

BID PROPOSAL INSTRUCTIONS

ABOUT IDOT PROPOSALS: All proposals are potential bidding proposals. Each proposal contains all certifications and affidavits, a proposal signature sheet and a proposal bid bond.

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.

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.

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 124) 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.

WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?

When a prospective prime bidder submits a "Request for Authorization to Bid/or Not For Bid Status"(BDE 124) 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 and the Chief Procurement Officer 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 to Bid or Not For Bid Report within a reasonable time of complete and correct original document submittal should contact the Department as to the status. 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 bidder'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 or revision will be included with the Electronic Plans and Proposals. 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 service emails are an added courtesy the Department provides. It is suggested that bidders check IDOT's website at <http://www.idot.illinois.gov/doing-business/procurements/construction-services/construction-bulletins/transportation-bulletin/index#TransportationBulletin> 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 DOT.D&Econtracts@illinois.gov

Technical questions about downloading these files may be directed to Tim Garman at (217)524-1642 or Timothy.Garman@illinois.gov.

STANDARD GUIDELINES FOR SUBMITTING PAPER BIDS

- All pages should be single sided.
- Use the Cover Page that is provided in the Bid Proposal (posted on the IDOT Web Site) as the first page of your submitted bid. It has the item number in large bold type in the upper left-hand corner and lines provided for your company name and address in the upper right-hand corner.
- Do not use report covers, presentation folders or special bindings and do not staple multiple times on left side like a book. Use only 1 staple in the upper left hand corner. Make sure all elements of your bid are stapled together including the bid bond or guaranty check (if required).
- **Do not include any certificates of eligibility, your authorization to bid, Addendum Letters or affidavit of availability.**
- Do not include the Subcontractor Documentation with your bid (pages i – iii and pages a – g). This documentation is required only if you are awarded the project.
- Use the envelope cover sheet (provided with the proposal) as the cover for the proposal envelope.
- Do not rely on overnight services to deliver your proposal prior to 10 AM on letting day. It will not be read if it is delivered after 10 AM.
- Do not submit your Substance Abuse Prevention Program (SAPP) with your bid. If you are awarded the contract this form is to be submitted to the district engineer at the pre-construction conference.

BID SUBMITTAL CHECKLIST

- Cover page** (the sheet that has the item number on it) – This should be the first page of your bid proposal, **followed by your bid (the Schedule of Prices/Pay Items)**. If you are using special software or CBID to generate your schedule of prices, do not include the blank pages of the schedule of prices that came with the proposal package.
- Page 4 (Item 9)** – Check “YES” if you will use a subcontractor(s) with an annual value over \$50,000. Include the subcontractor(s) name, address, general type of work to be performed and the dollar amount. If you will use subcontractor(s) but are uncertain who or the dollar amount; check “YES” but leave the lines blank.
- After page 4** – Insert the following documents: Cost Adjustments for Steel, Bituminous and Fuel (if applicable) and the Contractor Letter of Assent (if applicable). The general rule should be, if you don’t know where it goes, put it after page 4.
- Page 10 (Paragraph J)** – Check “YES” or “NO” whether your company has any business in Iran.
- Page 10 (Paragraph K)** – (Not applicable to federally funded projects) List the name of the apprenticeship and training program sponsor holding the certificate of registration from the US Department of Labor. If no applicable program exists, please indicate the work/job category. **Do not include certificates with your bid.** Keep the certificates in your office in case they are requested by IDOT.
- Page 11 (Paragraph L)** – Your State Board of Elections certificate of registration is no longer required with your bid.
- Page 11 (Paragraph M)** – Indicate if your company has hired a lobbyist in connection with the job for which you are submitting the bid proposal.
- Page 12 (Paragraph C)** – This is a work sheet to determine if a completed Form A is required. It is not part of the form and you do not need to make copies for each completed Form A.
- Pages 14-17 (Form A)** – One Form A (4 pages) is required for each applicable person in your company. Copies of the forms can be used and only need to be changed when the information changes. The certification signature and date must be original for each letting. **Do not staple the forms together.** If you answered “NO” to all of the questions in Paragraph C (page 12), complete the first section (page 14) with your company information and then sign and date the Not Applicable statement on page 17.
- Page 18 (Form B)** - If you check “YES” to having other current or pending contracts it is acceptable to use the phrase, “See Affidavit of Availability on file”. **Ownership Certification** (at the bottom of the page) - Check N/A if the Form A(s) you submitted accounts for 100 percent of the company ownership. Check YES if any percentage of ownership falls outside of the parameters that require reporting on the Form A. Checking NO indicates that the Form A(s) you submitted is not correct and you will be required to submit a revised Form A.
- Page 20 (Workforce Projection)** – Be sure to include the Duration of the Project. It is acceptable to use the phrase “Per Contract Specifications”.

- Proposal Bid Bond** – (Insert after the proposal signature page) Submit your Proposal Bid Bond (if applicable) using the current Proposal Bid Bond form provided in the proposal package. The Power of Attorney page should be stapled to the Proposal Bid Bond. If you are using an electronic bond, include your bid bond number on the Proposal Bid Bond and attach the Proof of Insurance printed from the Surety’s Web Site.
- Disadvantaged Business Utilization Plan and/or Good Faith Effort – Do Not Submit with Bid** The bidder shall submit a Disadvantaged Business Utilization Plan on completed Department forms SBE 2025 and 2026. (1) The final Utilization Plan must be submitted within five calendar days after the date of the letting. (2) To meet the five day requirement, the bidder may send the Utilization Plan electronically by scanning and sending to DOT.DBE.UP@illinois.gov or faxing to (217) 785-1524. The subject line must include the bid Item Number and the Letting date. The Utilization Plan should be sent as one .pdf file, rather than multiple files and emails for the same Item Number. It is the responsibility of the bidder to obtain confirmation of email or fax delivery.

Alternatively, the Utilization Plan may be sent by certified mail or delivery service within the five calendar day period. If a question arises concerning the mailing date of a Utilization Plan, the mailing date will be established by the U.S. Postal Service postmark on the certified mail receipt from the U.S. Postal Service or the receipt issued by a delivery service. It is the responsibility of the bidder to ensure the postmark or receipt date is affixed within the five days if the bidder intends to rely upon mailing or delivery to satisfy the submission day requirement. The Utilization Plan is to be submitted to:

Illinois Department of Transportation
 Bureau of Small Business Enterprises
 Contract Compliance Section
 2300 South Dirksen Parkway, Room 319
 Springfield, Illinois 62764

The Bid Letting is now available in streaming Audio/Video from the IDOT Web Site. A link to the stream will be placed on the main page of the current letting on the day of the Letting. The stream will not begin until 10 AM. The actual reading of the bids does not begin until approximately 10:30 AM.

Following the Letting, the As-Read Tabulation of Bids will be posted by the end of the day. You will find the link on the main Web page for the current letting.

QUESTIONS: pre-letting up to execution of the contract

Contractor pre-qualification	217-782-3413
Small Business, Disadvantaged Business Enterprise (DBE)	217-785-4611
Contracts, Bids, Letting process or Internet downloads	217-782-7806
Estimates Unit.....	217-785-3483
Aeronautics.....	217-785-8515
IDNR (Land Reclamation, Water Resources, Natural Resources).....	217-782-6302

QUESTIONS: following contract execution

Subcontractor documentation, payments	217-782-3413
Railroad Insurance	217-785-0275

RETURN WITH BID

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Proposal Submitted By
Name
Address
City

Letting July 29, 2016

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.

BIDDERS NEED NOT RETURN THE ENTIRE PROPOSAL

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



**Illinois Department
of Transportation**

Springfield, Illinois 62764

**Contract No. 60Y38
COOK County
Section (1517&1415)R-3
Route FAI 90
Project ACCMI-ACSTP-0090(403)
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
- An Annual Bid Bond is included or is on file with IDOT.

Prepared by

Checked by

F

Page intentionally left blank

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. 60Y38
COOK County
Section (1517&1415)R-3
Project ACCMI-ACSTP-0090(403)
Route FAI 90
District 1 Construction Funds**

Construction of a new lane along EB I-90 from Cumberland Ave. to Harlem Ave., new retaining walls, lighting, resurfacing of the Frontage Road between Oriole Ave. and Harlem Ave. and other related work location in Chicago.

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 will govern performance and payments.

RETURN WITH BID

3. **ASSURANCE OF EXAMINATION AND INSPECTION/WAIVER.** The undersigned bidder further declares that he/she has carefully examined the proposal, plans, specifications, addenda form of contract and contract bond, and special provisions, and that he/she has inspected in detail the site of the proposed work, and that he/she has familiarized themselves with all of the local conditions affecting the contract and the detailed requirements of construction, and understands that in making this bid proposal he/she waives all right to plead any misunderstanding regarding the same.

4. **EXECUTION OF CONTRACT AND CONTRACT BOND.** The undersigned bidder further agrees to execute a contract for this work and present the same to the department within fifteen (15) days after the contract has been mailed to him/her. The undersigned further agrees that he/she and his/her surety will execute and present within fifteen (15) days after the contract has been mailed to him/her contract bond satisfactory to and in the form prescribed by the Department of Transportation, in the penal sum of the full amount of the contract, or as specified in the special provisions, guaranteeing the faithful performance of the work in accordance with the terms of the contract.

5. **PROPOSAL GUARANTY.** Accompanying this proposal is either a bid bond on the department form, executed by a corporate surety company satisfactory to the department, or a proposal guaranty check consisting of a bank cashier's check or a properly certified check for not less than 5 per cent of the amount bid or for the amount specified in the following schedule:

<u>Amount of Bid</u>		<u>Proposal Guaranty</u>	<u>Amount of Bid</u>		<u>Proposal Guaranty</u>	
Up to	\$5,000	\$150	\$2,000,000	to	\$3,000,000	\$100,000
\$5,000	to \$10,000	\$300	\$3,000,000	to	\$5,000,000	\$150,000
\$10,000	to \$50,000	\$1,000	\$5,000,000	to	\$7,500,000	\$250,000
\$50,000	to \$100,000	\$3,000	\$7,500,000	to	\$10,000,000	\$400,000
\$100,000	to \$150,000	\$5,000	\$10,000,000	to	\$15,000,000	\$500,000
\$150,000	to \$250,000	\$7,500	\$15,000,000	to	\$20,000,000	\$600,000
\$250,000	to \$500,000	\$12,500	\$20,000,000	to	\$25,000,000	\$700,000
\$500,000	to \$1,000,000	\$25,000	\$25,000,000	to	\$30,000,000	\$800,000
\$1,000,000	to \$1,500,000	\$50,000	\$30,000,000	to	\$35,000,000	\$900,000
\$1,500,000	to \$2,000,000	\$75,000	over		\$35,000,000	\$1,000,000

Bank cashier's checks or properly certified checks accompanying bid proposals will be made payable to the Treasurer, State of Illinois.

If a combination bid is submitted, the proposal guaranties which accompany the individual bid proposals making up the combination will be considered as also covering the combination bid.

The amount of the proposal guaranty check is _____ \$(_____). If this proposal is accepted and the undersigned will fail to execute a contract bond as required herein, it is hereby agreed that the amount of the proposal guaranty will become the property of the State of Illinois, and shall be considered as payment of damages due to delay and other causes suffered by the State because of the failure to execute said contract and contract bond; otherwise, the bid bond will become void or the proposal guaranty check will be returned to the undersigned.

Attach Cashier's Check or Certified Check Here

In the event that one proposal guaranty check is intended to cover two or more bid proposals, the amount must be equal to the sum of the proposal guaranties which would be required for each individual bid proposal. If the guaranty check is placed in another bid proposal, state below where it may be found.

The proposal guaranty check will be found in the bid proposal for:

Item _____

Section No. _____

County _____

Mark the proposal cover sheet as to the type of proposal guaranty submitted.

RETURN WITH BID

6. **COMBINATION BIDS.** The undersigned bidder 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 contract 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 will 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 (the 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 transact business or conduct affairs in the State of Illinois prior to submitting the bid.
9. **EXECUTION OF CONTRACT:** The Department of Transportation will, in accordance with the rules governing Department procurements, execute the contract and shall be the sole entity having the authority to accept performance and make payments under the contract. Execution of the contract by the Chief Procurement Officer (CPO) or the State Purchasing Officer (SPO) is for approval of the procurement process and execution of the contract by the Department. Neither the CPO nor the SPO shall be responsible for administration of the contract or determinations respecting performance or payment there under except as otherwise permitted in the Code.
10. **The services of a subcontractor will be used.**

Check box Yes
 Check box No

For known subcontractors with subcontracts with an annual value of more than \$50,000, the contract shall include their name, address, general type of work to be performed, and the dollar allocation for each subcontractor.
 (30 ILCS 500/20-120)

ILLINOIS DEPARTMENT OF TRANSPORTATION
 SCHEDULE OF PRICES
 CONTRACT
 NUMBER -

60Y38

State Job # - C-91-376-14

County Name - COOK - -

Code - 31 - -

District - 1 - -

Section Number - (1517 & 1415) R-3

Project Number
 ACCMI-ACSTP-0090/403/

Route
 FAI 90

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
A2002008	T-AESCUL FLV YSB 2 BB	EACH	10.000				
A2002916	T-CELTIS OCCID 2	EACH	13.000				
A2005015	T-GYMNOCLA DIO 8' MSF	EACH	5.000				
A2006516	T-QUERCUS BICOL 2	EACH	10.000				
A2006568	T-QUERCUS BICL CL 7'	EACH	5.000				
A2006816	T-QUERCUS MEUH 2	EACH	10.000				
A2007132	T-QUERCUS SCHUETTI 2	EACH	10.000				
A2008468	T-ULMUS AMER PRINC 2	EACH	5.000				
D2001960	E-PICEA GLAU DEN 5'	EACH	13.000				
D2002260	E-PICEA PUNG GLAU 5'	EACH	13.000				
K0012990	P PL ORNAMENT T GAL P	UNIT	7.500				
K0013060	P PL SEDG MDW 2X4 DPG	UNIT	4.000				
K0029624	WEED CONTROL TEASEL	GALLON	101.000				
K0029632	WEED CONT N SEL/N RES	GALLON	5.000				
K0029634	WEED CONTR PRE-EM GRN	POUND	7.000				

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X0100004	TEMP FILL MATERIAL	CU YD	8.000				
X0300249	REMOV EX GATE	EACH	2.000				
X0321322	DROP GATE	EACH	2.000				
X0321809	PERMANENT GRND ANCHOR	EACH	10.000				
X0322247	MAIN EX TRAFFIC SURV	L SUM	1.000				
X0322441	DIG LOOP DET SEN U 4C	EACH	7.000				
X0322442	TONE EQ 3 FRE REC PRG	EACH	33.000				
X0322443	TONE EQ 3 FREQ TR PRG	EACH	33.000				
X0322444	TONE EQ POWER SUPPLY	EACH	10.000				
X0322445	TONE EQ MOUNT FRAME	EACH	10.000				
X0322936	REMOV EX FLAR END SEC	EACH	1.000				
X0322938	TEMPORARY END SECTION	EACH	6.000				
X0323261	TEMP SEDIMENT BASIN	EACH	1.000				
X0323524	REM EX SURVEIL CAM EQ	EACH	4.000				
X0323904	IDOT COMM CENTER NODE	L SUM	1.000				

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X0323917	CABINET MODEL 334	EACH	3.000				
X0324571	MAINT ST LTG SYS CHGO	L SUM	1.000				
X0324587	NOIS AB WAL A-ROD ASY	EACH	81.000				
X0324599	ROD AND CLEAN EX COND	FOOT	35.000				
X0325003	REM EX VALVE & VAULT	EACH	1.000				
X0325034	MH TA 6D W/2 T1FOL RP	EACH	1.000				
X0325040	FO INNERDUCT 1 1/4"	FOOT	31,415.000				
X0325201	SHOULDER RUM STRIP RM	SQ YD	1,914.000				
X0325405	FILL EX STORM SEWERS	CU YD	8.000				
X0325476	RADAR VEH DETECT SYST	EACH	6.000				
X0326263	EQUIPMENT CABINET	EACH	4.000				
X0326266	ETHERNET SWITCH	EACH	3.000				
X0326326	CC TPX 2-1/C6 1-1/CG	FOOT	135.000				
X0326465	MOD EX VID DSTN SYS	L SUM	1.000				

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X0326945	CCTV CAMERA EQUIPMENT	EACH	3.000				
X0326952	STEP-DOWN TRANSFORMER	EACH	1.000				
X0326964	FO INTERCONNECT CAB	EACH	1.000				
X0327117	ATMS SYS INTEGRATION	L SUM	1.000				
X0327216	CCTV CAMERA	EACH	3.000				
X0327261	CAB HOUSING EQU TY 4	EACH	3.000				
X0327332	FIB CONN IDOT DIST 1	L SUM	1.000				
X0327367	STL CAS P BOR/JKD 24	FOOT	232.000				
X0327392	WOOD POLE 60 CL 4	EACH	2.000				
X0327393	WOOD POLE 100 CL 2	EACH	31.000				
X0327601	CCTV CAM STR FD 80 MH	FOOT	63.000				
X0327602	CCTV CAM STR GS 80 MH	EACH	3.000				
X0327605	DMS REM AND INSTALL	L SUM	1.000				
X0327606	FIBER OPT SPL-LATERAL	EACH	8.000				
X0327607	FIBER OPT SPL-MAINLN	EACH	2.000				

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X0327682	CDWM ENG SERVICES	L SUM	1.000				
X0327752	CONDUIT RISER GAL STL	EACH	4.000				
X0327976	TRACK MONITORING	CAL DA	35.000				
X0327979	PAVMT MRKG REM GRIND	SQ FT	71,121.000				
X0327980	PAVMT MRKG REM WTR BL	SQ FT	24,238.000				
X0327984	STL CAS P BOR/JKD 54	FOOT	242.000				
X0900030	WEEP HOLS CLEAND/EXTD	L SUM	1.000				
X1200077	D I WATER MAIN 48	FOOT	65.000				
X1200078	D I WM 12 RJ PIPE	FOOT	327.000				
X1200079	D I WM 36 RJ PIPE	FOOT	352.000				
X1200080	STORM SEW JKD 48 SPL	FOOT	96.000				
X1200081	WATER VALVES 48	EACH	2.000				
X1400013	REM CABLE IN CONDUIT	FOOT	300.000				
X1400149	LUM LED HM C	EACH	80.000				
X1400180	ELCBL C COMM 19 6 PR	FOOT	4,686.000				

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X1400181	LUM UNDRPASS LED TY B	EACH	29.000				
X2020502	BRACED EXCAVATION	CU YD	853.000				
X2501800	SEEDING CL 4 MOD	ACRE	2.650				
X2503000	MAINTENANCE MOWING	ACRE	27.900				
X2503315	INTERSEED CL 4A MOD	ACRE	1.000				
X2511630	EROS CONT BLANKET SPL	SQ YD	12,842.000				
X2600019	LED FBN & FLSHR CTRLR	EACH	2.000				
X4060002	P HMA BC SMA 12.5 N80	TON	5,757.000				
X4060006	P HMA SC SMA 12.5 N80	TON	5,757.000				
X4403300	CONC MEDIAN REMOV	SQ FT	1,022.000				
X5537800	SS CLEANED 12	FOOT	663.000				
X5537900	SS CLEANED 15	FOOT	49.000				
X5538000	SS CLEANED 18	FOOT	186.000				
X5538200	SS CLEANED 24	FOOT	51.000				
X5538600	SS CLEANED 36	FOOT	189.000				

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X5610651	ABAN EX WM FILL CLSM	FOOT	789.000				
X6020096	MH TA 6D W/2 T1FCL RP	EACH	1.000				
X6024200	MAN TA 6D T1F CL SPL	EACH	3.000				
X6030310	FR & LIDS ADJUST SPL	EACH	39.000				
X6370279	CONC BAR 1F 42HT SPL	FOOT	1,075.000				
X6370700	CONC BAR TRANS SPL	FOOT	50.000				
X6640560	CH LK FENCE 6 SPL	FOOT	60.000				
X6643310	CH LK FN REM/RE-E CTA	FOOT	40.000				
X6700410	ENGR FLD OFF A SPL	CAL MO	16.000				
X7010216	TRAF CONT & PROT SPL	L SUM	1.000				
X7011015	TR C-PROT EXPRESSWAYS	L SUM	1.000				
X7013820	TR CONT SURVEIL EXPWY	CAL DA	395.000				
X7030025	WET REF TEM TP T3 L&S	SQ FT	557.000				
X7030030	WET REF TEM TAPE T3 4	FOOT	98,177.000				
X7030035	WET REF TEM TAPE T3 5	FOOT	36,001.000				

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X7030040	WET REF TEM TAPE T3 6	FOOT	287.000				
X7030045	WET REF TEM TAPE T3 8	FOOT	28,330.000				
X7030050	WET REF TEM TPE T3 12	FOOT	2,064.000				
X7030055	WET REF TEM TPE T3 24	FOOT	50.000				
X7040125	PIN TEMP CONC BARRIER	EACH	3,106.000				
X7240300	SIGN REMOVAL	EACH	2.000				
X8040310	ELECT SERV DISCONNECT	EACH	5.000				
X8210027	TEMP LUM SVHMHMT 750W	EACH	29.000				
X8210040	TEMP LUM HPSV HM 400W	EACH	1.000				
X8211125	LUM LED HM SPL	EACH	1.000				
X8250500	LIGHTING UNIT COMP SP	EACH	1.000				
X8251388	LT CT BM 480V200D RS	EACH	1.000				
X8300001	LIGHT P0LE SPECIAL	EACH	1.000				
X8420111	REM UNDERPASS LU NS	EACH	34.000				
X8710035	FIB OPT CBL 96F SM	FOOT	24,961.000				

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X8710036	FIB OPT CBL 12F SM	FOOT	2,530.000				
X8710054	FO TERM PANEL 12F 24F	EACH	6.000				
X8730312	EC C LEAD 18 4C TW SH	FOOT	2,273.000				
X8772115	TEMP MA A 15	EACH	30.000				
X8780105	CONC FDN SPL	EACH	3.000				
X8807670	SH LED RETROFIT	EACH	4.000				
X8850102	INDUCTION LOOP	FOOT	682.000				
X8950300	REM EX SIG HD & POST	EACH	4.000				
X8950510	REM FOC FR CONDUIT	FOOT	630.000				
X8950700	REM TEMP INTERCONNECT	L SUM	1.000				
Z0005216	HMA STAB 6 AT SPBGR	SQ YD	154.000				
Z0007120	WELD WIRE FAB 6X6	SQ YD	89.000				
Z0007510	ENGINEERED BARRIER	SQ YD	1,000.000				
Z0012754	STR REP CON DP = < 5	SQ FT	5.000				
Z0013798	CONSTRUCTION LAYOUT	L SUM	1.000				

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Z0018500	DRAINAGE STR CLEANED	EACH	21.000				
Z0019600	DUST CONTROL WATERING	UNIT	50.000				
Z0022800	FENCE REMOVAL	FOOT	1,281.000				
Z0030850	TEMP INFO SIGNING	SQ FT	1,260.000				
Z0033020	LUM SFTY CABLE ASMBLY	EACH	80.000				
Z0033028	MAINTAIN LIGHTING SYS	CAL MO	24.000				
Z0033052	COMMUNICATIONS VAULT	EACH	15.000				
Z0034105	MATL TRANSFER DEVICE	TON	11,514.000				
Z0046304	P UNDR FOR STRUCT 4	FOOT	2,788.000				
Z0048665	RR PROT LIABILITY INS	L SUM	1.000				
Z0056608	STORM SEW WM REQ 12	FOOT	47.000				
Z0056626	STORM SEW WM REQ 48	FOOT	85.000				
Z0062456	TEMP PAVEMENT	SQ YD	5,964.000				
Z0076600	TRAINEES	HOUR	2,000.000		0.800		1,600.000
Z0076604	TRAINEES TPG	HOUR	2,000.000		15.000		30,000.000

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Z0077800	WOOD POST	EACH	2.000				
20100110	TREE REMOV 6-15	UNIT	774.000				
20100210	TREE REMOV OVER 15	UNIT	295.000				
20101000	TEMPORARY FENCE	FOOT	4,434.000				
20101100	TREE TRUNK PROTECTION	EACH	21.000				
20101700	SUPPLE WATERING	UNIT	440.000				
20200100	EARTH EXCAVATION	CU YD	25,663.000				
20201200	REM & DISP UNS MATL	CU YD	3,706.000				
20800150	TRENCH BACKFILL	CU YD	6,992.000				
21101625	TOPSOIL F & P 6	SQ YD	25,526.000				
25000210	SEEDING CL 2A	ACRE	2.610				
25000312	SEEDING CL 4A	ACRE	0.010				
25000400	NITROGEN FERT NUTR	POUND	227.000				
25000500	PHOSPHORUS FERT NUTR	POUND	227.000				
25000600	POTASSIUM FERT NUTR	POUND	227.000				

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25100115	MULCH METHOD 2	ACRE	2.530				
25100127	MULCH METHOD 3A	ACRE	0.100				
25100630	EROSION CONTR BLANKET	SQ YD	12,199.000				
25100635	HD EROS CONTR BLANKET	SQ YD	484.000				
25200110	SODDING SALT TOLERANT	SQ YD	76.000				
28000200	EARTH EXC - EROS CONT	CU YD	47.000				
28000250	TEMP EROS CONTR SEED	POUND	262.000				
28000305	TEMP DITCH CHECKS	FOOT	224.000				
28000400	PERIMETER EROS BAR	FOOT	1,946.000				
28000510	INLET FILTERS	EACH	136.000				
28001000	AGGREGATE - EROS CONT	TON	61.000				
28001200	TEMP HD EROS CONTR BL	SQ YD	484.000				
28100107	STONE RIPRAP CL A4	SQ YD	47.000				
30300001	AGG SUBGRADE IMPROVE	CU YD	717.000				
30300112	AGG SUBGRADE IMPR 12	SQ YD	41,702.000				

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31100300	SUB GRAN MAT A 4	SQ YD	96.000				
31101200	SUB GRAN MAT B 4	SQ YD	1,265.000				
35400500	PCC BASE CSE W 10	SQ YD	148.000				
35501307	HMA BASE CSE 5 3/4	SQ YD	1,216.000				
35501308	HMA BASE CSE 6	SQ YD	925.000				
35501309	HMA BASE CSE 6 1/4	SQ YD	5,529.000				
35501313	HMA BASE CSE 7 1/4	SQ YD	413.000				
35501323	HMA BASE CSE 9 3/4	SQ YD	11,667.000				
35600724	HMA BC WID 12	SQ YD	5,644.000				
40600290	BIT MATLS TACK CT	POUND	50,590.000				
40600827	P LB MM IL-4.75 N50	TON	559.000				
40600982	HMA SURF REM BUTT JT	SQ YD	480.000				
40603085	HMA BC IL-19.0 N70	TON	250.000				
40603340	HMA SC "D" N70	TON	958.000				
40603565	P HMA SC "E" N70	TON	1,305.000				

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42000100	PCC PVT 6	SQ YD	96.000				
42001300	PROTECTIVE COAT	SQ YD	1,688.000				
42400200	PC CONC SIDEWALK 5	SQ FT	1,418.000				
42400410	PC CONC SIDEWALK 8	SQ FT	170.000				
42400800	DETECTABLE WARNINGS	SQ FT	103.000				
44000100	PAVEMENT REM	SQ YD	16,340.000				
44000159	HMA SURF REM 2 1/2	SQ YD	12,911.000				
44000165	HMA SURF REM 4	SQ YD	32,722.000				
44000166	HMA SURF REM 4 1/4	SQ YD	1,978.000				
44000500	COMB CURB GUTTER REM	FOOT	9,019.000				
44000600	SIDEWALK REM	SQ FT	2,307.000				
44001980	CONC BARRIER REMOV	FOOT	1,191.000				
44004250	PAVED SHLD REMOVAL	SQ YD	19,237.000				
44201777	CL D PATCH T2 11	SQ YD	15.000				
44201827	CL D PATCH T2 15	SQ YD	31.000				

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44201833	CL D PATCH T4 15	SQ YD	249.000				
44300200	STRIP REF CR CON TR	FOOT	28,564.000				
48101600	AGGREGATE SHLDS B 8	SQ YD	2,386.000				
48203036	HMA SHOULDERS 9 3/4	SQ YD	148.000				
48203038	HMA SHOULDERS 10 1/4	SQ YD	1,432.000				
48203042	HMA SHOULDERS 11 1/4	SQ YD	207.000				
48203052	HMA SHOULDERS 13 3/4	SQ YD	8,051.000				
50100100	REM EXIST STRUCT	EACH	1.000				
50102400	CONC REM	CU YD	110.000				
50104000	BRIDGE RAIL REMOVAL	FOOT	195.000				
50200100	STRUCTURE EXCAVATION	CU YD	9,015.000				
50300225	CONC STRUCT	CU YD	2,412.000				
50300255	CONC SUP-STR	CU YD	142.000				
50300300	PROTECTIVE COAT	SQ YD	2,547.000				
50500505	STUD SHEAR CONNECTORS	EACH	2,484.000				

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50800205	REINF BARS, EPOXY CTD	POUND	535,088.000				
51500100	NAME PLATES	EACH	6.000				
51603000	DRILLED SHAFT IN SOIL	CU YD	152.000				
52200020	TEMP SOIL RETEN SYSTM	SQ FT	20,041.000				
52200100	FUR SOLDIER PILES HP	FOOT	9,272.000				
52200105	FUR SOLDIER PILES WS	FOOT	48.000				
52200150	DRIVE SOLDIER PILES	FOOT	9,272.000				
52200200	DRILL SET SLD PI SOIL	CU FT	339.000				
52200250	UNTREATED TIMBER LAG	SQ FT	13,710.000				
542A0229	P CUL CL A 1 24	FOOT	49.000				
542A5479	P CUL CL A 1 EQRS 24	FOOT	43.000				
5421A012	P CUL CL A 1 12 TEMP	FOOT	279.000				
54213669	PRC FLAR END SEC 24	EACH	1.000				
54219202	R C PIPE TEE 48P 48R	EACH	1.000				
54261415	CONC ES 542001 15 1:4	EACH	4.000				

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54263424	CONC ES 542011 24 1:4	EACH	1.000				
550A0050	STORM SEW CL A 1 12	FOOT	996.000				
550A0070	STORM SEW CL A 1 15	FOOT	1,225.000				
550A0090	STORM SEW CL A 1 18	FOOT	126.000				
550A0120	STORM SEW CL A 1 24	FOOT	114.000				
550A0140	STORM SEW CL A 1 30	FOOT	326.000				
550A0160	STORM SEW CL A 1 36	FOOT	467.000				
550A0340	STORM SEW CL A 2 12	FOOT	147.000				
550A0380	STORM SEW CL A 2 18	FOOT	394.000				
550A0450	STORM SEW CL A 2 36	FOOT	89.000				
550A5510	SS CL A 2 EQRS 48	FOOT	725.000				
55100400	STORM SEWER REM 10	FOOT	306.000				
55100500	STORM SEWER REM 12	FOOT	669.000				
55100700	STORM SEWER REM 15	FOOT	100.000				
55100900	STORM SEWER REM 18	FOOT	633.000				

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55101200	STORM SEWER REM 24	FOOT	268.000				
55101600	STORM SEWER REM 36	FOOT	158.000				
55201300	STORM SEWERS JKD 36	FOOT	47.000				
56103300	D I WATER MAIN 12	FOOT	103.000				
56105200	WATER VALVES 12	EACH	2.000				
59000200	EPOXY CRACK INJECTION	FOOT	190.000				
59100100	GEOCOMPOSITE WALL DR	SQ YD	1,044.000				
60100060	CONC HDWL FOR P DRAIN	EACH	3.000				
60108100	PIPE UNDERDRAIN 4 SP	FOOT	98.000				
60108204	PIPE UNDERDR T 2 4	FOOT	6,079.000				
60200105	CB TA 4 DIA T1F OL	EACH	1.000				
60200805	CB TA 4 DIA T8G	EACH	3.000				
60200905	CB TA 4 DIA T9F&G	EACH	6.000				
60201310	CB TA 4 DIA T20F&G	EACH	33.000				
60205010	CB TA 5 DIA T20F&G	EACH	3.000				

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60218400	MAN TA 4 DIA T1F CL	EACH	4.000				
60219100	MAN TA 4 DIA T9F&G	EACH	1.000				
60221100	MAN TA 5 DIA T1F CL	EACH	5.000				
60224010	MAN TA 6 DIA T9F&G	EACH	1.000				
60224434	MAN TA 7 DIA T9F&G	EACH	4.000				
60224440	MAN TA 7 DIA T20F&G	EACH	1.000				
60224446	MAN TA 7 DIA T1F CL	EACH	1.000				
60236600	INLETS TA T9F&G	EACH	5.000				
60236700	INLETS TA T10F&G	EACH	7.000				
60237420	INLETS TA T20F&G	EACH	18.000				
60237460	INLETS TA T23F&G	EACH	1.000				
60248900	VV TA 5 DIA T1F CL	EACH	2.000				
60249010	VV TA 6 DIA T1F CL	EACH	2.000				
60255500	MAN ADJUST	EACH	1.000				
60300305	FR & LIDS ADJUST	EACH	158.000				

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60500040	REMOV MANHOLES	EACH	4.000				
60500050	REMOV CATCH BAS	EACH	7.000				
60500060	REMOV INLETS	EACH	25.000				
60500080	REMOV CB - MAIN FLOW	EACH	1.000				
60500090	REM INLET- MAIN FLOW	EACH	13.000				
60600605	CONC CURB TB	FOOT	33.000				
60602500	CONC GUTTER TA	FOOT	2,420.000				
60602800	CONC GUTTER TB	FOOT	2,737.000				
60603800	COMB CC&G TB6.12	FOOT	267.000				
60604400	COMB CC&G TB6.18	FOOT	41.000				
60610400	COMB CC&G TM6.24	FOOT	41.000				
60620000	CONC MED TSB6.24	SQ FT	5,755.000				
60624600	CORRUGATED MED	SQ FT	556.000				
63000001	SPBGR TY A 6FT POSTS	FOOT	1,406.000				
63100045	TRAF BAR TERM T2	EACH	2.000				

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63100085	TRAF BAR TERM T6	EACH	1.000				
63100089	TRAF BAR TERM T6B	EACH	2.000				
63100167	TR BAR TRM T1 SPL TAN	EACH	3.000				
63200310	GUARDRAIL REMOV	FOOT	458.000				
63301210	REM RE-E SPBGR TY A	FOOT	117.000				
63500105	DELINEATORS	EACH	94.000				
63700155	CONC BAR 1F 32HT	FOOT	50.000				
63700900	CONC BARRIER BASE	FOOT	40.000				
64200116	SHOULDER RUM STRIP 16	FOOT	14,200.000				
64300450	IMP ATTEN NRD TL3	EACH	1.000				
66400305	CH LK FENCE 6	FOOT	78.000				
66400505	CH LK FENCE 8	FOOT	110.000				
66409400	CH LK GATES 8X12 DBL	EACH	1.000				
66900200	NON SPL WASTE DISPOSL	CU YD	5,980.000				
66900450	SPL WASTE PLNS/REPORT	L SUM	1.000				

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66900530	SOIL DISPOSAL ANALY	EACH	7.000				
67000600	ENGR FIELD LAB	CAL MO	16.000				
67100100	MOBILIZATION	L SUM	1.000				
70103815	TR CONT SURVEILLANCE	CAL DA	90.000				
70106800	CHANGEABLE MESSAGE SN	CAL MO	35.000				
70300100	SHORT TERM PAVT MKING	FOOT	465.000				
70300240	TEMP PVT MK LINE 6	FOOT	1,790.000				
70400100	TEMP CONC BARRIER	FOOT	9,565.000				
70400200	REL TEMP CONC BARRIER	FOOT	15,396.000				
70600240	IMP ATTN TEMP NRD TL2	EACH	5.000				
70600250	IMP ATTN TEMP NRD TL3	EACH	4.000				
70600255	IMP ATTN TEMP FRN TL2	EACH	5.000				
70600260	IMP ATTN TEMP FRN TL3	EACH	2.000				
70600322	IMP ATTN REL FRN TL2	EACH	1.000				
70600340	IMP ATTN REL NRD TL2	EACH	2.000				

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70600350	IMP ATTN REL NRD TL3	EACH	1.000				
72000100	SIGN PANEL T1	SQ FT	112.000				
72000200	SIGN PANEL T2	SQ FT	204.000				
72000300	SIGN PANEL T3	SQ FT	1,321.000				
72400100	REMOV SIN PAN ASSY TA	EACH	2.000				
72400310	REMOV SIGN PANEL T1	SQ FT	103.000				
72400320	REMOV SIGN PANEL T2	SQ FT	217.000				
72400330	REMOV SIGN PANEL T3	SQ FT	1,380.000				
72400500	RELOC SIN PAN ASSY TA	EACH	1.000				
72501000	TERMINAL MARKER - DA	EACH	2.000				
72700100	STR STL SIN SUP BA	POUND	1,384.000				
72800100	TELES STL SIN SUPPORT	FOOT	253.000				
73000100	WOOD SIN SUPPORT	FOOT	126.000				
73300300	OVHD SIN STR-SPAN T3A	FOOT	157.000				
73302210	OSS CANT 3CA 3-0X7-0	FOOT	34.000				

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73304000	OVHD SIN STR BR MT	FOOT	21.500				
73400100	CONC FOUNDATION	CU YD	71.000				
73400200	DRILL SHAFT CONC FDN	CU YD	79.000				
73600100	REMOV OH SIN STR-SPAN	EACH	2.000				
73700100	REM GR MT SIN SUPPORT	EACH	27.000				
73700200	REM CONC FDN-GR MT	EACH	6.000				
73700300	REM CONC FDN-OVHD	EACH	2.000				
73800325	REM OVH SIGN STR BR M	EACH	1.000				
78000100	THPL PVT MK LTR & SYM	SQ FT	734.000				
78000200	THPL PVT MK LINE 4	FOOT	26,119.000				
78000400	THPL PVT MK LINE 6	FOOT	1,575.000				
78000500	THPL PVT MK LINE 8	FOOT	10,980.000				
78000600	THPL PVT MK LINE 12	FOOT	2,650.000				
78000650	THPL PVT MK LINE 24	FOOT	541.000				
78004210	PREF PL PM TB INL L4	FOOT	414.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
 SCHEDULE OF PRICES
 CONTRACT
 NUMBER -

60Y38

State Job # - C-91-376-14

County Name - COOK- -

Code - 31 - -

District - 1 - -

Section Number - (1517 & 1415) R-3

Project Number
 ACCMI-ACSTP-0090/403/

Route
 FAI 90

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
78004220	PREF PL PM TB INL L5	FOOT	5,135.000				
78004240	PREF PL PM TB INL L8	FOOT	503.000				
78005100	EPOXY PVT MK LTR-SYM	SQ FT	222.000				
78005110	EPOXY PVT MK LINE 4	FOOT	21,728.000				
78005120	EPOXY PVT MK LINE 5	FOOT	5,603.000				
78005140	EPOXY PVT MK LINE 8	FOOT	6,473.000				
78005150	EPOXY PVT MK LINE 12	FOOT	1,013.000				
78100100	RAISED REFL PAVT MKR	EACH	587.000				
78200410	GUARDRAIL MKR TYPE A	EACH	17.000				
78200530	BAR WALL MKR TYPE C	EACH	1,925.000				
78300200	RAISED REF PVT MK REM	EACH	550.000				
80400100	ELECT SERV INSTALL	EACH	1.000				
80400200	ELECT UTIL SERV CONN	L SUM	1.000				
81028170	UNDRGRD C GALVS 1	FOOT	30.000				
81028200	UNDRGRD C GALVS 2	FOOT	10,165.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
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 CONTRACT
 NUMBER -

60Y38

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Section Number - (1517 & 1415) R-3

Project Number
 ACCMI-ACSTP-0090/403/

Route
 FAI 90

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
81028220	UNDRGRD C GALVS 3	FOOT	1,482.000				
81028240	UNDRGRD C GALVS 4	FOOT	6,165.000				
81028730	UNDRGRD C CNC 1 1/4	FOOT	304.000				
81100320	CON AT ST 1 PVC GS	FOOT	800.000				
81100805	CON AT ST 3 PVC GALVS	FOOT	500.000				
81200230	CON EMB STR 2 PVC	FOOT	1,715.000				
81300220	JUN BX SS AS 6X6X4	EACH	29.000				
81300530	JUN BX SS AS 12X10X6	EACH	14.000				
81300830	JUN BX SS AS 18X18X8	EACH	6.000				
81300948	JUN BX SS AS 24X24X10	EACH	1.000				
81400200	HD HANDHOLE	EACH	36.000				
81603080	UD 3#2#4GXLPUSE 1 1/4	FOOT	12,730.000				
81702100	EC C XLP USE 1C 12	FOOT	2,562.000				
81702110	EC C XLP USE 1C 10	FOOT	2,400.000				
81702120	EC C XLP USE 1C 8	FOOT	2,100.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
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 CONTRACT
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60Y38

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District - 1 - -

Section Number - (1517 & 1415) R-3

Project Number
 ACCMI-ACSTP-0090/403/

Route
 FAI 90

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
81702130	EC C XLP USE 1C 6	FOOT	7,214.000				
81702140	EC C XLP USE 1C 4	FOOT	460.000				
81702150	EC C XLP USE 1C 2	FOOT	6,506.000				
81702160	EC C XLP USE 1C 1/0	FOOT	179.000				
81702220	EC C XLP USE 1C 350	FOOT	630.000				
81800230	A CBL 2-1C6 MESS WIRE	FOOT	2,233.000				
81800300	A CBL 3-1C2 MESS WIRE	FOOT	8,910.000				
83007300	LT P A 35MH 8MA	EACH	2.000				
83050825	LT P A 47.5MH 15DA	EACH	63.000				
83050965	LT P A 47.5MH 2-15DA	EACH	2.000				
83600200	LIGHT POLE FDN 24D	FOOT	797.000				
84100110	REM TEMP LIGHT UNIT	EACH	43.000				
84200600	REM LT U NO SALV	EACH	81.000				
84200804	REM POLE FDN	EACH	79.000				
84500110	REMOV LIGHTING CONTR	EACH	1.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
 SCHEDULE OF PRICES
 CONTRACT
 NUMBER - 60Y38

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Section Number - (1517 & 1415) R-3

Project Number
 ACCMI-ACSTP-0090/403/

Route
 FAI 90

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
85000200	MAIN EX TR SIG INSTAL	EACH	3.000				
87301305	ELCBL C LEAD 14 1PR	FOOT	80.000				
87800100	CONC FDN TY A	FOOT	16.000				
87800200	CONC FDN TY D	FOOT	12.000				
87900205	DRILL EX HD HANDHOLE	EACH	8.000				
88600100	DET LOOP T1	FOOT	234.000				
89000100	TEMP TR SIG INSTALL	EACH	1.000				
89502300	REM ELCBL FR CON	FOOT	4,280.000				
89502380	REMOV EX HANDHOLE	EACH	12.000				
89502385	REMOV EX CONC FDN	EACH	8.000				

CONTRACT NUMBER

60Y38

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 Code establishes the duty of all State CPOs, SPOs, 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-M, 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 CPO to void the contract, and may result in the suspension or debarment of the bidder or subcontractor. If a false certification is made by a subcontractor the contractor's submitted bid and the executed contract may not be declared void unless the contractor refuses to terminate the subcontract upon the State's request after a finding that the subcontractor's certification was false.

I acknowledge, understand and accept these terms and conditions.

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

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 State 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 State 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 calendar 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

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. Information concerning the exemption process is available from the Department upon request.

B. Negotiations

Section 50-15. Negotiations.

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.

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

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 provide a submission to a vendor portal or 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, not making a submission to a vendor portal, or who withholds a bid or submission to a vendor portal in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

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

Section 50-30. Revolving door prohibition.

CPOs, SPOs, 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.

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

Section 50-40. Reporting anticompetitive practices.

When, for any reason, any vendor, bidder, contractor, CPO, SPO, 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 CPO.

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 or submission to a vendor portal is submitted.

F. Confidentiality

Section 50-45. Confidentiality.

Any CPO, SPO, 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.

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

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.

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.

I acknowledge, understand and accept these terms and conditions for the above assurances.

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 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 CPO 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

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 2012.

(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 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 CPO 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.

The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50-5.

B. Felons

Section 50-10. Felons.

(a) 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.

(b) Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the Code and every vendor's submission to a vendor portal 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 CPO may declare the related contract void if any of the certifications required by this Section are false.

RETURN WITH BID

C. Debt Delinquency

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 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 CPO 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

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

The bidder or contractor or subcontractor, respectively, certifies in accordance with Section 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 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 CPO 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

Section 50-14 Environmental Protection Act violations.

The bidder or contractor or subcontractor, respectively, certifies in accordance with Section 50-14 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 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 CPO may declare the contract void if this certification is false.

F. Educational Loan

Section 3 of the Educational Loan Default Act, 5 ILCS 385/3.

Pursuant to the Educational Loan Default Act no State agency shall contract with an individual for goods or services if that individual is in default on an educational loan.

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

Section 33E-11 of the Criminal Code of 2012, 720 ILCS 5/3BE-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.

(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.

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.

RETURN WITH BID

H. International Anti-Boycott

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

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

I. Drug Free Workplace

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.

The bidder certifies that if awarded a contract in excess of \$5,000 it will provide a drug free workplace in compliance with the provisions of the Act.

J. Disclosure of Business Operations in Iran

Section 50-36 of the Code 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 may cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid 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 on the attached document.

RETURN WITH BID

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

In accordance with the provisions of Section 30-22 (6) of the 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.**

Additionally, Section 30-22 of the Code requires that the bidder certify that an Illinois office be maintained as the primary place of employment for persons employed for this contract.

NA-FEDERAL

The requirements of these certifications and disclosures are a material part of the contract, and the contractor shall require these certification provisions 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.

RETURN WITH BID

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

Sections 20-160 and 50-37 of the 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 or any other procurement opportunity 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 Code, and that it makes the following certification:

The undersigned bidder 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. If the business entity is required to register, the CPO shall verify that it is in compliance on the date the bid or proposal is due. The CPO shall not accept a bid or proposal if the business entity is not in compliance with the registration requirements.

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 Code. This provision does not apply to Federal-aid contracts.

M. Lobbyist Disclosure

Section 50-38 of the 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 CPO 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 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: _____

I acknowledge, understand and accept these terms and conditions for the above certifications.

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 CPO may void the bid, or contract, 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 Code. Furthermore, the CPO 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 Code provides that all bids of more than \$50,000 and all submissions to a vendor portal 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 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 100 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any individual 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 individual 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 individual making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

The current annual salary of the Governor is \$177,412.00.

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. A separate Disclosure Form A must be submitted with the bid for each individual meeting the above requirements. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies and a total ownership certification. **The forms must be included with each bid.**

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 100 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any individual 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 an individual 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 60% of the annual salary of the Governor? YES ___ NO ___
3. Does anyone in your organization receive more than 60% of the annual salary of the Governor of the bidding entity's or parent entity's 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 60% of the annual salary of the Governor? YES ___ NO ___

(Note: Only one set of forms needs to be completed per individual 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 an individual that is authorized to execute contracts for your organization. The individual signing can be, but does not have to be, the individual 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 an individual 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 Section 50-35 of the 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 \$50,000, 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.

The current annual salary of the Governor is \$177,412.00.

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 60% of the annual salary of the Governor. (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 State 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 60% of the annual salary of the Governor 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 60% of the annual salary of the Governor, 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 100% of the annual 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 60% of the annual salary of the Governor, 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 two 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 State 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 60% of the annual salary of the Governor, 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 60% of the annual salary of the Governor, 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 100% of the annual 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 60% of the annual salary of the Governor, 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 two 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 ___

(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 ___

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): _____

RETURN WITH BID

4. Suspension or 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: suspension or 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 Code.

RETURN WITH BID

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form B Other Contracts & Financial 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 Section 50-35 of the Code (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for all bids.

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 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

Signature of Authorized Representative, Date

OWNERSHIP CERTIFICATION

Please certify that the following statement is true if the individuals for all submitted Form A disclosures do not total 100% of ownership.

Any remaining ownership interest is held by individuals receiving less than \$106,447.20 of the bidding entity's or parent entity's distributive income or holding less than a 5% ownership interest.

Yes No N/A (Form A disclosure(s) established 100% ownership)

RETURN WITH BID

SPECIAL NOTICE TO CONTRACTORS

The following requirements of the Illinois Department of Human Rights Act 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 Title 44, Illinois Administrative Code, Section 750.120. 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. 60Y38
COOK County
Section (1517&1415)R-3
Project ACCMI-ACSTP-0090(403)
Route FAI 90
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 **Illinois 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. 60Y38
COOK County
Section (1517&1415)R-3
Project ACCMI-ACSTP-0090(403)
Route FAI 90
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.



This Annual Proposal Bid Bond shall become effective at 12:01 AM (CDST) on _____ and shall be valid until _____ 11:59 PM (CDST).

KNOW ALL PERSONS BY THESE PRESENTS, That We _____

as PRINCIPAL, and _____

as SURETY, and 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 the bid proposal under "Proposal Guaranty" in effect on the date of the 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 may submit bid proposal(s) to the STATE OF ILLINOIS, acting through the Department of Transportation, for various improvements published in the Transportation Bulletin during the effective term indicated above.

NOW, THEREFORE, if the Department shall accept the bid proposal(s) of the PRINCIPAL; and if the PRINCIPAL shall, within the time and as specified in the bidding and contract documents; 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 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 has caused this instrument to be signed by its officer _____ day of _____ A.D., _____

In TESTIMONY WHEREOF, the said SURETY has caused this instrument to be signed by its officer _____ day of _____ A.D., _____

(Company Name)

(Company Name)

By _____
(Signature and Title)

By _____
(Signature of Attorney-in-Fact)

Notary for PRINCIPAL

Notary for SURETY

STATE OF _____
COUNTY OF _____

STATE OF _____
COUNTY OF _____

Signed and attested before me on _____ (date)

Signed and attested before me on _____ (date)

by _____
(Name of Notary Public)

by _____
(Name of Notary Public)

(Seal) _____
(Signature of Notary Public)

(Seal) _____
(Signature of Notary Public)

(Date Commission Expires)

(Date Commission Expires)

In lieu of completing the above section of the Annual Proposal Bid Bond form, the Principal may file an Electronic Bid Bond. By signing the proposal(s) 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
--------------------------	---------------------	---------------------

This bond may be terminated, at Surety's request, upon giving not less than thirty (30) days prior written notice of the cancellation/termination of the bond. Said written notice shall be issued to the Illinois Department of Transportation, Chief Contracts Official, 2300 South Dirksen Parkway, Springfield, Illinois, 62764, and shall be served in person, by receipted courier delivery or certified or registered mail, return receipt requested. Said notice period shall commence on the first calendar day following the Department's receipt of written cancellation/termination notice. Surety shall remain firmly bound to all obligations herein for proposals submitted prior to the cancellation/termination. Surety shall be released and discharged from any obligation(s) for proposals submitted for any letting or date after the effective date of cancellation/termination.



Return with Bid

Division of Highways
Proposal Bid Bond

Item No. _____

Letting Date _____

KNOW ALL PERSONS BY THESE PRESENTS, That We _____

as PRINCIPAL, and _____

as SURETY, and 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 the bid proposal under "Proposal Guaranty" in effect on the date of the 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; 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 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 has caused this instrument to be signed by its officer _____ day of _____ A.D., _____

In TESTIMONY WHEREOF, the said SURETY has caused this instrument to be signed by its officer _____ day of _____ A.D., _____

(Company Name)

(Company Name)

By _____ (Signature and Title)

By _____ (Signature of Attorney-in-Fact)

Notary for PRINCIPAL

Notary for SURETY

STATE OF _____
COUNTY OF _____

STATE OF _____
COUNTY OF _____

Signed and attested before me on _____ (date)
by _____

Signed and attested before me on _____ (date)
by _____

(Name of Notary Public)

(Name of Notary Public)

(Seal) _____ (Signature of Notary Public)

(Seal) _____ (Signature of Notary Public)

(Date Commission Expires)

(Date Commission Expires)

In lieu of completing the above section of the Proposal Bid Bond form, the Principal may file an Electronic Bid Bond. By signing the proposal 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 _____

(1) Policy

It is public policy that disadvantageded businesses as defined in 49 CFR Part 26 and the Special Provision shall have the maximum opportunity to participate in the performance of contracts financed in whole or in part with Federal or State funds. Consequently the requirements of 49 CFR Part 26 apply to this contract.

(2) Obligation

The contractor agrees to ensure that disadvantageded businesses as defined in 49 CFR Part 26 and the Special Provision have the maximum opportunity to participate in the performance of contracts or subcontracts financed in whole or in part with Federal or State funds. The contractor shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 and the Special Provision to ensure that said businesses have the maximum opportunity to compete for and perform under this contract. The contractor shall not discriminate on the basis of race, color, national origin or sex in the award and performance of contracts.

(3) Project and Bid Identification

Complete the following information concerning the project and bid:

Route _____	Total Bid _____
Section _____	Contract DBE Goal _____ (Percent) _____ (Dollar Amount)
Project _____	
County _____	
Letting Date _____	
Contract No. _____	
Letting Item No. _____	

(4) Assurance

I, acting in my capacity as an officer of the undersigned bidder (or bidders if a joint venture), hereby assure the Department that on this project my company : (check one)

- Meets or exceeds contract award goals and has provided documented participation as follows:
Disadvantaged Business Participation _____ percent

Attached are the signed participation statements, forms SBE 2025, required by the Special Provision evidencing availability and use of each business participating in this plan and assuring that each business will perform a commercially useful function in the work of the contract.

- Failed to meet contract award goals and has included good faith effort documentation to meet the goals and that my company has provided participation as follows:

Disadvantaged Business Participation _____ percent

The contract goals should be accordingly modified or waived. Attached is all information required by the Special Provision in support of this request including good faith effort. Also attached are the signed participation statements, forms SBE 2025, required by the Special Provision evidencing availability and use of each business participating in this plan and assuring that each business will perform a commercially useful function in the work of the contract.

Company

By _____

Title _____

Date _____

The "as read" Low Bidder is required to comply with the Special Provision.

Submit only one utilization plan for each project. The utilization plan shall be submitted in accordance with the special provision.

Bureau of Small Business Enterprises
2300 South Dirksen Parkway
Springfield, Illinois 62764

Local Let Projects
Submit forms to the
Local Agency

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. 60Y38
COOK County
Section (1517&1415)R-3
Project ACCMI-ACSTP-0090(403)
Route FAI 90
District 1 Construction Funds**



Illinois Department of Transportation

SUBCONTRACTOR DOCUMENTATION

Public Acts 96-0795, 96-0920, and 97-0895 enacted substantial changes to the provisions of the 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 that entered into a contractual agreement with a total value of \$50,000 or more with a person or entity who has a contract subject to the Code and 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 Illinois Department of Transportation's CPO upon request within 15 calendar days after execution of the subcontract.

Financial disclosures required pursuant to Sec. 50-35 of the Code must be submitted for all applicable subcontractors. The subcontract shall contain the certifications required to be made by subcontractors pursuant to Article 50 of the 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.

RETURN WITH SUBCONTRACT

STATE ETHICAL STANDARDS GOVERNING SUBCONTRACTORS

Article 50 of the Code establishes the duty of all State CPOs, SPOs, 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 CPO may terminate or void the contract approval if it is later determined that the bidder or subcontractor rendered a false or erroneous certification. If a false certification is made by a subcontractor the contractor's submitted bid and the executed contract may not be declared void unless the contractor refuses to terminate the subcontract upon the State's request after a finding that the subcontractor's certification was false.

Section 50-2 of the 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 CPO 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

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 2012.

(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 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 CPO 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.

The contractor or subcontractor certifies that it is not barred from being awarded a contract under Section 50-5.

B. Felons

Section 50-10. Felons.

(a) 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.

(b) Certification. Every bid submitted to and contract executed by the State and every subcontract subject to Section 20-120 of the 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 CPO may declare the related contract void if any of the certifications required by this Section are false.

RETURN WITH SUBCONTRACT

C. Debt Delinquency

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 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 CPO 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

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 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 CPO 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 500/50-14 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 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 CPO 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.

_____ Name of Subcontracting Company		
_____ 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 CPO 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 scuspended or debarred for violations of the Code. Furthermore, the CPO may void the contract.

B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Code provides that all subcontracts with a total value of \$50,000 or more, from subcontractors identified in Section 20-120 of the Code, 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 100 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any individual 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 individual 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 individual making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

The current annual salary of the Governor is \$177,412.00.

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. A separate Disclosure Form A must be submitted with the bid for each individual meeting the above requirements. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies and a total ownership certification.

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 100 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any individual 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 an individual 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 60% of the annual salary of the Governor? YES ___ NO ___
3. Does anyone in your organization receive more than 60% of the annual salary of the Governor of the subcontracting entity's or parent entity's distributive income? YES ___ NO ___

(Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.)

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 60% of the annual salary of the Governor? YES ___ NO ___

(Note: Only one set of forms needs to be completed per individual 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 an individual that is authorized to execute contracts for your organization. The individual signing can be, but does not have to be, the individual 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 an individual 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.

**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 Section 50-35 of the 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 subcontracts with a total value of \$50,000 or more, from subcontractors identified in Section 20-120 of the Code, 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.**

The current annual salary of the Governor is \$177,412.00.

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 60% of the annual salary of the Governor. **(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 State 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 60% of the annual salary of the Governor, 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 60% of the annual salary of the Governor, 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 100% of the annual 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 60% of the annual salary of the Governor, 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 two 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 State 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 60% of the annual salary of the Governor, 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 60% of the annual salary of the Governor, 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 100% of the annual 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 60% of the annual salary of the Governor, 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 two 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 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 ___

(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 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 ___

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): _____

RETURN WITH SUBCONTRACT

4. Suspension or 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: suspension or 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 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 & Financial Related Information Disclosure

Form with fields: 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 Section 50-35 of the Code (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for subcontracts with a total value of \$50,000 or more, from subcontractors identified in Section 20-120 of the Code, 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 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

Signature box with fields for Signature of Authorized Officer and Date

OWNERSHIP CERTIFICATION

Please certify that the following statement is true if the individuals for all submitted Form A disclosures do not total 100% of ownership

Any remaining ownership interest is held by individuals receiving less than \$106,447.20 of the bidding entity's or parent entity's distributive income or holding less than a 5% ownership interest.

Yes No N/A (Form A disclosure(s) established 100% ownership)



- 1. TIME AND PLACE OF OPENING BIDS.** Sealed proposals for the improvement described herein will be received by the Department of Transportation. Electronic bids are to be submitted to the electronic bidding system (iCX-Integrated Contractors Exchange). Paper-based bids are to be submitted to the Chief Procurement Officer for the Department of Transportation in care of the Chief Contracts Official at the Harry R. Hanley Building, 2300 South Dirksen Parkway, in Springfield, Illinois until 10:00 a.m. July 29, 2016. 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 10:00 a.m.
- 2. DESCRIPTION OF WORK.** The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

**Contract No. 60Y38
COOK County
Section (1517&1415)R-3
Project ACCMI-ACSTP-0090(403)
Route FAI 90
District 1 Construction Funds**

Construction of a new lane along EB I-90 from Cumberland Ave. to Harlem Ave., new retaining walls, lighting, resurfacing of the Frontage Road between Oriole Ave. and Harlem Ave. and other related work location in Chicago.

- 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

Randall S. Blankenhorn,
Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted April 1, 2016

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS, frequently used RECURRING SPECIAL PROVISIONS, and LOCAL ROADS AND STREETS RECURRING SPECIAL PROVISIONS.

No ERRATA this year.

SUPPLEMENTAL SPECIFICATIONS

Std. Spec. Sec.

Page No.

No Supplemental Specifications this year.

RECURRING SPECIAL PROVISIONS

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

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STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the “Standard Specifications for Road and Bridge Construction,” adopted April 1, 2016, the latest edition of the “Manual on Uniform Traffic Control Devices for Streets and Highways” and the “Manual of Test Procedures for Materials” in effect on the date of invitation for bids; and the “Supplemental Specifications and Recurring Special Provisions,” adopted April 1, 2016, which apply to and govern the construction of FAI Route 90 (I-90), Project ACCMI-ACSTP-0090 (403), Section (1517 & 1415) R-3 in Cook County, Contract No. 60Y38 and in case of conflict with any or parts of said Specifications, the said Special Provisions shall take precedence and shall govern.

I-90, from I-190 to Harlem Avenue
Project ACCMI-ACSTP-0090 (403)
Section (1517 & 1415) R-3
Cook County
Contract 60Y38

LOCATION OF IMPROVEMENT

Eastbound I-90 from Cumberland Avenue to Harlem Avenue. Improvements are within the City of Chicago in Cook County, Illinois and covers a total length along all roadways of approximately 7900 feet (1.50 miles).

DESCRIPTION OF IMPROVEMENT

The roadway improvements consist of roadway reconstruction, widening, and resurfacing of I-90 from Cumberland Avenue to Harlem Avenue; including the installation of proposed storm sewer, lighting, signing, sign structures, pavement markings and collateral work necessary to complete the project as shown in the plans described herein.

COORDINATION WITH ADJACENT AND/OR OVERLAPPING CONTRACTS

This contract abuts and/or overlaps with other concurrent contracts listed below. The Contractor shall cooperate with the other contractors in the phasing and performance of his/her work so as not to delay, interrupt or hinder the progress or completion of work being performed by the other contractors.

I-90 Jane Addams Memorial Tollway Improvement – Rebuilding and Widening Project – Contract RR-15-5711

The project will consist of roadway and bridge reconstruction and widening just west of Plaza 19 (River Road).

Critical items affecting the above contract include (but not limited to): MOT coordination and overhead sign panel placement.

The Contractor shall be aware that Tollway Improvement is anticipated to be nearing the end of construction in the Fall of 2016. Contact Construction CM: John Naughton from Globetrotters for all coordination efforts.

Contract 60X56 – I-190/I-90 Cumberland Flyover

The I-190/I-90 Cumberland Flyover project will consist of a new flyover bridge from the Jane Addams Memorial Tollway to I-90. The roadway improvements include roadway reconstruction, widening, and resurfacing of I-190 and roadway widening and resurfacing of I-90. Other items of work include drainage, lighting, pavement markings, signing, sign structures, and pavement markings.

Critical items affecting the above contract include (but not limited to): MOT coordination and overhead sign panel placement.

The Contractor shall be aware that Contract 60X56 is anticipated to be under construction at the same time as this Contract (60Y38). The Suggested Staging and Traffic Control sheets for Contract 60Y38 and 60X56 both currently depict “stand alone” projects, with the understanding that these two Contracts are generally compatible for traffic staging purposes at their interface. The Contractor understands that the ongoing coordination of traffic staging between these two contracts may at any time result in a surplus or shortage of traffic control devices/signs, or may require that the two adjacent Contractors review, coordinate and propose a single revised staging interface, including tapers and/or advance signing locations, to respective Engineers for approval prior to implementation.

The Contractor shall be aware that Contract 60X56 is anticipated to be nearing the end of construction in the Fall of 2018.

Contract 62A64 – East River Road Reconstruction

The East River Road project will consist of the removal and replacement of the East River Road bridge over I-90 (SN 016-2124; Existing) (SN 016-2280; Proposed) and roadway reconstruction. Other items of work include drainage, lighting, pavement markings, sign maintenance and water main improvements.

The Contractor shall be aware that Contract 62A64 is anticipated to be under construction at the same time as this Contract (60Y38). The Suggested Staging and Traffic Control sheets for Contract 60Y38 and 60X56 both currently depict “stand alone” projects, with the understanding that these two Contracts are generally compatible for traffic staging purposes at their overlap. The Contractor understands that the ongoing coordination of traffic staging between these two contracts may at any time result in a surplus or shortage of traffic control devices/signs, or may require that the two adjacent Contractors review, coordinate and propose a single revised staging overlap, including tapers and/or advance signing locations, to respective Engineers for approval prior to implementation.

Critical items affecting the above contract include (but not limited to): MOT coordination and overhead sign panel placement.

The Contractor shall be aware that Contract 62A64 is anticipated to be nearing the end of construction in the Fall of 2016.

Contract 60Y39 – I-90 Westbound Reconstruction

The I-90 Westbound Reconstruction project will consist of the widening and resurfacing of I-90 from I-190 to Harlem Avenue, including the construction of a Collector-Distributor Roadway at the Cumberland Ave interchange. Other items of work include retaining wall design drainage, lighting, pavement markings and sign maintenance.

Critical items affecting the above contract include (but not limited to): MOT and detour coordination, coordination with CTA

The Contractor shall be aware that Contract 60Y3Y is anticipated to be nearing the end of construction in the Fall of 2018.

Chicago Transit Authority – Your New Blue Modernization

The Your New Blue (YNB) project includes upgrades to signal, traction power and communications systems, as well as structure rehabilitation, track replacement and passenger station rehabilitation on the Blue Line by Harlem and Cumberland CTA stations. The estimated completion date is 11/31/16

Critical items affecting the above contract: MOT coordination.

Add the following paragraph to the beginning of Article 105.08; "The Contractor shall identify all such work items (including the critical items listed above) at the beginning of the contract and coordinate the sequence and timing of their execution and completion with the other Contractor through the Engineer. All of these work items shall be identified as separate line items in the Contractor's proposed Construction Progress Schedule. Additional compensation or the extension of contract time will not be allowed for the progress of work items affected by the lack of such coordination by the Contractor".

Shared Access and Work Area

When necessary for proper prosecution of work, each Contractor shall permit the other access through the overlapping construction areas and the use of any access or haul roads constructed by others.

When necessary for the proper prosecution of work, each Contractor shall permit the other to work within predetermined areas of overlapping construction work areas for a predetermined duration. The Contractor working within the adjacent overlapping construction work areas will be responsible for cleaning the work area upon completion and leaving the work area in a suitable condition, including application of temporary erosion control measures as required, to the satisfaction of both Engineers. Examples of work requiring occupation of overlapping work areas include (but are not limited to): Earth Excavation/ Grading, Landscaping, Maintenance of Erosion Control Items.

Any damages resulting from the shared use of access facilities or overlapping work area shall be repaired by the Contractor which caused the damage at his own expense and at no additional cost to the Contract.

Basis of Payment: All expenses incurred by the Contractor by reason of compliance with these requirements shall be considered as included in and completely covered by the contract unit prices for the various items included in the contract.

MAINTENANCE OF ROADWAYS (D-1)

Effective: September 30, 1985

Revised: November 1, 1996

Beginning on the date that work begins on this project, the Contractor shall assume responsibility for normal maintenance of all existing roadways within the limits of the improvement. This normal maintenance shall include all repair work deemed necessary by the Engineer, but shall not include snow removal operations. Traffic control and protection for maintenance of roadways will be provided by the Contractor as required by the Engineer.

If items of work have not been provided in the contract, or otherwise specified for payment, such items, including the accompanying traffic control and protection required by the Engineer, will be paid for in accordance with Article 109.04 of the Standard Specifications.

STATUS OF UTILITIES (D-1)

Utility companies and/or municipal owners located within the construction limits of this project have provided the following information in regard to their facilities and the proposed improvements. The tables below contain a description of specific conflicts to be resolved and/or facilities which will require some action on the part of the Department's contractor to proceed with work. Each table entry includes an identification of the action necessary and, if applicable, the estimated duration required for the resolution.

UTILITIES TO BE ADJUSTED

Conflicts noted below have been identified by following the suggested staging plan included in the contract. The company has been notified of all conflicts and will be required to obtain the necessary permits to complete their work; in some instances resolution will be a function of the construction staging. The responsible agency must relocate or complete new installations as noted in the action column; this work has been deemed necessary to be complete for the Department's contractor to then work in the stage under which the item has been listed.

LOCATION / STAGE	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	ACTION
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Pre-Stage

No conflicts to be resolved

LOCATION / STAGE	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	ACTION
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Stage 1

EX I-90 Sta. 3047+79, EB I-90 NB Cumberland Exit 805+40 to 806+65, EB I-90 Cumberland Entrance 901+76	Underground Telephone Duct Bank	1. Possible conflict of 1-1/4" ITS fiber innerduct.	AT&T	35 Days Installation
		2. Possible conflict with proposed 36" storm sewer (Pipe No. 2015)		
		3. Possible conflict with detention pond grading. Proposed ground elevation at conflict is 633.66'		
		4. Possible conflict with proposed ditches along proposed Cumberland Ramp B		

Stage 2

No conflicts to be resolved

Pre-Stage: _____ Days Total Installation

Stage 1: _____ Days Total Installation

Stage 2: _____ Days Total Installation

The following contact information is what was used during the preparation of the plans as provided by the Agency/Company responsible for resolution of the conflict.

Agency/Company Responsible to Resolve Conflict	Name of contact	Address	Phone	e-mail address
Illinois American Water	Henry Maradiaga	1000 Internationale Parkway Woodridge, IL 60517	630-739-8859	Henry.maradiaga@amwater.com
AT&T	Thomas Follin - Legal Mandate Team	1000 Commerce Drive Oak Brook, IL 60523	630-573-6477	

UTILITIES TO BE WATCHED AND PROTECTED

The areas of concern noted below have been identified by following the suggested staging plan included for the contract. The information provided is not a comprehensive list of all remaining utilities, but those which during coordination were identified as ones which might require the Department's contractor to take into consideration when making the determination of the means and methods that would be required to construct the proposed improvement. In some instances the contractor will be responsible to notify the owner in advance of the work to take place so necessary staffing on the owners part can be secured.

LOCATION / STAGE	TYPE	DESCRIPTION	RESPONSIBLE AGENCY	ACTION
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Pre-Stage

No facilities requiring extra consideration

Stage 1

EX I-90 Sta. 3051+47	4" Water Service and 8" Sanitary Sewer	1. Possible conflict with 4" water service line crossing I-90	Illinois American Water Company	Water and Sanitary line cover is expected to be reduced. Watch and Protect only
EX I-90 Sta. 3051+90		1. Possible conflict with 8" sanitary sewer service line crossing I-90		
EX I-90 3075+82 (Stage 1)	Electric	1. Possible conflict with conduit crossing I-90 at Canfield Road Bridge.	City of Chicago	Conduits are attached to structure - no conflict exists. Watch and Protect Only
EX I-90 3093+67 (Stage 1)		1. Possible conflict with conduit crossing I-90 at Oriole Avenue Bridge.		Conduits are attached to structure - no conflict exists. Watch and Protect Only
EX I-90 3120+31 (Stage 1)		1. Possible conflict with conduit crossing I-90 at Harlem Avenue Bridge.		Conduits are attached to structure - no conflict exists. Watch and Protect Only

FAI Route 90 (I-90)
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EX I-90 Sta. 3074+90 (Stage 1)	Electrical	1. Possible conflict with proposed 12" water main and existing electrical line on Higgins Road.	ComEd	Existing conduit is adjacent to proposed connection point – no conflict exists watch and protect only while excavating
EX I-90 Sta. 3075+68 (Stage 1)		1. Possible conflict with electrical line crossing I-90 at Canfield Road Bridge.		Conduits are attached to structure - no conflict exists. Watch and Protect Only
EX I-90 Sta. 3090+00 (Stage 1)		1. Possible conflict with proposed 36" water main and existing electrical line on Higgins Road.		Proposed 36" water main is adjacent to existing 48" water main – no conflict exists watch and protect only while excavating
EX I-90 Sta. 3111+10 (Stage 1)		1. Possible conflict with proposed lighting 1-1/4" conduit crossing ComEd line. The ComEd line should be buried deeper than lighting conduit.		Contractor to watch and protect location during installation of conduit.
EX I-90 3118+41 (Stage 1)		1. Possible conflict with proposed lighting 1-1/4" conduit crossing I-90 at Harlem CTA Pedestrian Bridge.		Conduits are attached to structure - no conflict exists. Watch and Protect Only
EX I-90 3120+31 (Stage 1)		1. Possible conflict with lighting 1-1/4" conduit crossing I-90 at Harlem Avenue.		Conduits are attached to structure - no conflict exists. Watch and Protect Only
EX I-90 Sta. 3090+00 (Stage 1)	Gas Line	1. Possible conflict with proposed 36" water main and existing electrical line on Higgins Road.	People's Gas	Proposed 36" water main is adjacent to existing 48" water main at connection point – no conflict exists watch and protect only while excavating
EX I-90 Sta. 3093+21 (Stage 1)	16' Stainless Steel Gas Line	2. Possible conflict of 1-1/4" ITS fiber innerduct with 16" main crossing I-90.		Contractor to watch and protect locations during installation of conduits. Structure 2072 and 2092 along with connecting pipe are to be field placed to miss proposed gas line.
		3. Possible Conflict with lighting 3" galvanized steel conduit.		
		4. Possible conflict with proposed 15" storm sewer (Pipe No. 2072)		
		5. Possible conflict with drainage structures 2092 and 2072		
		6. Possible conflict with proposed retaining wall driven piles		
EX I-90 Sta. 3098+85 (Stage 1)		1. Possible conflict of ITS (2) 4" conduits with 16" gas main crossing I-90.		Contractor to contact People's Gas when excavating for undercut. Gas main will need to be
		2. Possible conflict with lighting 1-1/4" conduit.		
		3. Possible conflict with proposed		

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		retaining wall driven piles		braced
EX I-90 Sta. 3090+00 (Stage 1)	Underground Telephone Duct Bank and Bridge Mounted Conduit	1. Possible conflict with proposed 36" water main and existing electrical line on Higgins Road.	AT&T	Proposed 36" water main is adjacent to existing 48" water main – no conflict exists watch and protect only while excavating
EX I-90 Sta. 3102+74		2. Possible conflict of 1-1/4" ITS fiber innerduct.		Innerduct is above duct bank which is 7 ft. below ground line. Watch and Protect Only
		3. Possible conflict with proposed 12" storm sewer (Pipe No. 2080)		Storm sewer is above duct bank which is 7 ft. below ground line. Watch and Protect Only
		4. Possible conflict with lighting 1-1/4" conduit.		Conduit is above duct bank which is 7 ft. below ground line. Watch and Protect Only
		5. Possible conflict with proposed guardrail along Harlem exit ramp.		Guardrail will extend 40" below ground line which is above duct bank package. Watch and Protect Only
EX I-90 Sta. 3046+00 to EX I-90 Sta. 3110+00 15" x 15" Concrete Duct along center median on I-90	Underground Fiber Conduit	1. Sta. 3100+35 – Jacking 48" storm sewer	CTA	Confirmation required on existing duct depths to confirm conflict
EX I-90 Sta. 3103+00 220' Electrical Duct along center median on I-90		1. Jacking 48" storm sewer at 3100+35		Confirmation required on existing duct depths to confirm conflict
Project Limits		The Contractor is alerted that there are existing surface and underground facilities within the CTA operating area. These facilities may include, but are not limited to, Power Distribution Cables, Train Control Signal Cables and Communication Service Lines. The exact location of these facilities is not known. It will be the Contractor's responsibility to obtain this information from the CTA before proceeding with any work within the CTA operating area.		Confirmation required on existing duct depths to confirm conflict. Extreme caution must be exercised by the Contractor when doing any excavation or other sub-surface work within the CTA operating area.

EX I-90 Sta. 3118+00	Private Conduit	1. Possible conflict with conduit crossing I-90 under Harlem CTA Pedestrian bridge.		Conduits are attached to structure - no conflict exists. Watch and Protect Only
EX I-90 Sta. 3040+25	Fiber Optics	1. Possible conflict of 1-1/4" ITS fiber innerduct with underground communications crossing at Cumberland Avenue. Utility confirmed that depth at crossing is 22' to 27' below existing ground.	Level 3 Communications	No conflict exists. Watch and Protect Only

Stage 2

No facilities requiring extra consideration

The following contact information is what was used during the preparation of the plans as provided by the owner of the facility.

Agency/Company Responsible to Resolve Conflict	Name of contact	Address	Phone	e-mail address
City of Chicago - water section	Rolando Villalon	100 East Ohio Street +1, room 306 Chicag0, IL 60611	312-742-3601	
ComEd	Arture R. Salinas / Michelle Ho	Two Lincoln Center, 8th Floor Oakbrook Terrace, IL 60181	773-509-3284	
Peoples Gas	Mr. Robert Mirabal	200 East Randolph, floor 24-s, Chicago IL 60601	312-240-4707	
X0 Communications	Mel Conn	810 Jorie Blvd Oak Brook IL 60523	630-371-3108	Mel.conn@xo.com
AT&T	Stanley Plodzien	1000 Commerce Drive, Floor 1 Oak Brook, IL 60523	630-573-5453	
Illinois American Water	Henry Maradiaga	1000 Internationale Parkway Woodridge, IL 60517	630-739-8859	Henry.maradiaga@amwater.com
CTA	Abdin Carillo	567 West Lake Street 9 th Floor Chicago, IL 60661-1465	See CTA FLAGGING AND DCOORDINATION specification for contact and coordination information	
Level 3 Communications	James Martin	1305 E. Algonquin Road Arlington Heights, IL 60005	847-954-8212	

The above represents the best information available to the Department and is included for the convenience of the bidder. The days required for conflict resolution should be taken into account in the bid as this information has also been factored into the timeline identified for the project when setting the completion date. The applicable portions of the Standard Specifications for Road and Bridge Construction shall apply.

Estimated duration of time provided in the action column for the first conflicts identified will begin on the date of the executed contract regardless of the status of the utility relocations. The responsible agencies will be working toward resolving subsequent conflicts in conjunction with contractor activities in the number of days noted.

The estimated relocation dates must be part of the progress schedule submitted by the contractor. A utility kickoff meeting will be scheduled between the Department, the Department's contractor and the utility companies. The Department's contractor is responsible to contact J.U.L.I.E. prior to any and all excavation work.

WORK RESTRICTIONS

Chicago Department of Water Management states that water mains can be shut down only during the months between September 15 and May 15.

The Contractor is alerted to the allowable Track Access Occurrences in the Special Provision for CTA FLAGGING AND COORDINATION. At this time, CTA has specified a maximum of six (6) Overnight Single Track closures, and zero (0) Weekend Single Track closures. The Contractor is hereby notified that early coordination with CTA for any Track Closures will be required in order to maintain construction schedule. Additional compensation or the extension of contract time will not be allowed for the progress of work items affected by the lack of such coordination with CTA by the Contractor.

- The Contractor must coordinate and request any additional (if required) Overnight Single Track closure requests (beyond the 6 allotted) with CTA as early as possible, and the CTA reserves the right to deny Overnight Single Track closures based on other Blue Line projects, operational requirements, Special Events, or CTA manpower availability. There is no guarantee of availability.
- Weekend Single Track closures may be available (if required), however, the Contractor must coordinate and request the exact weekends with the CTA as early as possible, and the CTA reserves the right to deny Weekend Single Track closures based on other Blue Line projects, operational requirements, Special Events, or CTA manpower availability. There is no guarantee of availability.
- In order to minimize impact to CTA rail operations, the Contractor is encouraged (when feasible) to schedule multiple activities (each of which require a single track outage) - for the same single track outage.

The Contractor is alerted that sewer pipe jacking operations directly under the CTA tracks must occur under flagging operations, and per the requirements of CTA FLAGGING AND COORDINATION and TRACK MONITORING Special Provisions.

EXISTING UTILITIES

The Contractor shall familiarize himself with the locations of all utilities and structures that may be found in the vicinity of the construction. The Contractor shall conduct his operations to avoid damage to the above-mentioned utilities and structures. Should any damage occur due to the Contractor's negligence, repairs shall be made by the Contractor at his expense in a manner acceptable to the Engineer.

The Contractor shall notify all utility owners of his construction schedule and shall coordinate constructions operations with utility owners so that relocation of utility lines and structures may proceed in an orderly manner. Notification shall be in writing, with copies transmitted to the Engineer.

