1. The Illinois Procurement Code provides:

Section 50-25. Inducement. Any person who offers or pays any money or other valuable thing to any person to induce him or her not to bid for a State contract or as recompense for not having bid on a State contract is guilty of a Class 4 felony. Any person who accepts any money or other valuable thing for not bidding for a State contract or who withholds a bid in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-25, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

### **D. Revolving Door Prohibition**

1. The Illinois Procurement Code provides:

Section 50-30. Revolving door prohibition. Chief procurement officers, State purchasing officers, procurement compliance monitors, their designees whose principal duties are directly related to State procurement, and executive officers confirmed by the Senate are expressly prohibited for a period of 2 years after terminating an affected position from engaging in any procurement activity relating to the State agency most recently employing them in an affected position for a period of at least 6 months. The prohibition includes, but is not limited to: lobbying the procurement process; specifying; bidding; proposing bid, proposal, or contract documents; on their own behalf or on behalf of any firm, partnership, association, or corporation. This Section applies only to persons who terminate an affected position on or after January 15, 1999.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-30, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

### **E. Reporting Anticompetitive Practices**

1. The Illinois Procurement Code provides:

Section 50-40. Reporting anticompetitive practices. When, for any reason, any vendor, bidder, contractor, chief procurement officer, State purchasing officer, designee, elected official, or State employee suspects collusion or other anticompetitive practice among any bidders, offerors, contractors, proposers, or employees of the State, a notice of the relevant facts shall be transmitted to the Attorney General and the chief procurement officer.

2. The bidder assures the Department that it has not failed to report any relevant facts concerning the practices addressed in Section 50-40 which may involve the contract for which the bid is submitted.

### **F. Confidentiality**

1. The Illinois Procurement Code provides:

Section 50-45. Confidentiality. Any chief procurement officer, State purchasing officer, designee, or executive officer who willfully uses or allows the use of specifications, competitive bid documents, proprietary competitive information, proposals, contracts, or selection information to compromise the fairness or integrity of the procurement, bidding, or contract process shall be subject to immediate dismissal, regardless of the Personnel code, any contract, or any collective bargaining agreement, and may in addition be subject to criminal prosecution.

2. The bidder assures the Department that it has no knowledge of any fact relevant to the practices addressed in Section 50-45 which may involve the contract for which the bid is submitted.

## RETURN WITH BID

### **G. Insider Information**

1. The Illinois Procurement Act provides:

Section 50-50. Insider information. It is unlawful for any current or former elected or appointed State official or State employee to knowingly use confidential information available only by virtue of that office or employment for actual or anticipated gain for themselves or another person.

2. The bidder assures the Department that it has no knowledge of any facts relevant to the practices addressed in Section 50-50 which may involve the contract for which the bid is submitted.

### **III. CERTIFICATIONS**

The certifications hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. Section 50-2 of the Illinois Procurement Code provides that every person that has entered into a multi-year contract and every subcontractor with a multi-year subcontract shall certify, by July 1 of each fiscal year covered by the contract after the initial fiscal year, to the responsible chief procurement officer whether it continues to satisfy the requirements of Article 50 pertaining to the eligibility for a contract award. If a contractor or subcontractor is not able to truthfully certify that it continues to meet all requirements, it shall provide with its certification a detailed explanation of the circumstances leading to the change in certification status. A contractor or subcontractor that makes a false statement material to any given certification required under Article 50 is, in addition to any other penalties or consequences prescribed by law, subject to liability under the Whistleblower Reward and Protection Act for submission of a false claim.

#### **A. Bribery**

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government, or subcontracting under such a contract, as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, or which is signatory to the contract which the subcontract relates, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State, and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the contractor or the subcontractor, respectively, that the contractor or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any certifications required by this Section are false. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50.5.

#### **B. Felons**

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any State agency, or enter into a subcontract, from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

3. Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder or contractor or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any of the certifications required by this Section are false.

## RETURN WITH BID

### **C. Debt Delinquency**

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency.

The contractor or bidder or subcontractor, respectively, certifies that it, or any affiliate, is not barred from being awarded a contract or subcontract under the Procurement Code. Section 50-11 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The bidder or contractor or subcontractor, respectively, further acknowledges that the chief procurement officer may declare the related contract void if this certification is false or if the bidder, contractor, or subcontractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

### **D. Prohibited Bidders, Contractors and Subcontractors**

1. The Illinois Procurement Code provides:

Section 50-10.5 and 50-60(c). Prohibited bidders, contractors and subcontractors.

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 or if in violation of Subsection (c) for a period of five years from the date of conviction. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder, contractor, or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer shall declare the related contract void if any of the certifications completed pursuant to this Section are false.

### **E. Section 42 of the Environmental Protection Act**

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-12 that the bidder, contractor, or subcontractor, is not barred from being awarded a contract or entering into a subcontract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency, or entering into any subcontract, that is subject to the Procurement Code by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The bidder or contractor or subcontractor, respectively, acknowledges that the chief procurement officer may declare the contract void if this certification is false.

### **F. Educational Loan**

1. Section 3 of the Educational Loan Default Act provides:

§ 3. No State agency shall contract with an individual for goods or services if that individual is in default, as defined in Section 2 of this Act, on an educational loan. Any contract used by any State agency shall include a statement certifying that the individual is not in default on an educational loan as provided in this Section.

2. The bidder, if an individual as opposed to a corporation, partnership or other form of business organization, certifies that the bidder is not in default on an educational loan as provided in Section 3 of the Act.

### **G. Bid-Rigging/Bid Rotating**

1. Section 33E-11 of the Criminal Code of 1961 provides:

§ 33E-11. (a) Every bid submitted to and public contract executed pursuant to such bid by the State or a unit of local government shall contain a certification by the prime contractor that the prime contractor is not barred from contracting with any unit of State or local government as a result of a violation of either Section 33E-3 or 33E-4 of this Article. The State and units of local government shall provide the appropriate forms for such certification.

- (b) A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

A violation of Section 33E-3 would be represented by a conviction of the crime of bid-rigging which, in addition to Class 3 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be barred for 5 years from the date of conviction from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

## RETURN WITH BID

A violation of Section 33E-4 would be represented by a conviction of the crime of bid-rotating which, in addition to Class 2 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be permanently barred from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

2. The bidder certifies that it is not barred from contracting with the Department by reason of a violation of either Section 33E-3 or Section 33E-4.

### **H. International Anti-Boycott**

1. Section 5 of the International Anti-Boycott Certification Act provides:

§ 5. State contracts. Every contract entered into by the State of Illinois for the manufacture, furnishing, or purchasing of supplies, material, or equipment or for the furnishing of work, labor, or services, in an amount exceeding the threshold for small purchases according to the purchasing laws of this State or \$10,000.00, whichever is less, shall contain certification, as a material condition of the contract, by which the contractor agrees that neither the contractor nor any substantially-owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the U.S. Export Administration Act of 1979 or the regulations of the U.S. Department of Commerce promulgated under that Act.

2. The bidder makes the certification set forth in Section 5 of the Act.

### **I. Drug Free Workplace**

1. The Illinois "Drug Free Workplace Act" applies to this contract and it is necessary to comply with the provisions of the "Act" if the contractor is a corporation, partnership, or other entity (including a sole proprietorship) which has 25 or more employees.

2. The bidder certifies that if awarded a contract in excess of \$5,000 it will provide a drug free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance, including cannabis, is prohibited in the contractor's workplace; specifying the actions that will be taken against employees for violations of such prohibition; and notifying the employee that, as a condition of employment on such contract, the employee shall abide by the terms of the statement, and notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.

(b) Establishing a drug free awareness program to inform employees about the dangers of drug abuse in the workplace; the contractor's policy of maintaining a drug free workplace; any available drug counseling, rehabilitation, and employee assistance programs; and the penalties that may be imposed upon employees for drug violations.

(c) Providing a copy of the statement required by subparagraph (1) to each employee engaged in the performance of the contract and to post the statement in a prominent place in the workplace.

(d) Notifying the Department within ten (10) days after receiving notice from an employee or otherwise receiving actual notice of the conviction of an employee for a violation of any criminal drug statute occurring in the workplace.

(e) Imposing or requiring, within 30 days after receiving notice from an employee of a conviction or actual notice of such a conviction, an appropriate personnel action, up to and including termination, or the satisfactory participation in a drug abuse assistance or rehabilitation program approved by a federal, state or local health, law enforcement or other appropriate agency.

(f) Assisting employees in selecting a course of action in the event drug counseling, treatment, and rehabilitation is required and indicating that a trained referral team is in place.

(g) Making a good faith effort to continue to maintain a drug free workplace through implementation of the actions and efforts stated in this certification.



## RETURN WITH BID

### J. Disclosure of Business Operations in Iran

Section 50-36 of the Illinois Procurement Code, 30ILCS 500/50-36 provides that each bid, offer, or proposal submitted for a State contract shall include a disclosure of whether or not the Company acting as the bidder, offeror, or proposing entity, or any of its corporate parents or subsidiaries, within the 24 months before submission of the bid, offer, or proposal had business operations that involved contracts with or provision of supplies or services to the Government of Iran, companies in which the Government of Iran has any direct or indirect equity share, consortiums or projects commissioned by the Government of Iran, or companies involved in consortiums or projects commissioned by the Government of Iran and either of the following conditions apply:

- (1) More than 10% of the Company's revenues produced in or assets located in Iran involve oil-related activities or mineral-extraction activities; less than 75% of the Company's revenues produced in or assets located in Iran involve contracts with or provision of oil-related or mineral-extraction products or services to the Government of Iran or a project or consortium created exclusively by that government; and the Company has failed to take substantial action.
- (2) The Company has, on or after August 5, 1996, made an investment of \$20 million or more, or any combination of investments of at least \$10 million each that in the aggregate equals or exceeds \$20 million in any 12-month period, which directly or significantly contributes to the enhancement of Iran's ability to develop petroleum resources of Iran.

The terms "Business operations", "Company", "Mineral-extraction activities", "Oil-related activities", "Petroleum resources", and "Substantial action" are all defined in the Code.

Failure to make the disclosure required by the Code shall cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid, offer, or proposal or awarding the contract. The name of each Company disclosed as doing business or having done business in Iran will be provided to the State Comptroller.

Check the appropriate statement:

Company has no business operations in Iran to disclose.

Company has business operations in Iran as disclosed the attached document.

### K. Apprenticeship and Training Certification (Does not apply to federal aid projects)

In accordance with the provisions of Section 30-22 (6) of the Illinois Procurement Code, the bidder certifies that it is a participant, either as an individual or as part of a group program, in the approved apprenticeship and training programs applicable to each type of work or craft that the bidder will perform with its own forces. The bidder further certifies for work that will be performed by subcontract that each of its subcontractors submitted for approval either (a) is, at the time of such bid, participating in an approved, applicable apprenticeship and training program; or (b) will, prior to commencement of performance of work pursuant to this contract, begin participation in an approved apprenticeship and training program applicable to the work of the subcontract. The Department, at any time before or after award, may require the production of a copy of each applicable Certificate of Registration issued by the United States Department of Labor evidencing such participation by the contractor and any or all of its subcontractors. Applicable apprenticeship and training programs are those that have been approved and registered with the United States Department of Labor. The bidder shall list in the space below, the official name of the program sponsor holding the Certificate of Registration for all of the types of work or crafts in which the bidder is a participant and that will be performed with the bidder's forces. Types of work or craft work that will be subcontracted shall be included and listed as subcontract work. The list shall also indicate any type of work or craft job category that does not have an applicable apprenticeship or training program. **The bidder is responsible for making a complete report and shall make certain that each type of work or craft job category that will be utilized on the project as reported on the Construction Employee Workforce Projection (Form BC-1256) and returned with the bid is accounted for and listed.**

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The requirements of this certification and disclosure are a material part of the contract, and the contractor shall require this certification provision to be included in all approved subcontracts. In order to fulfill this requirement, it shall not be necessary that an applicable program sponsor be currently taking or that it will take applications for apprenticeship, training or employment during the performance of the work of this contract.

**L. Political Contributions and Registration with the State Board of Elections**

Sections 20-160 and 50-37 of the Illinois Procurement Code regulate political contributions from business entities and any affiliated entities or affiliated persons bidding on or contracting with the state. Generally under Section 50-37, any business entity, and any affiliated entity or affiliated person of the business entity, whose current year contracts with all state agencies exceed an awarded value of \$50,000, are prohibited from making any contributions to any political committees established to promote the candidacy of the officeholder responsible for the awarding of the contracts or any other declared candidate for that office for the duration of the term of office of the incumbent officeholder or a period 2 years after the termination of the contract, whichever is longer. Any business entity and affiliated entities or affiliated persons whose state contracts in the current year do not exceed an awarded value of \$50,000, but whose aggregate pending bids and proposals on state contracts exceed \$50,000, either alone or in combination with contracts not exceeding \$50,000, are prohibited from making any political contributions to any political committee established to promote the candidacy of the officeholder responsible for awarding the pending contract during the period beginning on the date the invitation for bids or request for proposals is issued and ending on the day after the date of award or selection if the entity was not awarded or selected. Section 20-160 requires certification of registration of affected business entities in accordance with procedures found in Section 9-35 of The Election Code.

By submission of a bid, the contractor business entity acknowledges and agrees that it has read and understands Sections 20-160 and 50-37 of the Illinois Procurement Code, and that it makes the following certification:

**The undersigned business entity certifies that it has registered as a business with the State Board of Elections and acknowledges a continuing duty to update the registration in accordance with the above referenced statutes. A copy of the certificate of registration shall be submitted with the bid. The bidder is cautioned that the Department will not award a contract without submission of the certificate of registration.**

These requirements and compliance with the above referenced statutory sections are a material part of the contract, and any breach thereof shall be cause to void the contract under Section 50-60 of the Illinois Procurement Code. This provision does not apply to Federal-aid contracts.

**M. Lobbyist Disclosure**

Section 50-38 of the Illinois Procurement Code requires that any bidder or offeror on a State contract that hires a person required to register under the Lobbyist Registration Act to assist in obtaining a contract shall:

- (i) Disclose all costs, fees, compensation, reimbursements, and other remunerations paid or to be paid to the lobbyist related to the contract,
- (ii) Not bill or otherwise cause the State of Illinois to pay for any of the lobbyist's costs, fees, compensation, reimbursements, or other remuneration, and
- (iii) Sign a verification certifying that none of the lobbyist's costs, fees, compensation, reimbursements, or other remuneration were billed to the State.

This information, along with all supporting documents, shall be filed with the agency awarding the contract and with the Secretary of State. The chief procurement officer shall post this information, together with the contract award notice, in the online Procurement Bulletin.

Pursuant to Subsection (c) of this Section, no person or entity shall retain a person or entity to attempt to influence the outcome of a procurement decision made under the Procurement Code for compensation contingent in whole or in part upon the decision or procurement. Any person who violates this subsection is guilty of a business offense and shall be fined not more than \$10,000.

Bidder acknowledges that it is required to disclose the hiring of any person required to register pursuant to the Illinois Lobbyist Registration Act (25 ILCS 170) in connection with this contract.

Bidder has not hired any person required to register pursuant to the Illinois Lobbyist Registration Act in connection with this contract.

Or

Bidder has hired the following persons required to register pursuant to the Illinois Lobbyist Registration Act in connection with the contract:

Name and address of person: \_\_\_\_\_  
All costs, fees, compensation, reimbursements and other remuneration paid to said person: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## RETURN WITH BID

### IV. DISCLOSURES

- A. The disclosures hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The bidder further certifies that the Department has received the disclosure forms for each bid.

The chief procurement officer may void the bid, contract, or subcontract, respectively, if it is later determined that the bidder or subcontractor rendered a false or erroneous disclosure. A contractor or subcontractor may be suspended or debarred for violations of the Procurement Code. Furthermore, the chief procurement officer may void the contract and the surety providing the performance bond shall be responsible for completion of the contract.

### B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Illinois Procurement Code provides that all bids of more than \$10,000 shall be accompanied by disclosure of the financial interests of the bidder. This disclosed information for the successful bidder, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act, filed with the Procurement Policy Board, and shall be incorporated as a material term of the contract. Furthermore, pursuant to Section 5-5, the Procurement Policy Board may review a proposal, bid, or contract and issue a recommendation to void a contract or reject a proposal or bid based on any violation of the Procurement Code or the existence of a conflict of interest as provided in subsections (b) and (d) of Section 50-35.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the bidding entity or its parent entity, whichever is less, unless the contractor or bidder is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, proposals, leases, or other ongoing procurement relationships the bidding entity has with any other unit of state government and shall clearly identify the unit and the contract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

### C. Disclosure Form Instructions

#### Form A Instructions for Financial Information & Potential Conflicts of Interest

If the bidder is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a bidder is not subject to Federal 10K reporting, the bidder must determine if any individuals are required by law to complete a financial disclosure form. To do this, the bidder should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on Form A must be signed and dated by a person that is authorized to execute contracts for the bidding company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES \_\_\_ NO \_\_\_
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than \$106,447.20? YES \_\_\_ NO \_\_\_
3. Does anyone in your organization receive more than \$106,447.20 of the bidding entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES \_\_\_ NO \_\_\_
4. Does anyone in your organization receive greater than 5% of the bidding entity's or parent entity's total distributive income, but which is less than \$106,447.20? YES \_\_\_ NO \_\_\_

(Note: Only one set of forms needs to be completed per person per bid even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The bidder must determine each individual in the bidding entity or the bidding entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable.** The person signing can be, but does not have to be, the person for which the form is being completed. The bidder is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

## RETURN WITH BID

### **Form B: Instructions for Identifying Other Contracts & Procurement Related Information**

Disclosure Form B must be completed for each bid submitted by the bidding entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the bidder to ignore Form B. Form B must be completed, checked, and dated or the bidder may be considered nonresponsive and the bid will not be accepted.*

The Bidder shall identify, by checking Yes or No on Form B, whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the bidder only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the bidder must do one of the following:

Option I: If the bidder did not submit an Affidavit of Availability to obtain authorization to bid, the bidder must list all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Do not include IDOT contracts. Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included. Bidders who submit Affidavits of Availability are suggested to use Option II.

Option II: If the bidder is required and has submitted an Affidavit of Availability in order to obtain authorization to bid, the bidder may write or type "See Affidavit of Availability" which indicates that the Affidavit of Availability is incorporated by reference and includes all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. For any contracts that are not covered by the Affidavit of Availability, the bidder must identify them on Form B or on an attached sheet(s). These might be such things as leases.

RETURN WITH BID

**ILLINOIS DEPARTMENT  
OF TRANSPORTATION**

**Form A  
Financial Information &  
Potential Conflicts of Interest  
Disclosure**

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Vendors desiring to enter into a contract with the State of Illinois must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of \$10,000, and for all open-ended contracts. **A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.**

**DISCLOSURE OF FINANCIAL INFORMATION**

- 1. Disclosure of Financial Information.** The individual named below has an interest in the BIDDER (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than \$106,447.20 (60% of the Governor's salary as of 7/1/07). **(Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)**

<b>FOR INDIVIDUAL (type or print information)</b>	
<b>NAME:</b>	_____
<b>ADDRESS</b>	_____
<b>Type of ownership/distributable income share:</b>	
stock _____ sole proprietorship _____ Partnership _____ other: (explain on separate sheet):	
% or \$ value of ownership/distributable income share:	_____

- 2. Disclosure of Potential Conflicts of Interest.** Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

- (a) State employment, currently or in the previous 3 years, including contractual employment of services.  
Yes \_\_\_ No \_\_\_

If your answer is yes, please answer each of the following questions.

- Are you currently an officer or employee of either the Capitol Development Board or the Illinois Toll Highway Authority?  
Yes \_\_\_ No \_\_\_
- Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) provide the name the State agency for which you are employed and your annual salary. \_\_\_\_\_  
\_\_\_\_\_

**RETURN WITH BID**

- 3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes \_\_\_ No \_\_\_
- 4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15% in aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes \_\_\_ No \_\_\_

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment for services in the previous 2 years.

Yes \_\_\_ No \_\_\_

If your answer is yes, please answer each of the following questions.

- 1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois Toll Highway Authority? Yes \_\_\_ No \_\_\_
- 2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) provide the name of the spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. \_\_\_\_\_
- 3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20.00, (60% of the salary of the Governor as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes \_\_\_ No \_\_\_
- 4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or any minor children entitled to receive (i) more than 15% in the aggregate of the total distributable income from your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes \_\_\_ No \_\_\_

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years.

Yes \_\_\_ No \_\_\_

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter.

Yes \_\_\_ No \_\_\_

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United State of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years.

Yes \_\_\_ No \_\_\_

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter.

Yes \_\_\_ No \_\_\_

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government.

Yes \_\_\_ No \_\_\_

**RETURN WITH BID**

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes \_\_\_ No \_\_\_

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(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes \_\_\_ No \_\_\_

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(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes \_\_\_ No \_\_\_

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**3. Communication Disclosure.**

Disclose the name and address of each lobbyist and other agent of the bidder or offeror who is not identified in Section 2 of this form, who is has communicated, is communicating, or may communicate with any State officer or employee concerning the bid or offer. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the process and throughout the term of the contract. If no person is identified, enter "None" on the line below:

Name and address of person(s): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**4. Debarment Disclosure.** For each of the persons identified under Sections 2 and 3 of this form, disclose whether any of the following has occurred within the previous 10 years: debarment from contracting with any governmental entity; professional licensure discipline; bankruptcies; adverse civil judgments and administrative findings; and criminal felony convictions. This disclosure is a continuing obligation and must be promptly supplemented for accuracy throughout the procurement process and term of the contract. If no person is identified, enter "None" on the line below:

Name of person(s): \_\_\_\_\_

Nature of disclosure: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**APPLICABLE STATEMENT**

**This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page. Under penalty of perjury, I certify the contents of this disclosure to be true and accurate to the best of my knowledge.**

Completed by:  \_\_\_\_\_ Date \_\_\_\_\_  
Signature of Individual or Authorized Representative

**NOT APPLICABLE STATEMENT**

**Under penalty of perjury, I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.**

**This Disclosure Form A is submitted on behalf of the CONTRACTOR listed on the previous page.**

\_\_\_\_\_ Date \_\_\_\_\_  
Signature of Authorized Representative

The bidder has a continuing obligation to supplement these disclosures under Sec. 50-35 of the Procurement Code.



**ILLINOIS DEPARTMENT  
OF TRANSPORTATION**

**Form B  
Other Contracts &  
Procurement Related Information  
Disclosure**

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of \$10,000, and for all open-ended contracts.

**DISCLOSURE OF OTHER CONTRACTS AND PROCUREMENT RELATED INFORMATION**

**1. Identifying Other Contracts & Procurement Related Information.** The BIDDER shall identify whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes \_\_\_ No \_\_\_

**If "No" is checked,** the bidder only needs to complete the signature box on the bottom of this page.

**2. If "Yes" is checked.** Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

**THE FOLLOWING STATEMENT MUST BE CHECKED**

<input type="checkbox"/>	<hr style="width: 80%; margin: auto;"/> Signature of Authorized Representative	<hr style="width: 10%; margin: auto;"/> Date
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## **RETURN WITH BID**

### **SPECIAL NOTICE TO CONTRACTORS**

The following requirements of the Illinois Department of Human Rights' Rules and Regulations are applicable to bidders on all construction contracts advertised by the Illinois Department of Transportation:

#### **CONSTRUCTION EMPLOYEE UTILIZATION PROJECTION**

- (a) All bidders on construction contracts shall complete and submit, along with and as part of their bids, a Bidder's Employee Utilization Form (Form BC-1256) setting forth a projection and breakdown of the total workforce intended to be hired and/or allocated to such contract work by the bidder including a projection of minority and female employee utilization in all job classifications on the contract project.
- (b) The Department of Transportation shall review the Employee Utilization Form, and workforce projections contained therein, of the contract awardee to determine if such projections reflect an underutilization of minority persons and/or women in any job classification in accordance with the Equal Employment Opportunity Clause and Section 7.2 of the Illinois Department of Human Rights' Rules and Regulations for Public Contracts adopted as amended on September 17, 1980. If it is determined that the contract awardee's projections reflect an underutilization of minority persons and/or women in any job classification, it shall be advised in writing of the manner in which it is underutilizing and such awardee shall be considered to be in breach of the contract unless, prior to commencement of work on the contract project, it submits revised satisfactory projections or an acceptable written affirmative action plan to correct such underutilization including a specific timetable geared to the completion stages of the contract.
- (c) The Department of Transportation shall provide to the Department of Human Rights a copy of the contract awardee's Employee Utilization Form, a copy of any required written affirmative action plan, and any written correspondence related thereto. The Department of Human Rights may review and revise any action taken by the Department of Transportation with respect to these requirements.



**RETURN WITH BID**

**Contract No. 60K06  
WILL County  
Section 2009-139 SG  
Project CMI-055-6(243)252  
Route FAI 55  
District 1 Construction Funds**

**PART II. WORKFORCE PROJECTION - continued**

- B. Included in "Total Employees" under Table A is the total number of **new hires** that would be employed in the event the undersigned bidder is awarded this contract.

The undersigned bidder projects that: (number) \_\_\_\_\_ new hires would be recruited from the area in which the contract project is located; and/or (number) \_\_\_\_\_ new hires would be recruited from the area in which the bidder's principal office or base of operation is located.

- C. Included in "Total Employees" under Table A is a projection of numbers of persons to be employed directly by the undersigned bidder as well as a projection of numbers of persons to be employed by subcontractors.

The undersigned bidder estimates that (number) \_\_\_\_\_ persons will be directly employed by the prime contractor and that (number) \_\_\_\_\_ persons will be employed by subcontractors.

**PART III. AFFIRMATIVE ACTION PLAN**

- A. The undersigned bidder understands and agrees that in the event the foregoing minority and female employee utilization projection included under **PART II** is determined to be an underutilization of minority persons or women in any job category, and in the event that the undersigned bidder is awarded this contract, he/she will, prior to commencement of work, develop and submit a written Affirmative Action Plan including a specific timetable (geared to the completion stages of the contract) whereby deficiencies in minority and/or female employee utilization are corrected. Such Affirmative Action Plan will be subject to approval by the contracting agency and the **Department of Human Rights**.
- B. The undersigned bidder understands and agrees that the minority and female employee utilization projection submitted herein, and the goals and timetable included under an Affirmative Action Plan if required, are deemed to be part of the contract specifications.

Company \_\_\_\_\_ Telephone Number \_\_\_\_\_

Address \_\_\_\_\_

**NOTICE REGARDING SIGNATURE**

The Bidder's signature on the Proposal Signature Sheet will constitute the signing of this form. The following signature block needs to be completed only if revisions are required.

Signature:  \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

- Instructions: All tables must include subcontractor personnel in addition to prime contractor personnel.
- Table A - Include both the number of employees that would be hired to perform the contract work and the total number currently employed (Table B) that will be allocated to contract work, and include all apprentices and on-the-job trainees. The "Total Employees" column should include all employees including all minorities, apprentices and on-the-job trainees to be employed on the contract work.
- Table B - Include all employees currently employed that will be allocated to the contract work including any apprentices and on-the-job trainees currently employed.
- Table C - Indicate the racial breakdown of the total apprentices and on-the-job trainees shown in Table A.

**RETURN WITH BID**

**ADDITIONAL FEDERAL REQUIREMENTS**

In addition to the Required Contract Provisions for Federal-Aid Construction Contracts (FHWA 1273), all bidders make the following certifications.

- A. By the execution of this proposal, the signing bidder certifies that the bidding entity has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid. This statement made by the undersigned bidder is true and correct under penalty of perjury under the laws of the United States.
- B. CERTIFICATION, EQUAL EMPLOYMENT OPPORTUNITY:
1. Have you participated in any previous contracts or subcontracts subject to the equal opportunity clause. YES \_\_\_\_\_ NO \_\_\_\_\_
  2. If answer to #1 is yes, have you filed with the Joint Reporting Committee, the Director of OFCC, any Federal agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements of those organizations? YES \_\_\_\_\_ NO \_\_\_\_\_

**RETURN WITH BID**

**Contract No. 60K06  
WILL County  
Section 2009-139 SG  
Project CMI-055-6(243)252  
Route FAI 55  
District 1 Construction Funds**

PROPOSAL SIGNATURE SHEET

The undersigned bidder hereby makes and submits this bid on the subject Proposal, thereby assuring the Department that all requirements of the Invitation for Bids and rules of the Department have been met, that there is no misunderstanding of the requirements of paragraph 3 of this Proposal, and that the contract will be executed in accordance with the rules of the Department if an award is made on this bid.

(IF AN INDIVIDUAL)

Firm Name \_\_\_\_\_  
Signature of Owner \_\_\_\_\_  
Business Address \_\_\_\_\_  
\_\_\_\_\_

(IF A CO-PARTNERSHIP)

Firm Name \_\_\_\_\_  
By \_\_\_\_\_  
Business Address \_\_\_\_\_  
Name and Address of All Members of the Firm: \_\_\_\_\_  
\_\_\_\_\_

(IF A CORPORATION)

Corporate Name \_\_\_\_\_  
By \_\_\_\_\_  
Signature of Authorized Representative \_\_\_\_\_  
Typed or printed name and title of Authorized Representative \_\_\_\_\_  
Attest \_\_\_\_\_  
Signature \_\_\_\_\_  
(IF A JOINT VENTURE, USE THIS SECTION FOR THE MANAGING PARTY AND THE SECOND PARTY SHOULD SIGN BELOW)  
Business Address \_\_\_\_\_

(IF A JOINT VENTURE)

Corporate Name \_\_\_\_\_  
By \_\_\_\_\_  
Signature of Authorized Representative \_\_\_\_\_  
Typed or printed name and title of Authorized Representative \_\_\_\_\_  
Attest \_\_\_\_\_  
Signature \_\_\_\_\_  
Business Address \_\_\_\_\_

If more than two parties are in the joint venture, please attach an additional signature sheet.



Return with Bid

Division of Highways
Proposal Bid Bond
(Effective November 1, 1992)

Item No. \_\_\_\_\_

Letting Date \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, That We \_\_\_\_\_

as PRINCIPAL, and \_\_\_\_\_

\_\_\_\_\_ as SURETY, are held jointly, severally and firmly bound unto the STATE OF ILLINOIS in the penal sum of 5 percent of the total bid price, or for the amount specified in Article 102.09 of the "Standard Specifications for Road and Bridge Construction" in effect on the date of invitation for bids, whichever is the lesser sum, well and truly to be paid unto said STATE OF ILLINOIS, for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH, that whereas, the PRINCIPAL has submitted a bid proposal to the STATE OF ILLINOIS, acting through the Department of Transportation, for the improvement designated by the Transportation Bulletin Item Number and Letting Date indicated above.

NOW, THEREFORE, if the Department shall accept the bid proposal of the PRINCIPAL; and if the PRINCIPAL shall, within the time and as specified in the bidding and contract documents, submit a DBE Utilization Plan that is accepted and approved by the Department; and if, after award by the Department, the PRINCIPAL shall enter into a contract in accordance with the terms of the bidding and contract documents including evidence of the required insurance coverages and providing such bond as specified with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof; or if, in the event of the failure of the PRINCIPAL to make the required DBE submission or to enter into such contract and to give the specified bond, the PRINCIPAL pays to the Department the difference not to exceed the penalty hereof between the amount specified in the bid proposal and such larger amount for which the Department may contract with another party to perform the work covered by said bid proposal, then this obligation shall be null and void, otherwise, it shall remain in full force and effect.

IN THE EVENT the Department determines the PRINCIPAL has failed to comply with any requirement as set forth in the preceding paragraph, then Surety shall pay the penal sum to the Department within fifteen (15) days of written demand therefor. If Surety does not make full payment within such period of time, the Department may bring an action to collect the amount owed. Surety is liable to the Department for all its expenses, including attorney's fees, incurred in any litigation in which it prevails either in whole or in part.

In TESTIMONY WHEREOF, the said PRINCIPAL and the said SURETY have caused this instrument to be signed by

their respective officers this \_\_\_\_\_ day of \_\_\_\_\_ A.D., \_\_\_\_\_ .

PRINCIPAL

SURETY

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Company Name)

By \_\_\_\_\_  
(Signature & Title)

By: \_\_\_\_\_  
(Signature of Attorney-in-Fact)

Notary Certification for Principal and Surety

STATE OF ILLINOIS,  
County of \_\_\_\_\_

I, \_\_\_\_\_, a Notary Public in and for said County, do hereby certify that  
\_\_\_\_\_ and \_\_\_\_\_  
(Insert names of individuals signing on behalf of PRINCIPAL & SURETY)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of PRINCIPAL and SURETY, appeared before me this day in person and acknowledged respectively, that they signed and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this \_\_\_\_\_ day of \_\_\_\_\_ A.D. \_\_\_\_\_

My commission expires \_\_\_\_\_

Notary Public

In lieu of completing the above section of the Proposal Bid Form, the Principal may file an Electronic Bid Bond. By signing the proposal and marking the check box next to the Signature and Title line below, the Principal is ensuring the identified electronic bid bond has been executed and the Principal and Surety are firmly bound unto the State of Illinois under the conditions of the bid bond as shown above.

Electronic Bid Bond ID# \_\_\_\_\_

Company / Bidder Name \_\_\_\_\_



Signature and Title \_\_\_\_\_

# PROPOSAL ENVELOPE



# PROPOSALS

for construction work advertised for bids by the  
Illinois Department of Transportation

Item No.	Item No.	Item No.

Submitted By:

Name:
Address:
Phone No.

Bidders should use an IDOT proposal envelope or affix this form to the front of a 10" x 13" envelope for the submittal of bids. If proposals are mailed, they should be enclosed in a second or outer envelope addressed to:

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

## **NOTICE**

**Individual bids, including Bid Bond and/or supplemental information if required, should be securely stapled.**



# CONTRACTOR OFFICE COPY OF CONTRACT SPECIFICATIONS

## NOTICE

None of the following material needs to be returned with the bid package unless the special provisions require documentation and/or other information to be submitted.

**Contract No. 60K06  
WILL County  
Section 2009-139 SG  
Project CMI-055-6(243)252  
Route FAI 55  
District 1 Construction Funds**



**Illinois Department of Transportation**

## **SUBCONTRACTOR DOCUMENTATION**

P.A. 96-0795, effective July 1, 2010, enacted substantial changes to the provisions of the Illinois Procurement Code (30 ILCS 500). Among the changes are provisions affecting subcontractors. The Contractor awarded this contract will be required as a material condition of the contract to implement and enforce the contract requirements applicable to subcontractors approved in accordance with article 108.01 of the Standard Specifications for Road and Bridge Construction.

If the Contractor seeks approval of subcontractors to perform a portion of the work, and approval is granted by the Department, the Contractor shall provide a copy of the subcontract to the Chief Procurement Officer within 20 calendar days after execution of the subcontract.

The subcontract shall contain the certifications required to be made by subcontractors pursuant to Article 50 of the Illinois Procurement Code. This Notice to Bidders includes a document incorporating all required subcontractor certifications and disclosures for use by the Contractor in compliance with this mandate. The document is entitled State Required Ethical Standards Governing Subcontractors.

**STATE ETHICAL STANDARDS**  
**GOVERNING SUBCONTRACTORS**

Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

The certifications hereinafter made by the subcontractor are each a material representation of fact upon which reliance is placed should the Department approve the subcontractor. The chief procurement officer may terminate or void the subcontract approval if it is later determined that the bidder or subcontractor rendered a false or erroneous certification.

Section 50-2 of the Illinois Procurement Code provides that every person that has entered into a multi-year contract and every subcontractor with a multi-year subcontract shall certify, by July 1 of each fiscal year covered by the contract after the initial fiscal year, to the responsible chief procurement officer whether it continues to satisfy the requirements of Article 50 pertaining to the eligibility for a contract award. If a contractor or subcontractor is not able to truthfully certify that it continues to meet all requirements, it shall provide with its certification a detailed explanation of the circumstances leading to the change in certification status. A contractor or subcontractor that makes a false statement material to any given certification required under Article 50 is, in addition to any other penalties or consequences prescribed by law, subject to liability under the Whistleblower Reward and Protection Act for submission of a false claim.

**A. Bribery**

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

- (1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or
- (2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government, or subcontracting under such a contract, as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

- (1) the business has been finally adjudicated not guilty; or
- (2) the business demonstrates to the governmental entity with which it seeks to contract, or which is signatory to the contract to which the subcontract relates, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State, and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the contractor or the subcontractor, respectively, that the contractor or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any certifications required by this Section are false. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50.5.

**B. Felons**

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any State agency, or enter into a subcontract, from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder or contractor or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer may declare the related contract void if any of the certifications required by this Section are false.

**C. Debt Delinquency**

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency.

The contractor or bidder or subcontractor, respectively, certifies that it, or any affiliate, is not barred from being awarded a contract or subcontract under the Procurement Code. Section 50-11 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency, or entering into a subcontract, if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The bidder or contractor or subcontractor, respectively, further acknowledges that the chief procurement officer may declare the related contract void if this certification is false or if the bidder, contractor, or subcontractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

**D. Prohibited Bidders, Contractors and Subcontractors**

1. The Illinois Procurement Code provides:

Section 50-10.5 and 50-60(c). Prohibited bidders, contractors and subcontractors.

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 or if in violation of Subsection (c) for a period of five years from the date of conviction.. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Procurement Code shall contain a certification by the bidder, contractor, or subcontractor, respectively, that the bidder, contractor, or subcontractor is not barred from being awarded a contract or subcontract under this Section and acknowledges that the chief procurement officer shall declare the related contract void if any of the certifications completed pursuant to this Section are false.

**E. Section 42 of the Environmental Protection Act**

The bidder or contractor or subcontractor, respectively, certifies in accordance with 30 ILCS 500/50-12 that the bidder, contractor, or subcontractor, is not barred from being awarded a contract or entering into a subcontract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency, or entering into any subcontract, that is subject to the Procurement Code by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The bidder or contractor or subcontractor, respectively, acknowledges that the chief procurement officer may declare the contract void if this certification is false.

**The undersigned, on behalf of the subcontracting company, has read and understands the above certifications and makes the certifications as required by law.**

<hr/>		
Name of Subcontracting Company		
<hr/>		<hr/>
Authorized Officer		Date

## RETURN WITH SUBCONTRACT

### SUBCONTRACTOR DISCLOSURES

#### I. DISCLOSURES

- A. The disclosures hereinafter made by the subcontractor are each a material representation of fact upon which reliance is placed. The subcontractor further certifies that the Department has received the disclosure forms for each subcontract.

The chief procurement officer may void the bid, contract, or subcontract, respectively, if it is later determined that the bidder or subcontractor rendered a false or erroneous disclosure. A contractor or subcontractor may be suspended or debarred for violations of the Procurement Code. Furthermore, the chief procurement officer may void the contract or subcontract.

#### B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Illinois Procurement Code provides that all subcontracts of more than \$10,000 shall be accompanied by disclosure of the financial interests of the subcontractor. This disclosed information for the subcontractor, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act, filed with the Procurement Policy Board, and shall be incorporated as a material term of the Prime Contractor's contract. Furthermore, pursuant to this Section, the Procurement Policy Board may recommend to allow or void a contract or subcontract based on a potential conflict of interest.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the subcontracting entity or its parent entity, whichever is less, unless the subcontractor is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a subcontractor is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, subcontracts, proposals, leases, or other ongoing procurement relationships the subcontracting entity has with any other unit of state government and shall clearly identify the unit and the contract, subcontract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

#### C. Disclosure Form Instructions

##### Form A Instructions for Financial Information & Potential Conflicts of Interest

If the subcontractor is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a subcontractor is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a subcontractor is not subject to Federal 10K reporting, the subcontractor must determine if any individuals are required by law to complete a financial disclosure form. To do this, the subcontractor should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on the second page of Form A must be signed and dated by a person that is authorized to execute contracts for the subcontracting company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES \_\_\_ NO \_\_\_
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than \$106,447.20? YES \_\_\_ NO \_\_\_
3. Does anyone in your organization receive more than \$106,447.20 of the subcontracting entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES \_\_\_ NO \_\_\_
4. Does anyone in your organization receive greater than 5% of the subcontracting entity's or parent entity's total distributive income, but which is less than \$106,447.20? YES \_\_\_ NO \_\_\_

(Note: Only one set of forms needs to be completed per person per subcontract even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The subcontractor must determine each individual in the subcontracting entity or the subcontracting entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable.** The person signing can be, but does not have to be, the person for which the form is being completed. The subcontractor is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT on page 2 of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

## RETURN WITH SUBCONTRACT

### **Form B: Instructions for Identifying Other Contracts & Procurement Related Information**

Disclosure Form B must be completed for each subcontract submitted by the subcontracting entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the subcontractor to ignore Form B. Form B must be completed, checked, and dated or the subcontract will not be approved.*

The Subcontractor shall identify, by checking Yes or No on Form B, whether it has any pending contracts, subcontracts, leases, bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the subcontractor only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the subcontractor must list all non-IDOT State of Illinois agency pending contracts, subcontracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts or subcontracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included.