COMPLETION DATE PLUS WORKING DAYS (D-1)

Effective: September 30, 1985

Revised: January 1, 2007

Revise Article 108.05 (b) of the Standard Specifications as follows:

"When a completion date plus working days is specified, the Contractor shall complete all contract items and safely open all roadways to traffic by 11:59 PM on **October 31, 2017** except as specified herein.

The Contractor will be allowed to complete all clean-up work and punch list items within 10 working days after the completion date for opening the roadway to traffic. Under extenuating circumstances the Engineer may direct that certain items of work, not affecting the safe opening of the roadway to traffic, may be completed within the working days allowed for clean-up work and punch list items. Temporary lane closures for this work may be allowed at the discretion of the Engineer.

The Special Provision for "Failure to Complete the Work on Time" shall apply to both the completion date and the number of working days.

FAILURE TO COMPLETE THE WORK ON TIME (D-1)

Effective: September 30, 1985

Revised: January 1, 2007

Should the Contractor fail to complete the work on or before the completion date as specified in the Special Provisions for "Interim Completion Date" or "Completion Date Plus Working Days", or within such extended time as may have been allowed by the Department, the Contractor shall be liable to the Department in the amount of **\$5,800**, not as a penalty but as liquidated damages, for each calendar day or a portion thereof of overrun in the contract time or such extended time as may have been allowed.

In fixing the damages as set out herein, the desire is to establish a certain mode of calculation for the work since the Department's actual loss, in the event of delay, cannot be predetermined, would be difficult of ascertainment, and a matter of argument and unprofitable litigation. This said mode is an equitable rule for measurement of the Department's actual loss and fairly takes into account the loss of use of the roadway if the project is delayed in completion. The Department shall not be required to provide any actual loss in order to recover these liquidated damages provided herein, as said damages are very difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty, as such is not the intention of the parties.

A calendar day is every day shown on the calendar and starts at 12:00 midnight and ends at the following 12:00 midnight, twenty-four hours later.

RESTRICTION FOR LANE CLOSURE

The right lane (Lane 4) closure of EB I-90 (Sta. 3023+14 to Sta. 3043+35) shown during Stage I (Substage B) of the Suggested Staging and Traffic Control Plans shall be restricted to 14 consecutive calendar days. The Contractor shall plan and perform all work required in this stage to be complete within the allotted time duration, and shall re-open the lane to traffic no later than 14 calendar days after initial lane closure.

The Special Provision for "Failure to Complete the Work on Time" shall apply to the RESTRICTION FOR LANE CLOSURE.

DETOUR RESTRICTIONS

The Contractor shall coordinate all detours per the Special Provision for COORDINATION WITH ADJACENT AND/OR OVERLAPPING CONTRACTS, and per the restrictions identified in this special provision. No extension of time or additional compensation will be awarded to the Contractor as a result of failure to coordinate these detours with the adjacent contracts.

Detour #1 (EB I-90 Contract 60Y38): EB Canfield Entrance Ramp Closure

- All traffic: North on Canfield Rd, east on Higgins Rd (signalized), south on Oriole Ave, east on Higgins Ave, north on Harlem Ave (**signalized**), east on Gregory St to EB Harlem Entrance Ramp
- Detour Restrictions
 - Detour #1 (and associated work) shall be completed before the end of 2017
 - Closure of the I-90 EB Canfield Entrance Ramp and implementation of Detour #1 shall only be allowed for a maximum **16** consecutive calendar weeks.
 - The Contractor is encouraged to complete work and open the ramp to traffic earlier than the maximum closure/detour duration.
 - Detour #1 shall not be in place concurrently with Contract 60Y39 Detour #4
- Parking Restrictions: Prior to detour installation, Contractor shall apply to CDOT Permitting, and receive permit for No Parking Postings along Higgins Rd (between Canfield Ave to Oriole Ave), Higgins Ave (between Ozanam Ave to Oriole Ave) and Higgins Ave (between Oriole Ave to Harlem Ave)

Detour #2 (EB I-90 Contract 60Y38): Moment Slab NB-3 Construction (SN 016-2296)

- Closure of Higgins Ave (Oriole Ave to Harlem Ave) – Westbound Lane Only Closed
- All traffic: North on Harlem Ave, west on Bryn Mawr Ave (**signalized**), south on Oriole Ave.
- Detour Restrictions
 - Detour #2 (and associated work) shall be completed before the end of 2017
 - Closure of the WB Lane of Higgins Ave (Oriole Ave to Harlem Ave) and implementation of Detour #2 shall only be allowed for a maximum **12** consecutive calendar weeks.
 - The Contractor is encouraged to complete work and open the roadway to traffic earlier than the maximum closure/detour duration.
 - Detour #2 shall not be in place concurrently with Contract 60Y39 Detour #5
- Parking Restrictions: Prior to detour installation, Contractor shall apply to CDOT Permitting, and receive permit for No Parking Postings along Higgins Ave (between Oriole Ave to Harlem Ave) and along Bryn Mawr Ave (between Oriole Ave to Harlem Ave).

Detour #3 (WB I-90 Contract 60Y39): WB Canfield Exit Ramp Closure **(FOR INFORMATION ONLY)**

- All traffic: WB I-90 exit at Cumberland Ave North Exit Ramp, east on Higgins Rd (**signalized**), end detour at Canfield Rd (**signalized**).
- Detour Restrictions
 - Detour #3 (and associated work) shall not begin until 2018, or until any/all conflicting work or detours from adjacent contracts is confirmed to be complete in 2017.
 - Closure of the WB I-90 Canfield Exit Ramp and implementation of Detour #3 shall only be allowed for a maximum **16** consecutive calendar weeks
 - The Contractor is encouraged to complete work and open the ramp to traffic earlier than the maximum closure/detour duration.

Detour #4 (WB I-90 Contract 60Y39): Moment Slab NB-5.1 Construction (SN 016-2293) and Moment Slab NB-5.3 Construction (SN 016-2294) **(FOR INFORMATION ONLY)**

- Closure of Higgins Rd (Canfield Ave to Oriole Ave) – Eastbound Lane Only Closed
- All traffic: South on Canfield Rd, east on Foster Ave (**signalized**) (or Lawrence Ave – TBD), north on Harlem Ave (**signalized**), end detour at Higgins Ave (**signalized**).
- Detour Restrictions
 - Detour #4 (and associated work) shall not begin until 2018, or until any/all conflicting work or detours from adjacent contracts is confirmed to be complete in 2017.
 - Detour #4 shall only be allowed for a maximum **12** consecutive calendar weeks
 - Closure of the EB Lane of Higgins Rd (Canfield Ave to Oriole Ave) and implementation of Detour #2 shall not be in place concurrently with Contract 60Y38 Detour #1
 - The Contractor is encouraged to complete work and open the roadway to traffic earlier than the maximum closure/detour duration.
- Parking Restrictions: Prior to detour installation, Contractor shall apply to CDOT Permitting, and receive permit for No Parking Postings along Seminole St and Higgins Ave (between Canfield Rd to Oriole Ave)

Winter Shutdown: Detours will not be allowed to remain in place during any winter shut down period.

Traffic Signal Coordination Along Detour Routes: Prior to detour installation, Contractor shall notify CDOT 14 days prior to start of each detour. At any time during the detour duration, and at the request of the Engineer or CDOT, the Contractor will coordinate and complete signal timing review and actual revision of signal timing to the subject traffic signal controller. Cost of the traffic signal timing review and revision of signal timing shall be included in the cost of MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION.

The cost of the Contractor obtaining No Parking permits and posting shall be included in the cost of TRAFFIC CONTROL AND PROTECTION (SPECIAL).

CTA FLAGGING AND COORDINATION

All work to be done by the Contractor on, over, or in close proximity of the CTA (Chicago Transit Authority) right-of-way and infrastructure shall be performed according to Article 107.12 of the Standard Specifications and this specification. This specification includes language from CTA Master Specification Section 01 35 15, "Special Project Procedures for Adjacent Construction." No interruption to CTA service will be allowed unless approved in writing by the CTA.

The CTA's Representative for this project will be:

Mr. Abdin Carrillo
Project Manager, Construction Oversight
(312) 681-3913

1.01 SUMMARY

- A. This section includes the requirements for safe construction operations on, above, below and adjacent to operating tracks of the CTA rail system. The Contractor shall be responsible for compliance with the CTA, *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System* (in effect at such time).
- B. After the letting of the contract and prior to performing any work, the CTA Representative shall be notified by the Department to attend the preconstruction meeting. In this meeting, the Contractor shall confer with the CTA's Representative regarding the CTA's requirements for the protection of clearances, operations and safety.
- C. Prior to the start of any work on or over the CTA's right-of-way, the Contractor shall meet with the CTA Representative to determine his requirements for flagmen and all other necessary items related to the work activities on, over and next to the CTA facilities and to receive CTA's approval for the Contractor's proposed operations. At least twenty-one (21) calendar days prior to the start of work the Contractor must request CTA to prepare a Right-of-Entry document. The Contractor must also conform to all requirements of the "CTA Requirements for Contractors Working along the Right-of-Way (R.O.W.)", included as EXHIBIT A.
- D. The Contractor shall notify the CTA Representative 72-hours in advance of the time he intends to enter upon the CTA right-of-way for the performance of any work.
- E. When the scope of work under this contract includes construction activities adjacent to and above CTA tunnels, then work activities shall protect the existing CTA infrastructure and allow unimpeded service to CTA customers unless specifically allowed by CTA as identified herein.

1.02 PROJECT CONDITIONS

- A. The Chicago Transit Authority (CTA) is an operating transportation agency and must maintain rail operations at all scheduled times for the benefit of the public. The Contractor shall conduct his operations in such a manner as not to cause damage to the CTA equipment, put the public or the CTA personnel in danger, cause inconvenience to the customers, interrupt train service (except as permitted herein) or cause avoidable inconvenience to the public and the surrounding communities.
- B. The CTA will be operating trains during the construction of this project. The rail operations are 24 hours per day, seven days per week.
- C. Certain portions of the project may be performed on, above or adjacent to sections of track where rail service is suspended in order to facilitate the work. For any work occurring within, above or adjacent to a section of track to be taken out of service, the Contractor shall confirm with the CTA that track within the work limits has been taken out of service and the third rail de-energized, as required, prior to beginning the work.
- D. If the CTA deems any of the Contractor's work or operations hazardous to the CTA's operations or to the public, the CTA shall contact the Engineer. The Engineer may elect to order the Contractor to immediately suspend work until reasonable remedial measures are taken satisfactory to the CTA.
- E. The CTA may review any of the Contractor's procedures, methods, temporary structures, tools or equipment that will be utilized within the CTA Right-of-Way. These reviews do not relieve the Contractor of responsibility for the safety, maintenance, and repairs of any temporary structure or work, or for the safety, construction, and maintenance of the work, or from any liability whatsoever on account of any procedure or method employed, or due to any failure or movement of any temporary structure, tools or equipment furnished as necessary to execute work on CTA Right-of-Way.
- F. At least five (5) weeks prior to the start of any work on, above or adjacent to the CTA right-of-way, the Contractor will be required to attend weekly coordination meetings with CTA Operations and other CTA departments to review and coordinate proposed work activities of the Contractor(s). The Contractor will be required to provide a five week look-ahead schedule, in a format acceptable to CTA, reflecting proposed work activities within the CTA Right-of-Way.
- G. The Contractor, through the Engineer, shall submit a Rail Service Bulletin Request form to the CTA at least twenty-one (21) calendar days in advance of the Contractor's proposed scheduled time to enter upon the CTA Right-of-Way for the performance of any work under this Contract. Bulletin requests will be required when performing work which impacts rail operations such as prior to each phase of staged station construction, Track Access Occurrences, track survey, etc.

- H. CTA generally permits only one Track Access Occurrence at a time on any given route. Other work on CTA's system, including required operations and/or maintenance by CTA, or work by other contractors elsewhere on the route, may limit the available dates of track access occurrences for this project. The Contractor is strongly encouraged to submit Rail Service Bulletin requests with more than the twenty-one (21) day minimum required advance notice. The CTA has indicated that they typically will not grant Track Access Occurrences on consecutive weekend periods in order to provide scheduled service to customers.
- I. The Contractor shall at all times observe all rules, safety regulations and other requirements of the CTA, including, but not limited to, the following Standard Operating Procedures (SOP's).
- No. 7037, "Flagging on the Right-of-Way".
 - No. 7038, "Train Operation Through Slow Zones".
 - No. 7041, "Slow Zones".
 - No. 8111, "Workers Ahead Warning System".
 - No. 8130, "Safety on Rapid Transit Tracks".
 - No. 8212, "Test Train Procedures"
 - Sketch 2000-SZ-1, Slow Zone Equipment

1.03 REIMBURSEMENT OF COSTS

- A. The cost of all flagmen, infrastructure crews, engineering inspection, switchmen, and other workmen furnished by the CTA and authorized by the Engineer shall be paid for directly to the CTA by the Contractor.
- B. The costs associated with Track Access Occurrences granted and established by the CTA shall be paid for directly to the CTA by the Contractor.
- C. The amount paid to the Contractor shall be the amount charged to the Contractor for all authorized CTA charges including CTA additive rates audited and accepted by the Department, according to Article 107.12 and Article 109.05 of the Standard Specifications.
- D. Following approval of the CTA invoices by the Department, the Contractor shall pay all monies to the CTA as invoiced and shall submit to the Department certified and notarized evidence of the amount of payments. No overhead or profit will be allowed on these payments.
- E. If there are maximum amounts of flagger shifts identified within this specification and if contractor operations require flagger shifts that are granted by the CTA beyond these limits, the Contractor shall pay for the services, but will receive no reimbursement.
- F. The Department will not be liable for any delays by the CTA in providing flagmen, establishing track closures or other service provided by the CTA and identified within this special provision.

1.04 RAIL SAFETY TRAINING

- A. All Contractor and Subcontractor employees assigned to work on, over or near the CTA Right-of-Way shall be required to attend an all-day Rail Right-of-Way Safety Training Session in accordance with the CTA, *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System*. The cost of this training is currently \$200.00 per employee, paid by the Contractor in advance. The certification is good for one calendar year from the date of issuance. The Contractor shall coordinate rail safety training with the Engineer. The cost of training shall be paid directly to the CTA by the Contractor.
- B. Rail Right-of-Way Safety Training for Contractor and subcontractor personnel will be scheduled by CTA as training slots become available. The Contractor is advised that the Contractor's failure to request training sufficiently in advance of when the employee is required on the work site shall not be cause for relaxing the requirement for Rail Right-of-Way Safety Training.
- C. The \$200.00 fee is non-refundable. If any individual fails to report for training or is rejected for training and must be rescheduled, an additional \$200.00 will be required. No additional compensation will be made for the rescheduling of any training.
- D. Upon successful completion of CTA Rail Safety Training, each trainee will be issued a non-transferable Rail Safety Tour Identification Card with the trainee's photo and a decal with pressure sensitive adhesive to be affixed on the hard hat. The Rail Safety Tour Identification Card and the decal are valid for one (1) year from the date of issue. The validity of the Card and the decal are in no way related to the length of this Contract.
- E. Contractor and Subcontractor personnel must renew their Rail Safety Tour Identification Cards annually by successfully completing Rail Safety Training again. Contractor or Subcontractor personnel who fail to maintain a valid Rail Safety Tour Identification Card are not permitted to work on, above or adjacent to the CTA Rail Right of Way and CTA reserves the right to remove such personnel from the work site.
- F. The costs incurred by the Contractor for CTA Rail Safety Training will not be reimbursed.

1.05 MANDATORY ITEMS FOR EMPLOYEES ON CTA RIGHT-OF-WAY

- A. Contractor's and Subcontractor's employees assigned to work on the CTA Right-of-Way:
 - 1. Contractor's and Subcontractor's employees will be given individual property permits. These permits shall be carried by each employee at all times while on CTA property. All permits issued shall be returned to CTA at the completion of the project, if the employee no longer works on this project, or on the date of expiration.

2. Each employee shall carry a valid Rail Safety Tour Identification Card at all times while on CTA right-of-way in accordance with Article 2-2 of the CTA Safety Manual.
 3. All employees shall wear an undamaged hard hat with current rail safety sticker affixed, CTA standard safety vest and eye protection at all times while on CTA right-of-way. Noise protection shall be used when necessary. The Contractor must also comply with all OSHA requirements as required for the work. The CTA shall provide the rail safety sticker to each Contractor employee upon successful completion of the Rail Right-of-Way Safety Training.
 4. Contractor personnel shall wear suitable work shoes with defined heel and non-slip soles. Steel toes or metal cleats on the sole or heel of shoes are prohibited. Shoelaces are to be kept short so they do not pose a tripping hazard. Athletic shoes, sandals, open-toed shoes, moccasins and/or shoes with heels higher than 1" are not permitted.
 5. Contractor personnel shall have a non-metallic, working flashlight after dark or when working in the subway.
- B. Contractor and Subcontractor employees assigned to work adjacent to or above the CTA right-of-way shall wear a CTA standard safety vest at all times. Personnel without current Rail Safety Training and a valid property permit shall not enter onto any CTA Right-of-Way.

1.06 WORK AREA AVAILABILITY

A. DEFINITIONS

1. RIGHT-OF-WAY WORK: Any work performed at, above, or below track level within the CTA Right-of-Way.
2. IN-SERVICE TRACK: All CTA tracks are in service seven days a week, 24 hours a day, unless specifically removed from service for specific times by a Rail Service Bulletin issued by the Vice President, Rail Operations. Copies of the CTA's current train schedule for the lines affected by this project is available on the CTA's website and are subject to changes at any time, before or during, the Contract.
3. OUT-OF-SERVICE TRACK: The CTA tracks within limits defined by CTA that are temporarily removed from service for the purpose of completing specific work. Traction power will remain on at all times unless power removal is requested by the Contractor and approved by the CTA. In such cases, traction power must be removed and restored by CTA personnel. The Contractor may request the CTA to de-energize portions of the CTA right-of-way to perform work on, or near an Out-of-Service Track when no revenue service is scheduled, or as specified under a Rail Service Bulletin. Upon completion of the Out-of-Service Work, the Contractor shall maintain sufficient personnel on-site to correct any deficiencies in the Contractor's Work discovered by the CTA during power and service restoration and testing.

4. TRACK ACCESS OCCURRENCE: A condition(s) which provides a modification to the normal operation of CTA service to facilitate access for a Contractor(s) to perform work on or near the CTA Right-of-Way as defined and limited herein.
5. RE-ROUTE: Modification to the normal routing of trains in order to remove rail traffic from a section of track to facilitate access for a Contractor(s) to perform work on or near the CTA Right-of-Way as defined and limited herein.
6. LINE CUT: A temporary cessation of all service on a transit line; meaning total stoppage of transit service on all tracks and at all stations within the closure zone to facilitate access for a contractor(s) to perform work on or near the CTA Right-of-Way as defined and limited herein.
7. SINGLE-TRACK: A temporary operation established by operating trains bi-directionally on one track while the adjacent track is taken out-of-service as defined in paragraph 1.05.a.4, above. Only one single-track at a time can be set up on a line and only for very limited time periods. If CTA or a separate contractor(s) request single track operations along the same line concurrently with the Contractor for this contract, CTA shall have the exclusive authority to determine which request shall be granted.
8. RUSH HOURS: Monday through Friday, from 0500 to 0900 hours and from 1500 to 1900 hours.
9. FLAGGER SHIFT: A flagger shift is defined as the services of a CTA Flagman up to, but no more than eight (8) hours including travel and required breaks. For example:
 - a. A Contractor five hour work shift which requires 3 flaggers will use 3 flagger shifts.
 - b. A Contractor eight hour work shift requiring 3 flaggers shall use 6 flagger shifts (because travel & break time will increase the flaggers work hours beyond eight).
 - c. A Contractor ten hour work shift requiring 3 flaggers will use 6 flagger shifts.
10. INFRASTRUCTURE SHIFT: An infrastructure shift is defined as up to, but no more than eight (8) hours worked per CTA Infrastructure employee. For example:
 - a. A Contractor five hour work shift requiring 2 signal maintainers will use 2 infrastructure shifts.
 - b. A Contractor eight hour work shift requiring 2 towermen shall use 2 infrastructure shifts.
 - c. A ten hour work shift requiring 2 lineman will use 4 infrastructure shifts.
11. PERSON-IN-CHARGE (PIC): A person or persons, specified in a CTA Rail Service Bulletin, who is solely in charge of a work zone and is the single point contact between CTA and all persons (Contractor's, CTA and others) working in a work zone. The Rail Service Bulletin may identify the PIC by name or by radio call number. The Engineer or the Engineer's designee shall serve as PIC.

12. POWER & WAY SERVICE BULLETIN (PWS Bulletin): A document authorized by the CTA Infrastructure Division intended to supplement a CTA Rail Service Bulletin by defining power/signal removal and restoration procedures and other work zone protection measures required to safely perform construction and/or maintenance work on or adjacent to the CTA Right-of-Way (ROW).
- B. No service disruptions will be allowed for the completion of this work, except as noted herein. If the CTA deems it necessary, the CTA will impact operations to avoid a hazardous condition to either the passengers or employees and charge the Contractor for all associated costs and damages incurred. No compensation will be made for CTA charges to the Contractor due to unauthorized Contractor access or other unapproved impacts to CTA operations.

1.07 CTA OPERATING REQUIREMENTS

- A. Strictly comply with operating requirements of the Chicago Transit Authority while construction work is in progress, specifically as follows:
1. All work performed on the CTA Right-of-Way will be allowed during the Construction Period only in accordance with the Article 1.08 "ALLOWABLE HOURS OF CONSTRUCTION". During most periods of construction, a "slow zone" shall be established at the work site and flagging personnel shall be deployed to facilitate safe and continuous train operations and to protect Contractor, CTA employees, passengers, the general public and property in the vicinity.
 2. No one is permitted to enter the CTA Right-of-Way during Rush Hours. Access to the underside of the existing or proposed bridge structure within the limits of the CTA Right-of-Way will not be permitted.
- B. As much work as possible is to be done under normal CTA operating conditions (under traffic) without disruption of train movements. A maximum interruption of service to the CTA traffic of 15 minutes or as agreed upon with the CTA will be allowed. No interruption to CTA service will be allowed unless approved in writing by the CTA. The CTA has indicated during overnight periods, train headways are between fifteen (15) and thirty (30) minutes.
- C. Pedestrian traffic access to CTA station facilities shall be maintained at all times. Barricades and signage for sidewalk closures as well as all details for pedestrian crossings of street intersections at the entrance of the station must be coordinated with the CTA at least twenty-eight (28) days prior to modifications to staging.
- D. Bus traffic access to CTA station facilities must be maintained. Any proposed changes to bus routes or normal access by pedestrians will need to be coordinated and approved by CTA (and Pace where applicable).

- E. Access control of the CTA Right-of-Way must be maintained at all times. This includes eliminating openings directly to the Right-of-Way where existing median barriers are to be removed. All planned removals of existing access control must be coordinated with the CTA, with plans for counter measures provided to the CTA at least three (3) weeks prior to removals. If the CTA grants the removal of a portion of the existing access control, the Contractor shall provide a fence system to enclose the Contractor's work area and provide a visual separation between the Contractor's work area and the CTA operating track(s). The fence shall be designed and installed to meet all CTA requirements, including, but not limited to, horizontal clearance requirements, minimum wind and vertical loading, foundation embedment, screening, fencing connections, installation requirements, maintenance of the fence throughout the installed period, removal of the fence at the completion of the period for the fence need and restoration of the CTA Right-of-Way. The Engineer and CTA shall approve all fence designs, components and installation procedures prior to the start of fence installation. The cost to design, install, maintain and remove the fence shall be considered included in the work required to be performed within the CTA Right-of-Way and will not be paid for separately.

1.08 ALLOWABLE HOURS OF CONSTRUCTION

- A. Construction activities within CTA Right-of-Way are not permitted during Rush Hours. Access to the underside of the existing or proposed bridge structure within the limits of the CTA Right-of-Way will not be permitted during Rush Hours.
- B. Construction activities within CTA Right-of-Way may be permitted during non-Rush Hour periods under flagging protection with the advance concurrence of the CTA as follows:
 - 1. Monday thru Friday: From 0900 to 1500 and from 1900 hours to 0500 hours the next day (the power shall remain on for these hours unless allowed via specific Track Access Occurrence).
 - 2. Weekends: 1900 hours Friday to 0500 hours Monday
- C. Track Access Occurrences:
 - 1. The total number of Track Access Occurrences shall be as specified below:
 - a. Overnight Single Tracks: A maximum of six (6) Overnight Single-Track Track Access Occurrences will be permitted. Construction activities within the CTA Right-of-Way may be permitted between the hours of 22:00 and 04:00 the following morning, including any time required for test trains stipulated in the Rail Service Bulletin.

- b. Weekend Single Tracks: A maximum of zero (0) Weekend Single-Track Track Access Occurrences will be permitted. Construction activities within the CTA Right-of-Way may be permitted between the hours of 22:00 Friday night and 04:00 the following Monday morning, including any time required for test trains stipulated in the Rail Service Bulletin.
 - c. If proposed work requires that CTA operations be suspended due to any circumstance, the Engineer must be informed immediately to coordinate the service suspension with the CTA. Any reimbursement to the CTA for the granting of a Track Access Occurrence must be approved by the Engineer.
- 2. The exact dates and hours for all Track Access Occurrences are subject to change by the CTA depending on the nature of the work, access requirements of CTA personnel, work performed under separate contract or operational requirements of the CTA. The approval of specific dates and times for Track Access Occurrences on this Contract may be affected by major events or by a Track Access Occurrence scheduled elsewhere on that route or the CTA System. The CTA has indicated that they typically will not grant Track Access Occurrences on consecutive weekend periods in order to provide scheduled service to customers.
- 3. Contractors completing other Department projects may also request Track Access Occurrences along the same section of track as described herein. These projects are identified in CONTRACTOR COOPERATION. Provided these Track Access Occurrences are approved, scheduled and initiated by the CTA, the Contractor shall be able to access CTA Right-of-Way with no impact to the total count of Track Access Occurrences attributed to this Contract.
 - D. The CTA reserves the right to modify the allowable dates or hours of track access occurrences based on service requirements for the subject route and manpower availability for the date and location requested.
 - E. The CTA reserves the right to deny or to cancel a previously approved request for a Track Access Occurrence based on service requirements for the time period requested. The CTA may notify the Contractor of such denial or cancellation no later than 1 day prior to a Track Access Occurrence. Service requirements may be affected by major events (e.g., festivals, White Sox and Cubs games, concerts), or by a Track Access Occurrence scheduled elsewhere on that route or the CTA System.

- F. The Contractor will not be permitted to perform work requiring a Track Access Occurrence or Flagging during the following special events:
1. Taste of Chicago
 2. Independence Day
 3. Chicago Air and Water Show
 4. Chicago Marathon
 5. Chicago Jazz Festival
 6. Chicago Blues Festival
 7. Chicago St. Patrick's Day Parade
 8. The Saturday before Thanksgiving Day through the Monday following Thanksgiving
 9. New Year's Eve and New Year's Day
 10. Easter Sunday
 11. Gospel Fest
 12. Chicago White Sox Home Games
 13. Chicago Cubs Home Games
 14. Chicago Bears Home Games
 15. Lollapalooza
 16. Pride Parade

In addition, CTA reserves the right to limit or deny access to the system during other major special events that may develop and that may impact service needs, during emergencies, and during severe weather conditions.

The CTA, at their discretion, may provide a Track Access Occurrence or Flagging during a time period identified above provided the request is made in conformance with this specification and is properly scheduled with the CTA as required.

1.09 CONSTRUCTION PROCESS PLAN

- A. CTA will require the Contractor to submit a Construction Process Plan whenever any work, in the opinion of the CTA, affects the safety or causes disruption of service or inconvenience to transit users, CTA Operations or impacts CTA Right-of-Way including, but not limited to: protection of CTA tracks/ CTA Right-of-Way, demolition, temporary shoring installation, drilled shaft installation, pier construction, structural steel erection over CTA tracks/ CTA Right-of-Way, temporary pedestrian bridge to CTA's station entrance, and any other necessary temporary construction related to the above listed items. At a minimum, an individual Construction Process Plan shall be required for each instance the Contractor requests a Track Access Occurrence from CTA and for any work that requires flagging protection from CTA.

- B. A draft Construction Process Plan must be submitted to CTA by such method as the CTA may direct, at least twenty-one (21) calendar days in advance of work and at least fourteen (14) calendar days prior to a pre-activity meeting. The plan shall include/address the following:
1. Applicable Contract Documents
 2. Options
 3. Possible conflicts
 4. Compatibility problems
 5. Time schedules
 6. Weather limitations
 7. Temporary facilities & signage
 8. Space and access limitations
 9. Governing regulations
 10. Safe Work Plans (including Hazard Analysis)
 11. CTA Operations Impact
 12. Proposed Traffic Control & Staging Areas
 13. Lift Plan
 14. For construction processes where failure of temporary structures will result in service interruptions and/or damage to CTA infrastructure CTA will require calculations and drawings signed and sealed by an Illinois SE. These processes include but are not limited to temporary Earth Retention Structures, formwork, lift plans and demolition. CTA also reserves the right to require a 3rd party SE review of the calculations, drawings and installation.
- C. The draft plan must also include reference to all Contractor Requests for Information (RFI's) and submittals that pertain to work identified in the plan.
- D. In addition, for any work to be performed during a Track Access Occurrence, the Contractor shall provide the following to the CTA:
1. A track access plan submitted to and approved by the CTA specifically identifying the area(s) of power removal and work zone protection methods being requested by the Contractor.
 2. Work zone protection methods to be performed by the Contractor
 3. Name, title, contact information, and work hours for Contractor's on-site supervision
 4. Work zone protection requested by the Contractor for implementation by the CTA (subject to CTA approval).
 5. Pre-approved Safety and Quality Control Checklists, applicable to the work elements being performed during the specific track(s) outage request for completion by the Contractor and submission to the Person-In-Charge during Track Access Occurrence.

6. A general schedule reflecting proposed work to be performed within the requested Track Access Occurrence.
 - E. After pre-activity meeting minutes have been agreed to, all comments from the meeting must be incorporated into a final Construction Process Plan. This plan must be submitted and approved by the Engineer and CTA prior to the start of related work.
 - F. Prior to the CTA implementing an authorized Track Access Occurrence, the Contractor must provide, at least 48 hours in advance, an hourly schedule broken into tasks with a defined critical path that clearly establishes milestones that may be monitored. The hourly schedule shall also include, but not be limited to:
 1. Name, title, contact information, and work hours for Contractor's on-site supervision.
 2. Power removal (min 1 hour)
 3. Proposed work activities.
 4. Activities for inspection and completion of safety & quality checklists by Contractor.
 5. Submission of safety & quality checklists to the CTA's Person-In-Charge (PIC) during Track Access Occurrence. The checklists shall be submitted to the PIC prior to commencing power restoration activities.
 6. Power, Signal Restoration (min 1 hour).
 7. Test train (min ½ hour).
 - G. The CTA intends to issue Power & Way Service Bulletins to supplement CTA Rail Service Bulletins. The Power & Way Service Bulletins are intended to provide procedural guidelines for safely removing and restoring the CTA's power & way systems (primarily traction power & signal) within the limits defined by the contract and Contractors specific track outage plan(s).
 - H. CTA labor shall be required to de-energize and re-energize traction power and perform such other work as may be deemed by the CTA to be required pursuant to the Contractor's work activities and authorized Track Access Occurrences, etc. CTA Signal Maintainer shall also be required to observe and witness the Contractor disconnection and reconnection of temporary signal work at each location where modifications are performed to support construction activities. One Signal Maintainer will be required to witness testing at each location or housing where it is taking place. CTA Signal Maintainer shall also be required to witness the Contractor restoration safety testing, prior to the line being returned to the CTA.
 - I. Two Linemen will be required at each location where traction power is energized or de-energized. The Contractor's schedule must include travel time for the CTA Electrician's (min ½ hour) if they are to energize or de-energize traction power at more than one location.

- J. Failure of the Contractor to provide the CTA the minimum specified time required for the removal and restoration of all Power & Way systems within an authorized Track Access Occurrence will result in specified liquidated damages for failure to return track(s) to service in accordance with the contract requirements. There will be no reimbursement for liquidated damages charged to the Contractor by CTA. The following schedule for liquidated damages has been established by the CTA:

From 1 minute through 29 minutes delay - \$5,000.00

From 30 minutes through 59 minutes delay – an additional \$5,000.00

For each additional hour or fraction thereof - \$30,000.00 per hour

- K. When scope of work under this Contract includes construction activities adjacent to the existing CTA tunnels, the construction process plan shall identify the following items to be approved by the CTA prior to all construction near the CTA tunnels:
1. The scope and sequence of work near the CTA tunnel
 2. The type of equipment to be used adjacent to the tunnel
 3. Equipment to be operated, stored or serviced within the limits of the projected edges of the CTA tunnels up to ground
 4. Specialized pads, racks, mats or other supports for any equipment to be operated or stored or materials to be stored over CTA tunnels
 5. Excavation limits in the area of the CTA tunnels, braced excavation or temporary earth retention system designs to be used (if applicable), excavation procedures (including hand, vacuum, hydro and other non-mechanical techniques), and other elements related to the excavations near the CTA tunnels
 6. Materials and activities to protect the CTA tunnels during excavations and proposed construction near the CTA tunnels
 7. Emergency plan and communication protocol in the event there is confirmed damage to the CTA tunnels due to Contractor activities
 8. Restoration plan and construction techniques to restore the soil fill around and over the CTA tunnels
- L. Placing equipment and materials in the area above the CTA tunnels is at the discretion of the CTA, and must be authorized prior to the start of any activities above and around the tunnel. In order for the CTA to evaluate the impact due to Contractor activities, a Structural Assessment Report shall be prepared concerning the CTA tunnel structures.

1. The Contractor shall retain the services of an engineering firm, prequalified in the IDOT consultant selection category of Highway Bridge (Advance Typical / Complex), for preparation of the Structural Assessment Report(s). Contractor's pre-approval shall not be applicable for this project. Preparation of the Structural Assessment Report(s) shall be at the Contractor's expense.
2. The Contractor is advised that the existing structures most likely contain elements that are in deteriorated conditions with reduced load carrying capacities. It is the Contractor's responsibility to account for the condition of existing structures when developing construction procedures for using them to support construction loads.
 3. The Contractor shall verify that the structural demands of the applied loads due to the Contractor's means and methods will not exceed the available capacity of the structure at the time loads are applied nor will any overstress to the tunnel structure occur. The Contractor may need to provide modifications to the existing tunnels (or other methods of retrofitting) to support construction loads. Locations and design of such modifications system will be the responsibility of the Contractor, will not be paid for separately, and will be subject to the review and approval of the CTA.
 4. The modifications may include constructing elements adjacent to the CTA tunnels to reduce the load transfer to the tunnel structures. Any proposed improvements within the area of the tunnel to support Contractor operations will not be paid for separately, but will be included in the cost of other items.

1.10 HAZARDOUS WORKING CONDITIONS

- A. The Contractor shall caution all employees of the presence of electric third rail (600 volts DC), live cables and moving trains on CTA tracks. The Contractor shall take all necessary precautions to prevent damage to life or property through contact with the electrical or operations systems. The Contractor shall caution all employees that any contact with live electric third rail or "live" portions of train undercarriage may result in a severe burn or death.
- B. The Contractor shall establish third-rail safety precautions in accordance with CTA regulations, such as using insulating hoods or covers for live third rail or cables adjacent to the work. On every day and at every work site where a live third rail hazard exists, the Contractor shall instruct all employees of the emergency procedures. Knowledge of the disconnect switch locations or manner of disconnection shall be available at all times to the personnel on the job. Unless otherwise noted, only CTA Electricians are allowed to disconnect power.
- C. The third rail may be de-energized during authorized Track Access Occurrences. The planning and implementation of the de-energizing shall be listed in the Contractor's process plan and include documenting checklist requirements.

1.11 TRACK SAFETY

- A. The Contractor shall, at all times, take special care to conduct operations over, on, under, adjacent to, or adjoining, the CTA Right-of-Way in such a manner as not to cause damage, settlement or displacement of any structures, tracks or any portion thereof. Contractor will monitor CTA tracks for vertical and horizontal movements. Contractor to refer to the requirements as identified under the Special Provision, "TRACK MONITORING".
- B. Any damages to the CTA tracks, supporting structures or other existing facilities and properties caused by the Contractor's operations shall be replaced or repaired by the Contractor to the satisfaction of the CTA without reimbursement. Contractor shall obtain photo documentation of damaged property to the CTA prior to performing any repair or replacement work.
- C. The CTA shall have the right to perform any work it deems to be of an emergency nature and/or necessary to permit normal train operations during construction operations by the Contractor. The work to be completed by the CTA may impact the ongoing Contractor operations. If the emergency work is required due to Contractor actions, the cost of such service or emergency work provided by the CTA shall be borne by the Contractor with no reimbursement by the Department.
- D. All work shall comply with the CTA, *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System* and CTA Standard Operating Procedures.

E. Train Clearances

1. Minimum 7'-2" Horizontal Clearance:

The Contractor shall take such precautions as are necessary to ensure the safety and continuity of the CTA operations and passengers. The Contractor shall provide a minimum horizontal clearance of 7'-2" from the centerline of the nearest tangent track to any falsework, bracing and forms or other temporary obstruction during the work under this Contract. The clearance requirements for curved track sections must be calculated by the Contractor to ensure encroachment into the clearance envelope will not occur. Prepare, submit and obtain approval of detailed drawings prepared and sealed by a licensed structural engineer in the state of Illinois for all falsework, sheeting and construction procedures adjacent to and under the tracks before doing any work on same. After obtaining approval of such plans, said falsework, sheeting and construction procedures shall be constructed strictly in accordance with the approved drawings and specifications. All submittals must be submitted to the Engineer to be provided to the CTA. In case of any settlement or displacement of structures or tracks, the Contractor shall immediately proceed with all shoring or other work necessary to maintain the CTA property in a safe condition for the operation of train service. If the Contractor fails to undertake this work within 24 hours after notice by the Engineer in writing, the CTA may proceed to repair or shore any such structure or tracks; and the cost thereof shall be billed to the Contractor with no compensation. If the settlement or displacement is severe enough to limit train service, the repairs shall be made immediately. All costs of any disruption to the CTA service due to the Contractor's operations or negligence shall be at the Contractor's expense with no compensation.

2. Limited minimum 6'-1" Horizontal Clearance:

In limited cases and with advance authorization by the CTA, a minimum horizontal clearance of 6'-1" between the centerline of the nearest tangent track and an obstruction may be allowed. This clearance does not allow CTA or Contractor personnel to safely stand between the obstruction and an operating train. In addition, an obstruction at this clearance is a hazard to motormen with a cab window open. Any required flagging by the CTA will need to be requested as described herein.

3. 14'-6" Vertical Clearance:

Vertical clearance A minimum vertical clearance of 14'-6" (4.42 m) above the high running rail the CTA tracks must be provided at all times.

F. Protective Shield

1. The Contractor shall furnish, install, and later remove protective shields to protect the CTA traffic from damage due to (a) falling material and (b) work on bridge piers.

2. Protective shields will be necessary for any demolition/repair/new construction activities.
3. The protective shield may be a platform, a net, or any other Department approved structure that can support the construction debris and satisfy train clearance requirements.
4. Required protective shield for falling material, as indicated on the plans and the supporting members shall be designed to sustain a load of 200 pounds per square foot in addition to its own weight.
5. Required protective shield for work on bridge piers shall be designed for a 30 psf minimum wind load pressure or greater as determined by Contractor's engineer for site specific conditions. Any other loads that can be imposed by Contractor's construction activities shall also be included. Preferred material for shield is wood.
6. Drawings and design calculations for the protective shields shall be stamped by an Illinois Licensed Structural Engineer and shall be submitted to the Department for approval. The protective shield shall be constructed only after the Department has approved the drawings and the design.

G. Work adjacent and above the CTA tunnels must consider the protection of the tunnel structures in addition to items described above related to open track conditions. The protection of the tunnel structure is critical to maintain continuous transit operations. Section 1.09K describes the required items as part of the Construction Process near the tunnel structures. The CTA, at their discretion, may place inspectors, or other personnel, within adjacent tunnel sections during Contractor operations. The CTA personnel will alert the Engineer if the Contractor actions appear to be damaging the CTA tunnel structure(s).

1.12 TRACK FLAGGING OPERATIONS

A. Temporary Track Flagging slow zones per CTA SOP 7041 and CTA, *Safety Manual for Contract Construction On, Above or Adjacent to the CTA Rail System* are restricted in the following manner:

1. Temporary track flagging slow zones can only be mobilized, utilized and demobilized in non-rush hour time periods and no more than one (1) Track Flagging Operation zone will be permitted at any given time. The Contractor will be the responsible party responsible to furnish (Contractor may purchase signage from CTA if Contractor does not have) and install the required slow zone signage and equipment. A Track Flagging Operation zone is defined as a contiguous work zone, of no more than 600 feet in length, regardless of the number of tracks fouled. The costs for all manpower, signage and equipment for flagging operations will be billed by the CTA to the Contractor with reimbursement as defined herein.

2. Current Standard Operating Procedures require Slow Zone with flagging protection whenever any workers are scheduled to work on, across or near a section of track. Flagging protection shall be ordered and assigned according to the CTA Flagmen Requirements Manual. These standards must be adhered to and the number of flagmen assigned to a work location shall be as required by the CTA Flagmen Requirements Manual that is available for public viewing at CTA Headquarters upon request. If the work will take place in an area of restricted visibility then flagmen must be assigned (for any number of workers/duration of work) and a slow zone must be established.
3. Temporary Track Flagging slow zone signs will be placed, removed or turned by the Contactor so the sign cannot be read from the motor cab or hooded to cover the sign so it may not be read from the motor cab when the work crew clears the Right-of-Way.
4. The Contractor shall provide the Engineer with a written request for flagmen and other personnel at least seventy two (72) hours (two normal working days and before noon) prior to the date, and time the work will be performed and the CTA personnel are requested. The Engineer or the Engineer's designee will coordinate all flagmen requests with the CTA.
5. A maximum of () N/A flagger shifts will be reimbursed as part of the Contract (N/A – All Flagger shifts will be reimbursed by IDOT, unless noted otherwise). The costs for additional flagger shifts required for the Contractor's operations that are requested and granted by the CTA will be reviewed after the flagger shift request has been made to the Engineer.
 - B. The providing of such personnel and any other safety precautions taken by the CTA shall not relieve the Contractor of any liability for death, injury or damage arising in connection with the construction operations. See CTA SOP No. 7037, "Flagging on the right-of-way", for a description of flagging personnel duties.
 - C. To minimize flagmen usage, the Contractor shall use approved barricades, barricaded scaffolds and/or safety railings. Barricades and safety railing arrangements shall be in accordance with Section 4-5.3 of the CTA, *Safety Manual for Contract Construction On, Above, or Adjacent to the CTA Rail System*.
 - D. The CTA does not guarantee that flagging or other personnel will always be available when requested. The Contractor shall be advised that requests for flagging manpower must conform to the CTA Flagman Requirements Manual, and certain work locations require multiple flagging personnel when only one track is fouled by the work.

- E. The Contractor shall pay for all flagging and other personnel costs incurred and charged by the CTA. The cost for the each flagger shift shall be approximately \$900.00 per flagger shift (exact cost will be based on actual wage rates, fringes and overhead). The Contractor shall also be responsible to reimburse the CTA for all costs associated with the use of other personnel for infrastructure shifts throughout the duration of the contract. The cost for any other CTA personnel (signalmen, linemen, towermen, inspectors, etc.) shall be approximately \$1,100.00 per infrastructure shift (exact cost will be based on actual wage rates, fringes and overhead). CTA personnel assigned to monitor CTA tunnels during Contractor operations identified within Section 1.111 are considered as infrastructure shifts.
 - F. By labor contract, CTA flagging personnel are entitled to a 30-minute break after a continuous 5-1/2 hour work period, including report and travel time. The 5-1/2 hour period begins when the person reports to work at his or her home terminal. Additionally, flagging personnel are entitled to occasional personal breaks (to use the washroom facilities) during the normal course of work. When flagging personnel leave the work site, work must cease unless provision is made for a relief flagger. The Contractor shall coordinate the Project work schedule with the flagging personnel break periods.
 - G. All employees of the Contractor and subcontractors shall report any actions of perceived CTA employee misconduct, or if any CTA employee does not provide a full level of cooperation in support of the contract; immediately and directly to the Engineer. The Engineer will provide written correspondence to the CTA Project Manager, as well as CTA Operations. Only with timely, written documentation will CTA be enabled to resolve work site personnel issues and take appropriate disciplinary action, when necessary.
 - H. If the Contractor, Engineer, CTA Construction or Safety Inspector believes that the Flagman is unable to perform his/her duties responsibly, work shall be stopped immediately, ensure that the Right-of-Way is safe for train operations, and the Work Crew shall exit, without delay, the Rail System Right-of-Way. The Contractor must contribute incident information to the Engineer to that a written report can be submitted to the CTA prior to the end of the workday.
1. In addition, all employees of the Contractor and subcontractors must report any actions of perceived CTA employee misconduct, or if any CTA employee does not provide a full level of cooperation in support of the contract immediately to the Engineer. The Engineer will then contact the CTA's Control Center and/or CTA Rail Operations Route Manager. Within 24 hours of alleged incident, the Engineer must provide a written report to the CTA including detailed explanation of incident, employee badge numbers, location of incident, etc. The Contractor must contribute incident information to the Engineer.

2. Failure to make the proper notification in writing may adversely affect any claim that the Department may file with respect to CTA employee performance or lack thereof.
 - I. CTA Flaggers only provide flagging protection for the CTA Right-of-Way, and only CTA Flaggers are permitted to provide flagging protection for the CTA Right-of-Way. Flaggers for streets, highways or other railroads are solely the responsibility of the Contractor, and will not be permitted to provide flagging protection for the CTA Right-of-Way. Any additional flagging required by other agencies or railroads is the responsibility of the Contractor.

1.13 TRACK ACCESS OCCURRENCES

- A. The entire system must be fully operational when the tracks are put back into service after a Track Access Occurrence. The track where work was conducted must be returned to the CTA in revenue condition; all stations must be open, fully functional and properly cleaned. The Contractor shall be immediately available with sufficient staff for up to one hour after revenue operation begins to ensure that all systems are functioning properly.
- B. The Contractor shall allow enough time prior to putting the tracks back into service to make sure the line can be fully operational. A test train shall be required after any construction activity, determined by the Engineer or CTA, to require a test train. The scheduling of test trains must include travel time to and from the location being tested. Additional time should also be allowed for any possible remedial work required before the system can be made fully operational.
- C. All components of the system, including, but not limited to, tracks, signals, stations, entrances, etc. must be fully and properly operational prior to putting the tracks and facilities back into service. Any facilities under demolition or construction and any temporary facilities must be safe and secure so they do not impact revenue service operations.
- D. The Contractor shall be subject to fines if any station, facility, yard, structure, track, or component is not fully operational and useable at the prescribed predetermined time; including all planned staging of construction sites. The CTA will identify appropriate fines at the time of the incident. No compensation will be made for fines levied by the CTA due to Contractor actions or delays in providing CTA facilities at prescribed times.
- E. The Contractor shall clean all debris and equipment from the work or staging areas after work has been completed after each work day. In the event the Contractor fails to so clean to the CTA's satisfaction, the CTA may perform any necessary cleaning and fine the Contractor the cost of such cleaning. No compensation will be made for fines levied by the CTA due to delays and cleaning costs.

TRACK MONITORING

Description.

This work shall consist of providing pre-construction and post-construction track surveys and daily monitoring of the CTA tracks for vertical and horizontal movements during operations associated with the removal and reconstruction of existing barrier wall, sign structure placement, braced excavation and backfilling for drainage structure installation, and jacking of steel casing pipes. These operations include, but not limited to:

1. Removal and replacement of CTA barrier wall for installation of Drainage Structure #2057 at station 3100+33. This work includes but is not limited to excavation of soils as braced excavation during the entire duration that these excavations are open, up to and including backfilling and replacement of barrier wall at completion of work.
2. Installation of STORM SEWERS JACKED IN PLACE, 48" (SPECIAL) (Storm Sewer # 2055) near Station 3100+33. This includes all work specified in the Special Provision for STORM SEWERS JACKED IN PLACE, up to and including backfilling. Track monitoring shall commence once the jacked casing is approximated to be within 20' of the CTA barrier wall.
3. Removal and replacement of CTA barrier wall for installation of DMS truss at 3073+91, and overhead sign truss at 3102+78.

A pre-construction track survey and inspection shall be performed prior to any construction operations taking place which shall consist of the Contractor establishing a horizontal baseline and track elevations with shots taken on top of the railroad tie at the edge closest to the operation and at the centerline of the tracks closest to the operation with measurements at approximately 10' centers within the construction zone and 50' beyond the identified construction limits for a period of three (3) consecutive calendar days prior to the start of the operation. The survey shall be coordinated with CTA (Abdin Carrillo, Project Manager, Construction Oversight (312) 681-3913) at least twenty-one (21) calendar days prior to any activity that precedes construction. If multiple operations are on-going concurrently, the baseline elevations shall be based off the operation that was initially started and with the furthest construction limit.

Daily monitoring shall consist of the Contractor surveying the same points taken during the pre-construction track survey, taking horizontal and vertical measurements. Daily monitoring shall only occur when the Contractor is working.

Track conditions shall be documented and tabulated for daily submittal to Abdin Carrillo, Project Manager, Construction Oversight (312) 681-3913 for review. Any measurements exceeding 1/4" of the pre-construction track survey, the Contractor must discontinue construction operations immediately and notify IDOT and CTA to evaluate the track condition. Contractor shall perform any restorative work at his/her expense prior to resuming construction operations. If track repairs are required, the Contractor shall use a qualified contractor experienced in CTA track work, and approved by CTA, to perform corrective track repair to the satisfaction of CTA.

The Contractor shall complete a post-construction track survey and inspection after completion of the operation. The post-construction track survey shall consist of the Contractor surveying the same points taken during the pre-construction track survey, taking horizontal and vertical measurements, for a period of three (3) consecutive calendar days and as accepted by the Resident Engineer. If multiple operations are on-going concurrently, the post-construction track survey shall be performed based off the operation that is completed last and with the furthest construction limit.

All pre-construction and post-construction track survey work shall be incidental and included in the cost of the daily track monitoring.

Basis of Payment.

This work will be paid for at the contract unit price per CALENDAR DAY for TRACK MONITORING.

RAILROAD PROTECTIVE LIABILITY INSURANCE (BDE)

Revised: January 1, 2006

Description. Railroad Protective Liability and Property Damage Liability Insurance shall be carried according to Article 107.11 of the Standard Specifications. A separate policy is required for each railroad unless otherwise noted.

NAMED INSURED & ADDRESS	NUMBER & SPEED OF PASSENGER TRAINS	NUMBER & SPEED OF FREIGHT TRAINS
Chicago Transit Authority (CTA) 120 N. Racine Avenue Chicago, IL 60607-2010	Blue Line 382 trains/day @ 55 mph	-0-
DOT/AAR No.: N/A RR Division: CTA	RR Mile Post: N/A RR Sub-Division: Blue Line	
For Freight/Passenger Information Contact: <u>Rick Herndobler</u>		Phone: <u>(312) 681-3921</u>
For Insurance Information Contact: <u>Mike Wrenn</u>		Phone: <u>(312) 681-3646</u>

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

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

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

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

KEEPING THE EXPRESSWAY OPEN TO TRAFFIC

Effective: March 22, 1996

Revised: January 21, 2015

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 at www.idotlcs.com twenty-four (24) hours in advance of all daily lane, ramp and shoulder closures and 7 days 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-90/94 Kennedy: E. River Road to Ohio

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS		
Sunday - Thursday	1-Lane*	9:00 PM	to	5:00 AM
	2-Lane	11:59 PM	to	5:00 AM
Friday	1-Lane*	10:00 PM (Fri)	to	8:00 AM (Sat)
	2-Lane	11:59 PM (Fri)	to	6:00 AM (Sat)
Saturday	1-Lane*	9:00 PM (Sat)	to	10:00 AM (Sun)
	2-Lane	11:59 PM (Sat)	to	8:00 AM (Sun)

LOCATION: I-190: Bessie Coleman to E. River Road

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS					
		INBOUND (Toward Chicago)			OUTBOUND (Toward O'Hare)		
Sunday - Thurs	One Lane	11:00 PM	to	5:00 AM	10:00 PM	to	4:00 AM
Friday	One Lane	11:59 PM (Fri)	to	7:00 AM (Sat)	11:00 PM (Fri)	to	6:00 AM (Sat)
Saturday	One Lane	9:00 PM (Sat)	to	7:00 AM (Sun)	8:00 PM (Sat)	to	5:00 AM (Sun)

LOCATION: I-90/94 Kennedy: E. River Road to Ohio (With Permanent Lane Closure)

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS			
		Sunday - Thursday	1-Lane*	10:00 PM	to
	2-Lane	11:59 PM	to	5:00 AM	
Friday	1-Lane*	11:00 PM (Fri)	to	8:00 AM (Sat)	
	2-Lane	11:59 PM (Fri)	to	6:00 AM (Sat)	
Saturday	1-Lane*	10:00 PM (Sat)	to	10:00 AM (Sun)	
	2-Lane	11:59 PM (Sat)	to	8:00 AM (Sun)	

LOCATION: I-190: Bessie Coleman to E. River Road (With Permanent Lane Closure)

WEEK NIGHT	TYPE OF CLOSURE	ALLOWABLE LANE CLOSURE HOURS					
		INBOUND (Toward Chicago)			OUTBOUND (Toward O'Hare)		
Sunday - Thurs	One Lane	11:00 PM	to	5:00 AM	10:00 PM	to	4:00 AM
Friday	One Lane	11:59 PM (Fri)	to	7:00 AM (Sat)	11:00 PM (Fri)	to	6:00 AM (Sat)
Saturday	One Lane	9:00 PM (Sat)	to	7:00 AM (Sun)	8:00 PM (Sat)	to	5:00 AM (Sun)

In addition to the hours noted above, temporary shoulder and non-system interchange partial ramp closures are allowed weekdays between 9:00 A.M. and 3:00 P.M. and between 7:00 P.M. and 5:00 A.M.

Narrow Lanes and permanent shoulder closures will not be allowed between Dec. 1st and April 1st.

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 Expressway Traffic Control Supervisor (847-705-4151) **shall be** notified 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. Liquidated Damages as specified in the Failure to Open Traffic Lanes to Traffic for One lane or ramp blocked shall be assessed to the Contract for every 15 minutes beyond the initial 15 minutes all lanes are blocked.

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. The Contractor shall notify the District One Expressway Traffic Control Supervisor at least 3 working days (weekends and holidays DO NOT count into this 72 hours notification) in advance of any proposed stage change.

A Maintenance of Traffic Plan shall be submitted to the District One Expressway Traffic Control Supervisor 14 days in advance of any stages changes or full expressway closures. The Maintenance of Traffic Plan shall include, but not be limited to: lane and ramp closures, existing geometrics, and equipment and material location.

All daily lane closures shall be removed during adverse weather conditions such as rain, snow, and/or fog and as determined by the Engineer. Also, the contractor shall promptly remove their lane closures when Maintenance forces are out for snow and ice removal.

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 one (1) 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.

Check barricades shall be placed every 1000' within a lane closure to prevent vehicles from driving through closed lanes.

Temporary ramp closures for service interchanges will only be permitted at night during the restricted hours listed for temporary one-lane closures within the project limits. However, no two (2) adjacent entrance and exit ramps in one direction of the expressway shall be closed at the same time.

Freeway to freeway (system interchange) full ramp closures for two lane ramps will not be permitted. Partial ramp closures of system ramps may be allowed during the 1-lane closure hours above. System ramp full closures for single lane ramps are only permitted for a maximum of four (4) hours

- between the hours of 1:00 a.m. and 5:00 a.m. on Monday thru Friday
- between the hours of 1:00 a.m. and 6:00 a.m. on Saturday, and
- between the hours of 1:00 a.m. and 7:00 a.m. on Sunday.

The Contractor shall furnish and install large (48" X 48") "DETOUR with arrow" signs as directed by the Engineer for all system ramp closures. In addition, one portable changeable message sign will be required to be placed in advance of the ramp closure. The cost of these signs and PCMS board shall be included in the cost of traffic control and protection (6 static signs maximum per closure).

Should the Contractor fail to completely open, and keep open, the ramps to traffic in accordance with the above limitations, the Contractor shall be liable to the Department for liquidated damages as noted under the Special Provision, "Failure to Open Traffic Lanes to Traffic".

FAILURE TO OPEN TRAFFIC LANES TO TRAFFIC (D-1)

Effective: March 22, 1996

Revised: February 9, 2005

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 = **\$ 3,000**

Two lanes blocked = **\$ 6,000**

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.

KEEPING ARTERIAL ROADWAYS OPEN TO TRAFFIC (LANE CLOSURES ONLY)

Effective: January 22, 2003

Revised: February 20, 2015

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 Details.

Arterial lane closures shall be in accordance with the Standard Specifications, Highway Standards, District Details, and the direction of the Engineer. The Contractor shall request and gain approval from the Illinois Department of Transportation's Arterial Traffic Control Supervisor at 847-705-4470 seventy-two (72) hours in advance of all long-term (24 hrs. or longer) lane closures. This advance notification is calculated based on a Monday through Friday workweek and shall not include weekends or state holidays.

Arterial lane closures not shown in the staging plans will not be permitted during **peak traffic volume hours**.

Peak traffic volume hours are defined as weekdays (Monday through Friday) from **7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM**.

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 locations approved by the Engineer in accordance with Articles 701.08 and 701.11 of the Standard Specifications.

Should the Contractor fail to completely open and keep open all the traffic lanes to traffic in accordance with the limitations specified above, the Contractor shall be liable to the Department for the amount of:

One lane or ramp blocked = \$1,000

Two lanes blocked = \$2,500

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 PLAN (D-1)

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.

PLANS:

SUGGESTED STAGES OF CONSTRUCTION AND TRAFFIC CONTROL SHEETS

STANDARDS:

701101	OFF-RD OPERATIONS, MULTILANE, 15' TO 24" FROM PAVEMENT EDGE
701106	OFF-RD OPERATIONS, MULTILANE, MORE THAN 15' AWAY
701301	LANE CLOSURE, 2L, 2W, SHORT TIME OPERATIONS
701311701400	LANE CLOSURE, 2L, 2W, MOVING OPERATIONS – DAY ONLY
701401	APPROACH TO LANE CLOSURE, FREEWAY/EXPRESSWAY
701411	LANE CLOSURE, FREEWAY/EXPRESSWAY
701427	LANE CLOSURE, MULTILANE, AT ENTRANCE OR EXIT RAMP, FOR SPEEDS >= 45 MPH
701428	LANE CLOSURE, MULTILANE, INTERMITTENT OR MOVING OPER., FOR SPEEDS <= 40 MPH
701446	TRAFFIC CONTROL SETUP AND REMOVAL FREEWAY/EXPRESSWAY
701501	TWO LANE CLOSURE FREEWAY/EXPRESSWAY
701606	URBAN LANE CLOSURE, 2L, 2W, UNDIVIDED
701611	URBAN SINGLE LANE CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN
701701	URBAN HALF ROAD CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN
701801	URBAN LANE CLOSURE, MULTILANE, 2W WITH MOUNTABLE MEDIAN
701901	URBAN LANE CLOSURE, MULTILANE INTERSECTION
704001	SIDEWALK, CORNER OR CROSSWALK CLOSURE
	TRAFFIC CONTROL DEVICES
	TEMPORARY CONCRETE BARRIER

DISTRICT 1 DETAILS:

TC-08	EXTRANCE AND EXIT RAMP CLOSURE DETAILS
TC-09	TRAFFIC CONTROL DETAILS FOR FREEWAY SINGLE & MULTI-LANE WEAVE
TC-10	TRAFFIC CONTROL AND PROTECTION FOR SIDE ROADS, INTERSECTIONS, AND DRIVEWAYS
TC-11	RAISED REFLECTIVE PAVEMENT MARKERS
TC-12	MULTI-LANE FREEWAY PAVEMENT MARKING (2 SHEETS)
TC-13	DISTRICT ONE TYPICAL PAVEMENT MARKING
TC-14	TRAFFIC CONTROL AND PROTECTION AT TURN BAYS (TO REMAIN OPEN TO TRAFFIC)
TC-16	PAVEMENT MARKINGS LETTERS AND SYMBOLS FOR TRAFFIC STAGING
TC-17	TRAFFIC CONTROL FOR SHOULDER CLOSURES AND PARTICAL RAMP CLOSURES
TC-18	SIGNING FOR FLAGGING OPERATIONS AT WORK ZONE OPENINGS
TC-21	DETOUR SIGNING FOR CLOSING STATE HIGHWAYS
TC-22	ARTERIAL ROAD INFORMATION SIGN
TC-27	MILE POST MARKERS – GORE SIGNS MAJOR GUIDE SIGN LAYOUT - ARROWS

DISTRICT 1 SPECIAL PROVISIONS:

MAINTENANCE OF ROADWAYS
KEEPING THE EXPRESSWAYS OPEN TO TRAFFIC (D-1)
FAILURE TO OPEN TRAFFIC LANES TO TRAFFIC (D-1)
PUBLIC CONVENIENCE AND SAFETY (D-1)
TRAFFIC CONTROL PLAN (D-1)
TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS) (D-1)
TRAFFIC CONTROL FOR WORK ZONE AREAS (D-1)
TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS)
TEMPORARY INFORMATION SIGNING (D-1)
WET REFLECTIVE TEMPORARY TAPE TYPE III (D-1)
TEMPORARY PAVEMENT (D-1)
TRAFFIC CONTROL AND PROTECTION (ARTERIALS) (D-1)
SPEED DISPLAY TRAILER (D-1)
SIGN SHOP DRAWING SUBMITTAL (D-1)
NIGHTTIME WORK ZONE LIGHTING (D-1)
KEEPING ARTERIAL ROADWAYS OPEN TO TRAFFIC (LANE CLOSURES ONLY)

CONTRACT SPECIAL PROVISIONS:

CLEANING OF TRAFFIC CONTROL DEVICES
COORDINATION WITH ADJACENT AND/OR OVERLAPPING CONTRACTS
SHOULDER RUMBLE STRIP REMOVAL

SUPPLEMENTAL SPECIFICATIONS

IMPACT ATTENUATORS, TEMPORARY

RECURRING SPECIAL PROVISIONS

GUARDRAIL AND BARRIER WALL DELINEATION
WORK ZONE PUBLIC INFORMATION SIGNS
PAVEMENT MARKING REMOVAL

BDE SPECIAL PROVISIONS

RETROREFLECTIVE SHEETING FOR HIGHWAY SIGNS
SIDEWALK, CORNER, OR CROSSWALK CLOSURE
SPEED DISPLAY TRAILER
TEMPORARY CONCRETE BARRIER
URBAN HALF ROAD CLOSURE WITH MOUNTABLE MEDIAN

TOLLWAY STANDARDS

E1 CONSTRUCTION SIGNS
E2 LANE CLOSURE DETAILS
E3 SHOULDER CLOSURE DETAILS

PUBLIC CONVENIENCE AND SAFETY (D-1)

Effective: May 1, 2012

Revised: July 15, 2012

Add the following to the end of the fourth paragraph of Article 107.09:

“If the holiday is on a Saturday or Sunday, and is legally observed on a Friday or Monday, the length of Holiday Period for Monday or Friday shall apply.”

Add the following sentence after the Holiday Period table in the fourth paragraph of Article 107.09:

“The Length of Holiday Period for Thanksgiving shall be from 5:00 AM the Wednesday prior to 11:59 PM the Sunday After”

Delete the fifth paragraph of Article 107.09 of the Standard Specifications:

“On weekends, excluding holidays, roadways with Average Daily Traffic of 25,000 or greater, all lanes shall be open to traffic from 3:00 P.M. Friday to midnight Sunday except where structure construction or major rehabilitation makes it impractical.”

TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS) (D-1)

Effective: March 8, 199

Revised: January 21, 2015

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 truck/trailer mounted attenuator and arrow board per State Standard 701428 and the Traffic Control Setup and Removal Freeway/Expressway BDE Special Provision. Failure to meet this requirement will be subject to a Traffic Control Deficiency. 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.
- (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 4200' before the closure, and 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. WORK ZONE SPEED LIMIT 55 PHOTO ENFORCED assemblies may be omitted when this assembly would normally be placed within 1500 feet of the END WORK ZONE SPEED LIMIT sign. If existing speed limit is over 65mph then additional signage should be installed per 701400.
 - 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. WORK ZONE SPEED LIMIT 55 PHOTO ENFORCED assemblies shall be eliminated in all cases. 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, exit ramp gores, or staged construction projects lasting more than 12 hours. 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).
- (f) Full Expressway Closures. Full Expressway Closures will only be permitted for a maximum of 15 minutes during the allowable hours listed in the Keeping the Expressway Open to Traffic Special Provision. During Full Expressway Closures, the Contractor will be required to close off all lanes except one, using Freeway Standard Closures. The Contractor will be required to provide one changeable message sign to be placed at the direction of the Engineer. The sign shall display a message as directed by the Engineer. A Maintenance of Traffic Plan shall be submitted to the District One Expressway Traffic Control Supervisor 14 days in advance of the planned work; including all stage changes. The Maintenance of Traffic Plan shall include, but not be limited to: lane and ramp closures, existing geometrics, and equipment and material location. The District One Expressway Traffic Control Supervisor (847-705-4151) shall be contacted at least 3 working days in advance of the proposed road closure and will coordinate the closure operation with police forces.

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, 701411, 701416, 701426, 701428, 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:

$$\text{Adjusted contract price} = .25P + .75P [1 \pm (X - 0.1)]$$

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 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.
- (j) The Changeable Message Sign required for Full Expressway Closures shall not be paid for separately.

TRAFFIC CONTROL AND PROTECTION (ARTERIALS) (D-1)

Effective: February 1, 1996

Revised: March 1, 2011

Specific traffic control plan details and Special Provisions have been prepared for this contract. This work shall include all labor, materials, transportation, handling and incidental work necessary to furnish, install, maintain and remove all traffic control devices required as indicated in the plans and as approved by the Engineer.

When traffic is to be directed over a detour route, the Contractor shall furnish, erect, maintain and remove all applicable traffic control devices along the detour route according to the details shown in the plans.

Method of Measurement: All traffic control (except “Traffic Control and Protection (Expressways)” and temporary pavement markings) indicated on the traffic control plan details and specified in the Special Provisions will be measured for payment on a lump sum basis.

Basis of Payment: All traffic control and protection will be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

Temporary pavement markings will be paid for separately unless shown on a Standard.

TRAFFIC CONTROL FOR WORK ZONE AREA (D-1)

Effective: September 14, 1995

Revised: January 1, 2007

Work zone entry and exit openings shall be established daily by the Contractor with the approval of the Engineer. All vehicles including cars and pickup trucks shall exit the work zone at the exit openings. All trucks shall enter the work zone at the entry openings. These openings shall be signed in accordance with the details shown elsewhere in the plans and shall be under flagger control during working hours.

The Contractor shall plan his trucking operations into and out of the work zone as well as on to and off the expressway to maintain adequate merging distance. Merging distances to cross all lanes of traffic shall be no less than 1/2 mile. This distance is the length from where the trucks enter the expressway to where the trucks enter the work zone. It is also the length from where the trucks exit the work zone to where the trucks exit the expressway. The stopping of expressway traffic to allow trucks to change lanes and/or cross the expressway is prohibited.

Failure to comply with the above requirements will result in a Traffic Control Deficiency charge. The deficiency charge will be calculated as outlined in Article 105.03 of the Standard Specifications. The Contractor will be assessed this daily charge for each day a deficiency is documented by the Engineer.

TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS)

Effective: October 25, 1995

Revised: January 21, 2015

The contractor shall provide a person with a vehicle to survey, inspect and maintain all temporary traffic control devices when a lane is closed to traffic, when hazards are present adjacent to or within 10 foot of the edge of pavement for more than 24 hours, or as directed by the Engineer.

The surveillance person is required to drive through the project, to inspect all temporary traffic control devices, to correct all traffic control deficiencies, if possible, or immediately contact someone else to make corrections and to assist with directing traffic until such corrections are made, at intervals not to exceed 4 hours. This person shall list every inspection on an inspection form, furnished by the Engineer, and shall return a completed form on the first working day after the inspections are made.

The Contractor shall supply a telephone staffed on a 24-hour-a-day basis to receive any notification of any deficiencies regarding traffic control and protection or receive any request for improving, correcting or modifying traffic control, installations or devices, including pavement markings. The Contractor shall dispatch additional men, materials and equipment as necessary to begin to correct, improve or modify the traffic control as directed, within one hour of notification by this surveillance person or by the Department. Upon completion of such corrections and/or revisions, the Contractor shall notify the Department's Communication Center at (847) 705-4612.

Method of Measurement.

Traffic Control Surveillance will be measured on calendar day basis. One calendar day is equal to a minimum of six (6) inspections. The inspections shall start within 4 hours after the lane is closed to traffic, a hazard exists within 10 foot from the edge of pavement, or as directed by the Engineer and shall end when the lane closure or hazard is removed or as directed by the Engineer.

Basis of Payment.

Surveillance will be paid for at the contract unit price per calendar day or fraction thereof for TRAFFIC CONTROL SURVEILLANCE (EXPRESSWAYS). The price shall include all labor and equipment necessary to provide the required inspection and maintenance on the expressway and on all cross streets which are included in the project. The cost of the materials for the maintenance of traffic control devices shall be included in the traffic control pay items.

TEMPORARY INFORMATION SIGNING (D-1)

Effective: November 13, 1996

Revised: January 2, 2007

Description.

This work shall consist of furnishing, installing, maintaining, relocating for various states of construction and eventually removing temporary informational signs. Included in this item may be ground mount signs, skid mount signs, truss mount signs, bridge mount signs, and overlay sign panels which cover portions of existing signs.

Materials.

Materials shall be according to the following Articles of Section 1000 - Materials:

	<u>Item</u>	<u>Article/Section</u>
a.)	Sign Base (Notes 1 & 2)	1090
b.)	Sign Face (Note 3)	1091
c.)	Sign Legends	1092
d.)	Sign Supports	1093
e.)	Overlay Panels (Note 4)	1090.02

Note 1. The Contractor may use 5/8 inch (16 mm) instead of 3/4 inch (19 mm) thick plywood.

Note 2. Type A sheeting can be used on the plywood base.

Note 3. All sign faces shall be Type A except all orange signs shall meet the requirements of Article 1106.01.

Note 4. The overlay panels shall be 0.08 inch (2 mm) thick.

GENERAL CONSTRUCTION REQUIREMENTS

Installation.

The sign sizes and legend sizes shall be verified by the Contractor prior to fabrication.

Signs which are placed along the roadway and/or within the construction zone shall be installed according to the requirements of Article 701.14 and Article 720.04. The signs shall be 7 ft (2.1 m) above the near edge of the pavement and shall be a minimum of 2 ft (600 mm) beyond the edge of the paved shoulder. A minimum of two (2) posts shall be used.

The attachment of temporary signs to existing sign structures or sign panels shall be approved by the Engineer. Any damage to the existing signs due to the Contractor's operations shall be repaired or signs replaced, as determined by the Engineer, at the Contractor's expense.

Signs which are placed on overhead bridge structures shall be fastened to the handrail with stainless steel bands. These signs shall rest on the concrete parapet where possible. The Contractor shall furnish mounting details for approval by the Engineer.

Method of Measurement.

This work shall be measured for payment in square feet (square meters) edge to edge (horizontally and vertically).

All hardware, posts or skids, supports, bases for ground mounted signs, connections, which are required for mounting these signs will be included as part of this pay item.

Basis Of Payment.

This work shall be paid for at the contract unit price per square foot (square meter) for TEMPORARY INFORMATION SIGNING.

WET REFLECTIVE TEMPORARY TAPE TYPE III (D-1)

Effective: February 1, 2007

Revised: February 1, 2011

Description. This work shall consist of furnishing, installing, and maintaining Type III Temporary Pavement Marking Tape for Wet Conditions.

Materials. Materials shall be according to the following.

Item	Article/Section
(a) Pavement Marking Tape	1095.06

Initial minimum reflectance values under dry and wet conditions shall be as specified in Article 1095.06. The marking tape shall maintain its reflective properties when submerged in water. The wet reflective properties will be verified by a visual inspection method performed by the Department. The surface of the material shall provide an average skid resistance of 45 BPN when tested according to ASTM E 303.

CONSTRUCTION REQUIREMENTS

Type III Temporary Tape for Wet Conditions shall meet the requirements of Article 703.03 and 703.05. Application shall follow manufacturer's recommendations.

Method of Measurement. This work will be measured for payment in place, in feet (meters).

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for WET REFLECTIVE TEMPORARY TAPE TYPE III of the line width specified, and at the contract unit price per square foot (square meter) for WET REFLECTIVE TEMPORARY TAPE TYPE III, LETTERS AND SYMBOLS.

SPEED DISPLAY TRAILER (D1)

Effective: April 1, 2015

Add the following to Article 701.15(l) of the Standard Specifications:

“(l) Speed Display Trailer. A speed display trailer shall be utilized on freeways and expressways as part of Highway Standard 701400. The trailer shall be placed on the right hand side of the roadway adjacent to, or within 100 ft. (30 m) beyond, the first work zone speed limit sign.

Whenever the speed display trailer is not in use, it shall be considered non-operating equipment and shall be stored according to Article 701.11.”

Add the following to Article 701.20 of the Standard Specifications:

“(k) Revised. “Speed Display Trailer will NOT be paid for by separate pay item, but its costs shall be included in the contract unit price of the various traffic control pay items.

Add the following to Article 1106.02 of the Standard Specifications:

“(o) Speed Display Trailer. The speed display trailer shall consist of a LED speed indicator display with self-contained, one-direction radar mounted on an orange see-through trailer. The height of the display and radar shall be such that it will function and be visible when located behind concrete barrier.

The speed measurement shall be by radar and provide a minimum detection distance of 1000 ft (300 m). The radar shall have an accuracy of ± 1 mile per hour.

The speed indicator display shall face approaching traffic and shall have a sign legend of “YOUR SPEED” immediately above or below the speed display. The digital speed display shall show two digits (00 to 99) in mph. The color of the changeable message legend shall be a yellow legend on a black background. The minimum height of the numerals shall be 18 in. (450 mm), and the nominal legibility distance shall be at least 750 ft (250 m).

The speed indicator display shall be equipped with a violation alert that flashes the displayed detected speed when the posted limit is exceeded. The speed indicator shall have a maximum speed cutoff. The display shall include automatic dimming for nighttime operation.

The speed indicator measurement and display functions shall be equipped with the power supply capable of providing 24 hours of uninterrupted service.”

CLEANING OF TRAFFIC CONTROL DEVICES

All traffic control devices shall be kept clean as stated in Article 701 of the Standard Specifications. In addition, the contractor shall make sure the traffic control devices are cleaned after snowfalls or snow plowing if needed or as directed by the Engineer. This work will not be measured for payment or paid for separately and shall be included in the other contract pay items for TRAFFIC CONTROL AND PROTECTION (EXPRESSWAYS).

TEMPORARY PAVEMENT (D-1)

Effective: March 1, 2003

Revised: April 10, 2008

Description. This work shall consist of constructing a temporary pavement at the locations shown on the plans or as directed by the engineer.

The contractor shall use either Portland cement concrete according to Sections 353 and 354 of the Standard Specifications or HMA according to Sections 355, 356, 406 of the Standard Specifications, and other applicable HMA special provisions as contained herein. The HMA mixtures to be used shall be specified in the plans. The thickness of the Temporary Pavement shall be as described in the plans. The contractor shall have the option of constructing either material type if both Portland cement concrete and HMA are shown in the plans.

Articles 355.08 and 406.11 of the Standard Specifications shall not apply.

The removal of the Temporary Pavement, if required, shall conform to Section 440 of the Standard Specification.

Method of Measurement. Temporary pavement will be measured in place and the area computed in square yards (square meters).

Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for TEMPORARY PAVEMENT and TEMPORARY PAVEMENT (INTERSTATE).

Removal of temporary pavement will be paid for at the contract unit price per square yard (square meter) for PAVEMENT REMOVAL.

AGGREGATE FOR CONCRETE BARRIER (D-1)

Effective: February 11, 2004

Revised: January 24, 2008

Add the following paragraph to Article 637.02 of the Standard Specifications:

“The coarse aggregate to be used in the concrete barrier walls shall conform to the requirement for coarse aggregate used in Class BS concrete according to Article 1004.01(b), paragraph 2.”

ADJUSTMENTS AND RECONSTRUCTIONS (D-1)

Effective: March 15, 2011

Revise the first paragraph of Article 602.04 to read:

“602.04 Concrete. Cast-in-place concrete for structures shall be constructed of Class SI concrete according to the applicable portions of Section 503. Cast-in-place concrete for pavement patching around adjustments and reconstructions shall be constructed of Class PP-1 concrete, unless otherwise noted in the plans, according to the applicable portions of Section 1020.”

Revise the third, fourth and fifth sentences of the second paragraph of Article 602.11(c) to read:

“Castings shall be set to the finished pavement elevation so that no subsequent adjustment will be necessary, and the space around the casting shall be filled with Class PP-1 concrete, unless otherwise noted in the plans, to the elevation of the surface of the base course or binder course. HMA surface or binder course material shall not be allowed. The pavement may be opened to traffic according to Article 701.17(e)(3)b.”

Revise Article 603.05 to read:

“603.05 Replacement of Existing Flexible Pavement. After the castings have been adjusted, the surrounding space shall be filled with Class PP-1 concrete, unless otherwise noted in the plans, to the elevation of the surface of the base course or binder course. HMA surface or binder course material shall not be allowed. The pavement may be opened to traffic according to Article 701.17(e)(3)b.”

Revise Article 603.06 to read:

“603.06 Replacement of Existing Rigid Pavement. After the castings have been adjusted, the pavement and HMA that was removed, shall be replaced with Class PP-1 concrete, unless otherwise noted in the plans, not less than 9 in. (225 mm) thick. The pavement may be opened to traffic according to Article 701.17(e)(3)b.

The surface of the Class PP concrete shall be constructed flush with the adjacent surface.”

Revise the first sentence of Article 603.07 to read:

“603.07 Protection Under Traffic. After the casting has been adjusted and the Class PP concrete has been placed, the work shall be protected by a barricade and two lights according to Article 701.17(e)(3)b.”

FRICITION AGGREGATE (D-1)

Effective: January 1, 2011

Revised: April 29, 2016

Revise Article 1004.03(a) of the Standard Specifications to read:

“1004.03 Coarse Aggregate for Hot-Mix Asphalt (HMA). The aggregate shall be according to Article 1004.01 and the following.

(a) Description. The coarse aggregate for HMA shall be according to the following table.

Use	Mixture	Aggregates Allowed
Class A	Seal or Cover	<u>Allowed Alone or in Combination</u> ^{5/} : Gravel Crushed Gravel Carbonate Crushed Stone Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag Crushed Concrete
HMA Low ESAL	Stabilized Subbase Shoulders or	<u>Allowed Alone or in Combination</u> ^{5/} : Gravel Crushed Gravel Carbonate Crushed Stone Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag ^{1/} Crushed Concrete
HMA High ESAL Low ESAL	Binder IL-19.0 or IL-19.0L SMA Binder	<u>Allowed Alone or in Combination</u> ^{5/ 6/} : Crushed Gravel Carbonate Crushed Stone ^{2/} Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Concrete ^{3/}
HMA High ESAL Low ESAL	C Surface and Leveling Binder IL-9.5 or IL-9.5L SMA Ndesign Surface 50	<u>Allowed Alone or in Combination</u> ^{5/} : Crushed Gravel Carbonate Crushed Stone ^{2/} Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag ^{4/} Crushed Concrete ^{3/}

Use	Mixture	Aggregates Allowed	
HMA High ESAL	D Surface and Leveling Binder IL-9.5 SMA Ndesign 50 Surface	<u>Allowed Alone or in Combination</u> ^{5/} : Crushed Gravel Carbonate Crushed Stone (other than Limestone) ^{2/} Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag ^{4/} Crushed Concrete ^{3/}	
		<u>Other Combinations Allowed:</u>	
		<i>Up to...</i>	<i>With...</i>
		25% Limestone	Dolomite
		50% Limestone	Any Mixture D aggregate other than Dolomite
75% Limestone	Crushed Slag (ACBF) or Crushed Sandstone		
HMA High ESAL	E Surface IL-9.5 SMA Ndesign 80 Surface	<u>Allowed Alone or in Combination</u> ^{5/ 6/} : Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag No Limestone.	
		<u>Other Combinations Allowed:</u>	
		<i>Up to...</i>	<i>With...</i>
		50% Dolomite ^{2/}	Any Mixture E aggregate
		75% Dolomite ^{2/}	Crushed Sandstone, Crushed Slag (ACBF), Crushed Steel Slag, or Crystalline Crushed Stone

Use	Mixture	Aggregates Allowed	
		75% Crushed Gravel ^{2/} or Crushed Concrete ^{3/}	Crushed Sandstone, Crystalline Crushed Stone, Crushed Slag (ACBF), or Crushed Steel Slag
HMA High ESAL	F Surface IL-9.5 SMA Ndesign 80 Surface	<u>Allowed Alone or in Combination</u> ^{5/ 6/} .	
		Crystalline Crushed Stone Crushed Sandstone Crushed Slag (ACBF) Crushed Steel Slag No Limestone.	
		<u>Other Combinations Allowed:</u>	
		<i>Up to...</i>	<i>With...</i>
		50% Crushed Gravel ^{2/} , Crushed Concrete ^{3/} , or Dolomite ^{2/}	Crushed Sandstone, Crushed Slag (ACBF), Crushed Steel Slag, or Crystalline Crushed Stone

- 1/ Crushed steel slag allowed in shoulder surface only.
- 2/ Carbonate crushed stone (limestone) and/or crushed gravel shall not be used in SMA Ndesign 80. In SMA Ndesign 50, carbonate crushed stone shall not be blended with any of the other aggregates allowed alone in Ndesign 50 SMA binder or Ndesign 50 SMA surface.
- 3/ Crushed concrete will not be permitted in SMA mixes.
- 4/ Crushed steel slag shall not be used as leveling binder.
- 5/ When combinations of aggregates are used, the blend percent measurements shall be by volume.”
- 6/ Combining different types of aggregate will not be permitted in SMA Ndesign 80.”

AGGREGATE SUBGRADE IMPROVEMENT (D-1)

Effective: February 22, 2012

Revised: April 1, 2016

Add the following Section to the Standard Specifications:

“SECTION 303. AGGREGATE SUBGRADE IMPROVEMENT

303.01 Description. This work shall consist of constructing an aggregate subgrade improvement.

303.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Coarse Aggregate	1004.07
(b) Reclaimed Asphalt Pavement (RAP) (Notes 1, 2 and 3)	1031

Note 1. Crushed RAP, from either full depth or single lift removal, may be mechanically blended with aggregate gradation CS 01 but shall not exceed 40 percent by weight of the total product. The top size of the Coarse RAP shall be less than 4 in. (100 mm) and well graded.

Note 2. RAP having 100 percent passing the 1 1/2 in (37.5 mm) sieve and being well graded, may be used as capping aggregate in the top 3 in. (75 mm) when aggregate gradation CS 01 is used in lower lifts. When RAP is blended with any of the coarse aggregates, the blending shall be done with mechanically calibrated feeders. The final product shall not contain more than 40 percent by weight of RAP.

Note 3. The RAP used for aggregate subgrade improvement shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications".

303.03 Equipment. The vibratory machine shall be according to Article 1101.01, or as approved by the Engineer. The calibration for the mechanical feeders shall have an accuracy of ± 2.0 percent of the actual quantity of material delivered.

303.04 Soil Preparation. The stability of the soil shall be according to the Department's Subgrade Stability Manual for the aggregate thickness specified.

303.05 Placing Aggregate. The maximum nominal lift thickness of aggregate gradation CS 01 shall be 24 in. (600 mm).

303.06 Capping Aggregate. The top surface of the aggregate subgrade shall consist of a minimum 3 in. (75 mm) of aggregate gradations CA 06 or CA 10. When Reclaimed Asphalt Pavement (RAP) is used, it shall be crushed and screened where 100 percent is passing the 1 1/2 in. (37.5 mm) sieve and being well graded. RAP that has been fractionated to size will not be permitted for use in capping. Capping aggregate will not be required when the aggregate subgrade improvement is used as a cubic yard pay item for undercut applications. When RAP is blended with any of the coarse aggregates, the blending shall be done with mechanically calibrated feeders.

303.07 Compaction. All aggregate lifts shall be compacted to the satisfaction of the Engineer. If the moisture content of the material is such that compaction cannot be obtained, sufficient water shall be added so that satisfactory compaction can be obtained.

303.08 Finishing and Maintenance of Aggregate Subgrade Improvement. The aggregate subgrade improvement shall be finished to the lines, grades, and cross sections shown on the plans, or as directed by the Engineer. The aggregate subgrade improvement shall be maintained in a smooth and compacted condition.

303.09 Method of Measurement. This work will be measured for payment according to Article 311.08.

303.10 Basis of Payment. This work will be paid for at the contract unit price per cubic yard (cubic meter) for AGGREGATE SUBGRADE IMPROVEMENT or at the contract unit price per square yard (square meter) for AGGREGATE SUBGRADE IMPROVEMENT, of the thickness specified.

Add the following to Section 1004 of the Standard Specifications:

“1004.07 Coarse Aggregate for Aggregate Subgrade Improvement. The aggregate shall be according to Article 1004.01 and the following.

- (a) Description. The coarse aggregate shall be crushed gravel, crushed stone, or crushed concrete. The top 12 inches of the aggregate subgrade improvement shall be 3 inches of capping material and 9 inches of crushed gravel, crushed stone or crushed concrete. In applications where greater than 36 inches of subgrade material is required, rounded gravel, meeting the CS01 gradation, may be used beginning at a depth of 12 inches below the bottom of pavement.
- (b) Quality. The coarse aggregate shall consist of sound durable particles reasonably free of deleterious materials. Non-mechanically blended RAP may be allowed up to a maximum of 5.0 percent.

(c) Gradation.

- (1) The coarse aggregate gradation for total subgrade thicknesses of 12 in. (300 mm) or greater shall be CS 01.

COARSE AGGREGATE SUBGRADE GRADATIONS					
Grad No.	Sieve Size and Percent Passing				
	8"	6"	4"	2"	#4
CS 01	100	97 ± 3	90 ± 10	45 ± 25	20 ± 20

COARSE AGGREGATE SUBGRADE GRADATIONS (Metric)					
Grad No.	Sieve Size and Percent Passing				
	200 mm	150 mm	100 mm	50 mm	4.75 mm
CS 01	100	97 ± 3	90 ± 10	45 ± 25	20 ± 20

- (2) The 3 in. (75 mm) capping aggregate shall be gradation CA 6 or CA 10.
 (3)

COARSE AGGREGATE FOR BACKFILL, TRENCH BACKFILL AND BEDDING (D-1)

Effective: November 1, 2011

Revised: November 1, 2013

This work shall be according to Section 1004.05 of the Standard Specifications except for the following:

Reclaimed Asphalt Pavement (RAP) maybe blended with gravel, crushed gravel, crushed stone crushed concrete, crushed slag, chats, crushed sand stone or wet bottom boiler slag. The RAP used shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications". The RAP shall be uniformly graded and shall pass the 1.0 in. (25 mm) screen. When RAP is blended with any of the coarse aggregate listed above, the blending shall be done mechanically with calibrated feeders. The feeders shall have an accuracy of ± 2.0 percent of the actual quantity of material delivered. The final blended product shall not contain more than 40 percent by weight RAP.

The coarse aggregate listed above shall meet CA 6 and CA 10 gradations prior to being blended with the processed and uniformly graded RAP. Gradation deleterious count shall not exceed 10% of total RAP and 5% of other by total weight.

EMBANKMENT I (D-1)

Effective: March 1, 2011

Revised: November 1, 2013

Description. This work shall be according to Section 205 of the Standard Specifications except for the following.

Material. All material shall be approved by the District Geotechnical Engineer. The proposed material must meet the following requirements.

- a) The laboratory Standard Dry Density shall be a minimum of 90 lb/cu ft (1450 kg/cu m) when determined according to AASHTO T 99 (Method C).
- b) The organic content shall be less than ten percent determined according to AASHTO T 194 (Wet Combustion).
- c) Soils which demonstrate the following properties shall be restricted to the interior of the embankment and shall be covered on both the sides and top of the embankment by a minimum of 3 ft (900 mm) of soil not considered detrimental in terms of erosion potential or excess volume change.
 - 1) A grain size distribution with less than 35 percent passing the number 75 um (#200) sieve.
 - 2) A plasticity index (PI) of less than 12.
 - 3) A liquid limit (LL) in excess of 50.
- d) Reclaimed asphalt shall not be used within the ground water table or as a fill if ground water is present.
- e) The RAP used shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications". Gradation deleterious count shall not exceed 10% of total RAP and 5% of other by total weight.

CONSTRUCTION REQUIREMENTS

Samples. Embankment material shall be sampled, tested, and approved before use. The contractor shall identify embankment sources, and provide equipment as the Engineer requires, for the collection of samples from those sources. Samples will be furnished to the Geotechnical Engineer a minimum of three weeks prior to use in order that laboratory tests for approval and compaction can be performed. Embankment material placement cannot begin until tests are completed and approval given.

Placing Material. In addition to Article 202.03, broken concrete, reclaimed asphalt with no expansive aggregate, or uncontaminated dirt and sand generated from construction or demolition activities shall be placed in 6 inches (150 mm) lifts and disked with the underlying lift until a uniform homogenous material is formed. This process also applies to the overlaying lifts. The disk must have a minimum blade diameter of 24 inches (600 mm).

When embankments are to be constructed on hillsides or existing slopes that are steeper than 3H:1V, steps shall be keyed into the existing slope by stepping and benching as shown in the plans or as directed by the engineer.

Compaction. Soils classification for moisture content control will be determined by the Soils Inspector using visual field examination techniques and the IDH Textural Classification Chart.

When tested for density in place each lift shall have a maximum moisture content as follows.

- a) A maximum of 110 percent of the optimum moisture for all forms of clay soils.
- b) A maximum of 105 percent of the optimum moisture for all forms of clay loam soils.

Stability. The requirement for embankment stability in Article 205.04 will be measured with a Dynamic Cone Penetrometer (DCP) according to the test method in the IDOT Geotechnical Manual. The penetration rate must be equal or less than 1.5 inches (38 mm) per blow.

Basis of Payment. This work will not be paid separately but will be considered as included in the various items of excavation.

ENGINEER'S FIELD OFFICE TYPE A (SPECIAL) (D-1)

Effective: December 1, 2011

Revised: May 1, 2013

Revise the first paragraph of Article 670.02 to read:

670.02 Engineer's Field Office Type A (Special). Type A (Special) field offices shall have a ceiling height of not less than 7 feet and a floor space of not less than 3000 square feet with a minimum of two separate offices. The office shall also have a separate storage room capable of being locked for the storage of the nuclear measuring devices. The office shall be provided with sufficient heat, natural and artificial light, and air conditioning. Doors and windows shall be equipped with locks approved by the Engineer.

Revise the first sentence of the second paragraph of Article 670.02 to read:

An electronic security system that will respond to any breach of exterior doors and windows with an on-site alarm shall be provided.

Revise the last sentence of the third paragraph of Article 670.02 to read:

Adequate all-weather parking space shall be available to accommodate a minimum of twelve vehicles.

Revise the fifth paragraph of Article 670.02 to read:

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 seven waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service. A weekly cleaning service for the office shall be provided.

Revise subparagraph (a) of Article 670.02 to read:

- (a) Twelve desks with minimum working surface 42 inch x 30 inch each and twelve non-folding chairs with upholstered seats and backs.

Revise the first sentence of subparagraph (c) of Article 670.02 to read:

- (c) Two four-post drafting tables with minimum top size of 37-½ inch x 48 inch.

Revise subparagraph (d) of Article 670.02 to read:

- (d) Eight free standing four-drawer legal size file cabinets with lock and an underwriters' laboratories insulated file device 350 degrees one hour rating.

Revise subparagraph (e) of Article 670.02 to read:

- (e) Twenty folding chairs and two conference tables with minimum top size of 44 inch x 96 inch.

Revise subparagraph (h) of Article 670.02 to read:

- (h) Three electric desk type tape printing calculator and two pocket scientific notation calculators with a 1000 hour battery life or with a portable recharger.

Revise subparagraph (i)(2) of Article 670.02 to read:

- (i)(2) Telephones lines. Five separate telephone lines including one line for the fax machine, and two lines for the exclusive use of the Engineer. All telephone lines shall include long distance service and all labor and materials necessary to install the phone lines at the locations directed by the Engineer. The TELCOM company shall configure ROLL/HUNT features as specified by the engineer.

Revise subparagraph (j) of Article 670.02 to read:

- (j) Two plain paper network multi-function printer/copier/scanner machines capable of reproducing prints up to 11 inch x 17 inch within automatic feed tray capable of sorting 30 sheets of paper. Letter size and 11 inch x 17 inch paper shall be provided. The contractor shall provide the multi-function machines with IT support for setup and maintenance.

Revise subparagraph (k) of Article 670.02 to read:

- (k) One plain paper fax machine including maintenance and supplies.

Revise subparagraph (l) of Article 670.02 to read:

- (l) Six four-line telephones, with touch tone, where available, and two digital answering machines, for exclusive use by the Engineer.

Revise subparagraph (m) of Article 670.02 to read:

- (m) One electric water cooler dispenser including water service.

Add the following subparagraphs to Article 670.02:

- (s) One 4 foot x 6 foot chalkboard or dry erase board.
- (t) One 4 foot x 6 foot framed cork board.

Add the following to Article 670.07 Basis of Payment.

The building or buildings, fully equipped, will be paid for at the contract unit price per calendar month or fraction thereof for ENGINEER'S FIELD OFFICE, TYPE A (SPECIAL).

HOT MIX ASPHALT QUALITY CONTROL FOR PERFORMANCE (BMPR)

Effective: January 1, 2012

Revised: January 16, 2015

Description. This special provision describes the procedures for production, placement and payment of hot-mix asphalt (HMA). This special provision shall apply to all pay items as specified in plans. This work shall be according to the Standard Specifications except as modified herein.

Exceptions may be approved for small tonnage less than 800 (725 metric) tons and miscellaneous mixture applications as defined by the Engineer.

Delete Articles:	406.06(b)(1), 2 nd Paragraph	(Temperature requirements)
	406.06 (e), 3 rd Paragraph	(Pavers speed requirements)
	406.07(b)	(Rolling)
	406.07(c)	(Density)
	1030.05(a)(4, 5, 9)	(QC/QA Documents)
	1030.05(d)(2)a.	(Plant Tests)
	1030.05(d)(2)b.	(Dust-to-Asphalt and Moisture Content)
	1030.05(d)(2)d.	(Small Tonnage)
	1030.05(d)(2)f.	(HMA Sampling)
	1030.05(d)(3)	(Required Field Tests)
	1030.05(d)(4)	(Control Limits)
	1030.05(d)(5)	(Control Charts)
	1030.05(d)(7)	(Corrective Action for Field Tests (Density))
	1030.05(e)	(Quality Assurance by the Engineer)
	1030.05(f)	(Acceptance by the Engineer)
	1030.06(a), 3 rd paragraph	(Before start-up...)
	1030.06(a), 7 th paragraph	(After an acceptable...)
	1030.06(a), 8 th paragraph	(If a mixture...)
	1030.06(a), 9 th paragraph	(A nuclear/core...)

Definitions:

- (a) Quality Control (QC): All production and construction activities by the Contractor required to achieve the required level of quality.
- (b) Quality Assurance (QA): All monitoring and testing activities by the Engineer required to assess product quality, level of payment, and acceptability of the product.
- (c) Pay Parameters: Pay Parameters shall be field Voids in the Mineral Aggregate (VMA), voids, and density. Field VMA will be calculated using the combined aggregates bulk specific gravity (G_{sb}) from the mix design.

- (d) Mixture Lot. A lot shall begin once an acceptable test strip has been completed and the AJMF has been determined. If the test strip is waived, a subplot shall begin with the start of production. A mixture lot shall consist of four sublots unless it is the last or only lot, in which case it may consist of as few as one subplot.
- (e) Mixture Sublot. A mixture subplot for field VMA, voids, and Dust/AC will be a maximum of 1000 tons (910 metric tons).
- If the remaining quantity is greater than 200 but less than 1000 tons, a subplot will consist of that amount.
 - If the remaining quantity is less than or equal to 200 tons, the quantity shall be combined with the previous subplot.
- (f) Density Interval. Density Intervals shall be every 0.2 mile (320 m) for lift thickness equal to or less than 3 in. (75 mm) and 0.1 mile (160 m) for lift thickness greater than 3 in. (75 mm).

Density Sublot. A subplot for density shall be the average of five consecutive Density Intervals. If a Density Interval is less than 200 ft (60 m), it will be combined with the previous Density Intervals.

- (g)
- If one or two Density Intervals remain outside a subplot, they shall be included in the previous subplot.
 - If three or more Density Intervals remain, they shall be considered a subplot.
- (h) Density Test: A density test consists of a core taken at a random longitudinal and random transverse offset within each Density Interval. The HMA maximum theoretical gravity (G_{mm}) will be based on the running average of four Department test results. Initial G_{mm} will be based on the average of the first four test results. If less than four G_{mm} results are available, use an average of all available Department G_{mm} test results.

The random transverse offset excludes a distance from each outer edge equal to the lift thickness or a minimum of 4 in. (100 mm). If a core is located within one foot of an unconfined edge, 2.0 percent density will be added to the density of that core.

Quality Control (QC) by the Contractor:

The Contractor's QC plan shall include the schedule of testing for both pay parameters and non-pay parameters required to control the product such as asphalt binder content and mixture gradation. The minimum test frequency shall be according to the following table.

Minimum Quality Control Sampling and Testing Requirements

Quality Characteristic	Minimum Test Frequency	
Mixture Gradation	1 per subplot	
Asphalt Binder Content		
Dust/AC Ratio		
Field VMA		
Voids		G_{mb}
		G_{mm}

The Contractor’s splits in conjunction with other quality control tests shall be used to control production.

The Contractor shall submit split jobsite mix sample test results to the Engineer within 48 hours of the time of sampling. All QC testing shall be performed in a qualified laboratory by personnel who have successfully completed the Department’s HMA Level I training.

Quality Assurance (QA) by the Engineer:

Voids, field VMA and Dust/AC ratio: The Engineer will determine the random tonnage and the Contractor shall be responsible for obtaining the sample according to the “PFP Hot-Mix Asphalt Random Jobsite Sampling” procedure.

Density: The Engineer will identify the random locations for each density testing interval. The Contractor shall be responsible for obtaining the four inch cores within the same day and prior to opening to traffic unless otherwise approved by the Engineer according to the “PFP and QCP Random Density Procedure”. The locations will be identified after final rolling and cores shall be obtained under the supervision of the Engineer. All core holes shall be filled immediately upon completion of coring. All water shall be removed from the core holes prior to filling. All core holes shall be filled with a rapid hardening mortar or concrete which shall be mixed in a separate container prior to placement in the hole. Any depressions in the surface of the filled core holes greater than 1/4 inch at the time of final inspection will require removal of the fill material to the depth of the lift thickness and replacement.

The Engineer will witness and secure all mixture and density samples. The Contractor shall transport the secured sample to a location designated by the Engineer.

The Engineer will test one or all of the randomly selected split samples from each lot for voids, field VMA and dust/AC ratio. The Engineer will test a minimum of one sample per project. The Engineer will test all of the pavement cores for density. All QA testing will be performed in a qualified laboratory by personnel who have successfully completed the Department’s HMA Level I training. QA test results will be available to the Contractor within 10 working days from receipt of secured cores and split mixture samples.

The Engineer will maintain a complete record of all Department test results and copies will be provided to the Contractor with each set of subplot results. The records will contain, as a minimum, the originals of all Department test results and raw data, random numbers used and resulting calculations for sampling locations, and quality level analysis calculations.

If the QA results do not meet the 100 % subplot pay factor limits or do not compare to QC results within the precision limits listed below, the Engineer will test all split mix samples for the lot.

Test Parameter	Limits of Precision
G _{mb}	0.030
G _{mm}	0.026
Field VMA	1.0 %

Acceptance by the Engineer: All of the Department's tests shall be within the acceptable limits listed below:

Parameter		Acceptable Limits
Field VMA		-1.0 – +3.0% ^{1/}
Voids		2.0 – 6.0%
Density:	IL-9.5, IL-19.0, IL-4.75, IL-9.5FG ^{3/}	90.0 – 98.0%
	SMA	92.0 – 98.0%
Dust / AC Ratio		0.4 – 1.6 ^{2/}

1/ Based on minimum required VMA from mix design

2/ Does not apply to SMA.

3/ Acceptable density limits for IL-9.5FG placed less than 1.25 in. shall be 89.0% - 98.0%

In addition, no visible pavement distresses shall be present such as, but not limited to, segregation, excessive coarse aggregate fracturing or flushing.

Basis of Payment: Payment will be based on the calculation of the Composite Pay Factor using QA results for each mix according to the "QCP Payment Calculation" document.

Dust / AC Ratio. A monetary deduction will be made using the pay adjustment table below for dust/AC ratios that deviate from the 0.6 to 1.2 range. If the tested subplot is outside of this range, the Department will test the remaining sublots for Dust / AC pay adjustment.

Dust / AC Pay Adjustment Table^{1/}

Range	Deduct / subplot
$0.6 \leq X \leq 1.2$	\$0
$0.5 \leq X < 0.6$ or $1.2 < X \leq 1.4$	\$1000
$0.4 \leq X < 0.5$ or $1.4 < X \leq 1.6$	\$3000
$X < 0.4$ or $X > 1.6$	Shall be removed and replaced

1/ Does not apply to SMA.

HMA MIXTURE DESIGN REQUIREMENTS (D-1)

Effective: January 1, 2013

Revised: April 1, 2016

1) Design Composition and Volumetric Requirements

Revise the table in Article 406.06(d) of the Standard Specifications to read:

"MINIMUM COMPACTED LIFT THICKNESS	
Mixture Composition	Thickness, in. (mm)
IL-4.75	3/4 (19)
SMA-9.5, IL-9.5, IL-9.5L	1 1/2 (38)
SMA-12.5	2 (50)
IL-19.0, IL-19.0L	2 1/4 (57)"

Revise the table in Article 1004.03(c) of the Standard Specifications to read:

"Use	Size/Application	Gradation No.
Class A-1, 2, & 3	3/8 in. (10 mm) Seal	CA 16
Class A-1	1/2 in. (13 mm) Seal	CA 15
Class A-2 & 3	Cover	CA 14
HMA High ESAL	IL-19.0 IL-9.5	CA 11 ^{1/} CA 16, CA 13 ^{3/}
HMA Low ESAL	IL-19.0L IL-9.5L Stabilized Subbase or Shoulders	CA 11 ^{1/} CA 16
SMA ^{2/}	1/2 in. (12.5mm) Binder & Surface IL 9.5 Surface	CA13 ^{3/} , CA14 or CA16 CA16, CA 13 ^{3/}

- 1/ CA 16 or CA 13 may be blended with the gradations listed.
- 2/ The coarse aggregates used shall be capable of being combined with stone sand, slag sand, or steel slag sand meeting the FA/FM 20 gradation and mineral filler to meet the approved mix design and the mix requirements noted herein.
- 3/ CA 13 shall be 100 percent passing the 1/2 in. (12.5mm) sieve.

Revise Article 1004.03(e) of the Supplemental Specifications to read:

“(e) Absorption. For SMA the coarse aggregate shall also have water absorption ≤ 2.0 percent.”

Revise the last paragraph of Article 1102.01 (a) (5) of the Standard Specifications to read:

“IL-4.75 and Stone Matrix Asphalt (SMA) mixtures which contain aggregate having absorptions greater than or equal to 2.0 percent, or which contain steal slag sand, shall have minimum surge bin storage plus haul time of 1.5 hours.”

Revise the nomenclature table in Article 1030.01 of the Standard Specifications to read:

“High ESAL	IL-19.0 binder; IL-9.5 surface; IL-4.75; SMA-12.5, SMA-9.5
Low ESAL	IL-19.0L binder; IL-9.5L surface; Stabilized Subbase (HMA) ^{1/} ; HMA Shoulders ^{2/}

1/ Uses 19.0L binder mix.

2/ Uses 19.0L for lower lifts and 9.5L for surface lift.”

Revise Article 1030.02 of the Standard Specifications and Supplemental Specifications to read:

“**1030.02 Materials.** Materials shall be according to the following.

Item	Article/Section
(a) Coarse Aggregate	1004.03
(b) Fine Aggregate	1003.03
(c) RAP Material	1031
(d) Mineral Filler	1011
(e) Hydrated Lime	1012.01
(f) Slaked Quicklime (Note 1)	
(g) Performance Graded Asphalt Binder (Note 2)	1032
(h) Fibers (Note 3)	
(i) Warm Mix Asphalt (WMA) Technologies (Note 4)	

Note 1. Slaked quicklime shall be according to ASTM C 5.

Note 2. The asphalt binder shall be an SBS PG 76-28 when the SMA is used on a full-depth asphalt pavement and SBS PG 76-22 when used as an overlay, except where modified herein. The asphalt binder shall be an Elvaloy or SBS PG 76-22 for IL-4.75, except where modified herein. The elastic recovery shall be a minimum of 80.

Note 3. A stabilizing additive such as cellulose or mineral fiber shall be added to the SMA mixture according to Illinois Modified AASHTO M 325. The stabilizing additive shall meet the Fiber Quality Requirements listed in Illinois Modified AASHTO M 325. Prior to approval and use of fibers, the Contractor shall submit a notarized certification by the producer of these materials stating they meet these requirements. Reclaimed Asphalt Shingles (RAS) may be used in Stone Matrix Asphalt (SMA) mixtures designed with an SBA polymer modifier as a fiber additive if the mix design with RAS included meets AASHTO T305 requirements. The RAS shall be from a certified source that produces either Type I or Type 2. Material shall meet requirements noted herein and the actual dosage rate will be determined by the Engineer.

Note 4. Warm mix additives or foaming processes shall be selected from the current Bureau of Materials and Physical Research Approved List, "Warm Mix Asphalt Technologies".

Revise Article 1030.04(a)(1) of the Standard Specifications and the Supplemental Specifications to read:

“(1) High ESAL Mixtures. The Job Mix Formula (JMF) shall fall within the following limits.

High ESAL, MIXTURE COMPOSITION (% PASSING) ^{1/}										
Sieve Size	IL-19.0 mm		SMA ^{4/} IL-12.5 mm		SMA ^{4/} IL-9.5 mm		IL-9.5 mm		IL-4.75 mm	
	min	max	min	max	min	max	min	max	min	max
1 1/2 in. (37.5 mm)										
1 in. (25 mm)		100								
3/4 in. (19 mm)	90	100		100						
1/2 in. (12.5 mm)	75	89	80	100		100		100		100
3/8 in. (9.5 mm)				65	90	100	90	100		100
#4 (4.75 mm)	40	60	20	30	36	50	34	69	90	100
#8 (2.36 mm)	20	42	16	24 ^{5/}	16	32 ^{5/}	34 ^{6/}	52 ^{2/}	70	90
#16 (1.18 mm)	15	30					10	32	50	65
#30 (600 μm)			12	16	12	18				
#50 (300 μm)	6	15					4	15	15	30
#100 (150 μm)	4	9					3	10	10	18
#200 (75 μm)	3	6	7.0	9.0 ^{3/}	7.5	9.5 ^{3/}	4	6	7	9 ^{3/}
Ratio Dust/Asphalt Binder		1.0		1.5		1.5		1.0		1.0

- 1/ Based on percent of total aggregate weight.
- 2/ The mixture composition shall not exceed 44 percent passing the #8 (2.36 mm) sieve for surface courses with Ndesign = 90.
- 3/ Additional minus No. 200 (0.075 mm) material required by the mix design shall be mineral filler, unless otherwise approved by the Engineer.
- 4/ The maximum percent passing the #635 (20 μm) sieve shall be ≤ 3 percent.
- 5/ When establishing the Adjusted Job Mix Formula (AJMF) the percent passing the #8 (2.36 mm) sieve shall not be adjusted above the percentage stated on the table.

- 6/ When establishing the Adjusted Job Mix Formula (AJMF) the percent passing the #8 (2.36 mm) sieve shall not be adjusted below 34 percent.

Revise Article 1030.04(b)(1) of the Standard Specifications to read:

- “(1) High ESAL Mixtures. The target value for the air voids of the HMA shall be 4.0 percent and for IL-4.75 it shall be 3.5 percent at the design number of gyrations. The VMA and VFA of the HMA design shall be based on the nominal maximum size of the aggregate in the mix, and shall conform to the following requirements.

VOLUMETRIC REQUIREMENTS High ESAL				
	Voids in the Mineral Aggregate (VMA), % minimum			Voids Filled with Asphalt Binder (VFA), %
Ndesign	IL-19.0	IL-9.5	IL-4.75 ^{1/}	
50	13.5	15.0	18.5	65 – 78 ^{2/}
70				65 - 75
90				

1/ Maximum Draindown for IL-4.75 shall be 0.3 percent

2/ VFA for IL-4.75 shall be 72-85 percent”

Replace Article 1030.04(b)(3) of the Standard Specifications with the following:

- “(3) SMA Mixtures.

Volumetric Requirements SMA ^{1/}			
Ndesign	Design Air Voids Target %	Voids in the Mineral Aggregate (VMA), % min.	Voids Filled with Asphalt (VFA), %
80 ^{4/}	3.5	17.0 ^{2/}	75 - 83
		16.0 ^{3/}	

1/ Maximum draindown shall be 0.3 percent. The draindown shall be determined at the JMF asphalt binder content at the mixing temperature plus 30 °F.

2/ Applies when specific gravity of coarse aggregate is ≥ 2.760.

3/ Applies when specific gravity of coarse aggregate is < 2.760.

- 4/ Blending of different types of aggregate will not be permitted.
For surface course, the coarse aggregate can be crushed steel slag, crystalline crushed stone or crushed sandstone. For binder course, coarse aggregate shall be crushed stone (dolomite), crushed gravel, crystalline crushed stone, or crushed sandstone.

Add to the end of Article 1030.05 (d) (2) a. of the Standard Specifications:

“During production, the Contractor shall test SMA mixtures for draindown according to AASHTO T305 at a frequency of 1 per day of production.”

Delete last sentence of the second paragraph of Article 1102.01(a) (4) b. 2.

Add to the end of Article 1102.01 (a) (4) b. 2.:

“As an option, collected dust (baghouse) may be used in lieu of manufactured mineral filler according to the following:

(a.) Sufficient collected dust (baghouse) is available for production of the SMA mix for the entire project.

(b.) A mix design was prepared based on collected dust (baghouse).

2) Design Verification and Production

Revise Article 1030.04 (d) of the Standard Specifications to read:

“(d) Verification Testing. High ESAL, IL-4.75, and SMA mix designs submitted for verification will be tested to ensure that the resulting mix designs will pass the required criteria for the Hamburg Wheel Test (IL mod AASHTO T-324) and the Tensile Strength Test (IL mod AASHTO T-283). The Department will perform a verification test on gyratory specimens compacted by the Contractor. If the mix fails the Department’s verification test, the Contractor shall make the necessary changes to the mix and resubmit compacted specimens to the Department for verification. If the mix fails again, the mix design will be rejected.

All new and renewal mix designs will be required to be tested, prior to submittal for Department verification and shall meet the following requirements:

- (1) Hamburg Wheel Test criteria. The maximum allowable rut depth shall be 0.5 in. (12.5 mm). The minimum number of wheel passes at the 0.5 in. (12.5 mm) rut depth criteria shall be based on the high temperature binder grade of the mix as specified in the mix requirements table of the plans.

Illinois Modified AASHTO T 324 Requirements ^{1/}

Asphalt Binder Grade	# Repetitions	Max Rut Depth (mm)
PG 70 -XX (or higher)	20,000	12.5
PG 64 -XX (or lower)	10,000	12.5

1/ When produced at temperatures of 275 ± 5 °F (135 ± 3 °C) or less, loose Warm Mix Asphalt shall be oven aged at 270 ± 5 °F (132 ± 3 °C) for two hours prior to gyratory compaction of Hamburg Wheel specimens.

Note: For SMA Designs (N-80) the maximum rut depth is 6.0 mm at 20,000 repetitions.
 For IL 4.75mm Designs (N-50) the maximum rut depth is 9.0mm at 15,000 repetitions.

(2) Tensile Strength Criteria. The minimum allowable conditioned tensile strength shall be 60 psi (415 kPa) for non-polymer modified performance graded (PG) asphalt binder and 80 psi (550 kPa) for polymer modified PG asphalt binder. The maximum allowable unconditioned tensile strength shall be 200 psi (1380 kPa).”

Production Testing. Revise first paragraph of Article 1030.06(a) of the Standard Specifications to read:

“(a) High ESAL, IL-4.75, WMA, and SMA Mixtures. For each contract, a 300 ton (275 metric tons) test strip, except for SMA mixtures it will be 400 ton (363 metric ton), will be required at the beginning of HMA production for each mixture with a quantity of 3000 tons (2750 metric tons) or more according to the Manual of Test Procedures for Materials “Hot Mix Asphalt Test Strip Procedures”.

Add the following after the sixth paragraph in Article 1030.06 (a) of the Standard Specifications:

“The Hamburg Wheel test shall also be conducted on all HMA mixtures from a sample taken within the first 500 tons (450 metric tons) on the first day of production or during start up with a split reserved for the Department. The mix sample shall be tested according to the Illinois Modified AASHTO T 324 and shall meet the requirements specified herein. Mix production shall not exceed 1500 tons (1350 metric tons) or one day’s production, whichever comes first, until the testing is completed and the mixture is found to be in conformance. The requirement to cease mix production may be waived if the plant produced mixture demonstrates conformance prior to start of mix production for a contract.

If the mixture fails to meet the Hamburg Wheel criteria, no further mixture will be accepted until the Contractor takes such action as is necessary to furnish a mixture meeting the criteria”

Method of Measurement:

Add the following after the fourth paragraph of Article 406.13 (b):

“The plan quantities of SMA mixtures shall be adjusted using the actual approved binder and surface Mix Design’s G_{mb} .”

Basis of Payment.

Replace the fourth paragraph of Article 406.14 of the Standard Specifications with the following:

“Stone matrix asphalt will be paid for at the contract unit price per ton (metric ton) for POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, STONE MATRIX ASPHALT, of the mixture composition and Ndesign specified; and POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, STONE MATRIX ASPHALT, of the mixture composition and Ndesign specified.”

GROUND TIRE RUBBER (GTR) MODIFIED ASPHALT BINDER (D-1)

Effective: June 26, 2006

Revised: April 1, 2016

Add the following to the end of article 1032.05 of the Standard Specifications:

“(c) Ground Tire Rubber (GTR) Modified Asphalt Binder. A quantity of 10.0 to 14.0 percent GTR (Note 1) shall be blended by dry unit weight with a PG 64-28 to make a GTR 70-28 or a PG 58-28 to make a GTR 64-28. The base PG 64-28 and PG 58-28 asphalt binders shall meet the requirements of Article 1032.05(a). Compatible polymers may be added during production. The GTR modified asphalt binder shall meet the requirements of the following table.

Test	Asphalt Grade GTR 70-28	Asphalt Grade GTR 64-28
Flash Point (C.O.C.), AASHTO T 48, °F (°C), min.	450 (232)	450 (232)
Rotational Viscosity, AASHTO T 316 @ 275 °F (135 °C), Poises, Pa·s, max.	30 (3)	30 (3)
Softening Point, AASHTO T 53, °F (°C), min.	135 (57)	130 (54)
Elastic Recovery, ASTM D 6084, Procedure A (sieve waived) @ 77 °F, (25 °C), aged, ss, 100 mm elongation, 5 cm/min., cut immediately, %, min.	65	65

Note 1. GTR shall be produced from processing automobile and/or light truck tires by the ambient grinding method. GTR shall not exceed 1/16 in. (2 mm) in any dimension and shall contain no free metal particles or other materials. A mineral powder (such as talc) meeting the requirements of AASHTO M 17 may be added, up to a maximum of four percent by weight of GTR to reduce sticking and caking of the GTR particles. When tested in accordance with Illinois modified AASHTO T 27, a 50 g sample of the GTR shall conform to the following gradation requirements:

Sieve Size	Percent Passing
No. 16 (1.18 mm)	100
No. 30 (600 μm)	95 ± 5
No. 50 (300 μm)	> 20

Add the following to the end of Note 1. of article 1030.03 of the Standard Specifications:

“A dedicated storage tank for the Ground Tire Rubber (GTR) modified asphalt binder shall be provided. This tank must be capable of providing continuous mechanical mixing throughout by continuous agitation and recirculation of the asphalt binder to provide a uniform mixture. The tank shall be heated and capable of maintaining the temperature of the asphalt binder at 300 °F to 350 °F (149 °C to 177 °C). The asphalt binder metering systems of dryer drum plants shall be calibrated with the actual GTR modified asphalt binder material with an accuracy of ± 0.40 percent.”

Revise 1030.02(c) of the Standard Specifications to read:

“(c) RAP Materials (Note 5)1031”

Add the following note to 1030.02 of the Standard Specifications:

Note 5. When using reclaimed asphalt pavement and/or reclaimed asphalt shingles, the maximum asphalt binder replacement percentage shall be according to the most recent special provision for recycled materials.

RECLAIMED ASPHALT PAVEMENT AND RECLAIMED ASPHALT SHINGLES (D-1)

Effective: November 1, 2012

Revise: April 2, 2016

Revise Section 1031 of the Standard Specifications to read:

“SECTION 1031. RECLAIMED ASPHALT PAVEMENT AND RECLAIMED ASPHALT SHINGLES

1031.01 Description. Reclaimed asphalt pavement and reclaimed asphalt shingles shall be according to the following.

- (a) Reclaimed Asphalt Pavement (RAP). RAP is the material resulting from cold milling or crushing an existing hot-mix asphalt (HMA) pavement. RAP will be considered processed FRAP after completion of both crushing and screening to size. The Contractor shall supply written documentation that the RAP originated from routes or airfields under federal, state, or local agency jurisdiction.
- (b) Reclaimed Asphalt Shingles (RAS). Reclaimed asphalt shingles (RAS). RAS is from the processing and grinding of preconsumer or post-consumer shingles. RAS shall be a clean and uniform material with a maximum of 0.5 percent unacceptable material, as defined in Bureau of Materials and Physical Research Policy Memorandum, “Reclaimed Asphalt Shingle (RAS) Sources”, by weight of RAS. All RAS used shall come from a Bureau of Materials and Physical Research approved processing facility where it shall be ground and processed to 100 percent passing the 3/8 in. (9.5 mm) sieve and 90 percent passing the #4 (4.75 mm) sieve. RAS shall meet the testing requirements specified herein. In addition, RAS shall meet the following Type 1 or Type 2 requirements.
 - (1) Type 1. Type 1 RAS shall be processed, preconsumer asphalt shingles salvaged from the manufacture of residential asphalt roofing shingles.
 - (2) Type 2. Type 2 RAS shall be processed post-consumer shingles only, salvaged from residential, or four unit or less dwellings not subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP).

1031.02 Stockpiles. RAP and RAS stockpiles shall be according to the following.

- (a) RAP Stockpiles. The Contractor shall construct individual, sealed RAP stockpiles meeting one of the following definitions. Additional processed RAP (FRAP) shall be stockpiled in a separate working pile, as designated in the QC Plan, and only added to the sealed stockpile when test results for the working pile are complete and are found to meet tolerances specified herein for the original sealed FRAP stockpile. Stockpiles shall be sufficiently separated to prevent intermingling at the base. All stockpiles (including unprocessed RAP and FRAP) shall be identified by signs indicating the type as listed below (i.e. "Non- Quality, FRAP -#4 or Type 2 RAS", etc...).
- (1) Fractionated RAP (FRAP). FRAP shall consist of RAP from Class I, Superpave HMA (High and Low ESAL) or equivalent mixtures. The coarse aggregate in FRAP shall be crushed aggregate and may represent more than one aggregate type and/or quality, but shall be at least C quality. All FRAP shall be processed prior to testing and sized into fractions with the separation occurring on or between the #4 (4.75 mm) and 1/2 in. (12.5 mm) sieves. Agglomerations shall be minimized such that 100 percent of the RAP in the coarse fraction shall pass the maximum sieve size specified for the mix the FRAP will be used in.
 - (2) Restricted FRAP (B quality) stockpiles shall consist of RAP from Class I, Superpave (High ESAL), or HMA (High ESAL). If approved by the Engineer, the aggregate from a maximum 3.0 in. (75 mm) single combined pass of surface/binder milling will be classified as B quality. All millings from this application will be processed into FRAP as described previously.
 - (3) Conglomerate. Conglomerate RAP stockpiles shall consist of RAP from Class I, Superpave HMA (High and Low ESAL) or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality, but shall be at least C quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate RAP shall be processed (FRAP) prior to testing. Conglomerate RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.
 - (4) Conglomerate "D" Quality (DQ). Conglomerate DQ RAP stockpiles shall consist of RAP from HMA shoulders, bituminous stabilized subbases or Superpave (Low ESAL)/HMA (Low ESAL) IL-19.0L binder mixture. The coarse aggregate in this RAP may be crushed or round but shall be at least D quality. This RAP may have an inconsistent gradation and/or asphalt binder content. Conglomerate DQ RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.
 - (5) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as "Non-Quality".

RAP or FRAP containing contaminants, such as earth, brick, sand, concrete, sheet asphalt, bituminous surface treatment (i.e. chip seal), pavement fabric, joint sealants, plant cleanout etc., will be unacceptable unless the contaminants are removed to the satisfaction of the Engineer. Sheet asphalt shall be stockpiled separately.

- (b) RAS Stockpiles. Type 1 and Type 2 RAS shall be stockpiled separately and shall be sufficiently separated to prevent intermingling at the base. Each stockpile shall be signed indicating what type of RAS is present.

However, a RAS source may submit a written request to the Department for approval to blend mechanically a specified ratio of Type 1 RAS with Type 2 RAS. The source will not be permitted to change the ratio of the blend without the Department prior written approval. The Engineer's written approval will be required, to mechanically blend RAS with any fine aggregate produced under the AGCS, up to an equal weight of RAS, to improve workability. The fine aggregate shall be "B Quality" or better from an approved Aggregate Gradation Control System source. The fine aggregate shall be one that is approved for use in the HMA mixture and accounted for in the mix design and during HMA production.

Records identifying the shingle processing facility supplying the RAS, RAS type, and lot number shall be maintained by project contract number and kept for a minimum of three years.

1031.03 Testing. FRAP and RAS testing shall be according to the following.

- (a) FRAP Testing. When used in HMA, the FRAP shall be sampled and tested either during processing or after stockpiling. It shall also be sampled during HMA production.
- (1) During Stockpiling. For testing during stockpiling, washed extraction samples shall be run at the minimum frequency of one sample per 500 tons (450 metric tons) for the first 2000 tons (1800 metric tons) and one sample per 2000 tons (1800 metric tons) thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons (3600 metric tons).
 - (2) Incoming Material. For testing as incoming material, washed extraction samples shall be run at a minimum frequency of one sample per 2000 tons (1800 metric tons) or once per week, whichever comes first.
 - (3) After Stockpiling. For testing after stockpiling, the Contractor shall submit a plan for approval to the District proposing a satisfactory method of sampling and testing the RAP/FRAP pile either in-situ or by restockpiling. The sampling plan shall meet the minimum frequency required above and detail the procedure used to obtain representative samples throughout the pile for testing.

Before extraction, each field sample of FRAP, shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for Department use. The Contractor shall extract the other test sample according to Department procedure. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

(b) RAS Testing. RAS shall be sampled and tested during stockpiling according to Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Shingle (RAS) Sources". The Contractor shall also sample as incoming material at the HMA plant.

(1) During Stockpiling. Washed extraction and testing for unacceptable materials shall be run at the minimum frequency of one sample per 200 tons (180 metric tons) for the first 1000 tons (900 metric tons) and one sample per 1000 tons (900 metric tons) thereafter. A minimum of five samples are required for stockpiles less than 1000 tons (900 metric tons). Once a ≤ 1000 ton (900 metric ton), five-sample/test stockpile has been established it shall be sealed. Additional incoming RAS shall be in a separate working pile as designated in the Quality Control plan and only added to the sealed stockpile when the test results of the working pile are complete and are found to meet the tolerances specified herein for the original sealed RAS stockpile.

(2) Incoming Material. For testing as incoming material at the HMA plant, washed extraction shall be run at the minimum frequency of one sample per 250 tons (227 metric tons). A minimum of five samples are required for stockpiles less than 1000 tons (900 metric tons). The incoming material test results shall meet the tolerances specified herein.

The Contractor shall obtain and make available all test results from start of the initial stockpile sampled and tested at the shingle processing facility in accordance with the facility's QC Plan.

Before extraction, each field sample shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for Department use. The Contractor shall extract the other test sample according to Department procedures. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

1031.04 Evaluation of Tests. Evaluation of test results shall be according to the following.

(a) Evaluation of FRAP Test Results. All test results shall be compiled to include asphalt binder content, gradation and, when applicable (for slag), G_{mm} . A five test average of results from the original pile will be used in the mix designs. Individual extraction test results run thereafter, shall be compared to the average used for the mix design, and will be accepted if within the tolerances listed below.

Parameter	FRAP
No. 4 (4.75 mm)	± 6 %
No. 8 (2.36 mm)	± 5 %
No. 30 (600 μm)	± 5 %
No. 200 (75 μm)	± 2.0 %
Asphalt Binder	± 0.3 %
G_{mm}	± 0.03 ^{1/}

1/ For stockpile with slag or steel slag present as determined in the current Manual of Test Procedures Appendix B 21, "Determination of Reclaimed Asphalt Pavement Aggregate Bulk Specific Gravity".

If any individual sieve and/or asphalt binder content tests are out of the above tolerances when compared to the average used for the mix design, the FRAP stockpile shall not be used in Hot-Mix Asphalt unless the FRAP representing those tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the District for evaluation.

The Contractor shall maintain a representative moving average of five tests to be used for Hot-Mix Asphalt production.

With the approval of the Engineer, the ignition oven may be substituted for extractions according to the ITP, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)" or Illinois Modified AASHTO T-164-11, Test Method A.

(b) Evaluation of RAS Test Results. All of the test results, with the exception of percent unacceptable materials, shall be compiled and averaged for asphalt binder content and gradation. A five test average of results from the original pile will be used in the mix designs. Individual test results run thereafter, when compared to the average used for the mix design, will be accepted if within the tolerances listed below.

Parameter	RAS
No. 8 (2.36 mm)	± 5 %
No. 16 (1.18 mm)	± 5 %
No. 30 (600 μm)	± 4 %
No. 200 (75 μm)	± 2.5 %
Asphalt Binder Content	± 2.0 %

If any individual sieve and/or asphalt binder content tests are out of the above tolerances when compared to the average used for the mix design, the RAS shall not be used in Hot-Mix Asphalt unless the RAS representing those tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the District for evaluation.

- (c) Quality Assurance by the Engineer. The Engineer may witness the sampling and splitting conduct assurance tests on split samples taken by the Contractor for quality control testing a minimum of once a month.

The overall testing frequency will be performed over the entire range of Contractor samples for asphalt binder content and gradation. The Engineer may select any or all split samples for assurance testing. The test results will be made available to the Contractor as soon as they become available.

The Engineer will notify the Contractor of observed deficiencies.

Differences between the Contractor's and the Engineer's split sample test results will be considered acceptable if within the following limits.

Test Parameter	Acceptable Limits of Precision	
	FRAP	RAS
% Passing: ^{1/}		
1/2 in.	5.0%	
No. 4	5.0%	
No. 8	3.0%	4.0%
No. 30	2.0%	3.0%
No. 200	2.2%	2.5%
Asphalt Binder Content	0.3%	1.0%
G _{mm}	0.030	

1/ Based on washed extraction.

In the event comparisons are outside the above acceptable limits of precision, the Engineer will immediately investigate.

- (d) Acceptance by the Engineer. Acceptable of the material will be based on the validation of the Contractor's quality control by the assurance process.

1031.05 Quality Designation of Aggregate in RAP and FRAP.

- (a) RAP. The aggregate quality of the RAP for homogeneous, conglomerate, and conglomerate "D" quality stockpiles shall be set by the lowest quality of coarse aggregate in the RAP stockpile and are designated as follows.
- (1) RAP from Class I, Superpave/HMA (High ESAL), or (Low ESAL) IL-9.5L surface mixtures are designated as containing Class B quality coarse aggregate.
 - (2) RAP from Superpave/HMA (Low ESAL) IL-19.0L binder mixture is designated as Class D quality coarse aggregate.
 - (3) RAP from Class I, Superpave/HMA (High ESAL) binder mixtures, bituminous base course mixtures, and bituminous base course widening mixtures are designated as containing Class C quality coarse aggregate.
 - (4) RAP from bituminous stabilized subbase and BAM shoulders are designated as containing Class D quality coarse aggregate.
- (b) FRAP. If the Engineer has documentation of the quality of the FRAP aggregate, the Contractor shall use the assigned quality provided by the Engineer.

If the quality is not known, the quality shall be determined as follows. Fractionated RAP stockpiles containing plus #4 (4.75 mm) sieve coarse aggregate shall have a maximum tonnage of 5,000 tons (4,500 metric tons). The Contractor shall obtain a representative sample witnessed by the Engineer. The sample shall be a minimum of 50 lb (25 kg). The sample shall be extracted according to Illinois Modified AASHTO T 164 by a consultant laboratory prequalified by the Department for the specified testing. The consultant laboratory shall submit the test results along with the recovered aggregate to the District Office. The cost for this testing shall be paid by the Contractor. The District will forward the sample to the Bureau of Materials and Physical Research Aggregate Lab for MicroDeval Testing, according to ITP 327. A maximum loss of 15.0 percent will be applied for all HMA applications. The fine aggregate portion of the fractionated RAP shall not be used in any HMA mixtures that require a minimum of "B" quality aggregate or better, until the coarse aggregate fraction has been determined to be acceptable thru a MicroDeval Testing.

1031.06 Use of FRAP and/or RAS in HMA. The use of FRAP and/or RAS shall be the Contractor's option when constructing HMA in all contracts.

- (a) FRAP. The use of FRAP in HMA shall be as follows.
- (1) Coarse Aggregate Size (after extraction). The coarse aggregate in all FRAP shall be equal to or less than the nominal maximum size requirement for the HMA mixture to be produced.

- (2) Steel Slag Stockpiles. FRAP stockpiles containing steel slag or other expansive material, as determined by the Department, shall be homogeneous and will be approved for use in HMA (High ESAL and Low ESAL) mixtures regardless of lift or mix type.
 - (3) Use in HMA Surface Mixtures (High and Low ESAL). FRAP stockpiles for use in HMA surface mixtures (High and Low ESAL) shall have coarse aggregate that is Class B quality or better. FRAP shall be considered equivalent to limestone for frictional considerations unless produced/screened to minus 3/8 inch.
 - (4) Use in HMA Binder Mixtures (High and Low ESAL), HMA Base Course, and HMA Base Course Widening. FRAP stockpiles for use in HMA binder mixtures (High and Low ESAL), HMA base course, and HMA base course widening shall be FRAP in which the coarse aggregate is Class C quality or better.
 - (5) Use in Shoulders and Subbase. FRAP stockpiles for use in HMA shoulders and stabilized subbase (HMA) shall be FRAP, Restricted FRAP, conglomerate, or conglomerate DQ.
- (b) RAS. RAS meeting Type 1 or Type 2 requirements will be permitted in all HMA applications as specified herein.
- (c) FRAP and/or RAS Usage Limits. Type 1 or Type 2 RAS may be used alone or in conjunction with FRAP in HMA mixtures up to a maximum of 5.0 percent by weight of the total mix.

When FRAP is used alone or FRAP is used in conjunction with RAS, the percent of virgin asphalt binder replacement (ABR) shall not exceed the amounts indicated in the table below for a given N Design.

Max Asphalt Binder Replacement for FRAP with RAS Combination

HMA Mixtures ^{1/ 2/ 4/}	Maximum % ABR		
Ndesign	Binder/Leveling Binder	Surface	Polymer Modified ^{3/}
30L	50	40	30
50	40	35	30
70	40	30	30
90	40	30	30
4.75 mm N-50			40
SMA N-80			30

1/ For Low ESAL HMA shoulder and stabilized subbase, the percent asphalt binder replacement shall not exceed 50 % of the total asphalt binder in the mixture.

- 2/ When the binder replacement exceeds 15 % for all mixes, except for SMA and IL-4.75, the high and low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25 % binder replacement using a virgin asphalt binder grade of PG64-22 will be reduced to a PG58-28). When constructing full depth HMA and the ABR is less than 15 %, the required virgin asphalt binder grade shall be PG64-28.
- 3/ When the ABR for SMA or IL-4.75 is 15 % or less, the required virgin asphalt binder shall be SBS PG76-22 and the elastic recovery shall be a minimum of 80. When the ABR for SMA or IL-4.75 exceeds 15%, the virgin asphalt binder grade shall be SBS PG70-28 and the elastic recovery shall be a minimum of 80.
- 4/ When FRAP or RAS is used alone, the maximum percent asphalt binder replacement designated on the table shall be reduced by 10 %.

1031.07 HMA Mix Designs. At the Contractor's option, HMA mixtures may be constructed utilizing RAP/FRAP and/or RAS material meeting the detailed requirements specified herein.

- (a) FRAP and/or RAS. FRAP and /or RAS mix designs shall be submitted for verification. If additional FRAP or RAS stockpiles are tested and found to be within tolerance, as defined under "Evaluation of Tests" herein, and meet all requirements herein, the additional FRAP or RAS stockpiles may be used in the original design at the percent previously verified.
- (b) RAS. Type 1 and Type 2 RAS are not interchangeable in a mix design. A RAS stone bulk specific gravity (Gsb) of 2.300 shall be used for mix design purposes.

1031.08 HMA Production. HMA production utilizing FRAP and/or RAS shall be as follows.

To remove or reduce agglomerated material, a scalping screen, gator, crushing unit, or comparable sizing device approved by the Engineer shall be used in the RAS and FRAP feed system to remove or reduce oversized material. If material passing the sizing device adversely affects the mix production or quality of the mix, the sizing device shall be set at a size specified by the Engineer.

If during mix production, corrective actions fail to maintain FRAP, RAS or QC/QA test results within control tolerances or the requirements listed herein the Contractor shall cease production of the mixture containing FRAP or RAS and conduct an investigation that may require a new mix design.

(a) RAS. RAS shall be incorporated into the HMA mixture either by a separate weight depletion system or by using the RAP weigh belt. Either feed system shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all rates of production and batch sizes. The portion of RAS shall be controlled accurately to within ± 0.5 percent of the amount of RAS utilized. When using the weight depletion system, flow indicators or sensing devices shall be provided and interlocked with the plant controls such that the mixture production is halted when RAS flow is interrupted.

(b) HMA Plant Requirements. HMA plants utilizing FRAP and/or RAS shall be capable of automatically recording and printing the following information.

(1) Dryer Drum Plants.

- a. Date, month, year, and time to the nearest minute for each print.
- b. HMA mix number assigned by the Department.
- c. Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).
- d. Accumulated dry weight of RAS and FRAP in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).
- e. Accumulated mineral filler in revolutions, tons (metric tons), etc. to the nearest 0.1 unit.
- f. Accumulated asphalt binder in gallons (liters), tons (metric tons), etc. to the nearest 0.1 unit.
- g. Residual asphalt binder in the RAS and FRAP material as a percent of the total mix to the nearest 0.1 percent.
- h. Aggregate RAS and FRAP moisture compensators in percent as set on the control panel. (Required when accumulated or individual aggregate and RAS and FRAP are printed in wet condition.)
- i. When producing mixtures with FRAP and/or RAS, a positive dust control system shall be utilized.
- j. Accumulated mixture tonnage.
- k. Dust Removed (accumulated to the nearest 0.1 ton (0.1 metric ton))

- (2) Batch Plants.
- a. Date, month, year, and time to the nearest minute for each print.
 - b. HMA mix number assigned by the Department.
 - c. Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).
 - d. Mineral filler weight to the nearest pound (kilogram).
 - f. RAS and FRAP weight to the nearest pound (kilogram).
 - g. Virgin asphalt binder weight to the nearest pound (kilogram).
 - h. Residual asphalt binder in the RAS and FRAP material as a percent of the total mix to the nearest 0.1 percent.

The printouts shall be maintained in a file at the plant for a minimum of one year or as directed by the Engineer and shall be made available upon request. The printing system will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

1031.09 RAP in Aggregate Surface Course and Aggregate Wedge Shoulders, Type B.

The use of RAP or FRAP in aggregate surface course and aggregate shoulders shall be as follows.

- (a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except "Non-Quality" and "FRAP". The testing requirements of Article 1031.03 shall not apply. RAP used shall be according to the current Bureau of Materials and Physical Research Policy Memorandum, "Reclaimed Asphalt Pavement (RAP) for Aggregate Applications".

Gradation. The RAP material shall meet the gradation requirements for CA 6 according to Article 1004.01(c), except the requirements for the minus No. 200 (75 μ m) sieve shall not apply. The sample for the RAP material shall be air dried to constant weight prior to being tested for gradation."

WEEP HOLES CLEANED AND EXTENDED

Description. This work consists of locating, cleaning and extending one (1) existing weep hole (6" diameter cast iron pipe through the wall) for proper drainage of the wall backfill as shown in plans and described in the Special Provisions.

Material. Materials shall be according to the following articles of Section 601 - Materials:

<u>Item</u>	<u>Article/Section</u>
Polyvinyl Chloride (PVC) Pipe	1040.03
Grout	1024.01

Construction.

Cleaning. The Contractor shall locate and clean the weep hole to allow free flow of drainage from the corrugated metal pipe underdrain behind the wall. The method shall not damage the wall or existing cast iron pipe or the corrugate metal pipe underdrain behind the wall. Any damage to these items shall be repaired by the Contractor at no additional cost. The weep hole shall be cleaned to the satisfaction of the Engineer.

Extension of Weep Hole. The existing weep hole shall be outletted to a concrete headwall using a 6 inch PVC drain pipe connected to weep hole using PVC flange. PVC flange shall be connected to the vertical face of the retaining wall against the weep hole using masonry screws.

For installation of the drain pipe the trench shall be excavated to the dimensions and grade shown on the plans, and a 1 in. (25 mm) layer of bedding material shall be placed and compacted in the bottom of the trench extending upward under the haunches to 1/2 the depth of the pipe underdrain for the full width and length of trench. The pipe shall be embedded firmly in the bedding material.

Concrete Headwall. Concrete headwall shall be constructed at the location and according to the details shown on the plans as per Section 601.05 of Standard Specifications.

After the pipe installation has been inspected and approved and concrete headwall constructed, granular backfill shall be placed and compacted to a height of 12 in. (300 mm) above the top of pipe. Any remaining portion of the trench above the granular backfill shall be filled with granular or impervious material as specified and thoroughly compacted.

Method of Measurement. This item shall be measured on a lump sum basis for locating and cleaning weep hole, furnishing and installing drain pipe, constructing concrete headwall and backfilling as required.

Basis of Payment. This work will be paid for at the contract lump sum price for WEEP HOLES CLEANED AND EXTENDED. This price shall be payment in full for all labor, materials, transportation, handling, and incidental work necessary to locate, furnish, install and backfill as required in the plans and specifications.

SIGN SHOP DRAWING SUBMITTAL

Effective: January 22, 2013

Revised: January 1, 2015

Add the following paragraph to Article 720.03 of the Standard Specifications:

Shop drawings will be required, according to Article 105.04, for all Arterials/Expressways signs except standard highway signs covered in the MUTCD. Shop drawings shall be submitted to the Engineer for review and approval prior to fabrication. The shop drawings shall include dimensions, letter sizing, font type, colors and materials.

OVERHEAD SIGN STRUCTURE – BRIDGE MOUNTED

Effective: July 1, 2015

Revise Article 733.09(b) of the Standard Specification to read:

“Sign Structure – Bridge Mounted. Bridge mounted overhead sign structures will be measured for by payment in feet (meters) of the overall width of the sign panel or total width of adjacent sign panels, including spacing between adjacent sign panels, to be installed on the sign structure.”

PROTECTION OF EXISTING DRAINAGE FACILITIES DURING CONSTRUCTION

All existing drainage structures are to be kept free of any debris resulting from construction operations. All work and material necessary to prevent accumulation of debris in the drainage structures will be considered as incidental to the contract. Any debris in the drainage structures resulting from construction operations shall be removed at the Contractor's own expense, and no extra compensation will be allowed. Any minor ditch grading, modifications to existing drainage structures to ensure proper roadway drainage, culverts under temporary drives, and any bulkheading as directed by the engineer necessary to provide for the interim drainage for construction staging will not be paid for separately but shall be included in the cost of earth excavation and erosion control. Should reconstruction or adjustment of a drainage structure be required by the Engineer in the field, the necessary work and payment shall be done in accordance with Section 602 and Article 104.02 respectively of the Standard Specifications.

During construction if the Contractor encounters or otherwise becomes aware of any sewers, underdrains or field drains within the right-of-way other than those shown on the plans, he shall so inform the Engineer who shall direct the work necessary to maintain or replace the facilities in service and to protect them from damage during construction if maintained. Existing facilities to be maintained that are damaged because of non-compliance with this provision shall be replaced at the Contractor's own expense. Should the Engineer have directed the replacement of a facility, the necessary work and payment shall be done in accordance with Sections 550 and 601 and Article 104.02 respectively of the Standard Specifications.

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES

This work shall be according to Article 669 of the Standard Specifications and the following:

Qualifications. The term environmental firm shall mean an environmental firm with at least five (5) documented leaking underground storage tank (LUST) cleanups or that is pre-qualified in hazardous waste by the Department. Documentation includes but not limited to verifying remediation and special waste operations for sites contaminated with gasoline, diesel, or waste oil in accordance with all Federal, State, or local regulatory requirements and shall be provided to the Engineer for approval. The environmental firm selected shall not be a former or current consultant or have any ties with any of the properties contained within and/or adjacent to this construction project.

General. This Special Provision will likely require the Contractor to subcontract for the execution of certain activities.

All contaminated materials shall be managed as either “uncontaminated soil” or non-special waste. This work shall include monitoring and potential sampling, analytical testing, and management of a material contaminated by regulated substances. The Environmental Firm shall continuously monitor all soil excavation for worker protection and soil contamination. **Phase I Preliminary Engineering information is available through the District’s Environmental Studies Unit.** Soil samples or analysis without the approval of the Engineer will be at no additional cost to the Department. The lateral distance is measured from centerline and the farthest distance is the offset distance or construction limit whichever is less.

The Contractor shall manage any excavated soils and sediment within the following areas:

Site 2746-1 (IDOT ROW)

- Station 105+15 to Station 106+15 (I-90 EB), 0 to 10 feet LT and 0 to 120 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance with Article 669.09. COC sampling parameter: arsenic, lead and manganese.
- Station 109+15 to Station 110+15 (I-90 EB), 0 to 40 feet LT and 0 to 60 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 3023+85 to Station 3024+85 (I-90 EB), 0 to 15 feet and 0 to 120 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, lead and manganese.
- Station 3038+00 to Station 3039+65 (I-90 EB), 0 to 20 feet and 0 to 120 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.

- Station 3044+75 to Station 3048+40 (I-90 EB) 0 to 120 feet RT and 0 to 225 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene.
- Station 3044+75 to Station 3046+65 (I-90 EB), 0 to 18 feet and 0 to 120 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, lead and manganese.
- Station 3046+65 to Station 3050+30 (I-90 EB), 0 to 18 feet and 0 to 120 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 3050+30 to Station 3052+65 (I-90 EB), 0 to 20 feet and 0 to 160 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: lead and manganese.
- Station 3052+65 to Station 3054+60 (I-90 EB), 0 to 20 feet and 0 to 150 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene.
- Station 3054+60 to Station 3056+30 (I-90 EB), 0 to 20 feet and 0 to 140 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance with Article 669.09. COC sampling parameter: lead and manganese.
- Station 3059+30 to Station 3060+90 (I-90 EB), 0 to 15 feet and 0 to 130 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, lead and manganese.
- Station 3060+90 to Station 3062+40 (I-90 EB), 0 to 15 feet and 0 to 120 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 3062+40 to Station 3065+80 (I-90 EB), 0 to 15 feet and 0 to 140 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance with Article 669.09. COC sampling parameter: lead.
- Station 3065+80 to Station 3067+65 (I-90 EB), 0 to 15 feet and 0 to 140 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 3067+65 to Station 3069+55 (I-90 EB), 0 to 20 feet and 0 to 140 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.

- Station 3071+60 to Station 3073+65 (I-90 EB), 0 to 20 feet and 0 to 140 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 3077+45 to Station 3081+50 (I-90 EB), 0 to 20 feet and 0 to 140 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 3083+50 to Station 3085+10 (I-90 EB), 0 to 20 feet and 0 to 120 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, lead and manganese.
- Station 3086+35 to Station 3090+00 (I-90 EB), 0 to 15 feet and 0 to 130 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, lead and manganese.
- Station 3090+00 to Station 3095+60 (I-90 EB), 0 to 15 feet and 0 to 145 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 3101+35 to Station 3103+00 (I-90 EB), 0 to 15 feet and 0 to 80 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: lead and manganese.
- Station 3103+00 to Station 3104+75 (I-90 EB), 0 to 15 feet and 0 to 120 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, lead and manganese.
- Station 3107+95 to Station 3109+65 (I-90 EB), 0 to 20 feet and 0 to 90 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 3111+65 to Station 3114+75 (I-90 EB), 0 to 20 feet and 0 to 100 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, lead and manganese.
- Station 804+10 to Station 809+50 (Ramp BB), 0 to 75 feet LT and 0 to 65 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 894+40 to Station 896+20 (Ramp B), 0 to 120 feet LT and 0 to 30 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, lead and manganese.

- Station 897+95 to Station 899+95 (Ramp B), 0 to 90 feet LT and 0 to 25 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameter: benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and manganese.
- Station 899+95 to Station 902+30 (Ramp B), 0 to 60 feet LT and 0 to 40 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese and pH.
- Station 902+30 to Station 904+70 (Ramp B) 0 to 50 feet LT and 0 to 45 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(1) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.
- Station 12+00 to Station 14+20 (Canfield Ave Ramp), 0 to 20 feet LT and 0 to 30 feet RT, (IDOT ROW, PESA site 2746-1, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameter: manganese.

Site 2746-1b (Intersection of I-90 and Canfield Avenue)

- Station 3073+65 to Station 3077+45 (I-90 EB), 0 to 20 and 0 to 140 feet RT, (IDOT ROW, PESA site #2746-1b, Intersection of I-90 and Canfield Ave): This material meets the criteria of Article 669.09(a)(2) and shall be managed in accordance with Article 669.09. COC sampling parameters: manganese.

Site 2746-2 (Chicago Transit Authority Tracks)

- Station 2992+00 to Station 2995+25 (I-90 EB), 0 to 90 and 0 to 280 feet RT (Chicago Transit Authority Tracks, PESA site 2746-2, 7200-8900 blocks of I-90): This material meets the criteria of Article 669.09(a)(3) and shall be managed in accordance with Article 669.09. COC sampling parameters: benzo(a)pyrene and manganese.

Site 2746-18 (IDOT ROW)

- Station 892+00 to Station 894+40 (Ramp B), 0 to 30 feet RT and 0 to 120 feet LT (IDOT ROW, PESA site 2746-18, 5000 block of N. Cumberland Avenue): This material meets the criteria of Article 669.09(a)(5) and shall be managed in accordance with Article 669.09. COC sampling parameters: VOCs, benzo(a)pyrene, lead and manganese.

CONCRETE BARRIER, SINGLE FACE (SPECIAL)

Description: This work shall consist of the construction of the reinforced concrete barrier, single face, of the height specified in the plans and shall include the concrete barrier base and the furnishing and installing of necessary materials in conformity with the lines, dimensions, sections and details shown on the plans and in accordance with Section 637 of the Standard Specifications and as modified herein.

Materials: Materials and equipment for concrete barrier and integral base shall be in accordance with the requirements of Section 503 and Section 637 of the Standard Specifications.

Joints: Expansion joints shall be constructed in the barrier wall at maximum joint spacing of 90 feet, or as shown on the plans. Contraction joints shall be constructed at both sides of all drainage structures.

Method of Measurement: Concrete Barrier, Single Face (Special) of the height specified and Concrete Barrier Transition (Special) will be measured for payment in feet along the centerline of the barrier.

Basis of Payment: This work will be paid for at the contract unit price per linear foot for CONCRETE BARRIER, SINGLE FACE, 42 INCH HEIGHT (SPECIAL) and CONCRETE BARRIER TRANSITION (SPECIAL), including all reinforcement bars in the barrier.

HOT-MIX ASPHALT STABILIZATION 6" AT STEEL PLATE BEAM GUARD RAIL

Description: This work shall consist of the installation of Hot-Mix Asphalt Stabilization 6" at Steel Beam Guard Rail.

Construction Requirements: The installation of Hot-Mix Asphalt Stabilization 6" at Steel Plate Beam Guard Rail shall conform to the applicable portions of Section 482 and Article 630.06 of the Standard Specifications and Standard 630201-06.

Method of Measurement: The Basis of Payment for the installation of Hot-Mix Asphalt Stabilization 6" at Steel Plate Beam Guard Rail will be paid according to Article 482.08 of the Standard Specifications.

Basis of Payment: The work Hot-Mix Asphalt Stabilization 6" at Steel Plate Beam Guard Rail will be paid for at the contract unit price per square yard for HOT-MIX ASPHALT STABILIZATION 6" AT STEEL PLATE BEAM GUARD RAIL.

TEMPORARY SEDIMENT BASIN

Description. This work shall consist of excavating and maintaining temporary sediment basins at pipe inlets or outfalls. The systems shall be constructed in accordance with applicable portions of Section 280 of the Standard Specifications, and as directed by the Engineer. Also included shall be all of the work necessary to remove all materials at the end of construction, and as directed by the Engineer.

The erosion control systems shown on the plans represent the minimum systems anticipated for the project. Revisions, or modifications of the sediment control systems shall be approved by the Engineer.

Add the following to Article 280.02:

- (m) Course Aggregate Gradation CA-3.....Article 1004.01
- (n) Excelsior Blanket.....Article 1081.10 (a)
- (o) Riprap, Gradation 3..... Article 1005.01

The cost of excavating for sediment basins will be paid for at the contract price cubic yard (cubic meter) EARTH EXCAVATION FOR EROSION CONTROL.

The cost of aggregate used for sediment basins will be paid for at the contract price per ton (metric ton) AGGREGATE (EROSION CONTROL).

Method of Measurement. Construction and maintenance of the temporary sediment basin will be measured for payment per each at the location specified in the plans.

Basis of Payment. This work will be paid for at the contract unit price per each for TEMPORARY SEDIMENT BASIN

FENCE REMOVAL

Description: This work shall consist of the removal and satisfactory disposal of existing chain link fence of variable height as shown on the plans.

General: Post foundations shall be removed to at least 1 foot below the proposed grade elevation of subgrade or ground surface. All holes left by the removal of the fence posts and post foundations shall be filled with crushed stone screenings.

All removed items shall be disposed in accordance with Article 202.03 of the Standard Specifications.

Method of Measurement: This work will be measured for payment in feet, along the top of the fence, including the length occupied by gates.

Basis of Payment: This work will be paid for at the contract unit price per foot for FENCE REMOVAL. The unit price per foot shall include the chain link fabric, barbed wire, posts, gates, post foundations, and all accessories.

MANHOLES, WITH RESTRICTOR PLATE

Description: This work shall consist of installing manholes of the size specified with a restrictor plate at the locations specified in the plans in accordance with the applicable portions of Section 602 of the Standard Specifications and as detailed in District One standard BD-12.

The inlet and outlet pipes to and from the structure shall have a Mastic Joint Sealer for Pipe applied between the wall of the structure and the pipe, placed in accordance to and meeting the material requirements of Section 1055 of the Standard Specification.

Basis of Payment: This work will be paid for at the contract unit price each for MANHOLES, TYPE A, (OF THE DIAMETER SPECIFIED), TYPE 1 FRAME, (OF THE LID TYPE SPECIFIED), RESTRICTOR PLATE, which price shall be payment in full for all labor, equipment, and materials necessary to complete the work as specified herein.

MANHOLES, TYPE A, 6'-DIAMETER, TYPE 1 FRAME, CLOSED LID, SPECIAL

Description. This work consists of designing, fabricating and installing deep manhole structures greater than 20' in total depth, as shown on the plans and as specified herein.

The structures designated as MANHOLES, TYPE A, 6'-DIAMETER, TYPE 1 FRAME, CLOSED LID, SPECIAL shall follow Standard 602406-06, except as modified below.

The manholes shall be constructed with precast reinforced concrete in accordance with AASHTO M199. Concrete masonry, brick masonry and cast in place concrete will not be allowed. All construction shall be in accordance with Articles 602 and 1042.10 of the latest edition of the IDOT Standard Specifications for Road and Bridge Construction.

For all structures greater than 20' in depth, the Contractor shall utilize an Illinois Licensed Structural Engineer to design structure wall thickness, circumferential reinforcement size and placement, as well as bottom slab thickness, reinforcement size and placement.

The Contractor shall closely coordinate and schedule all structure installation with the CTA per the Special Provisions for CTA FLAGGING AND COORDINATION and TRACK MONITORING.

Before fabrication begins:

- The Contractor shall field verify the exact location of the underlying main drain, other sewer(s) which will be connected to this manhole structure, and all existing field conditions which may impact or impede installation of the manhole structure.
- The Contractor shall submit design calculations and duplicate prints of shop drawings prepared and sealed by an Illinois Licensed Structural Engineer for the manhole structure, including bottom slab, to the Engineer for review and approval. Shop drawings shall show all necessary details for the construction of the manhole.
- Discrepancies in the contract plans or existing conditions discovered during field verification or preparation of the shop drawings shall be reported to the Engineer for resolution prior to submitting the shop drawings for review and approval. If the submitted shop drawings have significant discrepancies, revised sets shall be submitted until details comply with the contract requirements.

Basis of Payment. All costs required to manufacture, furnish, and completely install the precast manholes, including all excavation, concrete, reinforcing, bottom slabs, base sections, flat-slab tops, riser sections, steps, frames and lids, shall be paid for at the contract unit price per each for MANHOLES, TYPE A, 6'-DIAMETER, TYPE 1 FRAME, CLOSED LID, SPECIAL.

BRACED EXCAVATION, when specified in the contract, shall be paid for separately.

BRACED EXCAVATION

Description. This work shall include the installation of a bracing system, excavation, and backfilling to the elevation of the existing grade according to Section 502 of the Standard Specifications and as specified herein. The bracing system shall be designed and installed to prevent the movement of soil, structures, pavements and/or utilities adjacent to the excavated area.

Design and Construction Requirements.

The bracing system shall support excavations by the use of sheeting, timber or plates.

Water Infiltration / Dewatering

- The excavation shall be kept free of water by pumping during construction activities.
- The 48" main drain sewer shall be kept free of water by pumping/rerouting during any activities which require the sewer to be broken open for reconstruction.
- The contractor shall submit a plan-of-action (Plan) in the case of heavy rainfall events. The Plan shall outline measures to protect the excavation, the construction works and personnel during rainfall events, and measures to resume the work when the water levels permit. The Plan will be subject to approval by the Engineer.

CTA

- All braced excavation activities including, but not limited to, preparation, installation, work within, removal and backfilling, shall be coordinated closely with the adjacent railroad (CTA).
- The Contractor shall adhere to the Special Provision requirements for CTA FLAGGING AND COORDINATION and TRACK MONITORING.
- The braced excavation system shall be designed to allow a maximum of ¼" deflection in order to minimize CTA track movement.
- Daily survey of adjacent CTA track movement (pertaining to braced excavation) is to be taken starting when the braced excavation installation begins and concludes once excavation is completely backfilled and compacted.
- If the braced excavation limits fall within the adjacent CTA clear zone, then the placement of braced excavation shall be performed in coordination with the CTA to ensure no conflict with train schedules.
- the Contractor shall outline and detail in the CTA Construction Process Plan how the braced excavation shall be performed within the vicinity of the CTA tracks and within the CTA clear zone, and how/if the braced excavation will be left in place and protected at/below ground level prior to periods when the CTA trains are allowed to run adjacent to the braced excavation.
- Work will not be allowed within the braced excavation at any time while CTA train traffic is allowed to run along the south rail, without the written consent of the CTA.

The Contractor shall submit design calculations and shop drawings prepared and sealed by an Illinois Licensed Structural Engineer for the bracing system. Shop drawings shall show all necessary details for the construction of the bracing system, and indicate the method for keeping the excavation and 48" main drain free of water. The design calculations and shop drawings shall be submitted to the Engineer for review and approval a minimum of 8 weeks prior to installation. The Contractor shall also submit these same design calculations and sealed shop drawings to the CTA for review a minimum of 8 weeks prior to installation.

The excavation and bracing system installation shall not proceed without the written approval and authorization of the Engineer and CTA. However, in any event, the Contractor shall be fully responsible for the safety, stability and adequacy of the bracing system and shall be solely responsible and liable for all damages resulting from his construction operations or from failure or inadequacy of the bracing system.

In the event the bracing system fails or is otherwise deemed inadequate, in the judgment of the Engineer or by CTA, the Contractor shall, at his own expense, take all necessary steps to prevent the movement of soil, structures, pavements and/or utilities adjacent to the excavated area, and restore the excavated area to a safe working condition to the satisfaction of the Engineer.

Bracing members shall be installed as soon as an excavation level is reached to permit their installation. Bracing members shall be completely removed after the excavation is backfilled.

Method of Measurement. Braced excavation shall be measured in cubic yards according to the requirements for structure excavation as specified in Section 502.12 of the Standard Specifications.

Basis of Payment. Braced excavation will be paid for at the contract unit price per cubic yard for BRACED EXCAVATION. Payment for BRACED EXCAVATION will be limited to those locations shown on the plans. All sheeting and bracing members associated with braced excavation will not be measured for payment but shall be included in the cost for BRACED EXCAVATION. The cost of keeping excavation and the 48" main drain sewer free of water during construction activities shall be included in the cost of BRACED EXCAVATION.

The cost of preparing and submitting and implementing the Plan shall be included in the cost of BRACED EXCAVATION.

No separate payment will be made for structure excavation where braced excavation is shown.

CLEANING EXISTING DRAINAGE STRUCTURES (D-1)

Effective: September 30, 1985

Revised: December 1, 2011

All existing storm sewers, pipe culverts, manholes, catch basins and inlets shall be considered as drainage structures insofar as the interpretation of this Special Provision is concerned. When specified for payment, the location of drainage structures to be cleaned will be shown on the plans.

All existing drainage structures which are to be adjusted or reconstructed shall be cleaned according to Article 602.15 of the Standard Specifications. This work will be paid for according to accordance with Article 602.16 of the Standard Specifications.