RETURN WITH SUBCONTRACT

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form A
Subcontractor: Financial Information & Potential Conflicts of Interest Disclosure

Subcontractor Name
Legal Address
City, State, Zip
Telephone Number Email Address Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Subcontractors desiring to enter into a subcontract of a State of Illinois contract must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of \$10,000, and for all open-ended contracts. A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.

DISCLOSURE OF FINANCIAL INFORMATION

1. Disclosure of Financial Information. The individual named below has an interest in the SUBCONTRACTOR (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than \$106,447.20 (60% of the Governor's salary as of 7/1/07). (Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)

FOR INDIVIDUAL (type or print information)
NAME:
ADDRESS
Type of ownership/distributable income share:
stock sole proprietorship Partnership other: (explain on separate sheet):
% or \$ value of ownership/distributable income share:

2. Disclosure of Potential Conflicts of Interest. Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services. Yes \_\_\_ No \_\_\_

If your answer is yes, please answer each of the following questions.

1. Are you currently an officer or employee of either the Capitol Development Board or the Illinois Toll Highway Authority? Yes \_\_\_ No \_\_\_

2. Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) provide the name the State agency for which you are employed and your annual salary.

**RETURN WITH SUBCONTRACT**

3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes \_\_\_ No \_\_\_
4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes \_\_\_ No \_\_\_

---

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment services in the previous 2 years.

Yes \_\_\_ No \_\_\_

If your answer is yes, please answer each of the following questions.

1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois Toll Highway Authority? Yes \_\_\_ No \_\_\_
2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60 % of the Governor's salary as of 7/1/07) provide the name of your spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. \_\_\_\_\_
3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the salary of the Governor as of 7/1/07) are you entitled to receive (i) more then 71/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes \_\_\_ No \_\_\_
4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds \$106,447.20, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15 % in the aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes \_\_\_ No \_\_\_

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(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years. Yes \_\_\_ No \_\_\_

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(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes \_\_\_ No \_\_\_

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(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United States of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years. Yes \_\_\_ No \_\_\_

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(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes \_\_\_ No \_\_\_

---

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government. Yes \_\_\_ No \_\_\_

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**RETURN WITH SUBCONTRACT**

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes \_\_\_ No \_\_\_

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes \_\_\_ No \_\_\_

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections. Yes \_\_\_ No \_\_\_

**APPLICABLE STATEMENT**

**This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page. Under penalty of perjury, I certify the contents of this disclosure to be true and accurate to the best of my knowledge.**

Completed by:  \_\_\_\_\_ Date \_\_\_\_\_  
Signature of Individual or Authorized Officer

**NOT APPLICABLE STATEMENT**

**Under penalty of perjury, I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.**

**This Disclosure Form A is submitted on behalf of the SUBCONTRACTOR listed on the previous page.**

\_\_\_\_\_ Date \_\_\_\_\_  
Signature of Authorized Officer

RETURN WITH SUBCONTRACT

ILLINOIS DEPARTMENT  
OF TRANSPORTATION

Form B  
Subcontractor: Other Contracts &  
Procurement Related Information  
Disclosure

Subcontractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of \$10,000, and for all open-ended contracts.

**DISCLOSURE OF OTHER CONTRACTS, SUBCONTRACTS, AND PROCUREMENT RELATED INFORMATION**

**1. Identifying Other Contracts & Procurement Related Information.** The SUBCONTRACTOR shall identify whether it has any pending contracts, subcontracts, including leases, bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes \_\_\_ No \_\_\_

If "No" is checked, the subcontractor only needs to complete the signature box on the bottom of this page.

**2. If "Yes" is checked.** Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

**THE FOLLOWING STATEMENT MUST BE CHECKED**

<input type="checkbox"/>	_____	_____
	Signature of Authorized Officer	Date



- 1. TIME AND PLACE OF OPENING BIDS.** Sealed proposals for the improvement described herein will be received by the Department of Transportation at the Harry R. Hanley Building, 2300 South Dirksen Parkway, in Springfield, Illinois until 10:00 o'clock a.m., June 11, 2010. All bids will be gathered, sorted, publicly opened and read in the auditorium at the Department of Transportation's Harry R. Hanley Building shortly after the 10:00 a.m. cut off time.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 60K06  
WILL County  
Section 2009-139 SG  
Project CMI-055-6(243)252  
Route FAI 55  
District 1 Construction Funds**

**Fiber optic cable installation for highway surveillance on I-55 from I-80 to Naperville Road (Shorewood to Romeoville).**

- 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

Gary Hannig,  
Secretary

INDEX  
 FOR  
 SUPPLEMENTAL SPECIFICATIONS  
 AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2010

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

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**STATE OF ILLINOIS**

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**SPECIAL PROVISIONS**

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2007, 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 FAI 55 (I-55), Project CMI-055-6 (243) 252, Section 2009-139-SG, in Will County, Contract 60K06 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 on FAI 55 from approximately I-80 to Naperville Road in Will County.

**DESCRIPTION OF PROJECT**

The project involves the installation of fiber optic cable, radar vehicle detector systems, loop detectors and close circuit television (CCTV) for traffic surveillance from I-80 to Naperville Road.

**TRAFFIC CONTROL PLAN**

Effective: September 30, 1985

Revised: January 1, 2007

Traffic Control shall be according to the applicable sections of the Standard Specifications, the Supplemental Specifications, the "Illinois Manual on Uniform Traffic Control Devices for Streets and Highways", any special details and Highway Standards contained in the plans, and the Special Provisions contained herein.

Special attention is called to Article 107.09 of the Standard Specifications and the following Highway Standards, Details, Quality Standard for Work Zone Traffic Control Devices, Recurring Special Provisions and Special Provisions contained herein, relating to traffic control.

The Contractor shall contact the District One Bureau of Traffic at least 72 hours in advance of beginning work.

STANDARDS:

- |        |        |        |        |        |        |
|--------|--------|--------|--------|--------|--------|
| 701400 | 701401 | 701411 | 701446 | 701901 | 701001 |
|        | 701006 | 701301 | 701422 | 701501 |        |

DETAILS:

TC-8      TC-9      TC-17

SPECIAL PROVISIONS:

Personal Protective Equipment (BDE)  
Reflective Sheeting on Channelizing Devices (BDE)  
Truck Mounted/Trailer Mounted Attenuators (BDE)  
Failure to Open Traffic Lanes to Traffic  
Traffic Control and Protection (Expressways)  
TRAFFIC SURVEILLANCE (I55/I80 TO NORTH OF NAPERVILLE RD.)  
TRAFFIC SURVEILLANCE. - GENERAL

**TRAFFIC SURVEILLANCE (I55/I80 TO NORTH OF NAPERVILLE RD.)**

Effective Date: January 1, 1990

Revised: November 12, 2008

All work and equipment performed and installed under this contract, #60K06, Route# FAI 55, STATE Section: 2009-139-SG, shall be governed and shall comply with applicable sections of State of Illinois "Standard Specifications for Road and Bridge Construction" latest edition, herein referred to as the Standard Specifications; the State of Illinois "Manual on Uniform Traffic Control Devices for Streets and Highways," latest edition; the National Electrical Code, latest edition; the National Electrical Manufacturers Association, herein referred to as NEMA: Standards Publication for Traffic Control Systems, latest edition; AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and the "Supplemental Specifications and Recurring Special Provisions" noted herein.

The following Special Provisions supplement the above specifications, manuals, and code. In case of conflict with any part or parts of said documents, these Special Provisions shall take precedence and shall govern.

In order to reduce possible vehicular conflicts with fixed objects and avoid public criticism, it is necessary to require that no posts, poles, heads, or cabinets be installed until all traffic surveillance equipment is brought to and located on the job site.

The construction, installation and/or removal work shall be accomplished at the following location(s):

I55 I80 to N. of Naperville Rd.

Description of Work. The work to be done under this contract consists of furnishing and installing all traffic surveillance items as specified on the Plans and as specified herein in a manner acceptable and approved by the Engineer.

**TRAFFIC SURVEILLANCE. - GENERAL**

Effective: June 1, 1994

Revised: July 30, 2008

1.0 The following supplements applicable sections of Section 800 of the Standard Specifications for Road and Bridge Construction.

The intent of this Special Provision is to prescribe the materials and construction methods commonly used in traffic surveillance installations.

All material furnished shall be new. The locations and the details of all installations shall be as indicated on the Plans or as directed by the Engineer.

When the road is open to traffic, except as otherwise provided, the Contractor may request a turn on and inspection of all complete traffic surveillance installations system. This request must be made to the Engineer a minimum of seven (7) working days prior to the time of the requested inspection. Upon demonstration that all surveillance is operational and all work is completed in accordance with the contract and to the satisfaction of the Engineer, the Engineer will then allow all of the surveillance to be placed in continuous operation. The Agency that is responsible for the maintenance of the traffic surveillance installations will assume the maintenance upon successful completion of this inspection.

Projects which call for the storage and re-use of existing traffic surveillance equipment shall have a 30 day test period prior to project acceptance.

### DEFINITION OF TERMS

Whenever in these Special Provisions the following terms are used, the intent and meaning shall be interpreted as follows:

Induction Loop - A continuous non-spliced wire, three turns, permanently placed and sealed in sawcuts in the roadway and adjacent area, used in conjunction with an induction loop detector sensor unit.

T.S.C. - The Traffic Systems Center of the Illinois Department of Transportation with offices at 445 Harrison Street, Oak Park, Illinois 60304-1499.

State Highway Communications Center - The main communication control facility of the Illinois Department of Transportation with present offices at 201 W. Center Court, Schaumburg, Illinois 60196-1096.

### PROSECUTION OF SURVEILLANCE WORK

The work shall be as indicated on the Plans and as required by the Specifications. Unless otherwise indicated, the Contractor shall furnish and install all required materials and equipment, including all associated appurtenances, to produce a complete and operational installation. The appurtenances shall be as indicated, and the costs shall be included in the unit prices bid for the pay items of this contract. The work shall be done in a workmanlike manner.

### CONNECTIONS TO EXISTING INSTALLATIONS

Where new work connects to existing installations, the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation and shall remove all existing work, as required, to make satisfactory connections, with the work to be performed under these Provisions, so as to leave the entire work in a finished and workmanlike manner, as approved by the Engineer. No raceways shall be allowed to enter cabinet through the sides or backwalls.

Some contracted work which does not call for a complete rebuilding of a surveillance location but the replacement of detector loops and lead-in cable only in conjunction with work such as pavement overlay, cut and grind, curb and gutter replacement and other similar type work where existing appurtenances have been in place for several years.

This at times has created pre-existing conditions (such as blocked/broken lead-in conduits, buried handholes) which the contractor may have to repair/replace to make the location fully functioning. The Contractor will be compensated for such work utilizing contract items after a complete inspection by the T.S.C. Engineer, Resident Engineer and Electrical Contractor's Rep. with a full review on a case by case basis. Upon completing such work the Contractor shall notify the R.E. to contact the T.S.C. Engineer for checks and test to insure the location is on-line and working correctly.

The Contractor shall furnish all labor and material to the furtherance of this end, whether or not distinctly shown on the plans, in any of the "Standard Specifications" or in the Special Provisions.

Note that the Contractor shall be entitled to only one request for location marking of existing systems and that multiple requests may only be honored at the Contractor's expense.

### STANDARD GUARANTEE

Manufacturers' warranties or guarantees on all electrical and mechanical equipment consistent with those provided as customary trade practice shall be obtained and transferred to the State.

### IN-SERVICE WARRANTIES OR GUARANTEES

The Contractor shall provide warranties or guarantees that will provide for satisfactory in-service operation of the mechanical and electrical equipment and related components. These warranties or guarantees shall cover a period of two (2) years following project acceptance. The cost of these warranties and guarantees shall be considered incidental to the Contract.

### EQUIPMENT DOCUMENTS

The Contractor shall furnish five (5) diagrams of the internal and external connection of the equipment in each Traffic Systems Center cabinet. Contractor shall also furnish the Operating and maintenance instructions for all equipment supplied. One copy of the wiring diagrams for each cabinet shall be retained in each field cabinet. A wiring diagram shall be contained in a plastic pouch that shall be permanently mounted to the door of each cabinet. Contractor shall permanently mark the cabinet for each termination and each terminal connection as to loop, tone, closure, phone, and lane function of each termination in the cabinet and provide a completed cable log and location as-built diagram at each location.

### TERMINAL BLOCKS

Terminal blocks provided in field cabinets shall be the heavy duty barrier type. The terminal block shall be a minimum of 2 inches (50.8 mm) wide and 1-3/16 inch (30.16 mm) deep. Center to center of the terminal screws or studs shall be a minimum of 21/32 inch (16.67 mm) with barriers in between. Terminal blocks shall be rated at 45 amps 600 volts breakdown RMS line to line 11,000 V. and breakdown RMS line to ground 13,800 V. A marking strip shall be provided with each terminal block.

### EXISTING EQUIPMENT

All existing equipment, replaced by new equipment shall remain the property of the State and shall be delivered to the Electrical Maintenance Contractor.

The cost of removing and delivering the replaced equipment shall be paid for under separate pay item for Cabinet Housing Equipment - Removal.

### TELECOMMUNICATION CABLE

When installing the telecommunication cable, the Contractor shall extend his installation and connections of the cable to the next adjacent Surveillance installations or junction box, beyond the limits of his contract section. He shall be responsible for insuring that the cable is continuous and connected from one contract section to the other.

The Contractor shall comply with the agreement between the State of Illinois and IBT/Ameritech as to connections, locations, and terminations of the phone lines (Telephone Company, Engineering, General Service Engineering Division, Outside Plant Engineering Notes 14-36A., March 1971, Administrative Aids and Procedures).

### EXISTING SURVEILLANCE EQUIPMENT AND APPURTENANCES

Before starting work, the Contractor, in the presence of the Resident Engineer, Traffic Systems Center personnel and the State Electrical Maintenance Contractor's rep., shall inspect the existing equipment to be delivered or maintained by the Contractor and shall take an inventory of all defective, broken, and/or missing parts. Those parts found broken, defective, and/or missing shall be repaired or replaced by the State Electrical Maintenance contractor and shall be recorded as such. The Contractor shall be required to maintain all tone transmitters, tone receivers, tone power supplies, tone mounting frames, harnesses, controller and wiring. The Contractor shall be required to maintain all metering and surveillance cabinets, foundation, concrete handhole, vehicle detection equipment, all interconnecting cables and all Surveillance appurtenances including signal heads. Contractor shall number each cabinet as indicated on the plans, with reflective decals as those used on lighting pole standard.

Should damage occur to any surveillance items during the Contractor's contract period, the Contractor shall repair or replace all damaged equipment at his own expense. The TSC Engineer shall determine what equipment shall be reusable and what shall be replaced. Replaced equipment shall be of equal or better quality and type.

The Contractor, prior to the commencement of his work, shall notify the T.S.C. Engineer for a pre-construction inspection. If construction begins prior to this meeting, the Contractor assumes maintenance responsibilities of the locations within his contract limits and shall make any repairs or replace any damaged equipment pre-existing or damaged as a result of his own negligence at his own expense. This also relieves the Electrical Maintenance Contractor of providing one free locate of the surveillance installations within the contract limits.

### AS-BUILT PLANS

Upon completion of the work, the Contractor shall furnish one (1) copy of "as-built" drawings on CD compatible with Micro Station V8-2004 Edition software at the Traffic Systems Center and four (4) full size sets of "as-built" plans to the Engineer. The plans shall include definite locations and length of all cables, duct, conduit pushes, induction loop, lead-in, foundations, handhole and P-duct. The cost of the "as-built" plans shall be incidental to the contract. The Engineer will not authorize final inspection of any installations until the said plans are in his possession.

## PROTECTION OF THE WORK

Electrical work, equipment and appurtenances shall be protected from damage during construction until final acceptance. Electrical raceway or duct openings, shall be capped or sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

## STANDARDS OF INSTALLATION

Electrical work shall be installed in a neat and workmanlike manner in accordance with the best practices of the trade. Unless otherwise indicated, materials and equipment shall be installed in accordance with the manufacturer's recommendations.

Except as specified elsewhere herein, materials and equipment shall be in conformance with the requirements of Section 800 & 1088 of the Standard Specifications for Road and Bridge Construction.

In addition to the requirements of the Standard Specifications relating to control of materials, the Contractor shall comply with the following requirements.

The Contractor shall supply samples of all wire, cable, and equipment and shall make up and supply samples of each type of cable splice proposed for use in the work for the Engineer's approval.

Before equipment and/or material including cabinet, telemetry, and detectors are delivered to the job site, the Contractor shall obtain and forward to the Engineer a certified, notarized statement from the manufacturer, containing the catalog numbers of the equipment and/or material, guaranteeing that the equipment and/or material, after manufacture, comply in all respects with the requirements of the Specifications and these Special Provisions. Re-manufactured or modified equipment other than by the original manufacturer shall not be allowed. Original manufacturer shall certify that he made modification to the equipment.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and equipment are paid, and no additional materials and equipment are paid, and no additional compensation will be allowed. Materials and equipment not complying with the above requirements that have been installed on the job will be done at the Contractor's own risk and may be subject to removal and disposal at the Contractor's expense.

## PROCUREMENT

Materials and equipment shall be the products of established manufacturers, shall be new, and suitable for the service required. The Contractor is obligated to conduct his own search into the timely availability of the specified equipment and to ensure that all materials and equipment are in strict conformance with the contract documents. Materials or equipment items which are similar or identical shall be the product of the same manufacturer. The cost of submittals, certifications, any required samples and similar costs shall not be paid for extra but shall be included into the pay item bid price for the respective material or work.

## EXCEPTIONS, DEVIATIONS AND SUBSTITUTIONS

Exceptions to and deviations from the requirements of the Contract Documents shall not be allowed without approval by Engineer and T.S.C. personnel.

It is the Contractor's responsibility to note any deviations from contract requirements at the time of submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No substitutions shall be permitted without the approval of the Engineer, and T.S.C. personnel.

### SUBMITTALS

Within 30 days after contract award, the Contractor shall submit, for approval, complete manufacturer's product data (for standard products and components) and detailed shop drawings (for fabricated equipment). All of the submittal information shall be assembled by the Contractor and submitted to the Engineer at one time. All equipment samples shall be submitted at this time. Partial and sporadic submittals may be returned without review. The Contractor may request, in writing, permission to make a partial submittal. The Engineer will evaluate the circumstances of the request and may accept to review such a partial submittal. However, no additional compensation or extension of time shall be allowed for extra costs or delays incurred due to partial or late submittals.

### TESTING

Before final acceptance, the electrical equipment, material, induction loops and work provided under this contract shall be tested. Tests will not be made progressively, as parts of the work are completed they shall be all made at one time. Items which fail to test satisfactorily shall be repaired or replaced. Traffic Systems Center staff will witness all testing.

### INSTALLATION/INSPECTION PROCEDURES

After all control boxes and equipment to be installed has been physically inspected and approved by T.S.C. Engineer, the equipment supplier shall then deliver all equipment to the job site. The Contractor shall then install/safeguard all the equipment which has been delivered prior to requesting an inspection. No unapproved equipment shall be on the job site or installed as part of the job. This does not relieve the Contractor from replacement/repairs of equipment found to be damaged or in non-compliance of these provisions.

Certain items such as conduit, wire, duct, anchor bolts, and junction boxes will be inspected and may be tested by the Department's Bureau of Materials and these items shall not be delivered to the job site without inspection approval. Items such as cabinets shall be inspected by the Engineer at the contractor's or manufacturer's shop and these items shall not be delivered to the job site without T.S.C. staff inspection approval. It shall be the Contractor's responsibility to arrange inspection activities with the Engineer thirty (30) days prior to installation. 30 days prior to installation of the tone equipment being supplied and, prior to request for a turn-on, the T.S.C. Engineer will be contacted for the correct frequencies, controller addresses and "DB" setting for each location to be installed. When the work is complete, all equipment fully operational, the Contractor shall schedule a turn-on inspection with the Engineer. Acceptance will be made as a total system, not as parts. The Contractor shall request the inspection no less than seven (7) working days prior to the desired inspection date.

No inspection shall be made until the delivery of acceptable "as built" drawings, specified certifications, and the required guarantees.

It will be the responsibility of the installing contractor to provide a qualified technician representing the tone equipment supplier to be at the turn-on inspection of each location to provide the technical expertise to bring each location on line.

The Contractor shall furnish the necessary manpower and equipment to make the Inspection. The Engineer may designate the type of equipment required for the inspection tests.

A written record of the loop analyzer readings shall be submitted to the T.S.C. Engineer prior to the final inspection.

Any part or parts of the installation that are missing, broken, defective, or not functioning properly during the inspection shall be noted and shall be adjusted, repaired, or replaced as directed by the Engineer and another inspection shall be made at another date. Only upon satisfaction of all points shall the installation be acceptable.

After the subject inspections are completed the T.S.C. Engineer will provide the contractor with a complete punch list of items necessary to be completed prior to final inspection and acceptance for maintenance.

The Contractor shall furnish a written guarantee for all materials, equipment and work performed under the contract for a period of not less than two (2) years from the date of final acceptance.

## **GENERAL ELECTRICAL REQUIREMENTS**

Effective: June 1, 2009

Add the following to Article 801 of the Standard Specifications:

“Maintenance transfer and Preconstruction Inspection:

General. Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall request a maintenance transfer and preconstruction site inspection, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any lighting and/or traffic control systems which may be affected by the work. The request for the maintenance transfer and preconstruction inspection shall be made no less than seven (7) calendar days prior to the desired inspection date. The maintenance transfer and preconstruction inspection shall:

Establish the procedures for formal transfer of maintenance responsibility required for the construction period.

Establish the approximate location and operating condition of lighting an/or traffic control systems which may be affected by the work

Marking of Existing Cable Systems. The party responsible for maintenance of any existing lighting and/or traffic control systems at the project site will, at the Contractor’s request, mark and/or stake, once per location, all underground cable routes owned or maintained by the State. A project may involve multiple “locations” where separated electrical systems are involved (i.e. different controllers).



The markings shall be taken to have a horizontal tolerance of at least one (1) foot (304.8 mm) to either side. The request for the cable locations and marking shall be made at the same time the request for the maintenance transfer and preconstruction inspection is made. The Contractor shall exercise extreme caution where existing buried cable runs are involved. The markings of existing systems are made strictly for assistance to the Contractor and this does not relieve the Contractor of responsibility for the repair or replacement of any cable run damaged in the course of his work, as specified elsewhere herein. Note that the Contractor shall be entitled to only one request for location marking of existing systems and that multiple requests may only be honored at the Contractor's expense. No locates will be made after maintenance is transferred, unless it is at the contractor's expense.

Condition of Existing Systems. The Contractor shall conduct an inventory of all existing electrical system equipment within the project limits, which may be affected by the work, making note of any parts which are found broken or missing, defective or malfunctioning. Megger and load readings shall be taken for all existing circuits which will remain in place or be modified. If a circuit is to be taken out in its entirety, then readings do not have to be taken. The inventory and test data shall be reviewed with and approved by the Engineer and a record of the inventory shall be submitted to the Engineer for the record. Without such a record, all systems transferred to the Contractor for maintenance during construction shall be returned at the end of construction in complete, full operating condition.

Revise the 6<sup>th</sup> paragraph of Article 801.05 (a) of the Standard Specifications to read:

Resubmittals. All submitted items reviewed and marked 'APPROVED AS NOTED', OR 'DISAPPROVED' are to be resubmitted in their entirety with a disposition of previous comments to verify contract compliance at no addition cost to the state unless otherwise indicated within the submittal comments."

Revise Article 801.11(a) of the Standard Specifications to read:

Lighting operation and Maintenance Responsibility. The scope of work shall include the assumption of responsibility for the continuing operation and maintenance of the existing, proposed, temporary, sign and navigation lighting, or other lighting systems and all appurtenance affected by the work as specified elsewhere herein. Maintenance of lighting systems will be paid for separately".

Add the following to Section 801.11(a) of the Standard Specifications:

Energy and Demand Charges. The payment of basic energy and demand charges by the electric utility for existing lighting which remains in service will continue as a responsibility of the Owner, unless otherwise indicated. Unless otherwise indicated or required by the Engineer duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously at the Owner's expense and lighting systems shall not be kept in operation during long daytime periods at the Owner's expense. Upon written authorization from the Engineer to place a proposed new lighting system in service, whether the system has passed final acceptance or not, (such as to allow temporary lighting to be removed), the Owner will accept responsibility for energy and demand charges for such lighting, effective the date of authorization. All other energy and demand payments to the utility shall be the responsibility of the Contractor until final acceptance."

Add the following to Section 801 of the Standard Specifications:

“Lighting Cable Identification. Each wire installed shall be identified with its complete circuit number at each termination, splice, junction box or other location where the wire is accessible”.

“Lighting Cable Fuse Installation. Standard fuse holders shall be used on non-frangible (non-breakaway) light pole installations and quick-disconnect fuse holders shall be used on frangible (breakaway) light pole installations. Wires shall be carefully stripped only as far as needed for connection to the device. Over-stripping shall be avoided. An oxide inhibiting lubricant shall be applied to the wire for minimum connection resistance before the terminals are crimped-on. Crimping shall be performed in accordance with the fuse holder manufacturer’s recommendations. The exposed metal connecting portion of the assembly shall be taped with two half-lapped wraps of electrical tape and then covered by the specified insulating boot. The fuse holder shall be installed such that the fuse side is connected to the pole wire (load side) and the receptacle side of the holder is connected to the line side.”

Revise the 2<sup>nd</sup> and 3<sup>rd</sup> sentences of the second paragraph of Article 801.02 of the Standard Specifications to read:

“Unless otherwise indicated, materials and equipment shall bear the UL label, or an approved equivalent, whenever such labeling is available for the type of material or equipment being furnished.”

Revise the 2<sup>nd</sup> paragraph of Article 801.16 of the Standard Specifications to read:

“When the work is complete, and seven days before the request for a final inspection, the full-size set of contract drawings, stamped “RECORD DRAWINGS”, shall be submitted to the Engineer for review and approval and shall be stamped with the date and the signature of the Contractor’s supervising engineer or electrician. The record drawings shall be submitted in PDF format on CDROM as well as harcopy for review and approval. In addition to the record drawings, copies of the final catalog cuts which have been Approved or Approved as Noted shall be submitted in PDF format along with the record drawings. The PDF files shall clearly indicate either by filename or PDF table of contents the respective pay item number. Specific part of model numbers of items which have been selected shall be clearly visible.”

Add the following to Article 801.16 of the Standard Specifications:

“In addition to the specified record drawings, the Contractor shall record GPS coordinates of the following electrical components:

- Last light pole on each circuit
- Handholes
- Conduit crossings
- Controllers
- Buildings
- Structures with electrical connection, i.e. DMS, lighted signs.
- Electric Service locations

Datum to be used shall be North American 1983.

Data shall be provided electronically and in print form. The electronic format shall be compatible with MS Excel. Latitude and Longitude shall be in decimal degrees with a minimum of 6 decimal places. Each coordinate shall have the following information”:

1. Description of item
2. Designation or approximate station f the item is undesignated
3. Latitude
4. Longitude

Examples:

<b>DESCRIPTION</b>	<b>DESIGNATION</b>	<b>LATITUDE</b>	<b>LONGITUDE</b>
CCTV Camera Pole	ST 42	41.580493	-87.793378
FO mainline splice handhole	HHL-ST31	41.558532	-87.792571
Handhole	HH at STA 234+35	41.765532	-87.543571
Electric Service	Elec Serv	41.602248	-87.794053
Conduit crossing	SB IL83 to EB I290 ramp	41.584593	-87.793378
Light Pole	DA03	41.558532	-87.792571
Lighting controller	X	41.651848	-87.762053
Sign Structure	FGD	41.580493	-87.793378
Video Collection Point	VCp-1K	41.558532	-87.789771
Fiber splice connection	Toll Plaza 34	41.606928	-87.794053

Prior to the collection of data, the Contractor shall provide a sample data collection of at least six data points of known locations to be reviewed and verified by the Engineer to be accurate within 100 feet. Upon verification, data collection can begin. Data collection can be made as construction progresses, or can be collected after all items are installed. If the data is unacceptable the Contractor shall make corrections to the data collection equipment and/or process and submit the data for review and approval as specified.

Accuracy. Data collected is to be mapping grade. A handheld mapping grade GPS device shall be used for the data collection. The receiver shall support differential correction and data shall have a minimum 5 meter accuracy after post processing.

GPS receivers integrated into cellular communication devices, recreational and automotive GPS devices are not acceptable.

The GPS shall be the product of an established major GPS manufacturer having been in the business for a minimum of 6 years.”

**INDUCTION LOOP**

Effective: June 1, 1994                      Revised: Oct. 2, 2009

DESCRIPTION

This item shall consist of furnishing, installing and testing an induction loop, of the dimensions shown on the plans or of the dimension from Table 1, at the locations shown.

The induction loop shall be installed in accordance with all details shown on the plans and applicable portions of Section.886 Standard Specifications for Road and Bridge Construction. All sawcutting, cable installation, joint sealing, lead-ins and testing necessary to complete the installation shall conform with the following requirements.

#### MATERIALS

The cable used for induction loop shall be #14-7 strand XHHW XLP-600V, encased in orange Detecta-duct tubing as manufactured by Kris-Tech Wire Company, Inc., or comparable. All loop wire shall be UL listed. Lead-ins shall be Conoga 30003 or equal cable. The jacket, constructed of high density polyethylene, shall be rated to 600 volts in accordance with UL 83 Section 36.

Joint sealer shall have sufficient strength and resiliency to withstand stresses set up by vibrations and differences in expansion and contraction due to temperature changes. The joint sealer shall have a minimum tensile strength of 100 P.I.E. when tested by ASTM Method D638-58T. Adhesion to clean dry, oil-free Portland Cement concrete shall be at least equal to the tensile strength of the concrete. The joint sealer, with qualities described above, shall be capable of curing in a maximum time of 30 minutes at all temperatures above 50 degrees F (10 degrees C). Curing shall be defined as the capability of withstanding normal traffic loads without degradation. A hard asphalt-based filling and insulating compound having a high softening point and a high pouring temperature shall be used if the outside installation temperature is below 50 degrees F (10 degrees C). The filling compound shall have a softening point of not less than 235 degrees F (110 degrees C) and a summer pouring temperature of 375 degrees F (190 degrees C); winter pouring temperature of 425 degrees F (220 degrees C). Sealant for Detector Loop(s): The sealer shall meet or exceed the characteristics provided by OZ GEDNEY DOZSeal 230 filling compound.

#### INSTALLATION DETAILS

Slots in the pavement shall be cut with a concrete sawing machine in accordance with the applicable portions of Art. 420.05 of the Standard Specifications for Road and Bridge Construction. The slot must be clean, dry, and oil-free. Wire shall be inserted in the pavement slot with a blunt tool which will not damage the insulation. Loops shall not be dry cut. Loops should not be installed at an outside temperature below 50 degrees F (10 degrees C) unless directed by Engineer.

Plastic sleeving shall be used to insulate the wire where loop wire crosses cracks and joints in the pavement. The sleeving shall be properly sealed with electrical tape to prevent joint sealer from entering sleeves. Sleeving shall extend a minimum of 8 inch (20 cm) each side of joint.

Induction loops on exit and entrance ramps shall be square or rectangular with edges perpendicular or parallel to traffic flow. All mainline loops shall be round loops, 6 feet (1.8 m.) in diameter. Induction loops shall be centered on all ramps and in traffic lanes unless designated otherwise on the plans or by the Engineer. Traffic lanes shall be referred to by number and loop wire shall be color-coded and labeled accordingly. Lane one shall be the lane adjacent to the median, or that lane on the extreme left in the direction of the traffic flow; subsequent lanes are to be coded sequentially towards the outside shoulder. A chart which shows the coding for each installation shall be included in each cabinet. Core holes shall not be allowed at corner of loop. Sawcuts for all induction loops and lead-ins shall not be greater than 2.75 inches (7 cm) in depth.

All excess joint sealer shall be removed so that the level of the sealer in the sawcut is at the same level as the adjoining pavement.

All induction loops shall contain three (3) turns of No. 14 wire min. Each induction loop shall have its own Canoga 30003 or equal home run or lead-in to the cabinet when said induction loops is over 150 feet (45 m) from cabinet. Induction loops shall not be connected in series with other loops. This wire shall be free from kinks or any insulation abrasions. The loop lead-in shall be a Canoga 30003 cable. The loop lead-in shall be barrel sleeved, crimped, soldered and protected by heat shrinkable tubing to the loop #14 wire. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be brought into a cabinet or handhole at the time the induction loop is placed in the pavement. Loops located over 1000 feet (300m) from cabinet require four (4) turns of No. 14 wire.

Where lead in runs are less than 150 feet (45 meters) the loop wire will be utilized as lead in to the point of termination w/o splices, being twisted 16 turns per meter (5 turns per foot). The loop wire will be paid for as "lead in" from last point of sawcut in pavement at dive hole to point of termination.

Where duct is collapsed or damaged, making it impossible to pull loop lead-in, the affected area will need to be replaced. This will be paid for by the pay items CONDUIT IN TRENCH, HIGH DENSITY POLYETHYLENE COILABLE 1-1/4" and TRENCH AND BACKFILL FOR ELECTRICAL WORK.

Loop lead-ins placed in handholes shall be coiled, taped and hung from the side of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged in each handhole thru which it passes. The loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes thru, and at the termination point in the cabinet.

Contractor shall core drill all mainline round loops 6 feet (183 meters) in diameter x .25 inch (6 mm) in width x 2.75 inches (7 cm) in depth.

Loop lead-ins shall not be allowed in saw cuts in shoulders. The Engineer shall be contacted regarding proposed changes in loop locations necessitated by badly deteriorated pavement. The Engineer may relocate such loops. Loop Wire and lead-ins shall not be installed in the curb and gutter section or through the edge of pavement. A hole shall be drilled at least 12 inches (30 cm) in from the edge of pavement through which the P-duct, loop wire and lead-in shall be installed. Saw cuts through shoulders to core hole shall not be allowed.

W (M)	S (M)
13 ft (4.0 m)	9 ft (2.8 m)
14 ft (4.3 m)	10 ft (3.1 m)
15 ft (4.6 m)	11 ft (3.4 m)
16 ft (4.9 m)	12 ft (3.7 m)
17 ft (5.2 m)	13ft (4.0 m)
18 ft (5.5 m)	14ft (4.3 m)
19 ft (5.8 m)	15 ft (4.6 m)
20 ft (6.1 m)	16 ft (4.9 m)
21 ft (6.4 m)	17 ft(5.2 m)
22 ft (6.7 m)	18 ft (5.5 m)
23 ft (7.0 m)	19 ft (5.8 m)
24 ft (7.3 m)	20 ft (6.1 m)
25 ft (7.6 m)	21 ft (6.4 m)

Should the induction loop and/or core hole for the induction loop and loop lead-in cable be paved over by other construction operations, it shall be the contractor's responsibility for locating and finding the induction loop and/or the core hole for the repair of a bad loop or lead-in or for the installation of a new loop or loop lead-in. The locating of the core hole and the induction loop shall be incidental to the cost of the induction loop lead-in installation.

No extra compensation shall be allowed for finding and locating induction loops and/or core hole.

The loop shall be spliced to the lead-in wire with a barrel sleeve crimped and soldered. Epoxy filled heat shrink tubing shall be used to protect the splice. The soldered connection shall be made with a soldering iron or soldering gun. No other method will be acceptable, i.e. the use of a torch to solder will not be acceptable. The heat shrink tube shall be shrunk with a heat gun. Any other method will not be acceptable, i.e. the use of a torch will not be acceptable. No burrs shall be left on the wire when done soldering. Cold solder joints will not be acceptable. Refer to T.S.C. typical(s) TY-1TSC-418 #2 & #3 for proper loop to loop lead-in splice detail.

Where there are continuous count stations or multiple lane exits or entrance ramps the loop in the left most lane shall be wrapped clockwise, the adjacent lane loop wrapped counter-clockwise, etc, alternating wrapping the loops every other lane.

**TRAFFIC SYSTEMS CENTER LOOP SPLICING REQUIREMENT COLOR CODE**

<u>MAINLINE LOOPS</u>				<u>METERING LOOPS</u>	
Lane 1	Blue	Lane 4	Violet	Loop 1	Green
Lane 2	Brown	Exit	Black	Loop 2	Yellow
Lane 3	Orange	Entrance	White	Loop 3	Red

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, or lead-in wire. The tags shall be Panduit #MP250W175-C or equivalent. All wires and cables shall be identified in each handhole or cabinet that the cable passes through, or terminates in. The labels shall be attached to the cable by use of two cable ties.

**PROSECUTION OF SURVEILLANCE WORK**

The work shall consist of replacement and/or repairs caused by the pavement repair, removal and resurfacing to all induction loops, loop lead-in, poly-duct, steel conduits, all interconnecting cables and all Surveillance appurtenances. The Contractor shall make modifications to existing installations to render the location functional. The Contractor shall also furnish and install new induction loops, loop lead-ins, poly-duct, steel conduits, all interconnecting cables, and all Surveillance appurtenances.

Should damage occur to any Traffic Systems Center cabinets, housing telemetry equipment and/or vehicle detection equipment, the Contractor shall install and replace all damaged equipment at his own expense. The Traffic Systems Center staff shall determine what equipment shall be reusable and what shall be replaced. Replaced equipment shall be of equal or better quality and type.

### CONNECTIONS TO EXISTING INSTALLATIONS

Where new work connects to existing installations, the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation. The Contractor shall remove all existing equipment, as required to make satisfactory connections, so as to leave the entire work in a finished and workmanlike manner, as approved by the Engineer. No raceways shall be allowed to enter cabinet through the sides or backwalls.

### PROTECTION OF WORK

Electrical work, equipment and appurtenances shall be protected from damage during construction until final acceptance. Electrical raceway or duct openings, shall be capped or sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

### STANDARDS OF INSTALLATION

Electrical work shall be installed in a neat and workmanlike manner in accordance with the best practices of the trade. Unless otherwise indicated, materials and equipment shall be new and installed in accordance with the manufacturer's recommendations.

Except as specified elsewhere herein, materials and equipment shall be in conformance with the requirements of Section 106 of the Standard Specifications.

### TESTING

Before final acceptance, the induction loops shall be tested. Tests will not be made progressively, as parts of the work are completed. They shall be all made at one time. Items which fail to test satisfactorily shall be repaired or replaced.

An electronic test instrument capable of measuring large values of electrical resistance, such as major megger, shall be used to measure the resistance of the induction loop and its lead-in. The resistance of the loop and its lead-in shall be a minimum of 100 meg ohms above ground under any conditions of weather or moisture. The resistance tests and all electronic tests shall be performed in the presence of the Engineer any number of times specified by the Engineer. The loop and loop lead-in shall have an inductance between 100 micro henries and 700 micro henries. The continuity test of the loop and loop lead-in shall not have a resistance greater than two (2) ohms. The Contractor shall do all testing in the presence of the Engineer and all readings will be recorded by the Engineer. Testing shall be done with an approved loop tester.