All other existing drainage structures which are specified to be cleaned on the plans will be cleaned according to Article 602.15 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price each for DRAINAGE STRUCTURES TO BE CLEANED, and at the contract unit price per foot (meter) for STORM SEWERS TO BE CLEANED, of the diameter specified.

STORM SEWER ADJACENT TO OR CROSSING WATER MAIN

This work consists of constructing storm sewer adjacent to or crossing a water main, at the locations shown on the plans. The material and installation requirements shall be according to the latest edition of the "Standard Specifications for Water and Sewer Main Construction in Illinois", and the applicable portions of Section 550 of the Standard Specifications; which may include concrete collars and encasing pipe with seals if required.

Pipe materials shall meet the requirements of Sections 40 and 41-2.01 of the "Standard Specifications for Water and Sewer Main Construction in Illinois", except PVC pipe will not be allowed. Ductile-Iron pipe shall be used when specified on the plans, and shall meet the minimum requirements for Thickness Class 50.

Encasing of standard type storm sewer, according to the details for "Water and Sewer Separation Requirements (Vertical Separation)" in the "STANDARD DRAWINGS" Division of the "Standard Specifications for Water and Sewer Main Construction in Illinois", may be used for storm sewers crossing water mains.

Basis of Payment: This work will be paid according to Article 550.10 of the Standard Specifications, except the pay item shall be STORM SEWER (WATER MAIN REQUIREMENTS), of the diameter specified.

CHAIN LINK FENCE TO BE REMOVED AND RE-ERECTED (CTA)

Description: This work consists of the careful removal, storage, and re-erection of the chain link fence attached to CTA barrier wall to be removed and reconstructed at the location(s) shown in the contract plans according to Section 664 of the Standard Specifications and as modified herein.

General Requirements: Contractor shall coordinate any removal/replacement of CTA fence and/or barrier wall with CTA, and include details of the removal/replacement in the CTA Construction Process Plan.

Any new hardware, fasteners, fence posts, foundations and/or other appurtenances which are not salvageable, but are required to re-erect the fence on CTA barrier wall, shall be included in the unit price for this item. Any damage to the existing fence shall be replaced by the Contractor at no additional cost to the Department.

Existing fence may be kept on site under safeguarded conditions with the approval of the Engineer in writing.

All surplus or excess fence or appurtenances determined by the Engineer to not be necessary for the Contract shall become the property of the Contractor and must be disposed of offsite.

Method of Measurement: Chain link fence to be removed and re—erected will be measured in feet, in place at the new re-erected location. Surplus or excess fence will not be measured for payment.

Basis of Payment: This work will be paid for at the contract unit price per foot for CHAIN LINK FENCE TO BE REMOVED AND RE-ERECTED (CTA).

CHAIN LINK FENCE, 6' (SPECIAL)

Description: This work consists of fabricating, erecting, maintaining, removing and disposing of a temporary fence and access gate to maintain access control to the CTA operating area at the location(s) shown in the contract plans and according to Section 664 of the Standard Specifications and as modified herein.

General Requirements:

Contractor shall coordinate placement of CTA temporary fence/barrier with CTA, and include details of the temporary fence placement in the CTA Construction Process Plan.

The fence fabric must meet the requirements of Section 1006.27(a)b of the Standard Specifications. The fence must remain in place until the permanent CTA barrier and fence in completed.

Posts must meet the requirements of Section 1006.27(b) of the Standard Specifications. The fence posts are to be driven directly into the existing CTA ballast, and are not to be set in concrete.

Access Gate:

Contractor shall coordinate location of access gate with CTA prior to placement of chain link fence.

Access gates must not swing into the CTA operating area.

Method of Measurement: CHAIN LINK FENCE, 6' (SPECIAL) will be measured in feet in place along the top of the fence from center to center of end posts, including the length occupied by the access gate.

Access gate will not be measured for payment separately.

Basis of Payment: This work will be paid for at the contract unit price per foot for CHAIN LINK FENCE, 6' (SPECIAL).

Access gate is included in the cost of CHAIN LINK FENCE, 6' (SPECIAL).

STORM SEWERS JACKED IN PLACE, 48" (SPECIAL)

Description. This work shall consist of furnishing and installing, by jacking, a metal liner (steel casing pipe) of sufficient strength and size first, then a reinforced concrete storm sewer of the required inside diameter at the locations shown on the plans. Work shall be according to the applicable portions of Section 552 of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction and as specified herein.

This Special Provision includes specifications for pipe jacking in single-pass storm sewer construction. All excavation, jacking and boring, pumping, butt-welding, site restoration, furnishing, trenching, backfilling, labor, materials equipment, and all necessary to complete the contract work shall be included.

At the conclusion of storm sewer installation, the upstream end of the proposed sewer shall be bulkheaded with brick and mortar prior to backfilling.

General. The Contractor shall obtain additional soil information, as required, to clearly assess the existing conditions prior to starting the storm sewer jacking operations. Additional soil information, dewatering, contact grouting and monitoring requirements are included in the work.

The Contractor shall coordinate and schedule this work with the Chicago Transit Authority (CTA). The work shall adhere to the Special Provision "CTA FLAGGING AND COORDINATION." and "TRACK MONITORING".

Contractor shall coordinate portions of jacking under the CTA tracks with CTA, and include details of the jacking under CTA tracks in the CTA Construction Process Plan.

Contractor Due Diligence Prior to Boring and Jacking

The Contractor shall be solely obligated to verify that the soil is compatible with the single-pass storm sewer construction methodology. No excavation or delivery of pipe sections shall commence until the Contractor has verified this. All efforts related to this work shall be included in the contract unit price per lineal foot for STORM SEWERS JACKED IN PLACE, 48" (SPECIAL)

Excavation Included

Included in the storm sewer jacking cost shall be all tie-back anchors, bracing, piling, shoring and thrust blocks required for the launching area and receiving area, temporary sheet piling if required, all excavation and spoil haul as required for the launching area or receiving area, including the mud-slabs in the launching area and receiving area, if deemed necessary, and all excavation and haul of earth spoil material generated by the storm sewer construction.

All the excavation and haul necessary to construct the storm sewer shall be included in the contract unit price per lineal foot for STORM SEWERS JACKED IN PLACE, 48" (SPECIAL)

Contractor Experience

The Contractor or his subcontractor must be prequalified by the Illinois Department of Transportation in contractor prequalification category number 036, "Tunnel Excavation".

The Contractor or his subcontractor must demonstrate to the Engineer that he/she has successfully constructed a minimum of two (2) similar projects in the last five (5) years, with its own forces. The Contractor shall also verify that the specific jobsite superintendent in responsible charge of this project has managed at least two (2) comparable projects within the last ten (10) years.

Tolerances

The Contractor must construct the storm sewer in accordance with all applicable provisions of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction and acceptable industry standards, and per the Special Provision for TRACK MONITORING.

The storm sewer shall be constructed to within 1 foot of established horizontal alignment and to within 0.16 feet of established vertical grade.

Tolerance for ground settlement above the storm sewer under the CTA tracks induced by boring and jacking operations is $0 \pm 1/4$ inches, and per the Special Provision for TRACK MONITORING.

Submittals. The Contractor shall design and install a thrust block system for the storm sewer jacking. The thrust block capacity must be at least 50 percent greater than the anticipated maximum jacking load. Supplemental soil borings and geotechnical report for the thrust block system design, if required, shall be obtained by the Contractor. The Contractor shall submit complete design calculations and shop drawings for the thrust block system to the Engineer according to Article 1042.03(b) of the Standard Specifications. All submittals shall be sealed by an Illinois Licensed Structural Engineer and shall include all details, dimensions, quantities and cross sections necessary. No work or ordering of materials for the structure shall be done by the Contractor until the submittal has been approved in writing by the Engineer. The design shall be prepared by an Illinois Licensed Structural Engineer with a minimum of five (5) years of experience in the design of comparable thrust block systems. No work or ordering of materials for the structures shall be done by the Contractor until the submittal has been approved in writing by the Engineer.

The Contractor shall submit a Jacked Storm Sewer Work Plan that shall outline, as a minimum, the sequence of site preparation, storm sewer boring/jacking and post-jacking and boring operations, and structure placement, including dimensions as well as number and duration of daily shifts.

1. Methods of excavation, dewatering system, and equipment to be used.
2. Storm Sewer jacking machine and/or boring machine to be used including manufacturer, dimensions, propulsion system, face control capability, articulation provisions, means of installing initial ground support system and seal between the machine and leading pipe.
3. Provisions for controlling line and grade, and survey frequency with respect to progress of excavation.
4. Jacking equipment and methods, including jack arrangement and capacity.
5. Thrust block calculation, design, and capacity.
6. Lubricant composition, injection locations, and pump capacity (pressure and volume).

Materials. Casing pipe shall be made of steel that has a plain end, has a minimum tensile strength of 45,000 psi, minimum yield point strength of 66,000 psi, conforms to ASTM A252 Grade 3 and has a thickness as specified on the plans. Casing pipe shall have welded joints and have an exterior coated with minimum 5-mil coal tar epoxy or bituminous asphalt.

Construction Requirements.

General Jacking and Boring Requirements

Methods of excavation must fully support the face and control loss of soil during excavation as well as periods of shutdown. The storm sewer shall be excavated in a uniform and controlled manner. Loss of soil shall be controlled into the excavation as necessary to prevent damage, settlement, or loss of support to adjacent structures and utilities, maintain stability of the excavation, and preserve the original strength of soils surrounding the excavation.

The Contractor must be able to demonstrate to the Engineer that he/she has successfully constructed at least two (2) similar projects with its equipment and labor force.

The Contractor is solely responsible for the selection of the jacking and boring machine and its support equipment to safely complete this work.

At least once per shift, as excavation progresses, the ground surface along the excavation must be examined for cracking, subsidence, or other signs of distress that may indicate potential failure of the initial ground support system, excessive lost ground, or excessive ground movement.

Where excavation is discontinued for a period longer than two (2) hours, the entire face of the excavation shall be secured and supported.

Enlargements of the excavation for the Contractor's convenience must be backfilled completely with Controlled Low Strength Material to the satisfaction of the Engineer.

The Contractor is responsible for any damage or displacement to the CTA tracks and shall provide all necessary repairs to the satisfaction of the Engineer.

Storm Sewer Jacking Equipment Requirements

Jacking equipment must be capable of advancing the sections in a controlled manner without overstressing the pipe and joints. Jacking equipment must be equipped with both of the following features:

1. A device to measure applied jacking loads.
2. The means to prevent the main jacks from exceeding maximum allowable concentric jacking load onto the sections.

The Contractor shall be responsible for the jacking devices and a thrust ring, or other systems approved by the Engineer, to ensure uniform load distribution across the face of the joint to prevent damage to the jacking pipe.

The thrust blocks shall be designed to distribute jacking loads into the thrust block such that the thrust block support system is not loaded or deflected in a detrimental manner and that the jacking frame remains aligned. Thrust block capacity must be at least 50 percent greater than the anticipated maximum jacking load.

The guide rails shall be secured firmly and accurately positioned with respect to line and grade.

The mounting and control of the guidance system shall be the responsibility of the Contractor.

Storm Sewer Jacking Procedures

The Contractor shall examine the jacking pipe for defects on arrival at the site and prior to installation. All jacking pipe sections shall be inspected by the Engineer and approved prior to jacking.

The Contractor shall be responsible for any lubrication of the exterior of the pipe that will minimize friction loads on pipe sections during jacking operations. Lubricant may consist of water mixed with bentonite, polymers, or other lubricants having no deleterious effect on the pipe, soil or groundwater. Injection pressure shall be monitored to minimize loss of lubricant.

Full penetration welds meeting the requirements of AWS D1.1 shall be used to joint sections of smooth steel pipe.

Pipe damaged in jacking or boring operations shall be repaired in place to the satisfaction of the Engineer. Pipe damage beyond repair shall be left in place, filled with grout, and a new pipe will be installed. Repair or replacement of damaged pipe shall be done at the Contractor's expense.

Protection of Adjacent Structures

In the event that systematic ground losses during pipe excavation cause or threaten to cause structures (including railroad tracks and utilities) to settle or move in excess of allowable limits, as indicated by settlement monitoring, cease pipe excavation and modify equipment and methods of excavation to reduce ground movements to within allowable limits.

Illumination

The Contractor shall provide lighting for the entire length of storm sewer whenever the storm sewer is occupied. The lighting must be sufficient to ensure the safety of those entering the storm sewer, and must conform to OSHA requirements, as a minimum.

The Contractor shall provide temporary portable lighting in the storm sewer as necessary for the Engineer to evaluate conformance of structure with Contract requirements.

Emergency Measures

The Contractor shall provide emergency electric power supply that is independent of the primary electric power supply, and which is capable of powering the storm sewer lighting and dewatering systems.

Whenever there is a condition which is likely to endanger the stability of the excavation or adjacent work or structures, the Contractor shall operate with a full crew for 24 hours per day including weekends and holidays without interruption until those conditions are mitigated.

Survey

The Contractor shall maintain line and grade to provide for placement of the pipe within specified tolerances and shall survey each pipe section placed to determine line and grade along the culvert invert. The survey data shall be reported to the Engineer within one working day of performing said survey.

The pipe surveys must be sealed by a Professional Engineer or Land Surveyor licensed in the State of Illinois. All efforts for this work are incidental to the unit cost for STORM SEWERS JACKED IN PLACE, 48" (SPECIAL)

Completion of Storm Sewer

At the completion of jacking operations, the Contractor shall be responsible for removal of any structure utilized for pipe jacking to the satisfaction of the Engineer.

Method of Measurement: This work will be measured by the actual lineal feet of pipe in place, measured along the centerline of the pipe from end section to end section. Measurement will be based on surveys taken at the site as directed by the Engineer.

Basis of Payment: This work will be paid for at the contract unit price per lineal foot of pipe in place for STORM SEWERS JACKED IN PLACE, 48" (SPECIAL) including all labor, equipment, tools, monitoring, testing and incidentals described herein and as necessary to complete the item within the tolerances specified, and to the satisfaction of the Engineer. This price shall include coordination with the railroad (CTA) and bulkhead of the upstream end of the sewer prior to backfilling.

If rock, man-made obstructions, or soil conditions are encountered during the storm sewer construction, which differ from the soil conditions indicated in the geotechnical data or encountered by the exploratory borings, and the obstruction prevents the forward progress of the installation, the Contractor shall promptly advise the Engineer of the condition. If it is determined by the Engineer that extra work or special equipment will be required to advance the storm sewer, and the project documents do not contain a differing site condition clause, then payment for this extra work will be made in accordance with Article 109.04 of the Standard Specifications.

Track monitoring for CTA requirements will be paid for separately per the Special Provision for TRACK MONITORING.

REMOVE EXISTING FLARED END SECTION

Description. This work shall consist of the removal of existing flared end sections at the locations specified in the plans in accordance with applicable portions of Section 551 of the Standard Specifications, and as directed by the Engineer.

Method of Measurement. Removal of existing flared end sections will be measured for payment per each removed at the location specified in the plans.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING FLARED END SECTION.

TEMPORARY END SECTION

Description: This work shall consist of the construction and removal of temporary end sections as shown on the plans and in accordance with the applicable portions of Section 542 of the Standard Specifications.

This work shall include the subsequent removal of the temporary end sections in accordance with Section 551 of the Standard Specifications.

Materials: The temporary end sections shall be metal and shall conform to Section 1006.01 of the Standards Specifications.

Method of Measurement: This item shall be measured for payment installed in place per EACH.

Basis of Payment: This work shall be paid for at the contract unit price per each for TEMPORARY END SECTION.

Removal of the temporary end section shall not be paid for separately but shall be included in the contract unit price for TEMPORARY END SECTION.

FILL EXISTING STORM SEWERS

Description: This work shall consist of plugging and filling existing storm sewers as required to construct the pipe abandonment as shown on the plans.

The ends of the pipe shall be securely sealed as described in Section 605.

The ends of the storm sewer shall be excavated, if necessary, to the bottom flow line and to a minimum of 6 inches inside the barrel of the pipe. The inside of the storm sewer at the excavated ends shall be cleaned of all earth and debris to the satisfaction of the Engineer.

The Contractor shall construct a suitable plug at the opening of the storm sewer consisting of mortared concrete masonry blocks or a Class SI Concrete plug.

The cost of cleaning and plugging pipe ends will not be paid for separately but will be considered as included in the contract unit price for **FILL EXISTING STORM SEWERS**, of the diameter specified.

The controlled low-strength material used to fill the storm sewer and the filling operation will be in accordance with Section 593 of the Standard Specifications.

Method of Measurement: This work will be measured in place and the volume computed in cubic yards.

Basis of Payment: This work will be paid for at the contract unit price per cubic yard for **FILL EXISTING STORM SEWERS**.

PROTECTION OF EXISTING TREES

The Contractor shall be responsible for taking measures to minimize damage to the tree limbs, tree trunks, and tree roots at each work site. All such measures shall be included in the contract price for other work except that payment will be made for TEMPORARY FENCE.

All work, materials and equipment shall conform to Section 201 and 1081 of the Standard Specifications except as modified herein.

A. Temporary Fence:

1. The Contractor shall erect a temporary fence around all trees within the construction area to establish a "tree protection zone" before any work begins or any material is delivered to the jobsite. No work is to be performed (other than root pruning), materials stored or vehicles driven or parked within the "tree protection zone".
2. The exact location and establishment of the "tree protection zone" fence shall be approved by the Engineer prior to setting the fence.
3. The fence shall be erected on three sides of the tree at the drip-line of the tree or as determined by the Engineer.
4. All work within the "tree protection zone" shall have the Engineer's prior approval. All slopes and other areas not regarded should be avoided so that unnecessary damage is not done to the existing turf, tree root system ground cover.
5. The grade within the "tree protection zone" shall not be changed unless approved by the Engineer prior to making said changes or performing the work.

The fence shall be similar to wood lath snow fence (48 inches high), plastic poly-type or and other type of highly visible barrier approved by the Engineer. This fence shall be properly maintained and shall remain up until final restoration, unless the Engineer directs removal otherwise. Tree fence shall be supported using T-Post style fence posts. **Utilizing re-bar as a fence post will not be permitted.**

Temporary fence will be paid for at the contract unit price per foot for TEMPORARY FENCE, which price shall include furnishing, installing, maintaining, and removing.

B. Backfilling:

1. Prior to placing the topsoil and/or sod, in areas outside the protection zone, the existing ground shall be disked to a depth no greater than one (1"), unless otherwise directed by the Engineer. No grading will be allowed within the drip-line of any tree unless directed by the Engineer.

C. Damages:

1. In the event that a tree not scheduled for removal is injured such that potential irreparable damage may ensure, as determined by the Roadside Development Unit, the Contractor shall be required to remove the damage tree and replace it on a three to one (3:1) basis, at his own expense. The Roadside Development Unit will select replacement trees from the pay items already established in the contract.
2. The Contractor shall place extreme importance upon the protection and care of trees and shrubs which are to remain during all times of this improvement. It is of paramount importance that the trees and shrubs which are to remain are adequately protected by the Contractor and made safe from harm and potential damage from the operations and construction of this improvement. If the Contractor is found to be in violation of storage or operations within the "tree protection zone" or construction activities not approved by the Engineer, a penalty shall be levied against the Contractor with the monies being deducted from the contract. The amount of the penalty shall be two hundred fifty dollars (\$250.00) per occurrence per day.

PLANTING WOODY PLANTS

This work shall consist of planting woody plants as specified in Section 253 of the Standard Specifications with the following revisions:

Delete Article 253.03 Planting Time and substitute the following:

Spring Planting. This work shall be performed between March 15th and May 31st except that evergreen planting shall be performed between March 15th and April 30th in the northern zone.

Add the following to Article 253.03 (a) (2) and (b):

All plants shall be obtained from Illinois Nurserymen's Association or appropriate state chapter nurseries. All trees and shrubs shall be dug prior to leafing out (bud break) in the spring or when plants have gone dormant in the fall, except for the following species which are only to be dug prior to leafing out in the spring:

- Maple (*Acer* spp.)
- Buckeye (*Aesculus* spp.)
- Serviceberry (*Amelanchier* spp.)
- Hackberry (*Celtis occidentalis*)
- Hawthorn (*Crataegus* spp.)
- Black Walnut (*Juglans nigra*)
- Crabapple (*Malus* spp.)
- Black Tupelo (*Nyssa sylvatica*)
- American Hophornbeam (*Ostrya virginiana*)
- Oak (*Quercus* spp.)
- Baldcypress (*Taxodium distichum*)
- American Linden (*Tilia americana*)

Fall Planting. This work shall be performed between October 1st and November 30th except that evergreen planting shall be performed between August 15th and October 15th.

Planting dates are dependent on species of plant material and weather. Planting might begin or end prior or after above dates as approved by the Engineer. Do not plant when soil is muddy or during frost. No plant material shall be installed prior to the final grade of the planting soil. Trees must be installed first to establish proper layout and to avoid damage to other plantings.

Add the following to Article 253.05 Transportation:

Cover plants during transport. Plant material transported without cover shall be automatically rejected.

Delete the third sentence of Article 253.07 and substitute the following:

The Engineer will place the marking flags. Allow a minimum of seven working (7) days prior to installation for layout. The Contractor shall be responsible for:

1. Providing marking flags to the Engineer for locating plants.
2. Contacting utility companies to identify any conflicts with the proposed planting locations after flags have been placed.
3. Obtaining approval from the Engineer for any relocation of proposed plantings due to utility conflicts, or other conflicts.

Delete Article 253.08 Excavation of Plant Holes and substitute the following:

Protect structures, utilities, sidewalks, knee walls, fences, pavements, utility boxes, other facilities, lawns and existing plants from damage caused by planting operations.

Holes for trees shall be dug at the location indicated by the marking stakes. Holes for shrubs shall be dug within the marked outline of the planting bed. The spacing of plants will be designated on the plans. Spacing shall be measured from center-to-center, and alternate rows shall be staggered.

Excavate with sides vertical, bottom flat but with high center for drainage. Deglaze sides. The planting hole shall be twice the diameter of the root ball if possible, but in no case shall the hole be less than twelve (12) inches wider. Any soil covering the tree's root flair shall be removed to expose the crown, along with any secondary root growth, prior to planting. Remove all excavated subsoil from the site and dispose as specified in Article 202.03. The excavated material shall not be stockpiled on turf or in ditches.

Delete the third and fourth paragraphs of Article 253.10 Planting Procedures and Article 253.10 (a) and substitute the following:

Trees, shrubs, and vines shall be thoroughly watered with a method approved by the Engineer. Approved watering equipment shall be at the site of the work and in operational condition PRIOR TO STARTING the planting operation and DURING all planting operations OR PLANTING WILL NOT BE ALLOWED.

Set plants in the excavated hole with top of ball 2 to 3 inches above finished grade. Add soil as required under ball to achieve plumb. Remove all burlap and wire baskets from top three quarters (3/4) of the root ball. The remaining burlap shall be loosened and scored to provide the root system quick contact with the soil. All ropes or wires shall be removed from the root ball and tree trunk.

The hole shall be half (1/2) filled with soil, firmly packed, then saturated with water. After the water has soaked in, more soil shall be added to the top of the hole, and then the hole shall be saturated again. Maintain plumb during backfilling. Visible root flair shall be left exposed, uncovered by the addition of soil. By mounding up the soil around the hole, create a saucer depression around the tree to hold future water. In most cases, the backfill around the root ball shall be the same soil that was removed from the hole. Where rocks, gravel, heavy clay or other debris are encountered, clean top soil shall be used. Do not backfill excavation with subsoil.

Delete Article 253.11 and substitute the following:

Within 48 hours after planting, mulch shall be placed around all plants in the entire mulched bed or at the base of each tree to its dripline specified to a depth of 4 inches (100 mm). No weed barrier fabric will be required for tree and shrub planting.

The mulch shall consist of wood chips or shredded tree bark free not to exceed two (2) inches in its largest dimension, free of foreign matter, sticks, stones, and clods. A sample and request for material inspection form must be supplied to the Engineer for approval prior to performing any work.

Care shall be taken not to bury leaves, stems, or vines under mulch material. The mulch shall be pulled away 6" from the tree trunk, allowing the root flair at the base of the tree to be exposed and free of mulch contact. All finished mulch areas shall be left smooth and level to maintain uniform surface and appearance. After the mulch placement, any debris or piles of material shall be immediately removed from the right of way, including raking excess mulch out of turf areas.

Delete Article 253.12 Wrapping and substitute the following:

Any paper or cardboard trunk wrap must be removed before placing the tree in the tree hole in order to inspect the condition of the trunks. Within 48 hours, "A layer of commercial screen wire mesh shall be wrapped around the trunk of all deciduous trees. The screen wire shall be secured to itself with staples or single wire strands tied to the mesh. Trees shall be wrapped at time of planting, before the installation of mulch. The lower edge of the screen wire shall be in continuous contact with the ground and shall extend up to the lowest major branch.

Add the following to Article 253.13 Bracing:

Trees required to be braced shall be braced within 24 hours of planting.

Add the following to the first paragraph of Article 253.14 Period of Establishment:

Prior to being accepted, the plants shall endure a period of establishment. This period shall begin as soon as the tree is installed and end in December of the same year.

Delete the last sentence of the first paragraph of Article 253.15 Plant Care and substitute the following:

This may require pruning, cultivating, tightening and repairing supports, repair of wrapping, and furnishing and applying sprays as necessary to keep the plants free of insects and disease. The Contractor shall provide plant care a minimum of every two weeks, or within 3 days following notification by the Engineer. All requirements for plant care shall be considered as included in the cost of the contract.

Delete the first paragraph of Article 253.15 Plant Care (a) and substitute the following:

During plant care additional watering shall be performed at least every two weeks during the months of May through December. The contractor shall apply a minimum of 35 gallons of water per tree, 25 gallons per large shrub, 15 gallons per small shrub, and 4 gallons per vine. The Engineer may direct the Contractor to adjust the watering rate and frequency depending upon weather conditions.

Delete Article 253.17 Basis of Payment and substitute the following:

This work will be paid for at the contract unit price per each for TREES, SHRUBS, or VINES, of the species, root type, and plant size specified; and per unit for SEEDLINGS. Payment will be made according to the following schedule.

- (a) Initial Payment. Upon completion of planting, mulch covering, wrapping, and bracing, 75 percent of the pay item(s) will be paid.
- (b) Final Payment. Upon inspection and acceptance of the plant material, or upon execution of a third party bond, the remaining 25 percent of the pay item(s) will be paid.”

CONSTRUCTION AIR QUALITY – DUST CONTROL

Description. This work shall consist of developing and implementing a detailed Dust Control Plan (DCP) in accordance with Article 107.36 of the Standard Specifications. Development of a DCP is required. All construction activities shall be governed by the DCP. The nature and extent of dust generating activities, and specific control techniques appropriate to specific situations shall be discussed at the pre-construction meeting, with subsequent development of the DCP to include but not be limited to the requirements below.

General Requirements. The Contractor is responsible for the control of dust at all times during the duration of the contract, 24 hours per day, 7 days per week, including non-working hours, weekends, and holidays. This work shall be considered complete after the completion of all permanent erosion control measures required for the contract, and after all temporary and permanent seeding is established.

The DCP shall describe the plan for the implementation of control measures before, during and after conducting any dust generating operation. These controls must be in place on non-working days and after working hours, not just while work is being done on the site. The DCP must contain information specific to the project site, proposed work, and dust control measures to be implemented. A copy of the DCP must be available on the project site at all times.

The DCP must contain, at a minimum, all of the following information:

1. Name, address and phone number of the person(s) responsible for the dust generating operation and for the submittal and implementation of the DCP.
2. A drawing specifying the site boundaries of the project with the areas to be disturbed, the locations of the nearest public roads, and all planned exit and entrance locations to the site from any paved public roadways.
3. Control measures to be applied to all actual and potential fugitive dust sources before, during and after conducting any dust generating operation, including non-work hours and non-work days.
4. A contingency plan consisting of at least one contingency measure for each activity occurring on the site in case the primary control measure proves inadequate.

The Contractor shall submit two copies of the DCP that outlines in detail the measures to be implemented by the Contractor complying with this section, including prevention, cleanup, and other measures at least 14 days before beginning any dust generating activity. The Contractor shall not begin any dust generating activities until the Engineer approves the DCP in writing.

Materials.

1. Dust Suppression Agents: Water shall meet the requirements of Section 1002 of the Standard Specifications.
2. Soil stabilizers shall consist of seed and mulch meeting the requirements of Article 1081.06 (a) (2) and (3).
3. Covers for stockpiles shall be commercially available plastic tarps, or other materials approved by the Engineer.

Construction Methods. Water shall be used to provide temporary control of dust on entrances/exits to the job site, haul roads and other active work areas. Several applications per day may be necessary to control dust depending upon meteorological conditions and work activity. The Contractor shall apply water on a routine basis as necessary or as directed by the Engineer to control dust. Wet suppression consists of the application of water. Wet suppression equipment shall consist of sprinkler pipelines, tanks, tank trucks or other devices approved by the Engineer, capable of providing a regulated flow, uniform spray and positive shut off.

Haul truck cargo areas shall be securely covered during the transport of materials on public roadways that are prone to cause dust.

Public Roadway Dust Control. Trackout, including carryout and spillage of material that adheres to the exterior surfaces of or are spilled from motor vehicles and/or equipment and subsequently fall onto a paved public roadway must be controlled at all times. Cleanup of carryout and spillage is required immediately if it extends a cumulative distance of 50 feet or more on a paved public roadway. If the extent of carryout is less than 50 feet, clean up at the end of the day is permissible. Cleanup of paved surfaces shall be by wet spray power vacuum street sweeper. Dry power sweeping is prohibited.

Control of Earthwork Dust. During batch drop operations (i.e. earthwork with a front-end loader, clamshell bucket, or backhoe), the free drop height of excavated or aggregate material shall be reduced to minimum heights as necessary to perform the specified task, and to minimize the generation of dust. To prevent spills during transport, a minimum of 2 inches of freeboard space shall be maintained between the material load and the top of the truck cargo bed rail. A maximum drop height of two feet (or minimum height allowed by equipment) will be allowed, or to heights as directed by the Engineer.

Control of Dust on Stockpiles and Inactive Work Areas. The Contractor shall use the following methods to control dust and wind erosion of stockpiles and inactive areas of disturbed soil:

1. Water shall be used during active stockpile load-in, load-out, and maintenance activities.
2. Soil stabilizers (hydraulic or chemical mulch) may be applied to the surface of inactive stockpiles and other inactive areas of disturbed soil. Final grading and seeding of inactive areas shall occur immediately after construction activity is completed in an area and as directed by the Engineer.
3. Plastic tarps may be used on small stockpiles, secured with sandbags or an equivalent method approved by the Engineer, to prevent the cover from being dislodged by the wind. The Contractor shall repair or replace the covers whenever damaged or dislodged at no additional cost.

Method of Measurement. Water used as a dust suppression measure shall be measured for payment in units of 1000 Gallons of water applied. All measuring devices shall be furnished by the Contractor and approved by the Engineer. All other dust control measures will not be measured for payment.

Basis of Payment. The application of water as a dust suppression agent will be paid for at the contract unit price per unit for DUST CONTROL WATERING.

All other dust control measures, along with preparation of the DCP, will not be paid for directly but shall be considered as included in the various items involved and no additional compensation will be allowed.

GENERAL REQUIREMENTS FOR WEED CONTROL SPRAYING

Experience:

The Contractor shall have previous experience with the use of weed control chemicals. He/she shall have had at least one (1) season's experience in the use of their chemicals in spraying highway right-of-way or at least three (3) season's experience in their use in farm or custom spraying. The Contractor shall observe and comply with all sections of the Illinois Custom Spray Law, including licensing.

Equipment:

The equipment used shall consist of a vehicle-mounted tank, pump, spray bar and handgun, plus any other accessories needed to complete the specified work. Spraying shall be done through multiple low-pressure flooding or broad jet nozzles mounted on spray bars operated not more than 36" above the ground. If different sizes or types of nozzles are used to make up the spray pattern, the pressure, sizes and capacities shall be adjusted to provide a uniform rate of application for each segment of the spray pattern. Hand spray guns may be used for spraying areas around traffic control devices, lighting standard and similar inaccessible areas. Maximum speed of the spray vehicle during application of chemical shall be five (5) miles per hour.

Pumps used shall have a volume and pressure capacity range sufficient to deliver the mixture at a pressure to provide the required coverage and to keep the spray pattern full and steady without pulsation or excessive pressure as to cause fogging. Maximum pressure for application shall be 15 PSI. Quick acting shut-off valves and spring-loaded ball check valves shall be provided to stop the spray pattern with a minimum of nozzle drip. In areas where the spray vehicle must traverse the right-of-way, a four-wheel drive vehicle with flotation tires will be required to minimize damage to the ground surface.

Prior to beginning work, the Contractor shall obtain approval from the Engineer of the spraying equipment proposed for completing this work. The proposed equipment shall be in an operational condition and available for inspection by the Engineer at least two (2) weeks prior to the proposed starting time. If requested by the Engineer, the Contractor shall demonstrate the calibration of the equipment.

The equipment must provide consistently uniform coverage and keep the spray mixture sufficiently agitated or the work will be suspended until the equipment is repaired or replaced.

Spraying Areas:

This work includes roadsides and other types of right-of-way of various widths and gradients. Spray areas often extend more than thirty (30) feet from the edge of the roadway, requiring both spray bar and hand gun applications.

When the description of work requires weed control of a stated species, such as teasel, the chemical shall be applied only to locations where the stated species is present. When the description of work requires general weed control within a bed or area, such as broadleaf weed control in turf, then the chemical shall be applied to the entire bed or area.

Exclusion of Spraying Areas:

Areas where weed control spraying is inappropriate or detrimental to the environment, desirable planting, or private property shall be excluded from the spray area.

Spraying will not be permitted over any drainage swales or waterways, or other areas where the chemical label prohibits application. Spraying within 150 feet of a natural area or site where endangered or threatened species occur.

Responsibility for Prevention of Damage to Private Property:

The Contractor shall, at all times, exercise extreme caution to prevent damage to residential plantings, flower or vegetable gardens, vegetable crops, farm crops, orchard or desirable plants adjacent to the roadside.

The Contractor or Department receives a complaint, the Contractor shall contact a complaint within ten (10) days after receiving a claim for damages, either in person or by letter. The Contractor, or his authorized representative, shall make a personal contact with the complainant within twenty (20) days. The Engineer shall also be notified by the Contractor of all claims for damage he received and shall keep the Engineer informed as to the progress in arriving at a settlement for such claims.

Communication with the Engineer:

The Contractor is required to communicate with the Engineer to receive all required approvals in a timely way and to assure that the Engineer can accurately document the work performed.

It shall be the Contractor's responsibility to assure that all chemical containers are opened and added to the spray mixture in the presence of the Engineer.

The Contractor shall obtain approval from the Engineer to proceed with spraying at each location 24 hours prior to the proposed spray operations.

WEED CONTROL, TEASEL (TRANSLINE)

Description: This work shall consist of the application of a broadleaf herbicide (Transline or equal) along highway roadsides for control of teasel and thistle.

Materials: The broadleaf herbicide (Transline or equal) shall have the following formulation:

A. Active Ingredient	
Clopyralid: 3,6-dichloro-2-pyridinecarboxylic acid, monoethanolamine salt	40.9%
B. Inert Ingredients	<u>59.1%</u>
	TOTAL 100.00%

The Contractor shall submit a certificate, including the following, prior to starting work:

1. The chemical names of the compound and the percentage by weight of the ingredients which must match the above specified formulation.
2. A statement that the material is in a solution which will form a satisfactory emulsion for use when diluted with water for normal spraying conditions.
3. A statement that the Transline or equal, when mixed with water, will be completely soluble and dispersible and remain in suspension with continuous agitation.
4. A statement describing the products proposed for use when the manufacturer of Transline or equal requires that surfactants, drift control agents, or other additives be used with the product. These tank mix additives shall be used as specified by the manufacture. Required additives will not be paid for separately.

All material shall be brought to the spray area in the original, unopened containers supplied by the manufacturer.

Schedule: Spraying will not be allowed when temperatures exceed 90° F or under 45° F, when wind velocities exceed fifteen (15) miles per hour, when foliage is wet or rain is eminent, when visibility is poor or during legal holiday periods.

Application Rate: The Transline or equal broadleaf herbicide shall be applied at the rate of one (1) pint per acre (1.2 liters per hectare).

One (1) pint of Transline or equal formulation shall be diluted with a minimum of forty (40) gallons (one hundred fifty (150) liters) of water and applied as a mixture. Water for dilution of the mixture will not be paid for separately.

Method of Measurement: Weed Control, Teasel will be measured for payment in gallons (liters) of undiluted Transline or equal applied as specified. The gallons (liters) for payment will be determined based on the gallons (liters) specified on the label attached to the original container supplied by the manufacturer.

Basis of Payment: Weed Control, Teasel will be paid for at the contract unit price per gallon (liters) for WEED CONTROL, TEASEL. Water for dilution of the mixture and additives required for application will not be paid for as separate items, but the costs shall be considered as included in the contract unit price for Weed Control, Teasel, and no additional compensation will be allowed.

WEED CONTROL, PRE-EMERGENT GRANULAR HERBICIDE

Description: This work shall consist of spreading a pre-emergent granular herbicide in areas as shown on the plans or as directed by the Engineer. This item will be used in mulched plant beds and mulch rings.

Materials: The pre-emergent granular herbicide (Snapshot 2.5 TG or equivalent) shall contain the chemicals Trifluralin 2% active ingredient and Isoxaben with 0.5% active ingredient. The herbicide label shall be submitted to the Engineer for approval at least seventy-two (72) hours prior to application.

Method: The pre-emergent granular herbicide shall be used in accordance with the manufacturer's directions on the package. The granules are to be applied prior to mulching.

Apply the granular herbicide using a drop or rotary-type designed to apply granular herbicide or insecticides. Calibrate application equipment to use according to manufacturer's directions. Check frequently to be sure equipment is working properly and distributing granules uniformly. Do not use spreaders that apply material in narrow concentrated bands. Avoid skips or overlaps as poor weed control or crop injury may occur. More uniform application may be achieved by spreading half of the required amount of product over the area and then applying the remaining half in swaths at right angles to the first. Apply the granular herbicide at the rate of 100 lbs/acre (112 kg/ha) or 2.3 lbs/1000 sq. ft. (11.2 kg/1000 sq. meters).

Method of Measurement: Pre-emergent granular herbicide will be measured in place in Pounds (Kilograms) of Pre-emergent Granular Herbicide applied. Areas treated after mulch placement shall not be measured for payment.

Basis of Payment: This work will be paid for at the contract unit price per pound (kilogram) of WEED CONTROL, PRE-EMERGENT GRANULAR HERBICIDE which price shall include all materials, equipment, and labor necessary to complete the work as specified.

WEED CONTROL, NON-SELECTIVE AND NON-RESIDUAL (WETLAND - RODEO)

Description: This work shall consist of the application of a non-selective and non-residual herbicide (Rodeo or equal) for the control of broadleaf weeds in wetland areas.

Materials: The non-selective and non-residual herbicide (Rodeo or equal) shall have the following formulation:

Active Ingredient

*Glyphosate, N-(phosphonomethyl) glycine, in the form of its isopropylamine salt	53.80%
B. Inert Ingredients	<u>46.20%</u>
TOTAL	100.00%

*Equivalent to 4 lbs. per U.S. gallon of the acid, glyphosate.

The Contractor shall submit a certificate, including the following, prior to starting work:

1. The chemical names of the compound and the percentage by weight of the ingredients which must match the above specified formulation.
2. A statement that the material is in a solution which will form a satisfactory emulsion for use when diluted with water for normal spraying conditions.
3. A statement that the Rodeo or equal, when mixed with water, will be completely soluble and dispersible and remain in suspension with continuous agitation.
4. A statement describing the products proposed for use when the manufacturer of Rodeo or equal requires that surfactants, drift control agents, or other additives be used with the product. These tank mix additives shall be used as specified by the manufacturer. Required additives will not be paid for separately.

All material shall be brought to the spray area in the original, unopened containers supplied by the manufacturer.

Application Rate: The Rodeo or equal non-selective and non-residual herbicide shall be applied according to the label instructions.

Water for dilution of the mixture will not be paid for separately.

Method of Measurement: Weed Control, Non-selective and Non-Residual (Wetland) will be measured for payment in gallons of undiluted Rodeo or equal applied as specified. The gallons for payment will be determined based on the gallons specified on the label attached to the original container supplied by the manufacturer.

Basis of Payment: Weed Control, Non-selective and Non-Residual (Wetland) will be paid for at the contract unit price per gallon for WEED CONTROL, NON-SELECTIVE AND NON-RESIDUAL (WETLAND). Water for dilution of the mixture and additives required for application will not be paid for as separate items, but the costs shall be considered as included in the contract price for Weed Control, Non-selective and Non-Residual (Wetland), and no additional compensation will be allowed.

SUPPLEMENTAL WATERING

Scope: This work will include watering turf, trees, shrubs, vines and perennial plants at the rates specified and as directed by the Engineer.

Schedule: Watering will only begin after the successful completion of all period of establishment requirements.

Watering must be completed in a timely manner. When the Engineer directs the Contractor to do supplemental watering, the Contractor must begin the watering operation within 24 hours of notice. A minimum of 10 units of water per day must be applied until the work is complete. Damage to plant material that is a result of the Contractor's failure to water in a timely way must be repaired or replaced at the Contractor's expense.

Source of Water: The Contractor shall notify the Engineer of the source of water used and provide written certification that the water does not contain chemicals harmful to plant growth.

Rate of Application: The normal rates of application for watering are as follows. The Engineer will adjust these rates as needed depending upon weather conditions.

Perennial Plants: 5 gallons per square yard
Trees: 30 gallons per tree
Shrubs: 7 gallons per shrub
Vines: 3 gallons per vine

Method of Application: A spray nozzle that does not damage small plants must be used when watering perennial plants or turf. Water shall be applied at the base of the plant to keep as much water as possible off plant leaves. An open hose may be used to water trees, shrubs, and vines if mulch and soil are not displaced by watering. Water shall trickle slowly into soil and completely soak the root zone. The Contractor must supply metering equipment as needed to assure the specified application rate of water.

Method of Measurement: Supplemental watering will be measured in units of 1000 gallons (3,785 liters) of water applied as directed.

Basis of Payment: This work will be paid for at the contract unit price per unit of SUPPLEMENTAL WATERING, measured as specified. Payment will include the cost of all water, equipment and labor needed to complete the work specified herein and to the satisfaction of the Engineer.

SEEDING, CLASS 4 (MODIFIED) - NATIVE GRASS

INTERSEEDING, CLASS 4A (MODIFIED)

This work shall consist of Seeding Class 4 (Modified) in areas as shown in the plans or as directed by the Engineer.

All work, materials, and equipment shall conform to Sections 250 and 1081 of the Standard Specifications except as modified herein.

The Class 4 (Modified) seed mixture shall be supplied in separate bags of the two mixture components: Temporary Cover and Permanent Grasses. All native species will be local genotype and verified that original seed collection source will be from a radius of 150 miles from project site. Fertilizer is not required.

Article 250.07 Seeding Mixtures – Delete sentence 4. Delete the following from Table 1 – Seeding Mixtures:

Perennial Ryegrass

Article 250.09 – Add Seeding, Class 4 (Modified)

Article 250.10 – Add Seeding, Class 4 (Modified)

EROSION CONTROL BLANKET (SPECIAL)

This Special Provision revises Section 251 of the Standard Specifications for Road and Bridge Construction to eliminate the use of Excelsior Blanket for Erosion Control Blanket. This work shall consist of furnishing, transporting, and placing 100 % biodegradable erosion control blanket over seeded areas as detailed on the plans, according to Section 251 except as modified herein.

Delete Article 1081.10(a) Excelsior Blanket.

Delete the first paragraph of Article 1081.10 (b) Knitted Straw Mat and substitute the following:

Knitted Straw Mat. Knitted straw mat shall be a machine-produced mat of 100% clean, weed free agricultural straw. The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the blanket. The blanket shall be covered on top and bottom sides with a 100% biodegradable woven natural organic fiber netting such as North American Green S150BN or equal. No plastic netting will be allowed. The top netting shall consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine stands to form an approximate 0.50 x 1.0 (1.27 x 2.54 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches (5-12.5cm) from the edge) as an overlap guide for adjacent mats.

Short-term photodegradable erosion control blanket will not be allowed.

Delete Article 1081.10(d) Wire Staples.

Add the following to Article 1081.10 (e) Wood Stakes:

Biodegradable plastic stakes will be allowed. The biodegradable plastic anchor shall be approximately 6 in (15.24 cm) in length. No metal wire stakes will be allowed.

PLANTING SEDGE MEADOW PLUGS

This work shall consist of furnishing and installing sedge meadow and/or wetland plugs and goose grid barrier, initial watering of the plugs and other materials required in the planting operation including super absorbent moisture containment medium in areas as shown in the plans and details and as directed by the Engineer.

All work, materials, and equipment shall conform to Sections 254 and 1081 of the Standard Specifications except as modified herein.

Add the following to Article 254.02 Materials:

All plants shall be healthy, vigorous, and true to species and variety. All materials shall be provided by a certified nursery and shall be free of pests and disease. All plant materials shall comply with State and federal laws with respect to inspection for plant diseases and infestations. Written approval shall be necessary for substitutions.

Plugs – original seed source shall be within 150 miles of the project site location. Written approval will be required for substitutions and plant material purchased outside a 150 mile radius of the site.

Delete Article 254.04(b) Planting Time and substitute the following:

Plugs shall only be planted between May 1 and June 15. Approval from the Engineer must be received for all planting dates.

Add the following to Article 254.05 Transporting and Storing Plants:

Each species should be handled and packed in the manner approved for the plant, having regard for the soil climatic conditions at the time and place of digging and delivery, and for the time that will be consumed for transit and delivery.

Plant materials shall be packed to ensure adequate protection against damage during transit. The plants shall be protected with wet material to ensure that the plant materials are delivered in a moist and cool condition. The vehicle should be ventilated to prevent overheating.

Plant materials shall be stored in a shaded area. Watering shall occur to maintain plant vigor during on-site storage.

An on-site inspection will be made prior to the installation of plant material. Any plant material not meeting specification (that being of good health) must be moved off the site.

Delete Article 254.06 Layout of Planting and substitute the following:

When plants are specified to be planted in prepared soil planting beds, the planting bed shall be approved by the Engineer prior to planting. The Contractor shall be responsible for all plant layout. The layout must be performed by qualified personnel. The planting locations must be laid out as shown in the landscape plan. Plant plugs according to planting plan in overlapping zones to provide a natural gradient. Bed limits shall be painted or flagged. Individual plants layout shall be marked prior to installation. The Engineer will contact the Roadside Development Unit at (847) 705-4171 to approve the layout prior to installation. Allow a minimum of three (3) days prior to installation for approval.

Delete Article 254.07 (b) Planting Procedures and substitute the following:

When planting plugs in areas as shown on the plans or as directed by the Engineer, the following work shall be performed prior to planting:

- Permanent Seeding and Erosion Control Blanket must be installed prior to planting plugs to avoid damage to plantings.
- Trees and shrubs must be installed first to establish proper layout and to avoid damage to other plantings.
- Snags must be placed first to establish proper layout and to avoid damage to other plantings.

Install plugs through erosion control blanket with planting bar. Planting holes shall be as deep or slightly deeper than the plug roots to allow placing the plant without bending roots. Plant shall be placed flush with the earth surface. Hole shall be filled with soil carefully to avoid damage to roots and to leave no voids and pressed firm to earth surface to ensure soil contact.

Each installed plug shall receive the manufacturer's recommended amount of super absorbent moisture containment medium (Terra-Sorb or equivalent) and shall contain 93% of the active ingredient, Potassium Polyacrylamide Acrylate Copolymer. The super absorbent moisture containment medium label shall be submitted to the Engineer for approval at least seventy-two (72) hours prior to application.

Contractor shall provide and maintain all equipment necessary for planting, including watering equipment, water, and hoses. Immediately after planting, thoroughly water plant beds. Do not wash soil onto crowns of plants. The soil surface should be damp and all plugs must receive a minimum of equal to at least 1" of rain per week for the first four weeks following planting.

Install Goose Grid Barrier(s) along the perimeters of wetland planting pods (groupings) to prevent geese from uprooting and damaging the native plug plantings. Goose Grid Barrier(s) shall be installed at the time of planting to protect plugs from predation. The Contractor will not be relieved in any way from the responsibility of protecting plugs from geese predation due to lack of proper maintenance of Goose Grid Barriers.

1. Posts – 1" x 4" x 48" square Oak stakes or metal posts place 7-10' on center
2. Poultry fence, 24" with 3/4" x 1" grid, along the perimeter with cable ties.
3. Install bailing twine, from post top to post top (to form an "X"), to prevent the geese from entering the enclosure from the air.
4. Repair as necessary to remain effective for 12 months.
5. Remove and dispose when directed by the Engineer.

Delete the first sentence of Article 254.08 Mulching and substitute the following:

The plugs are not required to be mulched.

Delete Article 254.09 (b) Period of Establishment and substitute the following:

Plugs must undergo a 30-day period of establishment. Additional watering shall be performed not less than three times a week for four weeks following installation. Water shall be applied at the rate of at least 2 gallons per square foot. Should excess moisture prevail, the Engineer may delete any or all of the additional watering cycles. In severe weather, the Engineer may require additional watering.

A spray nozzle that does not damage small plants must be used when watering native plant plugs. Water shall be applied at the base of the plant to keep as much water as possible off plant leaves. The plants to be watered and the method of application will be approved by the Engineer. The Contractor will not be relieved in any way from the responsibility for unsatisfactory plants due to the amount of watering.

Add the following to Article 254.10 Method of Measurement:

- a) Disposal of debris (rock, stones, concrete, bottles, plastic bags, Goose Grid Barrier, etc.) removed from the plug plantings as specified in Article 202.03.
- b) Super absorbent moisture containment medium (Terra-Sorb or equivalent) will not be measured for payment.
- c) Goose Grid Barrier will not be measured for payment.

Delete Article 253.17 Basis of Payment and substitute the following:

- a) Payment for super absorbent moisture containment medium (Terra-Sorb or equivalent) shall be included in the in the contract unit price of the Perennial Plants, Sedge Meadow Plug pay item.
- b) Payment for Goose Grid Barrier shall be included in the contract unit price of the Perennial Plants, Sedge Meadow Plug pay item.
- c) The unit price shall include the cost of all materials, soil amendments, equipment, labor, plant care, removal, disposal and incidentals required to complete the work as specified herein and to the satisfaction of the Engineer.

MAINTENANCE MOWING (FOR PRAIRIE AND TURF)

Description: This work shall consist of mowing of: 1) prairie grass areas as close to the ground as possible and 2) turf grass areas to a height not more than 75 mm (3 inches). Prairie grass areas shall include only those areas seeded with Seeding Classes 4, 4A, 4B, and 5. Turf grass shall include only those areas sodded and seeded with Seeding Class 2A.

Schedule: Prairie grass mowing shall take place once between March 15 and April 15 and turf grass mowing shall be performed two (2) times per month from May to September.

Equipment: The Contractor shall keep all mowing equipment sharp and properly equipped for operation along an urban arterial route. The equipment used shall be capable of completely severing all growth at the cutting height and distributing it evenly over the mowed area. Special equipment may be required for prairie grass cutting, on steep slopes, in narrow areas, and for trimming around posts, poles, fences, trees, shrubs, seedlings, etc.

Method: All mowing and trimming operations are to proceed in the direction of traffic flow. The cut material shall not be windrowed or left in a lumpy or bunched condition. Additional mowing or trimming may be required to obtain the height specified or to disperse mowed material. Prairie grass shall have trimmings removed or very finely mulched to avoid thatch build-up and to expose the soil surface and encourage soil warming in the absence of prescribed burning.

Debris encountered during the mowing operations which hampers the operation or is visible from the roadway shall be removed and disposed of according to Article 202.03. All trimmings, windrowed material, and debris removal must be complete to the satisfaction of the Engineer. Damage to the turf, such as ruts or wheel tracks more than 2 inches (50 MM) in depth, or other plantings or highway appurtenances caused by the mowing or trimming operation shall be repaired at the Contractor's expense.

Method of Measurement: Mowing and trimming will be measured in acres (hectares) of surface area mowed at the completion of each mowing cycle.

Plan quantities are estimates only. Actual quantities will be measured in place. Agreement to plan quantities will not be allowed. Shrub beds or perennial beds within the mowed area that are less than 1000 square feet (90 square meters) will not be subtracted from the area mowed.

Basis of Payment: This work will be paid for at the contract unit price per acre (hectare) for MAINTENANCE MOWING. Any additional mowing or trimming required to obtain the height specified or to disperse mowed material will be considered as included in the cost of the initial mowing. Payment for mowing and trimming shall include the cost of all material, equipment, labor, removal, disposal and incidentals required to complete the work as specified herein and to the satisfaction of the Engineer.

LIGHT POLES (BDE)Effective: July 1, 2016

Revise the second paragraph of Article 1069.01 of the Standard Specifications to read:

“The detailed design and fabrication of the pole shaft, arms, tenons, and attachments shall be according to AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” current at the time the project is advertised. Light poles shall be designed for ADT > 10,000 and Risk Category Typical. If Fatigue design is required, light poles shall be designed for Importance Category I.”

Revise the fifth paragraph of Article 1069.01(a) of the Standard Specifications to read:

“Deflection of the pole top as caused by the combined effect of deadload referenced above and wind speed prescribed by AASHTO shall be as required by AASHTO. Pole deflection and loading compliance, certified by the manufacturer, shall be noted on the pole submittal.”

GENERAL ELECTRICAL REQUIREMENTS (D-1)

Effective: April 1, 2016

This special provision replaces Articles 801.01 – 801.07, 801.09 – 801-16 of the Standard Specifications.

Definition. Codes, standards, and industry specifications cited for electrical work shall be by definition the latest adopted version thereof, unless indicated otherwise.

Materials by definition shall include electrical equipment, fittings, devices, motors, appliances, fixtures, apparatus, all hardware and appurtenances, and the like, used as part of, or in connection with, electrical installation.

Standards of Installation. Materials shall be installed according to the manufacturer's recommendations, the NEC, OSHA, the NESC, and AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

All like materials shall be from the same manufacturer. Listed and labeled materials shall be used whenever possible. The listing shall be according to UL or an approved equivalent.

Safety and Protection. Safety and protection requirements shall be as follows.

Safety. Electrical systems shall not be left in an exposed or otherwise hazardous condition. All electrical boxes, cabinets, pole handholes, etc. which contain wiring, either energized or non-energized, shall be closed or shall have covers in place and be locked when possible, during nonworking hours.

Protection. Electrical raceway or duct openings shall be capped or otherwise sealed from the entrance of water and dirt. Wiring shall be protected from mechanical injury.

Equipment Grounding Conductor. All electrical systems, materials, and appurtenances shall be grounded. Good ground continuity throughout the electrical system shall be assured, even though every detail of the requirements is not specified or shown. Electrical circuits shall have a continuous insulated equipment grounding conductor. When metallic conduit is used, it shall be bonded to the equipment grounding conductor, but shall not be used as the equipment grounding conductor.

Detector loop lead-in circuits, circuits under 50 volts, and runs of fiber optic cable will not require an equipment grounding conductor.

Where connections are made to painted surfaces, the paint shall be scraped to fully expose metal at the connection point. After the connection is completed, the paint system shall be repaired to the satisfaction of the Engineer.

Bonding of all boxes and other metallic enclosures throughout the wiring system to the equipment grounding conductor shall be made using a splice and pigtail connection. Mechanical connectors shall have a serrated washer at the contact surface.

All connections to structural steel or fencing shall be made with exothermic welds. Care shall be taken not to weaken load carrying members. Where connections are made to epoxy coated reinforcing steel, the epoxy coating shall be sufficiently removed to facilitate a mechanical connection. The epoxy coating shall be repaired to the satisfaction of the Engineer. Where connections are made to insulated conductors, the connection shall be wrapped with at least four layers of electrical tape extended 6 in. (150 mm) onto the conductor insulation.

Submittals. At the preconstruction meeting, the Contractor shall submit a written listing of manufacturers for all major electrical and mechanical items. The list of manufacturers shall be binding, except by written request from the Contractor and approval by the Engineer. The request shall include acceptable reasons and documentation for the change.

Major items shall include, but not limited to the following:

Type of Work (discipline)	Item
All Electrical Work	Electric Service Metering Emergency Standby System Transformers Cable Unit Duct Splices Conduit Surge Suppression System
Lighting	Tower Pole Luminaire Foundation Breakaway Device Controllers Control Cabinet and Peripherals
ITS	Controller Cabinet and Peripherals CCTV Cameras Camera Structures Ethernet Switches Detectors Detector Loop Fiber Optic Cable

Within 30 calendar days after contract execution, the Contractor shall submit, for approval, one copy each of the manufacturer's product data (for standard products and components) and detailed shop drawings (for fabricated items). Submittals for the materials for each individual pay item shall be complete in every respect. Submittals which include multiple pay items shall have all submittal material for each item or group of items covered by a particular specification, grouped together and the applicable pay item identified. Various submittals shall, when taken together, form a complete coordinated package. A partial submittal will be returned without review unless prior written permission is obtained from the Engineer.

The submittal shall be properly identified by route, section, county, and contract number.

The Contractor shall have reviewed the submittal material and affixed his/her stamp of approval, with date and signature, for each individual item. In case of subcontractor submittal, both the subcontractor and the Contractor shall review, sign, and stamp their approval on the submittal.

Illegible print, incompleteness, inaccuracy, or lack of coordination will be grounds for rejection.

Items from multiple disciplines shall not be combined on a single submittal and transmittal. Items for lighting, signals, surveillance and CCTV must be in separate submittals since they may be reviewed by various personnel in various locations.

The Engineer will review the submittals for conformance with the design concept of the project according to Article 105.04 and the following. The Engineer will stamp the drawings indicating their status as "Approved", "Approved as Noted", "Disapproved", or "Information Only". Since the Engineer's review is for conformance with the design concept only, it shall be the Contractor's responsibility to coordinate the various items into a working system as specified. The Contractor shall not be relieved from responsibility for errors or omissions in the shop, working, or layout drawings by the Engineer's approval thereof. The Contractor shall still be in full compliance with contract and specification requirements.

All submitted items reviewed and marked "Disapproved" or "Approved as Noted" shall be resubmitted by the Contractor in their entirety, unless otherwise indicated within the submittal comments.

Work shall not begin until the Engineer has approved the submittal. Material installed prior to approval by the Engineer, will be subject to removal and replacement at no additional cost to the Department.

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.

Certifications. When certifications are specified and are available prior to material manufacture, the certification shall be included in the submittal information. When specified and only available after manufacture, the submittal shall include a statement of intent to furnish certification. All certificates shall be complete with all appropriate test dates and data.

Authorized Project Delay. See Article 801.08

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 and/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 304.8 mm (one (1) foot) 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, fully operating condition."

Marking Proposed Locations for Highway Lighting System. The Contractor shall mark or stake the proposed locations of all poles, cabinets, junction boxes, pull boxes, handholes, cable routes, pavement crossings, and other items pertinent to the work. A proposed location inspection by the Engineer shall be requested prior to any excavation, construction, or installation work after all proposed installation locations are marked. Any work installed without location approval is subject to corrective action at no additional cost to the Department.

Inspection of electrical work. Inspection of electrical work shall be according to Article 105.12 and the following.

Before any splice, tap, or electrical connection is covered in handholes, junction boxes, light poles, or other enclosures, the Contractor shall notify and make available such wiring for the Engineer's inspection.

Maintenance and Responsibility During Construction.

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 appurtenances affected by the work as specified elsewhere herein. Maintenance of lighting systems is specified elsewhere and will be paid for separately

The proposed lighting system must be operational prior to opening the roadway to traffic unless temporary lighting exists which is designed and installed to properly illuminate the roadway.

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.

Damage to Electrical Systems. Should damage occur to any existing electrical systems through the Contractor's operations, the Engineer will designate the repairs as emergency or non-emergency in nature.

Emergency repairs shall be made by the Contractor, or as determined by the Engineer, the Department, or its agent. Non-emergency repairs shall be performed by the Contractor within six working days following discovery or notification. All repairs shall be performed in an expeditious manner to assure all electrical systems are operational as soon as possible. The repairs shall be performed at no additional cost to the Department.

Lighting. An outage will be considered an emergency when three or more lights on a circuit or three successive lights are not operational. Knocked down materials, which result in a danger to the motoring public, will be considered an emergency repair.

Temporary aerial multi-conductor cable, with grounded messenger cable, will be permitted if it does not interfere with traffic or other operations, and if the Engineer determines it does not require unacceptable modification to existing installations.

Testing. Before final inspection, the electrical work shall be tested. Tests may be made progressively as parts of the work are completed, or may be made when the work is complete. Tests shall be made in the presence of the Engineer. Items which fail to test satisfactorily shall be repaired or replaced. Tests shall include checks of control operation, system voltages, cable insulation, and ground resistance and continuity.

The forms for recording test readings will be available from the Engineer in electronic format. The Contractor shall provide the Engineer with a written report of all test data including the following:

- Voltage Tests
- Amperage Tests
- Insulation Resistance Tests
- Continuity tests
- Detector Loop Tests

Lighting systems. The following tests shall be made.

- (1) Voltage Measurements. Voltages in the cabinet from phase to phase and phase to neutral, at no load and at full load, shall be measured and recorded. Voltage readings at the last termination of each circuit shall be measured and recorded.
- (2) Insulation Resistance. Insulation resistance to ground of each circuit at the cabinet, with all loads connected, shall be measured and recorded.

On tests of new cable runs, the readings shall exceed 50 megohms for phase and neutral conductors with a connected load over 20 A, and shall exceed 100 megohms for conductors with a connected load of 20 A or less.

On tests of cable runs which include cables which were existing in service prior to this contract, the resistance readings shall be the same or better than the readings recorded at the maintenance transfer at the beginning of the contract. Measurements shall be taken with a megohm meter approved by the Engineer.

- (3) Loads. The current of each circuit, phase main, and neutral shall be measured and recorded. The Engineer may direct reasonable circuit rearrangement. The current readings shall be within ten percent of the connected load based on material ratings.

- (4) Ground Continuity. Resistance of the system ground as taken from the farthest extension of each circuit run from the controller (i.e. check of equipment ground continuity for each circuit) shall be measured and recorded. Readings shall not exceed 2.0 ohms, regardless of the length of the circuit.
- (5) Resistance of Grounding Electrodes. Resistance to ground of all grounding electrodes shall be measured and recorded. Measurements shall be made with a ground tester during dry soil conditions as approved by the Engineer. Resistance to ground shall not exceed 10 ohms.

ITS. The following test shall be made in addition to the lighting system test above.

Detector Loops. Before and after permanently securing the loop in the pavement, the resistance, inductance, resistance to ground, and quality factor for each loop and lead-in circuit shall be tested. The loop and lead-in circuit shall have an inductance between 20 and 2500 microhenries. The resistance to ground shall be a minimum of 50 megohms under any conditions of weather or moisture. The quality factor (Q) shall be 5 or greater.

Fiber Optic Systems. Fiber optic testing shall be performed as required in the fiber optic cable special provision and the fiber optic splice special provision.

All test results shall be furnished to the Engineer seven working days before the date the inspection is scheduled.

Contract Guarantee. The Contractor shall provide a written guarantee for all electrical work provided under the contract for a period of six months after the date of acceptance with the following warranties and guarantees.

- (a) The manufacturer's standard written warranty for each piece of electrical material or apparatus furnished under the contract. The warranty for light emitting diode (LED) modules, including the maintained minimum luminance, shall cover a minimum of 60 months from the date of delivery.
- (b) The Contractor's written guarantee that, for a period of six months after the date of final acceptance of the work, all necessary repairs to or replacement of said warranted material or apparatus for reasons not proven to have been caused by negligence on the part of the user or acts of a third party shall be made by the Contractor at no additional cost to the Department.
- (c) The Contractor's written guarantee for satisfactory operation of all electrical systems furnished and constructed under the contract for a period of six months after final acceptance of the work.

The warranty for an uninterruptable power supply (UPS) shall cover a minimum of two years from date the equipment is placed in operation; however, the batteries of the Uninterruptable Power Supply (UPS) shall be warranted for full replacement for a minimum of five years.

Record Drawings. Alterations and additions to the electrical installation made during the execution of the work shall be neatly and plainly marked in red by the Contractor on the full-size set of record drawings kept at the Engineer's field office for the project. These drawings shall be updated on a daily basis and shall be available for inspection by the Engineer during the course of the work. The record drawings shall include the following:

- Cover Sheet
- Summary of Quantities, electrical items only
- Legends, Schedules and Notes
- Plan Sheet
- Pertinent Details
- Single Line Diagram
- Other useful information useful to locate and maintain the systems.

Any modifications to the details shall be indicated. Final quantities used shall be indicated on the Summary of Quantities. Foundation depths used shall also be listed.

As part of the record drawings, the Contractor shall inventory all materials, new or existing, on the project and record information on inventory sheets provided by the Engineer.

The inventory shall include:

- Location of Equipment, including rack, chassis, slot as applicable.
- Designation of Equipment
- Equipment manufacturer
- Equipment model number
- Equipment Version Number
- Equipment Configuration
 - Addressing, IP or other
 - Settings, hardware or programmed
- Equipment Serial Number

The following electronic inventory forms are available from the Engineer:

- Lighting Controller Inventory
- Lighting Inventory
- Light Tower Inspection Checklist
- ITS Location Inventory

The information shall be entered in the forms; handwritten entries will not be acceptable; except for signatures. Electronic file shall also be included in the documentation.

When the work is complete, and seven days before the request for a final inspection, the 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 hardcopy's for review and approval.

In addition to the record drawings, PDF copies of the final catalog cuts which have been Approved and Approved as Noted with applicable follow-up shall be submitted 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 or model numbers of items which have been selected shall be clearly visible. Hard copies of the catalog are not required with this submittal.

The Contractor shall provide two sets of electronically produced drawings in a moisture proof pouch to be kept on the inside door of the controller cabinet or other location approved by the Engineer. These drawings shall show the final as-built circuit orientation(s) of the project in the form of a single line diagram with all luminaires numbered and clearly identified for each circuit.

Final documentation shall be submitted as a complete submittal package, i.e. record drawings, test results, inventory, etc. shall be submitted at the same time. Partial piecemeal submittals will be rejected without review. A total of five hardcopies and CDROMs of the final documentation shall be submitted.

GPS Documentation. In addition to the specified record drawings, the Contactor shall record GPS coordinates of the following electrical components being installed, modified or being affected in other ways by this contract:

- All light poles and light towers.
- Handholes and vaults.
- Conduit roadway crossings.
- Controllers.
- Control Buildings.
- Structures with electrical connections, i.e. DMS, lighted signs.
- Electric Service locations.
- CCTV Camera installations.
- Roadway Surveillance installations.
- Fiber Optic Splice Locations.
- All fiber optic slack locations shall be identified with quantity of slack cable included. When sequential cable markings are available, those markings shall be documented as cable marking into enclosure and marking out of enclosure.

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. District
2. Description of item
3. Designation
4. Use
5. Approximate station
6. Contract Number
7. Date
8. Owner
9. Latitude
10. Longitude
11. Comments

A spreadsheet template will be available from the Engineer for use by the Contractor.

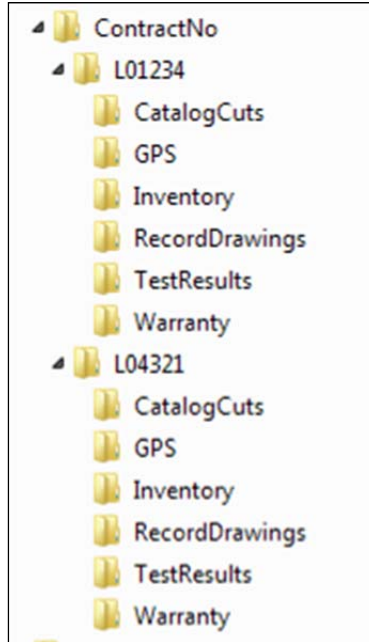
Prior to the collection of data, the contractor shall provide a sample data collection of at least six data points of known locations to be reviewed and verified by the Engineer to be accurate within 20 feet. Upon verification, data collection can begin. Data collection can be made as construction progresses, 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. **Data collection prior to the submittal and review of the sample data of existing data points will be unacceptable and rejected.**

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 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.”

The documents on the CD shall be organized by the Electrical Maintenance Contract Management System (EMCMS) location designation. If multiple EMCMS locations are within the contract, separate folders shall be utilized for each location as follows:



Extraneous information not pertaining to the specific EMCMS location shall not be included in that particular folder and sub-folder.

The inspection will not be made until after the delivery of acceptable record drawings, specified certifications, and the required guarantees.

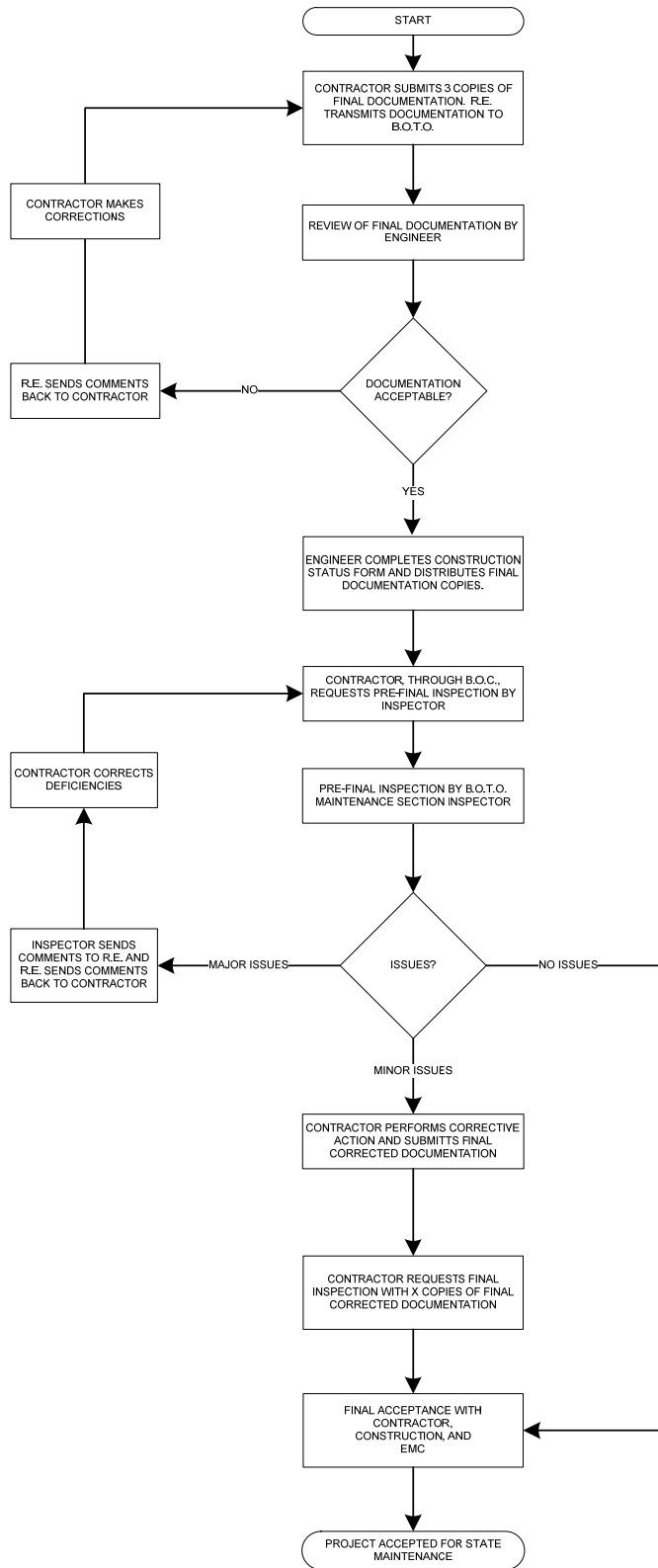
The Final Acceptance Documentation Checklist shall be completed and is contained elsewhere herein.

All CD's shall be labeled as illustrated in the CD Label Template contained herein.

Acceptance. Acceptance of electrical work will be given at the time when the Department assumes the responsibility to protect and maintain the work according to Article 107.30 or at the time of final inspection.

When the electrical work is complete, tested, and fully operational, the Contractor shall schedule an inspection for acceptance with the Engineer no less than seven working days prior to the desired inspection date. The Contractor shall furnish the necessary labor and equipment to make the inspection.

A written record of the test readings taken by the Contractor according to Article 801.13 shall be furnished to the Engineer seven working days before the date the inspection is scheduled. Inspection will not be made until after the delivery of acceptable record drawings, specified certifications, and the required guarantees.



Final Acceptance Documentation Checklist

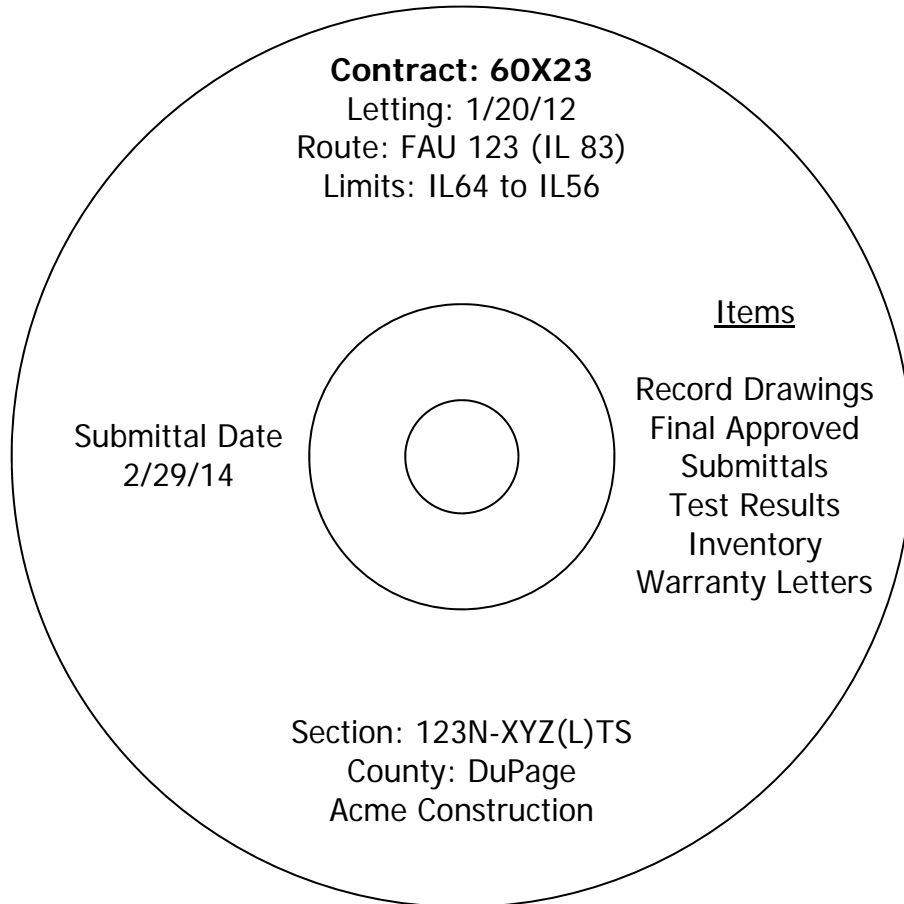
LOCATION	
Route	Common Name
Limits	Section
Contract #	County
Controller Designation(s)	EMC Database Location Number(s)

ITEM	Contractor (Verify)	Resident Engineer (Verify)
Record Drawings		
-Five hardcopies (11" x 17")	<input type="checkbox"/>	<input type="checkbox"/>
-Scanned to Five CD-ROMs	<input type="checkbox"/>	<input type="checkbox"/>
Field Inspection Tests		
-Voltage	<input type="checkbox"/>	<input type="checkbox"/>
-Amperage	<input type="checkbox"/>	<input type="checkbox"/>
-Cable Insulation Resistance	<input type="checkbox"/>	<input type="checkbox"/>
-Continuity	<input type="checkbox"/>	<input type="checkbox"/>
-Controller Ground Rod Resistance	<input type="checkbox"/>	<input type="checkbox"/>
GPS Coordinates		
-Excel file	<input type="checkbox"/>	<input type="checkbox"/>
Job Warranty Letter	<input type="checkbox"/>	<input type="checkbox"/>
Catalog Cut Submittals		
-Approved & Approved as Noted	<input type="checkbox"/>	<input type="checkbox"/>
Lighting Inventory Form	<input type="checkbox"/>	<input type="checkbox"/>
Lighting Controller Inventory Form	<input type="checkbox"/>	<input type="checkbox"/>
Light Tower Inspection Form (if applicable)	<input type="checkbox"/>	<input type="checkbox"/>

Four Hardcopies & scanned to four CD's shall be submitted for all items above. The CD ROM shall be labeled as shown in the example contained herein.

CD LABEL FORMAT TEMPLATE.

Label must be printed; hand written labels are unacceptable and will be rejected.



MAINTENANCE OF LIGHTING SYSTEMS (D-1)

Effective: January 1, 2012

Replace Article 801.11 and 801.12 of the Standard Specifications with the following:
COMED

Effective the date the Contractor's activities (electrical or otherwise) at the job site begin, the Contractor shall be responsible for the proper operation and maintenance of all existing and proposed lighting systems which are part of, or which may be affected by the work until final acceptance or as otherwise determined by the Engineer.

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

Existing lighting systems, when depicted on the plans, are intended only to indicate the general equipment installation of the systems involved and shall not be construed as an exact representation of the field conditions. It remains the Contractor's responsibility to visit the site to confirm and ascertain the exact condition of the electrical equipment and systems to be maintained.

Maintenance of Existing Lighting Systems

Existing lighting systems. Existing lighting systems shall be defined as any lighting system or part of a lighting system in service at the time of contract Letting. The contract drawings indicate the general extent of any existing lighting, but whether indicated or not, it remains the Contractor's responsibility to ascertain the extent of effort required for compliance with these specifications and failure to do so will not be justification for extra payment or reduced responsibilities.

Extent of Maintenance.

Partial Maintenance. Unless otherwise indicated, if the number of circuits affected by the contract is equal to or less than 40% of the total number of circuits in a given controller and the controller is not part of the contract work, the Contractor needs only to maintain the affected circuits. The affected circuits shall be isolated by means of in-line waterproof fuse holders as specified elsewhere and as approved by the Engineer.

Full Maintenance. If the number of circuits affected by the contract is greater than 40% of the total number of circuits in a given controller, or if the controller is modified in any way under the contract work, the Contractor shall maintain the entire controller and all associated circuits.

Maintenance of Proposed Lighting Systems

Proposed Lighting Systems. Proposed lighting systems shall be defined as any lighting system or part of a lighting system, temporary or permanent, which is to be constructed under this contract.

The Contractor shall be fully responsible for maintenance of all items installed under this contract. Maintenance shall include, but not be limited to, any equipment failures or malfunctions as well as equipment damage either by the motoring public, Contractor operations, vandalism, or other means. The potential cost of replacing or repairing any malfunctioning, damaged, or vandalized equipment shall be included in the bid price of this item and will not be paid for separately.

Lighting System Maintenance Operations

The Contractor's responsibility shall include all applicable responsibilities of the Electrical Maintenance Contract, State of Illinois, Department of Transportation, Division of Highways, District One. These responsibilities shall include the maintenance of lighting units (including sign lighting), cable runs and lighting controls. In the case of a pole knockdown or sign light damage, the Contractor shall promptly clear the lighting unit and circuit discontinuity and restore the system to service. The equipment shall then be re-set by the contractor within the time limits specified herein.

If the equipment damaged by normal vehicular traffic, not contractor operations, is beyond repair and cannot be re-set, the contractor shall replace the equipment in kind with payment made for such equipment under Article 109.04. If the equipment damaged by any construction operations, not normal vehicular traffic, is beyond repair and cannot be re-set, the contractor shall replace the equipment in kind and the cost of the equipment shall be included in the cost of this pay item and shall not be paid for separately.

Responsibilities shall also include weekly night-time patrol of the lighting system, with patrol reports filed immediately with the Engineer and with deficiencies corrected within 24 hours of the patrol. Patrol reports shall be presented on standard forms as designated by the Engineer. Uncorrected deficiencies may be designated by the Engineer as necessitating emergency repairs as described elsewhere herein.

The following chart lists the maximum response, service restoration, and permanent repair time the Contractor will be allowed to perform corrective action on specific lighting system equipment.

INCIDENT OR PROBLEM	SERVICE RESPONSE TIME	SERVICE RESTORATION TIME	PERMANENT REPAIR TIME
Control cabinet out	1 hour	4 hours	7 Calendar days
Hanging mast arm	1 hour to clear	na	7 Calendar days
Radio problem	1 hour	4 hours	7 Calendar days
Motorist caused damage or leaning light pole 10 degrees or more	1 hour to clear	4 hours	7 Calendar days
Circuit out – Needs to reset breaker	1 hour	4 hours	na
Circuit out – Cable trouble	1 hour	24 hours	21 Calendar days
Outage of 3 or more successive lights	1 hour	4 hours	na
Outage of 75% of lights on one tower	1 hour	4 hours	na
Outage of light nearest RR crossing approach, Islands and gores	1 hour	4 hours	na
Outage (single or multiple) found on night outage survey or reported to EMC	na	na	7 Calendar days
Navigation light outage	na	na	24 hours

- **Service Response Time** -- amount of time from the initial notification to the Contractor until a patrolman physically arrives at the location.
- **Service Restoration Time** – amount of time from the initial notification to the Contractor until the time the system is fully operational again (In cases of motorist caused damage the undamaged portions of the system are operational.)
- **Permanent Repair Time** – amount of time from initial notification to the Contractor until the time permanent repairs are made if the Contractor was required to make temporary repairs to meet the service restoration requirement.

Failure to provide this service will result in liquidated damages of \$500 per day per occurrence. In addition, the Department reserves the right to assign any work not completed within this timeframe to the Electrical Maintenance Contractor. All costs associated to repair this uncompleted work shall be the responsibility of the Contractor. Failure to pay these costs to the Electrical Maintenance Contractor within one month after the incident will result in additional liquidated damages of \$500 per month per occurrence. Unpaid bills will be deducted from any monies owed to the Contractor. Repeated failures and/or a gross failure of maintenance shall result in the State's Electrical Maintenance Contractor being directed to correct all deficiencies and the resulting costs deducted from any monies owed the contractor.

Damage caused by the Contractor's operations shall be repaired at no additional cost to the Contract.

Operation of Lighting

The lighting shall be operational every night, dusk to dawn. Duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously. Lighting systems shall not be kept in operation during long daytime periods.

Method of Measurement

The contractor shall demonstrate to the satisfaction of the Engineer that the lighting system is fully operational prior to submitting a pay request. Failure to do so will be grounds for denying the pay request. Months in which the lighting systems are not maintained and not operational will not be paid for. Payment shall not be made retroactively for months in which lighting systems were not operational.

Basis of Payment. Maintenance of lighting systems shall be paid for at the contract unit price per calendar month for MAINTENANCE OF LIGHTING SYSTEM, which shall include all work as described herein.

ELECTRIC UTILITY SERVICE CONNECTION (COMED)

Description.

This item shall consist of payment for work performed by ComEd in providing or modifying electric service as indicated. THIS MAY INVOLVE WORK AT MORE THAN ONE ELECTRIC SERVICE. For the Electrical Service Drop Locations see the plans.

CONSTRUCTION REQUIREMENTS

General.

It shall be the Contractor's responsibility to contact ComEd. The Contractor shall coordinate his work fully with the ComEd 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.

Method of Payment.

The Contractor will be reimbursed to the exact amount of money as billed by ComEd for its services. Work provided by the Contractor for electric service will be paid separately as described under ELECTRIC SERVICE INSTALLATION. 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 \$20,000

Basis of Payment.

This work will be paid for at the contract lump sum price for ELECTRIC UTILITY SERVICE CONNECTION which shall be reimbursement in full for electric utility service charges.

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)

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 2nd location. The 2nd 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.

EXPOSED RACEWAYS (D-1)

Effective: January 1, 2012

Revise the first paragraph of Article 811.03(a) of the Standard Specifications to read:

“General. Rigid metal conduit installation shall be according to Article 810.05(a). Conduits terminating in junction and pull boxes shall be terminated with insulated and gasketed watertight threaded NEMA 4X conduit hubs. The hubs shall be Listed under UL 514B. The insulated throat shall be rated up to 105° C. When PVC coated conduit is utilized, the aforementioned hubs shall also be PVC coated.”

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

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

“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.”

Add the following to Article 1088.01(a) of the Standard Specifications:

All iron and steel products, which are to be incorporated into the work, including conduit and all conduit fittings, shall be domestically manufactured or produced and fabricated as specified in Article 106.”

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

“a. 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.

- b. 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 0° F. to Federal Specifications PL-406b, Method 2051, Amendment 1 of 25 September 1952 (ASTM D 746)
Elongation:	200%

- c. 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.
- d. The nominal thickness of the PVC coating shall be 1 mm (40 mils). 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 -1°C (30°F).
- e. 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 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.
- f. Conduit bodies shall have a tongue-in-groove gasket for maximum sealing capability. The design shall incorporate a positive placement feature to assure proper installation. Certified test results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours shall be submitted for review when requested by the Engineer.
- g. The PVC conduit shall pass the following tests:

Exterior PVC Bond test RN1:

Two parallel cuts 13 mm (1/2 inch) apart and 40 mm (1 1/2 inches) 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 13 mm (1/2 inch) 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. Certified test results from a national recognized independent testing laboratory shall be submitted for review and approval. 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" 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" 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°F (66°C) 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°F (66°C) and 95% relative humidity. When the coating disbonds, the time to failure in hours shall be recorded.

Add the following to Article 1088.01(a)(4) of the Standard Specifications:

“All liquid tight flexible metal conduit fittings shall have an insulated throat to prevent abrasion of the conductors and shall have a captive sealing O-ring gasket. The fittings shall be Listed under UL 514B. The insulated throat shall be rated up to 105° C.”

Revise the second paragraph of Article 811.04 of the Standard Specifications to read:

“Expansion fittings and LFNC will not be measured for payment.”

Revise Article 811.05 of the Standard Specifications to read:

“**811.05 Basis of Payment.** This work will be paid for at the contract unit price per meter (foot) for **CONDUIT ATTACHED TO STRUCTURE**, of the diameter specified, **RIGID GALVANIZED STEEL, PVC COATED.**”

UNDERGROUND RACEWAYS (D-1)

Effective: March 1, 2015

Revise Article 810.04 of the Standard Specifications to read:

“Installation. All underground conduits shall have a minimum depth of 30-inches (700 mm) below the finished grade.”

Add the following to Article 810.04 of the Standard Specifications:

“All metal conduit installed underground shall be Rigid Steel Conduit unless otherwise indicated on the plans.”

Add the following to Article 810.04 of the Standard Specifications:

“All raceways which extend outside of a structure or duct bank but are not terminated in a cabinet, junction box, pull box, handhole, post, pole, or pedestal shall extend a minimum of 300 mm (12”) or the length shown on the plans beyond the structure or duct bank. The end of this extension shall be capped and sealed with a cap designed for the conduit to be capped.

The ends of rigid metal conduit to be capped shall be threaded, the threads protected with full galvanizing, and capped with a threaded galvanized steel cap.

The ends of rigid nonmetallic conduit and coilable nonmetallic conduit shall be capped with a rigid PVC cap of not less than 3 mm (0.125”) thick. The cap shall be sealed to the conduit using a room-temperature-vulcanizing (RTV) sealant compatible with the material of both the cap and the conduit. A washer or similar metal ring shall be glued to the inside center of the cap with epoxy, and the pull cord shall be tied to this ring.”

UNIT DUCT (D-1)

Effective: January 1, 2012

Revise the first paragraph of Article 810.04 to read:

“The unit duct shall be installed at a minimum depth of 30-inches (760 mm) unless otherwise directed by the Engineer.”

Revise Article 1088.01(c) to read:

“(c) Coilable Nonmetallic Conduit.

General:

The duct shall be a plastic duct which is intended for underground use and which can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance. The duct shall be a plastic duct which is intended for underground use and can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance.

The duct shall be made of high density polyethylene which shall meet the requirements of ASTM D 2447, for schedule 40. The duct shall be composed of black high density polyethylene meeting the requirements of ASTM D 3350, Class C, Grade P33. The wall thickness shall be in accordance with Table 2 for ASTM D 2447.

The duct shall be UL Listed per 651-B for continuous length HDPE coiled conduit. The duct shall also comply with NEC Article 354.100 and 354.120.

Submittal information shall demonstrate compliance with the details of these requirements.

Dimensions:

Duct dimensions shall conform to the standards listed in ASTM D2447. Submittal information shall demonstrate compliance with these requirements.

Nominal Size		Nominal I.D.		Nominal O.D.		Minimum Wall	
mm	in	mm	in	mm	in	mm	in
31.75	1.25	35.05	1.380	42.16	1.660	3.556 +0.51	0.140 +0.020
38.1	1.50	40.89	1.610	48.26	1.900	3.683 +0.51	0.145 +0.020

Nominal Size		Pulled Tensile	
mm	in	N	lbs
31.75	1.25	3322	747
38.1	1.50	3972	893

Marking:

As specified in NEMA Standard Publication No. TC-7, the duct shall be clearly and durably marked at least every 3.05 meters (10 feet) with the material designation (HDPE for high density polyethylene), nominal size of the duct and the name and/or trademark of the manufacturer.

Performance Tests:

Polyethylene Duct testing procedures and test results shall meet the requirements of UL 651. Certified copies of the test report shall be submitted to the Engineer prior to the installation of the duct. Duct crush test results shall meet or exceed the following requirements:

Duct Diameter		Min. force required to deform sample 50%	
mm	in	N	lbs
35	1.25	4937	1110
41	1.5	4559	1025

WIRE AND CABLE (D-1)

Effective: January 1, 2012

Add the following to the first paragraph of Article 1066.02(a):

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

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
		mm	mils		
6	7	1.1	(45)	6	6/1
4	7	1.1	(45)	4	6/1
2	7	1.1	(45)	2	6/1
1/0	19	1.5	(60)	1/0	6/1
2/0	19	1.5	(60)	2/0	6/1
3/0	19	1.5	(60)	3/0	6/1
4/0	19	1.5	(60)	4/0	6/1

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

“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.”

Revise Article 1066.04 to read:

“Aerial Cable Assembly. The aerial cable shall be an assembly of insulated aluminum conductors according to Section 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.”

TEMPORARY LUMINAIRE (D-1)

Effective: January 1, 2012

Add the following to first paragraph of Article 1067(c) of the Standard Specifications:

“The reflector shall not be altered by paint or other opaque coatings which would cover or coat the reflecting surface. Control of the light distribution by any method other than the reflecting material and the aforementioned clear protective coating that will alter the reflective properties of the reflecting surface is unacceptable”

Add the following to Article 1067(f) of the Standard Specifications:

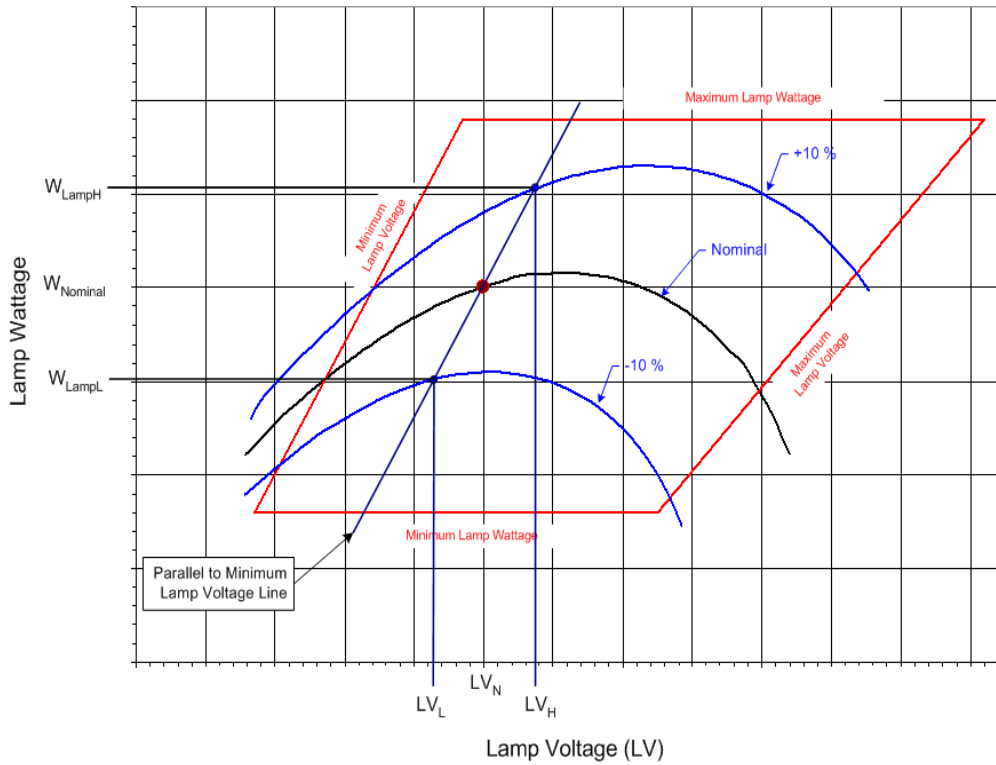
“The ballast shall be a High Pressure Sodium, high power factor, constant wattage auto-regulator, lead type (CWA) for operation on a nominal 240 volt system.”

Revise Article 1067(f)(1) of the Standard Specifications to read:

“The high pressure sodium, auto-regulator, lead type (CWA) ballast shall be designed to ANSI Standards and shall be designed and rated for operation on a nominal 240 volt system. The ballast shall provide positive lamp ignition at the input voltage of 216 volts. It shall operate the lamp over a range of input voltages from 216 to 264 volts without damage to the ballast. It shall provide lamp operation within lamp specifications for rated lamp life at input design voltage range. Operating characteristics shall produce output regulation not exceeding the following values:

Nominal Ballast Wattage	Maximum Ballast Regulation
1000	25%
750	25%
400	26%
310	26%
250	26%
150	24%
70	18%

For this measure, regulation shall be defined as the ratio of the lamp watt difference between the upper and lower operating curves to the nominal lamp watts; with the lamp watt difference taken within the ANSI trapezoid at the nominal lamp operating voltage point parallel to the minimum lamp volt line:



$$\text{Ballast Regulation} = \frac{W_{LampH} - W_{LampL}}{W_{LampN}} \times 100$$

where:

W_{LampH} = lamp watts at +10% line voltage when Lamp voltage = LV_H

W_{LampL} = lamp watts at - 10% line voltage when lamp voltage = LV_L

W_{LampN} = lamp watts at nominal lamp operating voltage = LV_N

Wattage	Nominal Lamp Voltage, LV _N	LV _L	LV _H
1000	120v	115v	125v
750	120v	115v	125v
400	100v	95v	105v
310	100v	95v	105v
250	100v	95v	105v
150	55v	50v	60v
70	52v	47v	57v

Ballast losses, based on cold bench tests, shall not exceed the following values:

Nominal Ballast Wattage	Maximum Ballast Losses
750	15%
750	15%
400	20%
310	21%
250	24%
150	26%
70	34%

Ballast losses shall be calculated based on input watts and lamp watts at nominal system voltage as indicated in the following equation:

$$\text{Ballast Losses} = \frac{W_{Line} - W_{Lamp}}{W_{Lamp}} \times 100$$

where:

W_{line} = line watts at nominal system voltage

W_{lamp} = lamp watts at nominal system voltage

Ballast output to lamp. At nominal system voltage and nominal lamp voltage, the ballast shall deliver lamp wattage with the variation specified in the following table.

Nominal Ballast Wattage	Output to lamp variation
750	± 7.5%
750	± 7.5%
400	± 7.5%
310	± 7.5%
250	± 7.5%
150	± 7.5%
70	± 7.5%

Example: For a 400w luminaire, the ballast shall deliver 400 watts ±7.5% at a lamp voltage of 100v for the nominal system voltage of 240v which is the range of 370w to 430w.

Ballast output over lamp life. Over the life of the lamp the ballast shall produce average output wattage of the nominal lamp rating as specified in the following table. Lamp wattage readings shall be taken at 5-volt increments throughout the ballast trapezoid. Reading shall begin at the lamp voltage (L_v) specified in the table and continue at 5 volt increments until the right side of the trapezoid is reached. The lamp wattage values shall then be averaged and shall be within the specified value of the nominal ballast rating. Submittal documents shall include a tabulation of the lamp wattage vs. lamp voltage readings.

Nominal Ballast Wattage	LV Readings begin at	Maximum Wattage Variation
750	110v	$\pm 7.5\%$
750	110v	$\pm 7.5\%$
400	90v	$\pm 7.5\%$
310	90v	$\pm 7.5\%$
250	90v	$\pm 7.5\%$
150	50v	$\pm 7.5\%$
70	45v	$\pm 7.5\%$

Example: *For a 400w luminaire, the averaged lamp wattage reading shall not exceed the range of $\pm 7.5\%$ which is 370w to 430w*

Add the following to Article 821.08 of the Standard Specifications:

“This work will be paid for at the contract unit price per each for TEMPORARY LUMINAIRE, of the lamp type, mount type, and wattage specified.

Revise Article 1067.06(a)(1) of the Standard Specifications to read:

“The lamps shall be of the clear type and shall have a color of 1900° to 2200° Kelvin.”

Add the following table(s) to Article 1067 of the Standard Specifications:

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 I-90 EB Temporary Lighting – 3 Lanes (Typical)**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	36 ft
	Number of Lanes	3
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height *	80 ft
	Mast Arm Length *	15 ft
	Pole Set-Back From Edge of Pavement	45 ft
	<i>* Typical data, see plans for other configurations</i>	
LUMINAIRE DATA	Lamp Type	HPS
	Lamp Lumens	105,000
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	Type II
	Total Light Loss Factor	0.7
LAYOUT DATA	Spacing	250 ft
	Configuration	Single Sided
	Luminaire Overhang over edge of pavement	0 (ft)

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

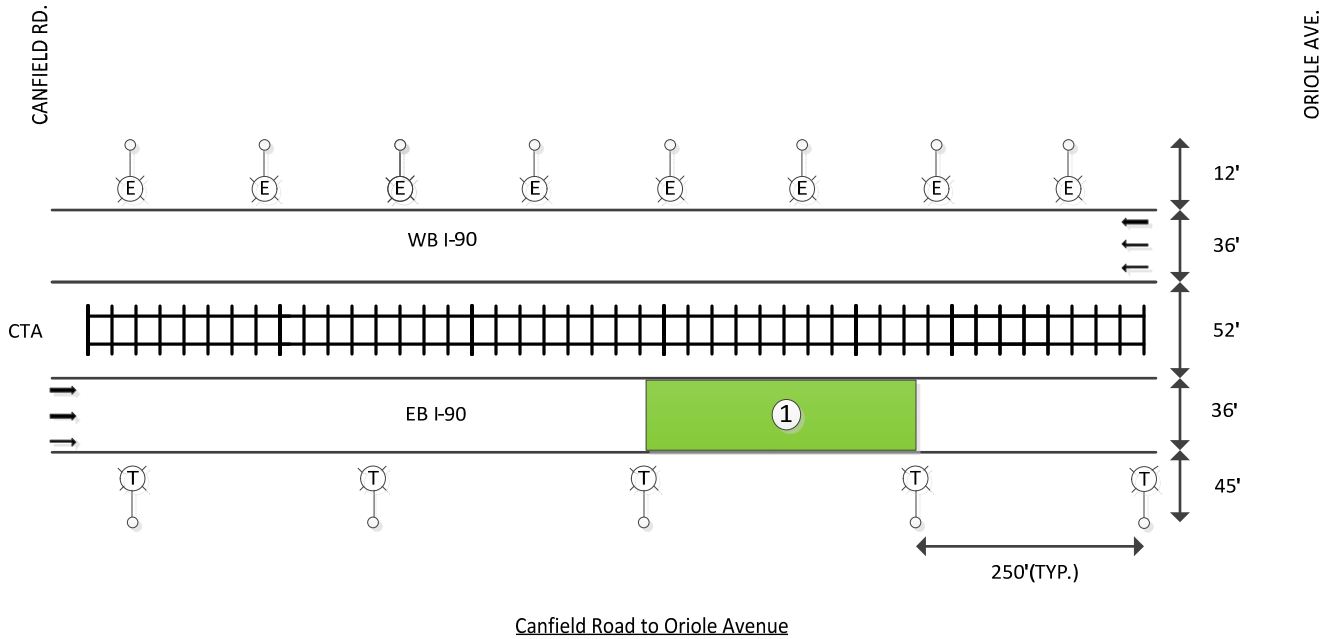
PERFORMANCE REQUIREMENTS		
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NOTE: These performance requirements shall be the acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

LUMINANCE	Average Luminance, L_{AVE}	0.8 Cd/m ² (Min)
	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3 (Max)



IDOT DISTRICT 1 LUMINAIRE PERFORMANCE DETAIL
I-90 EB Temporary Lighting – 3 Lanes (Typical Section)



-  PROPOSED TEMPORARY LIGHT POLE
 750W, MC-III HPS, FULL CUT OFF,
 105,000 LUMENS, 15 FT MA, 80 FT MH
-  EXISTING LIGHTING UNIT

 PHOTOMETRIC CALCULATION GRID & ID

LUMINAIRE SAFETY CABLE ASSEMBLY (D-1)

Effective: January 1, 2012

Description: This item shall consist of providing a luminaire safety cable assembly as specified herein and as indicated in the plans.

Materials. Materials shall be according to the following:

Wire Rope. Cables (wire rope) shall be manufactured from Type 304 or Type 316 stainless steel having a maximum carbon content of 0.08 % and shall be a stranded assembly. Cables shall be 3.18 mm (0.125") diameter, 7x19 Class strand core and shall have no strand joints or strand splices.

Cables shall be manufactured and listed for compliance with Federal Specification RR-W-410 and Mil-DTL-83420.

Cable terminals shall be stainless steel compatible with the cable and as recommended by the cable manufacturer. Terminations and clips shall be the same stainless steel grade as the wire rope they are connected to.

U-Bolts. U-Bolts and associated nuts, lock washers, and mounting plates shall be manufactured from Type 304 or Type 316 stainless steel.

CONSTRUCTION REQUIREMENTS

General. The safety cable assembly shall be installed as indicated in the plan details. One end of the cable assembly shall have a loop fabricated from a stainless steel compression sleeve. The other end of the cable assembly shall be connected with stainless steel wire rope clips as indicated. Slack shall be kept to a minimum to prevent the luminaire from creeping off the end of the mast arm. Unless otherwise indicated in the plans, the luminaire safety cable shall only be used in conjunction with luminaires which are directly above the traveled pavement.

Basis of Payment: This work shall be paid for at the contract price each for **LUMINAIRE SAFETY CABLE ASSEMBLY**, which shall be payment for the work as described herein and as indicated in the plans.

TEMPORARY WOOD POLE

Description. This special provision describes the installation of wooden poles in support of temporary lighting design and temporary cameras of the heights identified and at the locations identified in the plans.

Materials. Materials shall be according to Article 1069.04 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012.

Installation. Install shall be according to Article 830.0 of Standard Specifications for Road and Bridge construction, adopted January 1, 2012 and in accordance to IDOT District 1 standard detail BE-800.

Basis of Payment. This work will be paid for according to Article 830.05 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 with the exception that these poles shall be paid for without mast arms. Payment shall be at the contract unit price each for WOOD POLE, of the length and class specified installed at the location and depth indicated on plan and details.

TEMPORARY MAST ARM

Description. This special provision describes the installation of a 15 foot mast arm on wooden poles. Locations are identified on plan.

Materials. Materials shall be according to Article 1069.02.(a) of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012.

Installation. Install shall be according to Article 830-03 of Standard Specifications for Road and Bridge construction, adopted January 1, 2012. The mast arm shall be installed on wooden poles as per IDOT District 1 temporary light pole detail BE-800.

Basis of Payment. This work will be paid for according to Article 830.05 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012 at the contract unit price each for TEMPORARY MAST ARM, ALUMINUM, 15FT installed at the mounting height indicated on plan and details.

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 (CCTV camera system, dynamic message sign system, 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:

- (a) 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.
- (b) The equipment-grounding conductor shall be green color-coded. The following is in addition to Section 801.04 of the Standard Specifications.
 - (1) 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.
 - (2) 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.
 - (3) 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.
- (c) 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.

TRAFFIC SURVEILLANCE – GENERAL (D-1)

Effective: June 1, 1994

Revised: July 21, 2001

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 Bureau of Traffic Operations Electrical Engineer, The Bureau of Traffic Operations Electrical 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.
- 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 Bureau of Traffic Operations Electrical Engineer. No raceways shall be allowed to enter cabinet through the sides or back walls.

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 Bureau of Traffic Operations Electrical Engineer, Resident Engineer and Electrical Maintenance 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 Bureau of Traffic Operations Electrical 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 by the Electrical Maintenance Contractor 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 Bureau of Traffic Operations Electrical 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, Bureau of Traffic Operations Electrical Engineer 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 Bureau of Traffic Operations Electrical 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 Bureau of Traffic Operations Electrical 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 Bureau of Traffic Operations Electrical Design Section and four (4) full size sets of "as-built" plans to the Resident 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 Bureau of Traffic Operations Electrical Engineer. 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 Bureau of Traffic Operations Electrical Engineer.

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. Bureau of Traffic Operations Electrical Engineer will witness all testing.

INSTALLATION/INSPECTION PROCEDURES

After all control boxes and equipment to be installed has been physically inspected and approved by Bureau of Traffic Operations Electrical 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 Bureau of Traffic Operations Electrical Engineer 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 Bureau of Traffic Operations Electrical 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 Bureau of Traffic Operations Electrical 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 Bureau of Traffic Operations Electrical 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.

COMMUNICATIONS VAULT (D-1)

Effective: March 1, 2010

Description. Work under this item shall consist of constructing a composite concrete handhole and 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 ½ 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, which shall be payment in full for all material and work as specified herein.

HANDHOLE

Effective: June 1, 1994

Revised: May 19, 2009

Description. Work under 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.

REMOVE EXISTING HANDHOLE

Description. This work shall consist of removal and disposal of existing handholes or communications vaults.

Materials. None, backfill and restoration shall be incidental to other construction.

Removal. Removal shall be in accordance with Section 895.05(b) of the Standard Specifications. Removed items become property of Contractor and shall be removed from site within 48 hours.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING HANDHOLE.

REMOVE EXISTING CONCRETE FOUNDATION

Description. This work shall consist of the removal of a concrete foundation.

Materials. None, backfill and restoration shall be incidental to other construction.

Construction. Removal shall be in accordance with Section 895.05(c) of the Standard Specifications. Removed items become property of Contractor and shall be removed from site within 48 hours.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING CONCRETE FOUNDATION.

DIGITAL LOOP DETECTOR SENSOR UNIT (4 CHANNEL)

Description. This work shall consist of furnishing and installing digital four or two channel loop detector sensor units complete with associated enclosures, cable harness, quick disconnect plugs, and operation manuals in strict accordance with these specifications.

Functional Requirements.

- The sensor unit shall operate on a regulated 117 VAC. The sensor unit shall be of solid state design throughout. Each sensor unit shall include four or two complete loop detector channels in the space that is normally occupied by an INDUCTION LOOP DETECTOR SENSOR UNIT.
- The loop connected to each of the four channels or two shall be sequentially scanned at a rate of not less than 148 times per second. Only one loop shall operate at a time in the system to eliminate cross-talk.
- The digital loop sensor unit shall be automatically and instantaneously self-tuning requiring no burn-in or warm-up time. Then it shall also track environmental changes.
- The digital loop sensor unit shall be self-tracking and fully automatic in its recovery from power failure.
- The digital loop sensor unit shall be of sufficient sensitivity to detect the smallest licenseable motor vehicle, including motorbikes. The sensor unit shall detect a Honda CT-170 and hold the detection for minimum of four minutes.
- The sensor unit shall be designed to operate in conjunction with three turns of a loop of wire embedded up to 3" (76.2mm) deep in a reinforced concrete roadway. The loop and lead-ins will measure at least 100 megohms above ground and have a minimum inductance of 50 microhenries and a continuity resistance of not more than 2 ohms. Digital sensor unit shall be capable of tuning to an inductance range of 0 to 2000 microhenries.
- Vehicle detection shall be indicated by a single optically isolated solid state output per channel.
- Output circuit shall be an optically coupled output. It shall be a 2N37. Polarity of interface between telemetry and sensor unit must be observed.
- Any size or type of motor vehicle from motorcycle to a high bed tractor-trailer moving over the loop shall be detected and each vehicle shall produce only one output for the length of time the vehicle is over the loop.
- Detection shall be positive for all vehicle speeds 0 to 129km (80 mi.) per hour.
- The sensor unit shall be capable of reliable operations when placed up to 1000 ft. (304.8m) away from loops and connected with type No. 14 AWG, stranded copper wire. The loops will vary in size from 5 ft. x 6 ft. (1.52m by 1.83m) up to 18 ft. x 6 ft. (5.49m by 1.83m). Loop system with 1000 ft (304.8m.) of lead-in shall perform with sensitivity to detect and hold the smallest motorbike.
- Each detection channel shall have its own output incandescent indicator lamp and 16 position thumbwheel switch. The thumbwheel switch shall select the sensitivity and mode. The thumbwheel switch shall provide eight sensitivities, .0025% to .33% and 3 modes: off, pulse, and presence.

- In the pulse mode each new vehicle shall produce an output pulse of 225 milliseconds duration. A vehicle remaining on a loop for more than two seconds shall be "tuned out" allowing operation of the loop to other vehicles.
- In the presence mode output duration shall be equal to the percent of time the vehicle is present on the loop. Vehicle detection and hold times shall not be less than 30 minutes.
- Electrical connections from the sensor unit to incoming and outgoing circuits shall be made by one MS type multiple positive connection plug and jack, or equivalent arrangement, to permit rapid replacement with similar existing units without disconnecting or reconnecting individual wires.
- All the tuning adjustments shall be made with controls provided on the sensor unit without requiring movement of the sensor unit.
- These controls shall be identified and it shall not be necessary to remove or change wires or contacts nor to use any tools other than a screw driver in tuning or making sensitivity adjustments.
- A properly tuned sensor unit shall detect all high vehicles (truck) with chassis 4 feet (1.22m) above pavement surface with one contact closure and yet shall not detect vehicles passing in lanes adjacent to loop installation.
- All transistors shall be silicon type. The main logic of the unit shall be a single MOSLSI chip to simplify the electronics, increase reliability and improve maintainability.
- The sensor unit shall be contained in a rigid high quality metal enclosure providing complete protection to all components and electrical connections.
- During normal detection operation the state of the output indicator shall correspond exactly to the state of the optically coupled output.
- A frequency switch shall be provided to raise or lower the loop oscillator frequency for the elimination of cross-talk between sensor unit, should it ever occur.
- The digital sensor unit shall be provided with a circuit breaker.
- Special circuitry shall be provided so that the sensor unit shall continue in proper operation even though the induction loop is shorted or leaking to ground.
- Induction loops shall be coupled to a transformer to provide for rejection of induction loop lead-in cable noise and shall allow low inductance operation (0 to 50 microhenries).
- A reset shall be provided to reset all channels.
- There shall be a write-on pad mounted on sensor to identify traffic lane with channel indication.

Basis of Payment. This work will be paid for at the contract unit price per each for DIGITAL LOOP DETECTOR SENSOR UNIT, of the number of channels specified, installed, operating and completely in place. Terminal boards, cable harness wiring and miscellaneous will not be paid for separately, but shall be considered as incidental to the cost of the item.

STONE EQUIPMENT

General.

- (a) Telemetry equipment shall be furnished and installed in the Traffic Systems Center Office and along expressway at locations designated in these Special Provisions and Plans, and in strict accordance with these specifications.
- (b) Communication link from field located cabinets to the Traffic Systems Center Office will be via 3002 Channel, C1 conditioning, Type 7 FDDC telephone pairs leased by the Traffic Systems Center, or telecommunication cable in barrier wall.
- (c) All tone transmitters and tone receivers shall be three frequency frequency-shift; that is equipment which the center frequency is normally on at all times and is electrically shifted +30 Hz to a higher frequency (mark) or -30 Hz to a lower frequency (space). Other frequency shifts from +10 to +300 shall be user selectable.
- (d) All transmitters, receivers, and power supplies shall be of the modular plug-in type construction. The circuitry of each unit shall be protected by a U-shaped metal chassis, cadmium-plated, with iridite finish.
- (e) All tone equipment shall be physically interchangeable with existing Traffic Systems Center tone equipment, that is furnished tone equipment shall be directly compatible with and replaceable by existing tone equipment with no modification to any hardware.
- (f) All transmitters, receivers, and power supplies shall be solid state. All transistors shall be silicon, excepting the power transistors in power supplies. All transmitters and receivers I.C.s shall be plug in.
- (g) All transmitters and receivers shall be programmable frequency-shift key units. These units shall have a universal card which is field programmable for any channel frequency or shift. The frequencies available shall be in the range of 120 Hz to 5235 Hz in increments of 5 Hz. The shifts available shall be 10, 25, 30, 35, 42.5, 60, 70, 75, 120, 150, 240 and 300 Hz. A new center frequency or shift shall be field programmed by simply changing setting of the program switch.
- (h) All transmitters and receivers shall be capable of being operated at any frequency program switches. The center frequency shall be clearly visible through or on the front of each transmitter and receiver. Such indication shall always correspond to the frequency of the elements currently operating in each module. Contractor shall supply 500 complete sets of pre-printed tags for labeling the units indicating the center frequency.

- (i) Transmitters and receivers shall work into a communication link with standard impedance of 600 ohms.
- (j) Transmitters and receivers shall be individually fused.

Materials.

(a) General

- (1) Receivers, transmitters and power supplies shall be capable of operation in field cabinets which provide protection against direct contact with the elements with no special provisions for environment control.
- (2) All field located tone equipment shall be mounted in the surveillance cabinets as designated elsewhere in these specifications.
- (3) All field located tone equipment shall be capable of operation on a temperature range of -22 degrees F to 140 degrees F (-30° to +60° C) and shall have P.C. boards coated for protection against humidity in the range of 0% to 96%.
- (4) All field tone equipment shall be capable of being tipped, while in operation, from the vertical to the horizontal position and back again, without having adverse effect on the continuous operation of the transmitter, receiver or power supply

(b) Power Supply

- (1) The power supply shall operate on input voltage of 117 VAC allowing for 10% variation in line voltage.
- (2) The power supply shall provide a regulated 12 VDC output at 1.7 amps.
- (3) Each tone equipment mounting frame field located or office located, shall have its own regulated power supply, capable of operating at least ten tone modules in any combination of transmitters and receivers.
- (4) The power supply shall have floating type gold plated connections to insure good connection.
- (5) The front panel of the power supply shall have an on/off switch and a Red LED that indicates the status of the output DC voltage.
- (6) The power supply shall contain a switch and L.E.D. on the front panel to permit the monitoring of the supply voltage with the existing Traffic Systems Center tone test meter.

- (7) The power supply shall be fused.
- (8) The power supply shall have a DC voltage control.

(c) Transmitter

- (1) The tone transmitter shall operate on an input of a regulated 12 VDC.
- (2) The tone frequencies shall be programmable in the audio frequency range between 120 and 3820hertz.
- (3) The transmission quality shall be such that there may be as many as 25 channels of tone transmitters operating over one telephone pair with perfect discrimination by the associated tone receivers. The frequency of one tone transmitter shall have no adverse effect on the operation of the frequency of any other transmitter connected to the same telephone pair.
- (4) Output level of tone transmitters shall be adjustable over a range of -40 to +13 dBm.
- (5) Transmitter harmonic output shall be at least 42 dB down from the fundamental for each harmonic component.
- (6) Each unit furnished shall have an external jumper wire on the barrier type terminal block to provide a two frequency space-hold operation.
- (7) The transmitter shall have a floating type gold plate connector to insure good connection.
- (8) The transmitter shall be capable of holding any of its assigned frequencies (mark, space) continuously without degradation in life of performance.
- (9) Each transmitter shall be capable of test operation of at least 30 pulses per second.
- (10) No transmitter plugs shall be required for tone output. A toggle switch thru the faceplate shall put the transmitter "on line" and "off line".
- (11) The transmitter shall have L.E.D. indicators for Mark-Red, Space-Yellow and Carrier-Green visible through the face panel.
- (12) Test points through front face plate shall be provided to test for DC voltage levels.

(d) Receiver

- (1) The requirements as to the programmable channel frequency range, channel spacing, holding of shifted frequency, and operating voltage shall be the same as those for 3 Frequency Transmitter.
- (2) Input sensitivity of tone receiver shall be adjustable down to -45 dBm. The dynamic range shall be 25 dB.
- (3) Adjacent channel attenuation shall be at least 35 dB.
- (4) Each receiver shall be capable of test operation of at least 30 pulses per second.
- (5) Each receiver shall have one single pole, double throw, mark relay output and one single pole, double throw space output relay.
- (6) Each receiver shall also have a carrier detector circuit with one single pole, double throw relay output.
- (7) All output relay contacts shall be capable of handling a minimum of 30 VA continuously. Any substitution shall be subject to written approval of the Engineer.
- (8) Receiver shall have L.E.D. indicators for Mark-Red, Space-Yellow and Carrier-Green, visible through the face panel.
- (9) The receiver shall have a floating type gold plated connector to insure good connection.
- (10) Receiver shall operate in a space hold, 2 state operation.
- (11) An attenuation plug shall be provided to set sensitivity level of receiver.
- (12) Each receiver shall come with 2 spare relays as outlined in Sec. (d) (5) of this material specification.
- (13) Test points through front face plate shall be provided to test for DC voltage levels.

(e) Mounting Frame

- (1) Under this item, for a unit price each, the Contractor shall furnish and install an Inven 1X 11-1 mounting rack or equivalent in strict accordance with the requirements specified herein.

- (2) Each tone equipment mounting frame field located or office located, shall have with power supply added, 11 slots capable of operating at least ten tone modules in any combination of transmitters and receivers.
- (3) Each mounting frame shall provide a separate barrier type terminal block with screw-type terminal for each transmitter, receiver, and power supply.
- (4) Each mounting frame shall be constructed of steel with zinc bonderizing and hard baked finish of gold metallic epoxy paint.
- (5) Where the mounting frame is not completely filled with tone modules, the unused modules spaces shall be provided with the barrier type terminal blocks, within each mounting frame, shall be wired to the 12 VDC power supply.
- (6) Each mounting frame for the field equipment shall be of a size that shall hold the power supply, all transmitters and all receivers required at each field cabinet as specified elsewhere in these Special Provisions.
- (7) In all field cabinet locations where mounting frames are specified the mounting frames shall be bolted to the rear wall of the cabinet by means of a swing bracket as per field mounting frame with cradle assembly drawing #TY-1TSC 400#6.
- (8) The bracket cradle shall have three (3) position stops: horizontal, 45 degree and vertical.
- (9) The bracket cradles shall be constructed of ¼" (6.35mm) steel, cadmium plated with an irridite finish, as shown on plan for cradle assembly drawing #TY-1TSC 400#7.

Basis of Payment.

Power Supply

This item shall be paid for at the contract unit price each for TONE EQUIPMENT - POWER SUPPLY, installed, operating, and completely in place.

Terminal boards, wiring, and miscellaneous hardware will not be paid for separately, but shall be considered as incidental to the cost of this item.

Transmitter

This item will be paid for at the contract unit price each for TONE EQUIPMENT - 3 FREQUENCY TRANSMITTER PROGRAMMABLE, installed, operating and completely in place.

Terminal boards, wiring, and miscellaneous hardware will not be paid for separately, but shall be considered as incidental to the cost of this item.

Receiver

This item will be paid for at the contract unit price each for TONE EQUIPMENT - 3 FREQUENCY RECEIVER PROGRAMMABLE, installed, operating, and completely in place.

Terminal boards, wiring, optical-isolator, relays, cable assemblies and miscellaneous hardware will not be paid for separately, but shall be considered as this item.

Mounting Frame

This work shall be paid at the contract unit price each for TONE EQUIPMENT – MOUNTING FRAME, which shall be payment in full for all work as described herein and as directed by the Engineer.

REMOVE EXISTING SURVEILLANCE CAMERA EQUIPMENT

Description. This work shall consist of removal and transportation of equipment as shown on the plans and described in this Special Provision. Work includes the following:

- (a) Removal of a vehicle detection surveillance station cabinet, including all equipment inside the cabinet.
- (b) Securely packing surveillance tone equipment and associated components, cabinets and internal equipment, and safely delivering all items to the Department (District 1 headquarters) or Electrical Maintenance Contractor as directed by the Engineer.
- (c) There is no CCTV camera equipment to be removed for this contract.

Materials. None.

CONSTRUCTION REQUIREMENTS

General. No removal work will be permitted without approval from the Engineer. The Contractor shall set up a meeting with the State's Electrical Maintenance Contractor (EMC) and the Traffic Systems Center (TSC) Engineer. The EMC and TSC Engineer shall be notified at least 48 hours in advance of the meeting. This meeting shall be scheduled within two weeks after contract is awarded.

The meeting shall be at each cabinet to determine the condition of equipment. Any equipment that is to be salvaged that is damaged after this meeting shall be repaired or replaced at the contractor's expense, to the satisfaction of the Engineer. The equipment that is not salvaged shall be disposed of as directed by the Engineer and all debris removed beyond the right-of-way.

The condition of the equipment shall be documented and signed by representatives of the TSC, EMC and the Contractor. A copy shall be given to the Engineer.

If this meeting does not occur, then all of the equipment will be assumed to be in working condition. Any equipment that is not in working condition upon delivery shall be repaired or replaced at the Contractor's expense.

Removal Details. The equipment shall be removed in accordance with the following applicable sections of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction:

- (a) **Concrete Foundation:** Section 895. This shall be paid for in the Remove Existing Concrete Foundation pay item.
- (b) **Handhole:** Section 895. This shall be paid for in the Remove Existing Handhole pay item.
- (c) **Electric service installation:** Section 845. This shall be paid for in the Removal of Electric Service Installation pay item.
- (d) **Cabinet:** Section 845. All cabinets shall be removed and salvaged as directed by the Engineer. This shall be paid for under this pay item.
- (e) **Conduits:** Existing underground conduits shall be abandoned.
- (f) **Induction Loops:** Existing Induction Loops to be abandoned
- (g) **Cabinet Electronic Equipment:** All of the Transmitters, Receivers, Power Supplies and Loop Detectors shall be salvaged and sent to the Electrical Maintenance Contractor or Department as directed by the Engineer. This shall be paid for under this pay item

The Contractor shall provide and utilize equipment appropriate for removing the designated equipment.

Protection of Equipment. Upon removal, equipment shall be immediately packaged in suitable containers for protection for delivery. Containers shall become the property of IDOT upon delivery. The contents of each container shall clearly identify the contents, source location and date of removal on the outside of the container.

The Contractor shall deliver the cabinet and equipment inside the cabinet to the Department or EMC as directed by the Engineer. All components which the Engineer designates as salvage shall be removed, boxed in containers, approved by the Engineer, and delivered and unloaded at a facility of the Department, as designated by the Engineer. Packaging material required for proper shipping shall be included. Materials that are not salvaged shall become the property of the Contractor and shall be disposed of according to Article 202.03.

The Contractor shall prepare a printed delivery receipt to be signed by a representative of the recipient. A copy of this signed receipt shall be provided to the Engineer.

Any damage resulting from the removal and/or transportation of equipment and associated hardware that are to be salvaged, shall be repaired or replaced in kind. The Engineer will determine the extent of damage and the suitability of repair and/or replacement.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING SURVEILLANCE CAMERA EQUIPMENT, which shall be payment in full for all labor, material removal, and transportation to EMC or Department necessary to complete the work as described above.

CABINET, MODEL 334 (D-1)

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 1/2 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 Corbin # 2 Brass lock or equal 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 Corbin # 2 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.

Each Induction Loop shall have lightning protection. The Contractor shall furnish and install stud-mounted lightning protection devices. The device shall have three-terminals, two of which are connected across the loop input of the detector for differential mode protection and the third terminal grounded to protect against common mode damage. Differential mode surge shall be clamped by the semi-conductor array instantly and common mode surge shall be handled by three element gas discharge tube which fires at 400VDC and thereafter clamps the two loop leads to 30 volts in respect to ground. The device shall be installed in close proximity to the loop input. Extension of the factory leads of the device shall not be allowed.

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 plyboard-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 CABINET, MODEL 334, installed, tested, accepted, complete, and fully operational.

Basis of Payment

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.

EQUIPMENT CABINET

Description. This work shall consist of all materials and labor required to install a pole mounted equipment cabinet.

Materials.

General

The Cabinet, Model 336 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 1/2 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 be sized to adequately house all required components with extra space for arrangement and termination of wiring. The minimum size of the cabinet shall have a nominal outside dimension of 46 in. height x 24 inches wide X 24 inches deep. Cabinet, Model 336 shall consist of the following components: double door each equipped with a Corbin # 2 Brass lock or equal 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.

Ground and Neutral Bus Bars. A single copper ground and neutral bus bar, mounted on the equipment panel shall be provided. Ground and neutral conductors shall be separated on the bus bar. Compression lugs, plus 2 spare lugs, shall be sized to accommodate the cables with the heads of the connector screws painted green for ground connections and white for neutral connections.

Utility Services Connection. Where required; the Contractor shall notify the Utility Company marketing representative a minimum of 30 working days prior to the anticipated date of hook-up. This 30 day advance notification will begin only after the Utility Company marketing representative has received service charge payments from the Contractor. Prior to contacting the Utility Company marketing representative for service connection, the service installation controller cabinet and cable must be installed for inspection by the Utility Company.

Construction. The Contractor shall confirm the orientation of the installation and its door side with the engineer, prior to installation. All conduit entrances into the service installation shall be sealed with a pliable waterproof material.

The Contractor shall confirm the orientation of the Cabinet Model 336 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.

The equipment cabinet shall meet the testing, documentation, warranty requirements of the Cabinet, Model 334.

Basis of Payment. This work will be paid for at the contract unit price per each for EQUIPMENT CABINET 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.

FIBER OPTIC INNERDUCT (D-1)

Effective: April 1, 2005

1. Description.

This item shall consist of furnishing, installing, splicing, connecting and demonstrating continuity of fiber optic cable innerduct of sizes specified herein and as shown on the contract drawings. The innerduct shall be High Density Polyethylene.

2. Materials.

2.1 General:

The duct shall be a spiral ribbed plastic duct which is intended for underground use and which can be manufactured and coiled or reeled in continuous transportable lengths and uncoiled for further processing and/or installation without adversely affecting its properties of performance. The ribbed duct shall have internally designed longitudinal ribs for reduced pulling frictions and increased lubrication effectiveness.

The duct shall be made of high density polyethylene which shall meet the requirements of ASTM D 3035. The innerduct material shall be composed of high density polyethylene meeting the requirements of PE334470E/C as defined in ASTM D3350.

Submittal information shall demonstrate compliance with the details of these requirements.

2.2 Dimensions:

Duct dimensions shall conform to the standards listed in ASTM D3035, SDR-11. Submittal information shall demonstrate compliance with these requirements.

Nominal Size (diameter)	Inside Diameter (minimum)	Outside Diameter (Average)	Wall Thickness (Min.)	Bend Radius (minimum)	Pull Strength	Weight Average (lbs/100ft.)
1"	1.030"	1.315"	0.120"	14"	500	19
1.25"	1.313"	1.660"	0.151"	17"	750	31
1.5"	1.506"	1.900"	0.173"	19"	1000	40
2"	1.885"	2.375"	0.216"	24"	1600	60

2.3 Marking:

As specified in NEMA Standard Publication No. TC-7, the duct shall be clearly and durably marked at least every 10 feet with the material designation (HDPE for high density polyethylene), nominal size of the duct, and the name and/or trademark of the manufacturer.

- 2.4 Color:
 Innerduct shall be colored as follows or as directed by the Engineer.

Usage Designation	Color
Fiber Optic Trunk Cable (Ducts containing cables of 96 fibers)	Orange
Fiber Optic Distribution Cable (Ducts containing cables of 12, 6, or 4 fibers and 96 fiber ducts designated as distribution fibers)	Blue

3. Installation.

- 3.1 Pulling Tension.
 Pulling tension of the duct shall be monitored throughout the pull and pulling tension shall not exceed those listed in the table or the specific manufacturer maximum pulling tensions as indicated in the catalog cut submittals. Failure to monitor the pulling tension will result in non-payment of that particular duct span and the span may be reinstalled with new duct at no additional cost to the State. Lubricants used shall be compatible with the duct.

- 3.2 Junction boxes.
 Where duct passes through junction and/or pull boxes, the duct shall remain continuous unless a break is specifically indicated in the plans or as directed by the Engineer.

- 3.3 Handholes.
 Where duct passes through handholes, the duct shall be looped uncut within the handhole unless otherwise indicated on the Plans or directed by the Engineer.

Bends.

Minimum bending radius shall be in accordance with the above table or the manufacturer's recommended radius, whichever is larger. Bends shall be made so that the duct will not be damaged and the internal diameter of the duct will not be effectively reduced. The degrees of bend in one duct run shall not exceed 360° between termination points.

- 3.4 In Trench
 Where duct is installed in trench, it 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.

Where duct is shown to be installed in trench, it shall be installed at a depth not less than 30 inches unless otherwise indicated or specifically directed by the Engineer.

The inner duct may be plowed into place. Unless otherwise indicated or specifically approved by the Engineer, plowing of inner duct shall lay the duct in place and shall not pull the duct through the length of the cut behind a bullet-nose mandrel or similar apparatus. In all cases, plowing operations shall be non-injurious to the duct.

3.5 In Raceway

Where duct is installed in raceways, lubricating compounds shall be used where necessary to assure smooth installation.

3.6 Encased in Concrete

Concrete shall be class SI complying with Section 720 of the Standard Specifications.

Steel Reinforcement Bars. Steel reinforcement bars shall comply with Section 706.10 of the Standard Specifications.

Underground concrete-encased conduit shall be supported on interlocking plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common duct bank shall be not less than 2 inches. The interlocking spacers shall be used at a minimum interval of 8 ft.

Concrete cover overall shall not be less than 3 inches all around the encased run. Space below the conduit and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. Concrete shall be deflected during placement to minimize the possible damage to or movement of the conduits.

Conduit encased in concrete shall have steel reinforcing where installed below roadway or other paved vehicle areas (including shoulder) and the reinforcement shall extend not less than 5 feet additional from the edge of pavement unless otherwise indicated. Steel reinforcement shall not be less than No. 4 bars at corners and otherwise spaced on 12-inch centers, tied with No. 4 bars on 12-inch centers.

The Engineer shall examine all conduit joints for compliance with section 5 of this specification before concrete is poured.

3.7 Embedded

Conduit embedded in structure shall be supported on interlocking plastic spacers specifically designed for the purpose spaced along the length of the run as recommended by the manufacturer. Spacing between raceways within a common structure shall be not less than 2 inches. The interlocking spacers shall be used at a minimum interval of 8 ft.

Concrete cover overall shall not be less than 3 inches all around the embedded run. Space below the conduit and concrete fill shall be assured. Care shall be exercised during concrete placement to assure that there are no voids, so that spacers are undisturbed, and so that conduit joints stay secure and unbroken. Concrete shall be deflected during placement to minimize the possible damage to or movement of the conduits.

The Engineer shall examine all conduit joints for compliance with section 5 of this specification before concrete is poured.

4. Joints

4.1 All HDPE duct to HDPE duct joints shall be made with an approved duct fusion splicing device.

4.2 HDPE coilable non-metallic conduit to non-HDPE coilable non-metallic conduit joints shall be either made with an approved mechanical connector or with a chemical compound. Both methods must be specifically designed for joining HDPE coilable non-metallic conduit. Minimum pullout force for the chemical compound shall be as listed in the following table.

Nominal Size		Pullout Force	
mm	in	N	Lbs
31.75	1.25	2400	540
38.1	1.50	2535	570
50.8	2.0	3335	750
63.5	2.5	4445	1000
76.2	3.0	6225	1400
101.6	4.0	8890	2000

5. Measurement

The duct shall be measured for payment in linear feet in place as described herein. Measurements shall be made in straight lines between horizontal changes in direction between the centers of the terminating points (poles, cabinets, junction boxes). Vertical measurement of the duct shall be as follows:

For runs terminating at junction boxes and/or control cabinets, the vertical measurement shall be taken from the bottom of the trench, or horizontal raceway, to a point 18 inches beyond the center of the junction box or control cabinet.

For runs terminating at poles, the vertical measure shall be taken from the bottom of the trench, or horizontal raceway, to a point 18 inches beyond the center of the light pole handhole regardless of light pole mounting method

Innerduct installed in excess of the limits describes herein shall not be paid for.

6. Basis of Payment

This item will be paid for at the contract unit price per foot for FIBER OPTIC INNERDUCT, of the size of duct as indicated, which shall be payment in full for all material and work as specified herein.

RADAR VEHICLE DETECTION SYSTEM

General. This work shall consist of furnishing, installing, and placing into operation a temporary radar vehicle sensing device (RVSD) and appurtenant communications equipment and cabling on a temporary wood pole with an equipment cabinet. The RVSD must be compatible with the Department's existing ATMS software drivers.

RVSD

Sensor Detection. The RVSD shall be equivalent to the Image Sensing Solutions RTMS G4 or Wavetronix SmartSensor HD and shall provide volume average speed, occupancy, classification counts, 85th percentile speed, average headway, average gap, speed bin counts and direction counts for user-configurable time intervals for a minimum of 8 lanes of traffic.

- The RVSD shall provide up to 8 length-based classification bins.
- The RVSD shall provide up to 15 speed bins.
- The RVSD shall provide speed, length, class, lane assignment, and range data for each vehicle detection.
- The RVSD shall provide presence data for at least 8 lanes of traffic.

Detectable Area.

Detection Range. The RVSD shall be able to detect and report information in lanes located with the far boundary at a minimum of 200 ft. from the base of the pole on which the RVSD is mounted.

Barrier Performance. The RVSD shall detect vehicles with the specified accuracy in lanes that are adjacent to a barrier when 50% of a sedan is visible over the barrier from the point of view of the RVSD.

Performance.

Volume Accuracy. The volume data shall be within 5% of truth for a direction of travel during nominal conditions.

Speed Accuracy. Average speed data shall be accurate to within 3 mph (5 kph) for any direction of travel when there are more than 5 cars per lane in an interval. The RVSD shall measure speed using a dual-radar speed trap that calculates the time delay between two different radar beams.

Occupancy Accuracy. Occupancy data shall be within 10% of truth for any direction of travel on a roadway during nominal conditions.

Classification Accuracy. The RVSD shall correctly determine classification for 80% of detected vehicles when the classification bins are at least 10 ft. (3 m) wide and occupancy of all lanes is below 30%.

Performance Maintenance. The RVSD shall not require cleaning or adjustment to maintain performance.

The RVSD shall not rely on battery backup to store configuration information, thus eliminating any need for battery replacement.

Once the RVSD is calibrated, it shall not require recalibration to maintain performance unless the roadway configuration changes.

The designed mean time between failures (MTBF) of the RVSD, operating continuously, shall be 10 years or more.

Physical Properties. The RVSD shall not exceed 8 lbs in weight. The RVSD shall not exceed 14 in. by 12 in. by 6 in. (35.6cm x 30.5cm x 15.2cm) in its physical dimensions. All external parts of the RVSD shall be ultraviolet-resistant, corrosion-resistant, and protected from fungus growth and moisture deterioration.

Enclosure. The enclosure shall be classified “f1” outdoor weatherability in accordance with UL 746C. The RVSD shall be classified as watertight according to the NEMA 250 Standard. The RVSD enclosure shall conform to test criteria set forth in the NEMA 250 standard for type 4X enclosures. Test results shall be provided for each of the following type 4X criteria:

- External Icing (NEMA 250 clause 5.6)
- Hose-down (NEMA 250 clause 5.7)
- 4X Corrosion Protection (NEMA 250 clause 5.10)
- Gasket (NEMA 250 clause 5.14)

The RVSD enclosure shall include a connector that meets the MIL-C-26482 specification. The MIL-C-26482 connector shall provide contacts for all data and power connections.

Power Requirements. The RVSD shall consume less than 10 W. The RVSD shall operate with a DC input between 12 VDC and 28 VDC.

Communication Ports. The RVSD shall have an RS-485 port and an RS 232 port. The RVSD shall have contact closure pairs for each lane in order to communicate with existing locations. The RS-232 port shall be full-duplex and shall support true RTS/CTS hardware handshaking for interfacing with various communication devices. The RVSD shall support the upload of new firmware into the RVSD's non-volatile memory over either communication port. The communication ports shall support all of the following baud rates: 9600, 19200, 38400, 57600, and 115200 bps.

Data Protocols. The RVSD shall support 3 different data protocols for all lanes being monitored: interval (bin) data, event (per vehicle) data, and real-time true presence data. The interval (bin) data packet protocol shall support:

- Sensory ID
- A timestamp
- Total volumes
- Average speed values
- Occupancy in 0.1% increments
- Volume in up to 8 length-based user-defined vehicle classification bins
- Volume for both directions of traffic (bin by direction)
- 85th percentile speed in either mph or kph

The real-time true presence data packet protocol shall support:

- Sensor ID
- True presence information for each lane

Data Buffering. The RVSD shall store, in non-volatile memory, at least 9,000 interval data packets.

Radar Design. The RVSD shall employ a dual radar design that includes 2 receive channels. The RVSD shall not rely on temperatures compensation circuitry to maintain transmit frequency stability.

Antenna Design. The RVSD antennae shall be designed on printed circuit boards.

Resolution. The RVSD shall transmit a signal with a bandwidth of at least 240 MHz

RF Channels. The RVSD shall provide at least 4 RF channels so that multiple units can be mounted in the same vicinity without causing interference between them.

Configuration.

Auto-configuration. The RVSD shall have a method for automatically defining traffic lanes or detection zones without requiring user intervention.

Manual configuration. The auto-configuration method shall not prohibit the ability of the user to manually adjust the RVSD configuration. The RVSD shall support the configuring of lanes or detection zones in one-ft. (0.3-m) increments.

Windows Mobile-based Software. The RVSD shall include graphical user interface software that displays all configured lanes and the current traffic pattern, as well as, measured speed or length. The graphical interface shall operate on Windows Mobile Windows 2000, windows XP and Windows Vista in the .NET framework.

- Automatically find the correct baud rate
- Operate over a TCP/IP/NTCIP connection

Operating Conditions. The RVSD shall maintain accurate performance in all weather conditions. The RVSD shall be capable of continuous operation over an ambient temperature range of 40°F to 165.2°F (-40°C to 74°C). The RVSD shall be capable of continuous operation over a relative humidity range of 5% to 95% (non-condensing).

Testing.

FCC. Each RVSD shall be Federal Communication Commission (FCC) certified under CFR 47, Part 15, section 15.249 as an intentional radiator.

NEMA TS2-2003 Testing. The RVSD shall comply with the applicable standards stated in the NEMA TS2-2003 Standard.

Manufacturing. The internal electronics shall comply with the requirements set forth in IPC-A-610C Class 3, Acceptability of Electronic Assemblies.

Support. The RVSD manufacturer shall provide both training and technical support services.

Training. The manufacturer provided training shall be sufficient to fully train installers and operators in the installation, configuration, and use of the RVSD to ensure accurate RVSD performance. The training shall be conducted locally. The manufacturer provided training shall consist of comprehensive classroom labs and hands-on, in-the-field installation and configuration training. Presentations shall be followed by hands-on labs in which trainees shall practice using the equipment to calibrate and configure a virtual RVSD. The manufacturer-provided training shall include the following items:

- Knowledgeable trainer
- Presentation materials
- Computer files
- Laptop computers

Field training shall provide each trainee with the hands-on opportunity to install and configure the RVSD at roadside.

Technical Assistance. Manufacturer-provided technical support shall be available to assist with the physical installation, alignment, auto-configuration, troubleshooting, maintenance and replacement of each RVSD.

Documentation. RVSD documentation shall include a comprehensive user guide as well as an installer quick reference guide and a user quick-reference guide. The RVSD manufacturer shall supply the following documentation and test results at the time of the bid submittal:

- Volume accuracy data, including performance analyses for:
 - Free-flowing traffic
 - Traffic with a lane roughly 8 ft (2.4m) beyond a 4-ft. (1.2m) concrete barrier
 - 6-ft. (1.8-m) and 240-ft. (73.2m) lateral offset (simultaneous)
- Speed accuracy test data for both per-vehicle and average speed
- Occupancy accuracy test data
- Vehicle classification test data
- Auto-configuration documentation
- FCC CFR 47 certification
- NEMA 250 Standard for Type 4X Enclosure third-party test data
- NEMA TS2-2003 Standard third-party test data

The RVSD shall be warranted free from material and workmanship defects for a period of 2 years from date of shipment.

Terminal Server. If the RVSD does not have a direct Ethernet connection, then a new, rugged terminal server shall be provided with each RVSD at no additional cost to the Department. The terminal server shall be an IP addressable device that converts RS-232/RS-422/RS-485 serial communications protocols to 10/100 Base T/TX Ethernet protocol. The terminal server shall be fully compatible with the RVSD and shall meet the following requirements:

- Serial ports (minimum two ports)
 - Electronic Industries Association (EIA) 232/422/485, switch selectable.
 - Baud rates [50 bits per second (bps) to 230 kilobits per second (Kbps)]; parity (none, even, odd, mark, space); stop bits (1, 2) and full control of serial parameters including but not limited to:
 - Data Terminal Ready (DTR)
 - Data Carrier Detect (DCD)
 - Data Set Ready (DSR)
 - Clear to Send (CTS)
 - Request to Send (RTS)
 - RTS toggle for half-duplex emulation.
- One 10/100Base-TX Ethernet port that automatically negotiates speed and full-duplex or half-duplex operation.
- Input power must be 120 volts alternating current (VAC).

- Environmental requirements.
 - Operating temperature range: -31 degrees Fahrenheit (F) to 158 degrees F.
 - Operating humidity range of 0 to 95 percent non-condensing.
 - If a separate power adapter is provided, it must be certified by an independent testing company as meeting the above temperature and humidity requirements.
- Diagnostic light emitting diodes (LEDs) for power and Ethernet link status.
- Security.
 - Secure Shell (SSH) version 2.
 - Secure Socket Layer (SSL) version 3/Transport Layer Security (TLS) version 1 that supports Advanced Encryption Standard (AES) 256-bit strong encryption as defined in the Internet Engineering Task Force (IETF) Request for Comments (RFC) 3268 and the Federal Information Processing Standards (FIPS) 197.
- Remote monitoring, diagnostics, and configuration using simple network management protocol (SNMP).
- Ancillary equipment, including power and communication cables, mounting hardware, and power adapter.

Cellular Modem. A rugged outdoor 3G/4G cellular modem shall be provided for backhaul communications of outputs from radar vehicle sensing devices (RVSD).

Materials. The cellular modem shall have a small form factor and be manufactured for outdoor use and shall operate in harsh environments (operating temperature range of -22°F to +158°F). It shall be static IP addressable and include an Ethernet interface (10/100 Base-T, RJ45) and LED status indicators. The cellular modem shall support real-time 2-way communications for remote management and shall include management software by the modem manufacturer. The modem shall include an external antenna and cabling for optimum signal reception as recommended by the manufacturer. It shall include a power supply from the manufacturer of the modem and shall include the manufacturer's installation and operations manuals and documentation of exact equipment model and serial numbers in hardcopy and PDF formats on CD-ROM. The modem shall be approved by Verizon Wireless for use on their network.

Construction Details. The cellular modem shall be mounted securely inside an enclosure as shown on the plans. It shall be placed to minimize the length of antenna cabling. External antenna and cabling shall be installed only if required to achieve reliably consistent signal communications quality. Antenna installation location shall be approved by the Engineer. Power supply and connections shall be installed in accordance with the manufacturer's recommendations. Three copies of the cellular modem product manuals shall be provided to the Department. One copy shall be stored on site inside the equipment cabinet.

Mounting and Installation.

Mounting Assembly. The RVSD shall be mounted directly onto a mounting assembly fastened to a pole or other solid structure as shown on the plans. The RVSD mounting assembly shall be constructed of weather-resistant materials and shall be able to support a 20-lb. (9.1 kg) load.

Mounting Location. The RVSD shall be mounted at a height that is within the manufacturer's recommended mounting heights based on lateral offset from the nearest lane to the mounting pole. Two RVSD units shall not be mounted so that they are pointed directly at each other. The detector bracket shall be attached to the pole with stainless steel straps. Silicon dielectric compound shall be applied to the detector unit base before attaching it to the mounting bracket. Before tightening the bracket it should be aligned to +/- 2 degrees of perpendicular to the roadway and aimed at the detection area. A connector cable is then attached to the unit.

A distance of 40 ft. (12.2 m) or more, along the direction of the roadway, shall separate the RVSDs if they are located on opposing sides of a roadway and the RVSDs shall be configured to operate on different RF channels. It is recommended that the manufacturer be consulted to verify final RVSD placement if the RVSD is to be mounted near large planar surfaces (sound barrier, building, parked vehicles, etc) that run parallel to the monitored roadway. The RVSD shall be located within sight of cabinet for set-up.

Cabling. The cable end connector shall meet the MIL-C-26482 specification. The cable shall be the Orion Wire Combo-2207-2002-PVC-GY or equivalent. The cable shall be terminated only on the two farthest ends of the cable. If 12 VDC is being supplied for the RVSD then the cable length shall not exceed 110 ft. (33.5 m). If 24 VDC is being supplied for the RVSD then the cable length shall not exceed 600 ft. (182.9 m). A 3.5 foot (1.1m) serial cable shall be installed in control cabinet. The connector cable should be strapped to the pole to prevent cable strain.

Lightning Surge Protection. The RVSD shall be installed using lightning surge protection on all communication and power lines. The surge protection devices shall meet or exceed the EN 61000-4-5 Class 4 Specification. The lightning surge protection unit shall be as recommended by the RVSD manufacturer. The lightning surge protection shall withstand 6KV and/or 10,000A.

Power Supply. The RVSD shall include the RVSD manufacturer's power supply for the provided detector unit.

Cabinet. The radar detector shall be connected to power and the communications equipment in the same cabinet that will house additional RVSD and the electronics for a CCTV camera. It shall be connected to a RVSD manufacturer-recommended surge suppression device. A RVSD manufacturer-supplied power supply shall be used for power conversion. A terminal server, if needed, shall be installed inside the cabinet. The radar detection system shall include all equipment and devices recommended by the manufacturer for proper operation.

Method of Measurement. This item shall be measured as each RADAR VEHICLE DETECTION SYSTEM installed, tested, operational and complete with components specified herein.

Basis of Payment. This work will be paid for at the contract unit price per each for RADAR VEHICLE DETECTION SYSTEM, completely installed, tested, and operational in accordance with the contract drawings and these special provisions. Price shall include all labor, materials, equipment, setup, testing and training.

ETHERNET SWITCH

Description. This work shall consist of providing a hardened Ethernet Switch in a cabinet as shown on the plans.

Materials.

General

The Ethernet switch shall be an environmentally hardened managed 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 -40C to +85C 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 55C 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 Weigh 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.

Construction. The Contractor shall securely mount the Ethernet Switch as shown on the plans. The switch shall be installed such that its status lights and ports are easily accessible for maintenance technicians. The switch shall be configured and tested to operate with optimized bandwidth and manage network traffic to enable remote monitoring and control of the field devices. The switch shall be configured to be fully interoperable with the existing network.

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.

MODIFICATION OF EXISTING VIDEO DISTRIBUTION SYSTEM (D-1)

December 1, 2014

General. The CCTV (Closed Circuit Television) Distribution System is a fully integrated IP multicast system, comprised primarily of Cisco network 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 generally configured 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 two monitoring locations: District 1 Headquarters in Schaumburg, Traffic Systems Center in Oak Park.

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.

Video Control Software. The existing control software is ICX's 360 Cameleon Enterprise camera control. Included in this item, the Contactor shall provide 10 ITS software license units. The Contractor shall configure the cameras within the video control software. This work shall be coordinated with the Electrical Maintenance Contractor.

HD IP Video Decoder. The HD video decoder shall be capable of decoding high definition and standard definition streams using H.264 or MPEG-4 compression technology. The HD video decoder shall provide one (1) DVI-I, one (1) HDMI, and one (1) DP monitor output with two outputs usable simultaneously. The HD video decoder shall be of the same manufacturer as the HD cameras provided on this project.

Video Distribution System (VDS) Control System Driver. The decoder and video output shall be controlled and configured through the VDS. Consequently a software driver for the VDS is required and included as a part of the decoder. The VDS control system is Cameleon ITS manufactured by 360 Surveillance, a division of FLIR. It is the Contractor's responsibility to determine if an existing software driver exists for the proposed decoder. If a driver does not exist for the proposed decoder, the work and cost of developing the driver shall be included in this item.

Provisioning of IP routing and switching equipment. The Contractor shall fully integrate all the equipment to be installed with the existing video distribution system as a part of this item and this coordination will require technical services of the existing system integrator, AT&T, a Cisco Systems Integrator (Contact: Jim Patterson, AT&T, 217.801.2329) and coordination with the State District 1 Electrical 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.

CLOSED CIRCUIT TELEVISION CAMERA EQUIPMENT

Description. This item shall consist of furnishing and installing equipment for the control and distribution of CCTV video from the CCTV camera to a Video Collection Point (VCP). Transmission for the video and control signals shall be by fiber optic cable as specified elsewhere herein and as indicated in the plans.

Construction Requirements

General. The Contractor shall prepare and submit a shop drawing detailing the complete closed-circuit television cabinet equipment installation. The shop drawings shall identify the installation and specifications of all components to be supplied, for approval of the Engineer. Particular emphasis shall be given to the cabling and the interconnection of all of the components.

Appropriate connectors shall be furnished and installed to interface the in-cabinet components to the integrated dome camera assembly. The Contractor shall mount the in-cabinet components in the equipment cabinet and connect them to AC power, communications, and video feeds.

Testing. The Contractor shall test each installed CCTV Cabinet Equipment. The test shall be conducted from the field cabinet using the standard communication protocol and a laptop computer. The Contractor shall verify that the camera can be fully exercised and moved through the entire limits of Pan, Tilt, Zoom, Focus and Iris adjustments, using both the manual control and presets.

The Contractor shall repeat the test at the communications shelter associated with the CCTV camera.

The Contractor shall maintain a log of all testing and the corresponding results. A representative of the Contractor and a representative of the Engineer shall sign the log as witnessing the results. Records of all tests shall be submitted to the Engineer prior to accepting the installation.

Documentation. One copy of all operations and maintenance manuals for each CCTV component 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 costs.

The depot maintainer designated for each component shall be authorized by the original manufacturer to supply this service. A warranty certificate shall be supplied for each component from the designated depot repair site indicating the start and end dates of the warranty. The certificate shall be supplied at the conclusion of the system acceptance test and shall be for a minimum of two years after that point. The certificate shall name the Department as the recipient of the service. 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.

Materials.

Equipment Installation. The CCTV equipment shall be mounted in an enclosure provided and paid for separately. The installation and mounting of the CCTV equipment shall be fully coordinated with the enclosure or co-location.

Co-location of CCTV equipment. The CCTV equipment maybe co-located within another equipment controller cabinet as indicated.

The equipment shall be securely mounted on a mounting back panel or on a corrosion resistant DIN rail if equipment is configured as such.

Closed Circuit Television Camera Power Supply.

The Closed Circuit Television Camera Power Supply shall supply power to the camera dome assembly. The requirements include:

Input voltage	120 VAC \pm 10%
Output voltage	24 VAC \pm 10%
Operating Temperature Range:	-40°C to +70°C (minimum)
Storage Temperature Range:	-40°C to +75°C (minimum)

The power supply shall include an AC power indicator with power on/off switch. All outputs shall be fused. The power supply shall be sized for the dome units being supplied, considering pan/tilt, heating, and blower requirements, and shall not be less than 100 VA.

Over-voltage Protection. Over-voltage protection shall be provided on the power conductors, camera control conductors, and the video cables. The specific protection is based on the elements being protected.

Incoming Power Protection. The incoming power shall be protected with a filtering surge protector that absorbs power line noise and switching transients. The specified performance shall be as follows:

Peak current	20 kA (8x20 μ s waveshape)
Life Test	5% change
Clamp voltage	280 V typical @ 20 kA
Response time	\leq 5 ns
Continuous service current	10 amps max. 120 VAC/60 Hz
Operating Temperature	-40°C to +75°C (minimum)
Nominal dimensions	7.15 inches by 3.13 inches by 2.3 inches

Camera Cable Surge Protection. The CAT5/5e/6 cable from the camera shall be protected with a lightning surge protector. The unit shall be fully compatible with the camera cabling and PoE and shall have shielded RJ45 jacks for EMI noise suppression. The unit shall provide high performance 3-stage protection:

1. Differential gas discharge tube
2. PTC resettable fuse
3. Low capacitance diode array

Specific requirements include:

Ethernet Connectors	(2) Shielded RJ45 Ports
Gas Tube Voltage	+/- 90 V
PTC Fuse Rating	+/- 1 A
Clamping Voltage	+/- 58 V
Operating Temperature	-40° C to +80° C
Nominal dimensions	6.3 x 3.2 x 2.2 (inches)

The protector shall protect a minimum of four conductors. [Transmit Data (2 wires) and Receiver Data (2 wires)]

Ethernet Switch. The Ethernet switch shall meet the requirements specified for the ETHERNET SWITCH and shall be paid for separately under that pay item.

Enclosure. The CCTV cabinet shall meet the requirements specified for the CLOSED CIRCUIT TELEVISION CABINET or CABINET, MODEL 334 and shall be paid for separately under those respective pay items.

Method of Measurement. CCTV equipment shall be counted, each installed, tested, operational and complete.

Basis Of Payment. This item shall be paid at the contract unit each for CLOSED CIRCUIT TELEVISION CAMERA EQUIPMENT for all labor, materials, equipment, setup and testing. Miscellaneous connectors and cables shall be included in the unit price.

DYNAMIC MESSAGE SIGN REMOVAL AND INSTALLATION

Description. This work shall consist of removing, protecting, transporting and installation of the DMS, controller equipment, and removal of all necessary conduits, junction boxes, cables and hardware associated with the DMS, at the locations shown in the plans.

The Traffic Systems Center (TSC) Engineer will test the DMS prior to removal. The Contractor shall be responsible for the DMS, Sign Structure, Cabinet and Cabinet Equipment until they are transferred to the State.

The Contractor shall connect the DMS to the new Fiber Optic Network after the fiber backhaul connections are completed.

CONSTRUCTION REQUIREMENTS

Removal Coordination. It shall be the Contractor's responsibility to contact the TSC Engineer a minimum of 7 working days prior to the DMS removal. The Contractor shall coordinate his work fully with the TSC Engineer both as to the work required and the timing of the removal of the DMS. No additional compensation will be granted under this or any other item for extra work caused by failure to comply with this requirement.

The DMS on the existing structure shall remain operational until it is in conflict with construction operations, or as determined by the Engineer. The new structure shall be erected and prepared for the relocation of the existing DMS prior to removing the DMS from the existing structure to minimize the operational downtime of the DMS.

The DMS shall be installed as soon as possible, as determined by the Engineer, to allow for messages to be displayed during construction.

Removal Inspection. Prior to any work being performed by the Contractor, the Contractor shall (in the presence of the Engineer and the TSC Engineer) conduct an inspection of the DMS sign, sign structure, cabinet and the DMS cables, making note of any parts which are found broken, missing, defective, or malfunctioning.

The TSC Engineer will test the sign as deemed necessary. Any problems will be noted, and/or repaired prior to transfer of maintenance.

The Contractor shall assume full responsibility for the DMS, Sign Structure, Cabinet and Cabinet Equipment during removal, transportation, storage and installation. Any damage shall be repaired to the satisfaction of the Engineer, at no additional cost to the State.

This inspection shall be submitted in writing to the Engineer for record. Without such a record, any damage to the DMS, sign structure, cabinet, cabinet equipment, hardware, and/or cables shall be repaired by the Contractor to the full satisfaction of the Engineer at no additional cost to the Department.

DMS Removal. Power to the sign shall be disconnected to the satisfaction of the Engineer and the TSC Engineer prior to any work on the DMS removal. The power and communications cables shall be pulled from the sign to the cabinet and disposed of, to the satisfaction of the Engineer.

The cellular modem equipment shall be neatly and securely packaged and sent to State Stock after its use is completed. The existing cellular modem shall be temporarily used for DMS communications after the DMS is relocated to the new structure if the fiber backbone connection is not completed at that time, as directed by the Engineer and TSC Engineer.

Once the DMS sign is completely disconnected as coordinated with the Engineer, and TSC Engineer, the Contractor shall remove the DMS from the sign structure, remove the sign structure and the cabinet, and load and protect them for transport.

All underground conduits shall be abandoned.

Foundation Removal. The Contractor shall remove the sign structure and cabinet foundations to the satisfaction of the Engineer. This removal will be paid for with other pay items.

Transportation and Storage. The relocated DMS shall be installed on the same day of its removal if feasible with construction staging, as directed by the Engineer. The reused components shall be stored otherwise. The sign and cabinet shall be protected from moisture and damage by a tarp and a protective wooden frame enclosure constructed around the DMS and cabinet prior to loading it for transport. The equipment inside the cabinet shall be removed and protected.

Care shall be taken in loading, transporting, unloading, and storage of the DMS and controller equipment to prevent damage. The DMS and controller equipment shall be stored inside a building, as approved by the Engineer.

Installation. The Contractor shall re-attach the DMS to the new sign structure. All associated hardware, junction boxes, and conduit shall be attached to the DMS and sign structure. All cabling for the DMS shall be fed through the new conduit system and securely connected in the cabinet. New cables of the size and rating of the original shall be used. This includes up to 300 feet of power, ground, and CAT-5e Ethernet cable.

The Contractor shall install the cabinet on a concrete foundation as shown on the plans. The Contractor shall also construct a 5" (125 mm) P.C.C. pad of a rectangular area 3 ft (1 mm.) by the full width of the foundation immediately adjacent to the cabinet door. These shall be paid for with this pay item.

The Contractor shall install an Ethernet Switch and a Fiber Optic Termination panel in cabinet. These are paid for with other pay items.

The Contractor shall connect the cabinet equipment to the new Fiber Optic Ethernet Network. This is included in this pay item.

The existing service connection for the existing DMS shall be re-used.

The Contractor shall install a CCTV Camera on an 80 foot pole, at the location shown in the plans. This camera shall be able to read the sign. These shall be installed under other pay items.

Method Of Measurement. The removal of the DMS, cabinet and equipment, conduit and all associated hardware; and storage and installation of the DMS, controller equipment, conduit and all associated hardware shall be measured as lump sum.

Basis Of Payment. This work will be paid for at the contract lump sum price for DMS REMOVAL AND INSTALLATION. All conduit, cables, and hardware attached to the DMS and sign structure shall be included in this pay item. All labor to remove, store, and install the DMS is included in this pay item. The Contractor shall furnish a completely operational system.