### FINAL ACCEPTANCE INSPECTION

When the work is complete, tested and fully operational, the Contractor shall schedule a Final Acceptance Inspection with the Engineer. Final acceptance will be made as a total system, not as parts.

The Contractor shall furnish the necessary manpower and equipment to make the Final Acceptance Inspection. The Engineer will designate the type of equipment required for the inspection tests.

### METHOD OF MEASUREMENT

The induction loop measurement shall be the length of sawcut in the pavement which contain loop wire. The actual length of wire used in the sawcut shall not be considered in any measurement.

### BASIS OF PAYMENT

This item will be paid at the contract unit price per lineal foot (meter) as **INDUCTION LOOP** for furnishing and installing all materials listed complete and operating in place.

If loop is less than 150 ft. from cabinet, loop wire shall be used as lead-in and paid for at the contract unit price per linear foot (meter) as **ELECTRIC CABLE IN CONDUIT NO. 14, 1 PR...** If loop is greater than 150 ft. from cabinet, loop wire shall be spliced in handhole to a **4C #18 TWISTED SHIELDED CABLE.**

### **GALVANIZED STEEL CONDUIT**

Effective: June 1, 1994    Revised: November 12, 2008

#### DESCRIPTION:

This item shall consist of furnishing and installing galvanized steel conduit, fittings and accessories as specified herein and as shown on the contract drawings, either attached to structure, laid in trench, or pushed in place. The galvanized steel conduit shall conform to the requirements of applicable portions of Art. 810, 811 & 1088.01 of the Standard Specifications, and Section 1E-663#11 of the Recurring Special Provisions for Roadway Lighting (12/1992), except where more stringent requirements are specified herein.

#### MATERIALS:

##### GENERAL

Rigid steel conduit shall be manufactured in accordance with U.L. Standard 6 and shall be UL listed and labeled.

Rigid steel conduit shall meet Federal Specification WWC-581, ANSI Standard C80.1, and the requirements of NEC Article 344.

The conduit, after fabrication, shall be thoroughly cleaned and the inside and outside surfaces shall be galvanized.

Couplings and fittings shall meet ANSI Standard C80.4 and shall be hot-dip galvanized. Elbows and nipples shall conform to the specifications for conduit. The cost of fittings, couplings, elbows, nipples and other such conduit appurtenances shall be included in the bid unit price for conduit. All fittings and couplings for rigid conduit shall be of the threaded type.

##### PVC Coated Conduit

PVC coated conduit shall be manufactured in conformance to NEMA Standard No. RN1-1986.

The PVC coating shall have the following characteristics:

Hardness: 85+ Shore A Durometer

Dielectric Strength: 400V/mil @ 60 Hz

Aging: 1000 Hours Atlas Weatherometer

Temperature: The PVC compound shall conform at -18 ° C (0 degrees F) to Federal Specifications PL-406b, Method 2051. Amendment 1 of 25 September 1952 (ASTMD-746)

Elongation: 200%



The exterior galvanized surfaces shall be coated with a primer before PVC coating to ensure a bond between the zinc substrate and the PVC coating. The bond strength created shall be greater than the tensile strength of the plastic coating. The nominal thickness of the PVC coating shall be 40 mils. The PVC shall pass the following bonding test:

Two parallel cuts ½ inch (12mm) apart and 1-1/2 inches (38mm) in length shall be made with a sharp knife along the longitudinal axis. A third cut shall be made perpendicular to and crossing the longitudinal cuts at one end. The knife shall then be worked under the PVC coating for ½ inch (1/2") to free the coating from the metal. Using pliers, the freed PVC tab shall be pulled with a force applied vertically and away from the conduit. The PVC tab shall tear rather than any additional PVC coating separating from the substrate.

A two part urethane coating shall be applied to the interior of the conduit. The internal coating shall have a nominal thickness of 2 mils. The interior coating shall be applied in a manner so that there are no runs, drips, or pinholes at any point. The coating shall not peel, flake or chip off after a cut is made in the conduit or a scratch is made in the coating. The urethane interior coating applied shall afford sufficient flexibility to permit field bending without cracking or flaking of the interior coating.

All conduit fitting covers shall be furnished with stainless steel screws which have been encapsulated with a polyester material on the head to ensure maximum corrosion protection.

#### Liquid-Tight Metal Flexible Conduit

Liquid-tight flexible metal conduit shall be manufactured to the requirements of UL 360 and be UL Listed.

The conduit shall have a temperature range of. -4 degrees F to plus 140 degrees F (-20 degrees C to + 60 degrees C)

The thermoplastic covering shall be oil resistant.

Conduit from 3/8" (9.5mm) diameter to 1-1/4" (30mm) diameter shall have an integral copper ground wire.

## INSTALLATION

### General

Galvanized steel conduit shall be installed in conformance with the requirements of NEC Article 344 except where more stringent requirements are specified herein.

The ends of the conduit shall be cut square and thoroughly reamed before installation. All burrs and rough edges shall be removed.

Bends shall be made with a standard pipe bender. Bends shall be so made that the conduit will not be injured and that the internal diameter of the conduit will not be effectively reduced. The radius of the curve shall not be less than that shown on Table 344.24 of the National Electric Code and where larger radii are specified or shown on the Plans, the larger radii shall be used.

Conduit joints shall be threaded. All joints before assembly and exposed threads after assembly shall be coated with low resistance, conductive, joint compound.

Running threads in conduits runs will not be permitted. Care shall be used to assure that conduits are not over-threaded. Threading shall be in accordance with the requirements of NEC Article 344.28. The protective coatings on all threads must be sufficient to prevent corrosion before installation is made. If threads become corroded before installation, the material shall be replaced with new material or the corroded parts must be thoroughly cleaned and recoated as directed by the Engineer.

Whenever possible, conduits shall be installed so as to drain to the nearest opening, box or fitting.

Ends of conduits shall be equipped with insulating bushings. Rigid steel conduits terminating in the base of lighting controllers, pedestal bases, transformer bases and other open enclosures shall be equipped with insulating bushings with ground lugs which shall be used to bond the conduits to the enclosure via a copper ground conductor.

Unless otherwise indicated, conduits terminating at cast or malleable iron boxes, or in sheet steel boxes below grade shall be terminated in conduit hubs. Hubs may be integral to the box or may be installed separately. Non-integral hubs or integral hubs which do not provide a flared, smooth entry shall be used where conductors are No. 4 or larger, in compliance with NEC Article 312.6(c), and in these cases two locknuts and an insulating bushing shall be used.

Threaded conduits terminating at sheet metal boxes or enclosures above grade, or where bushings cannot be brought into firm contact with the box or enclosure or where insulating bushings are required by the NEC, shall terminate with two locknuts and an insulating bushing. Conduit bushings constructed wholly of an insulating material shall not be used to secure a raceway.

Conduit connections shall be made tight to assure good ground continuity.

Expansion fittings, as specified herein, shall be installed in all raceway runs crossing structural expansion joints. Unless otherwise indicated or approved by the Engineer, expansion fittings shall include a 8 inch (20cm) expansion fitting with a bonding jumper plus a deflection fitting allowing not less than a ¾ inch (2cm) deflection in any direction. Bonding jumpers for conduit attached to structure shall be external type. The drawings shall be examined to determine complete extent of expansion joints.

Fasteners used to mount conduit supports, and other associated items attached to the structure shall be suitable for the weight supported and shall be compatible with the structure material, i.e. wood screws shall be used for wood, toggle bolts shall be used for hollow masonry, expansion bolts or power-set studs shall be used for solid masonry or concrete and clamps shall be used for structural steel. Expansion anchors shall not be less than ¼ inch (6mm) trade size and shall extend at least 2 inches (50mm) into the masonry or concrete. Power-set anchors shall not be less than ¼ inch (6mm) trade size and they shall extend at least 1-1/4 inches (30.0mm) into masonry or concrete.

Raceways shall be protected from mechanical and corrosion damage during construction. Open ends shall be capped or fitted with plugs. Before cables are installed, raceways shall be cleared of all obstruction, moisture and burrs or rough edges. Conduits which have had mud, dirt or water inside shall be cleaned with a dry swab.

**Conduit Pushed**

Conduit which is pushed in place shall be installed in a manner so that it will not be less than 2.5 feet (75cm) below finished grade.

Unless otherwise required, pushed conduit shall extend 2 feet (60cm) beyond the shoulder, curb and/or guardrail, as applicable. If auguring is required to facilitate the push installation, the auguring shall be done at no additional cost to the State.

Immediately following the conduit push, the conduit shall be rodded and swabbed to remove all dirt and other foreign materials and it shall be capped until conductors are installed.

**Conduit Attached to Structure**

Unless otherwise indicated or specified, surface-mounted conduits shall be held in place by one-hole clamps and clamp backs. Conduits which are mounted to steel beams or columns shall be held in place by suitable beam clamps. Clamps, clamp backs and beam clamps shall be stainless steel.

Unless otherwise indicated, raceways suspended from the structure shall be supported by trapeze or other hangers approved by the Engineer. Trapeze hangers shall be hot-dip galvanized steel channels or angle irons with conduits held in place by heavy-duty stainless steel U-bolts, nuts and lock washers. Trapeze hangers shall be hung using threaded stainless steel rods not less than 3/8 inch (9 mm) diameter and appropriate anchors or by other means approved by the Engineer.

Table 3.1  
 MAXIMUM DISTANCE

CONDUIT DIAMETER BETWEEN RIGID METAL  
 CONDUIT SUPPORTS

(inch)	mm	(feet)	M
1/2-3/4	12.7-19	1.5	1.52
1	25	6	1.8
1-1/4 - 1-1/2	30-38	7	2.1
2-2 1/2	50-62	8	2.4
	75 and larger	10	3

**Conduit Support**

Raceway supports shall be as specified in Article 344.30 of the NEC, with a support within 3 feet (1 meter) of each cabinet, box or fitting except the maximum distance between supports shall be as indicated in table 3.1. The listed exceptions in NEC Article 341-12 shall not apply.

**PVC Coated Conduit Attached to Structure**

In addition to the methods described in section 3.3, the following methods shall be observed when installing PVC coated conduit.

PVC coated conduit pipe vise jaw adapters shall be used when the conduit is being clamped to avoid damaging the PVC coating.

PVC coated conduit should be cut with a roller cutter or by other means as approved by the conduit manufacturer.

After any cutting or threading operations are completed, the bare steel shall be touched up with the conduit manufacturer's touch up compound.

#### Liquid-Tight Flexible Conduit

In addition to the methods described in section 3.3 the following methods shall be observed when installing liquid-tight flexible conduit.

Conduit shall be installed in accordance with NEC Article 350.

Liquid-tight conduit shall not exceed 36 inches (1 meter) in length.

Fittings designed for use with liquid-tight flexible conduit shall be used at all connections.

Flexible conduit shall not be used as a substitute for the bending of rigid conduit. Flexible conduit should only be used where movement of the conduit is anticipated or as indicated on the plans.

#### METHOD OF MEASUREMENT:

Conduit shall be measured for payment in linear feet (meters) in place. Measurement shall be made in straight lines along the centerline of the conduit between ends and changes in direction. Vertical conduit shall be measured for payment. Liquid-tight flexible metal conduit shall not be measured for payment, but shall be included in the bid price for conduit attached to structure regardless of size or type.

#### BASIS OF PAYMENT:

This item shall be paid for at the contract unit price per linear meter (foot) for CONDUIT IN TRENCH, GALVANIZED STEEL, CONDUIT PUSHED, GALVANIZED STEEL, or, CONDUIT ATTACHED TO STRUCTURE, GALVANIZED STEEL, or, CONDUIT ATTACHED TO STRUCTURE, GALVANIZED STEEL, PVC COATED, of the diameter indicated which shall be payment in full for the work as described herein.

#### **POLYETHYLENE DUCT**

Effective: June 1, 1994      Revised: May 12, 2008

#### DESCRIPTION

This item shall consist of furnishing and installing polyethylene duct of the type and size specified including all couplings, junctions, adapters, reducers, condulets and all incidental items necessary to complete the work at the locations indicated on the plans or directed by the Engineer in accordance with the following requirements.

#### MATERIALS

The flexible electrical plastic duct shall be manufactured to comply with the American Society for Testing and Materials Standards (latest edition) cited by ASTM Designation D 3485, and to the standards of NEMA Publication No. TC-7.

The duct shall be manufactured from black polyethylene complying with ASTM Designation D1248, Type III, Grade 3, Class C with the following exceptions and additions:

The Elongation when tested by the procedure in ASTM Designation D-638 shall be a minimum of 300%.

The Brittle Temperature when tested by Procedure A in ASTM Designation D-746 shall be -94 degrees F. (-70 degrees C. ) or below.

The environmental Stress Crack Resistance when tested in accordance with ASTM Designation D-1693 shall produce not more than 2 failures per 10 specimens after 48 hours.

Construction: The duct shall be manufactured as polyethylene plastic pipe complying with ASTM Designation D-2104 with the following exceptions and additions:

The Outside Diameter, minimum wall thickness, and bending radius shall be as follows:

Nominal Size Inches/(mm)	Outside Diameter Inches/(mm)	Minimum Wall Thickness Inches/(mm)	Minimum Bending Radius Inches/(mm)
1-1/4"/(30)	1.660 ± 0.012" (42.16 ± 0.305)	0.106 ± 0.020 2.692 ± 0.508	18 inches (450)
2"/(50)	2.375 ± 0.012" 60.33 ± 0.305	0.158 ± 0.020 4.013 ± 0.508	26 in. (650)
3"/(75))	3.500 ± 0.012" (88.90 ± 0.305)	0.226 ± 0.020 5.740 ± 0.508	40in. (1000)

The duct may be manufactured to the dimensions in the above table, for Schedule 40. The duct must be capable of being bent in the minimum bending radius listed above.

When tested in accordance with the procedures and test methods referred to in ASTM Designation D-2104 the test pressures used shall be 75% of the values listed in Tables III, V, VI, VII.

The duct shall pass the following tests:

a) Freeze-up test:

A 10 ft (3.0m)length of the duct bent into an upright "U" shape shall be filled with water and then placed in a low temperature cabinet and maintained at -20 degrees C. for twenty-four hours. The duct shall not crack or burst during the test.

b) Compression Test:

The test shall be conducted on three, 6 inch (150.0mm) samples of the duct, using equipment set at 2 in.(50mm )per minute. Samples are placed between 6 in. (150.0 mm) plates and compressed at the rate of 1/2 in. (12.0mm) per minute until the distance between the plates is reduced by 50%, recording the load required to compress the duct. The samples are then removed and allowed to stand for exactly 5 minutes. The load required to compress the sample shall be equal to or greater than that listed below and the duct shall have returned to not less than 85% of its original diameter at the end of the 5 minutes.

Nominal Size In. (mm)	Load lbs (N)
1-1/4"(30.0)	188 lbs (836.26)
2 in. (50.0)	300 lbs (1334.50)
3 in (75.0)	350 lbs (1556.87)

The duct shall be permanently marked at regular intervals on the outside with the manufacturer's name or trademark.

The manufacturer shall certify that these tests were made and the results conform to specifications, using the apparatus and test methods listed above and shall be submitted to the Engineer for approval, prior to installation of duct.

Couplings shall be high density polyethylene or acetyl butyl styrene drive on pipe fittings.

### INSTALLATION DETAILS

Polyethylene duct will be installed in a prepared trench at a minimum depth in the ground of 750mm (30 inches). The Contractor shall exercise care in installing the duct to insure that the completed duct raceway is smooth, free of sharp bends and located in such a manner as will preclude damage from subsequent construction operations. Crushed or deformed polyethylene duct shall not be used or accepted. All joints, including those with galvanized steel conduit, shall be watertight.

Duct which passes through cabinet foundations shall have an upper termination approximately 2 inches (50mm) above the top of the foundation.

Duct terminations shall be temporarily capped to prevent water and other contaminants from entering during construction operations. The duct shall be swabbed and blown clean of any debris before installation of cable. If, in the opinion of the Engineer, water or any other debris is in the duct after the cable is installed the Contractor shall blow the duct clean and make any repair necessary to stop water leaking or debris entering.

Should damage occur to existing or newly installed polyethylene duct, the Contractor shall locate the damaged area and repair damaged area with new polyethylene duct. All repairs will be inspected by the T.S.C. Engineer. The cost of locating the damaged polyethylene duct shall be incidental to the cost of the new polyethylene duct.

Where new P-duct connects to existing installations or foundations the Contractor shall do all necessary cutting, fitting and foundation drilling to the existing installation as required, to make satisfactory connections, with the work to be performed under these Provisions, so as to leave the entire work in a finished and workmanlike manner, as approved by the Engineer. No raceways shall be allowed to enter cabinet through the sides or back walls. All cutting, fitting and foundation drilling shall be incidental to the cost of the polyethylene duct.

### METHOD OF MEASUREMENT

The length of measurement shall be the distance along a straight line measured between changes in direction of the polyethylene duct and its connection to terminal structures, galvanized steel conduit or condulets.

## BASIS OF PAYMENT

This item will be paid at the contract unit price per lineal foot (meter) of CONDUIT IN TRENCH, HIGH DENSITY POLYETHYLENE, COILABLE, for furnishing the specified size duct in place and connected at its terminal. Trench and backfill will be paid for separately.

## **EXPOSED RACEWAYS**

Effective: March 1, 2003

Revised: November 26, 2008

Add the following to Article 811.03(b) of the Standard Specifications:

“The personnel installing the PVC coated conduit must be trained and certified by the PVC coated conduit Manufacturer or Manufacturer’s representative to install PVC coated conduit. Documentation demonstrating this requirement must be submitted for review and approval.”

“All conduit fittings, couplings and clamps shall be PVC coated. All other mounting hardware and appurtenances shall be stainless steel.”

Revise the second paragraph of Article 1088.01 (a) of the Standard Specifications to read:

“Couplings and fittings shall meet ANSI Standard C80.5 and UL Standard 6. Elbows and nipples shall conform to the specifications for conduit. All fittings and couplings for rigid conduit shall be of the threaded type.”

Revise Article 1088.01 (a)(1) of the Standard Specifications to read:

“Rigid Steel Conduit. Rigid steel conduit shall be galvanized and manufactured according to UL Standard 6 and ANSI Standard C80.1.”

Revise Article 1088.01 (a)(3) of the Standard Specifications to read:

PVC Coated Steel Conduit. The PVC coated rigid metal conduit shall be UL Listed (UL 6). The PVC coating must have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit. Ferrous fittings for general service locations shall be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating shall be UL listed for hazardous locations.

The PVC coating shall have the following characteristics:

Hardness: 85+ Shore A Durometer

Dielectric  
Strength: 400V/mil @ 60 Hz

Aging 1,000 Hours Atlas Weatherometer

Temperature

The PVC compound shall conform at -17 degrees Celsius (0 degrees Fahrenheit) to Federal Specifications PL-406b, Method 2051, Amendment 1 of 25 September 1952 (ASTM D746)

Elongation: 200%

The exterior and interior galvanized conduit surface shall be chemically treated to enhance PVC coating adhesion and shall also be coated with a primer before the PVC coating to ensure a bond between the zinc substrate and the PVC coating. The bond strength created shall be greater than the tensile strength of the plastic coating.

The nominal thickness of the PVC coatings shall be 40 mils (1mm). The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above at -1° Celsius (+30° Fahrenheit).

An interior urethane coating shall be uniformly and consistently applied to the interior of all conduit and fittings. This internal coating shall be a nominal 2 mil (0.05mm) thickness. The interior coating shall be applied in a manner so there are no runs, drips, or pinholes at any point. The coating shall not peel, flake, or chip off after a cut is made in the conduit or a scratch is made in the coating.

The PVC conduit shall pass the following tests:

Exterior PVC Bond test RN1:

Two parallel cuts ½ inch (13mm) apart and 1-1/2 inch (40mm) in length shall be made with a sharp knife along the longitudinal axis. A third cut shall be made perpendicular to and crossing the longitudinal cuts at one end. The knife shall then be worked under the PVC coating for ½ inch (13mm) to free the coating from the metal.

Using pliers, the freed PVC tab shall be pulled with a force applied vertically and away from the conduit. The PVC tab shall tear, rather than cause, any additional PVC coating to separate from the substrate.

Boil Test:

Acceptable conduit coating bonds (exterior and interior) shall be confirmed if there is no disbondment after a minimum average of 200 hours in boiling water or exposure to steam vapor at one atmosphere. The RN1 Bond Test and the Standard Method for Measuring Adhesion by Tape Test shall be utilized.

Exterior Adhesion. In accordance with ASTM D870, a 6" (15mm) length of conduit test specimen shall be placed in boiling water. The specimen shall be periodically removed, cooled to ambient temperature and immediately tested according to the bond test (RN1). When the PVC coating separates from the substrate, the boil time to failure in hours shall be recorded.

Interior Adhesion. In accordance with ASTM D3359, a 6 inch (150mm) conduit test specimen shall be cut in half longitudinally and placed in boiling water or directly above boiling water with the urethane surface facing down. The specimen shall be periodically removed, cooled to ambient temperature and tested in accordance with the Standard Method of Adhesion by Tape Test (ASTM D3359). When the coating disbonds, the time to failure in hours shall be recorded.



Heat/Humidity Test:

Acceptable conduit coating bonds shall be confirmed by a minimum average of 30 days in the Heat and Humidity Test. The RN1 Bond Test and the Standard Method for Measuring Adhesion by Tape Test shall be utilized.

Exterior Adhesion: In accordance with ASTM D1151, D1735, D2247 and D4585, conduit specimens shall be placed in a heat and humidity environment where the temperature is maintained at 150° Fahrenheit (66° Celsius) and 95% relative humidity. The specimens shall be periodically removed and a bond test (RN1) performed. When the PVC coating separates from the substrate, the exposure time to failure in days shall be recorded.

Interior Adhesion: In accordance with ASTM D3359, conduit specimens shall be placed in a heat and humidity environment where the temperature is maintained at 150° Fahrenheit (66° Celsius) and 95% relative humidity. When the coating disbonds, the time to failure in hours shall be recorded.

**GROUNDING OF ITS SUBSYSTEMS**

Effective: March 12, 2009

The grounding of ITS subsystems shall meet the requirements of Section 806 of the Standard Specifications. In addition, amend Article 806.03 of the Standard Specifications to include:

General. All ITS subsystems (ramp metering system, dynamic message sign system, system detector stations, etc.), associated equipment, and appurtenances shall be properly grounded in strict conformance with the NEC and as shown on the Plans.

Testing shall be according to Section 801. 13(a)(5) of the Standard Specifications:

The grounded conductor (neutral conductor) shall be white color-coded. This conductor shall be bonded to the equipment-grounding conductor only at the Electric Service installation. All power cables shall include one neutral conductor of the same size as the phase (hot) conductors.

The equipment-grounding conductor shall be green color-coded. The following is in addition to Section 801.04 of the Standard Specifications.

Equipment grounding conductors shall be XLP insulated No. 6, unless otherwise noted on the Plans, and bonded to the grounded conductor (neutral conductor) only at the Electric Service Installation. The equipment-grounding conductor is paid for separately and shall be continuous. The Earth shall not be used as the equipment-grounding conductor.

Equipment grounding connectors shall be bonded, using a listed grounding conductor, to all ramp meters, DMS, and detector cabinets, handholes, and other metallic enclosures throughout the ITS subsystems, except where noted herein. A listed electrical joint compound shall be applied to all conductor terminations, connector threads, and contact points.

All metallic and non-metallic raceways containing ITS circuit runs shall have a continuous equipment grounding conductor, except raceways containing only detector loop lead-in circuits, circuits under 50 volts and/or fiber optic cable will not be required to include an equipment grounding conductor.

The grounding electrode conductor shall be similar to the equipment grounding conductor in color-coding (green) and size. The grounding electrode conductor is used to connect the ground rod to the equipment grounding conductor and is bonded to ground rods via exothermic welding, listed pressure connectors, listed clamps or other approved listed means.

BASIS OF PAYMENT: Payment shall be included in the various items associated with ITS.

**ELECTRICAL CABLE IN CONDUIT, (EPR)**

Effective: June 1, 1994

Revised: May 12, 2008

DESCRIPTION:

This work shall consist of furnishing materials and labor for installation of electric cables in conduit as shown on the contract drawings or as otherwise indicated, complete with all splicing, identification, terminating and testing.

MATERIALS:

**GENERAL:**

All cable shall be U.L. listed.

Unless otherwise indicated all cable shall be rated 600 volts.

The cable shall be rated 194 degrees F (90 degrees C) dry and 167 degrees F (75 degrees C) wet and shall be suitable for installation in wet and dry locations, exposed to the weather, and shall be resistant to oils and chemicals.

The cable shall be in conformance with ICEA Standard S-68-516, NEMA Standard Publication No. WC-8 and UL Standard 44.

Any cable used for an electric service entrance run shall have a rating which includes a USE rating.

Cable sized No. 2 AWG and smaller shall be U.L. listed Type RHH/RHW and may be Type RHH/RHW/USE.

Cable sized larger than No. 2 AWG shall be U.L. listed Type RHH/RHW/USE.

The U.L. listing mark, cable voltage, insulation type and ratings, as well as the cable size shall all be clearly printed on the cable in a color contrasting with the insulation color.

**Conductors:**

Conductors shall be uncoated or coated copper. The manufacturer shall assure that the insulation curing process shall be non-injurious to the uncoated copper conductors.

Uncoated Conductors shall meet the requirements of ASTM Designation B-3, ICEA S-68-516, NEMA Standard Publication No. WC-8 and UL Standard 44. Coated conductors shall meet the applicable requirements of ASTM designation B-8, ICEA S-68-516, NEMA Standard Publication No. WC-8 and UL Standard 44.

Unless otherwise indicated, all conductors shall be stranded. Stranding shall meet the requirements of ASTM Designation B-8 (or may be compact ASTM Designation B-496 for conductors larger than No. 2 AWG), ICEA S-68-516, NEMA Standard Publication No. WC-8 and UL Standard 44.

**Insulation:**

Cable insulation shall incorporate ethylene propylene rubber (EPR) as specified and the insulation shall meet or exceed the requirements of ICEA S-68-516, NEMA Standard Publication No. WC-8, UL Standard 44 as applicable.

Unless otherwise indicated, cables sized No. 2 AWG and smaller shall be solid, full color coded as specified via insulation color or by a painting process approved by the Engineer. These cables shall be insulated with EPR insulation over the conductor with average thickness as indicated in table 2.1 or may be insulated with a bonded composite insulation of EPR insulation and a chlorosulfanated polyethylene jacket with average thicknesses as indicated in table 2.2.

**Table 2.1**  
 Single Material Insulation Thickness

<b>Conductor Size, AWG</b>	<b>Average EPR Thickness</b>
No. 10 and smaller	45 mils
No. 8 through No. 2	60 mils

**Table 2.2**  
 Bonded Composite Insulation Thickness

<b>Conductor Size, AWG</b>	<b>Average EPR Thickness</b>	<b>Average Jacket Thickness</b>
No. 10 and smaller	30 mils	15 mils
No. 8	45 mils	15 mils
No. 6 through No. 2	45 mils	30 mils

Any painting process used shall produce good adherence and shall be certified as non-injurious to the cable insulation.

**COLOR CODING BY STRIPING WILL NOT BE ACCEPTABLE:**

Unless otherwise indicated, cables sized larger than No. 2 AWG shall be color coded as specified by having not less than 12 inch (30 cm)) of cable ends length field-taped with half-lapped color tape or by other means approved by the Engineer.

Cables No. 2 AWG and larger shall be insulated by EPR insulation over the conductor and a chlorosulfanated jacket overall, with the average thicknesses as follows:

**Table 2.3**

Insulation Thickness for Conductors Larger Than No. 2 AWG

Conductor Size, AWG	Average EPR Thickness	Average Jacket Thickness
No. 1 Through No. 4/0	55 mils	45 mils
250 MCM Through 500 MCM	65 mils	65 mils

Minimum insulation thickness at any point shall not be less than 90% of the average insulations thickness listed in tables 2.1, 2.2, and 2.3.

All electric cables installed on this Contract shall be color coded. Unless otherwise indicated, neutral wires shall be color coded white. Insulated ground wires, where applicable, shall be green. COLORED STRIPING OF CABLES WILL NOT BE ACCEPTABLE IN LIEU OF SPECIFIED COLOR CODING MEANS.

**Quality Control:**

Cables shall be the product of an established, reputable manufacturer and shall be manufactured and tested in accordance with Insulated Cable Engineers Association (ICEA) Publication S-68-516, otherwise referenced as NEMA Publication No. WC 8-1976(1982).

Submittal information shall include demonstration of compliance with all specified requirements.

All cables shall be new, having been manufactured within the time period indicated in table 2.4, preceding the date of delivery to the site. A certification from the cable manufacturer attesting to compliance with this requirement shall accompany the submittal.

**Table 2.4**

Maximum Cable Age

Plan Quantity	Time Period
Less than 2000 ft. (600 m)	30 months
2000 ft. and greater (600 m.)	18 months

All cable shall be delivered to the site in full reels. Cable on the reels shall be protected from damage during shipment and handling by wood lagging or other means acceptable to the Engineer. Reels shall be tagged or otherwise identified to show the UL listing.

**INSTALLATION:**

Wires and cables shall be carefully installed to avoid damage to insulation and cable jackets as applicable.

Wire lubricant shall be used when pulling wires into conduits. The lubricant shall be non-injurious to conduits, conductors, insulations or jackets and the lubricant shall be UL listed.

Each run of cable shall have sufficient slack.

Where a number of wires are trained through a box, manhole or handhole, they shall be grouped by circuit where applicable and bundled using appropriate cable ties and supported to minimize pressure or strain on cable insulation.

Wire and cable shall not be bent to a radius less than the manufacturer's recommended bending radius, either in permanent placement or during installation.

Cable pulling apparatus shall have no sharp edges or protrusions which could damage cables or raceways.

Splices and terminations, as required, shall be incidental to this item and shall be in conformance with Basic Materials and Methods, elsewhere herein.

#### TESTING:

After installation, including any backfill operations, the cable shall be field tested. Cable failing to pass the field test shall be replaced with new cable at no additional cost. Tests shall include but not be limited to system voltages, cable insulation and ground resistance and continuity. Tests shall be arranged and made before the Final Acceptance Inspection in the presence of the TSC Field Engineer.

Voltage Measurements: Voltages AC line to neutral and DC voltages taken at the power supply with surveillance equipment connected on line.

Insulation Resistance: Insulation Resistance to ground at each surveillance cabinet and to service pole or ground mounted transformer shall be proved under this contract. Each individual segment interconnecting cabinets shall be disconnected before testing. Tests on new cable runs shall exceed 100 megohms. Tests on existing cable shall demonstrate to the satisfaction of the TSC Field Engineer that the cable runs are free from shorts and grounds. Measurements shall be taken with a megohm meter approved by the Engineer.

MEASUREMENT. The cable shall be measured for payment in feet (meters) in place. Measurements shall be made in straight lines between changes in direction and to the center control cabinets. All vertical cable and permissible cable slack shall be measured for payment. A total of 3 feet (1 meter) slack shall be allowed for the end of a run terminating at a surveillance cabinet. Additional vertical distance for the height of barrier wall etc., as applicable, will be measured for payment for equipment so mounted. 2 meters (six feet) of slack shall be provided at all handhole locations.

BASIS OF PAYMENT. This item will be paid for at the contract unit price per linear foot (meter) installed for **ELECTRIC CABLE IN CONDUIT, (EPR)** of the size, number and type of conductors indicated.

#### **WIRE AND CABLE**

Effective: January 1, 2002

Revised: November 21, 2008

Revise the second sentence of the first paragraph of Article 1066.02(a) to read:

“The cable shall be rated at a minimum of 90 degrees Celsius dry and 75 degrees Celsius wet and shall be suitable for installation in wet and dry locations, and shall be resistant to oils and chemicals.”

Revise the second paragraph of Article 1066.02(b) to read:

“Uncoated conductors shall be according to ASTM B3, ICEA S-95-658/NEMA WC70, and UL Standard 44. Coated conductors shall be according to ASTM B33, ASTM B8, ICEA S-95-658/NEMA WC70 and UL Standard 44.”

Revise the third paragraph of Article 1066.02(b) to read:

“All conductors shall be stranded. Stranding meeting ASTM B 8, ICEA S-95-658/NEMA WC70, and UL Standard 44. Uncoated conductors meeting ASTM B3, ICEA S-95-658/NEMA WC70 and UL Standard 44.”

Revise the first sentence of Article 1066.03(a)(1) to read:

“General. Cable insulation designated as XLP shall incorporate cross-linked polyethylene (XLP) insulation as specified and shall meet or exceed the requirements of ICEA S-95-658, NEMA WC70, UL Standard 44.”

Add the following to Article 1066.03(a)(1) of the Standard Specifications:

“The cable shall be rated 600 volts and shall be UL Listed Type RHH/RHW/USE.”

Revise the Aerial Electric Cable Properties table of Article 1066.03(a)(3) to read:

**Aerial Electric Cable Properties**

Phase Conductor				Messenger Wire	
Size AWG	Stranding	Average Insulation Thickness		Minimum Size AWG	Stranding
		mils	mm		
6	7	(45)	1.1	6	6/1
4	7	(45)	1.1	4	6/1
2	7	(45)	1.1	2	6/1
1/0	19	(60)	1.5	1/0	6/1
2/0	19	(60)	1.5	2/0	6/1
3/0	19	(60)	1.5	3/0	6/1
4/0	19	(60)	1.5	4/0	6/1

Revise the first paragraph of Article 1066.03(b) to read:

“EPR insulation. Cable insulation shall incorporate ethylene propylene rubber (EPR) as specified and the insulation shall meet or exceed the requirements of ICEA S-95-6S8, NEMA Standard Publication No. WC70, and UL Standard 44, as applicable.”

Add the following to Article 1066.03(b) of the Standard Specifications:

“Cable sized No. 2 AWG and smaller shall be UL listed Type RHH/RHW and may be Type RHH/RHW/USE. Cable sized larger than No. 2 AWG shall be UL listed Type RHH/RHW/USE.”

Revise Article 1066.04 to read:

“Aerial Cable Assembly. The aerial cable shall be an assembly of insulated aluminum conductors according to Article 1066.02 and 1066.03. Unless otherwise indicated, the cable assembly shall be composed of three insulated conductors and a steel reinforced bare aluminum conductor (ACSR) to be used as the ground conductor. Unless otherwise indicated, the code word designation of this cable assembly is “Palomino”. The steel reinforced aluminum conductor shall conform to ASTM B-232. The cable shall be assembled according to ANSI/ICEA S-76-474.”

Revise the second paragraph of Article 1066.05 to read:

“The tape shall have reinforced metallic detection capabilities consisting of a woven reinforced polyethylene tape with a metallic core or backing.”

Revise Article 1066.08 to read:

“Electrical Tape. Electrical tape shall be all weather vinyl plastic tape resistant to abrasion, puncture, flame, oil, acids, alkalis, and weathering, conforming to Federal Specification MIL-I-24391, ASTM D1000 and shall be listed under UL 510 Standard. Thickness shall not be less than 8.5mils (0.215mm) and width shall not be less than ¾ inch (20mm).”

## **ELECTRICAL CABLE IN CONDUIT, 4C/NO. 18 SHIELDED LOOP DETECTOR WIRE**

Effective: March 1, 2010

Revised: 3/3/10

### Description.

This work shall consist of furnishing materials and labor for installation of shielded loop detector cables in conduit as specified herein and indicated by the Engineer, complete with all identification, terminating and testing.

### Materials.

#### General:

Lead-ins shall be Conoga 30003 or equal cable. The jacket of high density polyethylene shall be rated to 600 volts in accordance with UL 83 Section 36.

All cables shall be UL listed.

Unless otherwise indicated, all cable shall be rated 600 volts.

The cable shall be rated 90 degrees C dry and 75 degrees C wet and shall be suitable for installation in wet and dry locations, exposed to the weather, and shall be resistant to oils and chemicals.

The UL listing mark, cable voltage, insulation type and ratings, as well as the cable size shall all be clearly printed on the cable in a color contrasting with the insulation color.

#### Conductors:

Conductors shall be #18 awg 7 X .0152" un-coated copper.

Conductors shall meet the requirements of ASTM Designation B-8 as applicable.

Unless otherwise indicated, all conductors shall be stranded and twisted 4 turns per foot.

The cable shall be an assembly of pairs of left hand lay twisted insulated conductors, with a core filled with a petroleum base flooding compound, overlapped conductive tape shield and a black high density polyethylene jacket overall. This cable shall meet the requirements of IEEE Standard 383.

#### Insulation:

The conductors shall be coded as follows: black-red-white-green.

Cable insulation shall incorporate polyvinyl chloride (PVC) with a clear nylon covering overall as specified and the insulation shall meet or exceed the requirements of ICEA S-61-402, NEMA Standard Publication No. WC-5, UL Standard 83, as applicable.

Unless otherwise indicated, cable conductors shall be solid full color coded via insulation color.

#### Quality Control:

Submittal information shall include demonstration of compliance with all specified requirements.

All cables shall be delivered to the site in full reels. Cable on the reels shall be protected from damage during shipment and handling by wood lagging or other means acceptable to the Engineer. Reels shall be tagged or otherwise identified to show the UL listing.

#### Installation.

The loop lead-in shall be a Canoga 30003 or equal cable. The loop lead-in shall be barrel sleeved, crimped, soldered and protected by heat shrinkable tubing to the loop #14 wire. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be twisted in such a manner so as to prevent mechanical movement between the individual cables. Lead-ins shall be brought into the cabinet or handhole at the time the induction loop is placed in the pavement. Loops located over 1000 feet from cabinet require four (4) turns of No. 14 wire.

Lead-in cable Canoga 30003 or equivalent will be installed where the lead-in length from point of interception to the point of termination exceeds 150 feet.

Where lead-in runs are less than 150 feet, the loop wire will be utilized as lead-in to the point of termination w/o splices, being twisted 5 turns per foot.



The loop wire will be paid for as “lead-in” from last point of sawcut in pavement at dive hole to point of termination.

Loop lead-ins placed in handholes shall be coiled, taped, and hung from the side of the handhole to protect against water damage. Any other method of installation will require prior written approval of the Engineer. Each loop lead-in shall be color coded and tagged in each handhole through which it passes. The loop lead-in shall be color coded and tagged at the core hole, in each junction box it passes through and at the termination point in the cabinet.

**TRAFFIC SYSTEMS CENTER LOOP SPLICING REQUIREMENT**

MAINLINE LOOPS		METERING LOOPS			
Lane 1	Blue	Lane 4	Violet	Loop 1	Green
Lane 2	Brown	Exit	Black	Loop 2	Yellow
Lane 3	Orange	Entrance	White	Loop 3	Red

When 2 or 3 loops are installed on an exit or entrance ramp the loop color code shall conform to the mainline loop color code and shall be marked as entrance or exit ramp loops.

In addition to color codes each loop shall be identified with a written label attached to the loop wire, o lead-in wire. The tags shall be Panduit #MP250W175-C or equivalent. All wires and cables shall be identified in each handhole or cabinet the cable passes through, or terminates in. The labels shall be attached to the cable by use of two cable ties.

**Testing.**

After installation, the cable shall be tested as approved by the Engineer. Cable failing to pass the test shall be replaced with new cable at no additional cost.

Method of Measurement.

The cable shall be measured for payment in linear foot in place. Measurements shall be made in straight lines between changes in direction and to the centers of Equipment. All vertical cable and permissible cable slack shall be measured for payment. A total of six (6) feet of slack shall be allowed for the end of a run terminating at a panel and four (4) feet will similarly be allowed when terminating at a wall-mounted panel. Additional vertical distance for the height of conduit risers, etc., as applicable, will be measured for payment for equipment so mounted.

Basis of Payment.