ATMS SYSTEM INTEGRATION

Description.

This item includes integrating all remote vehicle sensing device (RVSD) units and all telemetry as shown in the plans into the IDOT Advanced Traffic Management System (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 changes in field sensors introduced by this project.

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, a PARSONS Company
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 RVSD units and all telemetry 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:

- (a) Integrate data from the additional RVSD units thru the NTCIP interface at a rate of once every 20 seconds.
- (b) Create new Vehicle Detection Station (VDS) display, data table, description and control panel display, and travel time tables.
- (c) Modify the existing graphic user interface, report generators, data bases, broadcast feeds (both subscriber and internal), data tables for the dynamic message sign control.
- (d) Display on the Traffic Systems Center ATMS maps, and all user interfaces to the new VDS data including Volume, Occupancy, Speed, Vehicle Classification (length), and operational status.
- (e) Create new segments and groupings used to display travel time and congestion data to the Dynamic Message Signs.
- (f) Update the Lake Michigan Interstate Gateway Alliance (LMIGA) data feeds for presentation of the additional data to the web page and user interfaces.
- (g) Develop an integration acceptance test plan and conduct said test to verify that all RVSD units and telemetry has 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.

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, as described above, and after passing an acceptance test proposed by the Subcontractor, and agreed upon by the Engineer.

CLOSED CIRCUIT TELEVISION CAMERA, HD (D-1)

Effective: December 1, 2014

1. Description.

This item shall consist of furnishing and installing an integrated High Definition Closed-Circuit Television (CCTV) Dome Camera Assembly as described herein and as indicated in the Plans.

2. Materials.

2.1 General. The HD (High Definition) CCTV Dome Color Camera shall be a rugged, non-pressurized, outdoor surveillance domed camera system. The HD CCTV Dome Camera shall be designed to perform over a wide range of environmental and lighting conditions and automatically switches from color daytime to monochrome nighttime operation. The high definition camera shall be either a Bosch Autodome IP series 7000 HD, Pelco Spectra 1080P HD Series, or a Siquira HSD820H3-E series in compliance with the requirement herein.

Camera shall use a standard Web browser interface for remote administration and configuration of camera parameters. The browser interface shall provide PTZ control including preset and pattern and on-screen display (OSD) for access to camera programming.

All equipment and materials used shall be standard components that are regularly manufactured and utilized in the manufacturer's system.

The manufacturer shall be ISO 14001 Certified. The manufacturer's quality system shall be in compliance with the I.S./ISO 9001/EN 29001, QUALITY SYSTEM. The manufacturer shall provide a three year (3) warranty. The manufacturer shall pay inbound and outbound shipping charges during the warranty period for products returned as warranty claims. The manufacturer shall also provide an advance exchange program for warranty claims.

The warranty period shall begin on the date of final acceptance of the video distribution system. This warranty shall include repair or replacement of all failed components via a factory authorized repair facility. All items sent to the repair facility for repair shall be returned within two weeks of the date of receipt at the facility. The repair facility location shall be in the United States. Any extended warranty coverage required to comply with the specified warranty period shall be provided as a part of this pay item at no additional cost to the Department.

2.2 Physical construction. The CCTV Dome Camera shall be provided in a NEMA 4X or IP66 certified, rugged, weather-resistant package. The CCTV Dome Camera shall also comply with the following requirements:

Environmental	Requirement
IP Rating	IP 66
Weight (max.)	10 lbs
Overall Dimensions	10" dia. x 14"
Humidity	0 to 100%
Operating temperature	-40°C to 50°C
Mount	1 ½" NPT

The CCTV dome camera shall be equipped with a fan and heater controlled by a thermostat. The heater shall prevent internal fogging of the lower dome throughout the operating temperature range of the camera.

An optional rugged clear dome bubble shall be available from the CCTV camera manufacturer. The rugged dome shall be made from 3mm thick polycarbonate, designed to meet stringent strength standards without compromising optical clarity. The dome, by itself, shall withstand a 100 foot-pound impact. This energy is equivalent to that of a 10 lb sledgehammer being dropped from a height of 10 feet. The dome, when installed in the CCTV camera, shall exceed the UL 1598 horizontal impact standard for lighting fixtures, by a factor of 10. The submittal needs to indicate compliance with this requirement.

2.3 Power. The CCTV Dome Camera shall be designed to operate from a 120V power source. The appropriate power supply, if required for the CCTV Dome Camera to operate, shall be included as a part of this item. The power requirements for the camera shall comply with the following:

Item	Requirement	
Port	RJ-45 for 100Base-TX; Auto MDI/MDI-X;	
Cabling Type	CAT5 cable or better for 100Base-TX	
Input Voltage	18 to 32 VAC; 24 VAC nominal; 22 to 27 VDC; 24 VDC nominal	
Input Power	24 VAC nominal	25 VA nominal (without heater and blower);
		75 VA nominal (with heater and blower)
	24 VDC nominal	0.7 A nominal (without heater and blower); 3 A nominal (with heater and blower)
	PoE	IEEE802.3af (without heater and blower)

2.4 Camera. The camera shall provide a minimum of two simultaneous video streams with a 2.1 megapixel (MPx) 1920 x 1080 resolution, auto iris with 30X optical, and 12X digital zoom. The CCTV Dome Camera shall incorporate

Item	Requirement
Sensor Type	1/2.8-inch Type Exmor CMOS sensor
Optical Zoom	30X
Digital Zoom	12X
Maximum Resolution	1920 x 1080
Lens	f/1.6 - f/4.7, (4.3 mm - 129.0 mm optical)
Horizontal Angle of View	59° (wide) - 2° (tele)
Aspect Ratio	16:9
Light Sensitivity	Sensitivity in lux for 90% reflectance, f/1.6 (wide angle), 28 dB gain at 30 IRE (30% of signal level) with Sensitivity Boost OFF; 4X improvement to sensitivity with Sensitivity Boost ON
Color (33 ms)	0.65 lux
Color (250 ms)	0.07 lux
Mono (33 ms)	0.20 lux
Mono (250 ms)	0.015 lux
Day/Night Capabilities	Yes
IR Cut Filter	Yes
IR Trace	Curves 850 nm and 950 nm
Wide Dynamic Range	80dB
Iris Control	Auto iris with manual override
Backlight Compensation	Auto / Manual
Automatic Gain Control	Auto / Manual
Active Noise Filtering	Auto / Manual
Electronic Image Stabilization (EIS)	30X

2.5 Video

Item	Requirement
Video Encoding	H.264 in High, Main, or Base profiles and MJPEG
Video Streams	Up to 2 simultaneous streams, the second stream is variable based on the setup of the primary stream
Frame Rate	Up to 30, 25, 15, 12.5, 10, 8.333, 7.5, 6, 5.3, 2.5, 2, 1 (depending upon coding, resolution, and stream configuration)
Minimum Available Resolutions	1920 x 1080 1280 x 720 720 x 480
Supported Protocols	TCP/IP, UDP/IP (Unicast, Multicast IGMP), UPnP, DNS, DHCP, RTP, RTSP, NTP, IPv4, IPv6, SNMP v2c/v3, QoS, HTTP, HTTPS, LDAP (client), SSH, SSL, SMTP, FTP, and 802.1x (EAP)
Security Access	Password protected
Software Interface	Web browser view and setup

2.6 PTZ Mechanical

Item	Requirement
Pan Movement	360° continuous pan rotation
Pan Speed	Variable between 400° per second continuous pan to 5.0° per second
Vertical Tilt	Unobstructed tilt of +1° to -90°
Manual Control Speed	Pan speed of 0.1° to 80° per second; tilt operation shall range from 0.5° to 40° per second.
Automatic Preset Speed	Pan speed of 280° and a tilt speed of 160° per second
Presets	255 positions
Tours	2 tours
Preset Accuracy	± 0.2°
Proportional Pan/Tilt Speed	Speed decreases in proportion to the increasing depth of zoom
Motor	Continuous duty and variable speed, operating at 18 to 32 VAC, 24 VAC nominal
Window Blanking	16 blanked windows
Auto Flip	Rotates dome 180° at bottom of tilt travel
Power Consumption	Nominal 45 VA (without heater and blower running) Nominal 75 VA (with heater and blower running)

The camera shall provide a freeze frame feature that freezes a camera image as a preprogrammed preset is called, providing a live view once positioned. Selections for on/off shall be available through the embedded Web browser.

The camera shall provide image stabilization to compensate for vibration introduced into the camera.

The camera shall support IPv6 configurations in conjunction with IPv4.

3. **Still Picture Capture.** The camera shall be capable of capturing a still image in JPEG format and automatically transferring this image to an FTP site. The resolution of the image shall be user selectable. The frequency of captures shall be user settable and shall as a minimum range from 1 picture every 30 seconds to 1 picture every five minutes.
4. **Video Distribution System (VDS) Control System Driver.** The camera and video output shall be controller and configured through the VDS. Consequently a software driver for the VDS is required and included as a part of the CCTV camera. The VDS control system is Cameleon ITS manufactured by 360 Surveillance, a division of FLIR. It is the Contractor's responsibility to determine if an existing software driver exists for the propose camera manufacturer. If a driver does not exist for the proposed CCTV camera, the work and cost of developing the driver shall be included in this item.
5. **Testing.** The Contractor shall test each CCTV Dome Camera Assembly in the presence of the Engineer after the camera is installed. This test may be done locally at the camera support structure.
6. **Product Support.** The manufacturer shall provide technical support via email, fax and toll-free telephone. The above forms of support shall be provided Monday through Friday, 8:00am to 8:00pm EST.
7. **Installation.** The Contractor shall install the CCTV camera in accordance with manufacturer's instructions. The camera firmware shall be the latest stable release available at the time of installation.
8. **Documentation.** In addition to the initial submittal(s) prior to procurement, the Contractor shall provide installation and operation manuals, documentation of exact equipment model and serial numbers, software/firmware version numbers, in hardcopy and PDF formats on CD-ROM.
9. **Measurement.** Closed-Circuit Television (CCTV) Cameras, High Definition shall be counted as each upon successful completion of the testing described herein for payment.
10. **Basis of Payment.** This item will be paid for at the contract unit price each for CLOSED CIRCUIT TELEVISION CAMERA, which shall be payment in full for all material and work as specified herein.

CABINET HOUSING EQUIPMENT, TYPE IV

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.

TYPE	HEIGHT	WIDTH	DEPTH	THICKNESS	OPENING
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"

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. (3.68m³/min) at .160" (4.1mm) of water static pressure.

Where the E.S.P. Type 3 cabinet is used to house equipment controlling ramp metering signals, the E.S.P. Type 3 cabinet shall have a signal load relay installed. The signal load relay shall consist of two components, a base which is mounted on the E.S.P. Type 3 cabinet wall and a locking screw. The coil of this relay shall be connected to the mark output of the signal change tone receiver. The one set contacts of the load relay shall be used to change the ramp signals and one set of contacts shall be used to key the mark input to the signal change transmitter. This relay shall be incidental to the cost of the cabinet when used.

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.

Each Induction loop shall have lightning protection. The Contractor shall furnish and install stud-mounted lightning protection devices. The device shall have three-terminals, two of which are connected across the loop input of the detector for differential mode protection and the third terminal grounded to protect against common mode damage. Differential mode surge shall be clamped by the semi-conductor array instantly and common mode surge shall be handled by three element gas discharge tube which fires at 400VDC and thereafter clamps the two loop leads to 30 volts in respect to ground. The device shall be installed in close proximity to the loop input. Extension of the factory leads of the device shall not be allowed.

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. The final coat color shall be specified by the Department 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, lightning protection for each loop (SRA-6LC surrestor), data line protection for each leg of the four (4) wire telecommunication system (SRA 64C surrestor), 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 therefrom.

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 cabinet.

Cable harnesses, terminal boards, and mounting hardware shall be installed as needed. These items shall be considered as incidental to the cost of the cabinet.

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.

FIBER CONNECTIVITY TO IDOT DISTRICT 1

Description

This item shall consist of coordinating with IDOT District 1, the Illinois Tollway, and the University of Chicago and performing the work necessary to reestablish the IDOT fiber optic communications currently functioning via the Illinois Tollway Plaza 19. Work includes configuring networking equipment and assigning fiber optic strands in a new communications shelter such that the existing IDOT communications are reestablished without network equipment or infrastructure inside Plaza 19.

Materials

The Contractor shall provide an Ethernet switch equal to the existing IDOT Travel Midwest Gateway switch in Illinois Tollway Plaza 19. The existing switch mistakenly has an Illinois Tollway property tag identification M63603.

Information on the existing switch is below:

Cisco Catalyst
Model: WS-C3750G-12S-E
SN: CAT0936Z32Z

The Contractor shall provide a fiber optic patch panel. The fiber patch panel enclosure shall meet the requirements of the fiber optic patch panel included in the Fiber Optic Cable, Single Mode pay item, except it shall accommodate (3) 96-strand single mode fiber cables.

CONSTRUCTION REQUIREMENTS

The existing Ethernet switch and fiber optic hardware have been identified as the items to be relocated to the new communications shelter. However, The Contractor shall visit the Plaza 19 computer room with representatives of the Illinois Tollway, IDOT, and UIC to confirm all needed equipment and communications infrastructure work has been determined.

All existing IDOT communications operating via Illinois Tollway Plaza 19 shall be reestablished through the installation of networking equipment and communications cabling work at the new communications shelter and the surrounding area. The work shall be staged such that the existing communications via Plaza 19 remains in operation to maximum extent possible, prior to making the switchover. The plan shall incorporate the use of the same Ethernet switch configured in the same way installed in advance in the new communications shelter equipment rack. This switch shall be ready to duplicate the networking function of the current switch in Plaza 19 and avoid the time required to physically move the switch. The staging plan shall allow the fiber work to be sequenced and completed to the extent possible prior to the fiber cutover. The plan shall include a means to temporary revert back to the current setup in the event that issues arise from the switchover. The details of the staging plan shall be submitted by the Contractor to the Engineer for approval prior to commencing with this work.

As part of a separate project, Cumberland Flyover (Contract No. 60X56), it is anticipated that 700 feet of 96-strand fiber-optic cable (FOC) will be stored in a communications vault near the west bank of the Des Plaines River as indicated on the plans. This existing FOC shall be pulled into the new communications shelter and shall be spliced to pigtails and terminated on fiber optic patch panels on the equipment rack in the new communications shelter. The existing, slacked FOC will be installed alongside new 96-strand FOCs installed as part of this project.

Fiber fusion splicing shall be performed in the communications vault near Tollway Plaza 19. Fiber assignments shall be determined in close coordination with the IL Tollway and IDOT. Fusion splicing shall reestablish the existing backhaul communications for the Ethernet switch that is relocated from Plaza 19 to the new communications shelter located west of the Des Plaines River and south of Interstate 190.

Work shall be closely coordinated among the various parties involved. The Contractor shall arrange a meeting prior to beginning work. Contact persons are listed below.

- UIC contact:
Doug Rorem
UIC CS Dept M/C 152
851 S Morgan Street room 1120
Chicago, IL 60607
(312) 996-5439
rorem@uic.edu

- IDOT D1 contact:
Roy Lawson
Electrical Engineer
Illinois Department of Transportation
Bureau of Traffic Operations/Electrical Field office
445 W. Harrison St.
Oak Park, Illinois 60304
708-524-2145 (office)
708-524-1455 (fax)
847-652-1776 (cell)
roy.lawson@illinois.gov

- Illinois Tollway
Elyse Morgan
Illinois Tollway
2700 Ogden Ave
Downers Grove, IL 60515
630-241-6800
emorgan@getipass.com

The routing of fiber optic cable shall be performed with care in accordance with the requirements of the Fiber Optic Cable, Single Mode pay item. Fiber testing shall be performed in accordance with and paid under the Fiber Optic Cable, Single Mode pay item.

Method of Measurement

This work will be measured for payment as a lump sum for all material and labor to establish high performance fiber optic communications between IDOT District 1 headquarters and several remote locations that have existing communications currently through Illinois Tollway Plaza 19.

Basis of Payment

This work will be paid for at the contract lump sum price for FIBER CONNECTIVITY TO IDOT DISTRICT 1 which shall be for the specified herein.

CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, FOUNDATION, 80 FT. MOUNTING HEIGHT (D-1)

Effective: March 1, 2010

Description:

This item shall consist of the construction of a steel reinforced concrete foundation, of the dimensions indicated, complete with raceways. The foundation depth shall be as indicated in the Foundation Depth Table on the plans (where applicable) or as otherwise shown on the Contract Drawings or as directed by the Engineer.

The foundation shall include excavation, reinforcement, concrete, anchor bolts, nuts, washers and raceways as well as clean up and restoration of the location when such work is not provided under other paid items.

Materials:

Concrete shall be Class SI complying with Article 720 of the Standard Specifications and shall incorporate a Calcium Nitrite Corrosion Inhibitor as specified in Check Sheet #21 of the Supplemental Specifications and Recurring Special Provisions, Adopted February 1, 1995.

Reinforcement bars shall comply with Article 706.10 of the Standard Specifications.

Unless otherwise indicated, anchor bolts shall comply with the requirements of ASTM Designation A 687. Unless otherwise indicated, nuts shall be hexagon nuts in conformance with ASTM A 194 2H or ASTM a 563 DH, and washers shall be in conformance with ASTM F436.

The entire length of the anchor bolts as well as the nuts and washers shall be hot dip galvanized in accordance with the requirements of ASTM Designation A 153.

Unless otherwise indicated, conduit raceways shall be heavy wall rigid polyvinylchloride (PVC) conduit, (Schedule 40) UL listed and in conformance with NEMA TC2 and Federal Specification WC 1094A. Raceways shall be of the number and size as indicated.

Construction Requirements:

The foundation depths shall be as directed by the Engineer based upon evaluation of the soil conditions encountered. The Engineer may determine soil condition by visual inspection or, where practical, by the use of a pocket penetrometer and will establish foundation depth based upon the Foundation Depth Table shown on the plans, where applicable.

The hole for the foundation shall be made by drilling with an auger, of the same diameter as the foundation. The foundation shall be cast in place and allowed to cure for 10 days minimum before the light pole is erected. If soil conditions require the use of a liner to form the hole, the liner shall be withdrawn as the concrete is deposited. The top of the foundation shall be constructed level so that no shims or other leveling device will be needed to set the light standard plumb on the foundation. A liner or form shall be used to produce a uniform smooth side to the top of the foundation. Foundation top shall be chamfered 19.05 mm (3/4 inch) unless otherwise indicated.

Extreme care shall be used in establishing the top elevation of concrete foundations, especially when foundations are installed before final grading is complete. Foundations shall not protrude above grade more than the limits indicated on the plans, except for specifically indicated locations, and where not otherwise indicated, foundation shall not protrude above grade more than 101.6 mm (4 inches) above a 1524.0 mm (60-inch) chord centered at the foundation, at any point around the circumference. Where foundation heights extend beyond specified limits, the Engineer may direct replacement of the foundation and the incorrect foundation will not be measured for payment.

The steel reinforcement, the raceway conduits and the anchor bolts shall be secured in place to each other and properly positioned in the augered hole so that at time of pouring of concrete mixture in place the above said components retain their proper positions. Special attention shall be paid to the positioning of the anchor bolts. It is of utmost importance that the anchor bolt projections on top of the foundation, after placement of the concrete, remain in a perfectly vertical position.

Method of Measurement:

The foundation shall be measured for payment in linear meters (feet) of the foundation in place, in accordance with the total length of concrete pier required, indicated as foundation depth, in the Foundation Depth Table on the Plans and as directed by the Engineer, i.e., extra foundation depth, beyond the directive of the Engineer, will not be measured for payment. Where extension above grade is required, this distance shall be measured for payment.

Basis of Payment:

This work will be paid for at the contract unit price per linear foot for CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, FOUNDATION, 80 FT. MOUNTING HEIGHT, which shall be payment in full for the work as shown on the Drawings and described herein.

CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, GALVANIZED STEEL, 80 FT. MOUNTING HEIGHT

Description. This work shall consist of furnishing a CCTV camera structure complete with camera lowering device. The structure shall be a galvanized steel structure. The lowering device shall be configured to support a **high definition** camera with the appropriate power and Ethernet cable connections.

Definitions.

- CCTV Camera Structure: The complete camera structure and lowering device as one integral working system.
- Shaft: The camera structure shaft.
- Lowering Device: The components involved with the mounting, operation, and raising and lowering of the CCTV camera.
- Structure Height: The height of the structure shall be measured as indicated on the detail drawings

Materials.

Materials shall be as specified elsewhere herein.

Deflection.

The design of the structure shaft shall achieve a maximum, fully loaded deflection at the top of the structure, which is not greater than 1-inch

Submittals and Certifications.

The structure shall be designed in accordance with 2001 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals with Appendix C wind pressure for a 90 mph wind zone with a 1.3 gust factor. The pole shall be designed for use with a single arm camera lowering device with a total effective area of 2 square feet and total weight of 95 lbs. The structure shall not exceed 1" deflection in a 30 mph (non-gust) wind.

The camera structure shall be designed and constructed so no structural member or other component is applied in excess of the manufacturer's recommended rating (when applicable) or the published rating, whichever is lower

Shop drawings, product data and certifications shall be submitted. The submitted information shall be complete and shall include information relative to all specified requirements suitable for verification of compliance.

THE SUBMITTALS SHALL BE ARRANGED AND CROSS-REFERENCED TO THE SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS. FAILURE TO CROSS-REFERENCE THE SUBMITTAL INFORMATION WITH THE SPECIAL PROVISIONS WILL RESULT IN THE SUBMITTAL BEING RETURNED WITHOUT REVIEW.

The submittal information shall be dated, current, project specific, identified as to the project, and shall also include the following calculations and certifications as applicable to the material utilized:

- Shaft design calculations, including Registered Engineer Certification.
- Certification of intent to provide domestic steel in accordance with Article 106.01 of the Standard Specifications.
- Welding details and procedures.
- Letter of intent to provide specified weld inspection reports.
- Confirmation of coordination between anchor rod supplier and the structure manufacturer for adequacy of anchor rod assembly.
- Manufacturer's recommended installation procedures.
- Letter of intent to provide manufacturer's representative during installation and to provide specified installation certification.

All certifications shall be notarized.

Shaft.

The pole shall be a maximum of three sections for field assembly. The pole shafts shall be a round cross section and meet the requirements of ASTM A595 grade A with a minimum yield strength of 55,000 psi. The bottom section shall have a minimum .3125 wall thickness and a minimum diameter of 23". The three shafts sections shall taper at a rate of .14" per foot and have an overall height of 80'. The pole base plate shall meet the requirements of ASTM A36 and be arranged to accommodate four (4) 1 1/2" x 54" x 6" anchor bolts on a 27" bolt circle. Anchor bolts shall conform to ASTM F1554 gr. 55

The pole assembly shall be equipped with a 6" x 27" reinforced hand hole opening with a 3 gauge cover and shall be attached with four (4) 1/4"-20 hex hd s.s. screws. The bottom of the hand hole shall be located up 14" from the bottom. The hand hole frame shall meet ASTM A529 grade 50 and shall be made from 3/4" x 3 1/2" bar. There shall be a 3/8" diameter rod for wire tie off located at the top of the opening and 1 3/4" from the front of the hand hole frame and also a 1/2" tapped hole located 1 3/4" from the front of the frame at the bottom of the opening as shown on the drawing.

Six (6) 1" i.d. eye rings for power and communication cables are required as shown on the drawing. Two (2) shall be located 38" up from the bottom, two (2) located 6" below the top of the bottom shaft and two (2) 6" below the top of the center shaft.

There shall be a 3 ½" schedule 40 (4" od) pipe tenon 11 ¾" tall on a 3/8" thick plate welded to the top of the pole. The pipe tenon shall include a 1 ¾" x 5 ¼" slot and two (2) 5/8" holes as shown on the drawing to accommodate the Camera Lowering System arm assembly. A J-hook shall be included inside the top of the tenon assembly and shall include a removable cast aluminum pole top.

Camera Lowering Device

General

The camera lowering system shall be designed to support and lower a **high definition** closed circuit television camera, lens, housing, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. The camera lowering system device and the pole are interdependent; and thus, must be considered a single unit or system. The lowering system shall consist of a pole, suspension contact unit, divided support arm, and a pole adapter for attachment to a pole top tenon, pole top junction box, conduit mount adapter and camera connection box. The divided support arm and receiver brackets shall be designed to self-align the contact unit with the pole center line during installation and insure the contact unit cannot twist under high wind conditions. For maximum arm strength, round support arms are not acceptable.

The camera-lowering device shall withstand wind forces of 100mph with a 30 percent gust factor using a 1.65 safety factor. The lowering device manufacturer, upon request, shall furnish independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum effective projected area, the actual effective projected area (EPA) or an EPA greater than that of the camera system to be attached. The camera-lowering device to be furnished shall be the product of manufacturers with a minimum of 3 years of experience in the successful manufacturing of camera lowering systems. The lowering device provider shall be able to identify a minimum of 3 previous projects where the proposed system has been installed successfully for over a one-year period of time each.

The lowering device manufacturer shall furnish a factory representative to assist the electrical contractor with the assembly and testing of the first lowering system onto the pole assembly. The manufacturer shall furnish the applicable DOT engineer documentation certifying that the electrical contractor has been instructed on the installation, operation and safety features of the lowering device. The contractor shall be responsible for providing applicable maintenance personnel "on site" operational instructions and providing three (3) copies of operations and maintenance manuals to the DOT engineer.

Suspension Contact Unit

The suspension contact unit shall have a load capacity 600 lbs. with a 4 to 1 safety factor. There shall be a locking mechanism between the fixed and moveable components of the lowering device. The movable assembly shall have a minimum of 2 latches. This latching mechanism shall securely hold the device and its mounted equipment. The latching mechanism shall operate by alternately raising and lowering the assembly using the winch and lowering cable. When latched, all weight shall be removed from the lowering cable and all electrical contacts shall be fully engaged. The fixed unit shall have a heavy duty cast tracking guide and means to allow latching in the same position each time. The contact unit housing shall be weatherproof with a gasket provided to seal the interior from dust and moisture.

The prefabricated components of the lift unit support system shall be designed to preclude the lifting cable from contacting the power or video/Ethernet cabling. The lowering device manufacturer shall provide a conduit mount adapter for housing the lowering cable. This adapter shall have an interface to allow the connection of a contractor provided 1.25 inch PVC conduit and be located just below the cable stop block at the back of the lowering device. The Contractor shall supply internal conduit in the pole as directed by the Lowering Device provider. The only cable permitted to move within the pole or lowering device during lowering or raising shall be the stainless steel lowering cable. All other cables must remain stable and secure during lowering and raising operations.

The female and male socket contact halves of the connector block shall be made of Hypalon. The female brass socket contacts and the male high conductivity brass pin contacts shall be permanently molded into the polymer body.

The current carrying male contacts shall be 1/8 inches in diameter. There shall be two male contacts that are longer than the rest which will make first and break last providing optimum grounding performance. The contacts shall be fully coordinated with the **high definition** camera specified elsewhere herein.

The current carrying female contacts shall be 1/8 inches I.D. All of the contacts shall be recessed 0.125" from the face of the connector. Cored holes in the socket measuring 0.25" in diameter and 0.125" deep molded into the connector body are centered on each contact on the face of the connector to create rain-tight seals when mated with the male connector.

The wire leads from both the male and female contacts shall be permanently and integrally molded in the Hypalon body. The current carrying and signal wires molded to the connector body shall be constructed of #18/1 AWG Hypalon jacketed wire.

The contacts shall be self-wiping with a shoulder at the base of each male contact so that it will recess into the female block, thereby giving a rain-tight seal when mated. The facility manufacturing the electrical contact connector must comply with Mil Spec Q-9858 and Mil Spec I-45208.

Lowering Tool

The camera-lowering device shall be operated by use of a portable lowering tool. The tool shall consist of a lightweight metal frame and winch assembly with cable as described herein, a quick release cable connector, an adjustable safety clutch and a variable speed industrial duty electric drill motor. This tool shall be compatible with accessing the support cable through the hand hole of the pole. The lowering tool shall attach to the pole with one single bolt. The tool will support itself and the load assuring lowering operations and provide a means to prevent freewheeling when loaded. The lowering tool shall be delivered to the State upon project completion. The lowering tool shall have a reduction gear to reduce the manual effort required to operate the lifting handle to raise and lower a capacity load. The lowering tool shall be provided with an adapter for operating the lowering device by a portable drill using a clutch mechanism. The lowering tool shall be equipped with a positive breaking mechanism to secure the cable reel during raising and lowering operations and prevent freewheeling. The manufacturer shall provide a variable speed, heavy-duty reversible drill motor and a minimum of two complete lowering tools plus any additional tools required by plan notes. The lowering tool shall be made of durable and corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

Camera Junction Box

The camera junction box shall be of two piece clamshell design with one hinge side and one latch side to facilitate easy opening. The general shape of the box shall be cylindrical to minimize the EPA. The Camera Junction Box shall be cast aluminum with stabilizing weights on the outside of the box to increase room on the interior. The box shall be capable of having up to 40 pounds of stabilizing weights. The bottom of the Camera Junction Box shall be drilled and tapped with a 1-1/2" NPT thread to accept industry standard dome housings and be able to be modified to accept a wide variety of other camera mountings. The junction box shall be gasketed to prevent water intrusion. The bottom of the box shall incorporate a screened and vented hole to allow airflow and reduce internal condensation.

Materials

All pulleys for the camera lowering device and portable lowering tool shall have sealed, self lubricated bearings, oil tight bronze bearings, or sintered- oil impregnated, bronze bushings. The lowering cable shall be a minimum 1/8-inch diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds with (7) strands of 19 wire each.

All electrical connections between the fixed and lowerable portion of the contact block shall be protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. The electrical connections between the fixed and movable lowering device components shall be designed to conduct high frequency data bits as well as the power requirements for operation of dome environmental controls.

The interface and locking components shall be made of stainless steel and or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

The Camera Manufacturer shall provide weights and /or counterweights as necessary to assure that the alignment of pins and connectors are proper for the camera support to be raised into position without binding. The lowering unit will have sufficient weight to disengage the camera and its control components in order that it can be lowered properly

Installation of the lowering device and camera shall be included as a part of this item and shall not be paid for separately.

Pole/Tower Installation.

The pole shall be set plumb on the foundation without the use of shims, grout or any other leveling devices under the pole base. The arm shall be set at right angles to the centerline of the pavement.

Poles shall not be installed until cameras are available for installation at the same time the poles are installed. Poles shall not be installed and left standing without a coordinated installation of arm and camera. Poles shall not be paid unless the coordinated assembly is complete.

Method of Measurement. CCTV camera structures shall be counted, each with all appurtenances installed.

Basis of Payment. This item shall be paid for at the contract unit price each for CLOSED CIRCUIT TELEVISION CAMERA STRUCTURE, GALVANIZED STEEL, of the mounting height specified.

FIBER OPTIC FUSION SPLICE

Description. This work shall consist of making all fiber optic fusion splices at a given site as shown on the plans. Fiber splicing consists of in-line fusion splices for all fibers described in the cable plan at the particular location. Splices shall be stored in rugged fiber optic splice closures in communications vaults or in splice trays of an above-ground fiber optic splice enclosure to secure and protect the fiber optic fusion splices.

Two splices are identified. A mainline splice includes fusion splicing all fibers in the cable sheath. In a lateral splice, the buffer tubes in the mainline cable are dressed out and designated buffer tubes and fiber strands are accessed and fusion spliced to lateral cable fiber strands or fiber pigtailed as identified on the plans.

Materials. All equipment and ancillary materials needed to make fiber optic fusion splices shall be included in this work.

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 unspliced 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.

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 0 and 100 degrees 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 0 and 100 degrees 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. cylindrical steel impacting head with a 2 in. spherical radius at the point where it contacts the closure. It shall be dropped from a height of 12 in. 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. 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. 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

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. All fiber splices shall be fusion spliced and secured inside a protective enclosure. 45 days prior to the start of the fiber optic cabling installation, the Contractor shall submit the proposed locations of the mainline splice points for review by the Department.

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. Fusion splices must meet the acceptance testing requirements of the Fiber Optic Cable specifications. As directed by the Engineer, the Contractor at no additional cost to the Department shall replace any cable splice not satisfying the requirements.

The closure shall be installed according to the manufacturer's recommended guidelines. 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.

After completing all fusion splices, 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.

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 no additional cost to the Department.

Method of Measurement. Fiber optic splices of the type specified will be measured as each for all the required splices shown on the plans at a given site completed, tested, and secured within protective enclosures.

Basis of Payment. This work will be paid for at the contract unit price per each for FIBER OPTIC SPLICE – LATERAL or FIBER OPTIC SPLICE – MAINLINE, which price shall be payment in full for all fusion splice work at a site location, complete as specified herein.

DRILL EXISTING JUNCTION BOX

Description. This work shall consist of drilling a hole in an existing junction box and furnishing and installing a new conduit.

Materials. All materials shall be in accordance to the requirements of section 813 of the Standard Specification.

Installation Details. Use a knockout punch to make a hole into the side wall of the metallic base adapter underneath a ground-mounted cabinet, or in the bottom of a pole-mounted cabinet. Use the punch size recommended by the manufacturer for the conduit being installed. Do not disturb any existing cables, cabinet equipment, or the integrity of the base adapter.

Run a galvanized steel close nipple through the hole, using sealing lock nut on each side of the wall.

Install a plastic insulating bushing on the nipple inside the base adapter or cabinet.

Connect the nipple to an underground conduit using metal conduit and fittings as required. Match the size of the underground conduit. At right angle connections, install mogul LB conduit bodies to facilitate the installation of cable.

Method of Measurement. This item shall be measured as each for DRILL EXISTING JUNCTION BOX, per hole drilled for a single conduit.

Basis of Payment. This work shall be paid for at the contract unit price each for DRILL EXISTING JUNCTION BOX, which shall be payment in full for the work complete as specified herein and as directed by the Engineer.

FIBER OPTIC CABLE, SINGLE MODE (D-1)

Effective: March 15, 2013

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 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1999 for a single sheathed, 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."

Physical Construction		
Requirement	Units	Value
Cladding Diameter	µm	12.50 ± 0.7
Core-to-Cladding Concentricity	µm	≤ 0.5
Cladding Non-Circularity	µm	≤ 0.7%
Mode Field Diameter (1310 nm)	µm	9.2 ± 0.4
Mode Field Diameter (1550 nm)	µm	10.4 ± 0.5
Coating Diameter	µm	245 ± 5
Colored Fiber Nominal Diameter	µm	253 – 259
Fiber Curl Radius of Curvature	m	> 4.0

Optical Characteristics			
Requirement		Units	Value
Cabled Fiber Attenuation	1310 nm	dB/km	≤ 0.4
	1550 nm		≤ 0.3
Point Discontinuity	1310 nm	dB	≤ 0.1
	1550 nm		≤ 0.1
Macrobend Attenuation	Turns	Mandrel OD	dB
	1	32 ± 2 mm	
	100	50 ± 2 mm	
	100	50 ± 2 mm	
	100	60 ± 2 mm	
	100	60 ± 2 mm	
Cable Cutoff Wavelength (Λ_{ccf})		nm	< 1260
Zero Dispersion Wavelength (Λ_0)		nm	1302 ≤ Λ_0 ≤ 1322
Zero Dispersion Slope (S_0)		ps/(nm ² -km)	≤ 0.089
Total Dispersion	1550 nm	ps/(nm-km)	≤ 3.5
	1285-1330 nm		≤ 17.5
	1625 nm		≤ 21.5
Cabled Polarization Mode Dispersion		(ps/km ²)	≤ 0.2
IEEE 802.3 GbE – 1300 nm Laser Distance		(m)	Up to 5000
Water Peak Attenuation: 1383 ± 3 nm		(dB/km)	≤ 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-swellaable yarn for water-blocking protection. The water-swellaable 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 swellaable yarn(s) shall be applied longitudinally along the central member during stranding.

Two polyester yarn binders shall be applied contrahelically 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 swellaable tape shall be applied longitudinally around the outside of the stranded tubes/fillers. The water swellaable 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 swellaable tape shall be applied longitudinally over both the inner and outer layer. The water swellaable 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 (NESEC), 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 unaged 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 multimode 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 ≤ 20 times the cable diameter after conditioning for four hours at test temperatures of -30°C and $+60^{\circ}\text{C}$. 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
 - Top (inside end of cable)
 - 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° F to +158° F (-50° C to +70° C)
- Installation temperature: -22° F to +158° F (-30° C to +70° C)
- Operating temperature: -40° F to +158° F (-40° C to +70° 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 Engineer.

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

- Identify where each cable will enter the underground system and the direction each pull.
- Identify locations where the cable is pulled out of a handhole, 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.
- Identify the location of slack storage locations
- Identify the locations of splices.
- Identify distances between fiber access points and crossings.

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. Unless specified otherwise by the fiber optic cable manufacturer, the outside bend radius of the cable during installation shall be no less than 20 times the outside diameter of the fiber optic cable. Entry guide chutes shall be used to guide the cable into the 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.

If figure-eight techniques are used during cable installation, the cable shall be handled manually and stored on the ground. The cable shall be placed on tarps to prevent damage from gravel, rocks, or other abrasive surfaces. Tarps should also be used in muddy conditions to keep the cable clean. Enough area to accommodate the cable length to be stored and sufficient personnel to maintain the required minimum-bending diameter as well as avoid kinking or otherwise damaging the cable shall be provided. If the cable has been figure-eighted in preparation for a forward feed, the figure-eight must be flipped over to access the outside cable end. Provide sufficient personnel to avoid kinking the cable as the figure-eight is flipped over. When removing the cable from the figure-eight, use care to avoid kinking the cable and violating the minimum-bending diameter.

Power assisted or figure-eight eliminator equipment, which is used to eliminate manual figure-eight procedures, shall not be used unless specifically allowed by the cable manufacturer in writing.

The pulling tension shall be continuously measured and shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable. A dynamometer or in-line tensiometer shall be used to monitor tension in the pull-line near the winch. This device must be visible to the winch operator or used to control the winch. 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 as well as included in the record drawing package.

The use of a breakaway link (swivel) may be used to ensure that the maximum tension of the cable is not exceeded. Breakaway links react to tension at the pulling eye and shall not be used in lieu of tension measuring devices. All pulling equipment and hardware which will contact the cable during installation must maintain the cable's minimum bend radius. Equipment including sheaves, capstans, bending shoes, and quadrant blocks shall be designed for use with fiber optic cable.

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" 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. A Compressed air cooler shall be used when ambient air temperatures reach 90°F or more.

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.

Tracer Wire. A tracer wire shall be installed with all fiber optic cable runs. One tracer wire shall be installed along with the fiber optic cable in each raceway. If a raceway has more than one fiber optic cable, only one tracer wire per raceway is required. If there are parallel raceways, a tracer wire is required in each raceway that contains a fiber optic cable. Tracer wire shall be installed in raceway segments which are metallic to provide a continuous tracer wire system.

The tracer wire shall be a direct burial rated, number 12 AWG (minimum) solid (.0808" diameter), steel core soft drawn high strength tracer wire. The wire shall have a minimum 380 pound average tensile break strength. The wire shall have a 30 mil high density yellow polyethylene (HDPE) jacket complying with ASTM-D-1248, and a 30 volt rating. Connection devices used shall be as approved by the tracer wire manufacturer, except wire nuts of any type are not acceptable and shall not be used.

The cost of the tracer wire shall be included in the cost of the fiber optic cable and not paid for separately.

Aerial Fiber Optic Cable. Aerial fiber optic cable assemblies shall be of a self-supporting figure-8 design. The fiber optic cable shall be as described herein and shall be waterblocked utilizing water-swallowable materials. The cable assembly shall be designed and manufactured to facilitate midspan access.

The submittal information must include a copy of the standard installation instructions for the proposed cable. Installed cable sag shall not exceed 1% of the span distance. The submittal information must also include catalog cuts for all hardware to be utilized in the installation.

Construction Documentation Requirements. 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.

Operations 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.

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

The Contractor shall provide the date, time and location of any tests required by this specification to the Engineer at least 5 working (7 calendar) days before performing the test. Included with the notification shall be a record drawing of the installed fiber optic cable system. The drawings shall indicate actual installed routing of the cable, the locations of splices, and locations of cable slack with slack quantities identified.

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

A Certified Technician utilizing an Optical Time Domain Reflectometer (OTDR) and Optical Source/Power Meter shall conduct the installation test. The test equipment used shall have been calibrated within the last two years. Documentation shall be provided. The Technician is directed to conduct the test using the standard operating procedures defined by the manufacturer of the test equipment. All fibers installed shall be tested in both directions.

A fiber ring or fiber box 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.

All testing shall be witnessed by the IDOT Engineer and a copy of the test results (CD ROM or USB Drive) shall be submitted on the same day of the test. Hardcopies shall be submitted as described herein with copies on CD ROM.

At the completion of the test, the Contractor shall provide copies of the documentation of the test results to the Project Engineer. The test documentation shall be submitted as two bound copies and three CD ROM copies, and shall include the following:

Cable & Fiber Identification:

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

Test Results shall include:

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

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 no additional cost to the Department.

Sample Power Meter Tabulation:

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

The OTDR test results file format must be Bellcore/Telcordia compliant according to GR196-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. A copy of the test equipment manufacture’s software to read the test files, OTDR and power, shall be provided to the Department. These results shall also be provided in tabular form, see sample below:

Sample OTDR Summary					
Cable Designation:	<i>TCF-IK-03</i>	OTDR Location:	<i>Pump Sta. 67</i>	Date:	<i>0/0/00</i>
Fiber Number	Event Type	Event Location	Event Loss (dB)		
<i>1</i>	<i>Splice</i>	<i>23,500 ft</i>	<i>0.082</i>	<i>0.078</i>	
<i>1</i>	<i>Splice</i>	<i>29,000 ft</i>	<i>0.075</i>	<i>0.063</i>	
<i>2</i>	<i>Splice</i>	<i>29,000 ft</i>	<i>0.091</i>	<i>0.082</i>	
<i>3</i>	<i>Splice</i>	<i>26,000 ft</i>	<i>0.072</i>	<i>0.061</i>	
<i>3</i>	<i>Bend</i>	<i>27,000 ft</i>	<i>0.010</i>	<i>0.009</i>	

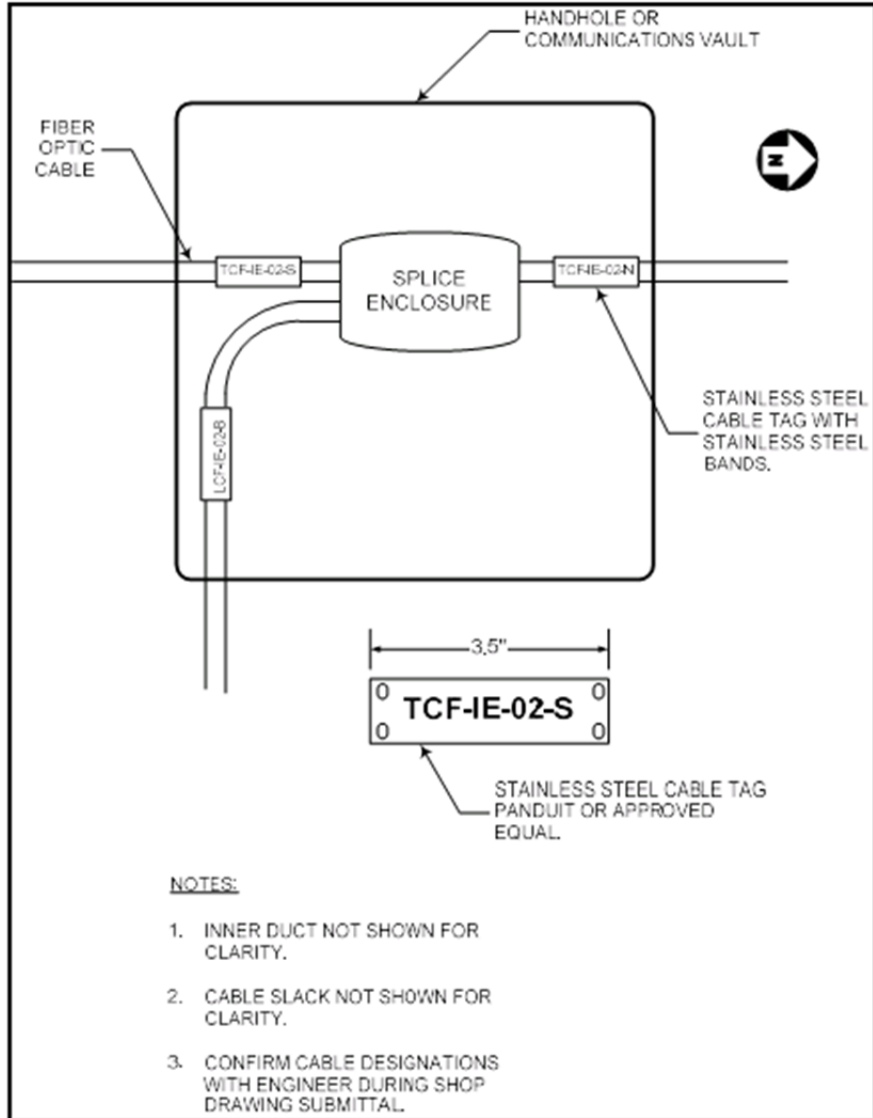
The following shall be the criteria for the acceptance of the cable:

- (a) Max cable attenuation @1310 nm ≤ 0.4 dB/km, @1550 nm ≤ 0.3 dB/km; events shall be ≤ 0.1 dB
- (b) Contractor shall submit to the Engineer a loss budget which includes cable attenuation, events from splices, and connectors at each patch panel where the cable is terminated. This shall be done for each trunk, distribution and lateral cable installed on the project. The loss budget shall be submitted for review 30 days prior to the cable installation. Once approved by the Engineer, the fiber cable can be installed and the loss budget document shall be used to judge whether the installed cable, spliced and terminated, is acceptable by the Department.

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. All splice locations must be identified in the Record Drawings. Cable runs which dead-end at a handhole, communications vault, interconnect cabinet, or any other type of enclosure, shall be dead ended in a splice enclosure.

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

Fiber optic cable shall be tagged inside handholes 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. See figure below:



Label the destination of each trunk cable onto the cable in each handhole, 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 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.

FIBER OPTIC TERMINATION PANEL, 12F OR 24F (D-1)

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:

- (a) The fiber optic termination panel shall be rack mountable or wall mounted
- (b) Rack mounted termination panels shall be installed in 19" racks inside of ITS or 334 Type Cabinets or Pump Houses w/19" racks
- (c) The fiber patch panel shall terminate pigtail fibers as called out on the Plans.
- (d) The fiber optic termination panel shall allow termination of a fiber patch cord to interconnect outside plant fibers to fiber optic communication equipment
- (e) Shall be supplied with optical splice tray and holder
- (f) Wall mounted termination panels shall be installed in Pump Station, Type III, Type IV, or Type V control Cabinets
- (g) 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.
- (h) Rack-mounted units shall be aluminum material per ATSMB 209, powder coated, and modular design.
- (i) 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.
- (j) 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.
- (k) 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 locations shown 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 12F OR 24F along with any necessary fiber optic patch cords and any other materials, hardware, and labor necessary to complete the installation.

ELECTRICAL CABLE IN CONDUIT, 4C/NO. 18 SHIELDED LOOP LEAD-IN

Effective: March 1, 2010

Revised: 3/30/11

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

Materials.

General:

Lead-ins shall be Canoga 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 7X.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 approved 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 additional loop wire will not be paid for separately but shall be included in the Induction Loop Pay Item.

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, 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 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, furnished and installed for ELECTRICAL CABLE IN CONDUIT, LEAD IN, NO. 18 4/C, TWISTED SHIELDED

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

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CONCRETE FOUNDATIONS (SPECIAL)

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 "Cabinet, Model 334 Installation 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 per each 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 each of CONCRETE FOUNDATIONS (SPECIAL).

INDUCTION LOOP

Effective: June 1, 1994

Revised: August 12, 2015

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 saw cutting, 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 #14-19 strand XHHW XLP-600V, encased in orange Detecta-duct tubing as manufactured by Kris-Tech Wire Company, Inc., IMSA 51-7, or comparable. All loop wire shall be UL listed. Lead-ins shall be Canoga 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. Saw cuts 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 saw cut 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 shall be utilized as lead-in from the Core Hole to the Cabinet, w/o splices, being twisted 5 turns per foot (16 turns per meter). The additional loop wire will not be paid for separately, but shall be considered part of this Pay Item.

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.

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, 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 saw cut in the pavement which contains loop wire. The actual length of wire used in the saw cut 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 will not be paid separately. If loop is greater than 150 ft. from cabinet, loop wire shall be spliced in handhole to an **ELECTRIC CABLE IN CONDUIT, LEAD-IN NO. 18 4/C TWISTED SHIELDED (see ELECTRICAL CABLE IN CONDUIT, 4C NO. 18 SHIELDED LOOP DETECTOR WIRE SPECIAL PROVISION).**

REMOVE FIBER OPTIC CABLE FROM CONDUIT

Description. This work shall consist of removing a portion of the existing fiber optic interconnect cable from conduit as shown on the plans.

Materials. None.

Construction. The existing fiber optic cable shall be disconnected from the communications end equipment and fiber enclosures, and removed from the existing conduits. Removal of the fiber optic cable shall prevent damage to end equipment from the cable being tugged. The existing fiber optic cable shall not be disconnected and removed until the temporary equipment and communications are installed in advance and operating to the satisfaction of the Engineer. Cables shall be taken off site for proper disposal.

Basis of Payment. This work will be paid for at the contract unit price per foot for REMOVE FIBER OPTIC CABLE FROM CONDUIT which price shall be payment in full for disconnecting the existing fiber optic cable from the end locations and removing the existing fiber optic cable from the existing conduits.

REMOVE TEMPORARY INTERCONNECT

Description. This work shall consist of the removal of equipment installed as part of the Advance Work plans as described in this Special Provision. Work includes the following:

- (a) Removal of type 336 cabinets from a wood pole, including mounting hardware.
- (b) Removal of a RVDS from a wood pole, including mounting hardware.
- (c) Securely packing RVDS and associated components, cabinets and internal equipment, and safely delivering all items to the Department (District 1 headquarters) or Electrical Maintenance Contractor as directed by the Engineer.
- (d) Removal of wood poles used exclusively for temporary RVDS installations. The removal of wood poles for temporary lighting are pay for separately.
- (e) Removal of span wire and attached fiber optic cables or power cables for temporary ITS systems.

Materials. None.

CONSTRUCTION REQUIREMENTS

General. No removal work will be permitted without approval from the Engineer. The Contractor shall set up a meeting with the State's Electrical Maintenance Contractor (EMC) and the Traffic Systems Center (TSC) Engineer. The EMC and TSC Engineer shall be notified at least 48 hours in advance of the meeting.

Each cabinet location shall be visited during the meeting to determine the condition of equipment. Any equipment that is to be salvaged that is damaged after this meeting shall be repaired or replaced at the contractor's expense, to the satisfaction of the Engineer. The equipment that is not salvaged shall be disposed of as directed by the Engineer and all debris removed beyond the right-of-way.

The condition of the equipment shall be documented and signed by representatives of the TSC, EMC and the Contractor. A copy shall be given to the Engineer.

If this meeting does not occur, then all of the equipment will be assumed to be in working condition. Any equipment that is not in working condition upon delivery shall be repaired or replaced at no additional cost to the Department.

Removal Details. The equipment shall be removed in accordance with the applicable sections of the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction:

- (a) **Cabinet:** All cabinets shall be removed and salvaged as directed by the Engineer.
- (b) **Cabinet Electronic Equipment:** Equipment housed in the cabinet shall be salvaged as directed by the Engineer.
- (c) **RVDS:** The RVDS assembly shall be removed and salvaged as directed by the Engineer.

- (d) **Wood Pole:** Wood Poles installed for temporary CCTV camera installations shall be removed and disposed of by the Contractor.
- (e) **Span Wire:** Span wire shall be removed and disposed of by the Contractor.
- (f) **Conduit:** Conduits installed for temporary connections that will not be used as part of the final ITS system shall be abandoned.
- (g) **Cable:** Cables installed for temporary connections that will not be used as part of the final ITS system shall be removed and disposed of by the Contractor. This work shall be paid for under this pay item.

Coordination with Temporary Lighting Removal. Removal of temporary ITS equipment and infrastructure shall be coordinated with the temporary lighting removal. Wood poles no longer required for temporary lighting, but needed to support ITS fiber optic cables and power cables, shall remain in place until the temporary ITS system has been decommissioned.

Salvaging Details. Upon removal, equipment to be salvaged, as designated by the Engineer, shall be immediately packaged in suitable containers for protection and delivery. Each container shall clearly identify the contents, source location, and date of removal on the outside of the container. Containers shall become the property of IDOT upon delivery.

Salvaged equipment shall be delivered and unloaded at a facility of the Department or EMC, as designated by the Engineer. Packaging material required for proper shipping shall be included. The Contractor shall prepare a printed delivery receipt to be signed by a representative of the recipient. A copy of this signed receipt shall be provided to the Engineer.

Any damage resulting from the removal and/or transportation of equipment and associated hardware that are to be salvaged, shall be repaired or replaced in kind. The Engineer will determine the extent of damage and the suitability of repair and/or replacement.

Basis of Payment. This work will be paid for at the contract lump sum price for REMOVE TEMPORARY INTERCONNECT, which shall be payment in full for all labor, material removal, and transportation (to EMC or Department) necessary to complete the work as described above.

TRAFFIC CONTROL LED SIGNAL HEAD & PEDESTAL

Effective: Aug. 29, 1996

Revised: July 30, 2008

Description. This work shall consist of furnishing and installing one way traffic control LED signal head and pedestal at the locations shown on the plans, in accordance with the following requirements.

Materials. Signal Heads shall be polycarbonate.

Doors

Doors shall be of the same materials. They shall be suitably hinged and held securely to the casing by stainless steel locking devices. All other door parts such as hinge pins, lens clips, etc., shall be stainless steel also.

Gaskets

Neoprene gaskets or their equivalent shall be provided between the casing and the door and between the lens and the door to make the signal face weather proof.

Visors

Each signal lens shall have a visor of polycarbonate material. Visors for vehicular signal faces shall be of the tunnel type. Each visor shall be of standard length and designed to fit tightly against the door. Screws of stainless steel or equal material approved by the Engineer shall be used to attach the visors to the doors.

Optical Units

Each signal lens shall have an optical unit composed of the following parts:

(A) A signal lens conforming to the "Specifications for Traffic Signal Lenses," A.S.A. Designation D10.1, latest revision. The nominal sizes for vehicular signal lenses shall be 8 inches (203.2mm).

(B) An LED lamp designed especially for traffic signal service. This lamp shall be according to Section 880 & 1078 for an 8" Signal Head.

(C) A weatherproof lamp receptacle made of molded bakelite, designed to hold a traffic signal lamp with the light center at the focal point of the reflector. Each lamp receptacle shall be provided with two #18 (or larger) standard lead wires color coded of adequate length to be connected to the terminal block.

Post

(A) Base. The base shall be of cast iron conforming to the Specifications for Gray Iron Castings, A.S.T.M. Designation: A-48, Class 20, latest revision. Each base shall be octagonal in shape, unless a square base is specified. The octagonal bases shall be approximately 14" (355.06 mm) high and 16" (400 mm) across the flat sides at the bottom. The octagonal bases shall be true to pattern, with sharp clean-cut ornamentation and equipped with access doors for cable handling.

(B) Tubular Steel Post. The post shall be straight sided, having an outside diameter of not less than 4-1/2" (112mm) and a minimum thickness of 0.12" (3mm) and shall be of high-grade, open-hearth lap-welded steel. Neither the post nor the cap shall be galvanized.

(C) Anchor bolts. The anchor bolts shall be a minimum of 5/8" (16mm) in diameter and a minimum of 16" (400mm) long with an approximate 3" (75mm) bend at one end and threaded approximately 4" (100mm) at the other end. The anchor bolts shall conform to the specifications for Low-Carbon Steel Externally and Internally Threaded Standard Fasteners, A.S.T.M. Designation: A307. The first 5 inches (127mm) at the threaded end of the anchor bolts, also the nuts and washers for use with the anchor bolts shall be galvanized by the hot-dip process or by electro-galvanizing.

(D) Ground Rod. Ground rod shall be 3/4" (19mm) in diameter and 8 ft (2.4 m) long, with one end pointed to facilitate driving and the other end chamfered to prevent mushrooming. It shall have a steel core with a heavy exterior layer of pure copper bonded to the core. A ground clamp capable of accommodating No. 6 wire shall be furnished with the rod.

(E) Barrier wall mounted. Where the signal is to be located on top of a barrier or retaining wall, a mounting plate will be provided in place of the iron base. This plate shall be 17" (425 mm) long, and 6" (150 mm) wide. It shall also extend 12" (300 mm) vertically down the wall. The plate will be constructed of 1" (25.4 mm) thick steel with a steel coupling welded in the center of the horizontal plate to accept the 4" (100 mm) steel post.

Installation Details. Each completely assembled traffic signal head shall normally be installed as follows:

A. Signal Head

1. The traffic control LED signal head shall consist of one signal face and each signal face shall consist of two signal sections. Each LED signal head shall be furnished with a terminal compartment and one terminal block.
2. The signal head shall normally be erected vertically on a signal post and the terminal compartment cover facing away from the road.
3. Each signal face shall be pointed in the direction of the approaching traffic it is to control. They shall be aimed as directed by the Engineer.

Each completely assembled traffic control signal post shall normally be installed as follows:

B. Signal Post

1. The metal post shall be screwed into an ornamental base, and the complete unit shall be erected vertically upon and securely bolted to a prepared foundation. Anchor bolts, nuts, and washers shall be furnished with each post.

C. Base Plate

1. The base plate mounted on the barrier wall shall be attached using self-tapping 5/8" x 5" (16 mm x 125 mm) galvanized hex-head anchor bolts. The signal head shall be at the same elevation as the signal on the opposite side of the ramp, normally 5' (1.5 m) above pavement.

PAINTING

All exposed metal surfaces shall be shop painted as follows:

1. Posts and bases shall have a minimum of two coats of durable paint, the final coat to be Federal Yellow in color.

2. The traffic signal visors are to be dull black in color.

3. Any steel or iron parts or fittings shall have one coat of approved primer and be finished with two coats of paint Federal Yellow in color.

Basis of Payment. This work shall be paid for at the contract unit price for SIGNAL HEAD, LED, RETROFIT, which price shall be payment in full for furnishing and installing the signal head, post, base, visor, doors, anchor bolts, nuts and washers complete. Any miscellaneous hardware will not be paid for separately, but shall be considered as incidental to the cost of this item.

REMOVE EXISTING RAMP METER SIGNAL HEAD AND POST

Description

This item shall consist of the removal of existing ramp meter signal heads and supports on freeway entrance ramps.

Removal of existing ramp meter signal heads, and supports shall be in accordance with Article 895.05 of the Standard Specifications with the following additions:

The ramp meter signal equipment which is to be removed and is to become the property of the Contractor shall be disposed of outside the right-of-way at the Contractor's expense unless otherwise directed by the Engineer.

All equipment to be returned to the State shall be delivered by the Contractor to the State's Electrical Maintenance Contractor's main facility. The Contractor shall contact the State's Electrical Maintenance Contractor to schedule an appointment to deliver the equipment. No equipment will be accepted without a prior appointment. All equipment shall be delivered within 30 days of removing it from the installation site. The Contractor shall provide 5 copies of a list of equipment that is to remain the property of the State, including model and serial numbers, quantities, and type of equipment where applicable. Equipment from the same location shall be boxed together (equipment from different locations may not be mixed) and all boxes and controller cabinets shall be clearly marked or labeled with the location from which they were removed. If equipment is not returned with these requirements, it will be rejected by the State's Electrical Maintenance Contractor. The Contractor shall be responsible for the condition of the signal equipment from the time Contractor takes maintenance until the acceptance of a receipt drawn by the State's Electrical Maintenance Contractor indicating the items have been returned in good condition.

Signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of the Department specifications at no cost to the contract.

Basis of Payment

This removal of the ramp meter signal head and post will be paid for at the contract unit price per each for REMOVE EXISTING SIGNAL HEAD AND POST.

RAMP GATE

Description

This item shall consist of the removal of an existing barrier ramp gate assembly and installation of a replacement barrier ramp gate assembly on freeway entrance ramps.

All existing ramp gate items shall be removed and new ramp gates shall be installed as shown on the plans. The removed barrier ramp gate assembly shall be delivered to the District Electrical Maintenance Contractor as directed by the Engineer. The concrete foundation shall be removed to a level at least 3 feet below the adjacent grade, backfilled with approved material, and the surface reconstructed to match the adjoining area. Removed material shall be disposed of according to Article 202.03. The removal shall extend deeper where required to facilitate roadway construction at no additional cost to the Department. The foundation shall be disposed of outside the right-of-way.

The installation of the barrier gate assembly shall be done to meet or exceed the requirements of the original installation, including stopping capacity. Record plans and specifications for the original installation shall be requested from the Department for reference. The location of the new barrier gate assembly shall be as indicated on the plans and directed by the Engineer. The Contractor shall submit shop drawings for the new barrier assembly for review and approval. The barrier gate assembly shall be sized to fit the new ramp conditions and shall include a safety mechanism to prevent failure in high winds. The submittal shall be comprehensive and shall include technical specifications, details drawings, elevations, and schematics to clearly describe the apparatus. Components shall include the gate stand, gate arm, anchor posts, and concrete foundations. The manufacturer shall have specialized in these types of barrier assemblies for a minimum of five years. The barrier assembly shall have successfully passed actual full scale crash tests conducted by a qualified independent agency. Full scale crash test data shall be included in the submittal.

The Contractor shall install the barrier ramp gate assembly in accordance with the manufacturer's recommendations.

Factory Testing

The barrier gate assembly shall be fully tested for proper operation by manufacturer prior to shipment. A nameplate with manufacturer's name, model number, and serial number shall be located within unit.

All critical dimensions shall be checked for accuracy against customer approved shop drawings.

Method of Measurement

The removal of the existing ramp gate assembly will be measured for payment for each ramp gate assembly that is completely removed. The installation of the ramp gate assembly will be measured for payment for each gate assembly installed complete in place with a barrier beam of sufficient width to span the ramp roadway.

Basis of Payment

This removal of the ramp gate assembly will be paid for at the contract unit price per each for REMOVE EXISTING GATE. The installation of the ramp gate assembly will be paid for at the contract unit price per each for DROP GATE.

LED FLASHING BEACON AND FLASHER CONTROLLER

Effective: June 1, 1994

Revised: July 30, 2008

Description

This item shall consist of furnishing and installing two one-section flashing beacon LED signal heads on a wood post or traffic signal post and a two-circuit flasher controller in the ramp metering control cabinet as indicated on the plans, or as directed by the Engineer, in accordance with the following requirements.

Materials and Equipment

This work shall conform to the requirements of applicable portions of Section 858, 880, & Article 1073.02 and Section 1078 for 8" heads of Standard Specifications for Road and Bridge Construction and Traffic Control Signal Head & Pedestal in these specifications.

Installation

This flashing beacon shall be installed on a wood post or traffic signal post as shown on the plans.

The flasher controller shall be solid state NEMA Type 3 and be according to NEMA Standards for Traffic Control Systems, TS 2. The flasher controller shall consist of two components; a base which is mounted on the ramp metering control cabinet wall and the flasher which plugs into and is secured to the base by a loading screw. A radio interference filter shall be supplied with the flasher controller. The flashing beacons shall flash alternately at the rate of not less than fifty nor more than sixty flashes per minute.

Basis of Payment

This work will be paid for at the contract unit price each for LED FLASHING BEACON (1 section, 1 face) AND FLASHER CONTROLLER, which price shall be payment in full for furnishing and installing LED FLASHING BEACON (1 section, 1 face) AND FLASHER CONTROLLER complete and operating in place. Conduit and fittings on the wooden post or light standard shall be incidental to the cost of the item and will not be paid for separately.

SIGN REMOVAL

Description

This item shall consist of the removal of an existing ramp meter advance flashing beacon sign assembly on freeway entrance ramps as shown on the plans and as described herein.

Removal of an existing flashing beacon installation, as shown on the plans or as directed by the Engineer, shall meet the requirements of the Traffic Signal Specifications and District Specifications for "Remove Existing Traffic Signal Equipment". This work shall consist of the complete removal of an existing flashing beacon sign assembly and the backfilling of the holes created by the removal of the poles and restoration of the surface to match the adjoining area. The existing flashing beacon sign assembly will be removed only after the permanent flashing beacon installation is accepted for maintenance, or as directed by the Engineer.

Basis of Payment

This removal of the existing flasher sign assembly will be paid for at the contract unit price per each for SIGN REMOVAL.

WOOD POST

Effective: June 1, 1994

Revised: July 30, 2008

Description

This item shall consist of furnishing, installing a 6" x 6" x 16'-0" (150 mm x 150 mm x 4.8 m) wood posts at ramp metering locations shown on the plans, or as directed by the Engineer.

Materials and Equipment

Each post shall be of southern pine conforming to Article 1007 of the Standard Specifications for Road and Bridge Construction. The preservative used in the treatment of the wood posts shall be a solution of pentachlorophenol meeting the requirement of Article 1007.12 of the Standard Specifications.

Installation

The posts shall be placed vertically in a vertical hole not exceeding 12 inches (30 cm) in diameter and not less than 5 feet (1.5 m) deep. The post shall be placed in the center of the hole and backfilled with stone screenings thoroughly tamped in 12-inch (30 cm) lifts. The stone screenings shall conform to Article 1004.01 (Gradation CA 6) of the Standard Specifications. The post shall be vertical after the tamping.

Under no circumstances will the sawing off of any part of a post be permitted after the preservative has been applied.

Basis of Payment

This work will be paid for at the contract unit price each for WOOD POST, of the length specified, which price shall be payment in full for furnishing and erecting the post, digging and backfilling the post hole.

CONDUIT RISER, GALVANIZED STEEL

Description

This item includes labor, material, and equipment necessary to install a 10-foot section of 2" diameter galvanized steel conduit riser at locations shown on the plans. The ends of the riser shall be threaded. The riser shall attach to underground conduit and the top of the riser shall include a weatherhead.

Method of Measurement

The method of measurement shall be EACH.

Basis of Payment

This work shall be paid for at the contract unit price each for CONDUIT RISER, GALVANIZED STEEL that shall be payment in full for the work complete, as specified herein and as directed by the Engineer.

MATERIAL TRANSFER DEVICE (BDE)

Effective: June 15, 1999

Revised: August 1, 2014

Description. This work shall consist of placing SMA binder and surface course mixtures, except that these materials shall be placed using a material transfer device (MTD).

Materials and Equipment. The MTD shall have a minimum surge capacity of 15 tons (13.5 metric tons), shall be self-propelled and capable of moving independent of the paver, and shall be equipped with the following:

- (a) Front-Dump Hopper and Conveyor. The conveyor shall provide a positive restraint along the sides of the conveyor to prevent material spillage. MTDs having paver style hoppers shall have a horizontal bar restraint placed across the foldable wings which prevents the wings from being folded.
- (b) Paver Hopper Insert. The paver hopper insert shall have a minimum capacity of 14 tons (12.7 metric tons).
- (c) Mixer/Agitator Mechanism. This re-mixing mechanism shall consist of a segmented, anti-segregation, re-mixing auger or two full-length longitudinal paddle mixers designed for the purpose of re-mixing the hot-mix asphalt (HMA). The longitudinal paddle mixers shall be located in the paver hopper insert.

CONSTRUCTION REQUIREMENTS

General. The MTD shall be used for the placement of all SMA binder and surface course mixtures placed with a paver. The MTD speed shall be adjusted to the speed of the paver to maintain a continuous, non-stop paving operation.

Use of a MTD with a roadway contact pressure exceeding 25 psi (172 kPa) will be limited to partially completed segments of full-depth HMA pavement where the thickness of binder in place is 10 in. (250 mm) or greater.

Structures. The MTD may be allowed to travel over structures under the following conditions:

- (a) Approval will be given by the Engineer.
- (b) The vehicle shall be emptied of HMA material prior to crossing the structure and shall travel at crawl speed across the structure.
- (c) The tires of the vehicle shall travel on or in close proximity and parallel to the beam and/or girder lines of the structure.

Method of Measurement. This work will be measured for payment in tons (metric tons) for all SMA binder and surface course materials placed with a material transfer device.

Basis of Payment. This work will be paid for at the contract unit price per ton (metric ton) for MATERIAL TRANSFER DEVICE.

The various HMA mixtures placed with the MTD will be paid for as specified in their respective specifications. The Contractor may choose to use the MTD for other applications on this project; however, no additional compensation will be allowed.

LIGHTING CONTROLLER, RADIO CONTROL, DUPLEX CONSOLE TYPE, WITH SCADA

Effective: January 1, 2012

Description: This work shall consist of furnishing and installing a roadway lighting electrical control cabinet with radio control complete with foundation and wiring for the control of highway lighting.

General. The completed controller shall be an Industrial Control Panel under UL 508, and shall be suitable for use as service equipment

Double Door Enclosure.

Cabinet. The cabinet shall be of the dimensions shown on the plans and fabricated from 1/8 in. (3 mm) thick aluminum alloy No. 3003-H14. The cabinet shall comply with ANSI C 33.71 and UL 50 and be reinforced with aluminum angles.

Doors. The doors shall have stainless steel hinges. The door handle shall be stainless steel, a minimum diameter of 1/2 in. (13 mm) and be furnished with a rain and ice resistant lock. The doors shall be gasketed to exclude the entry of moisture, dirt, and insects. A linkage-arm system, of simple construction, shall be attached to the cabinet doors to allow securing in a wide open position during field operations.

Insulation. When specified, the interior compartment shall be insulated on the inside of the sides, back, top, bottom, and inside of the doors with 1 in. (25 mm) thick polyisocyanurate rigid foam insulation board. The foam board shall have foil facers on each side. The side facing the interior of the cabinet shall have a white tinted foil facer with a satin finish. The insulation shall have a minimum aged thermal resistance (R-value) of 8 at a 40°F (4°C) mean temperature. The insulation shall comply with Federal Specification HH-I-1972/1, Class 2.

Mounting. The cabinet shall be mounted as indicated on the plans.

Work Pad. Except where the cabinet is facing a sidewalk, a poured, 4 in. (100 mm) thick concrete pad, not less than 48 in. (1.2 m) square shall be provided in front of the cabinet.

Finish. All aluminum enclosures shall be finished.

Surface Preparation: The cabinet, doors and all other parts to be painted will be submerged in each tank of a 3 step iron phosphate conversion technique. After phosphatizing the parts shall be passed through an oven and baked to eliminate any moisture.

Finish coat: Shall be polyester powder paint applied electrostatically to a minimum thickness of 2 mils and baked at 375°F for 20 minutes.

The color of the finish paint shall be ANSI Standard No. 70 Sky Gray or as specified by the Engineer.

The finish shall be applied according to the paint manufacturer's recommendations and the manufacturer shall certify, in writing, to the Department, that the finish has been applied properly.

Submittal data submitted for approval shall address the requirement for the paint manufacturer's certification and shall include a standard, single source paint warranty by the paint manufacturer of the controller manufacturer to the Department.

Identification. The cabinet door shall have a stainless steel name plate of the dimensions and engraving indicated on the plans. An identification decal shall also be installed on the back of the cabinet as specified elsewhere herein.

Control Components.

Time Switch. When specified, each controller shall have an electric time switch for automatic control of highway lighting circuits operating on a daily schedule having a fixed relation to sunrise and sunset. Turn-on and Turn-off times shall be adjustable \pm 45 minutes from sunrise and sunset. All settings shall be field adjustable without special tools. Complete installation instructions, details on wiring connections, and information on time setting, manual operation, and necessary adjustments shall be furnished with each time switch.

The time switch shall be a microprocessor-based two channel controller with astronomic functions on both channels. The latitude shall be adjustable from ten to 60 degrees in the Northern hemisphere. Latitude changes shall be user ettable without the use of special tools.

The time switch shall be programmable in an AM/PM format, with a resolution of one minute or better. The time switch shall automatically adjust for daylight saving time and have automatic leap year correction and operate on 240 V AC without the use of an additional transformer.

A battery backup shall be integral with the controller and shall use a nickel-cadmium battery. The battery backup shall provide power to the controller memory for a minimum of 72 hours in the event of power failures.

The published operating temperature range of the time switch shall be from 86 to 158°F (-30 to 70°C).

The time switch output relay contacts shall be rated sufficiently to handle the inrush current of two 200 A contactors. The time switch shall have a NEMA Type 1 enclosure as a minimum. The time switch programming instructions shall be moisture proof and permanently affixed to the time switch or as otherwise approved by the Engineer.

Circuit Breakers.

All feeders, branch circuits, and auxiliary and control circuits shall have overcurrent protection. The overcurrent protection shall be by means of circuit breakers.

Circuit breakers shall be standard UL listed molded case, thermal-magnetic bolt-on type circuit breakers with trip free indicating handles.

240 V circuit breakers shall have a UL listed interrupting rating of not less than 10,000 rms symmetrical amperes at rated circuit voltage for which the breaker is applied. 480 V applications shall have a UL listed interrupting rating of not less than 14,000 rms symmetrical amperes at rated circuit voltage.

Multi-pole circuit breakers larger than 100 A size shall have adjustable magnetic trip settings.

The number of branch circuit breakers shall be as indicated on the Control Cabinet detail drawing or as indicated in the lighting system wiring diagram which ever is greater plus two spare circuit breakers.

Contactors.

Contactors shall be electrically operated, mechanically held as specified, with the number of poles required for the service and with operating coil voltage as indicated. The contactor shall have an in-line drive operating mechanism. Ampere rating of contactors shall be not less than required for the duty shown and shall otherwise be rated as indicated.

Contactors shall be complete with a non-conducting inorganic, non-asbestos subpanel for mounting.

Mechanically held contactors shall be complete with coil clearing contacts to interrupt current through the coil once the contactor is held in position.

The main contactor contacts shall be the double break, silver to silver type. They shall be spring loaded and provide a wiping action when opening and closing. The contacts shall be renewable from the front panel, self aligning, and protected by auxiliary arcing contacts.

The line and load terminals shall be pressure type terminals of copper construction and of the proper size for the ampere rating of the contactor.

A lever for manual operation shall be incorporated in the mechanically held contactor. Protection from accidental contact with current carrying parts when operating the contactor manually shall be provided.

The contactor operating coil shall operate at phase to neutral voltage. Single phase contactors shall be two pole devices with continuous rating for the amperage selected per pole.

Open and closed positions for mechanically held contactors shall be clearly indicated and labeled in permanent manner as approved by the Engineer.

Auto/Manual Switches. The cabinet shall be equipped with automatic and manual operating controls via two, single pole double throw switches, one being a maintained-contact manual-automatic selector switch and one being a momentary-contact manual on-off switch with a center rest position. Both switches shall be premium specification grade, rated for the applied duty but not less than 20 A at 240 V and each shall be mounted in a 4 in. (100 mm) square box with cover.

The control circuit shall have overcurrent protection as indicated and as required by NEC requirements.

Ground & Neutral Bus Bars.

Separate ground and neutral bus bars shall be provided. The ground bus bar shall be copper, mounted on the equipment panel, fitted with 22 connectors of the type shown on the plans, as a minimum. The neutral bar shall be similar. The heads of connector screws shall be painted white for neutral bar connectors and green for ground bar connectors.

Interior Lighting, Receptacle and CCTV power.

The cabinet shall have an auxiliary device circuit at 120 V single phase to supply a convenience receptacle, cabinet light and a dedicated 120v circuit for CCTV camera power indicated in the plans. Where 120 V is not available directly from the service voltage, an outdoor dry type step-down transformer not less than 2 KVA shall be provided as described elsewhere herein.

The auxiliary circuit, including transformer primary and secondary, shall have overcurrent protection according to NEC requirements.

The interior, 60 W incandescent lighting fixture of the enclosed-and-gasketed type, shall be switched from a single pole, single throw, 20 A switch. The switch shall be premium specification grade in a suitable 4 in. (100 mm) box with a cover.

A 20 A duplex receptacle, ground fault interrupting, premium specification grade shall be furnished in a 4 in. (100 mm) square box with cover, for 120 V auxiliary use.

Surge Arrester.

The control circuit in the cabinet shall be protected by a surge arrester meeting the requirements of Article 1065.02.

Wiring and Identification.

Power wiring within the cabinet shall be of the size specified for the corresponding service conductors and branch circuits and shall be rated RHH/RHW, 600 V.

Control and auxiliary circuit wiring shall be rated RHH/RHW or MTW with jacket, 600 V.

All power and control wiring shall be stranded copper. When specified all wiring shall be tagged with self-sticking cable markers. When the contract drawings do not specifically indicate assigned wire designations, the manufacturer shall assign wire designations and indicate them on the shop drawings.

All switches, controls and the like shall be identified both as to function and position (as applicable) by means of engraved two color nameplates attached with screws, or where nameplate are not possible in the judgement of the Engineer, by the use of cloth-backed adhesive labels as approved by the Engineer.

The cabinet with all of its electrical components and parts shall be assembled in a neat orderly fashion. All of the electrical cables shall be installed in a trim, neat, professional manner. The cables shall be trained in straight horizontal and vertical directions and be parallel, next to, and adjacent to other cables whenever possible.

Transformer, General Purpose.

The transformer shall be dry type and weatherproof so that it may be installed indoors or outdoors without additional housing. It shall have an enclosure for splices with provisions for weather tight conduit connections.

The transformer shall have four taps on the primary side, one at 2 1/2 percent, one at 5 percent, one at 7 1/2 percent and one at ten percent below rated voltage.

Insulation shall be Class F or Class H. The transformer shall meet the applicable ASA and IEEE standards.

Mounting and back plates shall be of Aluminum Alloy 2024, 3003 or 6061. Bolts, nuts and washers shall be of Series 300 stainless steel. Bolts shall have hexheads. Nuts shall be hexagon and self locking. Washers shall be of the flat type.

Radio Control Equipment.

Receiver - Decoder: The radio control module consists of a radio receiver, digital decoder, and an output interface which allows centralized remote radio control of the lighting controller turn-on and turn-off functions. The radio control module must be capable of operation consistent with the existing radio control system, a Motorola SCADA Central Station.

The existing control system currently operates over 250 discrete lighting controllers via a securely coded proprietary data scheme. For this reason, the control module must consist of a Motorola ACE 3600 Modular Remote Unit, model F 7563, (small housing), with no less than the following options:

Motorola Designation	Description
F 7563 (VHF), F 7564 (UHF)	ACE 3600 CPU *
V 245	Mixed I/O
V 261	240 VAC Power Supply w/charger
Z 857AA	Surge Protection

* Includes (1) three slot frame, (1) ACE 3600 CPU plus firmware, (1) mixed I/O Module, (1) VHF or UHF (as directed by the Engineer) CDM 750 Radio with FSK Radio Interface, port 3 (1) AC Power Supply with Charger, (1) 6.5 Ah battery, installed in a 15" X 15" X 8.26" NEMA 4X/IP 56 painted metal enclosure with instruction manual.

The manufacturer's designation by no means relieves the Contractor of providing a fully functional radio system as described herein.

A 120/240 to 24VAC step down transformer shall be included for the SCADA system.

The Radio Control Module shall be programmed for the following operational parameters:

- Transceiver Frequency: To be specified by the Engineer
- Receive Frequency: To be specified by the Engineer
- Communications Failure Preset: Normally Open
- Individual Station address: To be specified by the Engineer

Antenna. The antenna shall be thick mount up to ½” mounting surface mounted by screw adapter (no magnet mounts). The low profile antenna mount shall be equivalent to Antenex – MABT8XNSI antenna Mount Low Profile. Accompanying antenna shall be equivalent to Antenex – B132 (Broad Band – VHF/UHF ¼ wave 150-928 MHz. Accompanying cable shall be equivalent to Antenex-RG8X and conductor equivalent to Antenex – CN8X from Radio to Antenna and shall be of appropriate length and not longer than 8 ft.

Installation. I/O Module. All motherboard cards shall be configured and installed as per manufacturer’s specifications and IDOT specification Ltg SCADA 397. Modules include but are not limited to; CPU, Mixed I/O. All digital inputs terminated on the Mixed I/O card shall be dry. Termination points for all digital input points will be reflected on power center wiring diagram or additional wiring schematic provided by the engineer. All digital outputs received from the Mixed I/O card shall be rated at 24 VAC 2A. All digital outputs shall be connected to interposing relays prior to being integrated into the power center wiring logic. The digital outputs shall maintain a momentary closure for approximately 2 seconds.

All wiring termination points shall be tagged using the nomenclature given on the wiring diagram. The alarms acknowledge button shall be implemented with a placard stating “Alarm Acknowledge”. Site configuration, map implementation, screens tagging and other related software configurations shall be specified elsewhere herein.

The antenna shall be centered on the top of the control cabinet. The antenna cable shall be dressed and trimmed for minimal length, allowing sufficient slack of removal of the radio connection for replacement or testing without disruption to the installation. The antenna connector shall be properly soldered to the cable assembly. Great care shall be exercised in the assembly of the antenna connector, excessive heat will destroy the inner insulation, and insufficient heat will produce a cold solder connection on the outer shield.

Intra-module wiring shall be 18 AWG stranded wire, color coded (American) consistent with battery polarity, and signal. The wire connection from terminal block (TB2) to the interpose relays shall be 14AWG stranded. All wires connected to the radio modules shall be dressed and tinned prior to insertion, (crimp on connectors will not be allowed for use in the radio system). Cost of all wire is inclusive within the scope of this work.

A terminal strip separate from the integral radio module and power supply shall be provided to interface power and signal conductors to the lighting controller. Terminals and wiring shall be labeled in accordance with the drawings, and dressed to allow service. The radio module shall be provided with constant 240 VAC power. The control power breaker shall provide power for the SCADA system. This is to allow the system to be energized at all times.

The SCADA system shall be tested in conjunction with the controller inspection, prior to field installation. The turn-on and turn-off function shall be tested ten (10) consecutive times utilizing actual signals originating from District 1 Headquarters. Any failures must be cleared before the controller is delivered to the job site.

Null covers shall be provided for the slots not used. All analog inputs shall be 4-20 mA. All I-O wiring including analog and digital shall be wired as per the enclosed table.

SCADA System Control Relay Assembly. The Contractor shall mount and wire four (4) relays in a box as shown in the wiring diagram. Two relays shall be 240 volts sealed type and two relays shall be 24 volts sealed type, unless otherwise indicated, shall have contacts rated at not less than 20 amperes at 240 volts. The power relay for activating the lighting contactors shall have contacts rated to handle the contactor inrush. The relays shall be wired to a marked terminal strip.

Testing. As part of final acceptance testing, all individual I/O points and internal status alarms shall be tested for proper operation and transmission. The transmission shall be confirmed at IDOT District 1 HQ. and the contractors dispatch facility. This full SCADA system start-up shall be completed with the Engineer present.

The SCADA radio system shall have the following items tested: VSWR, cable impedance, RSSI to the power center and confirmation that data sent from power center is received by the IDOT lighting system computers.

Analog Inputs And Transducers. The panel shall include one voltage transducer for monitoring the line voltage and one current transducer for monitoring the neutral current. Their outputs shall be 4-20 mA DC each and shall be wired to channels 1 and 2 of the Mixed I/O module as shown. The voltage transducer shall be Scientific Columbus Model # VT110 – PAN7 – A4-2 for 480/240 volt single phase systems. The current transducers shall be Mel Kirchler Technologies Model # AT2-420-24L-FT, with power supply, PS-240-24P-1A. Both analog inputs shall be wired using shielded cable. Both transducers shall also be calibrated so that the SCADA system reads the correct value.

Testing Of The Assembled Cabinet. Prior to shipment of the completed control cabinet, the control cabinet shall be tested for load, short circuits and complete operation of the cabinet as specified herein and as shown on the plans. The test shall be made at the manufacturer's shop, by the manufacturer and shall be witnessed by the Engineer. The Contractor shall arrange the test date with the Engineer and so allow not less than seven (7) days advance notice. The cabinet shall not be delivered to the job site until inspected, tested and approved for delivery by the Engineer.

Staging. All Central Configuration programming be completed prior to the initial check out/PM of the SCADA unit in the field. This is to assure/confirm 2 way radio communications from the field RTU the Central. Lighting controller information submitted for approval shall include any recommendations of the Manufacturer for storage as provided under this contract.

The packaging of the lighting controller shall incorporate the provisions recommended by the Manufacturer to accommodate storage.

TERM	MOSCAD DESTINATION	WIRE #	DESCRIPTION OF INPUT
32	Analog Input 1 (+)	TB2 B11	CABINET NEUTRAL CURRENT
33	Analog Input 1 (-)	TB2 B1	CABINET NEUTRAL CURRENT
34	Analog Input 2 (+)	TB2 A2	CABINET SERVICE VOLTAGE
35	Analog Input 2 (-)	TB2 B2	CABINET SERVICE VOLTAGE
40	P. Ground	TB2 A3	GROUND
1	Digital Input 1	TB2 B3	ALARM ACKNOWLEDGE
2	Digital Input 2	TB2 A4	DOOR OPEN
3	Digital input 3	TB2 A5	MAIN(S) BREAKER OPEN
4	Digital input 4	TB2 A7	CONTACTOR 1 OPEN
5	Digital Input 5	TB2 A8	CONTACTOR 2 OPEN
6	Digital input 6	TB2 A9	CABINET IN NON-AUTO
7	Digital input 7	TB2 A10	BACK-UP CLOCK OFF CALL
8	Digital Input 8	TB2 A11	BACK-UP CLOCK ON CALL
18	DI Common	*	COMMON
20	K1 NO	TB2 A12	LIGHTS ON CALL
21	K1 Com	TB2 B17	K1 COMMON
23	K2 NO	TB2 A13	LIGHTS OFF CALL
24	K2 Com	TB2 B17	K2 COMMON
17	24 V+	TB2 B13	24+ VDC

All analog inputs will be 4-20 mA only. Digital output relays will be electrically energized and momentarily held.

Mixed I/O module model number V 245

Lighting SCADA RTU terminal Configuration.

Description. This work shall consist of having the SCADA system manufacturer design, implement and test a new RTU on the Lighting SCADA System on all system terminals.

Materials. All software work shall be completed by the manufacturer or approved factory licensed sales and service company for the SCADA equipment. All licensing shall be provided by the entity completing the work. Licenses are to be held by IDOT.

SCADA RTU Configuration And Programming:

1. Setup of CPU and accompanying modules.
2. Setup of RTU site number, octal address, group call and All Call.
3. Configure application alarm parameters (download config./application).
4. Development and implementation of control and alarm application from IDOT submitted telemetry requirements.

NOTE: IDOT shall supply checklist listing I/O, telemetry, all call, group call and individual call data.

SCADA Service/Client Wonderware Programming:

1. Add RTU to Wonderware.
2. Configure Wonderware to poll SCADA CPU for data on that specific RTU.
3. Setup servers and clients for alarm notification and database I/O, for that specific RTU.
4. Configure RTU polling.
5. Activate RTU on FIU polling.

SCADA FIU CPU Programming:

If RTU exists as an Intrac site, it will have to be setup as a MOSCAD site (MOSCAD CPU). If RTU is a new site, it will have to be configured as a MOSCAD site (MOSCAD CPU).

Submittals. The Motorola VAR shall submit ladder programming, quiescent telemetry and SCADA configuration files for approval by the IDOT Engineer. Submittal will be reviewed by the Engineer and returned noting changes and/or comments.

Testing and Documentation. As part of final acceptance testing, all individual I/O points and internal status (COS) alarms shall be tested for proper operation and transmission. The transmission shall be confirmed at IDOT Dist. HQ. And the contractors dispatch facility. This full SCADA system start-up shall be completed with the Engineer present.

The control cabinet shall be tested for complete operation and the electrical load on each circuit shall be measured and documented on the Log form L-3. The ground resistance test shall be performed by the Contractor using the fall-of-potential method, with results recorded by the Contractor and witnessed by the Engineer. Ground continuity shall be tested using an approved low-impedance ohmmeter, to the farthest point of each circuit extension from the controller cabinet. Results shall be recorded by the Contractor and witnessed by the Engineer.

Installation.

The lighting controller installation shall be according to the details, location, and orientation shown on the plans.

Work Pad. A 4 in. (100 mm) thick portland cement concrete work pad, not less than 48 x 48 in. (1.2 x 1.2 m) shall be provided in front of the cabinet, except where the cabinet faces an adjacent sidewalk.

All conduit entrances into the lighting controller shall be sealed with a pliable waterproof material.

Concrete Foundation. The Contractor shall confirm the orientation of the lighting controller, and its door side, with the Engineer, prior to installing the foundation. A portland cement concrete foundation shall be constructed to the details shown on the plans and is included as a part of this pay items and shall not be paid for separately. The top of the foundation shall be 12-inches above grade.

The lighting controller enclosure shall be set plumb and level on the foundation. It shall be fastened to the anchor rods with hot-dipped galvanized or stainless steel nuts and washers. Foundation mounted lighting controllers shall be caulked at the base with silicone.

Where the controller has a metal bottom plate, the plate shall be sealed with a rodent and dust/moisture barrier.

Grounding.

Grounding shall be as shown on the lighting controller detail drawings. Ground rods, ground wells, connections, ground wire and other associated items shall be included in the cost the lighting controller and shall not be paid for separately.”

Method Of Measurement. Each lighting controller shall be counted each for payment.

Basis Of Payment. This item shall be paid for at the contract unit price each for **LIGHTING CONTROLLER, BASE MOUNTED, 480VOLT, 200AMP (DUAL), RADIO SCADA**, which shall be payment in full for the work, complete, as specified herein.

REMOVAL OF UNDERPASS LIGHTING UNIT, NO SALVAGE

Description. This special provision describes the removal of existing underpass lighting units no salvage.

Materials. Not applicable.

Installation. Removal shall be according to Article 842 of Standard Specifications for Road and Bridge Construction, adopted January 1, 2012, as modified for underpass lighting units as follows: removal shall include lamps, luminaires, mounting rings, conduits, and all associated hardware and appurtenances.

Basis of Payment. This work will be paid for according to the contract unit price each for REMOVAL OF UNDERPASS LIGHTING UNIT, NO SALVAGE at the locations indicated on plan and details.

LUMINAIRE, LED

Effective: February 1, 2016

Description.

This work shall consist of furnishing and installing LED luminaire as shown on the plans, as specified herein.

General.

The luminaire including the housing, driver and optical assembly shall be assembled in the U.S.A. The luminaire shall be assembled by and manufactured by the same manufacturer. The luminaire shall be in compliance with ANSI C136.37. LED light source(s) and driver(s) shall be RoHS compliant.

Submittal Requirements.

The Contractor shall submit, for approval, an electronic version of all associated luminaire IES files, AGi32 files and the TM-21 or TM-28 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide (as a minimum) an electronic (PDF) version of each of the following manufacturer's product data for each type of luminaire:

1. Descriptive literature and catalogue cuts for luminaire, LED driver, and surge protection device.
2. LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 25 C.

3. LED efficacy per luminaire expressed in lumens per watt (lpw).
4. Initial delivered lumens at the specified color temperature, drive current, and ambient temperature.
5. Computer photometric calculation reports as specified and in the luminaire performance table.
6. TM-15 BUG rating report.
7. Isofootcandle chart with max candela point and half candela trace indicated.
8. Documentation of manufacturers experience and verification that luminaires were assembled in the U.S.A. as specified.
9. Supporting documentation of compliance with ANSI standards as well as UL listing as specified.
10. Supporting documentation of laboratory accreditations and certifications for specified testing as indicated.
11. Thermal testing documents as specified.
12. IESNA LM-79, LM-80 (or LM-84) and TM-21 (or TM-28) reports as specified.
13. Salt fog test reports and certification as specified.
14. Vibration Characteristics Test Reports and certification as specified.
15. Ingress Protection Test Reports as specified.
16. Written warranty.

A sample luminaire shall be provided upon request of the Engineer. The sample shall be as proposed for the contract and shall be delivered to the District Headquarters.

Manufacturer Experience.

The luminaire shall be designed to be incorporated into a lighting system with an expected 20 year lifetime. The luminaire manufacturer shall have a minimum of 33 years' experience manufacturing HID roadway luminaires and shall have a minimum of seven (7) years' experience manufacturing LED roadway luminaires. The manufacturer shall have a minimum of 25,000 total LED roadway luminaires installed on a minimum of 100 separate installations, all within the U.S.A.

Housing.

Material. The luminaire shall be a single device not requiring on-site assembly for installation. The power supply for the luminaire shall be integral to the unit.

Finish. Painted or finished luminaire surfaces exposed to the environment shall exceed a rating of six, according to ASTM D1654, after 1000 hours of ASTM B117 testing. The coating shall exhibit no greater than 30% reduction of gloss, according to ASTM D523, after 500 hours of ASTM G154 Cycle 6 QUV® accelerated weathering testing.

Unless otherwise indicated in the plans, the luminaire color shall be grey.

The luminaire shall slip-fit on a mounting arm with a 2" diameter tenon (2.375" outer diameter), and shall have a barrier to limit the amount of insertion. The slip fitter clamp shall utilize four (4) bolts to clamp to the tenon arm. The luminaire shall be provided with a leveling surface and shall be capable of being tilted ± 5 degrees from the axis of attachment in 2.5 degree increments and rotated to any degree with respect to the supporting arm.

The housing shall be designed to prevent the accumulation of water, ice, dirt and debris and to ensure maximum heat dissipation.

The effective projected area of the luminaire shall not exceed 1.6 sq. ft.

The total weight of the luminaire(s) and accessories shall not exceed 75 pounds.

A passive cooling method with no moving, rotating parts, or liquids shall be employed for heat management.

The luminaire shall include a fully prewired, 7-pin twist lock ANSI C136.41-compliant receptacle. Unused pins shall be connected as directed by the Manufacturer and as approved by the Engineer. A shorting cap shall be provided with the luminaire.

Vibration Characteristics. All luminaires shall be vibration tested and pass ANSI C136.31 requirements. Luminaires shall be rated for "3G" peak acceleration. Vibration testing shall be run using the same luminaire in all three axes.

Labels and Decals. All luminaires shall have labels in accordance with ANSI C136.15 for an external label, and ANSI C136.22 for an internal label.

The luminaire shall be Listed for wet locations by a U.S. Occupational Safety Health administration (OSHA) Nationally Recognized Testing Laboratory (NRTL) and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by the NRTL tag/sticker on the inside of the luminaire.

Hardware. All fasteners shall be stainless steel. Captive screws are required on any components that require maintenance after installation.

Internal Luminaire Electrical Connections. Quick connect/disconnect plugs shall be supplied between the discrete electrical components within the luminaire such as the driver, surge protection device and optical assembly for easy removal. The quick connect/disconnect plugs shall be operable without the use of tools while wearing insulated gloves.

Provisions for any future house-side external or internal shielding should be indicated along with means of attachment.

Circuiting shall be designed to minimize the impact of individual LED failures on the operation of the other LED's.

Wiring. Wiring within the electrical enclosure shall be rated at 600v, 105°C or higher.

Driver.

The driver shall be integral to the luminaire. Integral driver components shall be mounted in the rear of the luminaire on the inside of a removable door or on a removable mounting pad. Driver wiring shall be connected by means of plugs. Upon unplugging the driver wiring the entire driver assembly shall remove for maintenance. The removable door or pad shall be secure when fastened in place and all individual components shall be secured upon the removable element. Each component shall be readily removable from the removable door or pad for replacement.

The plugs shall be keyed and shall be operable without the use of special tools by insulated, gloved hands

The driver shall tolerate indefinite open and short circuit output conditions without damage.

Ingress Protection. The driver Ingress Protection (IP) rating as defined in the ANSI/IEC 60529 standard shall have an IP66 rating.

Input Voltage. The driver shall be suitable for operation over a range of 120 to 277 volts or 347 to 480 volts as required by the system operating voltage.

Operating Temperature. The driver shall have an operating ambient temperature range of -40°C to 70°C.

Driver Life. The driver shall provide a life time of 100,000 hours at 25° C ambient.

Safety/UL. The driver shall be UL Listed under standard UL 1012.

Power Factor. Drivers shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20%.

Driver efficiency. Efficiency of the driver is defined by the ratio of output power and input power. The driver shall deliver a maximum efficiency of >90% at maximum load and an efficiency of >85% for the driver operating at 50% power.

Electrical Interference. The driver shall meet the Electromagnetic Compatibility (EMC) requirements per FCC Title 47 Code of Federal Regulations (CFR) Part 15 Class A.

Thermal Fold Back. The driver shall reduce the current to the LED module if the driver is overheating due to abnormal conditions.

Dimming. The driver shall have dimming capability. The driver shall accept a dimming control signal that is compliant with the 0-10V protocol in accordance with ANSI C136.37.

Leakage current. The driver shall comply with safety standards in accordance with IEC 61347-1.

The Surge Protection Device shall be UL 1449 labeled as Type 4 and be an integral part of the luminaire. The SPD shall be compliant with ANSI C136.2-2014 (Draft).

Thermal performance

Thermal Testing shall be provided as defined by ANSI/UL 1598. The luminaire shall start and operate in the ambient temperature range specified in the driver section. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation. Testing shall be submitted (whenever is available) to show the maximum rated case temperature of the driver, LEDs, and other internal components are not exceeded when the luminaire is operated with the heat sink filled with debris.

LED Optical Assembly

The LED optical assembly shall be a scalable array consisting of discrete LED panels or modules. Each panel or module shall have a minimum IP rating of 66.

The optical assembly shall utilize high brightness, long life, minimum 70 CRI, 4,000K color temperature (+/-300K) LEDs binned in accordance with ANSI C78.377. Lenses shall be UV-stabilized acrylic or glass.

Lumen depreciation at 50,000 hours of operation shall not exceed 15% of initial lumen output at the specified LED drive current and an ambient temperature of 25° C.

The luminaire may or may not have a glass lens over the LED modules. If a glass lens is used, it must be a flat lens. Material other than glass will not be acceptable. If a glass lens is not used, the LED modules may not protrude lower than the luminaire housing.

The assembly shall have individual serial numbers or other means for manufacturer tracking.

Photometric Performance.

Luminaires shall be tested according to IESNA LM-79. This testing shall be performed by a test laboratory holding accreditation from the National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) for the IESNA LM-79 test procedure.

Data reports as a minimum shall yield an isofootcandle chart, with max candela point and half candela trace indicated, maximum plane and maximum cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, spectral distribution plots, chromaticity plots, and other standard report outputs of the above mentioned tests.

Lumen maintenance shall be measured for the LEDs according to LM-80 or for the luminaires according to LM-84. The LM-80 report shall be based on a minimum of 6,000 hours, yet 10,000 hour reports shall be provided for luminaires where those tests have been completed.

The luminaire shall have a BUG rating of Back Light B3 or less, Up Light rating of U0, and a Glare rating of G4 or less unless otherwise indicated in the luminaire performance table.

Lumen Maintenance Projection.

The luminaire shall have long term lumen maintenance documented according to IESNA TM-21 or IESNA TM-28. Ambient temperature shall be 25⁰ C.

The submitted calculations shall incorporate the light loss factors as indicated the respective performance tables.

Photometric Calculations.

Calculations. Submitted report shall include a luminaire classification system graph with both the recorded lumen value and percent lumens by zone along with the BUG rating according to IESNA TM-15.

Complete point-by-point luminance and veiling luminance calculations as well as listings of all indicated averages and ratios as applicable shall be provided in accordance with IESNA RP-8 recommendations. Lighting calculations shall be performed using AGi32 software with all luminance calculations performed to two decimal places (i.e. x.xx cd/m²). Uniformity ratios shall also be calculated to two decimal places (i.e. x.xx:1). Calculation results shall demonstrate that the submitted luminaire meets the lighting metrics specified in the project Luminaire Performance Table(s). Values shall be rounded to the number of significant digits indicated in the luminaire performance table(s).

All photometry must be **photopic**. Scotopic or mesopic factors will not be allowed.

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 STREET LIGHTING**

GIVEN CONDITIONS			
IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE			
ROADWAY DATA	Pavement Width	48	(ft)
	Number of Lanes	4	
	Median Width	52	(ft)
	I.E.S. Surface Classification	R3	
	Q-Zero Value	.07	
SIDEWALK DATA	Sidewalk Width	N/A	(ft)
	Edge of sidewalk to Edge Of Pavement	N/A	(ft)
LIGHT POLE DATA	Mounting Height	47.5	(ft)
	Mast Arm Length	15	(ft)
	Pole Set-Back From Edge Of Pavement	17	(ft)
LUMINAIRE DATA	Lumens	22,001 – 36,000	
	BUG Rating	B3 – U0 – G4 (Max)	
	I.E.S. Vertical Distribution	Medium	
	I.E.S. Lateral Distribution	Type II	
	Total Light Loss Factor	0.70	
LAYOUT DATA	Spacing	200	(ft)
	Configuration	Single Sided	
	Luminaire Overhang over EOP	0	(ft)

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

NOTE: These performance requirements shall be the acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ROADWAY	Average Luminance, L_{AVE}	1.1	Cd/m ² (Max)
		0.8	Cd/m ² (Min)
LUMINANCE	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0	(Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0	(Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3	(Max)
SIDEWALK ILLUMINANCE	Average horizontal at pavement, E_{AVE}	N/A	Lux (min)
	Uniformity ratio (horizontal) E_{AVE}/E_{MIN}	N/A	(Max)
	Vertical at 5 ft, in both dir. of travel, EV_{MIN}	N/A	Lux (Min)

ROADWAY LIGHTING

GIVEN CONDITIONS

ROADWAY DATA	Pavement Width	16 (ft)
	Number of Lanes	1
	Median Width	N/A
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	47.5 (ft)
	Mast Arm Length	15 (ft)
	Pole Set-Back From Edge Of Pavement	17 (ft)
LUMINAIRE DATA	Lumens	22,001 – 36,000
	BUG Rating	B3 – U0 – G4 (Max)
	I.E.S. Vertical Distribution	Medium
	I.E.S. Lateral Distribution	Type II
	Total Light Loss Factor	0.70
LAYOUT DATA	Spacing	180 (ft)
	Configuration	Single Sided
	Luminaire Overhang over EOP	0 (ft)

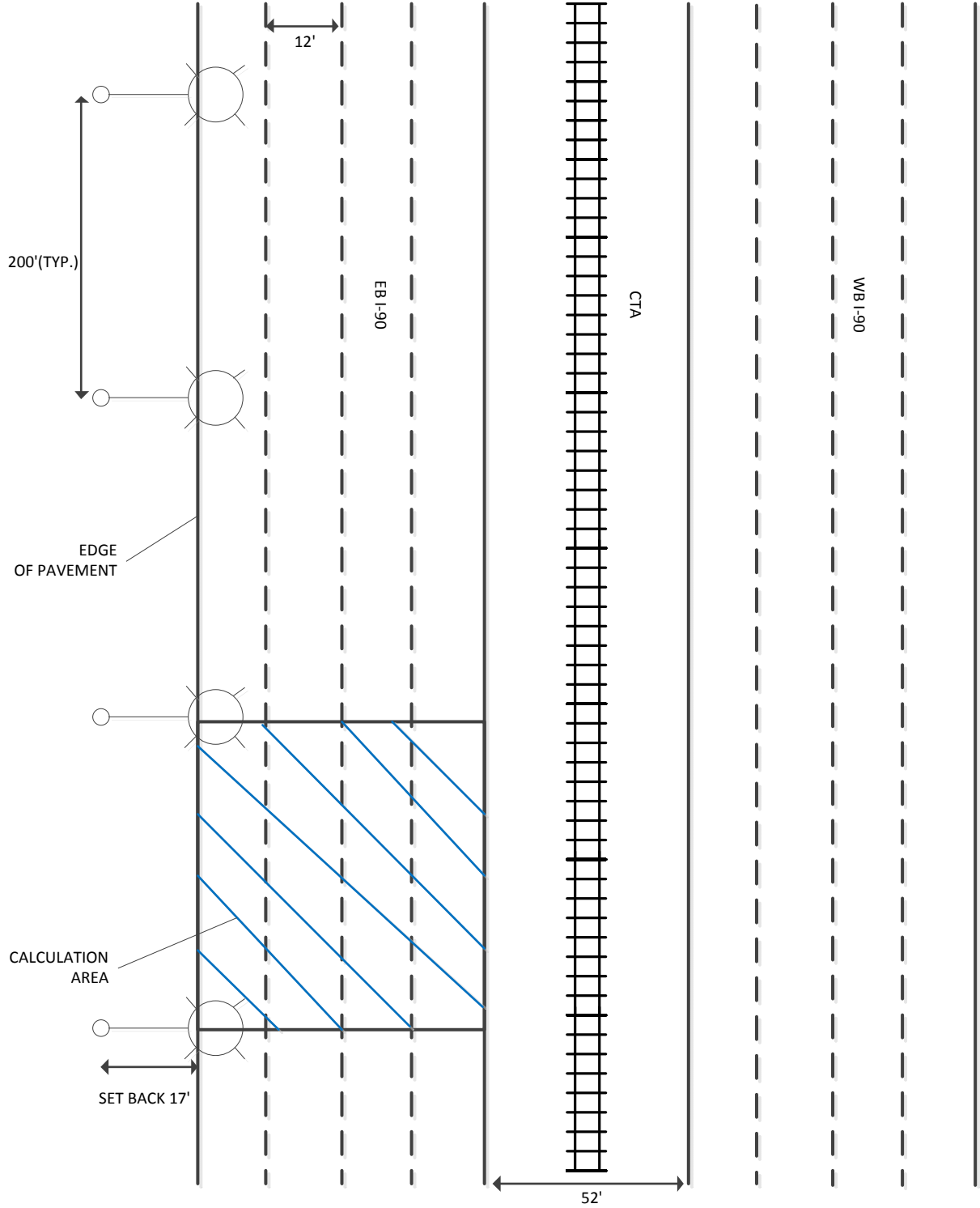
NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

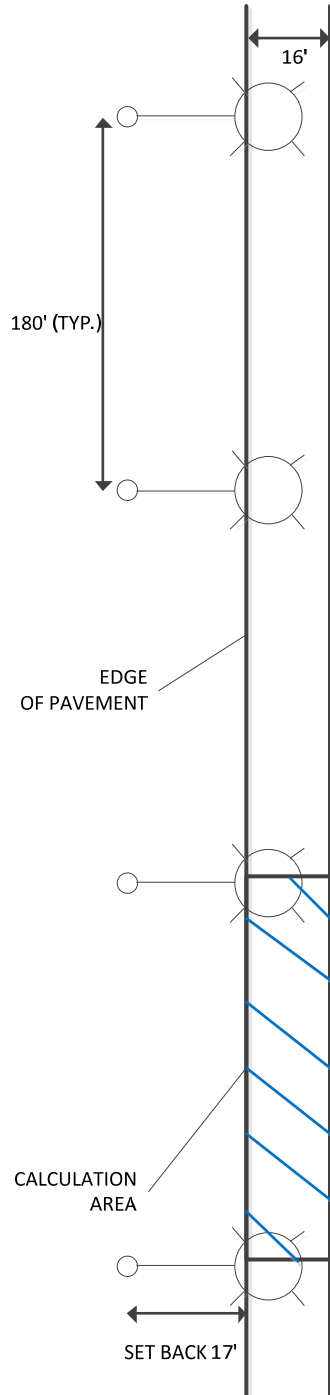
NOTE: These performance requirements shall be the acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ROADWAY	Average Luminance, L_{AVE}	1.3 Cd/m^2 (Max)
		0.8 Cd/m^2 (Min)
LUMINANCE	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3 (Max)

DOT DISTRICT 1 LUMINAIRE PERFORMANCE DETAIL
I-90 EB Final Lighting – 4 Lanes (Typical Section)



IDOT DISTRICT 1 LUMINAIRE PERFORMANCE DETAIL
I-90 EB Final Lighting – 1 Lane Ramp (Typical Section)



Independent Testing

When a contract has 30 or more luminaires of the same type (distribution type and lumen output/wattage), that luminaire type shall be independently tested, unless otherwise noted. The quantity of luminaires to be tested shall be as specified in the following table.

Contract Quantity	Luminaires to be Tested
1-29	0 (unless otherwise noted)
30-80	2
81-130	3
131-180	4
181-230	5
231-280	6
281-330	7

The Contractor shall coordinate the testing with the contract schedule taking into account submittal, manufacturing, testing, and installation lead-times and deadlines.

The Electrical Engineer shall select from all the project luminaires at the Contractor's or distributor's storage facility, within District 1, the luminaires for testing. In all cases, the selection of luminaires shall be a random selection from the entire completed lot of luminaires required for the contract. Selections from partial lots will not be allowed. An additional luminaire shall also be selected for physical inspection by the Engineer at the District Headquarters. This luminaire will be available for the Contractor to pick up at a later date to be installed under this contract. This luminaire is in addition to the luminaire required as a part of the submittal process specified elsewhere.

Luminaires shall be tested at a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory approved for each of the required tests. All costs associated with luminaire testing shall be included in the bid price of the luminaire.

The selection of the proposed independent laboratory shall be presented with the information submitted for approval.

The testing performed shall include photometric and electrical testing.

Photometric testing shall be according to IES recommendations and as a minimum, shall yield an isofootcandle chart, with max candela point and half candela trace indicated, an isocandela diagram, maximum planned and maximum cone plots of candela, a candlepower table (House and street side), a coefficient of utilization chart, a luminous flux distribution table, BUG rating report, and complete calculations based on specified requirements and test results.

Electrical testing shall conform to NEMA and ANSI standards and, as a minimum shall include a complete check of wiring connections and a table of characteristics showing input amperes, watts, power factor, total harmonic distortion and LED drive current.

Two copies of the summary report and the test results (including CDROM) shall be certified by the test laboratory and shall be sent by certified mail directly to the Engineer.

To: District Engineer
Attn: Bureau Chief of Traffic Operations
Illinois Department of transportation
201 West center Ct.
Schaumburg, IL 60196

The package shall state "luminaire test reports" and the contract number clearly.

A copy of this material shall be sent to the Contractor and the Resident Engineer at the same time.

Photometric performance shall meet or exceed that of the specified values. If the luminaire does not meet the specified photometric values, the luminaire has failed regardless of whether the test results meet the submitted factory data.

Should any of the tested luminaires of a given type, and distribution fail to satisfy the specifications and perform according to approved submittal information, the luminaire type of that distribution type and wattage shall be unacceptable and be replaced by alternate equipment meeting the specifications with the submittal and testing process repeated in their entirety; or corrections made to achieve required performance.

In the case of corrections, the Contractor shall advise the Engineer of the proposed corrections and shall request a repeat of the specified testing and, if the corrections are deemed reasonable by the Engineer, the testing process shall be repeated in its entirety.

The number of luminaires to be tested shall be the same quantity as originally tested as required in the above table.

Retesting, should it become necessary, shall not be grounds for additional compensation or extension of time

Submittal information shall include a statement of intent to provide the testing as well as a request for approval of the chosen laboratory.

Installation.

Each luminaire shall be installed according to the luminaire manufacturer's recommendations.

Luminaires which are pole mounted shall be mounted on site such that poles and arms are not left unloaded. Pole mounted luminaires shall be leveled/adjusted after poles are set and vertically aligned before being energized. When mounted on a tenon, care shall be exercised to assure maximum insertion of the mounting tenon. Each luminaire shall be checked to assure compatibility with the project power system. When the night-time check of the lighting system by the Engineer indicates that any luminaires are mis-aligned, the mis-aligned luminaires shall be corrected at no additional cost.

No luminaire shall be installed before it is approved. Where independent testing is required, full approval will not be given until complete test results, demonstrating compliance with the specifications, have been reviewed and accepted by the Engineer.

Pole wiring shall be provided with the luminaire. Pole wire shall run from handhole to luminaire. Pole wire shall be sized No. 10, rated 600 V, RHW/USE-2, and have copper conductors, stranded in conformance with ASTM B 8. Pole wire shall be insulated with cross-linked polyethylene (XLP) insulation. Wire shall be trained within the pole or sign structure so as to avoid abrasion or damage to the insulation.

Pole wire shall be extended through the pole, pole grommet, luminaire ring, and any associated arm and tenon. The pole wire shall be terminated in a manner that avoids sharp kinks, pinching, pressure on the insulation, or any other arrangement prone to damaging insulation value and producing poor megger test results. Wires shall be trained away from heat sources within the luminaire. Wires shall be terminated so all strands are extended to the full depth of the terminal lug with the insulation removed far enough so it abuts against the shoulder of the lug, but is not compressed as the lug is tightened.

Included with the pole wiring shall be fusing located in the handhole. Fusing shall be according to Article 1065.01 with the exception that fuses shall be 6 ampere.

Each luminaire and optical assembly shall be free of all dirt, smudges, etc. Should the optical assembly require cleaning, a luminaire manufacturer approved cleaning procedure shall be used.

Horizontal mount luminaires shall be installed in a level, horizontal plane, with adjustments as needed to insure the optics are set perpendicular to the traveled roadway.

When the pole is bridge mounted, a minimum size stainless steel 1/4-20NC set screw shall be provided to secure the luminaire to the mast arm tenon. A hole shall be drilled and tapped through the tenon and luminaire mounting bracket and then fitted with the screw.

Warranty.

The entire luminaire and all of its component parts shall be covered by a 10 year warranty. Failure is when one or more of the following occur:

- 1) Negligible light output from more than 10 percent of the discrete LEDs.
- 2) Significant moisture that deteriorates performance of the luminaire.
- 3) Driver that continues to operate at a reduced output due to overheating.

The warranty period shall begin on the date of project final acceptance. A copy of the acceptance letter shall be sent to the luminaire manufacturer and luminaire manufacturer's representative by the Contractor upon final acceptance.

The replacement luminaire shall be of the same manufacturer, model, and photometric distribution as the original.

Method of Measurement.

LED Luminaire classification shall be as follows:

Type	Min Lumens	Max Lumens
A	3,000	12,000
B	12,001	22,000
C	22,001	36,000
D	36,001	50,000

Where delivered lumens is defined as the initial delivered lumens at the specified color temperature.

Note: Luminaires above the stated maximums for the specified type will not be accepted

Basis of Payment.

This work will be paid for at the contract unit price per each for **LUMINAIRE, LED, HORIZONTAL MOUNT**, of the **TYPE** indicated.

LUMINAIRE, UNDERPASS, LED

Effective: January 1, 2016

Description.

This work shall consist of furnishing and installing LED underpass luminaire as shown on the plans, as specified herein.

General.

The luminaire including the housing, driver and optical assembly shall be assembled in the U.S.A. The luminaire shall be assembled by and manufactured by the same manufacturer. The luminaire shall be in compliance with ANSI C136.37. LED light source(s) and driver(s) shall be RoHS compliant.

Submittal Requirements.

The Contractor shall submit, for approval, an electronic version of all associated luminaire IES files, AGi32 files and the TM-21 or TM-28 calculator spreadsheet with inputs and reports associated with the project luminaires. The Contractor shall also provide (as a minimum) an electronic (PDF) version of each of the following manufacturer's product data for each type of luminaire:

1. Descriptive literature and catalogue cuts for luminaire, LED driver, and surge protection device.
2. LED drive current, total luminaire input wattage and total luminaire current at the system operating voltage or voltage range and ambient temperature of 25 C.
3. LED efficacy per luminaire expressed in lumens per watt (lpw).
4. Initial delivered lumens at the specified color temperature, drive current, and ambient temperature.
5. Computer photometric calculation reports as specified and in the luminaire performance table.
6. TM-15 BUG rating report.
7. Isofootcandle chart with max candela point and half candela trace indicated.
8. Documentation of manufacturers experience and verification that luminaires were assembled in the U.S.A. as specified.

9. Supporting documentation of compliance with ANSI standards as well as UL listing as specified.
10. Supporting documentation of laboratory accreditations and certifications for specified testing as indicated.
11. Thermal testing documents as specified.
12. IESNA LM-79, LM-80 (or LM-84) and TM-21 (or TM-28) reports as specified.
13. Salt fog test reports and certification as specified.
14. Vibration Characteristics Test Reports and certification as specified.
15. Ingress Protection Test Reports as specified.
16. Written warranty.
17. A sample luminaire shall be provided upon request of the Engineer. The sample shall be as proposed for the contract.

Manufacturer Experience.

The luminaire shall be designed to be incorporated into a lighting system with an expected 20 year lifetime. The luminaire manufacturer shall have a minimum of 33 years' experience manufacturing HID roadway luminaires and shall have a minimum of seven (7) years' experience manufacturing LED roadway luminaires. The manufacturer shall have a minimum of 25,000 total LED roadway luminaires installed on a minimum of 100 separate installations, all within the U.S.A.

Housing.

Material. The luminaire shall be a single device not requiring on-site assembly for installation. The power supply for the luminaire shall be integral to the unit. The housing shall be either stainless steel or cast aluminum.

Finish.

Cast aluminum housing. Painted or finished luminaire surfaces exposed to the environment shall exceed a rating of six, according to ASTM D1654, after 1000 hours of ASTM B117 testing. The coating shall exhibit no greater than 30% reduction of gloss, according to ASTM D523, after 500 hours of ASTM G154 Cycle 6 QUV® accelerated weathering testing.

Stainless steel housing. The stainless steel housing does not need to be painted. The manufacturer may paint the luminaire at no additional cost.

Unless otherwise indicated in the plans, the luminaire color shall be grey.

The housing shall be designed to prevent the accumulation of water, ice, dirt and debris and to ensure maximum heat dissipation.

The total weight of the luminaire(s) and accessories shall not exceed 75 pounds.

A passive cooling method with no moving, rotating parts, or liquids shall be employed for heat management.

Vibration Characteristics. All luminaires shall be vibration tested and pass ANSI C136.31 requirements. Luminaires shall be rated for "3G" peak acceleration. Vibration testing shall be run using the same luminaire in all three axes.

Labels and Decals. All luminaires shall have labels in accordance with ANSI C136.15 for an external label, and ANSI C136.22 for an internal label.

The luminaire shall be Listed for wet locations by a U.S. Occupational Safety Health administration (OSHA) Nationally Recognized Testing Laboratory (NRTL) and shall be in compliance with UL 8750 and UL 1598. It shall be identified as such by the NRTL tag/sticker on the inside of the luminaire.

Hardware. All hardware shall be stainless steel. Captive screws are required on any components that require maintenance after installation.

Internal Luminaire Electrical Connections. Quick connect/disconnect plugs shall be supplied between the discrete electrical components within the luminaire such as the driver, surge protection device and optical assembly for easy removal. The quick connect/disconnect plugs shall be operable without the use of tools while wearing insulated gloves.

Circuiting shall be designed to minimize the impact of individual LED failures on the operation of the other LED's.

Wiring. Wiring within the electrical enclosure shall be rated at 600v, 105°C or higher.

Mounting Brackets.

The brackets shall be properly sized to accommodate the weight of the luminaire with calculations or other suitable reference documentation submitted to support the material choice.

The luminaire shall have an opening in the housing for installation (by others) of a 28.1 mm (3/4 inch) diameter flexible conduit. The location of the opening shall be coordinated with the installation to minimize the length of flexible conduit required.

The mounting brackets shall be fully coordinated with the luminaire mounting method indicated in plans.

Driver.

The driver shall be integral to the luminaire. Integral driver components shall be mounted in the rear of the luminaire on the inside of a removable door or on a removable mounting pad. Driver wiring shall be connected by means of plugs. Upon unplugging the driver wiring the entire driver assembly shall remove for maintenance. The removable door or pad shall be secure when fastened in place and all individual components shall be secured upon the removable element. Each component shall be readily removable from the removable door or pad for replacement.

The plugs shall be keyed and shall be operable without the use of special tools by insulated, gloved hands

The driver shall be installed in a manner to keep it mechanically separated from the LED array heat sink.

The driver shall tolerate indefinite open and short circuit output conditions without damage.

Ingress Protection. The driver Ingress Protection (IP) rating as defined in the ANSI/IEC 60529 standard shall have an IP66 rating.

Input Voltage. The driver shall be suitable for operation over a range of 120 to 277 volts or 347 to 480 volts as required by the system operating voltage.

Operating Temperature. The driver shall have an operating ambient temperature range of -40°C to 70°C.

Driver Life. The driver shall provide a life time of 100,000 hours at 25° C ambient.

Safety/UL. The driver shall be UL Listed under standard UL 1012.

Power Factor. Drivers shall maintain a power factor of 0.9 or higher and total harmonic distortion of less than 20%.

Driver efficiency. Efficiency of the driver is defined by the ratio of output power and input power. The driver shall deliver a maximum efficiency of >90% at maximum load and an efficiency of >85% for the driver operating at 50% power.

Electrical Interference. The driver shall meet the Electromagnetic Compatibility (EMC) requirements per FCC Title 47 Code of Federal Regulations (CFR) Part 15 Class A.

Thermal Fold Back. The driver shall reduce the current to the LED module if the driver is overheating due to abnormal conditions.

Dimming. The driver shall have dimming capability. The driver shall accept a dimming control signal that is compliant with the 0-10V protocol.

Leakage current. The driver shall comply with safety standards in accordance with IEC 61347-1.

The Surge Protection Device shall be UL 1449 labeled as Type 4 and be an integral part of the luminaire. The SPD shall be compliant with ANSI C136.2-2014 (Draft).

Thermal performance

Thermal Testing shall be provided as defined by ANSI/UL 1598. The luminaire shall start and operate in the ambient temperature range specified in the driver section. The maximum rated case temperature of the driver, LEDs, and other internal components shall not be exceeded when the luminaire is operated in the ambient temperature range specified.

Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation. Testing shall be submitted (whenever is available) to show the maximum rated case temperature of the driver, LEDs, and other internal components are not exceeded when the luminaire is operated with the heat sink filled with debris.

LED Optical Assembly

The LED optical assembly shall be a scalable array consisting of discrete LED panels or modules. Each panel or module shall have a minimum IP rating of 66.

The optical assembly shall utilize high brightness, long life, minimum 70 CRI, 4,000K color temperature (+/-300K) LEDs binned in accordance with ANSI C78.377. Lenses shall be UV-stabilized acrylic or glass.

Lumen depreciation at 50,000 hours of operation shall not exceed 15% of initial lumen output at the specified LED drive current and an ambient temperature of 25° C.

The luminaire must have a clear glass lens over the LED modules. The lens shall be made of tempered crystal clear borosilicate glass. Material other than glass will not be acceptable.

The assembly shall have individual serial numbers or other means for manufacturer tracking.

Photometric Performance.

Luminaires shall be tested according to IESNA LM-79. This testing shall be performed by a test laboratory holding accreditation from the National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) for the IESNA LM-79 test procedure.

Data reports as a minimum shall yield an isofootcandle chart, with max candela point and half candela trace indicated, maximum plane and maximum cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, spectral distribution plots, chromaticity plots, and other standard report outputs of the above mentioned tests.

Lumen maintenance shall be measured for the LEDs according to LM-80 or for the luminaires according to LM-84. The LM-80 report shall be based on a minimum of 6,000 hours, yet 10,000 hour reports shall be provided for luminaires where those tests have been completed.

The luminaire shall have a BUG upward rating of U0 and a Glare rating of G4 or less.

Lumen Maintenance Projection.

The luminaire shall have long term lumen maintenance documented according to IESNA TM-21 or IESNA TM-28. Ambient temperature shall be 25⁰ C.

The submitted calculations shall incorporate the light loss factors as indicated the respective performance tables.

Photometric Calculations.

Calculations. Submitted report shall include a luminaire classification system graph with both the recorded lumen value and percent lumens by zone along with the BUG rating according to IESNA TM-15.

Complete point-by-point luminance and veiling luminance calculations as well as listings of all indicated averages and ratios as applicable shall be provided in accordance with IESNA RP-8 recommendations. Lighting calculations shall be performed using AGi32 software with all luminance calculations performed to two decimal places (i.e. x.xx cd/m²). Uniformity ratios shall also be calculated to two decimal places (i.e. x.xx:1). Calculation results shall demonstrate that the submitted luminaire meets the lighting metrics specified in the project Luminaire Performance Table(s). Values shall be rounded to the number of significant digits indicated in the luminaire performance table(s).

All photometry must be **photopic**. Scotopic or mesopic factors will not be allowed.

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 ROADWAY LIGHTING**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	60 (ft)
	Number of Lanes	5
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	16.8 (ft)
	Mast Arm Length	0 (ft)
	Pole Set-Back From Edge Of Pavement	2 (ft)
LUMINAIRE DATA	Lumens	6,001 – 9,000
	BUG Rating	B1 – U0 – G4
	I.E.S. Vertical Distribution	Short
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	Type IV
	Total Light Loss Factor	0.7
LAYOUT DATA	Spacing	45 (ft)
	Configuration	Opposite Side
	Luminaire Overhang over EOP	0 (ft)

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

NOTE: These performance requirements shall be the acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ROADWAY	Average Luminance, L_{AVE}	1.5 Cd/m ² (Max)
		1.2 Cd/m ² (Min)
LUMINANCE	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3 (Max)

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 ROADWAY LIGHTING**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	48 (ft)
	Number of Lanes	4
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	16.8 (ft)
	Mast Arm Length	0 (ft)
	Pole Set-Back From Edge Of Pavement	2 (ft)
LUMINAIRE DATA	Lumens	6,001 – 9,000
	BUG Rating	B1 – U0 – G4
	I.E.S. Vertical Distribution	Short
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	Type IV
	Total Light Loss Factor	0.7
LAYOUT DATA	Spacing	55 (ft)
	Configuration	Opposite Side
	Luminaire Overhang over EOP	0 (ft)

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

NOTE: These performance requirements shall be the acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ROADWAY	Average Luminance, L_{AVE}	1.5 Cd/m ² (Max)
		1.2 Cd/m ² (Min)
LUMINANCE	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3 (Max)

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 ROADWAY LIGHTING**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	36 (ft)
	Number of Lanes	3
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	16.8 (ft)
	Mast Arm Length	0 (ft)
	Pole Set-Back From Edge Of Pavement	2 (ft)
LUMINAIRE DATA	Lumens	6,001 – 9,000
	BUG Rating	B1 – U0 – G4
	I.E.S. Vertical Distribution	Short
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	Type IV
	Total Light Loss Factor	0.7
LAYOUT DATA	Spacing	35 (ft)
	Configuration	Staggered
	Luminaire Overhang over EOP	0 (ft)

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

NOTE: These performance requirements shall be the acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ROADWAY	Average Luminance, L_{AVE}	1.5 Cd/m ² (Max)
		1.2 Cd/m ² (Min)
LUMINANCE	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3 (Max)

**IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE
 ROADWAY LIGHTING**

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	24 (ft)
	Number of Lanes	2
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	16.8 (ft)
	Mast Arm Length	0 (ft)
	Pole Set-Back From Edge Of Pavement	2 (ft)
LUMINAIRE DATA	Lumens	6,001 – 9,000
	BUG Rating	B1 – U0 – G4
	I.E.S. Vertical Distribution	Short
	I.E.S. Control Of Distribution	Cutoff
	I.E.S. Lateral Distribution	Type IV
	Total Light Loss Factor	0.7
LAYOUT DATA	Spacing	30 (ft)
	Configuration	Staggered
	Luminaire Overhang over EOP	0 (ft)

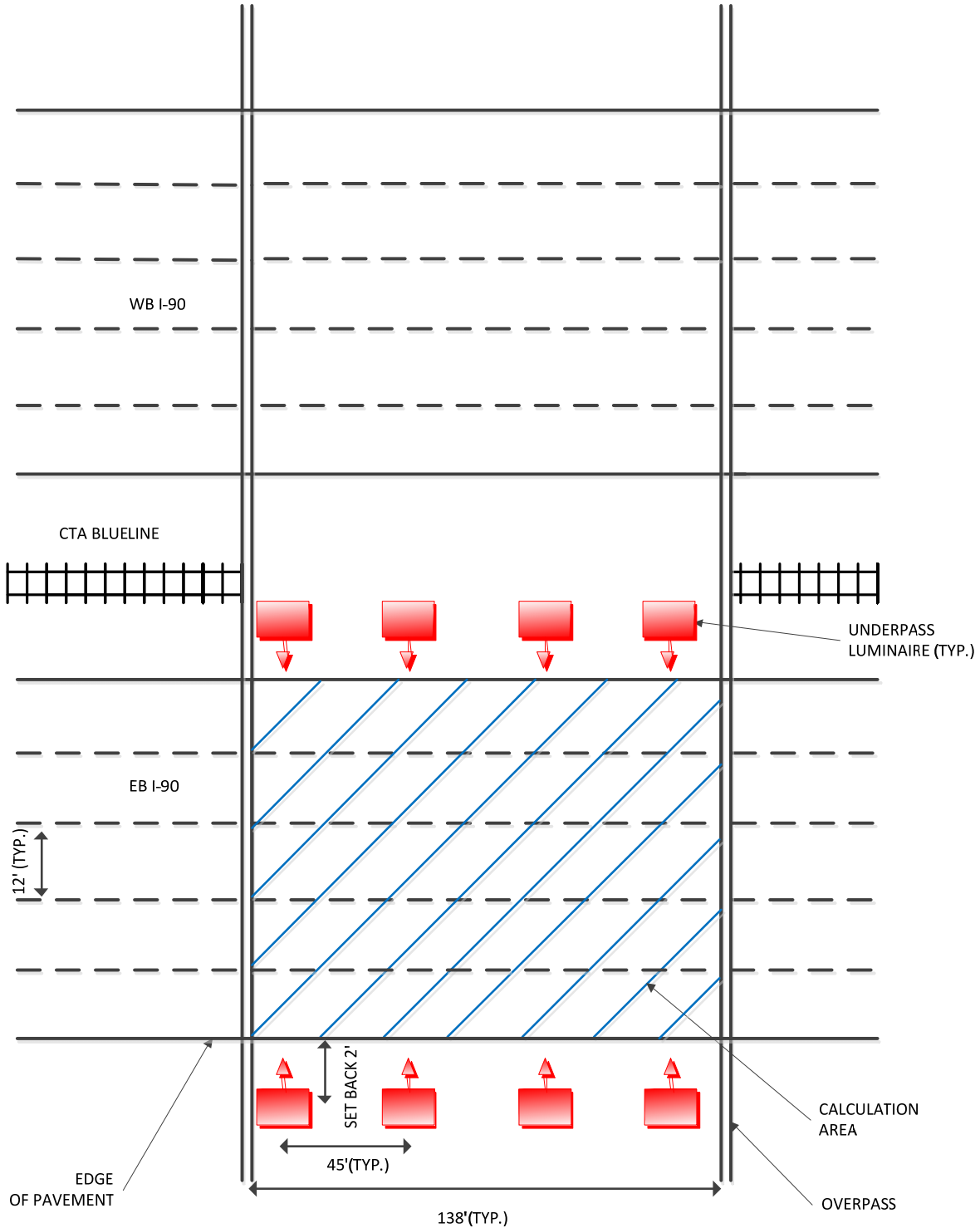
NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS		
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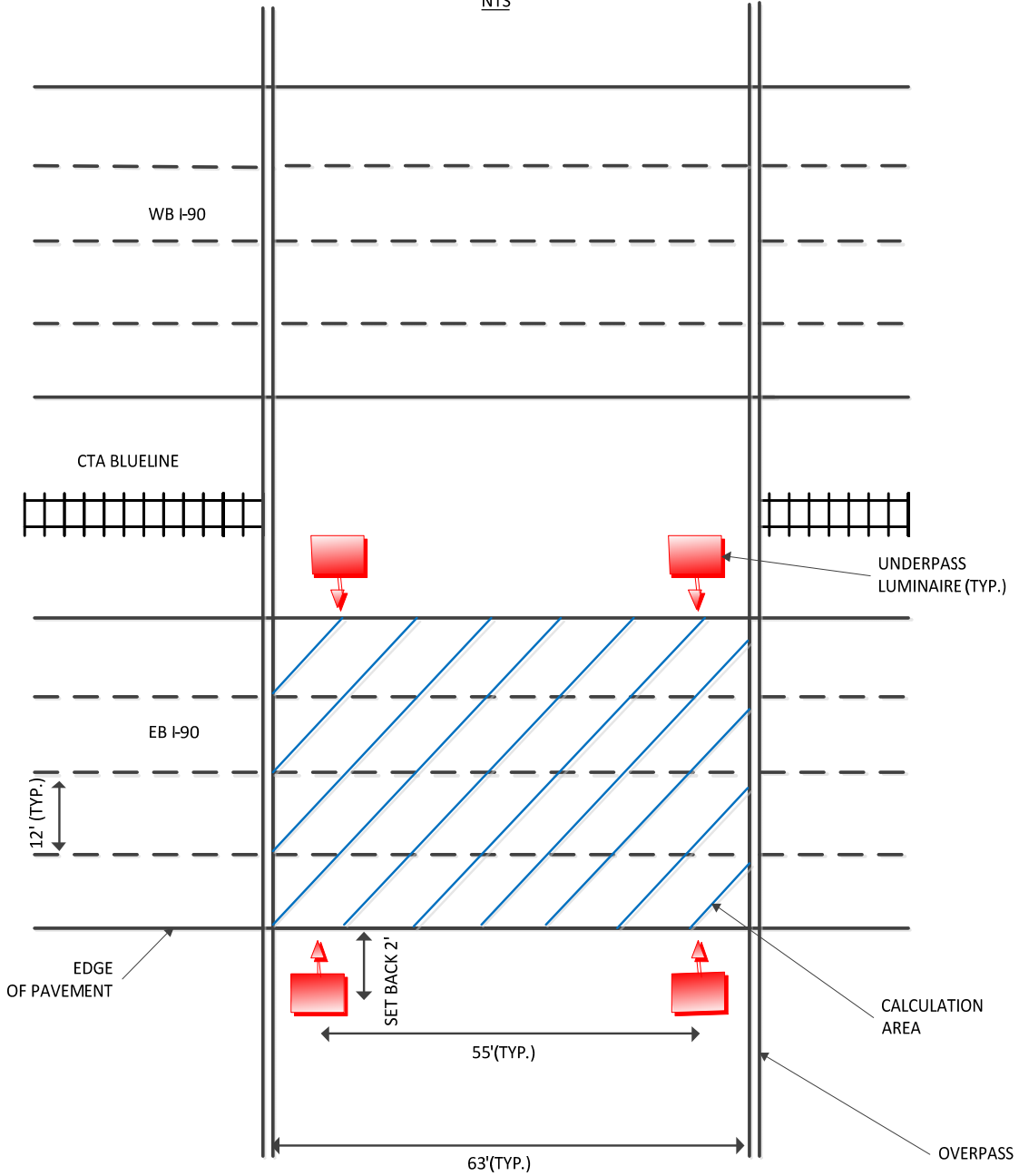
NOTE: These performance requirements shall be the acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ROADWAY	Average Luminance, L_{AVE}	1.5 Cd/m ² (Max)
		1.2 Cd/m ² (Min)
LUMINANCE	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0 (Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3 (Max)

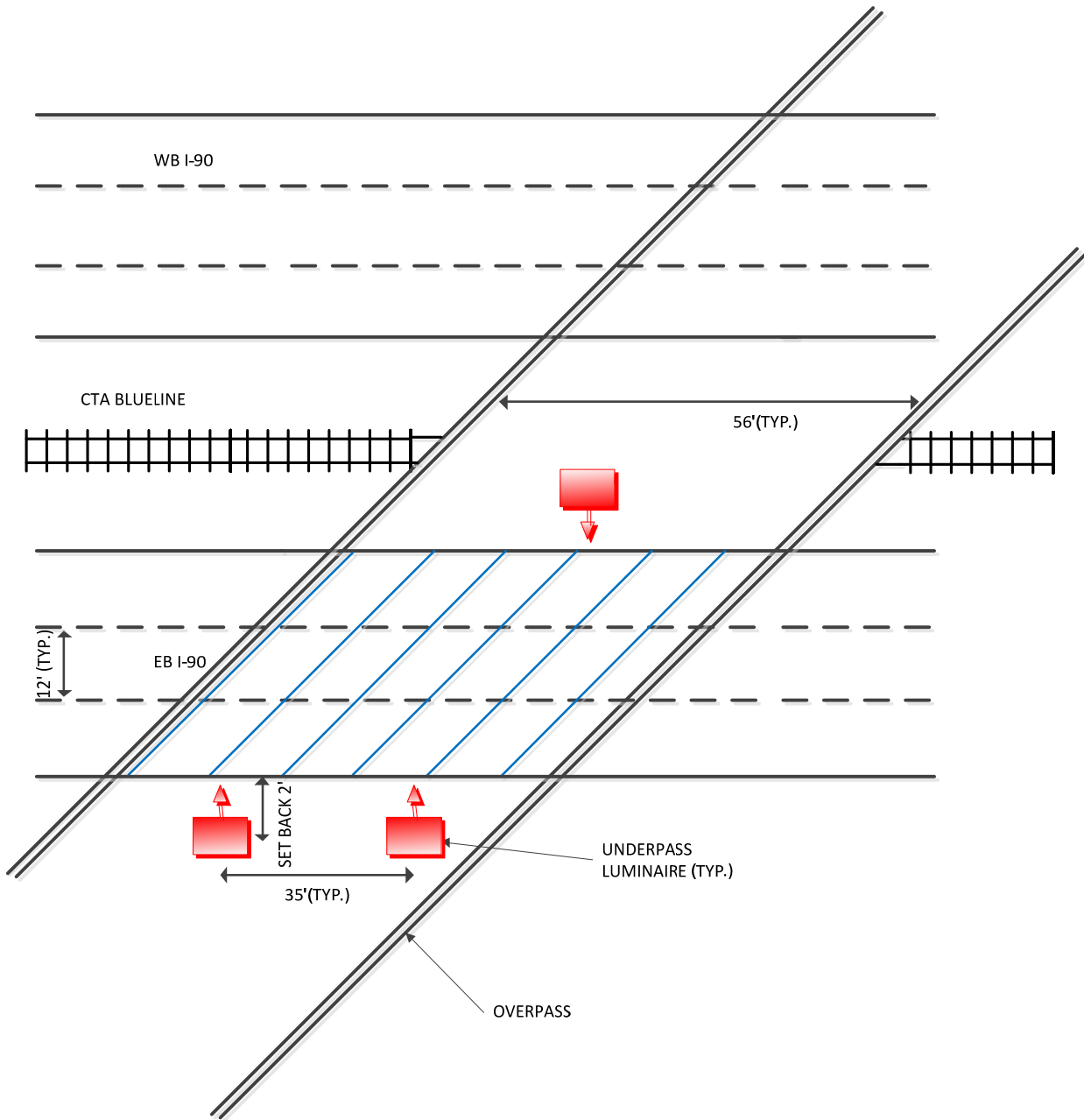
IDOT DISTRICT 1 UNDERPASS LUMINAIRE PERFORMANCE DETAIL
I-90 EB Final Lighting – 5 Lanes (Typical Section)
NTS



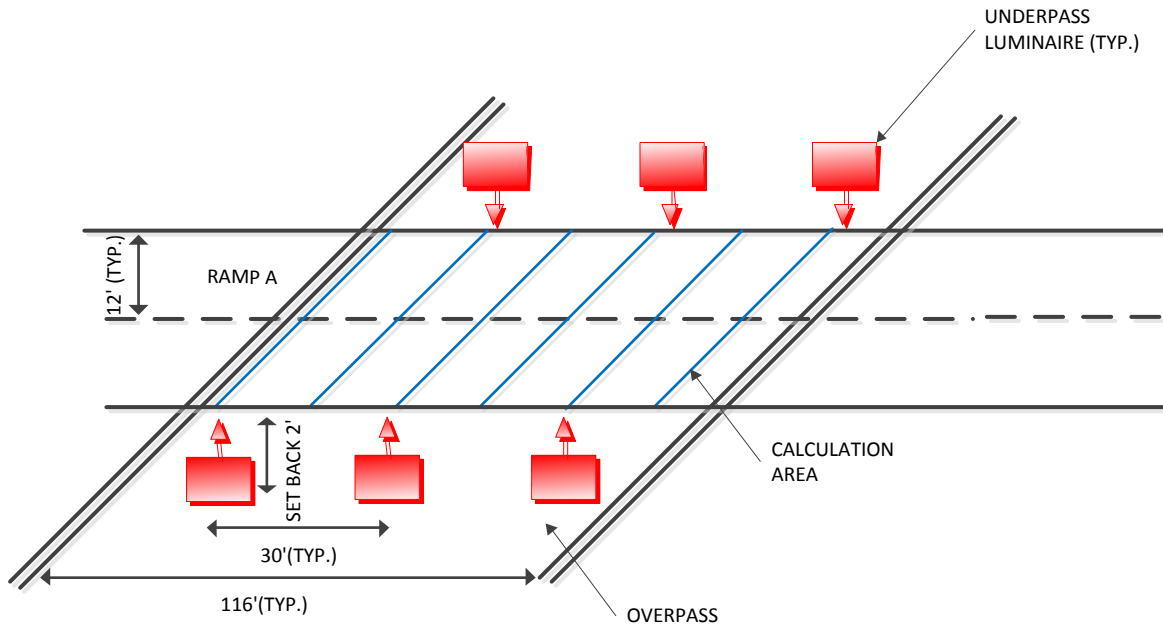
IDOT DISTRICT 1 UNDERPASS LUMINAIRE PERFORMANCE DETAIL
I-90 EB Final Lighting - 4 Lanes (Typical Section)
NTS



IDOT DISTRICT 1 UNDERPASS LUMINAIRE PERFORMANCE DETAIL
I-90 EB Final Lighting – 3 Lanes (Slanted)
NTS



IDOT DISTRICT 1 UNDERPASS LUMINAIRE PERFORMANCE DETAIL
I-90 EB Final Lighting – 2 Lanes (Slanted)
NTS



Independent Testing

When a contract has 30 or more luminaires of the same type (distribution type and lumen output/wattage), that luminaire type shall be independently tested, unless otherwise noted. The quantity of luminaires to be tested shall be as specified in the following table.

Contract Quantity	Luminaires to be Tested
1-29	0 (unless otherwise noted)
30-80	2
81-130	3
131-180	4
181-230	5
231-280	6
281-330	7

The Contractor shall coordinate the testing with the contract schedule taking into account submittal, manufacturing, testing, and installation lead-times and deadlines.

The Electrical Engineer shall select from all the project luminaires at the Contractor's or distributor's storage facility, within District 1, the luminaires for testing. In all cases, the selection of luminaires shall be a random selection from the entire completed lot of luminaires required for the contract. Selections from partial lots will not be allowed. An additional luminaire shall also be selected for physical inspection by the Engineer at the District Headquarters. This luminaire will be available for the Contractor to pick up at a later date to be installed under this contract. This luminaire is in addition to the luminaire required as a part of the submittal process specified elsewhere.

Luminaires shall be tested at a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory approved for each of the required tests. All costs associated with luminaire testing shall be included in the bid price of the luminaire.

The selection of the proposed independent laboratory shall be presented with the information submitted for approval.

The testing performed shall include photometric and electrical testing.

Photometric testing shall be according to IES recommendations and as a minimum, shall yield an isofootcandle chart, with max candela point and half candela trace indicated, an isocandela diagram, maximum planned and maximum cone plots of candela, a candlepower table (House and street side), a coefficient of utilization chart, a luminous flux distribution table, BUG rating report, and complete calculations based on specified requirements and test results.

Electrical testing shall conform to NEMA and ANSI standards and, as a minimum shall include a complete check of wiring connections and a table of characteristics showing input amperes, watts, power factor, total harmonic distortion and LED drive current.

Two copies of the summary report and the test results (including CDROM) shall be certified by the test laboratory and shall be sent by certified mail directly to the Engineer.

To: District Engineer
Attn: Bureau Chief of Traffic Operations
Illinois Department of transportation
201 West center Ct.
Schaumburg, IL 60196

The package shall state "luminaire test reports" and the contract number clearly.

A copy of this material shall be sent to the Contractor and the Resident Engineer at the same time.

Photometric performance shall meet or exceed that of the specified values. If the luminaire does not meet the specified photometric values, the luminaire has failed regardless of whether the test results meet the submitted factory data.

Should any of the tested luminaires of a given type, and distribution fail to satisfy the specifications and perform according to approved submittal information, the luminaire type of that distribution type and wattage shall be unacceptable and be replaced by alternate equipment meeting the specifications with the submittal and testing process repeated in their entirety; or corrections made to achieve required performance.

In the case of corrections, the Contractor shall advise the Engineer of the proposed corrections and shall request a repeat of the specified testing and, if the corrections are deemed reasonable by the Engineer, the testing process shall be repeated in its entirety.

The number of luminaires to be tested shall be the same quantity as originally tested as required in the above table.

Retesting, should it become necessary, shall not be grounds for additional compensation or extension of time

Submittal information shall include a statement of intent to provide the testing as well as a request for approval of the chosen laboratory.

Installation.

Each luminaire shall be installed according to the luminaire manufacturer's recommendations.

Luminaires shall be leveled/adjusted before being energized. Each luminaire shall be checked to assure compatibility with the project power system. When the night-time check of the lighting system by the Engineer indicates that any luminaires are mis-aligned, the mis-aligned luminaires shall be corrected at no additional cost.

No luminaire shall be installed before it is approved. Where independent testing is required, full approval will not be given until complete test results, demonstrating compliance with the specifications, have been reviewed and accepted by the Engineer.

Each luminaire and optical assembly shall be free of all dirt, smudges, etc. Should the optical assembly require cleaning, a luminaire manufacturer approved cleaning procedure shall be used.

Horizontal mount luminaires shall be installed in a level, horizontal plane, with adjustments as needed to insure the optics are set perpendicular to the traveled roadway.

Underpass luminaires shall be either attached to structures (such as piers, etc.) or suspended from structures (such as bridge decks) as indicated or implied by the configuration on the Plans. Mounting, including all hardware and appurtenant items, shall be included as part of this item.

Unless otherwise indicated, suspended underpass luminaires shall be installed one-inch above the lowest underpass beam and shall be mounted using vibration dampening assemblies. All mounting hardware shall be corrosion resistant and shall be stainless steel unless otherwise indicated.

The Engineer reserves the right to select the final light distribution pattern, luminaire aiming angle and change it as deemed necessary to produce the proper pavement luminance.

Surface mounted luminaires, all luminaires not mounted on suspension rods, shall have one-inch thick stainless steel spacers installed between the luminaire and the deck or wall.

An aluminum underpass luminaire numbering decal bracket for each underpass luminaire shall be installed as shown on the plan. The bracket shall be large enough to accommodate the identification and shall be mounted on the pier or retaining wall from which the luminaires are electrically fed as directed by the Engineer.

Warranty.

The entire luminaire and all of its component parts shall be covered by a 10 year warranty. Failure is when one or more of the following occur:

- 1) Negligible light output from more than 10 percent of the discrete LEDs.
- 2) Significant moisture that deteriorates performance of the luminaire.
- 3) Driver that continues to operate at a reduced output due to overheating.

The warranty period shall begin on the date of project final acceptance. A copy of the acceptance letter shall be sent to the luminaire manufacturer and luminaire manufacturer's representative by the Contractor upon final acceptance.

The replacement luminaire shall be of the same manufacturer, model, and photometric distribution as the original.

Method of Measurement.

LED Luminaire classification shall be as follows:

Type	Min Lumens	Max Lumens
A	3,000	6,000
B	6,001	9,000
C	9,001	12,000

Where delivered lumens is defined as the initial delivered lumens at the specified color temperature. Luminaires above the stated maximums for the specified type will not be accepted

Basis of Payment.

This work will be paid for at the contract unit price per each for **LUMINAIRE, UNDERPASS, LED**, of the **TYPE** indicated.

REMOVAL OF CABLE IN CONDUIT

Description.

This work shall consist of the removal of the cable from the conduit only if it is determined that new cable can be installed safely in the existing conduit.

General.

The Contractor shall investigate the existing conduit runs to determine the feasibility of removing existing cable and pulling/installing new cable in the existing conduit. If it is determined to be feasible, the existing electric cable shall be removed, as directed by the Engineer, from the conduit. The conduit shall be cleaned and swabbed prior to reinstallation of cable.

Method Of Measurement. The work will be measured for payment in feet. If two or more cable in the conduit are to be removed, each cable will be measured for payment separately.

Basis Of Payment. This work will be paid for at the contract unit price per foot for **REMOVAL OF CABLE IN CONDUIT**.

CONTROLLED LOW STRENGTH MATERIAL (CLSM)

General:

This item consists of furnishing, transporting and placing a controlled low-strength material (CLSM) as flowable backfill at locations shown on the Drawings or as directed by the Engineer.

Materials:

- A. Portland Cement – Portland Cement must conform to the requirements of ASTM C-150 Type I. If for any reason, cement becomes partially set or contains lumps of caked cement, it will be rejected. Cement salvaged from discarded or used bags will not be used.
- B. Fly Ash – Fly Ash must conform to ASTM C-618, Class C or F.
- C. Fine Aggregate (Sand) – Fine aggregate must conform to the requirements of ASTM C-33 except for aggregate gradation. Any aggregate gradation which produces performance characteristics of the CLSM specified herein will be accepted, except as follows:

Sieve Size	Percent Passing by Weight
$\frac{3}{4}$ inch (19.0 mm)	100
No. 200 (0.075 mm)	0-12

- D. Water – Water used in mixing must be free of oil, salt, acid, alkali, sugar, vegetable matter, or other substances injurious to the finished product.
- E. Dyes and other methods of coloring the backfill material may be incorporated if desired.

Mix Design

- A. Mix Proportions – The Contractor must submit to the Engineer a mix design including the proportions and source of materials, admixtures, and dry cubic yard (cubic meter) batch weights. The mix must contain a minimum of 50 pounds of cement and 250 pounds fly ash per cubic yard (30kg cement and 148kg fly ash per cubic meter), with the remainder of the volume composed of sand, water, and any approved admixtures.
- B. Compressive Strength – CLSM must be designed to achieve a 28-day compressive strength of 100 to 200 psi (690 to 3680 kPa) when tested in accordance with ASTM D 4832 Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders. There should be no significant strength gain after 28 days. Test specimens will be made in accordance with ASTM D 4832.

- C. Consistency – Consistency of the fresh mixture will be such that the mixture may be placed without segregation. A desired consistency may be approximated by filling an open-ended three inch (75 mm) diameter cylinder, six inches (150 mm) high to the top, with the mixtures and the cylinder pulled immediately pulled straight up. The correct consistency will produce an approximate eight inch (205 mm) diameter circular-type spread without segregation. Adjustments of the proportions of materials should be made to achieve proper solid suspension and flowable characteristics, however theoretical yield must be maintained at one cubic yard (cubic meter) for the given batch weights.

Construction Methods:

- A. Placement – CLSM may be placed by any reasonable means from a mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement will be performed in such a manner that structures or pipes are not displaced from their desired final position and intrusion of CLSM into undesirable areas is avoided. The material will be brought up uniformly to the fill line shown on the Plans or as directed to the Engineer. Each placement of CLSM will be as continuous an operation as possible. If CLSM is placed in more than one layer, the base layer must be free of surface water and loose or foreign material prior to placement of the next layer.
- B. Limitations of Placement – CLSM will not be placed on frozen ground. Mixing and placing may begin when the air temperature is at least 35 degrees F (2 degrees C) and rising. At the time of placement, CLSM must have a temperature of at least 40 degrees F (4 degrees C). Mixing and placement must stop when the air temperature is 40 degrees F (4 degrees C) and falling or when the anticipated air temperature will be 35 degrees F (2 degrees C) or less in the 24 hour period following proposed placement.
- C. Curing – The air in contact with the CLSM should be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32 degrees F (0 degrees C), the material may be rejected by the Engineer if damage to the material is observed.
- D. Protection – The CLSM will not be subject to loads and will remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor will be responsible for providing evidence to the Engineer that the material has reached the desired strength. Acceptable evidence will be based upon compression tests made in accordance with Section 3.01 B – Compressive Strength.

Material Acceptance

Acceptance of CLSM delivered and placed as shown on the Drawings or as directed by the Engineer will be based upon mix design approval and batch tickets provided by the Contractor to confirm that the delivered material conforms to the mix design. The Contractor must verify by additional testing, each 150 cubic yards of material used, but perform a minimum of at least one set of compressive strength specimen per day. Verification will include confirmation of material proportions and tests of compressive strength to confirm that the material meets the original mix design and the requirements of CLSM as defined in this Specification.

Adjustments will be made as necessary to the proportions and materials prior to further production.

Method of Measurement:

CLSM will be measured by the number of cubic yards completed and accepted.

Payment:

Accepted quantities of CLSM will be paid for at the Contract unit per price per cubic yard under the TEMPORARY FILL MATERIAL pay item. Payment will be full compensation for all materials, equipment, labor and all work required to complete the item as specified.

MAINTENANCE OF STREET LIGHTING SYSTEM (CITY OF CHICAGO)

Description. Work under this item shall consist of furnishing all labor, equipment, and incidental materials for maintaining existing City of Chicago street lighting system until the proposed new equipment is installed, energized, tested, and accepted for operation by the Engineer as shown in the Contract Plans and as directed by the Engineer. Work under this item shall be performed according to Sections 801 and 1000 of the Standard Specifications, and to the City of Chicago, Department of Transportation, Division of Electrical Operations Standards; except as herein modified.

Materials.

Materials used to maintain the existing roadway lighting system shall conform to the requirements of the Standard Specification; or City of Chicago, Department of Transportation, Division of Electrical Operations Material Specifications. Material Specifications as referenced in specification sections listed below.

General Requirements.

The work shall include any necessary temporary devices to maintain existing illumination. The location and protection of devices necessary to comply with these requirements shall be subject to the approval of the Engineer. The Engineer will be the sole judge of satisfying existing illumination levels.

Any temporary wire or cable which may be required to be installed overhead between existing poles or temporary devices shall be furnished, installed, terminated, and maintained in service until the proposed lighting equipment is installed, tested and accepted for operation by the Engineer.

The Contractor shall maintain existing lighting systems (temporary and permanent) and proposed lighting systems, as well as receptacles and other ancillary devices connected to the applicable street lighting controllers. Effective the day the Contractor starts work (including non-electrical work), the Contractor shall maintain the existing lighting equipment located within the project limits as it then exists. The contractor shall also maintain any street lighting equipment outside of the project limits but connected to a controller situated within the project limits. The contractor shall also maintain any street lighting equipment inside of the project limits but connected to a controller situated outside the project limits.

The scope of work shall include the assumption of responsibility for the continuing operation of existing, temporary, or other lighting-systems affected by the work as may be specified elsewhere herein. Existing lighting systems, when depicted on the Plans, are intended only to indicate the general nature of the systems involved and shall not be construed as an exact representation of the field conditions. It remains the Contractor's responsibility to visit the site to confirm and ascertain the exact nature of systems to be maintained.

The Contractor shall take over maintenance of all the equipment supplied with electric power from street lighting controllers, regardless of location, which power lighting units located within the project limits.

Preconstruction Inspection.

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

- Establish details of any formal transfers of maintenance responsibility required for the construction period.
- Establish approximate locations of known lighting and/or traffic control systems, which may be affected by the work.
- Establish the condition of lighting and/or traffic control systems which may be affected by the Work.

Construction Requirements.

Construction shall be in accordance with the City of Chicago, Department of Transportation, Division of Electrical Operations Construction Specifications for the following items:

Cable Splicing and Termination
Splices, Fuse holders, and Fuses
Aerial Cable Assembly
Pole Wire
Lamps
Luminaires
Metal Light Poles
Thermal Magnetic Circuit Breaker

Operation of Lighting

The lighting shall be operational every night, dusk to dawn. Duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously. Lighting systems shall not be kept in operation during long daytime periods.

Method of Measurement

The contractor shall demonstrate to the satisfaction of the Engineer that the lighting system is fully operational prior to submitting a pay request. Failure to do so will be grounds for denying the pay request.

Basis of Payment. This work will be paid for at the contract lump sum price for MAINTENANCE OF STREET LIGHTING SYSTEM (CITY OF CHICAGO

LIGHT POLE, SPECIAL

Description. This work will consist of the removal, salvage, and delivery of existing electrical equipment, including but not limited to light poles, arms, and luminaires, as specified on the plans or as directed by the Engineer. Salvaged electrical equipment must be delivered to the Bureau of Electricity yard at Cicero and 41st Street or to another City of Chicago location as directed by the Engineer.

Materials. Not applicable.

Construction Requirements. Construction shall be in accordance with the City of Chicago Construction Specification "Item 504, Electrical Equipment Removal and Salvage."

Measurement. This item will be measured per unit installed, complete. All light poles, mast arms, and luminaires, will be included in this measurement.

Payment. This work shall be paid for at the contract unit price each for LIGHT POLE, SPECIAL, which shall be payment in full for all work listed herein and as directed by the Engineer.

ROD AND CLEAN EXISTING CONDUIT

Description. This work shall consist of preparing existing City of Chicago street lighting conduit for the installation of conductors in accordance with a City of Chicago construction specification. Note – this work must be completed whenever and wherever conductors will be installed in existing City of Chicago conduit, whether or not this work is not shown on plans.

Materials. Not applicable.

Construction Requirements.

Construction shall be in accordance with the City of Chicago Construction Specification "Item 144, Rod and Clean Duct in Existing Conduit System".

Measurement.

This work will be measured per lineal foot for each conduit cleaned. Measurements will be made from point to point horizontally. No vertical rises will count in the measurement.

Payment.

This work will be paid for at the contract unit price per lineal foot for ROD AND CLEAN EXISTING CONDUIT for the installation of new electric cables. Such price will include the furnishing of all necessary tools, equipment, and polyethylene line as required to prepare a conduit for the installation of cable. When the number of cables to be installed requires the use of more than one conduit in the same run, each additional conduit required will be rodded and cleaned as a separate unit and paid for at the contract unit price.

CABLE IN CONDUIT, TRIPLEX, 2-1/C NO. 6 AND 1-1/C NO. 8 GROUND

Description.

This work consists of furnishing and installing City of Chicago triplex street lighting cable in conduit in accordance with a City of Chicago construction specification.

Materials.

All materials shall be in accordance with the City of Chicago Material Specification(s) as referenced in the cited in City of Chicago Construction Specification "Item 249, Electric Cable in Conduit, Triplex 2 1/C No. 6, 1/C No.8".

Construction Requirements.

Construction shall be in accordance with the City of Chicago Construction Specification "Item 249, Electric Cable in Conduit, Triplex 2 1/C No. 6, 1/C No.8".

Measurement.

The length of triplex cable furnished and installed will be measured as the length of conduit plus three feet for cable entering and leaving a light pole or street light control cabinet, plus any slack in manholes or handholes.

Payment.

This work shall be paid for at the contract unit price per lineal foot for CABLE IN CONDUIT, TRIPLEX, 2-1/C NO. 6 AND 1-1/C NO. 8 GROUND. The price will be payment in full for furnishing, installing, and testing the cable, and will include all material, labor, terminations, and incidentals necessary to complete the work as per the contract plans.

LIGHTING UNIT COMPLETE, SPECIAL

Description.

This work shall consist of furnishing and installing a City of Chicago lighting unit in accordance with City of Chicago construction and material specifications.

Materials.

All materials shall be in accordance with the City of Chicago Material Specification(s) as referenced in the cited in City of Chicago Construction Specification "Item 67, Pole, Aluminum, Davit, Arterial, 32'-6" MH, Anodized", and "Item 73, Mast Arm, Aluminum, Davit, Arterial, 8 Foot".