This work shall be paid at the Contract unit price per linear foot, furnish and installed for ELECTRICAL CABLE IN CONDUIT, 4/C NO. 18 SHIELDED TWISTED.

**FIBER OPTIC PATCH PANEL**

Effective: Oct. 11, 2002      Revised: March 3, 2009

Description:

This item shall consist of furnishing and installing a fiber optic patch panel, type and size as specified in the plans and described herein.

Materials:

The Fiber Optic Patch Panel wall mount shall be equal to Siecor Model FBT-048. The bulk heads or single mode adapter types shall be single mode ST compatible, ceramic. The Contractor shall supply enough splice trays to accommodate 48 single mode splices. The splice trays shall accommodate 6 fusion splices and be equal to Siecor Model M67-068.

The Fiber Optic Patch Panel Rackmount shall be equal to Siecor Model CPH-096. The bulkheads or single mode adapter types shall be single mode ST compatible, ceramic. The Contractor shall supply enough splice trays to accommodate 96 single mode splices. The splice trays shall accommodate 12 fusion splices and be equal to Siecor Model M67-041-C. Splice trays shall mount in the 19" rack and be housed in their own housing separate from the bulk heads.

Installation Details:

The Fiber Optic Patch Panels shall be installed in Traffic Systems Center cabinets or control buildings as specified in the plans. Patch Panels shall come with cable strain relief hardware and pull out label for administrative documentation. Pigtails shall be fusion spliced to the fiber optic cable and terminated in the fiber patch panel. All work shall be neat and in a workmanlike manner. Particular care shall be taken as to not crush or kink the cable. If in the opinion of the TSC Engineer the cable has been crushed or kinked, the entire cable span shall be removed and replaced at the Contractor's expense.

The Contractor shall follow all accepted good industry practices while installing and terminating the fiber optic cable.

The Contractor shall supply each fiber optic patch panel with 12 single fiber cable, single mode patch cords with optical connectors at each end. The TSC Engineer shall supply the Contractor with cable lengths, and connector types to be used with the patch cord assemblies.

Basis of Payment:

This work shall be paid for at the contract unit price each for Fiber Optic Patch Panel, of size and type which price shall include furnishing and installing the fiber optic patch panel, patch cords and any other materials, hardware, and labor necessary to complete the installation.

**ETHERNET SWITCH**

Effective: November 6, 2009

Revised: 3/1/10

**General:** This item shall consist of purchasing and installing an Ethernet Switch in a cabinet as shown on the plans. It shall be Ruggedcom Rugged switch RS 900 or approved equal.

**Environmental:** The Ethernet switch shall meet the following requirements:

- Have an operating temperature of -40 to + 85°C (-40 to +185°F)
- Shall operate in humidity from 5% to 95% (non-condensing)
- Exceed NEMA TS-2 Immunity to EMI and heavy electrical surges for traffic control equipment.

**Ethernet Ports:** The Ethernet switch shall meet the following requirements:

- A minimum of 2 100Mbps fiber ports
- Use Industry standard ST Fiber optic connectors
- Allow for single mode optical transceivers
- Include up to 300' of Cat 5 Ethernet Cable

**Cyber Security:** The Ethernet switch shall meet the following requirements:

- Multi-level user passwords
- SSH/SSL encryption
- Enable/Disable ports
- VLAN (802.1q) to segregate and secure network management

**Operating System:** The Ethernet switch shall meet the following requirements:

- Simple plug and play operation
- Quality of service (802.1p) for real time traffic
- Link aggregation (802.3ad)
- Port Rate limiting and broadcast storm limiting
- Port configuration, status, statistics, mirroring, security

**Management Tools:** The Ethernet switch shall meet the following requirement:

- Allow for remote monitoring
- Allow for diagnostics with logging and alarms
- Record all significant events to a non-volatile system for troubleshooting:
- Link failure and recovery
- Unauthorized access
- Self test diagnostics

**Power Supply:** The Ethernet switch shall meet the following requirements:

- Fully integrated power supply
- Universal high voltage range: 88-300 VDC or 85-264 VAC
- Dual low-voltage DC inputs: 24 VDC (9-36 VDC) or 48V (36-72 VDC)
- CSA/UL 60950 safety approved to +85°C

**SNMP (Simple network Management Protocol):** The Ethernet switch shall meet the following requirements

- Easy integration with any network management system
- Security features, such as, authentication, privacy and access control

**SNTP: (Simple network time protocol)** shall automatically synchronize internal clock of all devices on the network

**Configuration:** The Ethernet switch configuration parameters shall be stored in an ASCII formatted text file. This configuration shall be easily manipulated by a text editor. The text file shall be able to be downloaded to the Ethernet switch

**Loss off Link Management:** The Ethernet switch shall be able to automatically switch to a backup port if the main port fails. It shall disable link signals when required

**Command Line Interface (CLI):** A CLI can be used in conjunction with remote shell to automate data retrieval, configuration updates and firmware upgrades

**Switch Properties:** The Ethernet switch shall meet the following requirements:

- Switching method: store and forward
- Switching latency shall be less than 10 us.
- Switching bandwidth shall be more than 1.5 Gbps
- MAC address table size shall be at least 16 Kbytes
- Priority Queues: 4 or greater
- Frame buffer memory: 1MBit or greater
- VLANs: 4096 or greater
- IGMP multicast groups: 256 or greater
- Port rate limiting: 128 kbps, 256, 512, 4, 8 Mbps

**Approvals:** The Ethernet switch must have the following approvals:

- ISO: Designed, and manufactured using ISO 9001: 2000 certified quality program
- Emissions: FCC Part 15 (Class A) EN 55022 (CISPR22 Class A)
- Safety: UL 60950
- Laser Eye Safety: (FDA/CDRH): complies with 21 CFR Chapter 1, Subchapter J
- IETF RFC 894 – IP over Ethernet

**Warranty:** The Ethernet switch shall have a minimum 5 year warranty in design and manufacture

#### **METHOD OF MEASUREMENT**

This items shall be measured ETHERNET SWITCH, installed each, tested, operational and complete

#### **BASIS OF PAYMENT**

This work shall consist of furnishing all labor, materials, equipment, setup and testing to supply and install an ETHERNET SWITCH, complete in accordance with the contract drawings and these special provisions. Miscellaneous connectors, cables and Ethernet cables shall be included in the unit price.

#### **FIBEROPTIC INNERDUCT (I55)**

Effective: April 1, 2005

Revised:

#### GENERAL

The Contractor shall provide a continuous Spiral Ribbed Inner duct installed in the 4 in. (100mm) surveillance PVC duct system installed within the median barrier wall. The Polyethylene Plastic Duct shall conform to the following industry standards.

- ASTM D2239 - Polyethylene plastic duct (SIDR-PR) sized by controlled inside diameter
- ASTM D3035 - Polyethylene plastic duct (SDR-PR) sized by controlled outside diameter.
- ASTM D2247 - Standard specification for polyethylene plastic duct schedules 40 & 80 and sized by controlled outside diameter.
- ASTM D1248 - Polyethylene plastics extrusions and molding materials.

The Spiral Ribbed Duct shall be orange in color unless otherwise specified elsewhere in the plans or by the Engineer.

**MATERIALS**

The high density polyethylene used shall be consistent with PE334420 E/C as described in ASTM D 3350 as per Table 1.

Table 1 - Resin Properties

The resin properties shall meet or exceed the values set forth below for high density Polyethylene (HDPE).

<u>ATSM TEST</u>	<u>Description</u>	<u>Values HDPE</u>
D-638	Tensile Strength at yield PSI	3200min
D638	% Ultimate Elongation Value	400 min
D-746	Brittleness Temp.	-103°F (-75°C) max
D-256	Impact per inch of notch	3.4ft lb/in
D-1238	Melt index, g/10 min Condition E	.4 max
<u>ATSM TEST</u>	<u>Description</u>	<u>Values HDPE</u>
D-1505	Density g/CM <sup>3</sup>	.941-.959
D-1693	Environmental Stress Crack Resistance Condition B, F <sub>20</sub>	48 hrs

Nominal Duct Size	Nominal Inside Diameter	Minimum Wall Thickness	Nominal Outside Diameter	Min Sup. Bend Radius
1" (25mm)	1.101" (28mm)	.097" (2.5mm)	1.315" (33mm)	12" (300mm)
1.5" (38mm)	1.534" (39mm)	.173" (4.4mm)	1.900" (48mm)	17" (432mm)

The ribbed duct shall have internally and externally designed longitudinal ribs for reduced pulling frictions and increased lubrication effectiveness.

A pre-lubricated pull tape shall be installed in the inner duct with a minimum tensile strength of 1251.1 lb. (568 Kg) or as recommended by manufacturer. The pull tape shall have accurate printed foot (meter) markings.

### INSTALLATION DETAILS

The Contractor shall install the innerduct 30 inches below grade. The innerduct may be installed by plowing, trenching, or boring. When boring, a 4" (100mm) GS Conduit sleeve shall be used.

### BASIS OF PAYMENT

This item will be paid for at the contract unit price per lineal foot (meter) of FIBEROPTIC INNERDUCT (DIRECT BURIAL). The price will be payment in full for furnishing the specified size duct in place and connected at its terminal.

### **FIBER OPTIC TERMINATION PANEL, 12F OR 24F**

Effective: Dec. 28, 2009

Description Work under this item shall consist of furnishing and installing a fiber optic termination panel, type and size as specified on the plans and described herein. This equipment will be used to link field equipment using single-mode fiber optic cable.

Materials The fiber optic termination panel shall comply with the following requirements:

- The fiber optic termination panel shall be rack mountable or wall mounted
- Rack mounted termination panels shall be installed in 19" racks inside of ITS or 334 Type Cabinets or Pump Houses w/19" racks
- The fiber patch panel shall terminate pigtail fibers as called out on the Plans.
- The fiber optic termination panel shall allow termination of a fiber patch cord to interconnect outside plant fibers to fiber optic communication equipment
- Shall be supplied with optical splice tray and holder
- Wall mounted termination panels shall be installed in Pump Station, Type III, Type IV, or Type V control Cabinets
- Wall-mounted termination panels shall be made out of solid steel construction, shall be powder coated, and feature top or bottom cable entry w/dust resistant grommets.
- Rack-mounted units shall be aluminum material per ATSMB 209, powder coated, and modular design.
- The approved type optical connectors on the end of each pigtail shall screw into a sleeve securely mounted to a patch panel within the controller cabinet. The maximum optical loss across the connection shall not exceed 0.25 dB.
- The fibers with the optical connectors on the pigtail cable shall be routed through and secured in the fiber optic termination panel as directed by and to the satisfaction of the Engineer.
- The bulkheads or single-mode adapter types shall be single-mode ST compatible, ceramic, unless a substitute is approved by the Engineer.

### **CONSTRUCTION REQUIREMENTS**

The Fiber Optic Termination Panel shall be installed in the Traffic Signals surveillance cabinets or pump stations as specified on the Plans. The panels shall come with cable strain relief hardware and pull out label for administrative documentation. All work shall be neat and in a workmanlike manner. Particular care shall be taken as to not crush or kink the fiber optic cable. If in the opinion of the engineer the cable has been crushed or kinked, the entire cable span shall be removed and replaced at the Contractor's expense.

The approved type of single-mode connectors on the end of each pigtail must screw into a sleeve securely mounted to the termination panel within the fiber termination panel enclosure. The panel must be provided with pre-connectorized and pre-wired port modules.

Basis of Payment FIBER OPTIC TERMINATION PANEL, 12F OR 24F will be paid for at the Contract unit price each. This price shall be payment for furnishing and installing the FIBER OPTIC TERMINATION PANEL 12 F OR 24 F along with any necessary fiber optic patch cords and any other materials, hardware, and labor necessary to complete the installation.

### **ETHERNET SWITCH (12 PORT OR HIGHER)**

Effective: December 29, 2009

Revised: Mar. 16, 2010

**General:** This item shall consist of purchasing and installing an Ethernet Switch in a communications shelter as shown on the plans. It shall be Ruggedcom Rugged switch M2100 or approved equal.

**Environmental:** The Ethernet switch shall meet the following requirements:

- Have an operating temperature of -40 to + 85°C (-40 to +185°F) with no fans
- Shall operate in humidity from 5% to 95% (non-condensing)
- Exceed NEMA TS-2 Immunity to EMI and heavy electrical surges for traffic control equipment.
- Immunity to EMI and heavy electrical surges
- Exceeds NEMA TS-2 (traffic control equipment)

**Ethernet Ports:** The Ethernet switch shall meet the following requirements:

- A minimum of 12 100Mbps fiber ports
- Use Industry standard ST Fiber optic connectors
- Allow for single mode optical transceivers

**Cyber Security:** The Ethernet switch shall meet the following requirements:

- Multi-level user passwords
- SSH/SSL encryption
- Enable/Disable ports
- VLAN (802.1q) to segregate and secure network management

**Operating System:** The Ethernet switch shall meet the following requirements:

- Simple plug and play operation
- Quality of service (802.1p) for real time traffic
- Link aggregation (802.3ad)
- Port Rate limiting and broadcast storm limiting
- Port configuration, status, statistics, mirroring, security

**Management Tools:** The Ethernet switch shall meet the following requirement:

- Allow for remote monitoring
- Allow for diagnostics with logging and alarms
- Record all significant events to a non-volatile system for troubleshooting:
  - Link failure and recovery
  - Unauthorized access
  - Self test diagnostics

**Power Supply:** The Ethernet switch shall meet the following requirements:

- Fully integrated power supply
- Universal high voltage range: 88-300 VDC or 85-264 VAC
- Dual low-voltage DC inputs: 24 VDC (9-36 VDC) or 48V (36-72 VDC)
- CSA/UL 60950 safety approved to +85°C

**SNMP (Simple network Management Protocol):** The Ethernet switch shall meet the following requirements

- Easy integration with any network management system
- Security features, such as, authentication, privacy and access control

**SNTP: (Simple network time protocol)** shall automatically synchronize internal clock of all devices on the network

**Configuration:** The Ethernet switch configuration parameters shall be stored in an ASCII formatted text file. This configuration shall be easily manipulated by a text editor. The text file shall be able to be downloaded to the Ethernet switch

**Loss off Link Management:** The Ethernet switch shall be able to automatically switch to a backup port if the main port fails. It shall disable link signals when required

**Command Line Interface (CLI):** A CLI can be used in conjunction with remote shell to automate data retrieval, configuration updates and firmware upgrades

**Switch Properties:** The Ethernet switch shall meet the following requirements:

- Switching method: store and forward
- Switching latency shall be less than 10 us.
- Switching bandwidth shall be more than 1.5 Gbps
- MAC address table size shall be at least 16 Kbytes
- Priority Queues: 4 or greater
- Frame buffer memory: 1MBit or greater
- VLANs: 4094 or greater
- IGMP multicast groups: 256 or greater
- Port rate limiting: 128 kbps, 256, 512, 4, 8 Mbps



**Approvals:** The Ethernet switch must have the following approvals:

- ISO: Designed, and manufactured using ISO 9001: 2000 certified quality program
- Emissions: FCC Part 15 (Class A) EN 55022 (CISPR22 Class A)
- Safety: UL 60950
- Laser Eye Safety: (FDA/CDRH): complies with 21 CFR Chapter 1, Subchapter J
- IETF RFC 894 – IP over Ethernet

**Warranty:** The Ethernet switch shall have a minimum 5 year warranty in design and manufacture

**METHOD OF MEASUREMENT:** This item shall be measured ETHERNET SWITCH, installed each, tested, operational and complete

### **BASIS OF PAYMENT**

This work shall consist of furnishing all labor, materials, equipment, setup and testing to supply and install an ETHERNET SWITCH (12 PORT OR HIGHER), complete in accordance with the contract drawings and these special provisions. Miscellaneous connectors, cables and Ethernet cables shall be included in the unit price.

### **FIBER OPTIC SPLICE**

Effective: April 1, 2005

Description. The Contractor will splice optical fibers from different cable sheaths and protect them with a splice closure at the locations shown on the Plans, Fiber splicing consists of in-line fusion splices for all fibers described in the cable plan at the particular location.

Two splices are identified. A mainline splice includes all fibers in the cable sheath. In a lateral splice, the buffer tubes in the mainline cable are dressed out and those fibers identified on the plans are accessed in and spliced to lateral cables.

### Materials.

Splice Closures. Splice Closures shall be designed for use under the most severe conditions such as moisture, vibration, impact, cable stress and flex temperature extremes as demonstrated by successfully passing the factory test procedures and minimum specifications listed below:

Physical Requirements. The closures shall provide ingress for up to four cables in a butt configuration. The closure shall prevent the intrusion of water without the use of encapsulates.

The closure shall be capable of accommodating splice organizer trays that accept mechanical, or fusion splices. The splice closure shall have provisions for storing fiber splices in an orderly manner, mountings for splice organizer assemblies, and space for excess or un-spliced fiber. Splice organizers shall be re-enterable. The splice case shall be UL rated.

Closure re-entry and subsequent reassembly shall not require specialized tools or equipment. Further, these operations shall not require the use of additional parts.

The splice closure shall have provisions for controlling the bend radius of individual fibers to a minimum of 1.5 in. (38 mm).

#### Factory Testing.

Compression Test. The closure shall not deform more than 10% in its largest cross-sectional dimension when subjected to a uniformly distributed load of 1335 N at temperatures of -18 and 38° Celsius (0 and 100° Fahrenheit). The test shall be performed after stabilizing at the required temperature for a minimum of two hours. It shall consist of placing an assembled closure between two flat parallel surfaces, with the longest closure dimension parallel to the surfaces. The weight shall be placed on the upper surface for a minimum of 15 minutes. The measurement shall then be taken with weight in place.

Impact Test. The assembled closure shall be capable of withstanding an impact of 28 N-M at temperatures of -18 and 38° Celsius (0 and 100° Fahrenheit). The test shall be performed after stabilizing the closure at the required temperature for a minimum of 2 hours. The test fixture shall consist of 20 lbs. (9 kg) cylindrical steel impacting head with a 2 in. (50 mm) spherical radius at the point where it contacts the closure. It shall be dropped from a height of 12 in. (305 mm). The closure shall not exhibit any cracks or fractures to the housing that would preclude it from passing the water immersion test. There shall be no permanent deformation to the original diameter or characteristic vertical dimension by more than 5%.

Cable gripping and Sealing Testing. The cable gripping and sealing hardware shall not cause an increase in fiber attenuation in excess of 0.05 dB/fiber @ 1550 nm when attached to the cables and the closure assembly. The test shall consist of measurements from six fibers, one from each buffer tube or channel, or randomly selected in the case of a single fiber bundle. The measurements shall be taken from the test fibers before and after assembly to determine the effects of the cable gripping and sealing hardware on the optical transmission of the fiber.

Vibration Test. The splice organizers shall securely hold the fiber splices and store the excess fiber. The fiber splice organizers and splice retaining hardware shall be tested per EIA Standard FOTP-II, Test Condition 1. The individual fibers shall not show an increase in attenuation in excess of 0.1 dB/fiber.

Water Immersion Test. The closure shall be capable of preventing a 10 ft. (3m) water head from intruding into the splice compartment for a period of 7 days. Testing of the splice closure is to be accomplished by the placing of the closure into a pressure vessel and filling the vessel with tap water to cover the closure. Apply continuous pressure to the vessel to maintain a hydrostatic head equivalent to 10 ft. (3 m) on the closure and cable. This process shall be continued for 30 days. Remove the closure and open to check for the presence of water. Any intrusion of water in the compartment containing the splices constitutes a failure.

Certification. It is the responsibility of the Contractor to insure that either the manufacturer, or an independent testing laboratory has performed all of the above tests, and the appropriate documentation has been submitted to the Department. Manufacturer certification is required for the model(s) of closure supplied. It is not necessary to subject each supplied closure to the actual tests described herein.

## CONSTRUCTION REQUIREMENTS

The closure shall be installed according to the manufacturer's recommended guidelines. For mainline splices, the cables shall be fusion spliced. 45 days prior to start of the fiber optic cabling installation, the Contractor shall submit the proposed locations of the mainline splice points for review by the Department.

The Contractor shall prepare the cables and fibers in accordance with the closure and cable manufacturers' installation practices. A copy of these practices shall be provided to the Engineer 21 days prior to splicing operations.

Using a fusion splicer, the Contractor shall optimize the alignment of the fibers and fuse them together. The contractor shall recoat the fused fibers and install mechanical protection over them.

Upon completing all splicing operations for a cable span, the Contractor shall measure the mean bi-directional loss at each splice using an Optical Time Domain Reflectometer. This loss shall not exceed 0.1 dB.

The Contractor shall measure the end-to-end attenuation of each fiber, from connector to connector, using an optical power meter and source. This loss shall be measured from both directions and shall not exceed 0.5 dB per installed kilometer of single mode cable. Measurements shall be made at both 1300 and 1550 nm for single mode cable. For multi-mode cable, power meter measurements shall be made at 850 and 1300 nm. The end-to-end attenuation shall not exceed 3.8 dB/installed kilometers at 850 nm or 1.8 dB per installed kilometer at 1300 nm for multi-mode fibers.

As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice not satisfying the required objectives.

The Contractor shall secure the Splice Closure to the side of the splice facility using cable support brackets. All cables shall be properly dressed and secured to rails or racks within the manhole. No cables or enclosures will be permitted to lie on the floor of the splice facility. Cables that are spliced inside a building will be secured to the equipment racks or walls as appropriate and indicated on the Plans.

Method of Measurement. Fiber optic splice of the type specified will be measured as each completely installed and tested with all necessary splices completed within the enclosure, and the enclosure secured to the wall of the splice facility.

Basis of Payment. This item shall be paid at the contract unit price each for **FIBER OPTIC SPLICE, LATERAL OR FIBER OPTIC SPLICE, MAINLINE** of the type specified, which shall be payment in full for the work, complete as specified herein.

### **FIBER OPTIC CABLE, SINGLE MODE (I55)**

Effective: July 10, 2006

Description. The Contractor shall furnish and install loose-tube, single-mode, fiber optic cable of the number of fibers specified as shown in the plans and as directed by the Engineer.

Other ancillary components, required to complete the fiber optic cable plant, including but not limited to, moisture and water sealants, cable caps, fan-out kits, etc., shall be included in the cost of fiber optic cable and will not be paid for separately.

**Materials** The single-mode, fiber optic cable shall incorporate a loose, buffer-tube design. The cable shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 175,900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1999 for a single sheathed, non-armored cable, and shall be new, unused and of current design and manufacture.

**Fibers.**

The cables shall use dispersion unshifted fibers. The optical and physical characteristics of the un-cabled fibers shall include:

The single-mode fiber shall meet EIA/TIA-492CAAA, "Detail Specification for Class IVa Dispersion-Unshifted Single-Mode Optical Fibers," and ITU recommendation G.652.D, "Characteristics of a single-mode optical fiber cable."

<b>Physical Construction</b>			
<b>Requirement</b>		<b>Units</b>	<b>Value</b>
Cladding Diameter		( $\mu\text{m}$ )	125.0 $\pm$ 0.7
Core-to-Cladding Concentricity		( $\mu\text{m}$ )	$\leq$ 0.5
Cladding Non-Circularity			$\leq$ 0.7%
Mode Field Diameter	1310nm	( $\mu\text{m}$ )	9.2 $\pm$ 0.4
	1550nm		10.4 $\pm$ 0.5
Coating Diameter		( $\mu\text{m}$ )	245 $\pm$ 5
Colored Fiber Nominal Diameter		( $\mu\text{m}$ )	253 - 259
Fiber Curl Radius of Curvature		(m)	$>$ 4.0 m

<b>Optical</b>			
<b>Requirement</b>		<b>Units</b>	<b>Value</b>
Cabled Fiber Attenuation	1310 nm	(dB/km)	$\leq$ 0.4
	1550 nm		$\leq$ 0.3
Point discontinuity	1310 nm	(dB)	$\leq$ 0.1
	1550 nm		$\leq$ 0.1
Macrobend Attenuation	Turns	Mandrel 00	
	1	32 $\pm$ 2 mm	$<$ 0.05 at 1550 nm
	100	50 $\pm$ 2 mm	$<$ 0.05 at 1310 nm
	100	50 $\pm$ 2 mm	$<$ 0.10 at 1550 nm
	100	60 $\pm$ 2 mm	$<$ 0.05 at 1550 nm
100	60 $\pm$ 2 mm	$<$ 0.05 at 1625 nm	
Cable Cutoff Wave length ( $\lambda_c$ )		(nm)	$<$ 1260
Zero Dispersion Wavelength		(nm)	1302 $\leq \lambda_0 \leq$ 1322
Zero Dispersion Slope (So)		(ps/(nm <sup>2</sup> .km))	$\leq$ 0.089
Total Dispersion	1550 nm	(ps/(nm.km))	$\leq$ 3.5
	1285-1330 nm		$\leq$ 17.5
	1625 nm		$\leq$ 21.5
Cabled Polarization Mode Dispersion		(ps/km- <sup>2</sup> )	$\leq$ 0.2
IEEE 802.3 GbE - 1300 nm Laser Distance		(m)	UP to 5000
Water Peak Attenuation: 1383 $\pm$ 3 nm		(dB/km)	$\leq$ 0.4

### **Cable Construction.**

The number of fibers in each cable shall be as specified on the plans.

Optical fibers shall be placed inside a loose buffer tube. The nominal outer diameter of the buffer tube shall be 3.0 mm. Each buffer tube shall contain up to 12 fibers. The fibers shall not adhere to the inside of the buffer tube.

Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." The fibers shall be colored with ultraviolet (UV) curable inks.

Buffer tubes containing fibers shall be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-B, "Optical Fiber Cable Color Coding." Buffer tube colored stripes shall be inlaid in the tube by means of co-extrusion when required. The nominal stripe width shall be 1 mm.

For cables containing more than 12 buffer tubes, standard colors are used for tubes 1 through 12 and stripes are used to denote tubes 13 through 24. The color sequence applies to tubes containing fibers only, and shall begin with the first tube. If fillers are required, they shall be placed in the inner layer of the cable. The tube color sequence shall start from the inside layer and progress outward.

In buffer tubes containing multiple fibers, the colors shall be stable across the specified storage and operating temperature range and shall not be subject to fading or smearing onto each other. Colors shall not cause fibers to stick together.

The buffer tubes shall be resistant to external forces and shall meet the buffer tube cold bend and shrinkback requirements of 7 CFR 1755.900.

Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed. Fillers shall be placed so that they do not interrupt the consecutive positioning of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 2.5 mm or 3.0 mm in outer diameter.

The central member shall consist of a dielectric, glass reinforced plastic (GRP) rod (optional steel central member). The purpose of the central member is to provide tensile strength and prevent buckling. The central member shall be overcoated with a thermoplastic when required to achieve dimensional sizing to accommodate buffer tubes/fillers.

Each buffer tube shall contain a water-swellable yarn for water-blocking protection. The water-swellable yarn shall be non-nutritive to fungus, electrically non-conductive, and homogeneous. It shall also be free from dirt or foreign matter. This yarn will preclude the need for other water-blocking material; the buffer-tube shall be gel-free. The optical fibers shall not require cleaning before placement into a splice tray or fan-out kit.

Buffer tubes shall be stranded around the dielectric central member using the reverse oscillation, or "S-Z", stranding process.

Water-swellable yarn(s) shall be applied longitudinally along the central member during stranding.

Two polyester yarn binders shall be applied contrahelicly with sufficient tension to secure each buffer tube layer to the dielectric central member without crushing the buffer tubes.

The binders shall be non-hygroscopic, non-wicking, and dielectric with low shrinkage.

For single layer cables, a water swellable tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The water swellable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

For dual layer cables, a second (outer) layer of buffer tubes shall be stranded over the original core to form a two layer core. A water swellable tape shall be applied longitudinally over both the inner and outer layer. The water swellable tape shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter.

The cables shall contain one ripcord under the sheath for easy sheath removal. Tensile strength shall be provided by the central member, and additional dielectric yarns as required.

The dielectric yarns shall be helically stranded evenly around the cable core.

The cables shall be sheathed with medium density polyethylene (MDPE). The minimum nominal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members (as required) and water swellable tape. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The MDPE jacket material shall be as defined by ASTM D1248, Type II, Class C, Category 4 and Grades J4, E7 and E8.

The jacket or sheath shall be free of holes, splits, and blisters.

The cable jacket shall contain no metal elements and shall be of a consistent thickness.

Cable jackets shall be marked with the manufacturer's name, month and year of manufacture, sequential meter or foot markings, a telecommunication handset symbol as required by Section 350G of the National Electrical Safety Code (NEESC), fiber count, and fiber type. The actual length of the cable shall be within -0/+1 % of the length markings. The print color shall be white, with the exception that cable jackets containing one or more co-extruded white stripes, which shall be printed in light blue. The height of the marking shall be approximately 2.5 mm.

The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

The shipping, storage, and operating temperature range of the cable shall be -40°C to + 70°C. The installation temperature range of the cable shall be -30°C to + 70°C.

### **General Cable Performance Specifications**

The fiber optic cable manufacturer shall provide documentation and certify that the fiber optic cable complies with the following EIA-455-xxx Fiber Optic Test Procedures (FOTP):

When tested in accordance with FOTP-3, "*Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components*," the change in attenuation at extreme operational temperatures (-40°C and + 70°C) shall not exceed 0.15 dB/km at 1550 nm for single-mode fiber and 0.3 dB/km at 1300 nm for multimode fiber.

When tested in accordance with FOTP-82, "*Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable*," a one meter length of un-aged cable shall withstand a one meter static head or equivalent continuous pressure of water for one hour without leakage through the open cable end.

When tested in accordance with FOTP-81, "*Compound Flow (Drip) Test for Filled Fiber Optic Cable*," the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 70°C.

When tested in accordance with FOTP-41, "*Compressive Loading Resistance of Fiber Optic Cables*," the cable shall withstand a minimum compressive load of 220 N/cm (125 lbf/in) applied uniformly over the length of the sample. The 220 N/cm (125 lbf/in) load shall be applied at a rate of 2.5 mm (0.1 in) per minute. The load shall be maintained for a period of 1 minute. The load shall then be decreased to 110 N/cm (63 lbf/in). Alternatively, it is acceptable to remove the 220 N/cm (125 lbf/in) load entirely and apply the 110 N/cm (63 lbf/in) load within five minutes at a rate of 2.5 mm (0.1 in) per minute. The 110 N/cm (63 lbf/in) load shall be maintained for a period of 10 minutes. Attenuation measurements shall be performed before release of the 110 N/cm (63 lbf/in) load. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fibers and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-104, "*Fiber Optic Cable Cyclic Flexing Test*," the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-25, "*Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies*," except that the number of cycles shall be two at three locations along a one meter cable length and the impact energy shall be at least 4.4 Nm (in accordance with ICEA S-87-640)", the change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-33, "*Fiber Optic Cable Tensile Loading and Bending Test*," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a rated tensile load of 2670N (601 lbf) and residual load of 30% of the rated installation load. The axial fiber strain shall be  $\leq 60\%$  of the fiber proof level after completion of 60 minute conditioning and while the cable is under the rated installation load. The axial fiber strain shall be  $\leq 20\%$  of the fiber proof level after completion of 10 minute conditioning and while the cable is under the residual load. The change in attenuation at residual load and after load removal shall not exceed 0.15 dB at 1550 nm for single mode fiber and 0.30 dB at 1300 nm for multi mode fiber.

When tested in accordance with FOTP-85, "*Fiber Optic Cable Twist Test*," a length of cable no greater than 2 meters shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.15 dB at 1550 nm for single-mode fiber and 0.30 dB at 1300 nm for multimode fiber.

When tested in accordance with FOTP-37, "*Low or High Temperature Bend Test for Fiber Optic Cable*," the cable shall withstand four full turns around a mandrel of  $\leq 20$  times the cable diameter after conditioning for four hours at test temperatures of -30°C and +60°C. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears, or other openings. The change in attenuation shall not exceed 0.30 dB at 1550 nm for single mode fiber and 0.50 dB at 1300 nm for multimode fiber.

### **Quality Assurance Provision**

All cabled optical fibers > 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel. The cable manufacturer shall be TL 9000 registered.

### **Packaging**

Top and bottom ends of the cable shall be available for testing. Both ends of the cable shall be sealed to prevent the ingress of moisture. Each reel shall have a weather resistant reel tag attached identifying the reel and cable. The reel tag shall include the following information:

- Cable Number
- Gross Weight
- Shipped Cable Length in Meters
- Job Order Number
- Product Number
- Customer Order Number
- Date Cable was Tested
- Manufacturer Order Number
- Cable Length Markings
- a: Top (inside end of cable)
- b: Bottom (outside end of cable)

The reel (one flange) marking shall include:

- Manufacturer
- Country of origin
- An arrow indicating proper direction of roll when handling
- Fork lift-handling illustration
- Handling Warnings.

Each cable shall be accompanied by a cable data sheet. The cable data sheet shall include the following information:

- Manufacturer Cable Number
- Manufacturer Product Number
- Manufacturer Factory Order Number
- Customer Name
- Customer Cable Number
- Customer Purchase Order Number
- Mark for Information
- Ordered Length
- Maximum Billable Length
- Actual Shipped Length
- Measured Attenuation of Each Fiber

The cable shall be capable of withstanding a minimum-bending radius of 20 times its outer diameter during installation and 10 times its outer diameter during operation without changing the characteristics of the optical fibers.

The cable shall meet all of specified requirements under the following conditions:

- Shipping/storage temperature: -58<sup>0</sup> F to +158<sup>0</sup> F (-50<sup>0</sup> C to +70<sup>0</sup> C)
- Installation temperature: -22<sup>0</sup> F to +158<sup>0</sup> F (-30<sup>0</sup> C to +70<sup>0</sup> C)
- Operating temperature: -40<sup>0</sup> F to +158<sup>0</sup> F (-40<sup>0</sup> C to +70<sup>0</sup> C)
- Relative humidity from 0% to 95%, non-condensing



### **Optical Patch Cords and Pigtails.**

The optical patch cords and pigtails shall comply with the following:

- The optical patch cords 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 optical patch cords and pigtails shall meet or exceed the requirements for approved connectors specified herein.
- The fiber portion of each patch cord and pigtail shall be a single, jacketed fiber with optical properties identical to the optical cable furnished under this contract.
- The twelve fiber single-mode fiber optic cable shall be installed as a pigtail with factory installed ST compatible connectors.
- The patch cords shall comply with Telcordia GR-326-CORE

### **Connectors.**

The optical connectors shall comply with the following:

- All connectors shall be factory installed ST 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.
- All fibers shall be connectorized at each end.
- All fibers shall terminate at a fiber patch panel
- 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. Pigtails shall be one meter in length.

## **CONSTRUCTION REQUIREMENTS**

### **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 fusion 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 Installers shall be familiar with the cable manufacturer's recommended procedures for installing the cable. This shall include knowledge of splicing procedures for the fusion splicer 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 and a copy of the test equipment operation manual for approval by the Engineer.

### **Installation in Raceways.**

The Contractor shall provide a cable-pulling plan, identifying where the cable will enter the underground system and the direction of pull. This plan will address locations where the cable is pulled out of a hand hole, coiled in a figure eight, and pulled back into the hand hole. The plan shall address the physical protection of the cable during installation and during periods of downtime. The cable-pulling plan shall be provided to the Engineer for approval a minimum of 15 working days prior to the start of installation. The Engineer's approval shall be for the operation on the freeway and does not include an endorsement of the proposed procedures. The Contractor is responsible for the technical adequacy of the proposed procedures. During cable pulling operations, the Contractor shall ensure that the minimum bending of the cable is maintained during the unreeling and pulling operations. Entry guide chutes shall be used to guide the cable into the handhole conduit ports. 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. The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. Fuse links and breaks can be used to ensure that the cable tensile strength is not exceeded. The pulling system shall have an audible alarm that sounds whenever a pre-selected tension level is reached. Tension levels shall be recorded continuously and shall be given to the Engineer.

The cable shall be pulled into the conduit as a single component, absorbing the pulling force in all tension elements. The central strength member and Aramid yarn shall be attached directly to the pulling eye during cable pulling. "Basket grip" or "Chinese-finger type" attachments, which only attach to the cable's outer jacket, shall not be permitted. A breakaway swivel, rated at 95% of the cable manufacturer's approved maximum tensile loading, shall be used on all pulls. When simultaneously pulling fiber optic cable with other cables, separate grooved rollers shall be used for each cable.

To minimize the exposure of the backbone cable and to facilitate the longer lengths of fiber optic cable, the Contractor shall use a "blown cable" (pneumatically assisted) technique to place the fiber optic cable.

Where cable is to be pulled through existing conduit which contains existing cables, optical or other, the existing cables shall be removed and reinstalled with the fiber optic cable as indicated on the plans. The removal of the cable(s) shall be paid for separately. Reinstallation of the existing cables, if indicated on the plans, along with the fiber optic cable shall be included in this item for payment.

### **Construction Documentation Requirements**

#### **Installation Practices for Outdoor Fiber Optic Cable Systems**

The Contractor shall examine the proposed cable plant design. At least one month prior to starting installation of the fiber optic cable plant, the Contractor shall prepare and submit to the Engineer for review and approval, ten (10) copies of the Contractor's "Installation Practices for Outdoor Fiber Optic Cable Systems" manual. This manual shall address the Contractor's proposed practices covering all aspects of the fiber optic cable plant. This submittal shall include all proposed procedures, list of installation equipment, and splicing and test equipment.

Test and quality control procedures shall be detailed as well as procedures for corrective action.

### **Operation and Maintenance Documentation**

After the fiber optic cable plant has been installed, ten (10) 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.
- Final copies of all approved test procedures
- Complete performance data of the cable plant showing the losses at each splice location and each terminal connector.
- Complete parts list including names of vendors.

### **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. Un-terminated (non-connectorized) fibers shall be tested with an approved bare fiber adapter.

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 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 Technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers shall be tested in both directions.

A fiber ring or fiber box 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.

At the completion of the test, the Contractor shall provide two copies of documentation of the test results to the Project Engineer. The test documentation shall be submitted as both a bound copy and a CDROM and shall include the following:

#### **Cable & Fiber Identification:**

- Cable ID
- Cable Location – beginning and end point
- Fiber ID, including tube and fiber color
- Wavelength
- Pulse width (OTDR)
- Refractory index (OTDR)

- Operator Name
- Date and Time
- Setup Parameters
- Range (OTDR)
- Scale (OTDR)
- Setup Option chosen to pass OTDR “dead zone”
- Test Results shall include
- OTDR Test Results
- Total Fiber Trace
- Splice Loss/Gain
- Events greater than 0.10dB
- Measured Length (Cable Marking)
- Total Length (OTDR)
- Optical Source/Power Meter Total Attenuation (dB/km)

Sample Power Meter Tabulation:

Power Meter Measurement (dB)									
Location		Fiber No. 1	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									

The OTDR test results file format must be Bellcore/Telcordia compliant according to GR-196-CORE Issue 2, OTDR Data Standard, GR 196, Revision 1.0, GR 196, Revision 1.1, GR 196, Revision 2.0 (SR-4731) in a “.SOR” file format. These results shall also be provided in tabular form, see sample below:

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	<i>Splice</i>	23500 ft.	.082	.078
1	<i>Splice</i>	29000 ft.	.075	.063
2	<i>Splice</i>	29000 ft.	.091	.082
3	<i>Splice</i>	26000 ft.	.072	.061
3	<i>Bend</i>	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 follow: 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 no additional cost to the state, both labor and materials. Elevated attenuation due to exceeding the pulling tension during installation shall require the replacement of the cable run at no additional cost to the State, including labor and materials.

**Splicing Requirements**

Splices shall be made at locations shown on the Plans. Any other splices shall be permitted only with the approval of the Engineer. Splices will be paid for separately.

**Slack Storage of Fiber Optic Cables.**

Included as a part of this item, slack fiber shall be supplied as necessary to allow splicing the fiber optic cables in a controlled environment, such as a splicing van or tent. After splicing has been completed, the slack fiber shall be stored underground in hand holes or in the raised base adapters of ground mounted cabinets. Where identified on the plans, or as directed by the Engineer, additional lengths of fiber shall be stored, as maintenance coils. The aggregate lengths of the maintenance coils and the slack fiber will be used to repair and maintain the fiber optic cable. Fiber optic cable shall be tagged inside hand holes with yellow tape containing the text: "CAUTION - FIBER OPTIC CABLE." In addition, permanent tags, as approved by the engineer, shall be attached to all cable in a hand hole or other break-out environment. These tags shall be stainless steel, nominally 0.75" by 1.72", and permanently embossed. These tags shall be attached with stainless steel straps, and shall identify the cable number, the number of fibers, and the specific fiber count. Tags and straps shall be Panduit or approved equal.

Label the destination of each trunk cable onto the cable in each hand hole, vault or cable termination panel.

**Method of Measurement** Fiber optic cable will be measured for payment in feet in place installed and tested. Fiber optic cable will be measured horizontally and vertically between the changes in direction, including slack cable. The cable length in the foundation of a termination or splice point will be accounted as 6 feet or the actual installed length whichever is less. The entire lengths of cables installed in buildings will be measured for payment

**Basis of Payment** This work will be paid for at the contract unit price per foot for FIBER OPTIC CABLE of the type, size, and number of fibers specified. Payment shall not be made until the cable is installed, spliced and tested in compliance with these special provisions .

**SOLAR POWERED SPREAD SPECTRUM RADAR VEHICLE DETECTOR SYSTEM (SPSSRVDS)**

Effective: December 21, 2009

Revised: 3/17/10

**Description:** The Contractor shall supply a working system to transmit contact closures from an RVD, that does not have a power drop, to a cabinet that is the next one down the line. The system shall include all the equipment described in this special provision. The locations shall be as shown in the plans.

The detailed construction drawings are as shown in the plans.

All work will require close coordination with the TSC staff and Engineer.

**Materials.** The Contractor shall supply the following components and subsystems that can be configured as an SPSSRVDS.

Solar Power Assembly. The solar arrays shall be made in North America and have a 20-year factory warranty. Each solar array shall provide a minimum of 85 watts of peak power. The solar arrays shall be UL listed, FM Class 1, Div. II, Group C & D approved.

The array mount shall attach to the side of the pole with stainless steel fasteners. The array mount shall be aluminum alloy or stainless steel. The array shall be capable of withstanding 125-mph winds.

A solar charge regulator shall be provided that is UL listed, and rated for a minimum of 10 amperes continuous current, with solid state, low voltage disconnect. The solar charge regulator shall be sealed with internal temperature compensation, lightning protection, reverse polarity protection, and LED indicators. The solar charge regulator shall be FM Class I, Div. II, Groups ABCD and have the CE mark.

The Contractor shall supply batteries that are 12V, gel-electrolyte, non-spillable, and maintenance-free units. The batteries shall have a minimum rating of 120 ampere-hours.

Enclosure. Enclosures shall be .125" aluminum with stainless steel hardware. The enclosures shall have a #2 Corbin Lock on an insulated door. There shall be separate compartments for the batteries and for the electronics. The minimum enclosure dimensions shall be 43.875" X 16.5" X 10.25".

The enclosure shall have two shelves minimum with 1.0" X 2.00" opening cutout in shelf. The lower compartment shall have a 13.00" X 15.00" back panel .125" thick. The upper and middle compartments shall be vented by louvers on each side. The door shall be equipped with a door stop mechanism to stop the door at 90° and 180°. The cabinet shall have a plastic sheet holder which shall contain the wiring and as-built diagrams specific to the site.

#### Radar Vehicle Detector

General. All equipment and component parts furnished shall be new, be of the latest design and manufacture, and be in an operable condition at the time of delivery and installation. All parts shall be of high quality workmanship, and no part or attachment shall be substituted or applied contrary to the manufacturer's recommendations and standard practices.

The design shall prevent reversed assembly or improper installation of connectors, fasteners, etc. Each item of equipment shall be designed to protect personnel from exposure to high voltage during equipment operation, adjustments and maintenance.

The designed Mean Time Between Failures (MTBF) of the radar vehicle detector unit, operating continuously, shall be 10 years or longer.

The manufacturer of the radar vehicle detector shall provide at least three (3) references to show that the Radar Vehicle Detector product has been deployed in Operational systems of similar scope and size for over three (3) years. The contractor shall be responsible for providing all materials to install and place into operation (Mounting brackets, connector backshells) which will be part of the bid price of the item.

Environmental Conditions and Protection. Except as stated otherwise herein, the equipment shall meet all its specified requirements in the following environments:

- Ambient temperature range of -37 to +74 degrees C
- Relative humidity from 5 to 95%, non-condensing

The design shall be inherently temperature compensated to prevent abnormal operation. The circuit design shall include such compensation as is necessary to overcome adverse effects due to temperature in the specified environmental range.

Except as may be otherwise stated herein for a particular item, no item, component, or subassembly shall emit a noise level exceeding the peak level of 55 dBA when measured at a distance of 3 ft. (1 meter) away from its surface.

The microwave radar detector shall be resistant to vibration in accordance with IEC 68-2-30 (test Fc), NEMA TS-1 (Section 2.1.12), or approved equivalent.

Radar Transmitter. The microwave radar detector shall transmit in the frequency band of 10.525 +/- 25 MHz or other FCC approved spectral band. It shall comply with the limits for a Class A digital device, pursuant to 47CFR, Part 15 or the appropriate Spectrum Management Authority. Transmitter power shall not exceed 10 milliwatts. The Contractor shall resolve any issues with interference.

Beam Coverage. The Radar Vehicle Detector shall cover an area defined by an oval shaped beam and its maximum detection range shall be as follows:

- Elevation Beam Width (Half-power) 40 degrees
- Azimuth Beam Width (Half-power) 15 degrees
- Range 10 to 200 feet

Detection Zones. The radar detector shall provide a minimum of eight detection zones. The range limits of each zone shall be user-defined with a 7-ft. (2 meters) resolution.

Functional Characteristics. The Radar Vehicle Detector shall be a true presence detector. It shall be suitable for mounting on roadside poles or overhead structures and provide the following:

- Presence of moving or stopped vehicles in its detection zones, provided as duration contact closure to existing controllers
- Traffic data shall be available simultaneously with detection zone contact closures

Measurement Accuracy. The detector shall identify vehicle presence within each detection zone with a 95% accuracy or greater, independent of the vehicle's direction of travel through the detection zone.

The maximum permissible error shall be 5% in the detection of the direction and magnitude of radial speed and 10% in the case of transverse speed.

Physical. The microwave radar detector shall be enclosed in a rugged weatherproof box and sealed to protect the unit from wind up to 90 mph, dust and airborne particles, and exposure to moisture (NEMA type 3R enclosure). The maximum weight of the microwave radar detector assembly shall be 5 pounds (2.2 kg).

Electrical. The Radar Vehicle Detector unit shall be operable from 12-24 VAC/DC or 95-135 VAC @ 60 Hz. Power supply shall be obtained from the power distribution assembly within the controller cabinet, solar array or any convenient power source.

Power dissipation shall not exceed 4.5W or an average of 6.0 Watts for Radar Vehicle Detector equipped with an internal Spread Spectrum modem.

Mounting Bracket. The Contractor shall supply a mounting assembly to secure the Radar Vehicle Detector to the pole. The mounting assembly shall have all coated steel, stainless steel, or aluminum construction, and shall support a load of 20 pounds. The mounting assembly shall incorporate a ball-joint, or other approved mechanism, that can be tilted in both axis, then locked into place, to provide the optimum area of coverage. The mounting bracket shall allow replacement of a unit without the need for re-aiming.

Cable. Connection between the RADAR VEHICLE DETECTOR and the cabinet equipment shall be provided by a single cable, terminated in an MS connector.

The cable shall provide power to the unit, and contain eight output contact closure wire pairs. The insulation of the conductors shall be rated at 300V AC/DC. A junction box or cabinet to house the data interface connector must be located within sight of the desired detection zones in order to initially set up the sensor or to alter the set-up at a later date.

The cable shall be UV-resistant and provide nine (9) twisted pairs of stranded AWG #20 or #22 wire with a common shield rated at 300V with a temperature rating of 105° C.

The MS connector pins must be crimped to the cable conductors, assembled into the connector shell, and tested prior to the installation and pulling of cable on the site.

For the solar array, power wiring shall be 10AWG, stranded copper, double-insulated, sunlight-resistant, 600V 90C rated cable.

Electrical Isolation and Surge Protection. The contact closures and serial port shall be optically isolated. Power lines and serial port shall be surge protected within the unit.

Software. Contractor shall provide the Department with 10 licensed copies or a multiple user license for the Radar Vehicle Detector software to set up, calibrate, and monitor the Radar Vehicle Detector. Contractor shall be responsible to provide his own computer to set up and calibrate the Radar Vehicle Detector or Master Radio Controller sites.

Spread Spectrum Radio Transceivers.

Technology	Frequency Hopping, Spread spectrum Radio
Frequency band	900MHz or 2.4 GHz, license exempt ISM bands
Mode	Point-to-point operation
Hopping pattern	64 pseudo-random sequences selectable
Transmitter Power	1mW, 10mW, 100mW, or 1 W user-selectable
Antenna	Yagi Antenna
Range	Up to 20 miles depending on power and propagation
Licensing	FCC rules Part 15 approval. License free operation in U.S.
Temperature Range	37° to +70° C
Power Consumption	2.2 watts maximum



## Aluminum Pole.

1.0 Description. This item shall consist of furnishing and installing a conventional type round tapered aluminum pole complete with all required hardware including bolt covers as specified herein. The Contractor shall supply a pole at the RVD(s) location and at the receiver location.

### 2.0 Materials.

#### 2.1 Pole Shaft

- 2.1.1 The pole shall be designed to AASHTO design criteria for 80mph(128.72 kph) wind loading
- 2.1.2 The pole shall be designed such that the deflection of the pole from the vertical axis does not exceed one degree per 10 feet (3.04 M) of nominal pole height, as caused by the deadweight moment of design load RVD, at height specified on the plans.
- 2.1.3 The shaft shall be of smooth circular cross section seamless tapered aluminum alloy, type 6063-T8. It shall be free of dents, kinks, ripples, scratches or other defects. The outer wall shall have a satin ground finish, 50 grit or finer.
- 2.1.4 The shaft shall have a cast aluminum base plate conforming to ASTM designation B108 and SG70A for aluminum alloy, welded to the pole shaft. All welding shall be performed by the inert gas shielded arc method, and all welds shall be free from cracks and pores. The base plate shall slots suitable for 1 inch (25.4mm) diameter anchor bolts and 11.5 inch (292.1mm) nominal bolt circles.
- 2.1.5 The height of the pole shall be 30 feet (9.1.14m), or as otherwise noted on the plans.
- 2.1.6 The shaft for the poles shall have an 8 inch (203.2mm) bottom diameter and shall taper to a consistent diameter of 6 inches (152.4mm) at a point 18 ft. 7" (5.67 m) up from the base.
- 2.1.7 The shaft shall have a nominal wall thickness of not less than 250 mils.
- 2.1.8 The shaft shall have a 4 inch by 8 inch (101.6mm X 203.2 mm) handhole with rounded ends. The handhole shall be reinforced and shall have a cover of the same materials as the pole held in place with 1/8" (3.175 mm) -20 steel core nylon screws. The holes for the screws shall be tapped with the appropriate thread configuration. The handhole shall be located 18 inches (457.2 mm) from the bottom of the pole to the centerline of the handhole.

- 2.1.9 The support structures shall provide a means of routing the required conductors inside the structure from the base of the structure. These conductors shall not be exposed between ground level and the base of the RVD housing.
- 2.1.10 The shaft shall be equipped with a ground lug, welded inside the shaft, suitable for No. 8 and No. 4 wires, located adjacent to and accessible from the handhole.
- 2.1.11 The support structure shall be a single, tapered, tubular pole with a circular cross-section and ,minimum of 20” (508) mm) long support arm.

### 3.0 POLE FOUNDATION

- 3.1 Pole foundation concrete in ground shall be Type “E” in accordance with the State standard 2378-6 and with the exceptions as shown on the drawings.
- 3.2 Pole foundation concrete in ground shall not be paid separately.

### 4.0 INSTALLATION

The pole shall be set on a breakaway device.

#### Breakaway Device, Transformer Base, For Aluminum Pole

##### Description:

This item shall consist of furnishing and installing a breakaway device, transformer base, for an aluminum pole.

##### Materials:

Materials shall be according to Article 1070.04 of the Standard Specifications for Road and Bridge Construction, Current version, except that certification shall be submitted from the supplier that the device used under the conditions of the particular design meets the 1985 AASHTO breakaway specification.

The packaging of the breakaway devices, transformer bases, shall incorporate the provisions recommended by the Manufacturer to accommodate storage.

Revise the second sentence of Article 1070.04 (a) (1) of the Standard Specifications to read:

“Certification shall be submitted from the supplier that the device used under the conditions of the particular design meets the 1985 AASHTO breakaway specification.”

#### INSTALLATION OF SPSSRVDS

Based upon a tentative approval for the proposed locations, the Contractor shall use portable test equipment to verify the signal propagation and measure the existing noise levels over the proposed frequency spectrum of the spread spectrum modems at the proposed locations.

The Contractor shall provide the Department a Radio Site Survey of the construction zone to determine the optimum radio band to operate the Wireless Transfer System. The Radio Site Survey will also determine the feasibility of the suggested radar vehicle detector locations and data collection sites listed in this specification. It shall be the Contractor's responsibility to verify each location's viability and make any alternate site recommendations to the Department, should the viability of a particular site be in question. The final locations shall be picked based on the Radio site Survey. The cost of the Radio Site Survey shall be included in the cost of this pay item.

Detector Locations. The Contractor shall install a solar powered Spread Spectrum RVD System (SPSSRVDS) at the locations indicated in the plans

The detector locations shall include the following hardware:

- Aluminum Pole (30 ft.) (11.5 inch bolt circles)
- Type E foundation (11.5 inch bolt circles)
- Breakaway Device (11.5 inch bolt circles)
- Radar Vehicle Detector(s)
- 900 MHz or 2.4 GHz Spread Spectrum Radio
- Solar Panels
- Solar Charge Regulator
- Batteries
- Cabinet/Enclosure to house batteries and electronics
- Yagi antenna
- All related connection cables, brackets, and other items incidental to the construction of the SPSSRVDS.

Data Collection Locations: The Contractor shall install a detection hub at the next proposed state cabinet in the direction indicated in the plans. The data collection sites shall include the following hardware:

- Aluminum Pole (30 ft.) (11.5 inch bolt circles)
- Type "E" foundation (11.5 inch bolt circles)
- Breakaway Device (11.5 in bolt circles)
- 900 MHz or 2.4 GHz Spread Spectrum Radio(s)
- Yagi Antennas
- GSC Rigid conduit from aluminum pole to cabinet
- All related connection cables, conduit brackets and other items incidental to the construction of the SPSSRVDS

The RADAR VEHICLE DETECTORS shall be mounted in a side-fired configuration on a 30 foot aluminum pole at the locations specified in the plans, using the supplied mounting brackets. The brackets shall be attached with approved  $\frac{3}{4}$  inch wide .025 inch thick, stainless steel bands.

The Contractor shall install the detector unit on the pole at the nominal height of 21 feet above the road surface (or as recommended by the manufacturer) so that the masking of vehicles is minimized and that all detection zones are contained within the specified elevation angle as suggested by the manufacturer. The radar vehicle detector's detection zones shall be set up using the provided licensed software and the Contractor's Notebook PC.

Each Hub communicates to at least 1 SPSSRVDS using point-to-point spread spectrum radios. The Contractor shall assign the radios to specific channels based on:

- The assessment of propagation and noise measurements during the initial site assessment
- Mitigation of interference between links.

The Contractor shall install the cabinets, detectors, and transceivers at the Stations and Hubs approved by the Engineer. The Contractor shall interface the transmitter to the radar detectors at the RVD locations and the receivers at the hub locations to the 2070 in the cabinet bypassing the loop detectors.

When all equipment is installed and connected, the Contractor shall test and demonstrate the performance and accuracy of the installed detectors. This test shall match observed and detected vehicles, as well as the ability of the Advance Traffic Management System to collect and use the data for travel times. The accuracy of the travel times is not an issue for the Contractor, provided the detectors are reporting the vehicle's presence correctly.

**METHOD OF MEASUREMENT:** The SPSSRVDS shall be measured for the entire system from detector location to Hub.

**BASIS OF PAYMENT:** The SOLAR POWERED SPREAD SPECTRUM RADAR VEHICLE DETECTOR SYSTEM (median) shall be paid for at the unit price each for which shall include all materials, equipment, programming, selection of frequencies, and labor required to supply a working system using 2 RVDs.

The SOLAR POWERED SPREAD SPECTRUM RADAR VEHICLE DETECTOR SYSTEM (roadside) shall use 1 RVD.

## **ELECTRIC SERVICE DISCONNECT**

Effective Date: January 1, 2005

Revised: October 10, 2008

### **Description:**

This item shall consist of furnishing and installing an Electric Service Disconnect, mounted on a wood pole or wall as specified below, shown on accompanying details drawing and as directed by the Engineer.

### **Materials:**

The disconnect box shall be NEMA 4X stainless steel, nominally 12" x 18" x 8" with piano hinged door, steel back panel, fast acting stainless steel enclosure clamps, padlock provisions and door stop kit, Hoffman catalog #A-16H1208SS6LP/A-16P12/A-DSTOPK/C-PMK12, or approved equal.

Circuit Breakers shall be thermal magnetic bolt-on type with a minimum interrupt capacity of 10,000 symmetrical amperes at 120 volts. Breakers shall be lockable in the off position for lock out/tag-out compliance.

Disconnect surge protector shall be suitable for 240/120 volt single phase 60 Hz. AC electrical service.

Protector shall have a surge energy capability of 3600 joules or better at 8/20 microseconds, rated -40 to 60 degrees C., with LED operating indicators and shall be UL listed per UL 1449. Protector shall be a Cutler Hammer CMOV230L65XST or approved equal.

Conduit and wire to complete the installation of the disconnect box shall be paid for via pay items elsewhere herein.

Bus bars, connectors and lugs shall be copper, insulated and isolated, and configured to prevent shorted conditions from tightening terminations. Lug and connectors shall be rated for 75 degrees C. Overall bus section shall be configured behind an insulating barrier shield which is removable for access to connections.

Combination ground and neutral bar shall be configured with separate ground and neutral sections and spare terminals as indicated. The heads of ground screws shall be painted green. The heads of neutral screws shall be painted white.

A plastic laminated layout and circuit diagram shall be affixed to the interior side of the enclosure door.

A 2-color engraved plastic nameplate, attached with screws and engraved as indicated, shall be provided for each main breaker.

The exact mounting height of the box shall be field determined and marked by the Engineer.

Electrical service shall be of the voltage indicated. Where 120 volt service is indicated, service drop cable shall be installed accordingly.

The electric service equipment assembly shall be UL labeled, suitable for use as service equipment.

Stainless steel unistrut channel, stainless steel "L" shaped brackets, and stainless steel hardware shall be provided for proper installation of the disconnect, as shown on disconnect mounting details. (TY-1TSC-400 #20).

**Installation:**

When mounting on pole, the box shall be installed as per accompanying disconnect mounting detail (TY-1TSC-400#19&#20)

When mounting on wall, the box shall be installed as per accompanying disconnect details (TY-1TSC-400#25 and #26).

Note detail drawing for installation of stainless steel straps and iron conduit straps (TY-1TSC-400#19).

Pole mounted disconnect shall be installed a minimum of 10 feet above final grade, as shown on electric service detail TY-1TSC-400#20. Wall mounted disconnect shall be installed a minimum of 4 feet above final grade, as shown on electric service detail TY-1TSC400#25 One Electric Service Disconnect may be used for more than one location as shown on plans. If so, an extra circuit breaker shall be installed to control the 2<sup>nd</sup> location. The 2<sup>nd</sup> circuit breaker supplied shall be considered incidental to the Electric Service Disconnect pay item.

Removal of existing Electric Service Type "C" shall be considered as incidental to Electric Service Disconnect pay item. Contractor shall not be entitled to extra compensation for removal of Type "C" service.

All work beginning to end shall be coordinated with the power utility company. Contractor shall call the power utility company to set up all service calls.

**Method of Measurement:**

Each Electric Service Disconnect mounted on a wood pole or on a wall for the Surveillance System, installed as per the above specifications and as directed by Engineer, shall count as a unit for payment.

**Basis of Payment:**

This item shall be paid at the contract unit price each for ELECTRIC SERVICE DISCONNECT, which shall be payment in full for the material and work as described herein. To make Electric Service and Disconnect complete, ground rod and miscellaneous hardware shall be included in contract unit price for ELECTRIC SERVICE DISCONNECT.

**ELECTRIC UTILITY SERVICE CONNECTION**

Effective Date: January 1, 2002

Revised Date: Dec. 24, 2009

Description. This item shall consist of payment for work performed by ComEd in providing or modifying electric service as indicated. Com Ed shall supply continuous 60 cycle single phase 120 Volt electrical service. This involves work at more than one electric service location.

**CONSTRUCTION REQUIREMENTS**

General. It shall be the Contractor's responsibility to contact ComEd. The Contractor shall coordinate his work fully with Com ED both as to the work required and the timing of the installation. No additional compensation will be granted under this or any other item for extra work caused by failure to meet this requirement. **Please contact ComEd, New Business Center Call Center, at 866 NEW ELECTRIC (1-866-639-3532) to begin the service connection process. The Call Center Representatives will create a work order for the service connection. The representative will ask the requestor for information specific to the request. The representative will assign the request based upon the location of project.**

The Contractor should make particular note of the need for the earliest attention to arrangements with ComEd for service. In the event of delay by ComEd, no extension of time will be considered applicable for the delay unless the Contractor can produce written evidence of a request for electric service within 30 days of execution.

Materials. All work and materials shall be furnished by ComED. All connections shall conform to the installation requirements of ComEd.

Method of Payment. The Contractor will be reimbursed to the exact amount of money as billed by ComEd for its services plus administration costs included in Article 109.05. Work provided by the Contractor for electric service will be paid separately as described under ELECTRIC SERVICE DISCONNECT.

No extra compensation shall be paid to the Contractor for any incidental materials and labor required to fulfill the requirements as shown on the plans and specified herein.

For bidding purposes, this item shall be estimated as \$36,000.00.

Basis of Payment. This work will be paid for at the contract lump sum price for electric utility services charges plus administration costs associated with Article 109.05 as ELECTRIC UTILITY SERVICE CONNECTION, which shall be reimbursement in full for electric utility service charges.

## **CONCRETE FOUNDATION**

Effective: June 1, 1994

Revised: November 21, 2008

### DESCRIPTION:

This item shall consist of constructing a concrete foundation for the installation of a traffic signal, cabinet, and cabinet with pedestal, anchor bolt, and ground rod in accordance with the following requirements and conforming in all respects to the lines, grades and dimensions shown on the plans or as directed by the Engineer and in applicable portions of Section 878 of the Standard Specifications and the Standard Drawing for Concrete Foundations, Standard 2378.

### MATERIALS

The materials shall conform to the specifications of Class SI concrete and concrete Reinforcement Bars in the Standard Specifications for Road and Bridge Construction. The conduit and fittings within the limits of the foundation shall conform to the same requirements as that specified for the conduit outside these limits.

Anchor bolts shall meet the requirements of Section 505 of the Standard Specifications and the material shall conform to the requirements of Article 1006.09 of the Standard Specifications for Road and Bridge Construction. A ground rod shall be installed in each foundation and shall conform to Section 806. Unless otherwise indicated in plans, ground rods shall be one piece copper-clad steel rods 3/4" x 10' (2cm x 3 m).

### CONSTRUCTION DETAILS

Concrete foundations shall be Type A or Type D and location as specified on the plans. The top of the foundation shall be finished level. Shimming will not be permitted. All edges along the top of the foundation shall be given a 1 inch (25mm) bevel. A form extending a minimum of 9 inches (225mm) below the top surface of the foundation is required. The form shall be set level and means shall be provided for holding same rigidly in place while the concrete is being deposited. Whenever the excavation is irregular, a form shall be used to provide the proper dimension of the entire foundation below the ground surface. Where a concrete foundation is contiguous to a sidewalk, preformed joint filler of 1/2 inch (12mm) thickness shall be placed between the foundation and the sidewalk.

All conduit in the foundation shall be installed rigidly in place before concrete is deposited in the form. Insulated bushings shall be provided at the ends of conduit. Anchor bolts shall be set in place before the concrete is deposited by means of a template constructed to space the anchor bolts in accordance with the pattern of the bolt holes in the base. After installation of cables, all conduit openings in foundations shall be sealed with an approved mastic.

The required number and size of galvanized steel conduits shall be installed in every concrete foundation as shown on the plans. An excess of galvanized steel conduits shall be installed in every concrete foundation. These excess stubs shall be 2 inches (50 mm) in diameter. Placement and quantity shall be determined by the Engineer, and the ends of the stubs shall be capped.

Incidental to the cost of each control box foundation, the Contractor shall construct a 5" (125 mm) P.C.C. sidewalk of a rectangular area 3 ft (1 mm.) by 4 ft (1.2 meter.) immediately adjacent to the cabinet door, with the 4' (1.2 meter) dimension of the rectangle parallel to the cabinet door when closed. This paragraph shall be applicable at all cabinet foundation locations included in this Section. The only situations where this paragraph shall not apply are as follows: When the foundation is immediately adjacent to or within a paved sidewalk or shoulder area and no further surfacing is require. The Engineer shall be the sole judge as to the applicability of this paragraph in all questions arising therefrom.

#### **BASIS OF PAYMENT**

This work will be paid for at the contract unit price per meter/foot for CONCRETE FOUNDATION of the type specified, which price shall be payment in full for all necessary excavating, backfilling, disposal of surplus material and formwork and furnishing all materials, anchor bolts, stubs and ground rod within the limits of the foundation.

#### **CONCRETE FOUNDATION, SURVEILLANCE CABINET, MODEL 334**

Effective: 11/19/09

**Description.** Concrete foundations shall be constructed to support ITS equipment cabinets at locations as indicated on the Plans. This work shall include installing any necessary hardware (entering conduits, bolts, anchor rods, grounding, etc.) as shown on the Plans. This work shall also include any topsoil, fertilizing, seeding, and mulching of the disturbed areas in accordance with Sections 211, 250, and 251 of the Standard Specifications.

**Materials.** Concrete foundations shall be according to materials defined in Article 836.02 of Section 836 of the Standard Specifications. All anchor bolts shall be in accordance with Section 1006.09 of the Standard Specifications except that all anchor bolts shall be hot dipped galvanized the full length of the anchor bolt including the hooks. Anchor bolts shall provide bolt spacing as shown in the Plans and as required by the cabinet manufacturer.

The Concrete foundations shall also be fabricated in accordance with Section 1070 of the Standard Specifications. These concrete foundations shall be fabricated from material new and unused in any previous application. The manufacturer shall provide a Certificate of Compliance that the materials are new and meet the specified requirements in accordance with the Standard Specifications and as shown on the Plans.

#### **CONSTRUCTION REQUIREMENTS**

The Engineer will determine the final placement of the Concrete foundations. Concrete foundation dimensions shall be in accordance with those dimensions shown in the Plans on the detail sheet "Concrete Foundation (Model 334 Cabinet) Detail". The foundation shall be located as required in order to avoid existing and relocated utilities. The top of the foundation shall be finished level. Shimming of the appurtenance to be attached will not be permitted.



Prior to pouring the foundation, the Contractor shall check the Plans for the specific number, size, and direction of conduit entrances required at the given location. All conduit in the foundation shall be installed rigidly in place before concrete is deposited in the form. Bushings shall be provided at the ends of the conduit. Anchor rods and ground rod shall be set in place before the concrete is deposited by means of a template constructed to space the anchor rods according to the pattern of the bolt holes in the base of the appurtenance to be attached. The appurtenance shall not be erected on the foundation until the bases have cured for at least (7) days. The Concrete shall cure according to Article 1020.13 of the Standard Specifications.

**Method of Measurement.** Concrete foundations shall be measured for payment in feet (meters) of the concrete foundation in-place installed in accordance with the total length of concrete foundation required for foundations as indicated on the Plans and as directed by the Engineer. Extra foundation depth, beyond the directive of the Engineer, will not be measured for payment.

**Basis of Payment.** Payment will be paid for at the contract unit price per feet (meter) of **CONCRETE FOUNDATION, SURVEILLANCE CABINET, MODEL 334**, of the diameter and materials (entering conduits, bolts, anchor rods, grounding, etc.) within the limits of the foundation and any topsoil, fertilizing, seeding, and mulching of the disturbed areas as well as all associated labor is to be included in this price.

## **HANDHOLE**

Effective: June 1, 1994

Revised: May 19, 2009

### **DESCRIPTION**

This item shall consist of constructing a handhole, a heavy-duty handhole, or a double handhole, cast in place, complete with frame and cover and in accordance with the following requirements and conforming in all respects to the lines, grades, and dimensions shown on the plans or as directed by the Engineer. All handholes shall be installed in accordance with the Standard Specifications Sec. 814.

### **MATERIALS**

All handholes shall be constructed of Class SI concrete meeting the requirements of the Standard Specifications for Road and Bridge Construction Section 1020.

### **CONSTRUCTION DETAILS**

Handhole of the type specified shall be constructed in accordance with the details shown on the plans and conform to the following requirements:

1. Concrete: Concrete construction shall be done in accordance with the provisions of Concrete for Structures and Incidental Construction contained in the Standard Specifications for Road and Bridge Construction Sec. 503.
2. Placing Castings: Castings shall be set accurately to the finished elevation so that no subsequent adjustment will be necessary. Castings shall be set flush with a sidewalk or pavement surface. When installed in an earth shoulder away from the pavement edge, the top surface of the casting shall be 1 in. (25.4mm) above the finished surface of the ground.

3. Backfilling: Any backfilling necessary under a pavement, shoulder, sidewalk or within 2 ft. (60 cm) of the pavement edge shall be made with sand or stone screenings.
4. Forming: Forms will be required for the inside face of the handhole wall, and across all trenches leading into the handholes excavation. The ends of conduits leading into the handhole shall fit into a conduit bell which shall fit tightly against the inside form and the concrete shall be carefully placed around it so as to prevent leakage.
5. French Drain: A french drain conforming to the dimensions shown on the plans shall be constructed in the bottom of the handhole excavation.
6. Steel Hooks: Each handhole shall be provided with four galvanized steel hooks of appropriate size, one on each wall of the handhole.
7. Frame and Cover: The outside of the cover shall contain a recessed ring Type "G" for lifting and a legend "IDOT TSC" cast-in.
8. Cleaning: The handhole shall be thoroughly cleaned of any accumulation of silt, debris, or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.

#### BASIS OF PAYMENT

This work will be paid for at the contract unit price each for HANDHOLE or HEAVY DUTY HANDHOLE, or CONCRETE HEAVY DUTY HANDHOLE (SPECIAL), as the case may be, for all necessary excavating, backfilling, disposal of surplus material and form work, frame and cover, and furnishing all materials.

#### **TRENCH AND BACKFILL**

Effective: June 1, 1994

Revised: May 19, 2009

#### DESCRIPTION

This item shall consist of constructing a trench for the accommodation of the poly-duct or conduit and backfilling it at the locations indicated by the Engineer. Included is the furnishing of the backfill material and disposing of surplus materials. All work shall be done in accordance with these specifications and Section 819 of the Standard Specifications.

#### CONSTRUCTION METHODS

The trench shall be excavated in a manner to prevent cave-ins and to a depth of not less than 30 inch (750mm) below final grade. Excavated material cannot fall back onto the trench. The width of the trench shall be at least 3 inches (75.0mm). Where the duct enters the foundation or rigid steel conduit, the bottom of the trench shall be built up to provide a smooth bed for the duct.

The duct shall be placed in the bottom of the trench after all loose stones have been removed and all protruding stones have been removed or covered with backfill material as directed by the Engineer.

If the trench is for an electrical power line, a cable marker shall be installed 12 inch (30 cm) below finished grade. The marker shall be a 6 inches (15 cm) wide (match trench width for smaller trenches) reinforced metallic detection tape consisting of a reinforced polyethylene tape with a metallic core.

The tape shall be red with black lettering to read "CAUTION-ELECTRICAL LINE BURIED BELOW". The tape shall have a thickness of not less than 8 mils. The tensile strength of a 3 inch (75.0mm) wide specimen shall be a minimum of 600 lbs.(2669 N). Splicing of the tape shall be accomplished with metal clips to maintain electrical continuity along the entire length of the tape. In addition to metal clips, all splices must be wrapped with a waterproof adhesive tape to prevent corrosion of the metal core.

The trench shall be backfilled by placing backfill material in uniform layers not exceeding 6 inch (15 cm) in depth (loose measure). The material in each layer shall be thoroughly compacted to a density equal to the existing ground or as approved by the Engineer in such a manner as not to injure the duct.

No stone or rock greater than 1 inch (25mm.) in maximum dimension shall be allowed in any layer or backfill.

No sod, frozen material, or any material which, by decay or otherwise, might cause settlement shall be used as backfill. Deleterious substances, such as coal, lignite, shells, clay lumps, and conglomerate and cemented particles shall not exceed 5 percent by weight in any one sample of backfill material.

Any material excavated from the trench may be used as backfill provided it does not conflict with the above and that the material meets with the approval of the Engineer.

The Engineer will inspect:

1. The trench before the duct or conduit is placed in the trench.
2. The duct in the trench before the first layer of backfill.
3. The trench at any other time during excavation or backfilling.

Trenches under and within 2 ft. (60 cm.) of pavement, curb, gutter, or curb and gutter and other locations indicated by the Engineer shall be filled with sand or stone screenings complying with Articles 1003.01 and 1003.04 of the Standard Specifications. Extra compensation shall not be allowed for such sand or stone screenings.

The method and type of equipment to be used in compacting the backfill material shall be approved by the Engineer before any work is started.

All areas and plant material damaged by the installation shall be replaced as follows:

1. Grass Areas: Replace top soil to a depth of 3 inch (8 cm) , re-grade shoulders, ditch slopes, and open areas back to former existing grades. Fertilize, seed and mulch all damaged areas.
2. Sodded Areas: Fertilize and re-sod all damaged areas.
3. Plant Materials: Remove and replace damaged trees, shrubs, and vines with the same varieties that existed prior to the damage.
4. Shoulders Other than Stabilized Shoulders and back slopes: Replace shoulders to original condition and restore edge of back slope to original lines and grades.

All damaged landscape shall be replaced in accordance with Sections 250 through 254 of the Standard Specifications for Road and Bridge Construction.

### METHOD OF MEASUREMENT

The length of measurement shall be the distance along a straight line measured between changes in direction of the trench.

### BASIS OF PAYMENT

This work will be paid for at the contract unit price per lineal foot (meter) for TRENCH AND BACKFILL FOR ELECTRICAL WORK, for all excavation, cable marker, furnishing and placing all backfill material, and the disposal of surplus excavations. Any boring made for the purpose of placing conduit or cable under sidewalks or driveways shall be paid for at the same contract unit price per lineal foot (meter) and designated as TRENCH AND BACKFILL FOR ELECTRICAL WORK for seeding or sodding the surface of the trench, when and as directed by the Engineer.

## **2070 LITE CONTROLLER**

Effective: November 9, 2009

Revised: 3/1/10

### Description

This work shall consist of furnishing and installing a Model 2070 Advanced Transportation Controller (ATC) Lite at locations shown on the Plans, including all necessary hardware and accessories required for use as a 2070 Lite Controller. The 2070 Lite Controller along with its associated components will be part of the ramp metering and vehicle sensing subsystem known as the surveillance system.

### Materials

Materials shall be according to the following:

#### General

The Model 2070 Lite ATC shall comply with the Caltrans 2002 Transportation Electrical Equipment Specifications (TEES) and meet or exceed the requirements as outlined in the Advanced Transportation Controller Standard Specification by the Joint AASHTO/ITE/NEMA ATC Committee minus the VME chassis.

The Model 2070 Lite ATC unit shall be modular in design and configurable for a variety of traffic management applications. In addition, the Model 2070 Lite ATC shall be compatible with Type 170, 170E, and NEMA specified controller equipment. In addition, the Model 2070 Lite ATC shall mate with Type 170 and ITS style cabinets.

### Hardware

The Model 2070 Lite ATC unit shall consist of a metal housing that is 7 in (177 mm) high by 19 in (483 mm) wide by 10 in (260mm) deep and weighs less than 25 lbs (11.3kg) with the following components:

- Serial motherboard
- Single 96-pin DIN connectors for all plug-in boards
- Liquid-Crystal Display (LCD), 8 lines, 40 characters per line, back-light 8 in (203mm) by 40 in (1000mm)
- 2 keypads on panel for programming

### CPU (Engine Board)

A plug on board with two (2) predefined 50 pin connectors shall be provided. The Motorola 68360 microprocessor computer shall be provided with the minimum requirements defined below and will be mounted on the engine board, along with the various crystals and communications circuitry:

- 25 Mhz
- 4MB of DRAM
- 512 KB SRAM
- 4 MB of flash memory
- 256 K battery-backed SRAM
- Data Key
- Real-time time of day clock

### **Operating**

The Model 2070 Lite ATC shall be capable of running the standard Microware OS-9 operating system as well as multi-tasking and DOS like commands.

### **Field I/O Modules**

The following common features shall be provided:

- 614 kbaud data rate to CPU
- Parallel I/O ports – 64 bits each input and 64 output
- SDLC compatible communication with CPU module
- External EIA-485 port connector
- Optically isolated modules to provide protection from lightning and surges

### **Power Supply**

A power supply shall be provided meeting or exceeding the following requirements:

- 10 amps
- Power consumption of 25 to 75 watts typical and 120 watts maximum
- 100 watt quadruple industrial-grade outlet supply
- 50 Khz switching regulator
- Storage system for memory backup without batteries
- Internal safety circuitry senses and measures

The cabinet shall be equipped with two-stage surge suppression, which incorporates both silicon avalanche diode and MOV components and technology. The surge suppression shall be equipped with status and maintenance LED indicators.

### **Communications Modules**

The communications modules shall conform to EIA-232 specifications, and the two leftmost slots on the motherboard shall be made available for dual communications modules.

## Miscellaneous Features

The following miscellaneous and optional features shall also be provided with the Model 2070 Lite ATC:

- Direct access to serial ports from the application software
- A self-contained, independent power supply module
- Input protection
- +5 VDC standby power using capacitor backup
- Safety circuitry to monitor line voltage and output

## Environmental

All components shall operate within the following environments”:

- Temperature range: -35 to +150° F (-37 to +74° Celsius)
- Humidity: 5 to 95% non-condensing

## Application Software

Application software and associated licenses shall be provided with each Model 2070 Lite ATC unit. The application software shall be designed to operate on the Model 2070 controller hardware platform, and shall allow the Model 2070 Lite ATC to continuously control the ramp meters as well as poll and monitor the volume, occupancy, classification and speed of vehicles passing over the detector loops at the locations shown on the Plans. The Model 2070 Lite ATC application software shall then process and communicate this data at the system polling rate of 20 seconds when requested in ASCII character strings to a computer workstation located at the IDOT Traffic Systems Center (TSC). The application software shall also have the following features:

- Diverse programming configuration capabilities
- Support high-speed system communications using NTCIP 1209:2005 Vol 19 Data Element Definitions for Transportation Sensor Systems
- Allow special software control configurations
- Provide user-definable cabinet input/output function mappings
- Provides easy-to-use menu driven inter-face with spreadsheet style data entry and multi-table parameter database
- Provide security and password protected access
- Provides extensive status information on communications, detector diagnostics, and input/outputs
- Generates extensive reports that include the date and time of occurrence on Local Alarm Log, Communications Fault Log, Detector Fault Log, System Detector Log, MOE Log, Speed Log, and Volume Count Log

## Construction Requirements

### Installation

The Model 2070 Lite ATC unit shall be installed and connected inside the Model 334 Cabinet at the locations as shown on the Plans and according to the manufacturer's instructions.

The Contractor shall install all cables and ancillary equipment, connecting the Model 2070 Lite ATC to the Ramp Meters and Detectors.

Surge and over-voltage protection shall be installed on all loop lead-in cables and all power conductors.

All cables shall be neatly dressed and labeled with their function and physical connection.

#### Testing

The Contractor shall power up the unit and self-test the unit using available software. Applications software shall be uploaded, configured, and validated. This testing shall be accomplished prior to installing the unit in the field cabinet.

After the unit is installed in the cabinet, the Contractor shall apply power and verify the unit is operating correctly. Tests previously used for bench checking shall be repeated and documented.

The Contractor shall test the operation of the 2070 Lite Controller, using CCTV video as ground truth for ramp meter operations and volumes, and a calibrated radar gun for speed. Traffic data produced by the 2070 Lite controller shall be within 5% of ground truth (actual traffic counts and speeds). A written copy of the test, with supporting videotape, shall be submitted to the Engineer at the end of the test for approval.

#### Documentation

Three copies of all operations and maintenance manuals for each Model 2070 Lite ATC unit shall be delivered for each assembly installed. In addition, full documentation for all software and associated protocols shall be supplied to the Department on a CD-ROM. The Department reserves the right to provide this documentation to other parties who may be contracted with in order to provide overall integration or maintenance of this item.

#### Warranty

The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation, unless other warranty requirements prevail. The warranty period shall begin when the Contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. This warranty shall include repair and/or replacement of all failed components via a factory authorized depot repair service. All items sent to the depot for repair shall be returned within two weeks of the date of receipt at the facility. The depot location shall be in the United States. Repairs shall not require more than two weeks from date of receipt and the provider of the warranty shall be responsible for all return shipping cost. The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service.

A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall be for a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. The Department shall have the right to transfer this service to other private parties who may be contracted to perform overall maintenance of the facility.

**Method of Measurement**

2070 Lite Controller shall be measured for payment by the actual number of the Model 2070 Lite ATC units furnished, installed, tested, and accepted.

**Basis of Payment**

Payment will be made at the contract unit price for each **2070 LITE CONTROLLER** including all equipment, material, testing, documentation, and labor detailed in the contract documents for this bid item.

**DETECTOR RACK (I55)**

Effective: 1/26/10

Revised: 3/3/10

**Scope:**

The Contractor shall furnish and install a Detector Rack with power supplies, loop interface panels, cables and harnesses complete in a Model 334 cabinet as shown on the plans and as directed by the TSC Surveillance Engineer.

**Power Supply**

The power supply shall provide regulated DC power for up to 16 input channels.

Input voltage shall be 120 VAC, 50/60 Hz

Output voltage (per channel)

<u>Output Voltage VAC</u>	<u>Load Current (mA)</u>
31.3	0
27.2	100
24.3	200
21.8	300

Output Indicators – One per channel, high intensity red LEDs shall indicate output status. Indicators shall illuminate when voltage is greater than or equal to 21.0 VAC ± 1.0VDC and extinguish when voltage is less than 21.0 VDC ± 1.0 VDC.

One power switch switches input line voltage for all channels.

Dimensions 2.00" x 4.50" H x 6.875 D

Weight approximately 2.5 Lbs.

Connector – 2 x 22 pin edge card connector with .156" spacing. Connector centered on 4.50" dimension with the following pin assignments:

<u>Pins</u>	<u>Assignment</u>
1 & A	DC Common
2 & B	Channel 1
3 & c	Channel 2
4 & D	Spare
5 & E	Spare



<u>Pins</u>	<u>Assignment</u>
6 & F	Spare
7 & H	Spare
8 & J	Spare
9 & K	Spare
10 & L	Chassis Ground
11 & M	120 VAC Neutral
12 & N	120 VAC Line
13 & P	Spare
14 & R	Spare
15 & S	Spare
16 & T	Spare
17 & U	Channel 3
18 & V	Channel 4
19 & W	Spare
20 & X	Spare
21 & Y	Spare
22 & Z	Spare

Power supply shall fit in standard size card rack

#### Card Rack

The card rack shall be equal to or exceed an Econolite 16-position card rack with the loop interface panel.

The 16-position card rack shall be able to support eight 2-channel detectors, four 4-channel detectors or any combination needed.

The Contractor shall provide all labor and materials necessary to terminate the loops in the surveillance cabinet and extend the detector outputs to the 2070 Lite Controller.

The interface panels shall be manufactured from FR4 G10 fiberglass, .062" thick, with a minimum of 2 oz. of copper for all traces.

The loop interface panel shall be used for the purpose of connecting the field loops to the detector.

One 16-position interface panel shall be provided for each 16-position card rack.

Each interface panel shall be supplied with a ground terminal bus for termination of the homerun cable shield if elected to be terminated.

Each interface panel shall accommodate 16 independent field loops to be connected.

The card rack optically isolated FEP outputs shall be hard wired to the telemetry terminal strips. The telemetry terminal strips are the break point between the 2070 Lite and the card rack.

Lightning protection shall be mounted and provided for each field loop on the interface panel. Mounting holes shall be provided for the Edco SRA-6LC loop lightning protection device.

A detector rack shall be included in every cabinet that utilizes loops.

The Contractor shall supply enough cards to make a complete system.

The detectors shall be according to Section 885 of the Standard Specs.

#### Method of Measurement

This item shall be measured as each for DETECTOR RACK, installed, tested, including the power supplies, loop interface panels and harnesses complete and operational.

#### BASIS OF PAYMENT

This work shall be paid for at the contract unit price each for DETECTOR RACK, which shall be payment in full for the work complete as specified herein and as directed by the Engineer.

#### **CONTROL OF TRAFFIC SURVEILLANCE MATERIALS**

Effective: June 1, 1994      Revised: May 12, 2008

Control of materials shall meet the requirements of Section 801 of the Standard Specifications, except for the following:

#### DOCUMENTATION

The Contractor shall submit the following traffic surveillance material documentation for the Engineer's approval. The material shall be submitted prior to the delivery of equipment to the job site, or within 30 consecutive calendar days after the contract is awarded, or within 15 consecutive calendar days after the contract is awarded, or within 15 consecutive calendar days after the preconstruction meeting.

(A) One (1) complete set of manufacturer's descriptive literature, drawings, and specifications of the traffic surveillance equipment, handholes, junction box, cable, conduit and all associated items that will be installed on the contract.

(B) Eight (8) complete shop drawings of the cabinets, showing in detail the fabrication, anchor bolts, and reinforcing materials.

(C) Eight (8) copies of a letter listing the manufacturer's name and model numbers of the proposed equipment to be supplied, as noted in Paragraphs (A) and (B) of this Special Provision. The letter will be reviewed by the Traffic Surveillance Engineer to determine whether the equipment to be used is approved. The letters will be stamped as approved or not approved accordingly and returned to the Contractor.

(D) (A), (B), and (C) above shall be stamped with the Contract Number, Permit Number, or Intersection for FAUS projects.

Unless otherwise approved by the Engineer, all of the above items shall be submitted to the Engineer at the same time. Each item shall be properly identified by route, section and contract number. Failure to submit the required information above may result in any request for 120-day delay under Article 801.08 being denied.

## ACCEPTANCE

Acceptance of the traffic surveillance equipment by the Department shall be based upon inspection results at the Traffic Surveillance “turn on”. If approved, traffic surveillance acceptance shall be verbal at the “turn on” inspection followed by written correspondence from the Engineer. The Contractor shall be responsible for all traffic surveillance equipment and associated maintenance thereof until Departmental acceptance is granted.

At or prior to the “Turn On” inspection of the traffic surveillance installation, the Contractor shall provide the Traffic Surveillance Inspector with one(1) copy of the letter described in Paragraph (C) above. In addition, the Contractor shall provide the Engineer with one (1) copy of the operation and service manuals of the associated equipment and five (5) copies of the cabinet wiring diagrams and cable log and location diagram. If these items are not delivered, the traffic surveillance installation(s) will not be placed in operation.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and surveillance equipment are paid, and no additional compensation will be allowed. Materials and equipment not complying with the above requirements will be subject to removal and disposal at the Contractor’s expense.

## **SURVEILLANCE CABINET, MODEL 334**

Effective: Nov. 11, 2009

### Description

Work under this item shall consist of furnishing and installing a Model 334 cabinet for field equipment including fiber optic communications, ramp meter and system detector stations, and dynamic message signs as shown on the Plans and hereinafter provided.

### Materials

#### General

Cabinet, Model 334 shall be a durable, weatherproof enclosure, constructed of 3/16 in. (4.75mm) thick aluminum or 1/8 inch (3.175 mm) thick aluminum lined with bullet resistant fiberglass panels that shall be UL listed and tested for UL752 Level 3 with a nominal thickness of ½ inch (12.7mm) maximum, and a nominal weight of 5.0 lbs. per square foot (24.5 kg per square meter) maximum. The cabinet shall have a nominal outside dimension of 66 in. (1.7m) height x 24 inches (600mm) wide X 30 inches (762mm) deep. Cabinet, Model 334 shall consist of the following components: double door each equipped with a lock for front and rear cabinet entry, housing, mounting cage, power distribution assembly, service panel, thermostatically controlled fan, and all necessary mounting hardware and wiring, and other equipment, as shown on the Plans and specified in these special provisions.

All bolts, nuts, washers, screws, hinges, and hinge pins that are subject to corrosion shall be stainless steel unless otherwise specified. All equipment under this item shall be in accordance with Section 1074.03 of the Standard Specifications except as modified herein.

### Cabinet Components

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

The cabinet shall have single front and rear doors, each equipped with a lock. The enclosure door frames shall be double flanged out on all 4 sides and shall have strikers to hold tension on and form a firm seal between the door gasketing and the frame. The front and rear doors shall be provided with catches to hold the door open at both 90 and 180 +/- 10 degrees. Gasketing shall be provided on all door openings and shall be dust-tight. For horizontal support and bolt attachment, cage bottom support mounting angles shall be provided on either side, level with the bottom edge of the door.

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

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

The intake (including filter with shell) and exhaust areas shall pass a minimum of 60 cubic feet (1.7 cubic meters) of air per minute for housing #1 and 26 cubic feet (0.74 cubic meters) of air per minute for housing #2. The thermostatically controlled fan with ball or roller bearings shall be mounted within the housing and vented. The fan shall provide a capacity of at least 150 cubic feet (4.25 cubic meters) of free air delivery per minute of ventilation. The fan shall be thermostatically controlled and activated when the temperature inside the cabinet exceeds 75° F (24° Celsius), and shut off when the temperature is less than 64°F (18° Celsius). In addition, the fan shall be manually adjustable for automatic turn on and off. The fan circuit shall be protected at 125% of the fan motor ampacity.

The housing shall also be equipped with a heating element installed in the bottom front of the cabinet and mounted along the side of the rack. The heating element shall draw 500 watts and have an output of at least 1500 watts (7900 Btu/hr). The heater shall have a built-in quick response thermostat with sealed contacts that has a temperature control range 40 to 100° F (5 to 39 degrees Celsius), and have a built-in thermal cut-off to automatically shut off the heater in the event of overheating.

All subassemblies shall be mounted in removable 19 in. (482 mm) EIA self-standing rack assemblies. The EIA rack portion of the cage shall consist of 2 pairs of continuous, adjustable equipment mounting angles that comply with Standard EIA RS-310-B. The cage shall be centered within the cabinet and bolted to the cabinet at 4 points.

Each cabinet shall be equipped with 2 shelves. Shelves shall be the full width of the rack and 12 in. (300mm) deep. The shelves shall be designed to support a minimum of 50 lbs. (23 kg).

The power distribution assembly shall be as shown on Plans and shall consist of input files that are common to both 332 and 336 type cabinets and provides 9 AC outputs and up to 28 isolated inputs. The power distribution assembly shall consist of the following: one 30A, 120V main circuit breaker; three 15A, 120V single pole secondary circuit breakers; eight standard 117 VAC controller and equipment receptacles; and one duplex, 3-prong, NEMA GF1 Type 5-15R grounded utility type outlet.

Rating of breakers shall be shown on face of breaker or handle. Breaker function shall also be labeled below breakers on front panel. The first equipment receptacle in the circuit shall have ground-fault circuit interruption as defined in the NEC. Circuit interruption shall occur on 6 mA of ground-fault current. All conductors from the power distribution assembly routed to the cabinet wiring shall be connected to the terminal block on the common side, except for the AC power conductor between the service terminal block and main circuit breaker. All internal conductors terminating at the blocks shall be connected to the other side of the blocks.

Two side panels shall be provided and mounted on the cabinet sidewalls. In viewing from the front door, the left side panel shall be designated as the "input/Communications" and the right side panel shall be designated as the "Service Panel". The panel shall be drilled and tapped, as necessary, to mount the terminal blocks and other attachments described herein, as well as to mount the panel to the cabinet wall.

The terminal blocks shall be barrier type rated at 20 A 600 V RMS minimum. The terminal screws shall be nickel-plated brass binder head type with screw inserts of same material. The terminals of the power line service terminal block shall be labeled "AC+, AC-, and AC GND", and shall be covered with a clear insulating material to prevent inadvertent contact. Terminating lugs large enough to accommodate No. 2 conductors shall be furnished for the service terminal block. The terminal block shall be rated for 50 A at 600 V peak, minimum.

The power distribution assembly shall also protect the equipment powered by the assembly from power transients. Over voltage protection shall be provided for the power distribution assembly and shall contain, as a minimum, a surge arrestor, which shall reduce the effect of power line voltage transients and be mounted to the service panel. The arrestor shall have the following minimum features:

Recurrent Peak Voltage:	184 V
Energy Rating (Minimum):	50 J
Power Dissipation, Average:	0.85 W
Peak Current for pulses less than 7 microseconds	1250 A
Stand-by Current for 60 Hz Sinusoidal:	1mA or less

Each cabinet shall be equipped with one fluorescent lighting fixture mounted to the inside top front portion of the cabinet. The fixture shall have an F15-T8 cool white lamp; operated from a normal power factor, UL listed cold weather ballast. A door-activated switch shall be installed to turn the cabinet light on when the front door is opened. The door switch shall be on a separate circuit by itself and used only to turn on the cabinet light.

Each cabinet shall be supplied with a heavy-duty plastic envelope to store plans, wiring diagrams, schematics, etc. This envelope shall have metal grommets so that it hangs from the door hooks. The envelope shall have minimum dimensions of 10 in. (250mm) x 15 in. (381mm).

Foundations shall conform to those shown on Detail sheet "Cabinet Model 334 Details" of the plans. The foundation is paid for separately.

#### Identification

The Cabinet, Model 334 shall be identified and labeled with external markings as specified in Article 1069.06 of the Standard Specifications and as shown on the Plans.

#### Construction Requirements

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

The Contractor shall securely fasten the Cabinet Model 334 on the new concrete foundation at the locations shown on the Plans. The Contractor shall confirm the orientation of the Cabinet Model 334 installation and its front door side with the Engineer prior to installation. Stainless steel bolted connections shall be provided with lock-washers, locking nuts, or other approved means to prevent the connection nuts from backing off. Dissimilar materials shall be isolated from one another by stainless steel fittings.

The Contractor shall make all power connections to the cabinet in accordance with the Plans and as required. The neutral bus shall be isolated from the cabinet and equipment ground. It shall terminate at the neutral lug ultimately attached to the meter pedestal. All conductors used in cabinet wiring shall terminate with properly sized non-insulated (if used, for DC logic only) or clear insulated spring-spade type terminals except when soldered to a through-panel solder lug on the rear side of the terminal block or as specified otherwise. All conductors, except those which can be readily traced, shall be labeled. Labels attached to each end of the conductor shall identify the destination of the other end of the conductor. Cabling shall be routed to prevent conductors from being in contact with metal edges. Cabling shall be arranged so that any removable assembly may be removed without disturbing conductors not associated with that assembly.

All equipment in the cabinet, when required, shall be clearly and permanently labeled using marker strips. The marker strips shall be made of material that can be easily and legibly written on using a pencil or ballpoint pen. Marker strips shall be located immediately below the item that they are to identify and must be clearly visible with the items installed.

#### Tests

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

Spray water from a point directly overhead at an angle of 60° from the vertical axis of the cabinet. Repeat for each of eight equally spaced positions around the cabinet for a period of five minutes in each position.

The water shall be sprayed using a domestic type sprinkling nozzle at a rate of not less than 10 gal./min (40 liters/min) per square foot (0.1 meters) of surface area. The cabinet shall then be inspected for leakage. Evidence of water leakage shall be cause for rejection.

Operational Standalone Test: The operational standalone test for each Cabinet, Model 334 installed shall consist of the following:

- Visual inspection of the cabinet and its contents for workmanship
- Verification of the cabinet grounding in accordance with Article 1074.03 (a)(4) of the Standard Specifications
- Measurement of the voltage at the input panel

#### Documentation

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

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

For each cabinet, four copies of a configuration of the equipment reporting to that cabinet shall be provided. The sheet shall also list field settable options for the equipment contained in the cabinet. This shall include device addresses and output voltage settings for power supplies. One of these copies shall be placed in the clear plastic envelope furnished as part of the cabinet. The other three copies shall be delivered to the Engineer.

#### Warranty

The Contractor shall warranty all materials and workmanship including labor for a period of two years after the completion and acceptance of the installation, unless other warranty requirements prevail. The warranty period shall begin when the contractor completes all construction obligations related to this item and when the components for this item have been accepted, which shall be documented as the final completion date in the construction status report. The warranty shall warrant and guarantee repair of the component parts of the Cabinet Model 334 furnished by the Contractor that prove to be defective in workmanship and materials during the first two years of operation as defined and noted above at no additional cost to the Department.

The Engineer will notify the Contractor that a warranted item needs repair. The Contractor shall acknowledge the notification within 24 hours and replace or correct any part or parts of materials and equipment that are found defective within the two-year in-service warranty period. All items needing repair shall be returned to the Department in two weeks from the date of receipt at the Contractor's facility or replaced in-kind by the Contractor, and the Contractor shall be responsible for any return shipping costs. No compensation will be made to the Contractor for such replacements or corrections.

The Contractor shall provide a warranty certificate for this item and its related components to the Department. The Department reserves the right to transfer this service to other parties who may be contracted with in order to provide overall maintenance of this item.

**Method of Measurement**

This item shall be measured as each SURVEILLANCE CABINET, MODEL 334, installed, tested, accepted, complete, and fully operational.

**Basis of Payment**

**SURVEILLANCE CABINET, MODEL 334**, measured as provided above, will be paid for at the contract unit price each, which price shall be payment in full for furnishing and installing the cabinet and all connections, testing, and for all labor, tools, equipment, transportation, and incidentals necessary to complete this item of work.

**CABINET HOUSING EQUIPMENT, MOUNTING AND SIZE AS SPECIFIED (CCTV)**

Effective: Jan. 22, 2010

**DESCRIPTION**

This item shall consist of furnishing and installing cabinets of the type and size specified in place including anchor bolts, bases, pedestals, posts, fans, cable harnesses, ground rods, terminal boards, shelves, mounting hardware, and all miscellaneous items at locations as directed by the Engineer.

**MATERIALS**

Cabinets shall be of fabricated aluminum supplied in sizes with minimum inside dimensions as listed below.

<u>TYPE</u>	<u>HEIGHT</u>	<u>WIDTH</u>	<u>DEPTH</u>	<u>THICKNESS</u>	<u>OPENING</u>
E.S.P. 1	22-1/2"	14-1/4"	9-3/4"	3/16"	18" x 11"
E.S.P. 2	36"	20"	15"	3/16"	28" x 17-1/2"
E.S.P. 3	49-1/2"	30"	17"	3/16"	38" x 27-11/2"
E.S.P. 4	55"	44"	26"	3/16"	2-1/2" x 41-1/2"
E.S.P. 1	571.5mm	362mm	248mm	4.7mm	457mm x 279mm
E.S.P. 2	914.4mm	508mm	381mm	4.7mm	711mm x 444.5mm
E.S.P. 3	1257.3mm	762mm	432mm	4.7mm	965mm x 698.5mm
E.S.P. 4	1397mm	1117.6mm	660.4mm	4.7mm	1079.5mm x 1054.1mm

Cabinets shall be watertight. Doors shall be gasketed to provide a waterproof seal. Bases shall be caulked to obtain a moisture-proof bond. All cabinet types shall have a minimum of two (2) shelves for setting detectors and other equipment on, and Type 2 Corbin brass locks or equal.

E.S.P. Type 3 and Type 4 cabinets shall be fitted with a thermostatically controlled fan. It shall be mounted at the top of the cabinet for a forced air fan system that has a screened air exhaust opening under roof overhang and no opening in top of cabinetry. The fan shall be capable of operating at 130C.F.M. (3.68m<sup>3</sup>/min) at .160" (4.1mm) of water static pressure.

Materials shall conform to controller cabinets as listed in the Standard Specifications 1074.03 except that the door shall not have any outside designation nor shall the cabinet door be equipped with a police door or louvers. Post top mounted cabinets, shall have a 1/4" (6.4mm) bottom of cabinet welded.



## INSTALLATION DETAILS

Installation shall conform to applicable portions of Section 863 of the Standard Specifications.

Cabinets, cabinet posts, and cabinet pedestals shall be primed and painted in accordance with TSC Specification T712#1. The final coat color shall be specified by the T.S.C. at the time of the pre-construction meeting. Interior of all cabinets shall be painted high gloss white.

CMS/DMS Type 4 cabinets shall be serviced by 117 volts AC power with a 60 amp circuit breaker minimum.

All cabinets shall be serviced by 117 volts AC power and a telecommunication system. Each cabinet shall be equipped with a 10 ampere circuit breaker, ground rod, 115 VAC RFI filtering surge protector (ACD-340 surrestor), 130 volt, 70 joules, 10 amp varistor, a pull chain porcelain base light fixture with a 3 prong 110 volt outlet. The porcelain fixture shall be mounted on metal plate, that shall be mounted on the cabinet ceiling. No holes shall be drilled thru the cabinet exterior for internal equipment mounting.

Each wire entering a cabinet shall be trained in a workmanlike manner and lugged at each terminal strip or switch. If more than one wire has a common terminal on a terminal strip, the adjacent strip shall be used and an appropriate jumpered connection shall be made.

All cables and wiring entering a cabinet shall be dressed, harnessed, tied, laced, and clamped to produce a workmanlike wiring installation.

All cables (loop wires, power, phone) shall be labeled with a panduit type cable tag. The tag will identify the type of cable and the cable destination.

A copper grounding bus shall be mounted on the rear wall of the cabinets.

Each cabinet shall contain a wiring diagram of the installation in addition to the diagrams which are to be submitted to the Engineer.

Prior to the wiring of the cabinet, the contractor shall submit box print for approval before cabinet wiring shall begin.

The Contractor shall furnish three (3) diagrams of the internal and external connections of the equipment in each Traffic Systems Center cabinet. He shall also furnish the operating and maintenance instructions for all equipment supplied. One copy of the wiring diagrams for each cabinet shall be retained in each field cabinet. Wiring diagram shall be contained in a plastic pouch that shall be permanently mounted to the door of each cabinet. Contractor shall permanently mark the cabinet for each termination and each terminal connection as to loop, tone, closure, phone, and lane function of each termination in the cabinet.

Incidental to the cost of each cabinet, the Contractor shall construct 5" (127mm) P.C.C. sidewalk of a rectangular area 3' x 4' (1 meter by 1.2m) immediately adjacent to the cabinet foundation on the same side of the foundation as the cabinet door, with the 4' (1.2m) dimension of the rectangle parallel to the cabinet door when closed. If the width of the required cabinet foundation is greater than the 3 feet (1 meter) width of the standard concrete foundation. Type D, the 4' (1.2m) dimension of the sidewalk area shall be increased to equal the width of the foundation plus 1ft (30 cm), the area to extend 6" (15cm) beyond each side of the foundation. This paragraph shall be applicable at all cabinet locations included in this Section. The only situations where this paragraph shall not apply are as follows:

When the foundation is immediately adjacent to or within a paved sidewalk or shoulder area and no further surfacing is required. The Engineer shall be the sole judge as to the applicability of this paragraph in all questions arising there from.

No raceways shall be allowed to enter cabinet through the sides, top or back walls.

Anchor bolts shall be installed for pedestal and base mounted cabinets. These shall be considered as incidental to the cost of the cabinets.

Cable harnesses, terminal boards, and mounting hardware shall be installed as needed. These items shall be considered as incidental to the cost of the contract.

Terminal blocks provided in field cabinets shall be the heavy duty barrier type. The terminal block shall be a minimum of 2" (50.8mm) wide and 1-3/16" (30.2mm) deep. Center to center of the terminal screws or studs shall be a minimum of 21/32" (16 mm) with barriers in-between. Terminal blocks shall be rated at 45 amps 600 volts breakdown RMS line to line 11,000 V. and breakdown RMS line to ground 13,800 V. A marking strip shall be provided with each terminal block.

**METHOD OF MEASUREMENT**

Cabinets will be accepted as concrete foundation mounted, pole mounted, pedestal mounted, or attached to structure. Each cabinet installed complete and in place will be counted as a single unit.

**BASIS OF PAYMENT**

This work will be paid for at the contract price each for CABINET HOUSING EQUIPMENT, mounting and size specified, installed complete and in place.

**KEEPING THE EXPRESSWAY OPEN TO TRAFFIC**

Effective: March 22, 1996

Revised: February 9, 2005

Whenever work is in progress on or adjacent to an expressway, the Contractor shall provide the necessary traffic control devices to warn the public and to delineate the work zone as required in these Special Provisions, the Standard Specifications, the State Standards and the District Freeway details. All Contractors' personnel shall be limited to these barricaded work zones and shall not cross the expressway.

The Contractor shall request and gain approval from the Illinois Department of Transportation's Expressway Traffic Operations Engineer (847-705-4151) twenty-four (24) hours in advance of all daily lane, ramp and shoulder closures and seventy-two (72) hours in advance of all permanent and weekend closures on all Freeways and/or Expressways in District One. This advance notification is calculated based on workweek of Monday through Friday and shall not include weekends or Holidays.

**LOCATION: I-55: I-80 to IL 53**

WEEKNIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS		
Sunday - Thursday	1-Lane	9:00 PM	to	5:00 AM
	2-Lane	11:00 PM	to	5:00 AM
Friday	1-Lane	10:00 PM	to	7:00 AM
	2-Lane	11:59 PM	to	7:00 AM
Saturday	1-Lane	9:00 PM	to	9:00 AM
	2-Lane	11:00 PM	to	9:00 AM

In addition to the hours noted above, temporary shoulder and partial ramp closures are allowed weekdays between 9:00 A.M. and 3:00 P.M.

Narrow lanes and permanent shoulder closures will not be allowed between Dec. 1<sup>st</sup> and April 1<sup>st</sup>.

Full Expressway Closures will only be permitted for a maximum of 15 minutes at a time during the low traffic volume hours of 1:00 A.M. to 5:00 A.M. Monday thru Friday and from 1:00 A.M. to 7:00 A.M. on Sunday. During Full Expressway Closures, the Contractor will be required to close off all lanes except one, using Freeway Standard Closures. Police forces should be notified and requested to close off the remaining lane at which time the work item may be removed or set in place. The District One Traffic Operations Department **shall be** notified (847-705-4151) at least 3 working days (weekends and holidays DO NOT count into this 72 hours notification) in advance of the proposed road closure and will coordinate the closure operations with police forces.

All stage changes requiring the stopping and/or the pacing of traffic shall take place during the allowable hours for Full Expressway Closures and shall be approved by the Department.

All daily lane closures shall be removed during adverse weather conditions such as rain, snow, and/or fog and as determined by the Engineer.

Additional lane closure hour restrictions may have to be imposed to facilitate the flow of traffic to and from major sporting events and/or other events.

All lane closure signs shall not be erected any earlier than one-half (1/2) hour before the starting hours listed above. Also, these signs should be taken down within one-half (1/2) hour after the closure is removed.

The Contractor will be required to cooperate with all other contractors when erecting lane closures on the expressway. All lane closures (includes the taper lengths) without a three (3) mile gap between each other, in one direction of the expressway, shall be on the same side of the pavement. Lane closures on the same side of the pavement with a half (1/2) mile or less gap between the end of one work zone and the start of taper of next work zone should be connected. The maximum length of any lane closure on the project and combined with any adjacent projects shall be three (3) miles. Gaps between successive permanent lane closures shall be no less than two (2) miles in length.

Private vehicles shall not be parked in the work zone. Contractor's equipment and/or vehicles shall not be parked on the shoulders or in the median during non-working hours. The parking of equipment and/or vehicles on State right-of-way will only be permitted at the locations approved by the Engineer.

#### **FAILURE TO OPEN TRAFFIC LANES TO TRAFFIC:**

Rev. 2-09-05

Should the Contractor fail to completely open and keep open all the traffic lanes to traffic in accordance with the limitations specified under the Special Provisions for "Keeping the Expressway Open to Traffic", the Contractor shall be liable to the Department for the amount of:

One lane or ramp blocked = \$ 1500

Not as a penalty but as liquidated and ascertained damages for each and every 15 minute interval or a portion thereof that a lane is blocked outside the allowable time limitations. Such damages may be deducted by the Department from any monies due the Contractor. These damages shall apply during the contract time and during any extensions of the contract time.

### **TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS)**

Effective: 3/8/96

Revised: 5/29/09

Description. This work shall include furnishing, installing, maintaining, replacing, relocating, and removing all traffic control devices used for the purpose of regulating, warning, or directing traffic. Traffic control and protection shall be provided as called for in the plans, applicable Highway Standards, District One Expressway details, Standards and Supplemental Specifications, these Special Provisions, or as directed by the Engineer.

General. The governing factor in the execution and staging of work for this project is to provide the motoring public with the safest possible travel conditions on the expressway through the construction zone. The Contractor shall arrange his operations to keep the closing of lanes and/or ramps to a minimum.

The Contractor shall be responsible for the proper location, installation, and arrangement of all traffic control devices. Special attention shall be given to existing warning signs and overhead guide signs during all construction operations. Warning signs and existing guide signs with down arrows shall be kept consistent with the barricade placement at all times. The Contractor shall immediately remove, completely cover, or turn from the motorist's view all signs which are inconsistent with lane assignment patterns.

The Contractor shall coordinate all traffic control work on this project with adjoining or overlapping projects, including barricade placement necessary to provide a uniform traffic detour pattern. When directed by the Engineer, the Contractor shall remove all traffic control devices that were furnished, installed, or maintained by him under this contract, and such devices shall remain the property of the Contractor.

All traffic control devices shall remain in place until specific authorization for relocation or removal is received from the Engineer.

Additional requirements for traffic control devices shall be as follows.

- (a) Traffic Control Setup and Removal. The setting and removal of barricades for the taper portion of a lane closure shall be done under the protection of a vehicle with a crash attenuator and arrow board. The attenuator vehicle shall be positioned in the live lane that is being closed or opened in advance of the workers and shall have the arrow panel directing traffic to the adjacent open lane. Failure to meet this requirement will subject to a Traffic Control Deficiency charge. The deficiency will be calculated as outlined in Article 105.03 of the Standard Specifications. Truck/trailer mounted attenuators shall comply with Article 1106.02(g) or shall meet the requirements of NCHRP 350 Test Level 3 with vehicles used in accordance with manufacturer's recommendations and requirements.

(b) Sign Requirements

- (1) Sign Maintenance. Prior to the beginning of construction operations, the Contractor will be provided a sign log of all existing signs within the limits of the construction zone. The Contractor is responsible for verifying the accuracy of the sign log. Throughout the duration of this project, all existing traffic signs shall be maintained by the Contractor. All provisions of Article 107.25 of the Standard Specifications shall apply except the third paragraph shall be revised to read: "The Contractor shall maintain, furnish, and replace at his own expense, any traffic sign or post which has been damaged or lost by the Contractor or a third party. The Contractor will not be held liable for third party damage to large freeway guide signs".
  - (2) Work Zone Speed Limit Signs. Work zone speed limit signs shall be installed as required in Article 701.14(b) and as shown in the plans and Highway Standards. Based upon the existing posted speed limit, work zone speed limits shall be established and signed as follows.
    - a. Existing Speed Limit of 55mph or higher. The initial work zone speed limit assembly, located approximately 3200' before the closure, shall be 55mph as shown in 701400. Additional work zone 45mph assemblies shall be used as required according to Article 701.14(b) and as shown in the Highway Standards and plans.
    - b. Existing Speed Limit of 45mph. The advance 55mph work zone speed limit assembly shown in 701400 shall be replaced with a 45mph assembly. Additional work zone 45mph assemblies shall be used as required according to Article 701.14(b) and as shown in the Highway Standards and plans. "Resumes" assemblies shall be eliminated. END WORK ZONE SPEED LIMIT signs are required.
  - (3) Exit Signs. The exit gore signs as shown in Standard 701411 shall be a minimum size of 48 inch by 48 inch with 12 inch capital letters and a 20 inch arrow. EXIT OPEN AHEAD signs shown in Standard 701411 shall be a minimum size of 48 inch by 48 inch with 8 inch capital letters.
  - (4) Uneven Lanes Signs. The Contractor shall furnish and erect "UNEVEN LANES" signs (W8-11) on both sides of the expressway, at any time when the elevation difference between adjacent lanes open to traffic equals or exceeds one inch. Signs shall be placed 500' in advance of the drop-off, within 500' of every entrance, and a minimum of every mile.
- (c) Drums/Barricades. Check barricades shall be placed in work areas perpendicular to traffic every 1000', one per lane and per shoulder, to prevent motorists from using work areas as a traveled way. Check barricades shall also be placed in advance of each open patch, or excavation, or any other hazard in the work area, the first at the edge of the open traffic lane and the second centered in the closed lane. Check barricades, either Type I or II, or drums shall be equipped with a flashing light.

To provide sufficient lane widths (10' minimum) for traffic and also working room, the Contractor shall furnish and install vertical barricades with steady burn lights, in lieu of Type II or drums, along the cold milling and asphalt paving operations. The vertical barricades shall be placed at the same spacing as the drums.

- (d) Vertical Barricades. Vertical barricades shall not be used in lane closure tapers, lane shifts, and exit ramp gores. Also, vertical barricades shall not be used as patch barricades or check barricades. Special attention shall be given, and ballast provided per manufacture's specification, to maintain the vertical barricades in an upright position and in proper alignment.
- (e) Temporary Concrete Barrier Wall. Prismatic barrier wall reflectors shall be installed on both the face of the wall next to traffic, and the top of sections of the temporary concrete barrier wall as shown in Standard 704001. The color of these reflectors shall match the color of the edgelines (yellow on the left and crystal or white on the right). If the base of the temporary concrete barrier wall is 12 inches or less from the travel lane, then the lower slope of the wall shall also have a 6 inch wide temporary pavement marking edgeline (yellow on the left and white on the right).

Method of Measurement. This item of work will be measured on a lump sum basis for furnishing, installing, maintaining, replacing, relocating, and removing traffic control devices required in the plans and these Special Provisions. Traffic control and protection required under Standards 701101, 701400, 701401, 701402, 701406, 701411, 701416, 701426, 701446, 701901 and District details TC-8, TC-9, TC-17, TC-18 and TC-25 will be included with this item.

Basis of Payment.

- (a) This work will be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS). This price shall be payment in full for all labor, materials, transportation, handling, and incidental work necessary to furnish, install, maintain, replace, relocate, and remove all Expressway traffic control devices required in the plans and specifications.

In the event the sum total value of all the work items for which traffic control and protection is required is increased or decreased by more than ten percent (10%), the contract bid price for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS) will be adjusted as follows:

$$\text{Adjusted contract price} = .25P + .75P [1+(X-0.1)]$$

Where: "P" is the bid unit price for Traffic Control and Protection

Where: "X" =	$\frac{\text{Difference between original and final sum total value of all work items for which traffic control and protection is required}}{\text{Original sum total value of all work items for which traffic control and protection is required.}}$
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The value of the work items used in calculating the increase and decrease will include only items that have been added to or deducted from the contract under Article 104.02 of the Standard Specifications and only items which require use of Traffic Control and Protection.

- (b) The Engineer may require additional traffic control be installed in accordance with standards and/or designs other than those included in the plans. In such cases, the standards and/or designs will be made available to the Contractor at least one week in advance of the change in traffic control. Payment for any additional traffic control required will be in accordance with Article 109.04 of the Standard Specifications.
- (c) Revisions in the phasing of construction or maintenance operations, requested by the Contractor, may require traffic control to be installed in accordance with standards and/or designs other than those included in the plans. Revisions or modifications to the traffic control shown in the contract shall be submitted by the Contractor for approval by the Engineer. No additional payment will be made for a Contractor requested modification.
- (d) Temporary concrete barrier wall will be measured and paid for according to Section 704.
- (e) Impact attenuators, temporary bridge rail, and temporary rumble strips will be paid for separately.
- (f) Temporary pavement markings shown not shown on the Standard will be measured and paid for according to Section 703 and Section 780.
- (g) All pavement marking removal will be measured and paid for according to Section 703 or Section 783.
- (h) Temporary pavement marking on the lower slope of the temporary concrete barrier wall will be measured and paid for as TEMPORARY PAVEMENT MARKING, 6”.
- (i) All prismatic barrier wall reflectors will be measured and paid for according to the Recurring Special Provision Guardrail and Barrier Wall Delineation.

## **COMMUNICATIONS VAULT**

Effective: March 1, 2010

### **Description.**

Work under this item shall consist of constructing a composite concrete handhole a cover, in accordance with the details shown on the plans and as specified herein.

Materials. The composite concrete handhole and two piece vault lid shall be constructed of polymer concrete material, and shall be gray in color.

The composite concrete handhole shall be 48 inches x 48 inches and shall have an effective depth of 36 inches.

The composite concrete handhole and cover shall have a design/test loading of 22,500/33,750 lbs respectively. The cover shall have a permanently recessed logo that reads “IDOT COMMUNICATIONS”, or as otherwise designated by the Engineer. The composite concrete handhole lid shall have two ½-in x 4-in pull slots. The lid surface shall have a coefficient of friction of 0.50 in accordance with ASTM C-1028.

The Contractor shall install manufacturer-approved gasketing between the lid and the handhole to prevent water from entering the composite concrete handhole.

The composite concrete handhole lid shall be secured to the vault with two 3/8-inch NC stainless steel penta-head bolts and washers to lock the lid. In addition, a "lock tool" shall be provided for composite concrete handhole entry.

A fiber optic cable support assembly shall be recommended by the manufacturer and approved by the Engineer for fiber optic cable and splice enclosures used in the vault. Each support assembly shall consist of multiple brackets, racks, and/or rails required to suspend the required surplus cabling and any splice enclosures required.

The support assembly shall be made from or coated with weather resistant material such that there is no corrosion of the supports. The support assemblies shall be anchored to the vault using stainless steel hardware.

The fiber optic cable support assemblies shall be included in the Contract unit price for the composite concrete handhole. Void areas between openings and conduit shall be filled with self-curing caulking consisting of a permanent, flexible rubber which is unaffected by sunlight, water, oils, mild acids or alkalis. The caulking shall be mildew resistant and non-flammable. The material shall provide a permanent bond between the conduit entering the vault and the polymer concrete. The caulking shall be gray in color.

### **CONSTRUCTION REQUIREMENTS**

Composite concrete handholes shall be installed in accordance with applicable requirements of Section 800 of the Standard Specifications and as provided herein.

A manufacturer-approved knockout punch driver shall be used to provide openings in the vaults for conduit, or the required openings may be machined at the time of stackable vault fabrication. Voids between entering conduits and punch driven or machined openings shall not exceed 1/2-inch.

Any void areas shall be caulked from the interior and exterior of the composite concrete handhole. The caulk shall be allowed to fully cure per the manufacturer's specifications, prior to backfilling.

The composite concrete handhole shall be placed on 12 inches of coarse aggregate, CA-5 or CA 7 Class A, as specified in Section 1004 of the Standard Specifications. Seal and flash test the vault per the manufacturer's recommendations.

A minimum of 150 feet of excess cable per cable run shall be coiled in each composite concrete handhole containing splices to allow moving the splice enclosure to the splicing vehicle unless otherwise indicated in the plans.

Basis of Payment. This item will be paid for at the contract unit price each for **COMMUNICATIONS VAULT**, of the size indicated, which shall be payment in full for all material and work as specified herein.



## **MODIFY EXISTING CCTV INSTALLATION FOR FIBER OPTIC COMMUNICATIONS**

Effective: April 1, 2010

### Description.

General. This item shall consist of modifying the existing CCTV equipment installation for video and data transmission over fiber optic cables as well as Surveillance control cabinets being installed in this contract. In general this work shall consist of installing a hardened Gigabit Ethernet switch to the existing CCTV equipment and connection to the video codec and fiber optic cable. Where the CCTV camera is greater than 200 feet from the designated Surveillance cabinet, a fiber optic transceiver pair shall be used to extend the Ethernet signal to the surveillance cabinet. All equipment utilized shall be rated for an outdoor temperature range.

The system shall utilize existing CCTV elements, and shall include all materials and equipment necessary to integrate the new cameras into the existing system. The work under this Special Provision includes the coordination with camera equipment provided under this contract and coordination with existing CCTV equipment as indicated, including adjustments of or supplements to the remote equipment as may be required

Direct Category 5 (Ethernet) connection. For distances less than 200 feet, a direct Category 5e cable connection shall be furnished and installed from the CCTV equipment cabinet to the designated surveillance control cabinet. A Gigabit Ethernet switch, specified herein, shall be provided and installed in the surveillance cabinet. Fiber optic patch cables shall be installed from the Gigabit Ethernet switch to the fiber patch block. The Category 5e cables shall be suitable for outdoor installation, Belden 7997A or approved equal. The cable shall be installed bellow grade in fiber optic inner duct. All cabling shall be included in the cost of this item.

Fiber Optic connection. For distances greater than 200 feet, a media converter pair, specified elsewhere herein, shall be utilized to extend the Ethernet connection from the CCTV equipment cabinet to the surveillance controller. A Gigabit Ethernet switch, specified herein, shall be provided and installed in the surveillance cabinet. Fiber optic patch cables shall be installed from the Gigabit Ethernet switch to the fiber patch block. The fiber optic cable between the CCTV equipment cabinet and the surveillance cabinet shall be a 12 fiber single mode cable and shall be installed in a 1 ¼" inner duct.

CCTV equipment cabinet modification. The existing CCTV equipment cabinet shall be modified to provide the entry of a 2 ½" diameter PVC coated galvanized steel conduit riser into the bottom of the cabinet. The conduit riser shall be secured with threaded PVC coated conduit hubs. The riser shall include a 90 degree sweep at the bottom and shall be a minimum of 30"-inches below grade. The cost of this work shall be included in this item.

### Gigabit Ethernet Switch

General Requirements. The Ethernet switch shall be an environmentally hardened Ethernet switch compliant with IEEE 802.3 (10Mbps) and IEEE 802.3u (100Mbps) as manufactured by RuggedCom, Series RS900G or approved equal.

Operating Environment. The Ethernet switch shall be capable of operating properly over an ambient temperature range of -40°C to +85°C without the use of internal or external cooling fans in accordance with IEC 60068-2-1 and 60068-2-2.

The Ethernet switch shall be capable of operating properly in relative humidity conditions of 95% non-condensing at 55°C in accordance with IEC 60068-2-30. The Ethernet switch shall meet the environmental requirements of traffic control equipment in accordance with NEMA TS 2 (1998), Section 2: Environmental Requirements. Specifically NEMA TS 2 1998 (Section 2.2.8)

- a. Vibration in each of the 3 mutually perpendicular planes.
- b. Vibration frequency sweep of 5 to 30 Hz
- c. Vibration strength = 0.5g
- d. Duration = 3 hours, 1 hour at each plane

The manufacturer shall provide evidence of independent testing verifying performance. In general, the Ethernet switch shall comply with the environmental requirements outlined in Table 1. The Ethernet switch shall be capable of operating properly when exposed to radiated electric fields of up to 10V/m continuously and magnetic fields of up to 40A/m continuously. In general, the Ethernet switch shall comply with the EMI Immunity requirements given in IEC 61850-3 and IEEE1613. The Ethernet switch shall also pass the minimum EMC immunity requirements of EN61800-3. EN61800-3 A11 is the IEC standard for EMC emissions and immunity requirements for Adjustable Speed Power Drive Systems.

Port Requirements. The Ethernet switch shall have 8 10/100BaseTX ports 2 - 1000BaseX fiber optical ports. All fiber optic link ports shall be capable of Multimode or Single mode. The Ethernet switch shall have the option of both small form pluggable (SFP) optics and fixed (soldered on) optics. Single mode optics shall support distances up to 70km. The Ethernet switch shall support the following requirements and options:

10/100BaseTX ports:

- RJ45 connectors
- Cable type: Category 5, unshielded twisted pair (CAT 5 UTP)
- Segment Length: 100m
- Auto-negotiation support (10/100Mbps)
- Auto MDIX crossover capability
- TVS (Transient voltage suppression) between Line +/-, Line +/--ground, to protect the circuitry.
- Full Duplex operation (IEEE 802.3x)

1000BaseX fiber optical ports:

- SFP (small form pluggable)
- LC Connectors (multi-mode), LC or SC Connectors (single-mode)\_
- Optical Characteristics: 850 nm multi-mode, 1310 nm single-mode, 1550nm single-mode
- Supports Fiber Type: 62.5/125 um multi-mode fiber, 9/125 um single-mode fiber
- Segment Length: + 2 km with multi-mode fiber, Minimum Optical Budget 14 dB @ 850 nm
- Optical Budget single-mode fiber: minimum 17 dB @ 1310 nm
- Full Duplex operation (IEEE 802.3x)
- Optical power shall be sufficient to transport the signal back to the I55 Wiegth Station video collection hut.

Networking Requirements. The Ethernet switch shall support automatic address learning of up to 8192 MAC addresses. The Ethernet switch shall support the following advanced layer 2 functions:

- IEEE 802.1Q VLAN, with support for up to 255 VLANs and 4096 VLAN ID's.
- IEEE 802.1p priority queuing
- IEEE 802.1w rapid spanning tree
- IEEE802.1Q-2005 MSTP (formerly 802.1s)
- IEEE 802.1Q-2005 standard GMRP
- IEEE 802.3x flow control
- IEEE 802.3ad-Link Aggregation
- IGMPv2 with 256 IGMP groups
- Port Rate Limiting
- Configuration via test file which can be modified through standard text editor
- Forwarding/filtering rate shall be 14,880 packets per second (PPS) for 10Mps, 148,800 for 100Mps, 1,488,000 for 1000Mps
- DHCP Option 82

Network Management Functionality Requirements. The Ethernet switch shall provide the following network management functions

- SNMPv2, SNMPv3
- RMON
- GVRP
- Port Mirroring
- 802.1x port security
- SSL – Secure Socket Layer
- SSH – Secure Shell
- TFTP
- Network Time Protocol (NTP),
- Simple Network Time Protocol (SNTP)
- Management via web or Telnet
- Built in Protocol Analyzer which enables traces to be run from within the Ethernet switch operating system. Must be able to forward traces to an IP address or UDP port. Traces for must include but not be limited to the following: STP, MAC, Link, IGMP, GVRP, PPP, Transport, DHCPRA, 802.1X, WEBS, SNMP, IP, TacPlus, Radius, FORW, IPASSIGN, TRANSPORT

Additionally, the Ethernet switch shall demonstrate to provide sub 15 ms failover per Ethernet switch hop in a ring topology.

Programmable Critical Failure Relay. The Ethernet switch shall provide a programmable critical failure out relay that may be configured to activate upon critical error detection such as loss of link or detection of critical system errors. This function shall be user enabled and programmable. The output contacts shall be available in a Form-C configuration with Max Current at 2A@250 VAC, [.15A@125VDC](#), 2@20VDC.

**Power Supply Requirements.** The Ethernet switch shall be supplied with provisions for operation at the following power supply inputs, 85 to 264 Vac (50/60Hz). The power supply shall be internal to the Ethernet switch. Power supply shall have two stage isolation accomplished via two transformers which step down from primary AC/DC to VDC. A power cord of not less than 5 feet in length shall be supplied as well. The Ethernet switch shall require no more than 15W of power.

**'Hipot' Testing in the Field** The Ethernet switch shall allow for dielectric strength ('hipot') tests in the field, in accordance with IEC 60255-5, by trained personnel. It shall be capable of enduring a test voltage of at least 2kVrms on power supply inputs above 60V and 0.5kVrms on power supply inputs below 60V. A removable grounding wire shall be provided to allow disconnecting of any transient suppression circuitry at the power supply input to allow for 'hipot' testing without activating the transient suppression circuitry.

**Mounting Requirements.** The Ethernet switch shall provide options for DIN Rail mounting or panel mounting via brackets

**Warranty.** The Ethernet switch shall be warranted for defects in material and workmanship for five (5) years after shipment. The Warranty shall include software updates and 7x24 phone support for the 5 year warranty period.

**Environmental Requirements.** The Ethernet switch shall comply with the atmospheric, vibration, shock and bump requirements outlined in Table 1. This compliance shall be demonstrated by type withstands tests (i.e. 'type tests') as outlined in Table 1 and summarized in a Type Test Report per the test report requirements of each of the standards given in Table 1.

Table 1: Environmental Tests				
Test	Description		Test Level	Severity
IEC 60068-2-1	Cold Temp	Test Ad	-40 deg. C, 16 hours	N/A
IEC 60068-2-2	Dry Heat	Test Bd	+85 deg. C, 16 hours	N/A
IEC 60068-2-30	Humidity	Test Db	95% (non-condensing), 55 deg. C, 6 cycles	N/A
IEC 60255-21-1	Vibration	Test Fc		Class 1
IEC 60255-21-2	Shock	Test Ea		Class 1
IEC 60255-21-2	Bump	Test Eb		Class 1

**Safety Requirements / Agency Approvals.** The Ethernet switch shall comply with the following electrical safety requirements or equivalents: UL60950 or CSA C22.2 No. 60950 (safety requirements for IT equipment). The Ethernet switch shall also have CE (Europe) qualification. The Ethernet switch shall also comply with FCC Part15 Class A for EMI emissions.

**Fiber Optic Media converter pair.** An industrial grade media converter pair shall be used transport Ethernet over fiber for cabinet to cabinet distances greater than 200 feet. The media converter pair shall be complete with power supplies and shall have single mode optical fiber compatibility. The media converters shall be Moxa IMC-101G-T series, Hirschmann SPIDER 1TX/1FX-SM EEC series, or approved equal.

Method of Measurement. The modification of existing CCTV installation shall be measured for payment as each when furnished, installed, configured, warranted, made fully operational, and tested as detailed herein.

Basis Of Payment. This work will be paid for at the contract price, each, for **MODIFY EXISTING CCTV INSTALLATION FOR FIBER OPTIC COMMUNICATIONS**, of the type specified, which shall be for the work as specified herein.

Basis Of Payment. This work will be paid for at the contract lump sum price for **MODIFY EXISTING CCTV INSTALLATION FOR FIBER OPTIC COMMUNICATIONS**, of the type specified, which shall be for the work as specified herein.

## **MODIFICATION OF EXISTING CCTV DISTRIBUTION SYSTEM**

Effective: April 1, 2010

General. The CCTV (Closed Circuit Television) Distribution System is a fully integrated IP multicast system, comprised of hardware and software, providing multi-point internet protocol based video images and control over Ethernet to multiple monitoring center locations while minimizing bandwidth demand upon the system. The system shall be configured to avoid a single point of failure that could totally shut down the system.

The system shall be generally configured as indicated on the plans to collect video images and connect control from field mounted cameras at distribution node locations and to produce video images and controls at designated distribution nodes and at three monitoring locations under this contract work.

The three monitoring locations to be addressed by this contract under this item are:

- The ComCenter at the District 1 Headquarters in Schaumburg
- The Traffic Systems Center in Oak Park
- The ITS Project Office in Schaumburg

These monitoring locations and the collection node location (I55 Weigh Station) are depicted on the plans and are as defined under this Special Provision. The system shall have capability for additional locations under future work without the need to replace existing system equipment items.

The system shall utilize existing CCTV elements, and shall include all materials and equipment necessary to integrate the new cameras into the existing system. The work under this Special Provision includes the coordination with camera equipment provided under this contract, adjacent contract(s), and coordination with existing CCTV equipment as indicated, including adjustments of or supplements to the equipment as may be required

Control software. The existing control software is ICX's 360 Chameleon camera control. Included in this item shall be the addition of a 100 unit license package.

Two Hardened Gigabit Ethernet switches shall be provided at the collection hub, fully compatible with the switches being provided under the Modify Existing CCTV install for Fiber item and shall be Ruggedcom RS900G series or approved equal.

Six video decoders, codecs, shall be included in this item. Two decoders shall be installed at each of the 3 locations listed above.

The decoders shall be dedicated hardware devices. The codec shall be a single video channel type to transfer "full motion" 30 frame-per-second high quality D1 color video at up to 20 Megabits per second. The units shall operate to produce a robust data communications stream that shall allow for both video and audio transmission and shall be immune to timing disruptions in the existing IP multi-cast system.

The units shall be rack-mountable, or single unit chassis for single unit installation complete with power supplies as required, operating from a 120-volt single phase AC power input. Units mounted in VCPs or other control building shall be rack mountable and include standard 19" racks with dual redundant power supplies.

Decoders shall have multi-stream format detection, and decode H.264, MPEG-4 and MJPEG streams.

Approvable codecs shall be compatible with and demonstrably interoperable with the standard codec product of at least one other vendor. Final approval of codec equipment shall be dependent upon a demonstration test of multi-vendor interoperability. Initial submittal information shall include documentation of this interoperability and a demonstration testing plan for approval by the Engineer.

The CODEC decoders shall be Optelecom-NKF series S-60 D-MC, or approved equal by the Engineer. The Approved equal shall be 100% interchangeable with the specified unit with respect to functionality and performance.

Materials shall be supplied to satisfy the following:

Video	Requirements
Video channels	1x PAL/NTSC (Auto/PAL/NTSC)
Output level	1 Vpp (±3 dB)
Compression algorithms	H.264 BP (ISO/IEC 14496-10), MJPEG, MPEG-4 (ISO/IEC 14496-2, ISMA comp.)
Type of streaming	UDP/IP (multi- and/or unicast)
Decoding latency	TBD
Resolution	D1, ½D1, 2CIF, CIF, QCIF, VGA
GOP structure	I, IP
Frame rate	1 to 30 fps
On Screen Display (OSD)	3x Text lines (configurable: position, color, border/outline color, font size), 1x image in BMP, GIF, or JPEG format configurable: position, scaling)
Live View encoder (MJPEG)	HTTP, FTP pull
Connector type	BNC 75Ω (gold plated center pin)

<b>Transmission interface</b>	<b>Requirements</b>
Number of interfaces	1
Interface 10/100Base-TX	Fast Ethernet Auto Negotiation, half-duplex/full-duplex, 10/100 Mb
SFP option	Empty SFP slot for 100 Mbps SFP device
Protocols	H.264 BP, MPEG-4 ES, (M)JPEG, RTP, RTCP, RTSP, TCP, UDP, IP, DHCP, IGMPv2,(S)NTP, MX/IP, HTTP, SNMP v2, FTP, TelNet, SAP, UPnP
Connector type	RJ45

<b>Power</b>	<b>Requirements</b>
Power consumption	<5W
Rack-mount units	MC 10 and MC11 power supply cabinets
Stand-alone units (/SA)	11 to 19 VDC (PSA-12 DC/25 or PSR-12 DC)

<b>Management</b>	<b>Requirements</b>
LED status indicators	
DC	Power-on indicator (green)
SYNC	All links are operational (green); failure in RX stream(s) (yellow); failure in TX stream(s) (red)
Ethernet port	Green LED: on=100 Mb, off=10 Mb; Amber LED: on=link okay, flashes with activity
Network Management & Control	SNMP v2, MX™, HTTP API, HTML (password protected)

<b>Environmental</b>	<b>Requirements</b>
Operating temperature	+14° F to +140° F (-10 °C to +60 °C)
Relative humidity	<95% as long as there is no condensation.
MTBF	TBD
Safety & EMC	TBD

<b>Contact Closures</b>	<b>Requirements</b>
Number of channels	2x in, 2x out
Number of streams	2x 3 (multi- and/or unicast)
Output	Fail-safe, potential-free
Connector type	RJ45

<b>Data</b>	<b>Requirements</b>
Number of channels	2 (full-duplex)
Number of streams	2x 3 (multi- and/or unicast)
Interfaces	1x RS232 1x RS422/485 (2- or 4-wire)
Stream	TCP/UDP/MX configurable
Data rate	300 b/s to 230.4 kb/s
Connector type	RJ45

Audio	Requirement
Number of channels	2 (stereo, full-duplex)
Number of streams	3 (multi- and/or unicast)
Maximum bandwidth	20 Hz to 20 kHz
Sampling resolution	8/16-bits linear PCM or G.711
Input level	Adjustable, mic or line
Output level	Adjustable, 3 Vrms max.
Input impedance	>20 kΩ or 600Ω bal.
Output impedance	<100Ω bal.
Connector type	RJ45

The decoders shall be UL listed and be type-accepted to 47 CFR (FCC), Part 15, Type A.

The Codecs shall be the standard product of an established North American manufacturer. The manufacturer shall have been in business for a minimum of 7 years. The manufacturer shall provide a minimum of a twelve (12) month warranty from the date of installation. The manufacturer shall provide technical support via email, fax and telephone. The above forms of support shall be provided Monday through Friday, 8:00am to 5:00pm EST. The Manufacturer shall also have a repair facility within North America.

The units shall be 19-inch rack-mountable, complete with power supplies as required for the rack configurations indicated on the plans, operating from a 120-volt single phase AC power input

The codecs shall be fully capable of transmitting the PTZ commands of the CCTV camera manufacturer being furnished under this contract as well as existing Philips/Bosch, Pelco, Vicon and Cohu camera commands. Serial data will be transmitted over TCP-IP. Each serial port must support IP addressing with the ability to select the appropriate IP socket number. The codecs must provide the ability to establish an IP connection directly from a workstation to any encoder IP address and socket number to pass serial data. Transmission of serial data must be independent of the video stream. Any serial data conversion required by the codec to communicate to the camera shall be included in this pay item and shall not be paid for separately.

The Encoder/Decoder serial data port must support Multicast data to broadcast a single serial data input to multiple remote encoder serial data port recipient. Bi-directional data must be supported on the codecs.

A demonstration of this low speed serial data transfer shall be required before material submittal approval is given. See submittal requirements in this Special Provision.

Codec operation and management. Each unit must support a local console accessible using one of the serial interfaces to provide access to all configuration menus of the product including the initial IP address configuration as well as for troubleshooting purposes. The interface must be menu driven for novice users.

All units (encoders and decoders) must support SNMPv2 management protocol to provide the ability to control and monitor all configuration parameters and diagnostics from any 3rd party SNMP management application.



The Encoders/Decoders must support firmware updates from a central site. Updates must be downloadable to a single unit or by bulk via a single command from a firmware utility application via the Ethernet network. The firmware utility application must provide confirmation of the successful and unsuccessful updates. Upon completing of the update, the units must resume to original configuration without the need to reload the unit configuration.

Provisioning of IP routing and switching equipment. The Contractor shall fully integrate the equipment to be installed with the existing system as a part of this item and this coordination may require technical services of the existing system integrator, AT&T, a Cisco Systems integrator and the Maintenance Contractor. This work shall be included in the item and will not be paid for separately.

Method of Measurement. The modification of existing video distribution system shall be measured for payment as lump sum when furnished, installed, configured, warranted, made fully operational, and tested as detailed herein.

Basis Of Payment. This work will be paid for at the contract lump sum price for **MODIFICATION OF EXISTING VIDEO DISTRIBUTION SYSTEM** which shall be for the work as specified herein.

## **ATMS SYSTEM INTEGRATION**

### Description:

This item includes integrating all 2070 lite units shown on the plans into the IDOT Advanced Traffic Management System (ATMS). Data from the 2070 lite units will be added to the existing Dan Ryan NTCIP interface to the ATMS. This item includes all software, programming, miscellaneous devices, and cables necessary to provide the successful expansion of the expressway traffic monitoring system to reflect I55 from Naperville Road to Lorenzo Road..

### Integration:

The Contractor shall subcontract with the development and maintenance contractor for the ATMS to perform all ATMS software and hardware modifications. Contact information is:

Delcan Corporation  
c/o Scott Lee – project manager  
650 E Algonquin Rd, Suite 104  
Schaumburg, IL 60173

Phone: (847) 925-0120

The ATMS system shall be upgraded and expanded to add all 2070 lite units shown on the plans. The integration must be made to make this expansion a seamless transition, and function in an identical manner as the existing expressway surveillance. Work under this item includes but is not limited to the following:

- Integrate data from the additional 2070 lite units thru the existing NTCIP interface at the existing rate of once every 20 seconds.
- Create new Vehicle Detection Station (VDS) display, data table, description and control panel display, and travel time tables.

- Modify the existing graphic user interface, report generators, data bases, broadcast feeds (both subscriber and internal), data tables for the dynamic message sign control,
- Display on the Traffic Systems Center ATMS maps, and all user interfaces the new VDS data including Volume, Occupancy, Speed, and operational status.
- Create new segments and groupings used to display travel time and congestion data to the Dynamic Message Signs.
- Update the Lake Michigan Interstate Gateway Alliance (LMIGA) data feeds for presentation of the additional data to the web page and user interfaces.
- Develop an integration acceptance test plan and conduct said test to verify that all 2070 lite units have been properly integrated according to the requirements. This acceptance plan shall conclude with a 30 day burn-in period. During the burn-in period, the subcontractor shall identify and resolve any problems identified with the integration.

Method of Measurement:

The ATMS integration shall be measured as lump sum.

Basis of Payment

This item shall be paid for at the contract lump sum price for ATMS SYSTEM INTEGRATION, which price shall be payment in full for the work described. Acceptance shall be granted after integration and after passing an acceptance test proposed by the Subcontractor, and agreed upon by the Engineer.

**ALKALI-SILICA REACTION FOR CAST-IN-PLACE CONCRETE (BDE)**

Effective: August 1, 2007

Revised: January 1, 2009

Description. This special provision is intended to reduce the risk of a deleterious alkali-silica reaction in concrete exposed to humid or wet conditions. The special provision is not intended or adequate for concrete exposed to potassium acetate, potassium formate, sodium acetate or sodium formate. The special provision shall not apply to the dry environment (humidity less than 60 percent) found inside buildings for residential or commercial occupancy. The special provision shall also not apply to precast products or precast prestressed products.

Aggregate Expansion Values. Each coarse and fine aggregate will be tested by the Department for alkali reaction according to ASTM C 1260. The test will be performed with Type I or II cement having a total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) of 0.90 percent or greater. The Engineer will determine the assigned expansion value for each aggregate, and these values will be made available on the Department's Alkali-Silica Potential Reactivity Rating List. The Engineer may differentiate aggregate based on ledge, production method, gradation number, or other factors. An expansion value of 0.05 percent will be assigned to limestone or dolomite coarse aggregates and 0.03 percent to limestone or dolomite fine aggregates (manufactured stone sand); however the Department reserves the right to perform the ASTM C 1260 test.

Aggregate Groups. Each combination of aggregates used in a mixture will be assigned to an aggregate group. The point at which the coarse aggregate and fine aggregate expansion values intersect in the following table will determine the group.

AGGREGATE GROUPS			
Coarse Aggregate or Coarse Aggregate Blend ASTM C 1260 Expansion	Fine Aggregate or Fine Aggregate Blend ASTM C 1260 Expansion		
	≤ 0.16%	> 0.16% - 0.27%	> 0.27%
≤ 0.16%	Group I	Group II	Group III
> 0.16% - 0.27%	Group II	Group II	Group III
> 0.27%	Group III	Group III	Group IV

Mixture Options. Based upon the aggregate group, the following mixture options shall be used; however, the Department may prohibit a mixture option if field performance shows a deleterious alkali-silica reaction or Department testing indicates the mixture may experience a deleterious alkali-silica reaction.

- Group I - Mixture options are not applicable. Use any cement or finely divided mineral.
- Group II - Mixture options 1, 2, 3, 4, or 5 shall be used.
- Group III - Mixture options 1, 2 and 3 combined, 4, or 5 shall be used.
- Group IV - Mixture options 1, 2 and 4 combined, or 5 shall be used.

For Class PP-3 concrete the mixture options are not applicable, and any cement may be used with the specified finely divided minerals.

- a) Mixture Option 1. The coarse or fine aggregates shall be blended to place the material in a group that will allow the selected cement or finely divided mineral to be used.

When a coarse or fine aggregate is blended, the weighted expansion value shall be calculated separately for the coarse and fine aggregate as follows:

$$\text{Weighted Expansion Value} = (a/100 \times A) + (b/100 \times B) + (c/100 \times C) + \dots$$

Where: a, b, c... = percentage of aggregate in the blend;  
 A, B, C...= expansion value for that aggregate.

- b) Mixture Option 2. A finely divided mineral shall be used as described in 1), 2), 3), or 4) that follow. The replacement ratio is defined as “finely divided mineral:portland cement”.
  - 1) Class F Fly Ash. For Class PV, BS, MS, DS, SC, and SI concrete and cement aggregate mixture II (CAM II), Class F fly ash shall replace 15 percent of the portland cement at a minimum replacement ratio of 1.5:1.
  - 2) Class C Fly Ash. For Class PV, MS, SC, and SI Concrete, Class C fly ash with 18 percent to less than 26.5 percent calcium oxide content, and less than 2.0 percent loss on ignition, shall replace 20 percent of the portland cement at a minimum replacement ratio of 1:1; or at a minimum replacement ratio of 1.25:1 if the loss on ignition is 2.0 percent or greater.

Class C fly ash with less than 18 percent calcium oxide content shall replace 20 percent of the portland cement at a minimum replacement ratio of 1.25:1.

For Class PP-1, RR, BS, and DS concrete and CAM II, Class C fly ash with less than 26.5 percent calcium oxide content shall replace 15 percent of the portland cement at a minimum replacement ratio of 1.5:1.

- 3) Ground Granulated Blast-Furnace Slag. For Class PV, BS, MS, SI, DS, and SC concrete, ground granulated blast-furnace slag shall replace 25 percent of the portland cement at a minimum replacement ratio of 1:1.

For Class PP-1 and RR concrete, ground granulated blast-furnace slag shall replace 15 percent of the portland cement at a minimum replacement ratio of 1.5:1.

For Class PP-2, ground granulated blast-furnace slag shall replace 25 to 30 percent of the portland cement at a minimum replacement ratio of 1:1.

- 4) Microsilica or High Reactivity Metakaolin. Microsilica solids or high reactivity metakaolin shall be added to the mixture at a minimum 25 lb/cu yd (15 kg/cu m) or 27 lb/cu yd (16 kg/cu m) respectively.
- c) Mixture Option 3. The cement used shall have a maximum total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) of 0.60 percent. When aggregate in Group II is involved, any finely divided mineral may be used with a portland cement.
- d) Mixture Option 4. The cement used shall have a maximum total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) of 0.45 percent. When aggregate in Group II or III is involved, any finely divided mineral may be used with a portland cement.
- e) Mixture Option 5. The proposed cement or finely divided mineral may be used if the ASTM C 1567 expansion value is  $\leq 0.16$  percent when performed on the aggregate in the concrete mixture with the highest ASTM C 1260 test result. The ASTM C 1567 test will be valid for two years, unless the Engineer determines the materials have changed significantly. For latex concrete, the ASTM C 1567 test shall be performed without the latex. The 0.20 percent autoclave expansion limit in ASTM C 1567 shall not apply.

If during the two year time period the Contractor needs to replace the cement, and the replacement cement has an equal or lower total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ), a new ASTM C 1567 test will not be required.

Testing. If an individual aggregate has an ASTM C 1260 expansion value  $> 0.16$  percent, an ASTM C 1293 test may be performed by the Contractor to evaluate the Department's ASTM C 1260 test result. The ASTM C 1293 test shall be performed with Type I or II cement having a total equivalent alkali content ( $\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$ ) of 0.80 percent or greater. The interior vertical wall of the ASTM C 1293 recommended container (pail) shall be half covered with a wick of absorbent material consisting of blotting paper. If the testing laboratory desires to use an alternate container or wick of absorbent material, ASTM C 1293 test results with an alkali-reactive aggregate of known expansion characteristics shall be provided to the Engineer for review and approval.

If the expansion is less than 0.040 percent after one year, the aggregate will be assigned an ASTM C 1260 expansion value of 0.08 percent that will be valid for two years, unless the Engineer determines the aggregate has changed significantly.

The Engineer reserves the right to verify a Contractor's ASTM C 1293 or 1567 test result. The Engineer will not accept the result if the precision and bias for the test methods are not met.

The laboratory performing the ASTM C 1567 test shall either be accredited by the AASHTO Materials Reference Laboratory (AMRL) for ASTM C 227 under Portland Cement Concrete or Aggregate; or shall be inspected for Hydraulic Cement - Physical Tests by the Cement and Concrete Reference Laboratory (CCRL) and shall be approved by the Department. The laboratory performing the ASTM C 1293 test shall be inspected for Portland Cement Concrete by CCRL and shall be approved by the Department.

### **APPROVAL OF PROPOSED BORROW AREAS, USE AREAS, AND/OR WASTE AREAS INSIDE ILLINOIS STATE BORDERS (BDE)**

Effective: November 1, 2008

Revise the title of Article 107.22 of the Standard Specifications to read:

**"107.22 Approval of Proposed Borrow Areas, Use Areas, and/or Waste Areas Inside Illinois State Borders."**

Add the following sentence to the end of the first paragraph of Article 107.22 of the Standard Specifications:

"Proposed borrow areas, use areas, and/or waste areas outside of Illinois shall comply with Article 107.01."

### **CEMENT (BDE)**

Effective: January 1, 2007

Revised: April 1, 2009

Revise Section 1001 of the Standard Specifications to read:

#### **"SECTION 1001. CEMENT**

**1001.01 Cement Types.** Cement shall be according to the following.

- (a) Portland Cement. Acceptance of portland cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland cement shall be according to ASTM C 150, and shall meet the standard physical and chemical requirements. Type I or Type II may be used for cast-in-place, precast, and precast prestressed concrete. Type III may be used according to Article 1020.04, or when approved by the Engineer. All other cements referenced in ASTM C 150 may be used when approved by the Engineer.

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement. The total of all inorganic processing additions shall be a maximum of 4.0 percent by weight (mass) of the cement. However, a cement kiln dust inorganic processing addition shall be limited to a maximum of 1.0 percent. Organic processing additions shall be limited to grinding aids that improve the flowability of cement, reduce pack set, and improve grinding efficiency. Inorganic processing additions shall be limited to granulated blast-furnace slag according to the chemical requirements of AASHTO M 302, Class C fly ash according to the chemical requirements of AASHTO M 295, and cement kiln dust.

- (b) Portland-Pozzolan Cement. Acceptance of portland-pozzolan cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland-pozzolan cement shall be according to ASTM C 595 and shall meet the standard physical and chemical requirements. Type IP may be used for cast-in-place, precast, and precast prestressed concrete, except when Class PP concrete is used. The pozzolan constituent for Type IP shall be a maximum of 21 percent of the weight (mass) of the portland-pozzolan cement.

For cast-in-place construction, portland-pozzolan cement shall not be used in concrete mixtures when the air temperature is below 40 °F (4 °C) without permission of the Engineer. If permission is given, the mix design strength requirement may require the Contractor to increase the cement or eliminate the cement factor reduction for a water-reducing or high range water-reducing admixture which is permitted according to Article 1020.05(b).

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement. Organic processing additions shall be limited to grinding aids as defined in (a) above. Inorganic processing additions shall be limited to cement kiln dust at a maximum of 1.0 percent.

- (c) Portland Blast-Furnace Slag Cement. Acceptance of portland blast-furnace slag cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland blast-furnace slag cement shall be according to ASTM C 595 and shall meet the standard physical and chemical requirements. Type IS portland blast-furnace slag cement may be used for cast-in-place, precast, and precast prestressed concrete, except when Class PP concrete is used. The blast-furnace slag constituent for Type IS shall be a maximum of 25 percent of the weight (mass) of the portland blast-furnace slag cement.

For cast-in-place construction, portland blast-furnace slag cement shall not be used in concrete mixtures when the air temperature is below 40 °F (4 °C) without permission of the Engineer.

If permission is given, the mix design strength requirement may require the Contractor to increase the cement or eliminate the cement factor reduction for a water-reducing or high range water-reducing admixture which is permitted according to Article 1020.05(b).

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement. Organic processing additions shall be limited to grinding aids as defined in (a) above. Inorganic processing additions shall be limited to cement kiln dust at a maximum of 1.0 percent.

(d) **Rapid Hardening Cement.** Rapid hardening cement shall be used according to Article 1020.04 or when approved by the Engineer. The cement shall be on the Department's current "Approved List of Packaged, Dry, Rapid Hardening Cementitious Materials for Concrete Repairs", and shall be according to the following.

(1) The cement shall have a maximum final set of 25 minutes, according to Illinois Modified ASTM C 191.

(2) The cement shall have a minimum compressive strength of 2000 psi (13,800 kPa) at 3.0 hours, 3200 psi (22,100 kPa) at 6.0 hours, and 4000 psi (27,600 kPa) at 24.0 hours, according to Illinois Modified ASTM C 109.

(3) The cement shall have a maximum drying shrinkage of 0.050 percent at seven days, according to Illinois Modified ASTM C 596.

(4) The cement shall have a maximum expansion of 0.020 percent at 14 days, according to Illinois Modified ASTM C 1038.

(5) The cement shall have a minimum 80 percent relative dynamic modulus of elasticity; and shall not have a weight (mass) gain in excess of 0.15 percent or a weight (mass) loss in excess of 1.0 percent, after 100 cycles, according to AASHTO T 161, Procedure B.

(e) **Calcium Aluminate Cement.** Calcium aluminate cement shall be used only where specified by the Engineer. The cement shall meet the standard physical requirements for Type I cement according to ASTM C 150, except the time of setting shall not apply. The chemical requirements shall be determined according to ASTM C 114 and shall be as follows: minimum 38 percent aluminum oxide ( $Al_2O_3$ ), maximum 42 percent calcium oxide (CaO), maximum 1 percent magnesium oxide (MgO), maximum 0.4 percent sulfur trioxide ( $SO_3$ ), maximum 1 percent loss on ignition, and maximum 3.5 percent insoluble residue.

**1001.02 Uniformity of Color.** Cement contained in single loads or in shipments of several loads to the same project shall not have visible differences in color.

**1001.03 Mixing Brands and Types.** Different brands or different types of cement from the same manufacturing plant, or the same brand or type from different plants shall not be mixed or used alternately in the same item of construction unless approved by the Engineer.

**1001.04 Storage.** Cement shall be stored and protected against damage, such as dampness which may cause partial set or hardened lumps. Different brands or different types of cement from the same manufacturing plant, or the same brand or type from different plants shall be kept separate.”

## **CONCRETE ADMIXTURES (BDE)**

Effective: January 1, 2003

Revised: April 1, 2009

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

“(b) Admixtures. The use of admixtures to increase the workability or to accelerate the hardening of the concrete will be permitted when approved by the Engineer. Admixture dosages shall result in the mixture meeting the specified plastic and hardened properties. The Department will maintain an Approved List of Corrosion Inhibitors. Corrosion inhibitor dosage rates shall be according to Article 1020.05(b)(12). The Department will also maintain an Approved List of Concrete Admixtures, and an admixture technical representative shall be consulted when determining an admixture dosage from this list. The dosage shall be within the range indicated on the approved list unless the influence by other admixtures, jobsite conditions (such as a very short haul time), or other circumstances warrant a dosage outside the range. The Engineer shall be notified when a dosage is proposed outside the range. To determine an admixture dosage, air temperature, concrete temperature, cement source and quantity, finely divided mineral sources(s) and quantity, influence of other admixtures, haul time, placement conditions, and other factors as appropriate shall be considered. The Engineer may request the Contractor to have a batch of concrete mixed in the lab or field to verify the admixture dosage is correct. An admixture dosage or combination of admixture dosages shall not delay the initial set of concrete by more than one hour. When a retarding admixture is required or appropriate for a bridge deck or bridge deck overlay pour, the initial set time shall be delayed until the deflections due to the concrete dead load are no longer a concern for inducing cracks in the completed work. However, a retarding admixture shall not be used to further extend the pour time and justify the alteration of a bridge deck pour sequence.

When determining water in admixtures for water/cement ratio, the Contractor shall calculate 70 percent of the admixture dosage as water, except a value of 50 percent shall be used for a latex admixture used in bridge deck latex concrete overlays.”

Revise Section 1021 of the Standard Specifications to read:

### **“SECTION 1021. CONCRETE ADMIXTURES**



1021.01 **General.** Admixtures shall be furnished in liquid form ready for use. The admixtures shall be delivered in the manufacturer's original containers, bulk tank trucks or such containers or tanks as are acceptable to the Engineer. Delivery shall be accompanied by a ticket which clearly identifies the manufacturer and trade name of the material. Containers shall be readily identifiable as to manufacturer and trade name of the material they contain.

Corrosion inhibitors will be maintained on the Department's Approved List of Corrosion Inhibitors. All other concrete admixture products will be maintained on the Department's Approved List of Concrete Admixtures. For the admixture submittal, a report prepared by an independent laboratory accredited by the AASHTO Materials Reference Laboratory (AMRL) for Portland Cement Concrete shall be provided. The report shall show the results of physical tests conducted no more than five years prior to the time of submittal, according to applicable specifications. However, for corrosion inhibitors the ASTM G 109 test information specified in ASTM C 1582 is not required to be from an independent lab. All other information in ASTM C 1582 shall be from an independent lab.

Tests shall be conducted using materials and methods specified on a "test" concrete and a "reference" concrete, together with a certification that no changes have been made in the formulation of the material since the performance of the tests. Per the manufacturer's option, the cement content for all required tests shall either be according to applicable specifications or 5.65 cwt/cu yd (335 kg/cu m). Compressive strength test results for six months and one year will not be required.

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

The manufacturer shall include in the submittal the following admixture information: the manufacturing range for specific gravity, the midpoint and manufacturing range for residue by oven drying, and the manufacturing range for pH. The submittal shall also include an infrared spectrophotometer trace no more than five years old.

For air-entraining admixtures according to Article 1021.02, the specific gravity allowable manufacturing range shall be established by the manufacturer and the test method shall be according to ASTM C 494. For residue by oven drying and pH, the allowable manufacturing range and test methods shall be according to ASTM C 260.

For admixtures according to Articles 1021.03, 1021.04, 1021.05, 1021.06, and 1021.07, the pH allowable manufacturing range shall be established by the manufacturer and the test method shall be according to ASTM E 70. For specific gravity and residue by oven drying, the allowable manufacturing range and test methods shall be according to ASTM C 494.

When test results are more than seven years old, the manufacturer shall re-submit the infrared spectrophotometer trace and the report prepared by an independent laboratory accredited by AASHTO.

All admixtures, except chloride-based accelerators, shall contain a maximum of 0.3 percent chloride by weight (mass).

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

**1021.02 Air-Entraining Admixtures.** Air-entraining admixtures shall be according to AASHTO M 154.

**1021.03 Retarding and Water-Reducing Admixtures.** The admixture shall be according to the following.

- (a) The retarding admixture shall be according to AASHTO M 194, Type B (retarding) or Type D (water-reducing and retarding).
- (b) The water-reducing admixture shall be according to AASHTO M 194, Type A.
- (c) The high range water-reducing admixture shall be according to AASHTO M 194, Type F (high range water-reducing) or Type G (high range water-reducing and retarding).

**1021.04 Accelerating Admixtures.** The admixture shall be according to AASHTO M 194, Type C (accelerating) or Type E (water reducing and accelerating).

**1021.05 Self-Consolidating Admixtures.** The self-consolidating admixture system shall consist of either a high range water-reducing admixture only or a high range water-reducing admixture combined with a separate viscosity modifying admixture. The one or two component admixture system shall be capable of producing a concrete mixture that can flow around reinforcement and consolidate under its own weight without additional effort and without segregation.

The high range water-reducing admixture shall be according to AASHTO M 194, Type F.

The viscosity modifying admixture shall be according to ASTM C 494, Type S (specific performance).

**1021.06 Rheology-Controlling Admixture.** The rheology-controlling admixture shall be capable of producing a concrete mixture with a lower yield stress that will consolidate easier for slipform applications used by the Contractor. The rheology-controlling admixture shall be according to ASTM C 494, Type S (specific performance).

**1021.07 Corrosion Inhibitor.** The corrosion inhibitor shall be according to one of the following.

- (a) Calcium Nitrite. The corrosion inhibitor shall contain a minimum 30 percent calcium nitrite by weight (mass) of solution, and shall comply with the requirements of AASHTO M 194, Type C (accelerating).
- (b) Other Materials. The corrosion inhibitor shall be according to ASTM C 1582.”

**CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)**

Effective: June 1, 2010

The reduction of emissions of particulate matter (PM) for off-road equipment shall be accomplished by installing retrofit emission control devices. The term “equipment” refers to diesel fuel powered devices rated at 50 hp and above, to be used on the jobsite in excess of seven calendar days over the course of the construction period on the jobsite (including rental equipment).

Contractor and subcontractor diesel powered off-road equipment assigned to the contract shall be retrofitted using the phased in approach shown below. Equipment that is of a model year older than the year given for that equipment’s respective horsepower range shall be retrofitted:

Effective Dates	Horsepower Range	Model Year
June 1, 2010 <sup>1/</sup>	600-749	2002
	750 and up	2006
June 1, 2011 <sup>2/</sup>	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006
June 1, 2012 <sup>2/</sup>	50-99	2004
	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006

- 1/ Effective dates apply to Contractor diesel powered off-road equipment assigned to the contract.
- 2/ Effective dates apply to Contractor and subcontractor diesel powered off-road equipment assigned to the contract.

The retrofit emission control devices shall achieve a minimum PM emission reduction of 50 percent and shall be:

- a) Included on the U.S. Environmental Protection Agency (USEPA) *Verified Retrofit Technology List* (<http://www.epa.gov/otaq/retrofit/verif-list.htm>), or verified by the California Air Resources Board (CARB) (<http://www.arb.ca.gov/diesel/verde/verdev.htm>); or

- b) Retrofitted with a non-verified diesel retrofit emission control device if verified retrofit emission control devices are not available for equipment proposed to be used on the project, and if the Contractor has obtained a performance certification from the retrofit device manufacturer that the emission control device provides a minimum PM emission reduction of 50 percent.

Note: Large cranes (Crawler mounted cranes) which are responsible for critical lift operations are exempt from installing retrofit emission control devices if such devices adversely affect equipment operation.

Diesel powered off-road equipment with engine ratings of 50 hp and above, which are unable to be retrofitted with verified emission control devices or if performance certifications are not available which will achieve a minimum 50 percent PM reduction, may be granted a waiver by the Department if documentation is provided showing good faith efforts were made by the Contractor to retrofit the equipment.

Construction shall not proceed until the Contractor submits a certified list of the diesel powered off-road equipment that will be used, and as necessary, retrofitted with emission control devices. The list(s) shall include (1) the equipment number, type, make, Contractor/rental company name; and (2) the emission control devices make, model, USEPA or CARB verification number, or performance certification from the retrofit device manufacturer. Equipment reported as fitted with emissions control devices shall be made available to the Engineer for visual inspection of the device installation, prior to being used on the jobsite.

The Contractor shall submit an updated list of retrofitted off-road construction equipment as retrofitted equipment changes or comes on to the jobsite. The addition or deletion of any diesel powered equipment shall be included on the updated list.

If any diesel powered off-road equipment is found to be in non-compliance with any portion of this special provision, the Engineer will issue the Contractor a diesel retrofit deficiency deduction.

Any costs associated with retrofitting any diesel powered off-road equipment with emission control devices shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall not be grounds for a claim.

### **Diesel Retrofit Deficiency Deduction**

When the Engineer determines that a diesel retrofit deficiency exists, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be \$1,000.00 for each deficiency identified.

The deficiency will be based on lack of diesel retrofit emissions control.

If a Contractor accumulates three diesel retrofit deficiency deductions for the same piece of equipment in a contract period, the Contractor will be shutdown until the deficiency is corrected.

Such a shutdown will not be grounds for any extension of the contract time, waiver of penalties, or be grounds for any claim.

### **CONSTRUCTION AIR QUALITY - DIESEL VEHICLE EMISSIONS CONTROL (BDE)**

Effective: April 1, 2009

Revised: July 1, 2009

Diesel Vehicle Emissions Control. The reduction of construction air emissions shall be accomplished by using cleaner burning diesel fuel. The term "equipment" refers to any and all diesel fuel powered devices rated at 50 hp and above, to be used on the project site in excess of seven calendar days over the course of the construction period on the project site (including any "rental" equipment).

All equipment on the jobsite, with engine ratings of 50 hp and above, shall be required to: use Ultra Low Sulfur Diesel fuel (ULSD) exclusively (15 ppm sulfur content or less).

Diesel powered equipment in non-compliance will not be allowed to be used on the project site, and is also subject to a notice of non-compliance as outlined below.

The Contractor shall submit copies of monthly summary reports and include certified copies of the ULSD diesel fuel delivery slips for diesel fuel delivered to the jobsite for the reporting time period, noting the quantity of diesel fuel used.

If any diesel powered equipment is found to be in non-compliance with any portion of this specification, the Engineer will issue the Contractor a notice of non-compliance and identify an appropriate period of time, as outlined below under environmental deficiency deduction, in which to bring the equipment into compliance or remove it from the project site.

Any costs associated with bringing any diesel powered equipment into compliance with these diesel vehicle emissions controls shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall also not be grounds for a claim.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists, he/she will notify the Contractor in writing, and direct the Contractor to correct the deficiency within a specified time period. The specified time-period, which begins upon Contractor notification, will be from 1/2 hour to 24 hours long, based on the urgency of the situation and the nature of the deficiency. The Engineer shall be the sole judge regarding the time period.

The deficiency will be based on lack of repair, maintenance and diesel vehicle emissions control.

If the Contractor fails to correct the deficiency within the specified time frame, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be \$1,000.00 for each deficiency identified.

If a Contractor or subcontractor accumulates three environmental deficiency deductions in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of contract time, waiver of penalties, or be grounds for any claim.

### **CONSTRUCTION AIR QUALITY - IDLING RESTRICTIONS (BDE)**

Effective: April 1, 2009

Idling Restrictions. The Contractor shall establish truck-staging areas for all diesel powered vehicles that are waiting to load or unload material at the jobsite. Staging areas shall be located where the diesel emissions from the equipment will have a minimum impact on adjacent sensitive receptors. The Department will review the selection of staging areas, whether within or outside the existing highway right-of-way, to avoid locations near sensitive areas or populations to the extent possible. Sensitive receptors include, but are not limited to, hospitals, schools, residences, motels, hotels, daycare facilities, elderly housing and convalescent facilities. Diesel powered engines shall also be located as far away as possible from fresh air intakes, air conditioners, and windows. The Engineer will approve staging areas before implementation.

Diesel powered vehicle operators may not cause or allow the motor vehicle, when it is not in motion, to idle for more than a total of 10 minutes within any 60 minute period, except under any of the following circumstances:

- 1) The motor vehicle has a gross vehicle weight rating of less than 8000 lb (3630 kg).
- 2) The motor vehicle idles while forced to remain motionless because of on-highway traffic, an official traffic control device or signal, or at the direction of a law enforcement official.
- 3) The motor vehicle idles when operating defrosters, heaters, air conditioners, or other equipment solely to prevent a safety or health emergency.
- 4) A police, fire, ambulance, public safety, other emergency or law enforcement motor vehicle, or any motor vehicle used in an emergency capacity, idles while in an emergency or training mode and not for the convenience of the vehicle operator.
- 5) The primary propulsion engine idles for maintenance, servicing, repairing, or diagnostic purposes if idling is necessary for such activity.
- 6) A motor vehicle idles as part of a government inspection to verify that all equipment is in good working order, provided idling is required as part of the inspection.
- 7) When idling of the motor vehicle is required to operate auxiliary equipment to accomplish the intended use of the vehicle (such as loading, unloading, mixing, or processing cargo; controlling cargo temperature; construction operations, lumbering operations; oil or gas well servicing; or farming operations), provided that this exemption does not apply when the vehicle is idling solely for cabin comfort or to operate non-essential equipment such as air conditioning, heating, microwave ovens, or televisions.
- 8) When the motor vehicle idles due to mechanical difficulties over which the operator has no control.
- 9) The outdoor temperature is less than 32 °F (0 °C) or greater than 80 °F (26 °C).

When the outdoor temperature is greater than or equal to 32 °F (0 °C) or less than or equal to 80 °F (26 °C), a person who operates a motor vehicle operating on diesel fuel shall not cause or allow the motor vehicle to idle for a period greater than 30 minutes in any 60 minute period while waiting to weigh, load, or unload cargo or freight, unless the vehicle is in a line of vehicles that regularly and periodically moves forward.

The above requirements do not prohibit the operation of an auxiliary power unit or generator set as an alternative to idling the main engine of a motor vehicle operating on diesel fuel.

Environmental Deficiency Deduction. When the Engineer is notified, or determines that an environmental control deficiency exists based on non-compliance with the idling restrictions, he/she will notify the Contractor, and direct the Contractor to correct the deficiency.

If the Contractor fails to correct the deficiency a monetary deduction will be imposed. The monetary deduction will be \$1,000.00 for each deficiency identified.

### **DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)**

Effective: September 1, 2000

Revised: January 1, 2010

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 that 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.

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 that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. This 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 that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform 0.0% 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 forth in this Special Provision:

- (a) The bidder documents that enough DBE participation has been obtained to meet the goal; or
- (b) The bidder documents that 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 may 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 web site at [www.dot.il.gov](http://www.dot.il.gov).

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

(a) The bidder shall submit a Disadvantaged Business Utilization Plan on Department forms SBE 2025 and 2026 with the bid.

(b) The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number, and telefax number of a responsible official of the bidder designated for purposes of notification of plan approval or disapproval under the procedures of this Special Provision.

(c) The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. For bidding purposes, submission of the completed SBE 2025 forms, signed by the DBEs and faxed to the bidder will be acceptable as long as the original is available and provided upon request. All elements of information indicated on the said form shall be provided, including but not limited to the following:

- (1) The names and addresses of DBE firms that will participate in the contract;
- (2) A description, including pay item numbers, of the work each DBE will perform;



- (3) The dollar amount of the participation of each DBE firm participating. The dollar amount of participation for identified work shall specifically state the quantity, unit price, and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;
- (4) DBE Participation Commitment Statements, form SBE 2025, signed by the bidder and each participating DBE firm documenting the commitment to use the DBE subcontractors whose participation is submitted to meet the contract goal;
- (5) If the bidder is a joint venture comprised of DBE companies and non-DBE companies, the plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s); and,
- (6) If the contract goal is not met, evidence of good faith efforts.

GOOD FAITH EFFORT PROCEDURES. The contract will not be awarded until the Utilization Plan submitted by the apparent successful bidder is approved. All information submitted by the bidder must be complete, accurate and adequately document the good faith efforts of the bidder 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 commits sufficient commercially useful DBE work performance 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. The Utilization Plan will not be approved by the Department if the Utilization Plan does not commit sufficient DBE participation to meet the contract goal unless the apparent successful bidder documented in the Utilization Plan that it made a good faith effort to meet the goal. This means that 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 that 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 prime 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.

(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 that the apparent successful 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 that it is otherwise eligible for award. If the Department determines that the bidder has failed to meet the requirements of this Special Provision and 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 shall include a statement of reasons why good faith efforts have not been found.

(c) The bidder may request administrative reconsideration of a determination adverse to the bidder within the five working days after receipt of the notification date of the determination by delivering the request to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217)785-1524). Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The determination shall become final if a request is not made and delivered. A request may provide additional written documentation and/or argument concerning the issue of whether an adequate good faith effort was made to meet the contract goal. The request will be forwarded to the Department's Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of 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 prime 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 it 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 or 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 regular dealer or 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.

(a) 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 submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764. Telephone number (217) 785-4611. Telefax number (217) 785-1524.

(b) The Contractor must notify and obtain written approval from the Department's Bureau of Small Business Enterprises prior to replacing a DBE or making any change in the participation of a DBE. Approval for replacement will be granted only if it is demonstrated that the DBE is unable or unwilling to perform. The Contractor must make every good faith effort to find another certified DBE subcontractor to substitute for the original DBE. The good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the contract as the original DBE, to the extent needed to meet the contract goal.

(c) Any deviation from the DBE condition-of-award or contract specifications must be approved, in writing, by the Department. 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.

(d) 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) That 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) That the DBE is aware that 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) That the DBE is not capable of performing the replacement work or has declined to perform the work at a reasonably 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) 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, must be signed and submitted.

(f) If the commitment of work is in the form of additional tasks assigned to an existing subcontract, then a new Request for Approval of Subcontractor shall not be required. However, the Contractor must document efforts to assure that the existing DBE subcontractor is capable of performing the additional work and has agreed in writing to the change.

(g) All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the Participation Statement. The Contractor shall not terminate for convenience a DBE listed in the Utilization Plan and then perform the work of the terminated DBE with its own forces, those of an affiliate or those of another subcontractor, whether DBE or not, without first obtaining the written consent of the Bureau of Small Business Enterprises to amend the Utilization Plan. The Contractor shall notify the Bureau of Small Business Enterprises of any termination for reasons other than convenience, and shall obtain approval for inclusion of the substitute DBE in the Utilization Plan. If good faith efforts following a termination of a DBE for cause are not successful, the Contractor shall contact the Bureau of Small Business Enterprises and provide a full accounting of the efforts undertaken to obtain substitute DBE participation. The Bureau of Small Business Enterprises will evaluate the good faith efforts in light of all circumstances surrounding the performance status of the contract, and determine whether the contract goal should be amended.

(h) The Contractor shall maintain a record of payments for work performed to the DBE participants. The records shall be made available to the Department for inspection upon request. 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 thirty 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 Regional 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 that 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 (j) of this part.

(i) 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.

(j) 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.

#### **ENGINEER'S FIELD OFFICE TYPE A (BDE)**

Effective: April 1, 2007

Revised: August 1, 2008

Revise Article 670.02 of the Standard Specifications to read:

**"670.02 Engineer's Field Office Type A.** Type A field offices shall have a minimum ceiling height of 7 ft (2 m) and a minimum floor space 450 sq ft (42 sq m). The office shall be provided with sufficient heat, natural and artificial light, and air conditioning.

The office shall have an electronic security system that will respond to any breach of exterior doors and windows. Doors and windows shall be equipped with locks. Doors shall also be equipped with dead bolt locks or other secondary locking device.

Windows shall be equipped with exterior screens to allow adequate ventilation. All windows shall be equipped with interior shades, curtains, or blinds. Adequate all-weather parking space shall be available to accommodate a minimum of ten vehicles.

Suitable on-site sanitary facilities meeting Federal, State, and local health department requirements shall be provided, maintained clean and in good working condition, and shall be stocked with lavatory and sanitary supplies at all times.

Sanitary facilities shall include hot and cold potable running water, lavatory and toilet as an integral part of the office where available.

Solid waste disposal consisting of two waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service.

In addition, the following furniture and equipment shall be furnished.

- (a) Four desks with minimum working surface 42 x 30 in. (1.1 m x 750 mm) each and five non-folding chairs with upholstered seats and backs.
- (b) One desk with minimum working surface 48 x 72 in. (1.2 x 1.8 m) with height adjustment of 23 to 30 in. (585 to 750 mm).
- (c) One four-post drafting table with minimum top size of 37 1/2 x 48 in. (950 mm x 1.2 m). The top shall be basswood or equivalent and capable of being tilted through an angle of 50 degrees. An adjustable height drafting stool with upholstered seat and back shall also be provided.
- (d) Two free standing four drawer legal size file cabinet with lock and an underwriters' laboratories insulated file device 350 degrees one hour rating.
- (e) One 6 ft (1.8 m) folding table with six folding chairs.
- (f) One equipment cabinet of minimum inside dimension of 44 in. (1100 mm) high x 24 in. (600 mm) wide x 30 in. (750 mm) deep with lock. The walls shall be of steel with a 3/32 in. (2 mm) minimum thickness with concealed hinges and enclosed lock constructed in such a manner as to prevent entry by force. The cabinet assembly shall be permanently attached to a structural element of the field office in a manner to prevent theft of the entire cabinet.
- (g) One refrigerator with a minimum size of 16 cu ft (0.45 cu m) with a freezer unit.
- (h) One electric desk type tape printing calculator.
- (i) A minimum of two communication paths. The configuration shall include:
  - (1) Internet Connection. An internet service connection using telephone DSL, cable broadband, or CDMA wireless technology. Additionally, an 802.11g/N wireless router shall be provided, which will allow connection by the Engineer and up to four Department staff.
  - (2) Telephone Lines. Three separate telephone lines.
- (j) One plain paper copy machine capable of reproducing prints up to 11 x 17 in. (280 x 432 mm) with an automatic feed tray capable of storing 30 sheets of paper. Letter size and 11 x 17 in. (280 x 432 mm) paper shall be provided.
- (k) One plain paper fax machine with paper.
- (l) Two telephones, with touch tone, where available, and a digital telephone answering machine, for exclusive use by the Engineer.

- (m) One electric water cooler dispenser.
- (n) One first-aid cabinet fully equipped.
- (o) One microwave oven, 1 cu ft (0.03 cu m) minimum capacity.
- (p) One fire-proof safe, 0.5 cu ft (0.01 cu m) minimum capacity.
- (q) One electric paper shredder.
- (r) One post mounted rain gauge, located on the project site for each 5 miles (8 km) of project length.”

Revise the first sentence of the first paragraph of Article 670.07 of the Standard Specifications to read:

“The building or buildings fully equipped as specified will be paid for on a monthly basis until the building or buildings are released by the Engineer.”

Revise the last sentence of the first paragraph of Article 670.07 of the Standard Specifications to read:

“This price shall include all utility costs and shall reflect the salvage value of the building or buildings, equipment, and furniture which become the property of the Contractor after release by the Engineer, except that the Department will pay that portion of the monthly long distance telephone bills that, when combined, exceed \$150.”

#### **EQUIPMENT RENTAL RATES (BDE)**

Effective: August 2, 2007

Revised: January 2, 2008

Replace the second and third paragraphs of Article 105.07(b)(4)a. of the Standard Specifications with the following:

“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).”

Replace Article 109.04(b)(4) of the Standard Specifications with the following:

- “(4) Equipment. Equipment used for extra work shall be authorized by the Engineer. The equipment shall be specifically described, be of suitable size and capacity for the work to be performed, and be in good operating condition. For such equipment, the Contractor will be paid as follows.
  - a. Contractor Owned Equipment. Contractor owned equipment will be paid for by the hour using the applicable FHWA hourly rate from the “Equipment Watch Rental Rate Blue Book” (Blue Book) in effect when the force account work begins. The FHWA hourly rate is calculated as follows.



FHWA hourly rate = (monthly rate/176) x (model year adj.) x (Illinois adj.) + EOC

Where: EOC = Estimated Operating Costs per hour (from the Blue Book)

The time allowed will be the actual time the equipment is operating on the extra work. For the time required to move the equipment to and from the site of the extra work and any authorized idle (standby) time, payment will be made at the following hourly rate: 0.5 x (FHWA hourly rate - EOC).

All time allowed shall fall within the working hours authorized for the extra work.

The rates above include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs, overhaul and maintenance of any kind, depreciation, storage, overhead, profits, insurance, and all incidentals. The rates do not include labor.

The Contractor shall submit to the Engineer sufficient information for each piece of equipment and its attachments to enable the Engineer to determine the proper equipment category. If a rate is not established in the Blue Book for a particular piece of equipment, the Engineer will establish a rate for that piece of equipment that is consistent with its cost and use in the industry.

- b. Rented Equipment. Whenever it is necessary for the Contractor to rent equipment to perform extra work, the rental and transportation costs of the equipment plus five percent for overhead will be paid. In no case shall the rental rates exceed those of established distributors or equipment rental agencies.

All prices shall be agreed to in writing before the equipment is used.”

**LIQUIDATED DAMAGES (BDE)**

Effective: April 1, 2009

Revise the table in Article 108.09 of the Standard Specifications to read:

“Schedule of Deductions for Each Day of Overrun in Contract Time			
Original Contract Amount		Daily Charges	
From More Than	To and Including	Calendar Day	Work Day
\$ 0	\$ 100,000	\$ 375	\$ 500
100,000	500,000	625	875
500,000	1,000,000	1,025	1,425
1,000,000	3,000,000	1,125	1,550
3,000,000	5,000,000	1,425	1,950
5,000,000	10,000,000	1,700	2,350
10,000,000	And over	3,325	4,650”

**NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM / EROSION AND SEDIMENT CONTROL DEFICIENCY DEDUCTION (BDE)**

Effective: April 1, 2007

Revised: November 1, 2009

Revise Article 105.03(a) of the Standard Specifications to read:

- “(a) National Pollutant Discharge Elimination System (NPDES) / Erosion and Sediment Control Deficiency Deduction When the Engineer is notified or determines an erosion and/or sediment control deficiency(s) exists, or the Contractor’s activities represents a violation of the Department’s NPDES permits, the Engineer will notify and direct the Contractor to correct the deficiency within a specified time. The specified time, which begins upon notification to the Contractor, will be from 1/2 hour to 1 week based on the urgency of the situation and the nature of the work effort required. The Engineer will be the sole judge.

A deficiency may be any lack of repair, maintenance, or implementation of erosion and/or sediment control devices included in the contract, or any failure to comply with the conditions of the Department’s NPDES permits. A deficiency may also be applied to situations where corrective action is not an option such as the failure to participate in a jobsite inspection of the project, failure to install required measures prior to initiating earth moving operations, disregard of concrete washout requirements, or other disregard of the NPDES permit.

If the Contractor fails to correct a deficiency within the specified time, a daily monetary deduction will be imposed for each calendar day or portion of a calendar day until the deficiency is corrected to the satisfaction of the Engineer. The calendar day(s) will begin with notification to the Contractor and end with the Engineer’s acceptance of the correction. The base value of the daily monetary deduction is \$1000.00 and will be applied to each location for which a deficiency exists. The value of the deficiency deduction assessed for each infraction will be determined by multiplying the base value by a Gravity Adjustment Factor provided in Table A. Except for failure to participate in a required jobsite inspection of the project prior to initiating earthmoving operations which will be based on the total acreage of planned disturbance at the following multipliers: <5 Acres: 1; 5-10 Acres: 2; >10-25 Acres: 3; >25 Acres: 5. For those deficiencies where corrective action was not an option, the monetary deduction will be immediate and will be valued at one calendar day multiplied by a Gravity Adjustment Factor.

Table A Deficiency Deduction Gravity Adjustment Factors				
Types of Violations	Soil Disturbed and Not Permanently Stabilized At Time of Violation			
	< 5 Acres	5 - 10 Acres	>10 - 25 Acres	> 25 Acres
Failure to Install or Properly Maintain BMP	0.1 - 0.5	0.2 - 1.0	0.5 - 2.5	1.0 - 5
Careless Destruction of BMP	0.2 - 1	0.5 - 2.5	1.0 - 5.	1.0 - 5
Intrusion into Protected Resource	1.0 - 5	1.0 - 5	2.0 - 10	2.0 - 10
Failure to properly manage Chemicals, Concrete Washouts or Residuals, Litter or other Wastes	0.2 - 1	0.2 - 1	0.5 - 2.5	1.0 - 5
Improper Vehicle and Equipment Maintenance, Fueling or Cleaning	0.1 - 0.5	0.2 - 1	0.2 - 1	0.5 - 2.5
Failure to Provide or Update Written or Graphic Plans Required by SWPPP	0.2 - 1	0.5 - 2.5	1.0 - 5	1.0 - 5
Failure to comply with Other Provisions of the NPDES Permit	0.1 - 0.5	0.2 - 1	0.2 - 1	0.5 - 2.5"

**NIGHTTIME WORK ZONE LIGHTING (BDE)**

Effective: November 1, 2008

Description. This work shall consist of furnishing, installing, maintaining, moving, and removing lighting for nighttime work zones. Nighttime shall be defined as occurring shortly before sunset until after sunrise.

Materials. The lighting shall consist of mobile and/or stationary lighting systems as required herein for the specific type of construction. Mobile lighting systems shall consist of luminaires attached to construction equipment or moveable carts. Stationary lighting systems shall consist of roadway luminaires mounted on temporary poles or trailer mounted light towers at fixed locations. Some lighting systems, such as balloon lights, may be adapted to both mobile and stationary applications.

Equipment. The Contractor shall furnish an illuminance meter for use by the Engineer. The meter shall have a digital display calibrated to NIST standards, shall be cosine and color corrected, and shall have an accuracy of ± five percent. The sensor shall have a level indicator to ensure measurements are taken in a horizontal plane.

CONSTRUCTION REQUIREMENTS

General. At the preconstruction conference, the Contractor shall submit the type(s) of lighting system to be used and the locations of all devices.

Before nighttime construction may begin, the lighting system shall be demonstrated as being operational.

Nighttime Flagging. The requirements for nighttime flagging shall be according to Article 701.13 of the Standard Specifications and the glare control requirements contained herein.

Lighting System Design. The lighting system shall be designed to meet the following.

- (a) **Lighting Levels.** The lighting system shall provide a minimum of 5 foot candles (54 lux) throughout the work area. For mobile operations, the work area shall be defined as 25 ft (9 m) in front of and behind moving equipment. For stationary operations, the work area shall be defined as the entire area where work is being performed.

Lighting levels will be measured with an illuminance meter. Readings will be taken in a horizontal plane 3 ft (1 m) above the pavement or ground surface.

- (b) **Glare Control.** The lighting system shall be designed and operated so as to avoid glare that interferes with traffic, workers, or inspection personnel. Lighting systems with flood, spot, or stadium type luminaires shall be aimed downward at the work and rotated outward no greater than 30 degrees from nadir (straight down). Balloon lights shall be positioned at least 12 ft (3.6 m) above the roadway.

As a large component of glare, the headlights of construction vehicles and equipment shall not be operated within the work zone except as allowed for specific construction operations. Headlights shall never be used when facing oncoming traffic.

- (c) **Light Trespass.** The lighting system shall be designed to effectively light the work area without spilling over to adjoining property. When, in the opinion of the Engineer, the lighting is disturbing adjoining property, the Contractor shall modify the lighting arrangement or add hardware to shield the light trespass.

Construction Operations. The lighting design required above shall be provided at any location where construction equipment is operating or workers are present on foot. When multiple operations are being carried on simultaneously, lighting shall be provided at each separate work area.

The lighting requirements for specific construction operations shall be as follows.

- (a) **Installation or Removal of Work Zone Traffic Control.** The required lighting level shall be provided at each truck and piece of equipment used during the installation or removal of work zone traffic control. Headlights may be operated in the work zone.
- (b) **Milling and Paving.** The required lighting level shall be provided by mounting a minimum of one balloon light to each piece of mobile construction equipment used in the work zone. This would include milling machines, mechanical sweepers, material transfer devices, spreading and finishing machines, and rollers; but not include trucks used to transport materials and personnel or other vehicles that are continuously moving in and out of the work zone. The headlights of construction equipment shall not be operated within the work zone.
- (c) **Patching.** The required lighting level shall be provided at each patching location where work is being performed.

- (d) Pavement Marking and Raised Reflective Pavement Marker Removal/Installation. The striping truck and the attenuator/arrow board trucks may be operated by headlights alone; however, additional lighting may be necessary for the operator of the striping truck to perform the work.

For raised reflective pavement marker removal and installation and other pavement marking operations where workers are on foot, the required lighting level shall be provided at each truck and piece of equipment.

- (e) Layout, Testing, and Inspection. The required lighting level shall be provided for each active area of construction layout, material testing, and inspection. The work area shall be defined as 15 ft (7.6 m) in front and back of the individual(s) performing the tasks.

Basis of Payment. This work will be paid for at the contract lump sum price for NIGHTTIME WORK ZONE LIGHTING.

### **PAYMENTS TO SUBCONTRACTORS (BDE)**

Effective: June 1, 2000

Revised: January 1, 2006

Federal regulations found at 49 CFR §26.29 mandate the Department to establish a contract clause to require Contractors to pay subcontractors for satisfactory performance of their subcontracts and to set the time for such payments.

State law also addresses the timing of payments to be made to subcontractors and material suppliers. Section 7 of the Prompt Payment Act, 30 ILCS 540/7, requires that when a Contractor receives any payment from the Department, the Contractor shall make corresponding, proportional payments to each subcontractor and material supplier performing work or supplying material within 15 calendar days after receipt of the Department payment. Section 7 of the Act further provides that interest in the amount of two percent per month, in addition to the payment due, shall be paid to any subcontractor or material supplier by the Contractor if the payment required by the Act is withheld or delayed without reasonable cause. The Act also provides that the time for payment required and the calculation of any interest due applies to transactions between subcontractors and lower-tier subcontractors and material suppliers throughout the contracting chain.

This Special Provision establishes the required federal contract clause, and adopts the 15 calendar day requirement of the State Prompt Payment Act for purposes of compliance with the federal regulation regarding payments to subcontractors. This contract is subject to the following payment obligations.

When progress payments are made to the Contractor according to Article 109.07 of the Standard Specifications, the Contractor shall make a corresponding payment to each subcontractor and material supplier in proportion to the work satisfactorily completed by each subcontractor and for the material supplied to perform any work of the contract. The proportionate amount of partial payment due to each subcontractor and material supplier throughout the contracting chain shall be determined by the quantities measured or otherwise determined as eligible for payment by the Department and included in the progress payment to the Contractor. Subcontractors and material suppliers shall be paid by the Contractor within 15 calendar days after the receipt of payment from the Department.

The Contractor shall not hold retainage from the subcontractors. These obligations shall also apply to any payments made by subcontractors and material suppliers to their subcontractors and material suppliers; and to all payments made to lower tier subcontractors and material suppliers throughout the contracting chain. Any payment or portion of a payment subject to this provision may only be withheld from the subcontractor or material supplier to whom it is due for reasonable cause.

This Special Provision does not create any rights in favor of any subcontractor or material supplier against the State or authorize any cause of action against the State on account of any payment, nonpayment, delayed payment, or interest claimed by application of the State Prompt Payment Act. The Department will not approve any delay or postponement of the 15 day requirement except for reasonable cause shown after notice and hearing pursuant to Section 7(b) of the State Prompt Payment Act. State law creates other and additional remedies available to any subcontractor or material supplier, regardless of tier, who has not been paid for work properly performed or material furnished. These remedies are a lien against public funds set forth in Section 23(c) of the Mechanics Lien Act, 770 ILCS 60/23(c), and a recovery on the Contractor's payment bond according to the Public Construction Bond Act, 30 ILCS 550.

#### **PERSONAL PROTECTIVE EQUIPMENT (BDE)**

Effective: November 1, 2008

Revise the first sentence of Article 701.12 of the Standard Specifications to read:

“All personnel on foot, excluding flaggers, within the highway right-of-way shall wear a fluorescent orange, fluorescent yellow/green, or a combination of fluorescent orange and fluorescent yellow/green vest meeting the requirements of ANSI/ISEA 107-2004 for Conspicuity Class 2 garments.”

#### **REFLECTIVE SHEETING ON CHANNELIZING DEVICES (BDE)**

Effective: April 1, 2007

Revised: November 1, 2008

Revise the seventh paragraph of Article 1106.02 of the Standard Specifications to read:

“At the time of manufacturing, the retroreflective prismatic sheeting used on channelizing devices shall meet or exceed the initial minimum coefficient of retroreflection as specified in the following table. Measurements shall be conducted according to ASTM E 810, without averaging. Sheeting used on cones, drums and flexible delineators shall be reboundable as tested according to ASTM D 4956. Prestriped sheeting for rigid substrates on barricades shall be white and orange. [The sheeting shall be uniform in color and devoid of streaks throughout the length of each roll. The color shall conform to the latest appropriate standard color tolerance chart issued by the U.S. Department of Transportation, Federal Highway Administration, and to the daytime and nighttime color requirements of ASTM D 4956.](#)”

Initial Minimum Coefficient of Retroreflection candelas/foot candle/sq ft (candelas/lux/sq m) of material				
Observation Angle (deg.)	Entrance Angle (deg.)	White	Orange	Fluorescent Orange
0.2	-4	365	160	150
0.2	+30	175	80	70
0.5	-4	245	100	95
0.5	+30	100	50	40"

Revise the first sentence of the first paragraph of Article 1106.02(c) of the Standard Specifications to read:

“Barricades and vertical panels shall have alternating white and orange stripes sloping downward at 45 degrees toward the side on which traffic will pass.”

Revise the third sentence of the first paragraph of Article 1106.02(d) of the Standard Specifications to read:

“The bottom panels shall be 8 x 24 in. (200 x 600 mm) with alternating white and orange stripes sloping downward at 45 degrees toward the side on which traffic will pass.”

**SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)**

Effective: April 2, 2005

To account for the preparatory work and operations necessary for the movement of subcontractor personnel, equipment, supplies, and incidentals to the project site and for all other work or operations that must be performed or costs incurred when beginning work approved for subcontracting in accordance with Article 108.01 of the Standard Specifications, the Contractor shall make a mobilization payment to each subcontractor.

This mobilization payment shall be made at least 14 days prior to the subcontractor starting work. The amount paid shall be equal to 3 percent of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor’s work.

This provision shall be incorporated directly or by reference into each subcontract approved by the Department.

**TRUCK MOUNTED/TRAILER MOUNTED ATTENUATORS (BDE)**

Effective: January 1, 2010

Revise Article 701.03(k) of the Standard Specifications to read:

“(k) Truck Mounted/Trailer Mounted Attenuators ..... 1106.02”

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

“(h) Truck Mounted/Trailer Mounted Attenuators (TMA). TMA units shall have a roll ahead distance in the event of an impact. The TMA shall be between 100 and 200 ft (30 and 60 m) behind the vehicle ahead or the workers. This distance may be extended by the Engineer.

TMA host vehicles shall have the parking brake engaged when stationary.

The driver and passengers of the TMA host vehicle should exit the vehicle if the TMA is to remain stationary for 15 minutes or more in duration.”

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

“(g) Truck Mounted/Trailer Mounted Attenuators. The attenuator shall be a NCHRP 350 approved unit for Test Level 3. Test Level 2 may be used as directed by the Engineer for normal posted speeds less than or equal to 45 mph.”

**WORKING DAYS (BDE)**

Effective: January 1, 2002

The Contractor shall complete the work within **120** working days.



**REQUIRED CONTRACT PROVISIONS  
FEDERAL-AID CONSTRUCTION CONTRACTS**

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**ATTACHMENTS**

**A. Employment Preference for Appalachian Contracts  
(included in Appalachian contracts only)**

**I. GENERAL**

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

- Section I, paragraph 2;
- Section IV, paragraphs 1, 2, 3, 4 and 7;
- Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6 and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. Selection of Labor: During the performance of this contract, the contractor shall not:

- a. Discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

- b. Employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

**II. NONDISCRIMINATION**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

**1. Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60 (and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

- a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their

review of his/her activities under the contract.

- b. The contractor will accept as his operating policy the following

statement: "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job-training."

**2. EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for an must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

- a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

- b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

- c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

- d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees,

applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employees referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish which such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

#### **6. Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be

in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

**8. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees.

Contractors shall obtain lists of DBE construction firms from SHA

personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

**9. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of

DBE subcontractors or subcontractors with meaningful minority and

female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

### III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

### IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located

on roadways classified as local roads or rural minor collectors, which are exempt.)

#### 1. General:

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

#### 2. Classification:

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the

contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the question, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advised the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

### 3. Payment of Fringe Benefits:

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any cost reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

### 4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

#### a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any

employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid

the full amount of fringe benefits listed on the wage determination

for the applicable classification. If the Administrator for the Wage

and Hour Division determines that a different practice prevails for

the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

#### b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which cases such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration

withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

**c. Helpers:**

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV. 2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

**5. Apprentices and Trainees (Programs of the U.S. DOT):**

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**6. Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainee's and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

**7. Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**8. Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or

permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

**9. Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall; upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

**V. STATEMENTS AND PAYROLLS**

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

**1. Compliance with Copeland Regulations (29 CFR 3):**

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

**2. Payrolls and Payroll Records:**

- a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.
- b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.
- c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely

all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for submitting payroll copies of all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;
- (2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;
- (3) that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S. C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

## VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all federal-aid contracts on the national highway system, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635) the contractor shall:

- a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.
- b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.
- c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data

required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

## VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractors' own organization (23 CFR 635).

- a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.
- b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

## VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in

surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

#### **IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

##### **NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS**

18 U.S.C. 1020 reads as follows:

*“Whoever, being an officer, agent or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or*

*Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or*

*Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;*

*Shall be fined not more than \$10,000 or imprisoned not more than 5 years or both.”*

#### **X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more).

By submission of this bid or the execution of this contract, or

subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 *et seq.*, as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 *et seq.*, as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

#### **XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

1. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
- d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal

is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification in all lower tier covered transactions

and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded from Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

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#### **Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Primary Covered Transactions**

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

- a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and
- d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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#### **2. Instructions for Certification - Lower Tier Covered Transactions:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealing.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

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2. Where the prospective primary participant is unable to certify



**Certification Regarding Debarment, Suspension, Ineligibility And  
Voluntary Exclusion-Lower Tier Covered Transactions:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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**XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR  
LOBBYING**

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**MINIMUM WAGES FOR FEDERAL AND FEDERALLY  
ASSISTED CONSTRUCTION CONTRACTS**

This project is funded, in part, with Federal-aid funds and, as such, is subject to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Sta. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in a 29 CFR Part 1, Appendix A, as well as such additional statutes as may from time to time be enacted containing provisions for the payment of wages determined to be prevailing by the Secretary of Labor in accordance with the Davis-Bacon Act and pursuant to the provisions of 29 CFR Part 1. The prevailing rates and fringe benefits shown in the General Wage Determination Decisions issued by the U.S. Department of Labor shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged on contract work of the character and in the localities described therein.

General Wage Determination Decisions, modifications and supersedes decisions thereto are to be used in accordance with the provisions of 29 CFR Parts 1 and 5. Accordingly, the applicable decision, together with any modifications issued, must be made a part of every contract for performance of the described work within the geographic area indicated as required by an applicable DBRA Federal prevailing wage law and 29 CFR Part 5. The wage rates and fringe benefits contained in the General Wage Determination Decision shall be the minimum paid by contractors and subcontractors to laborers and mechanics.

**NOTICE**

The most current **General Wage Determination Decisions** (wage rates) are available on the IDOT web site. They are located on the Letting and Bidding page at <http://www.dot.state.il.us/desenv/delett.html>.

In addition, ten (10) days prior to the letting, the applicable Federal wage rates will be e-mailed to subscribers. It is recommended that all contractors subscribe to the Federal Wage Rates List or the Contractor's Packet through IDOT's subscription service.

PLEASE NOTE: if you have already subscribed to the Contractor's Packet you will automatically receive the Federal Wage Rates.

The instructions for subscribing are at <http://www.dot.state.il.us/desenv/subsc.html>.

If you have any questions concerning the wage rates, please contact IDOT's Chief Contract Official at 217-782-7806.