Construction Requirements.

Construction shall be in accordance with the City of Chicago Construction Specification "Item 67, Pole, Aluminum, Davit, Arterial, 32'-6" MH, Anodized", and "Item 73, Mast Arm, Aluminum, Davit, Arterial, 8 Foot".

Measurement.

This item will be measured per unit installed, complete. Work will consist of anodizing the pole, attaching the pole to the foundation, application of nut covers, attachment of handhole door, attachment of davit mast arm, and plumbing of the pole. No distinction will be made for parapet mounted poles or foundation mounted poles.

Payment.

This work shall be paid for at the contract unit price each for LIGHTING UNIT COMPLETE, SPECIAL, which shall be payment in full for all work listed herein and as directed by the Engineer.

LUMINAIRE, LED, HORIZONTAL MOUNT, SPECIAL

Description.

This work shall consist of furnishing and installing a City of Chicago street lighting LED arterial luminaire in accordance with City of Chicago construction and material specifications.

Materials.

All materials shall be in accordance with the City of Chicago Material Specification(s) as referenced in the cited in City of Chicago Construction Specification "Item 86, Luminaire, LED, (400W HPSV Equivalent), 240V, Arterial, Cut-off".

Construction Requirements.

Construction shall be in accordance with the City of Chicago Construction Specification "Item 86, Luminaire, LED, (400W HPSV Equivalent), 240V, Arterial, Cut-off".

Measurement.

This item will be measured per unit installed, complete. All wiring to the underground feeder cable, including splices, will be included in this measurement.

Payment.

This work shall be paid for at the contract unit price each for LUMINAIRE, LED, HORIZONTAL MOUNT, SPECIAL, which shall be payment in full for all work listed herein and as directed by the Engineer.

COMMUNICATIONS SHELTER

Description. Provide fabrication, delivery, installation and testing of Equipment Shelter to support Intelligent Transportation System (ITS) communication equipment. The shelter shall be used to house electronic communications equipment, power distribution, and related components necessary for the proper operating conditions of the equipment to be installed within a controlled environment.

Technical Abbreviations and Definitions. The abbreviations, acronyms and their definitions listed below may be used throughout this section:

AWG	American Wire Gauge
BCH	Bose-Chaudhuri-Hocquenghem (type of cyclic redundancy code)
CMOS	Complementary Metal-Oxide Semiconductor
FSK	Frequency Shift Keying
IEEE	Institute of Electrical and Electronic Engineers
mA	Milliamperes
MTBF	Mean Time Between Failure
NEC	National Electrical Code
RTU	Remote Terminal Unit
TIA	Telecommunications Industry Association
UPS	Uninterruptible Power Supply

Applicable Publications. The publications listed below form a part of these Specifications to the extent referenced. The publications are referred to the test by basic designation only. Conform to reference standards by date of issue in effect on the date of contract advertisement.

- ANSI/TIA/EIA-606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
- ANSI/TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications.
- ANSI/NETA ATS-2013 Section 7.15.2 Rotating Machinery, Synchronous Motors and Generators
- ANSI/NETA ATS-2013 Section 7.22.2, Emergency Systems, Uninterruptable Power Systems
- ANSI/NETA ATS-2013 Section 7.22.3, Emergency Systems, Automatic Transfer Switches
- ANSI/NETA ATS-2013 Section 7.25, Fiber-Optic Cables
- National Electrical Code (NEC).
- IEEE C37.90.1 – IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus
- IEEE C62.41 - IEEE Recommended Practice on Surge Voltages in Low-Voltage Ac Power Circuits
- NFPA 780, Standard to the Installation of Lightning Protection Systems

Materials.

PREFABRICATED EQUIPMENT SHELTER

The equipment shelter shall be pre-assembled, and of reinforced solid concrete construction. The shelter shall be a standard item provided by any of several manufacturers. The shelter shall come complete with a secure door; power distribution panels; a heating, ventilation, and air conditioning (HVAC) system; a grounding system; and any other necessary appurtenances to provide for an integrated communication shelter. The shelter shall be installed with a lightning protection system. The shelter shall be built and constructed to wind loads as required by local building codes. The shelter's exterior shall be provided with a concrete aggregate finish. The shelter shall have a bullet-resistant surface as required by UL 752. The shelter's exterior color shall be earth tone to blend into surroundings. The shelter's heat transfer coefficient shall not exceed 0.07 British Thermal Unit (BTU) per hour per square foot (hr/ft²) per degree Fahrenheit (°F).

Shelter floor. The equipment shelter's supporting floor shall be concrete or a concrete composite material. The equipment room's finished floor covering shall be industrial-grade vinyl flooring fastened to the sub floor with waterproof glue. The sub floor shall be 6 inch precast reinforced concrete, insulated, and equipped with integral lifting points, and shall contain a recessed step-joint, to prevent water intrusion into the shelter. The floor shall be designed and constructed to support a minimum live load of 150 pounds per square foot (lbs/ft²) while on foundation.

Shelter foundation. The communication shelter's foundation shall be a monolithic slab that serves and the shelter sub floor. The foundation for the communication shelter shall be evaluated for the specific requirements of the site, in consideration of disturbed soil conditions, communication shelter site pad, and local building restrictions. Shelter anchor locations shall be coordinated with shelter manufacturer. The top of the foundation slab shall be 6" above communication shelter site pad to prevent water from entering inside the shelter. Sufficient cross bracing shall be provided to prevent the equipment shelter's structure from bending or breaking during moving, towing, or hoisting, and to ensure minimum warping after the shelter has been placed on the foundation with the interior equipment installed. Contractor shall submit a foundation design, stamped by an Illinois Structural Engineer, which includes as a minimum the following data: shelter loading and connection details, IBC seismic and wind loading requirements, reinforcing details, entrance stoop connection details, and frost depth used to determine size of footing. Note – shelter anchorage varies between vendors and shelter sizes therefore foundation submittal must include shelter vendor's connection detail for proposed shelter. Foundation slab shall rest on a 6 mil plastic vapor barrier, which is installed over at least 6" of compacted CA-6. Footing shall rest on least 6" of compacted CA-6 that is at least twice as wide as the bottom of the footing. Footing must be installed below frost line. A continuous 0.5 inch pre-molded joint filler shall be installed between the shelter foundation slab and communication shelter site pad. Foundation slab shall extend past shelter face by at least six inches, these edges shall be installed with a 3% to 5% slope away from the shelter, and the three edges that are not against the entrance stoop must be chamfered for 1" at 45-degrees.

Door. The door shall be an exterior pre-hung, fully insulated, bullet-resistant, galvanized steel door with continuous hinge, and shall be provided with baked enamel finish, and a door check and doorstop. The exterior door shall be 36 inches in width by 84 inches in length with a mortised deadbolt security common-keyed lock, consistent with other Illinois Department of Transportation (IDOT) sites. The keys to the door's lock shall be provided to the Department. Doors shall have a hydraulic door closer, and a passage style lever handle on both the inside and outside for opening and closing. The door shall be installed with a door-open alarm contact. Door shall have a stainless steel door sill (secured with stainless steel bolts) and weather stripping around top and sides.

Walls. The walls shall be constructed of 4 inch thick reinforced concrete, with a two-step keyway joint, to prevent water intrusion into the shelter. The walls shall be insulated using a minimum insulating factor of R11. Interior surfaces shall be sheathed with 1.5 inches of high performance hard board insulation. The interior of the walls shall be finished with an aesthetically pleasing 0.75 inch plywood panel with a white laminate coating, and molding on all corners. Total wall system shall have a thermal insulation rating of R19. All floor/wall intersections shall have 4-inch vinyl baseboards installed using waterproof glue.

The ceiling structure shall be designed and constructed to support all of the proposed fixtures, cable trays, etc., or a minimum live load of 30 lbs/ft².

Roof. The roof sections shall be designed and constructed of 4 inch thick reinforced concrete, with a minimum 0.25-inch per foot pitch from the center for drainage. All voided areas between the roof and the ceiling shall be sheathed with 1.5 inches of high performance hard board insulation with a thermal performance of R11, covered with a layer of an aesthetically pleasing 0.5 inch white laminate wood panel with a vapor shield. The exterior of the roof shall be covered with an ultraviolet resistant, reflective elastomeric coating to prevent water intrusion. The roof shall be designed and constructed to support a minimum live load of 100 lbs/ft².

Entrance Stoop. The shelter's entrance shall have a reinforced concrete slab, installed so that the top of the slab aligns with the top of the foundation slab. The distance from the final grade to the shelter floor shall not exceed 6 inches. Dimensions of the entrance stoop are 5' deep and width equal to the shelter foundation slab. The entrance slab shall be installed as a separate slab from the shelter foundation, there shall be a continuous 0.5 inch pre-molded joint filler between the two. Stoop shall be installed with a 3% to 5% slope away from the shelter, and the three edges that are not against the shelter foundation must be chamfered for 1" at 45-degrees. Entrance stoop shall be installed on communication shelter site concrete pad..

Lighting. The equipment shelter shall utilize LED, 4,000K, surface-mounted fixtures. The luminaire shall provide 70% of initial lumen output after 50,000 hours of service (as per IESNA LM-80) and come with a 5 year warranty. The Contractor shall supply a sufficient quantity of light fixtures to provide an average light level of 30 footcandles on the floor to avoid shadows throughout the building – minimum quantity of fixtures shall be four. The Contractor shall provide a photometric calculation with the shelter submittal showing the required average light level as well as 3:1 for average-to-minimum and 5:1 for maximum-to-minimum illumination uniformity ratios. Photometric calculation grid must not include equipment rack locations; that is, equipment racks must be included as solid objects of applicable dimensions. An interior light switch shall be mounted adjacent to the entry door.

The Contractor shall furnish and install four vandal-resistant, wet-location, cast aluminum, floodlights mounted on each exterior wall of the shelter. LED shall be 4,000K, 1200 lumen minimum, 20 watt maximum on 120V circuit. The luminaire shall provide 70% of initial lumen output after 50,000 hours of service (as per IESNA LM-80) and come with a 5 year warranty. The security lights shall be controlled by integral photocell and motion detectors.

The Contractor shall also furnish and install an interior two-headed emergency light that is wired to the UPS distribution panel. The emergency light fixture shall be mounted above the exit door.

Heating, Ventilation, and Air Conditioning System. The Contractor shall provide a single exterior vertical wall-mounted heating, ventilation, and air conditioning (HVAC) system for the communication shelter. The HVAC system shall provide an alarm that indicates HVAC unit failure (i.e., a dry contact closure alarm point). The unit shall have an adjustable time delay initially set to five minutes to prevent compressor damage or generator stall if utility power service is prematurely restored following a power failure. The unit shall also have a hard start device installed to reduce the starting current required during a cold start or under high-head pressure conditions. The unit shall be capable of safely operating when the outside temperature falls below 60°F, allowing continuous interior equipment cooling and dehumidification in cold weather. The unit shall have sufficient capacity to cool from a 95°F ambient temperature to 75°F, including the equipment heat load. The unit shall have sufficient capacity to heat from a -20 °F ambient temperature to 65°F. A user-adjustable thermostat shall be used to provide separate equipment shelter temperature alarms for internal temperature lower than 60°F, or higher than 80°F. Shelter submittal shall include necessary HVAC vendor documentation to show feed breaker sizing coordination with the distribution panel.

Fire and Smoke Detection and Suppression. The equipment shelter shall include one ionization and one photoelectric smoke detector wired to the UPS distribution panel. The detectors shall be mounted on the ceiling and shall each include a dry contact closure that will activate during detection conditions; smoke detection alarm contacts shall be wired such that either detector initiates an alarm signal. A hand-held carbon dioxide fire extinguisher suitable for use on electrical fires shall be mounted on the wall near the door. The extinguisher shall have a valid inspection tag and be refillable.

Electrical Distribution. The standard electrical configuration for the shelter site shall be single-phase 120/240 volts of alternating current (VAC at 60 hertz (Hz)) with a 100-amp service. The Contractor shall provide the necessary power service drop and site-specific power needs to the site.

Provide one service entrance rated 240V, 100 Amp, 42 position distribution panel with an inner swing out door. The main breaker shall be 65 KAIC rated, breakers for any external load shall be rated 22 KAIC, breakers for loads internal to the shelter shall be rated for 10 KAIC; breaker ratings must be clearly visible without opening the inner door. Provide two spare breakers of all types used in the distribution panel, except for the main breaker.

Provide a laminated single line diagram for the shelter, attached to exterior of the main distribution panel.

Provide one external GFCI duplex receptacle in a metallic, "in-use" cover. External receptacle shall be on side of shelter facing generator.

In the main distribution panel provide a dedicated breaker for the HVAC unit, for any internal controls/sensors, for the internal lighting circuit, for the external security light & receptacle, and for the internal convenience receptacles. Provide a dedicated breaker for each generator load (fuel tank indication panel, heaters, battery charger, etc.). Provide two breakers for the UPS distribution panel – one breaker shall be a normal feed to the UPS unit while the second shall bypass the UPS.

The UPS output shall be wired to the UPS distribution panel. Two UPS panel breakers shall be dedicated for each equipment rack, one breaker position shall be connected to the fire/smoke detectors, and one breaker position shall be connected to the exit light. The UPS distribution panel shall be main-lug-only with a minimum of 18 spaces.

Both distribution panels and the manual transfer switch shall be NEMA 12 (IP52) rated.

AC-Powered Transient Voltage Surge Suppression Device. The shelter shall have a primary AC Surge Suppression Device (SSD). The SSD device shall use field-replaceable modular technology and shall include a set of Normally Opened (NO) Normally Closed (NC) Form C contacts for remote alarm monitoring as detailed below.

The Contractor shall ground the SSD device to the interior perimeter ground; conductor size as specified by equipment manufacturer, or #2 American Wire Gauge (AWG) if not specified by vendor. Connection to the perimeter ground to be completed using an exothermic weld. The SSD device shall consist of primary modules using silicon avalanche diode (SAD) technology and a secondary module using the metal oxide varistor (MOV) technology. The shelter shall have a spare MOV and SAD module with for the AC SSD device. For substitute product approval, the Contractor shall submit a certified, signed, and sealed statement that the device meets or exceeds all requirements as detailed herein, within the plan set, and/or in the Contract from an engineer registered in the State of Illinois.

In addition, the Contractor shall submit unpotted samples of each module to the engineer for inspection. The modules shall be bolted in the SSD device. No plug-in modules shall be permitted. The equivalent of a minimum of two SAD modules and one MOV module shall be installed from each phase conductor to the neutral conductor. One or more separate MOV modules capable of handling at least 75 kiloamperes (kA) of surge current shall be installed between the neutral and ground.

A 200-kA ampere interrupting capacity (AIC) fused disconnect shall be installed in the SSD device. The SSD device shall have a surge counter on the front cover that counts the number of surge current transients that are being suppressed over 150 amps. Surges in any mode and phase shall be counted. The SSD device shall have a UL 1283 listed electromagnetic interference (EMI)/radio frequency interference (RFI) filter with a maximum attenuation of 75 decibels (dB) from 100 kilohertz (kHz) to 100 megahertz (MHz). Enclosure shall be NEMA 12, and shall be compliant with the UL 95 standard's Test 5V. The SSD device shall be listed in the second edition of the UL 1449 standard.

The SSD device shall comply with the specifications detailed herein, within the plan set, and/or in the Contract, including:

- A maximum surge current (8x20 μ s) for a SAD module that is greater than or equal to 24 kA;
- minimum energy absorption for a SAD module of 0.9 BTU [1,000 Joules];
- maximum surge current (8x20 μ s) for a MOV module that is 50 kA;
- minimum energy absorption for a MOV module of 4.7 BTUs [5,000 joules];
- maximum continuous operating voltage of 150 volts; and
- let-through voltage of 339 volts as required in the second edition of the UL 1449 standard.

Conduit and Ground Wire Entry. Communication and power conductors shall enter the shelter by a pair of junction boxes mounted on the either side of the wall. The exterior junction box shall have a NEMA 3R rating while the interior box shall have a NEMA 12 rating. The junction boxes shall have a permanent barriers to separate the communication cabling from the power cabling. The plans show the minimum, nominal junction box sizes; the contractor may install larger enclosures or separate pairs of enclosures for power and communications wiring provided Chicago Electric Code, National Electric Code, and manufacturer suggested wire bending radiuses are all adhered. Contractor shall provide four-4" sleeves on the communications side and three-2" sleeves on the power side. After cable testing is complete, the Contractor shall seal the conduit openings with a removable plug (spare conduits) or removable duct sealing compound (around conductors); Contractor shall not use foam.

There shall be five ground wires leaving the shelter to connect to the shelter's ground ring: four from the halo ring and one from the SSD. Penetrations shall be formed or core drilled through the slab flooring, between 2" an 4" from wall, as is necessary to avoid contact with slab reinforcing. Opening shall be sleeved per PVC conduit of size noted in the plans. After the ground wire is tested, the openings shall be sealed with mortar.

Labeling and Signs. Contractor must provide white with black core laminated phenolic nameplates with 1/4 inch minimum lettering etched through the outer covering on all equipment; inscription must be made with all upper case letters and must be the same inscriptions as shown on the Drawings or as directed by the Engineer. Use contact-type permanent adhesive or stainless steel screws to mount labels; embossed self-adhering plastic tape labels will not be accepted.

Provide equipment "warning" signs as required by OSHA and NFPA 70E.

Provide one polyethylene, 14" x 10", red core with white laminate warning sign that is attached to exterior of fence with stainless steel clamps. Sign shall indicate language as coordinated with Engineer.

Serial Device Server. The Contractor shall furnish industrially-hardened, Ethernet serial device servers. The device server shall be a multi-port serial-to-Ethernet server, specifically designed to operate in harsh environments. The Ethernet server shall operate within specifications over the temperature range of -40° to 85° C. The server shall operate with relative humidity of 95%, non-condensing.

The Ethernet server shall have four RS-232 ports, two 100BaseT ports, and two 100BaseFX ports. The optical ports shall satisfy the following:

- Shall be designed to operate into single mode cable with physical core of 8-9 microns
- Shall provide a nominal output power of -16 dBm, receive sensitivity of -32 dBm, and link power budget of 16 dB.
- Shall operate at 1310 nm (nominal)

The Ethernet ports shall be full duplex. The Ethernet switch management shall include:

- Enhanced Rapid Spanning Tree (IEEE 802.1w) for fault tolerance with rapid recovery times
- Quality of Service (IEEE 802.1p) for real-time traffic
- Port rate limiting: 128 kbps, 256 kbps, 512 kbps, 4 Mbps, and 8 Mbps
- VLAN (IEEE 802.1q) for traffic segregation with double tagging
- IGMP Snooping for multicast filtering
- Port configuration, status, statistics, mirroring, and security
- Loss of link management for link pulse control on fiber ports
- Web-based, Telnet, CLI management interfaces
- SNMP v2 and RMON
- Diagnostics with logging and alarm

The serial device server shall include a power supply compatible with 120 VAC. The power supply shall be compatible with the environment specified for the device server.

The device server shall be DIN rail or panel mounted.

The server shall comply with the following IEEE standards:

- 802.3—10BaseT
- 802.3u—100BaseTX, 100BaseFX
- 802.3x—Flow Control
- 802.3d—MAC Bridges
- 802.1d—Spanning Tree Protocol
- 802.1p—Class of Service
- 802.1q—VLAN Tagging
- 802.1w—Rapid Spanning Tree Protocol

The server shall comply 47 CFR, Part 15, Type A and be UL listed.

SCADA System. The remote terminal unit(s) (RTU) shall be fully compatible with the IDOT DISTRICT 1 existing Supervisory Control and Data Acquisition (SCADA) system. The Contractor shall expand the existing District 1 Headquarters SCADA equipment by integrating additional remote terminal units (RTUs) specified under this contract. The remote terminal units shall collect device status data. The flow of alarm data to the District 1 Headquarters shall be initiated by equipment on/off sensors installed in equipment to be monitored.

The Contractor shall include all required programming and updating of the SCADA database at the communications shelter as part of this contract. In addition, all communications equipment and components necessary for a complete and operational system at the District 1 Headquarters shall be included.

In the communications shelter the Contractor shall furnish and install a SCADA cabinet consisting of line surge protection and ground fault detection, power supply, central processor, digital input modules, and digital output modules.

The SCADA RTU inputs shall be communications shelter alarm inputs. The Contractor shall provide a multi-port digital output card under this contract for the SCADA Alarm System identified as SCADA Main and a second multi-port digital output card identified as SCADA Backup, both individually connected via CAT-5e Ethernet cable to a Serial Device Server as specified herein. Hardware shall be provided in sufficient quantity to support all the points in the communications shelter and shall have initial spare capacity. The RTU capacity shall be readily expandable with additional cards for additional points.

The Remote Terminal Unit (RTU) shall be furnished and installed in the communications shelter, and shall include the auxiliary equipment necessary for the interface functions associated with equipment at its location.

REMOTE TERMINAL UNIT (RTU)

Functional Requirements. The RTU shall be microprocessor controlled such that changes in their operation may be made by merely changing memory elements. System input/output boards shall be cable connected to logic boards and arranged such that future expansion of the RTU may be made with minimum effort and not require specialized tools or knowledge.

The RTU shall communicate with the IDOT District 1 Headquarters over the IDOT District 1 Fiber Optic backbone.

The inputs to the RTU shall be on/off sensors such as dry contacts, limit switches, etc. The RTU shall be furnished with an MODBUS RTU protocol and external modem to permit polling over telephone lines using DF-1 Protocol.

All Contractor furnished equipment shall function and communicate with existing IDOT District 1 Headquarters SCADA equipment, located at the Headquarters communication center.

Operational Requirements. The remote station RTU enclosures shall be fused to protect the lines and equipment in the event of accidental contact with 120VAC.

The RTU shall support programmable calculation and control algorithms. These shall be written on a portable laptop computer using a script editor. These shall be compiled and loaded into non-volatile memory in the RTU. The RTU shall have the capability to upload the script to the Master Station. In the event of a failure of the RTU or corruption of the script file, the Master Station shall download the file into the RTU. This file format and communication protocol shall be compatible with the existing District 1 Headquarters SCADA System.

As a minimum, the calculation and control routines shall support the following mathematical and logical functions: add, subtract, multiply, divide, assign, log, exponential, sine, cosine, tan, arcsine, arccosine, arctan, equal to, not equal to, greater than or equal to, less

The available database for the above shall include: local status values, local accumulator values, set-point values from Master Station, date and time variables, and communications failure.

Functions shall include: set status value, set accumulator value, and start local timer. The RTU shall have a built-in circuit to detect and isolate a grounded SCADA communication line from the RTU so a "ground" at only one point on the data transmission line wire shall not cause a LINE SUPERVISION alarm or impair operation of the system. (LINE SUPERVISION is defined as loss of communication between the Master Station and the RTU).

The RTU shall have an adjustable ground detection system capable of sensing a resistance to ground with an adjustable range between 5,000 Ohms and 50,000 Ohms on the RTU station DC power (both positive and negative). 2 outputs of ground detector circuits shall be dry contacts with configuration "energized in Normal Condition".

The negative supply potential of the ground detectors shall be connected to ground or Shelter Structure as appropriate. The ground detector system shall be energized from an independent DC power supply, rectified and filtered from an isolated 120 VAC -60 Hz source

Input and Output Points.

Status Points. The RTU shall be capable of accepting SCADA inputs from 64 sources. These shall be monitored by the remote station. All status points associated with an RTU shall be interrogated by the RTU at least once every 10 milliseconds.

The RTU shall be equipped such that if a device change of state occurs, but disappears before that remote is polled by the Master Station, the change is not lost. Storage for up to 7 changes of state per status point must be available.

All RTU inputs shall be protected against voltage surges and shall meet the IEEE surge withstand capacity test.

A separated industrial barrier type interposing terminal blocks shall be provided for all interface connections between other, contractor furnished equipment and the SCADA RTU inputs. These terminal blocks shall accommodate up to No. 10 AWG wire, and shall be General Electric type EB-5 or approved equal.

Local LED indicators shall be provided to display the state of all status points.

Circulating current to dry contacts shall be supplied by the RTU at a 12 VDC level. Non-shielded wires shall be used and the input point shall not be affected by electromagnetic and electrostatic interferences. The input points shall be capable of operating from contact devices up to 400 feet from the RTU over No. 14 AWG non-shielded wires.

The initial configuration shall contain the following inputs:

<u>Source</u>	<u>Alarm Description</u>
i. Communication Shelter Door Intrusion	Comm. Shelter Key Switch
ii. Fire or Smoke Detector Alarm	General Alarm – Fire
iii. Comm. Shelter Temp.	Comm Shelter Alarm – Low Temp.
iv. Comm. Shelter Temp.	Comm. Shelter High -- High Temp Alarm
v. HVAC	HVAC -- Malfunction
vi. Generator Alarm	Low Fuel
vii. Generator Alarm	Generator Malfunction
viii. Generator Alarm	Emergency Generator Running
ix. Generator Alarm	Charger Low DC Voltage
x. Generator Alarm	Charger High DC Voltage
xi. Generator Alarm	Charger Malfunction
xii. Generator Alarm	Fuel Containment Leak
xiii. Generator Alarm	Generator Not in Auto
xiv. AC Transfer Switch	Automatic Transfer Switch "Bypassed"
xv. AC Transfer Switch	AC Normal Power Failure
xvi. AC Transfer Switch	Automatic Transfer Switch "Generator Position"

xvii. AC Transfer Switch	Automatic Transfer Switch "Normal Power"
xviii. AC Transfer Switch	Automatic Transfer Switch – Malfunction
xix. UPS	UPS Trouble
xx. Surge Suppression Device	SSD Trouble
xxi. Serial Device Server	Server Trouble

Communication Path Security. The RTU's encoding/decoding of information shall guard against false commands being executed and prevent false data from being transmitted to the Master Station. As a minimum the following security features are required:

- BCH error detection coding or equivalent cross-hatch parity, error detection encoding shall be used.
- The RTU shall re-encode and retransmit (to the Master Station) part or all information control messages according to existing master handshake procedures.

Internal Operation and Construction Security. As a minimum, the following features are required:

- High stability clocks for internal timing. The time base of all RTUs shall be periodically synchronized by the Master Station to ensure Sequence of Event accuracy and a time base for calculate and control programs.
- The following conditions shall not produce false control operations by the Master Station. In addition, these conditions shall not produce false or continuous transmission to the Master Station. These conditions are: Power up of the RTU; Switching from the primary power source to the back-up source; Communication circuit failure; Any component failure in the RTU; A logic card left out of the RTU.
- The RTU design shall be modular for ease of maintenance and expansion. Failure of one card containing a group of input or output points shall not disable the entire RTU. The RTU reliability shall be high, with a mean time between failures (MTBF) of at least 10,000 hours.
- The Manufacturer shall provide details of all data security features for the review/approval of the Engineer prior to the start of the manufacturing process.
- Integrated circuits using circuit types other than CMOS logic shall require the approval of the Engineer prior to the start of the manufacturing process.

RTU Hardware

Control Panel. The RTU shall be an Allen Bradley ControlLogix 1756. It shall acquire data from two separate communication systems. The first and the primary system is an IDOT fiber optic communications backbone network. The second is a dial up phone system operating at the slow speed of 2400 baud to accommodate the existing RTU's.

The RTU shall be microprocessor controlled such that changes in their operation may be made by merely changing memory elements. The controller shall be modular and multiple controllers may be placed in any slot of the backplane. The Controller shall be able to communicate with other processors across RS-232 (DFI/DH-485 protocol), DeviceNet, DH+, ControlNet, Ethernet/IP networks. The contractor shall select the appropriate communications interface module.

RTU Supervision. The supervision of all devices shall be accomplished via the monitoring of dedicated auxiliary contact(s) on each device.

The auxiliary contact(s) will open or close depending on the status of the device (open, closed, running, etc.). The RTU shall monitor the position of the contacts and report the status of the device to the Master Station. The status of 2 auxiliary contacts shall indicate a maximum of 4 possible positions of the device.

The RTU shall be equipped with local indicators that will display the state of each and every contact.

Visual Basic code in the RSView application software requests data from Kepware, at which point Kepware communicates with the modem for dialing and data transfer.

Terminal Blocks. Within the RTU cabinet, all external wiring interfacing with the RTU cabinet shall terminate on easily accessible interposing terminal blocks. This wiring shall include, but not be limited to: emergency power supply wiring, supervision contacts, interposing relay contacts, telemetering points and line wires. Terminal blocks shall be General Electric type EB-5 or approved equal. Self-extinguishing white vinyl marking strips shall be included on all interposing terminal blocks. All terminals to which battery or other high voltages are to be connected, shall be provided with protective covers. All terminal blocks shall be labeled and have corresponding identification on unit schematic prints.

Wiring. All wiring shall be stranded and of suitable gauge and insulation to meet the intended use. Extra flexible stranded control wires shall be used for wiring between hinged and stationary portions of panels. All internal wiring to interposing terminal blocks shall be a minimum of No. 14 AWG stranded wire.

Input and output wiring shall be kept physically separate where possible. AC and low voltage DC wiring shall be kept physically separate where possible.

All wiring shall be clearly identified with designation at each end using white plastic slip-on markers with black lettering. The marker diameter shall be consistent with the wire diameter to insure a snug fit, but yet be able to be rotated for identification.

All wiring shall be secured into harnesses. All wiring including harnesses shall be routed in such a manner as to not obstruct the installation or removal of RTU components, and shall be secured to the cabinet where appropriate for neatness and to reduce strain on components.

All terminations to terminal strips within all RTUs shall be made with crimp-on insulated ring type terminals.

Input/Output Isolation and Protection. All inputs and outputs including power supply and circuit ports shall be capable of withstanding the IEEE surge withstand capacity test without damage.

Components. Proper mounting shall be employed for all components on printed circuit boards to prevent damage from shipping and vibration encountered in the IDOT "right-of-way" environments.

Circuit boards and their components shall be suitably protected from dampness and corrosion common to the exterior environments.

Construction/Packaging/Labeling. In addition to general quality workmanship the following shall be implemented:

All plug-in printed circuit cards shall be keyed to prevent damage to the RTU or devices connected to the RTU through improper connection.

Gold plated contacts shall be used on all printed circuit board and other multi-pin connectors.

All printed circuit boards shall be made of glass-epoxy material.

Each printed circuit board and all subassemblies shall be serial numbered to uniquely identify them for warranty.

All nameplates for cabinets, panels, components, relays, fuse blocks, switches and terminal blocks (except terminal block numbering strips) shall be plastic, utilize white printing on a black background, and shall match those on existing IDOT District 1 SCADA equipment. All nameplates shall meet the approval of the Engineer.

All terminal blocks, rows and/or columns shall be suitably and clearly labeled by the contractor using standard methods.

All plug-in devices/cards shall employ a positive locking design to prevent loosening from vibration.

All internal components shall be labeled and referenced to the internal schematic diagram.

Remote Terminal Unit Enclosure. Cabinets shall be rigid, weatherproof and constructed from fiberglass reinforced polyester resins for use in highly corrosive atmospheres. Design shall conform to NEMA Type 4X construction.

The main box portion of the cabinet shall be of one-piece construction, with smooth, rounded comers and a mounting flange around the entire perimeter (attached back plate is unacceptable). All fabrication seams must be sealed and no unused holes are permitted. There shall be no gasketed joints except for the neoprene door gasket. Gasket material shall be approved by IDOT.

Cabinet shall have automatic, corrosion-proof condensation drain plugs installed in the bottom. Plugs shall be of tamper-proof design with stainless steel screening. Cabinet design shall incorporate an integral fiberglass drip shield to protect the door hardware from water, ice/snow buildups and settling dust.

The cabinet shall be arranged for top or bottom cable entry and shall have overlapping double doors. Each door shall be fastened to the main box with a continuous stainless steel hinge (16 gauge minimum) for the full length of the door. All hinges, latches, etc. shall be fastened to the cabinet using stainless steel rivets with stainless steel backup washers. All rivets shall be sealed with RTV or similar material. All doors shall be capable of opening a minimum of 180 degrees and shall be of tamperproof design and construction.

The door surfaces shall incorporate fiberglass bracing to prevent door buckling or warpage. No RTU electronic components or modules shall be mounted on the doors. The doors shall be equipped with holdopens for the 180 degree position. All cabinet doors shall be furnished with suitable handles and 3-point latching mechanisms. All door locks shall be keyed to match existing SCADA RTU cabinet locks. Doors shall be provided with hasps suitable for a IDOT supplied 5/8 inch padlock. All cabinets shall have a print pocket attached to the inside of the cabinet door for the storage of prints and point assignment charts.

Cabinets shall be provided with a 3/8 inch fiberglass laminate interior mounting panel of NEMA GPO-2 construction with a UL 94V-0 rating for high flame resistance. The panel shall be attached to the inside of the cabinet by stainless steel collar studs embedded in the main cabinet interior. All RTU components shall be installed on this mounting board using bolted connections. All mounting holes must be tapped (nuts behind panels are not permitted).

Cabinet shall be designed so that removal of the cabinet from its mounts or the removal of any internal components from the RTU shall not require the removal of any interior mounting panel. Maximum dimensions of the RTU cabinet shall be 48" high by 23" wide by 15" deep.

All cabinets shall be designed to incorporate necessary bracing to assure the rigidity of the cabinet structure including an optional door(s). The cabinets shall be of sufficient strength that no external supports are required if the cabinets are securely fastened to the wall.

Each cabinet shall have mounted on it a large, easily readable identification label corresponding to the location where the RTU will be installed. These shall match labels on existing IDOT District 1 RTUs or shall be approved by the Engineer.

A ground lug capable of accommodating up to a No. 8 AWG stranded grounding cable shall be provided in each cabinet.

Other. All RTUs shall have a switchable interior AC light and dual duplex AC receptacle mounted inside the RTU cabinet.

Two rack-mounted, plug-in type modems are to be provided for installation in the Communication Line Termination Cabinet in the Control Center. These modems will be installed and setup by IDOT personnel. The modems shall be hot-pluggable. Modems shall be US model V.3225 or approved equal.

Equipment Cabinets. Equipment cabinets shall be installed as shown in the plans. The cabinet shall have maximum dimensions of 82 inches high by 24 inches wide by 36 inches deep. The cabinet shall be capable of mounting 2,000 pounds of equipment and hardware. The cabinet shall provide a minimum of 42 standard rack units of mounting space. The cabinet shall have a black, powder-coat paint finish. The front and back of the rack shall have heavy-gauge doors of perforated metal, protecting the components in the rack but permitting the enclosed equipment to be viewed and allowing ventilation air to enter. The front and back doors shall be lockable. The front door shall be split. The equipment rack shall be APC Model 2800, Middle Atlantic MRK Series, or approved equal.

Equipment racks shall be equipped with all hardware required to mount equipment that has been designed to mount in accordance with EIA-310-D.

Interconnecting Cabling.

600 volt cable. All 120 VAC distribution wiring that is entirely within the communication hut shall be made with NEC Type THHN/THWN cable rated for 600V, thermo-plastic insulated, 90 degrees C dry and 75 degrees C wet rated, with a minimum wire gauge of 12 AWG. All conduits shall be a minimum of electrical metallic tubing (EMT), and all EMT conduit fittings shall be compression, not set-screw type. All power wiring (600 volt cable) shall be in EMT. Outlet and junction boxes shall all be galvanized steel with galvanized steel faceplates or covers. All switches, receptacles, and other wiring devices shall be industrial specification grade. There shall be a minimum of one duplex receptacle on each short wall, and two receptacles on the longer walls.

Two 20-Ampere circuits from the UPS panel shall be dedicated to each equipment rack, and provide a minimum of 3 duplex receptacles per circuit at evenly spaced intervals for the entire height of the each rack. Power to equipment racks will be by conductors in conduit attached to the ceiling.

Plug Strips may be used within the equipment racks, but shall not reduce the number of duplex receptacles required per circuit. The plug strip housing shall be all metal and shall mount in the rack using mounting brackets sized for the equipment racks in the communications shelter and occupy no more than 1 RU in height. Plug Strips shall be Tripp-Lite PDU-1220 or approved equivalent.

Power Supplies for equipment requiring other than 120 VAC shall be manufactured by or approved in writing for that use by the maker of the equipment they are to serve. Power supplies shall be rack-mounted, or shall be bolted or otherwise mechanically attached to shelving designed for mounting in the equipment rack. Connections between the power supplies and the equipment they serve shall be made with PVC-jacketed cables. Unjacketed individual conductors shall not be permitted.

Coaxial Cable (including connectors). The coax cable shall be a Belden 1694A precision video cable, or approved equal complying with the following specifications. The center conductor shall be an 18 AWG, Solid Bare Copper conductor, the insulation shall be Gas Injected Foam High Density Polyethylene, and the shield shall consist of an Aluminum Foil-Polyester outer shield with 100% shield coverage plus tinned copper Braid Shield with 95% shield coverage. For installations in shelters, the jacket material shall be Polyvinyl Chloride, suitable for indoor and outdoor-aerial applications.

Electrical Characteristics:

Impedance: 75 +/- 1.5 ohms
 Inductance: 0.106 microH/ft.
 Capacitance Conductor Shield: 16.2 pF/ft. (nominal)
 Velocity Of Propagation: 82% (nominal)
 Delay: 1.24 ns/ft. (nominal)
 Nom. Conductor Dc Resistance @ Deg. C: 206.4 ohms/1000 ft.
 Nom. Shield Dc Resistance @ 20 Deg. C: 2.8 ohms/1000 ft.
 Return Loss: 23 dB minimum, 5 - 850 MHz
 21 dB minimum, 851 – 3000 MHz
 Max. Operating Voltage: not less than 300 Vrms (UL)

Nominal Attenuation:

<u>MHz</u>	<u>dB/100 ft</u>	<u>MHz</u>	<u>dB/100 ft</u>
1.0	0.24	180	2.42
3.6	0.45	270	2.97
5.0	0.54	360	3.43
7.0	0.63	540	4.25
10.0	0.72	720	4.95
67.5	1.57	750	5.00
71.5	1.60	1000	5.89
88.5	1.75	1500	7.33
100.0	1.84	2000	8.57
135.0	2.10	2250	9.14
143.0	2.16	3000	10.67

Physical Characteristics:

Temperature Rating: -30 to +75 degrees C
 Min. Bend Radius: 10x cable O.D. or 2.75"
 Max. Pulling Tension: 69 lbs
 Nom. Weight/1000 ft: 40 lbs
 Jacket Color: BLACK for CMG cable; violet for CMP cable
 Applicable Specifications: UL/NEC: CMR/CMP C(UL)/CEC: CMG
 Flame Resistance: UL: 1666 VERTICAL SHAFT CSA: FT4

Coaxial connectors shall be BNC or as required by the equipment to which the cables connect. The connectors shall attach to the cable by compression. Connectors shall be plated for corrosion resistance and good electrical connections. All BNC connectors shall be physically designed to fit the specified cable without adaptation and shall have a characteristic impedance of 75 ohms. Connectors with a characteristic impedance of 50 ohms are not acceptable.

Ethernet Cable (including connectors). Ethernet Cable shall be ANSI/TIA/EIA-568-B.2 Category 5e, UL verified to Category 5e, 4 twisted pair, 24 AWG bare copper with polyolefin insulation. The cable shall be unshielded with polyvinyl chloride (PVC) insulation. The cable shall be Belden part number 1500A or approved equal. The terminations shall be crimp-on RJ-45, Ideal Industries 85-396 or approved equal.

Cable Identification Materials. All cables, fiber optic cables, and individual conductors and fiber strands when broken out from a cable assembly shall be uniquely labeled in accordance with the Contractor's interconnection diagram. Labels shall be computer-printed and shall be waterproof and non-smearing. Labels shall be polyester adhesive wrap labels produced by the Brady Corporation or approved equal. The labeling shall comply with ANSI/EIA/TIA -606-B.

Cable Tray. Unless otherwise indicated on the plans, the Contractor shall furnish cable tray with 3/8" x 1-1/2" high tensile tubular steel stringers and 1" x 1-1/2"x1/8" channeled cross slats. The nominal width of the tray shall be 12" and the distance between cross slats shall be 8". The Contractor shall furnish all hangers, rods, straight splices, unistrut, threaded rods, nuts, open clips, closed clips, wall anchors, J-bolt assemblies, straight clamps, corner clamps, and other hardware required to complete the assembly required by the plans. The Contractor shall include all necessary bonding and grounding hardware to bond and ground the cable tray.

Fiber Optic Termination Panel – Rack Mounted. The rack-mounted fiber optic termination panel shall terminate 96 single mode fibers in ST connectors or connectors matching the terminations on the equipment. All connectors shall be identical. The upper chamber of the box will contain splices between the incoming cable and the pigtailed connectors that attach to the bulkhead connectors. The lower chamber will house the incoming distribution cables, connecting the incoming fibers to the terminal equipment.

Video Distribution Amplifiers. Video distribution amplifiers shall be high performance, high impedance design with an input loop-through connection. The amplifier shall include signal gain and cable equalization. The distribution amplifiers shall meet the following requirements:

Bandwidth	29MHz (-3dB) minimum
Gain	-3dB to +3dB adjustable (0.7Vp-p to 1.5Vp-p output when input level is 1.0Vp-p)
Input levels	0.4v to 2.0v with no offset at unity gain
Connectors	BNC
Impedance	75 Ohms
Return Loss	greater than 35dB at 5 MHz
Differential Phase Error	±0.1° to 5 MHz
Differential Gain Error	±0.1% to 5 MHz
Frequency Response	±0.1 dB to 5 MHz
Input connections	1 composite video
Output connections	four (4) as indicated on plans, one (1) composite loop-through

The distribution amplifiers shall be rack mounted in 3 RU rack mounted frame with an integral power supply. Multiple single channel video distribution amplifiers placed on or fastened to a rack mount shelf will not be acceptable. Corded modular power supplies will also be unacceptable.

ENGINE GENERATOR SET

Unless otherwise indicated, engine generator set ratings shall be based on 105 degrees C. characteristics and published data. Minimum generator size shall be 150% of maximum calculated load, however actual rating may be higher to achieve compliance with specification requirements.

These specifications include units suitable for mounting on an exterior concrete foundation. These specifications also include a separate remote annunciator.

Submittal Information

- Complete engine-generator set sizing calculations for all identified starting condition cases. Include a copy of any vendor software used to prepare the calculations. Calculations shall clearly demonstrate all input assumptions and conditions as well as the adequacy of the unit proposed.
- Complete manufacturer catalog information sheets, highlighted to indicate specified features and options for specification compliance.
- Complete manufacturer catalog information for annunciator panels highlighted to indicate specified features and options.
- Manufacturer information.

General:

Each Generator Package shall consist of a prefabricated assembly of an external diesel engine generator set together with integral double walled fuel tank and all required auxiliary equipment mounted in a solidly-constructed weatherproof "skin-tight" housing on a structural steel frame including adjustment and testing. Auxiliary equipment shall include all items specified herein and all items required or recommended by the manufacturer for a complete operating unit. Each package shall be completely pre-wired and pre-piped as specified herein requiring only field mounting and power input and output connections, alarm output connection and fuel input and over flow connections. All materials found in the generator package shall conform to all aspects of this specification except as otherwise provided for within the specification.

The engine generator set shall recover rapidly from instantaneous changes between no load and full load, as well as the reverse changes of load, without damage.

Generator Sizing:

The engine generator set shall be sized to meet the required KW rating, as described above. Nominal KW ratings shall be not less than stand-by ratings equivalent to Fuel Stop Power ratings in accordance with ISO3046, AS2789, DIN6271 and BS5514, and all units shall accept 100% of nameplate KW rating in one step, in conformance with NFPA 110, paragraph 5-13.2.6. KW ratings shall be certified by the manufacturer, shall be based on published data, and unless otherwise indicated shall be based on 105 degree rise characteristics. Unless otherwise indicated, starting and loading requirements shall be single-phase, concurrent auxiliary loading shall be unity power factor. **All engine generator sets shall achieve specified starting with no greater than 10% sustained RMS voltage dip during motor starting and shall achieve specified starting with no greater than the instantaneous RMS voltage dip (approximately 2-4 cycles) specified elsewhere herein for individual sizes.**

Calculations Must Be Submitted. All generator loading and starting capabilities shall be demonstrated by means of calculations ***included with the bid***. **Submitted calculations shall include all reference information necessary to substantiate calculations, and if a vendor's software program is used, a copy of the program shall be included with the bid.**

Other:

Operating and maintenance manuals and wiring diagrams shall be furnished with submitted drawings. A directive set of operating instructions and a wiring diagram shall be mounted under or laminated within heavy clear plastic on the inside wall of the "skin tight" housing.

Units shall be suitable for mounting on a permanent concrete pad. Manufacturer's anchoring details and pad recommendations shall be submitted with engine generator submittal.

As a condition for substantial completion the fuel tank must be filled by Contractor to capacity after commissioning is complete.

A generator alarm annunciator panel is included as a part of this pay item and shall not be paid for separately. Alarm points for the generator, generator control panel, transfer switch, and all generator ancillary equipment shall be wired to the annunciator panel. The annunciator panel shall be capable of displaying current system status as well as the last 128 alarm notices. The following generator alarms shall be hard wired from the generator alarm annunciator to the SCADA RTU: Low Fuel, Generator Malfunction, Generator Running.

Included shall be on-site factory representative witness for commissioning activities and two on-site training sessions. In addition hands-on operation of the equipment the training sessions shall use copied pages from the actual operational & maintenance documentation to be provided with the equipment,

Engine:

Engine Type and Rating:

The engine shall be for service as herein specified for stationary service with or without pre-combustion chambers, watercooled, four cycle in line or V-type and a maximum operating speed of 1800 RPM. Units for sets above 125 KW shall be full diesel direct injection and those for sets 125 KW and below may be indirect injections.

The engine may be turbocharged. The engine may be aftercooled. Bid information shall indicate where specific sizes are either turbocharged or aftercooled to achieve specified ratings.

The engine shall be able to meet the specification when operating on a #2 diesel grade of fuel oil and at the altitude where installed (1000 feet MSL) at a temperature range between -20 degrees F and 105 degrees F.

The brake horsepower of the engine shall not be less than the brake horsepower to drive the engine auxiliaries plus 1.3 times the indicated KW rating of the generator divided by the generator's efficiency expressed as a decimal. Submittal information shall include verification of this calculation.

The engine shall be capable of a continuous two hour over-load of 10% (but need not exceed a total of two hours out of any 24 consecutive hours of operation). The engine shall operate under such service without "wet stacking" excessive smoke, overheating or mechanical damage. The manufacturer shall so certify.

The engine shall be able to start cold in a 40 degrees F ambient while using No. 2 diesel oil without the use of starting aids such as glow plugs, additives or other injections.

The engine shall be complete with fuel system, cooling water system, lube oil system, governor and electric engine starting system as specified herein.

Fuel System:

The fuel oil system shall be the unit/direct injector type with engine-driven fuel pumps, fuel filters and flexible fuel lines. Fuel lines between injection pumps and valves shall be heavy seamless tubing and shall be of the same length for all cylinders to eliminate irregularity of fuel injections.

Fuel injection shall be by individual injection pumps and nozzles for each cylinder. Each pump shall inject oil directly into its cylinder or pre-combustion chamber. Plungers shall be carefully lapped for precision fit and shall not require any packing. The injection system assemblies shall not contain any filters or screens which require replacement. The surplus oil shall return to the storage tank by gravity. The fuel system shall have an easily accessible fuel shut-off valve in case of emergency.

An engine-driven, positive-displacement fuel pump shall circulate fuel oil through the secondary fuel filters to the injectors and back to the tank. Pressure shall be limited by relief valves.

Fuel oil filters shall have filter elements of the cleanable or replaceable type which will entrap and remove water from the fuel oil. Filters shall be located to insure that the fuel oil will be thoroughly filtered before it reaches the injector assemblies.

The fuel tank and internal baffling shall be designed and constructed as an integral part of the base assembly which shall provide a rigid support of the engine generator set package. For mobile units, the tank and base assembly shall also be an integral part of the trailer frame. The tank assembly shall be constructed of heavy gauge corrosion-resistant sheet steel.

The fuel storage tank shall be doubled-walled with an inner tank and an outer leak containment chamber. The fuel storage tank shall have a capacity to supply the engine for a minimum of 4 days at full rated load. The assembly shall have internal baffles where required and any associated baffles shall have fuel transfer holes large enough to allow fuel to flow freely. The tank shall be constructed with an interior bottom pitch and a drain line with a valve shall be connected to the lowest point of the tank. The drain valve shall be located inside the overall set enclosure and the tank drainage provisions shall be vandal-proof. The fuel tank filler pipe shall not be less than two inches inside diameter and it shall include a wire mesh strainer and shall be equipped with a SAE truck-type locking cap with five (5) keys. The fuel tank shall be vented in accordance with EPA regulations and it shall not create a vacuum condition when the tank is full. The vent shall be opposite the filler pipe to maintain proper ventilation during tank filling. The assembly shall be equipped with a fuel leak detector sensor within the leak containment chamber with an alarm and a fuel level sensor and indicator of the electronic type, both as referenced elsewhere herein. The tank assembly for fixed units shall be UL listed as a closed-top, diked generator base tank and is to be installed in accordance with NFPA 30 for flammable and combustible liquids. Tanks on mobile units shall be constructed to similar or more stringent standards and otherwise be in conformance with US DOT and National Highway Safety Administration standards, in compliance with the Code of Federal Regulations, Section 571.108. Tanks shall be factory tested, including pressure testing to 3 psi, and certified to be free of leaks.

The fuel leak detector sensor alarm point shall be connected to the generator alarm annunciator panel, and then hardwired to the SCADA RTU.

Lube Oil System:

The engine shall be equipped with a pressure lubrication system to supply oil to all surfaces requiring lubrication. Circulation shall be by means of an engine-driven, positive displacement, lube oil pump.

The lube oil system shall include a heat exchange utilizing engine cooling medium.

Immersion Heaters:

The engine shall be equipped with electric immersion heaters with protective jackets for maintaining the engine's cooling water and lube oil temperatures at valves recommended by the engine manufacturer. The heaters shall operate at 120, 208 or 240 volts single phase as selected and coordinated with the auxiliary panelboard and the associated supply to it. Unless otherwise designated, heaters shall be 240 volts single phase. The heaters shall operate continuously except when the engine is running or when the thermostats are satisfied.

Air Intake and Exhaust System:

The engine intake air filter shall be of the engine-mounted dry type with restriction indicator and shall be securely braced against vibration. The filter element shall be cleanable or replaceable while the engine is running.

The exhaust muffler shall be of a design recommended by the engine manufacturer to provide critical type silencing. The muffler shall be mounted within the housing with exhaust pipe extension with suitable insulation extended through the outer skin, outside the housing. The muffler shall include a condensation drain plug. Venting via the cooling ventilation louver will not be acceptable.

The pressure drop in the entire exhaust system shall be small enough to insure satisfactory operation when the engine-generator set is operating at 110% of indicated generator output. Submittal information shall document compliance with this requirement by calculation.

Governor:

The engine speed shall be controlled by a governor of the electronic type. The governor shall maintain frequency regulation not to exceed 0.5% from no load to full load. The governor shall have manual adjustments, which can be made with the engine running.

Engine Starting System:

The engine starting system shall consist of a heavy duty, electric cranking motor with appropriate automatic engagement and drive mechanism, battery rack, battery cables and clamps and a battery charger.

The electric cranking motor shall have sufficient capacity to crank at a speed that will start the engine for four cranking cycles as specified hereinafter without overheating. The cranking motor shall be rigidly mounted on the engine and shall start the engine from any position of the flywheel.

The starting battery shall be a heavy duty, industrial lead acid type with the required number of cells assembled with connectors to provide proper voltage for the starting motor shall have high rate discharge performance and shall have sufficient capacity to provide two minutes total cranking time without recharging based on the specified temperature for the unit (-20 degrees F – 105 degrees F) without a battery heater.

Submittal information shall document battery type, battery capacity and temperature characteristics.

The battery charger shall be multiple rate temperature compensated and suitable for the battery shall have full wave silicon rectifiers, surge suppressers, charge rate potentiometers, charge rate indication, DC ammeter, DC voltmeter, input and output fuses and shall be self-regulated against shorted or reversed battery connections and overload currents. The charger shall have a high charging rate compatible with the battery capable of fully recharging a depleted battery in not more than 24 hours, and when the battery is brought up to full charge it shall automatically reduce the charge rate to a continuous trickle charge. The charger shall operate from a 120-volt, single phase, power source or shall operate from a transfer switch source when installed within. Submittal literature shall include complete, highlighted battery charger information

The charger shall generate the following alarm indications and outputs:

- a) Low DC voltage
- b) High DC voltage
- c) Battery Charger Malfunction

Charger alarms shall be wired to the generator alarm annunciator panel, and then hardwired to the SCADA RTU.

The battery charger shall be installed in a NEMA 3R enclosure mounted on the set and connected to the auxiliaries panelboard.

Engine Start-Stop and Safety Controls:

The generator shall be equipped with two control panels, one mounted on the generator, and one remote panel located inside the shelter; the inside panel is also referred to as the alarm annunciator panel.

The local engine start-stop and safety controls shall be installed in a generator control panel which shall have a NEMA 3R rating and will be mounted at the generator. The panel shall be a combination engine and generator control panel which shall house controls and instruments for the engine and the generators. All control instrument and alarm designations shall be in English text; symbols alone will not be acceptable.

The control system shall be the manufacturer's most current and complete microprocessor-based system for monitoring, metering and controlling the engine generator set. The controllers shall feature digital displays as well as analog meters for AC volts, AC amperes, and Frequency, as a minimum, **even if these functions are duplicated digitally**. Gauges for Engine functions, including Lube Oil Pressure and Cooling Water Temperature shall be supplied and may be incorporated in the panel or may separately mounted.

The control system shall incorporate a key-operated Run-Off-Auto switch. In the "Run" position, the engine shall start and operate at rated speed. The starting function shall include a cranking cycle of several alternate crank and rest periods in the event that several attempts are necessary. If the unit has not started by the end of the cranking cycle, the start controls shall terminate the attempts and actuate the over-crank alarm (transmitted as part of Generator Malfunction Alarm). In the "Stop" position, the engine shall be unable to start or run. The "Stop" position shall also reset lockout relays and alarm indications, or the panel may incorporate a "Reset" switch. In the "Auto" position, the engine shall start and operate at rated speed in response to a remote contact from a transfer switch or other control. When the switch is not in the AUTO position an alarm, wired in parallel with the output breaker's auxiliary contact, sends a "Generator Not in Auto" alarm to the SCADA RTU.

The control panel shall include selectors for phase selection and for meter scale ranges, as appropriate.

The control system shall incorporate a non-reset-able running time indicator.

The external control panel shall, as a minimum, indicate alarms for the following functions:

- Overcrank (*)
- Overspeed (*)
- High Water Temperature – Pre-Alarm
- High Water Temperature (*)
- Lube Oil Low Pressure – Pre-Alarm
- Lube Oil Low Pressure (*)
- Low Fuel **
- Generator Switch Not in Auto

These alarms shall be wired to the generator alarm annunciator panel located inside the shelter. From there the alarms designated with an asterisk shall be hardwired to the SCADA RTU as part of the common "Generator Malfunction" alarm while the "Low Fuel" and "Generator Switch Not in Auto" alarms shall be wired as their own alarms.

The panels shall provide for alarm acknowledge (silence) and test functions.

For units incorporating a unit-mounted battery charger, battery charger alarms shall also be indicated on the control panel or shall be annunciated on the battery charger. In any case, any of the battery charger alarms shall trigger the common "Generator Malfunction" alarm.

The control panels shall have all functions clearly visible in daylight or night conditions by incorporating internal and/or external lighting. The external control panel shall be environmentally hardened and suitable for operation in an outdoor environment in wet weather without the entry of moisture, dust or other airborne contaminants.

The control panels shall be UL508 and ISO 8528-4 listed and shall conform to the National Electrical Code and NFPA 110.

Engine Instruments:

The engine shall be provided with an appropriate instrument panel with the following equipment mounted thereon all properly connected for the desired services:

- Pressure gauge-fuel oil (not panel mounted)
- Temperature indicator-cooling water
- Temperature indicator-lube oil

Generator:

Generator Type and Rating. The generator shall be three phase, 60 hertz, rotating field, synchronous type, with a permanent magnet exciter, a standard oversize alternator and shall have the output voltage and KW rating at 0.8 power factor as specified, shall be connected to the engine flywheel with a flexible coupling and shall have an open, drip-proof enclosure.

The generator and exciter shall have Class F insulation and shall be capable of withstanding an overspeed of 125% without damage. Bearings shall be ball, double shielded, cartridge type with grease fittings. The generator shall be re-connectable by means of reconfiguring conductive straps, bars or pre-made jumpers furnished with the unit and such reconnection shall be from an accessible location that does not require disassembly of other parts of the unit. Generator output shall be re-connectable as:

- 240/120 volt, 1 phase, 3 wire

The generator and exciter shall be rated for operation continuously at 110% of rated load without exceeding insulation temperature limits of 105% rise (Celcius). Submittal information shall document compliance with this requirement.

Voltage Regulator:

The voltage regulator shall be static type with surge protection and shall match the characteristics of the generator and exciter. A rheostat for a maximum of plus or minus 5% voltage adjustment shall be provided.

Digital voltage regulation for maximum calibration shall not be more than plus or minus 1% from no load to full load.

Stable operating conditions shall be re-established within two seconds following any sudden change in load between full and no load. Stable generator operation is defined as operation with terminal voltage held constant within plus or minus 1% of rated voltage.

Readily accessible voltage drop, voltage level and voltage gain controls shall be provided.

The set may supply non-linear loads such as UPS systems or DC drives. The set sizing and construction shall take this into account and the set shall be immune to negative effects from such loading.

Generator Instruments:

The generator instrument shall be panel mounted in the generator control panel and shall include:

- AC Ammeter
- AC Voltmeter
- Voltmeter/Ammeter phase selector switch
- Frequency meter dial type
- Elapsed Time meter

Generator Circuit Breakers:

Each engine generator set shall have two generator output circuit breakers mounted in an enclosure on the unit. The circuit breakers shall be a molded case, thermal magnetic type with an interchangeable trip, ambient compensated for installation outdoors in full sun. The circuit breakers shall have a frame size suitable for the maximum nominal output amperes available in the "worst-case" reconnect-able configuration. Alternate trip modules shall be provided within a tool box for all various output configurations. The circuit breakers shall be UL listed, molded case, rated for 600 volts and shall have an interrupting rating suitable for the available fault current of the unit.

The main breaker shall be wired to the automatic transfer switch. this breaker shall be furnished with a auxiliary contact to indicate that the generator is not switched to automatic position. The purpose of other breaker is for a connecting to a load bank for routine testing. The breaker enclosure shall provide terminals and a convenient means to attach cabling, up to #1/0 in size, to a portable load bank. The breakers shall be keylocked so that only one may be closed at a time.

Portable load bank and cabling is not included in contract.

Housing:

Each unit shall have an outdoor sound attenuating enclosure rated for 75db attenuation at 15 feet. The housing shall consist of a "skin tight" design prefabricated structure according to manufacturer's dimensions bolted and sealed on the structural steel frame for mounting on a concrete pad or steel grating. Insulation shall be mineral wool or fiberglass.

The size of the housing enclosure shall be sufficient for all items mounted within and shall have adequate space to allow sufficient clearances for access and maintenance of equipment. The housing shall have standard size heavy duty primed and painted steel access doors with outside padlocking provisions and door "hold open" latches.

It shall have a fabricated steel base assembly with integral fuel tank, motorized intake and exhaust louvers, ducted radiator exhaust assembly and environmental control system including lights, heaters and convenience receptacles.

The steel base shall incorporate an integral double walled fuel tank of not less than the capacity specified and shall provide adequate support and stiffness. The base shall be bolted to the concrete pad. The steel base shall be sand blasted to a commercial finish in accordance with the manufacturer's standards.

The generator package shall be equipped with a 100 ampere 240/120 volt single phase panel board with a 100 ampere main circuit breaker and load size circuit breakers to distribute power for lighting receptacles and auxiliary items as required and indicated on plans. Circuit breakers shall be bolt-on type with not less than 10,000 RMS symmetrical amperes for internal loads, 22,000 RMS for external loads, and 65,000 RMS main breaker. The vendor shall coordinate voltage configuration for each individual unit ordered.

The housing shall be equipped with interior and exterior signs to warn of "Flammable Material" and "NO SMOKING".

The engine generator unit, base tank, and associated housing shall all be factory painted with a multi-coat, corrosion resistant finish.

Auxiliary Items:

The package shall be equipped with lighting switched from an access door to provide general lighting for maintenance and inspections.

The package shall be equipped with two thermostatically controlled 120 volt electric space heaters to prevent condensation within the housing and to maintain the house at 50 degrees F while outside temperature is 0 degrees F. The thermostat shall be accessible for adjustment.

Conduit used for wiring within the housing may be electrical metal tubing except for flexible connections where liquid-tight flexible metal conduit shall be used. Assure ground continuity with equipment ground wires.

Alarm Annunciator Panel:

Alarm Annunciator Panel shall be standard manufacturer compliments to the engine generator sets as specified herein, suitable to provide remote monitoring, and visual and audible alarm of engine generator status and malfunction conditions.

Annunciators shall comply with NFPA standards for Essential Electrical Systems for Health Care Facilities and Emergency and Standby Electric Power Systems as well as National Electrical Code requirements. The alarm annunciator panel shall be powered from the shelter's AC distribution system.

Annunciators shall be mounted in a metal enclosure, with a front suitable for flush or surface wall mounting.

Annunciators shall have space for not less than 20 alarm conditions, and it shall be possible to customize designations of each space. At least 18 of the alarm spaces shall be capable of initiating the audible alarm, and each shall have the audible alarm selectable as "on" or "off". The annunciator shall be equipped with an audible alarm silence and a lamp test feature, and the vendor shall provide instructions on how to disable the audible alarm and how to substitute an output connection to a silent strobe or similar device.

Annunciators shall be of a modular design using replaceable and interchangeable LED lights. A supply of 10 green, 10 red and 10 yellow spare LEDs shall be provided with the unit. A supply of not less than 20 spare legend labels for customizing the configuration shall also be included.

Specific set alarms may be tailored to each specific installation, and specific alarm designations may be specified at the time any annunciator is ordered. In the absence of installation specific designations, each annunciator unit shall initially be shipped with the alarm functions specified herein for the engine generator set control panel; plus the battery charger alarms; plus a “Generator Running” indication; plus an alarm for Fuel Leak to Rupture Basin, generally as follows:

<u>Condition</u>	<u>Color</u>	<u>Audible Horn</u>
Not in Auto	Red	No
Battery Charger Malfunction	Red	Yes
Generator Running	Red	No
Low Fuel	Red	Yes
Fuel Leak - Rupture Basin	Red	Yes
Pre-High Coolant Temp.	Red	Yes
High Coolant Temp.	Red	Yes
Low Engine Temp.	Red	Yes
Pre-Low Oil Pressure	Red	Yes
Low Oil Pressure	Red	Yes
Overspeed	Red	Yes
Overcrank	Red	Yes
Generator Overload Pre-Alarm	Red	Yes
Generator Overload Shutdown	Red	Yes
Normal Power Present	Green	No
Emergency Power Present	Red	Yes
Transfer Switch in Normal	Green	No
Transfer Switch in Emergency	Red	No

Annunciators shall be UL listed.

Guarantees/Warranties:

All equipment shall be furnished complete with the Manufacturer’s standard year guarantee/warranty applicable to the Illinois Department of Transportation or other appropriate procuring agency from the date of delivery. Such guarantee shall accompany final record drawings and product data.

Delivery:

District One ordered units shall be delivered to a single site designated by IDOT within District One. Delivery date and time shall be coordinated with IDOT in advance. Off-loading will be handled by IDOT and may be witnessed by the manufacturer’s representative.

After testing at the installed site, the manufacturer shall provide a certification as specified elsewhere herein.

Local Service:

The successful bidder shall have an ongoing business operation within the State of Illinois, shall provide 24-hour service capability and shall provide units for which factory-authorized service is available at various locales statewide to minimize emergency response times. A complete listing of factory-authorized service within Illinois (and adjacent bordering locales) shall be provided with the bid.

Acceptable Products:

The engine generator set shall be as manufactured by Onan, Kohler, Caterpillar, or approved equal.

Tests

Engine Generator Factory Test

The engine generator set incorporated in the engine generator package must be fully tested, as specified herein at the factory and certified by the engine generator manufacturer.

The factory test(s) shall be per manufacturer's standards.

All tests shall be neatly recorded, and a copy of the test results shall be given to IDOT.

The set serial number(s) shall be recorded on the test result forms.

Assembled Package Installed Tests:

The completed package assembly shall be field tested to assure proper operations and connection of the engine generator set and all other components of the assembly. The tests shall include simulations of automatic, manual, and retransfer to normal simulation of all alarm functions as well as tests of the field tank and other package auxiliary items.

The manufacturer of the Engine Generator Package shall furnish the services of an experience engineer to check the equipment and witness testing and file reports and certification and such services shall be available within 10 days of notification that installation and connection is complete and ready for testing. The services manufacturer's representative shall be available to assist in the adjusting and testing of the engine generator set and the assembled package in the field. These adjustments shall be made in the presence of IDOT.

Tests shall demonstrate the proper operation of the set, including automatic starting and picking up of the load.

Except for the manufacturer's representative, all instruments, test equipment, fuel, lube oil, and personnel that are required for the test as confirmed with the manufacturer will be furnished by the installing Contractor. The manufacturer may provide supplemental test equipment.

The representative of the engine generator set manufacturer shall furnish certification in writing that the set has been properly installed at the site and that the trial operation has been satisfactory. Documentation shall include recorded test results. The certification shall be submitted to the owner in triplicate before final acceptance.

Submittals:

The submittal shall include calculations and other detailed information showing compliance with all generator package specifications and appurtenances specified herein and they shall also include detailed drawings of the generator, dimension weights, lift points, and rigging recommendations, its wiring, the base, the superstructure, and any other information needed in the construction of the complete package shall also be provided to the extent practical for bidding.

In submitted calculations, bidders shall indicate all specified input parameters plus any assumed characteristics such as motor efficiency and power factor that may be germane to the calculation.

IDOT may request additional information from the successful bidder. Bids submitted with incomplete submittal information will be considered non-responsive and may be rejected.

Also, component catalog information shall be included and highlighted.

The Contractor is responsible for highlighting and explaining any proposed deviations from specified requirements. Minor deviations relative to set appurtenances and accessories may be allowed, but deviations affecting set sizing, load capacity, noise rating, and other basic unit features will not be allowed.

Documentation

Each unit ordered shall be delivered with two (2) sets of catalog and shop drawing information, test results and vendor certification and two (2) sets of operating and maintenance manuals.

AUTOMATIC TRANSFER SWITCH

The Transfer Switch shall be supplied by the same vendor as the Engine Generator Package. The vendor shall provide suitable interconnection reference diagrams.

Basic Transfer Switch Requirements:

Automatic transfer switches shall be air break, double throw interrupter type, electrically operated and mechanically held in both the normal and emergency positions. The switch operators shall be momentarily energized by the source to which the load is transferred. Switches shall be capable of transfer in either direction on 70% of rated voltage. Switches composed of molded case breakers, contactors, or components not specifically designed as an automatic transfer switch will not be acceptable. Switches shall be listed to UL 1008 and all accessories shall be UL listed for factory or field installation. Equipment shall comply with applicable NEMA, NFPA, and CSA requirements and standards.

Transfer time in either direction shall not exceed 0.5 second.

Switch current ratings shall be the nominal switch size rating as indicated, as a minimum, but larger switches may be derated to achieve specification compliance on other factors. Each switch shall be rated for 600 volts. Main contacts and main current carrying parts shall be insulated for 600 volts. The rating of the switch shall be a 24-hour continuous rating in a non-ventilated enclosure for all classes of loads. Temperature rise shall conform to U/L –1008 and NEMA standards. The contact structure shall consist of a main current carrying contact which is a silver alloy with a minimum of 50% silver content. The current carrying contacts shall be protected by silver tungsten arcing contacts on all sizes.

Main contacts shall be mechanically held in position by the operating linkage without the use of hooks, latches, magnets, or springs and the contacts shall be of silver alloy. Main and arcing contacts shall be visible without major disassembly to facilitate inspection and maintenance.

Not less than two auxiliary contacts, one closed on normal and one closed on emergency, rated not less than 5 amperes at 120 volts, shall be mounted and actuated by the same shaft as the main contacts. Additional relay contacts, timers, control keys, and associated wiring required for the functions indicated shall be front accessible. All wiring shall be tagged with tubular wire markers or other means approved by the state.

The switch operation shall provide an adjustable period in a fully disconnected (neutral) position on both transfer and retransfer operations. Except for the normal functioning of the programmed neutral position, failure of any component shall not result in a neutral position where both normal and emergency contacts remain open. Also, the failure of any component shall not result in a condition where both normal and emergency contacts are closed, or attempt to close at the same time.

Transfer switches shall not have integral overcurrent or short circuit protection.

Switch components shall be easily maintainable from the front without removal of the switch from its enclosure and without disconnecting the main power cables. Adequate safety baffles and barriers shall be provided and all components shall be clearly identified.

Operation:

Operation shall be selectable as either manual or automatic.

Automatic operation shall be controlled by adjustable voltage sensing in each phase of both normal and emergency sources. Upon a fall in voltage on one or more phases of the normal source below the pre-set limit (roughly 70% of rated voltage) transfer operation shall be initiated. Delays and other transfer features shall be as specified herein. Upon restoration of voltage to all phases of the normal source (to roughly 90% of rated voltage) re-transfer to normal shall be initiated, also subject to delays and features specified herein.

Each transfer switch shall be equipped with a manual operator. Manual operation shall operate the switch in the same transfer time as normal electric operator transfer. Interlocking shall be provided to prevent electric operation of the switch when the manual operation is selected. The manual operator shall be arranged to provide adequate shielding and protection from live electrical parts for operating personnel. A manual handle shall be provided for maintenance purposes with the switch de-energized. An operator disconnect switch shall be provided to defeat automatic operation during maintenance, inspection or manual operation.

Withstand Rating, Tests and Certifications:

Each switch shall have a UL-1008 withstand and closing current rating, when coordinated with circuit breakers, at 480 volts AC of not less than 42,000 RMS symmetrical amperes.

Submittal information shall include documentation that identical switches have met the requirements of UL standard 1008 for the specified ratings. In addition, the data shall include certified copies of test documentation of the 3-cycle withstand requirements of 42,000 amperes at 480 volts.

Test results shall include a dielectric test at the conclusion of the withstand and closing tests.

After installation, the vendor shall provide installed switch operations testing and start-up adjustments. A representative of the manufacturer/vendor shall check the installation and submit to the Engineer, three (3) certified, signed statements, addressed to IDOT for each installed switch, that the equipment has been properly installed and is in good working order.

A record of all auxiliary device settings, etc. shall be provided for each installed switch.

In addition, a record of these settings shall be within a clear, heavy-duty plastic sheet protector at an appropriate location within, or upon, the switch enclosure.

Start-up testing and operating personnel training shall be provided by the equipment supplier. Training shall cover basic switch operation, auxiliary device purposes and settings, maintenance requirements and remote alarms.

Plastic-laminated step-by-step operating and test procedures, complete with schematic wiring diagrams shall be permanently attached to automatic transfer switch enclosures.

Final record drawings, recommended spare parts, and maintenance manuals shall be available for start-up.

The transfer switch shall be equipped with a microprocessor based control panel. The control panel shall perform the operational and display functions of the transfer switch. The display functions of the control panel shall include ATS position and source availability. Control settings shall not be lost during a total power outage and switch position indications shall remain viable as well.

Special Features:

Each transfer switch shall include, as a minimum the following control features:

Emergency Transfer Time Delay. This time delay (or delays) shall delay the transfer to the emergency source for a time to allow for momentary outages. This time delay shall be adjustable with a range of roughly 0 to 5 minutes. This delay shall also delay engine generator start.

Test Switch. A test switch shall be mounted on the enclosure door to stimulate the failure of the normal source.

Indicating Lights and Alarms:

The switch shall have indicating lights mounted on the enclosure to indicate the switch position (normal to emergency) and the presence of power (normal and emergency). Each shall have an engraved nameplate and color as follows:

<u>Legend</u>	<u>Color</u>
Normal Power Present	Green
Switch in Normal Position	Green
Emergency Power Present	Red
Switch in Emergency Position	Red

ATS alarms shall be wired to the generator alarm annunciator panel, and then hardwired to the SCADA RTU. Alarms include:

- Transfer Switch in Normal Position
- Transfer Switch in Generator Position
- Transfer Switch Bypassed
- Transfer Switch Normal Power Supply Fail
- Transfer Switch Malfunction

Adjustable Programmed Neutral Position. The switch operation shall have a programmed, adjustable time neutral position in which neither the normal or emergency sources are connected to the load. The time period shall be adjustable from roughly 0 to 20 seconds to prevent mechanical damage to motors which are running at the time of transfer.

Override Switch. The transfer switch shall have an override switch, mounted on the enclosure door to hold transferred switch in the emergency position regardless of the status of the normal source.

Auxiliary Contacts:

The switch shall have not less than an auxiliary relay contact for each of the following functions:

- a) A contact closed when the normal source is connected to load (switch in “normal” position)
- b) A contact closed when the emergency source is connected to load (switch in “emergency” position)
- c) A contact to close to initiate engine generator start and stop
- d) A contact closed on normal source undervoltage
- e) A contact closed on emergency source undervoltage

Contacts shall be coordinated with a remote annunciator or the engine generator, as appropriate and the contacts shall be in addition to those required for specified indicating light on the switch.

Normal Retransfer Time Delay:

The switch shall have a Normal Retransfer Time Delay. This delay shall delay re-transfer to normal for an adjustable time of 0-60 minutes. If the emergency source fails during the re-transfer time delay period, the transfer switch controls shall automatically bypass the time delay and immediately initiate re-transfer to the normal source position.

The switch shall be equipped with solid state control with all-phase monitoring on each power source, surge voltage isolation, relays for all outputs, isolation transformers for AC power inputs plus adjustable voltage sensors and time delays. Controls shall provide indicators or digital display of control status.

When ordered in a coordinated package with an engine generator unit, the transfer switch may house and be integrated with a DC control voltage supply and battery charger which may also power a coordinated DC remote annunciator. The supply shall derive power from the appropriate energized source at the switch and the charger shall then service in lieu of a generator-mounted unit. Coordinated wiring diagrams shall be provided.

The control panel shall be shielded from electrical noise.

Transfer switch controls shall allow the selection or non-selection of an automatic engine generator exercise mode.

A load/no load clock exercise shall be incorporated within the controls and shall be programmable to start the engine generator set and transfer the load (when selected) for exercise purposes on a periodic basis. The controls shall not lose settings during a power outage.

Each switch shall have a fully rated neutral bar with lugs isolated from the switch housing and other grounded parts. Each switch shall also have a suitable ground block, with lugs, and it shall be suitable for connection to a grounding electrode, equipment grounding conductors and an appropriate neutral-ground bonding jumper if both normal and emergency (generator) supplies are grounded via the transfer switch.

Each switch shall have a momentary pushbutton to bypass the time delays on transfer and retransfer and programmable commit/no commit control logic.

All relays shall be continuous duty industrial type wiping contacts. Customer interface contacts shall be rated 10 amperes minimum. Coils, relays, timers, and accessories shall be readily front accessible. The control panel and power section shall be interconnected with a harness ribbon connector and keyed disconnect plugs for maintenance.

Enclosures:

The switch shall be mounted in a NEMA 12 enclosure, with a hinged door.

Submittals:

A complete package submittal shall be furnished with this bid. The submittal shall include detailed information showing compliance with all transfer switch package specifications and appurtenances specified herein and they shall also include detailed drawings of the transfer switch, its wiring, the base, the superstructure, and any other information needed in the construction of the complete package. Also, component catalog information shall be included and highlighted.

IDOT may request additional information from the successful bidder. Bids submitted with incomplete submittal information will be considered non-responsive and may be rejected.

The Bidder is responsible for completing all questions contained herein and explaining any proposed deviations from specified requirements. Minor deviations relative to appurtenances and accessories may be allowed, but deviations affecting basic switch rating and function will not be acceptable.

Guarantees/Warranties:

The transfer switches shall have a guarantee to be free of defects in material and workmanship for one (1) year from date of delivery.

Documentation:

Not less than four (4) full sets of hardbound installation and maintenance manuals, complete with any appropriate descriptive literature and any special tools required to service transfer switches shall be provided. The material so furnished shall include complete wiring diagrams. This material shall also be furnished in PDF format of CDROM.

Plastic-laminated step-by-step operating and test procedures, complete with schematic wiring diagrams shall be permanently attached to automatic transfer switch enclosures.

Manufacturers:

The vendor shall have an established local factory authorized twenty-four hour service capability within IDOT District 1. Submittal information shall confirm this capability.

Delivery:

Switches are to be delivered to a location in the Joliet, Illinois area. Location to be designated in the Release Order.

Certification and Documentation:

Four (4) installation instructions and operation and maintenance manuals shall be provided at time of delivery. The manuals shall contain final, approved shop drawings and product data sheets (including any field additions or modifications) as well as recommended installation, testing, operation, and maintenance procedures.

After installation, the vendor shall provide installed switch operations testing and start-up adjustments and shall provide documentation of these tests and adjustments.

A representative of the manufacturer/vendor shall check the installation and submit to the Engineer, three (3) certified, signed statements, addressed to IDOT for each installed switch, stating that the equipment has been properly installed and is in good working order. A record of all auxiliary device settings, etc. shall be provided for each installed switch.

Acceptable Products:

The transfer switch shall be as manufactured by Onan, Zenith Controls, Inc., Russelectric, or approved equal.

Each package shall incorporate an auxiliary systems panelboard as specified herein. Voltage, breaker sizing and wiring of auxiliaries shall be coordinated with the panelboard.

The engine generator unit, base tank, associated housing, shall all be factory painted with a multi-coat, corrosion resistant finish.

UNINTERRUPTIBLE POWER SUPPLY

Standards. The UPS shall be designed in accordance with the applicable sections of the current revision of the following documents. Where a conflict arises between these documents and statements made herein, the statements in this specification shall govern.

- IEEE C62.41, Category A & B
- ASME
- CSA 22.2, No. 107.1
- FCC Part 15, Sub Part B, Class A
- National Electrical Code (NFPA 70)
- NEMA PE-I
- OSHA
- UL Standard 1778

General. The UPS system shall consist of the appropriate number of modules for capacity and/or redundancy. All modules are to be operating simultaneously and sharing the load. In a non-redundant system, all the modules making up the UPS are required to supply the full rated load. If a power or control module should malfunction, the load is to be transferred automatically to the bypass line. If a battery module should malfunction, it is to be isolated from the system resulting in reduced back up time. For redundant operation, the UPS will have one or more modules than what is required to supply the full rated load. The malfunction of one of the modules shall cause that module to be isolated from the system and the remaining module(s) shall continue to carry the load. Replacement of a module shall be capable without disturbance to the connected load.

Modes of Operation. The UPS shall be designed to operate as a true on-line system in the following modes:

- A. Normal - The critical AC load is continuously supplied by the UPS inverter. The input converter derives power from a utility AC source and supplies DC power to the inverter. The battery charger shall maintain a float-charge on the battery.
- B. Back-up - Upon failure of utility AC power the critical AC load is supplied by the inverter, which obtains power from the battery. There shall be no interruption in power to the critical load upon failure or restoration of the utility AC source.
- C. Recharge
 1. Upon restoration of utility AC power, after a utility AC power outage, the input converter shall automatically restart and resume supplying power to the inverter. Also the battery charger shall recharge the battery.
 2. Automatic Restart - Upon restoration of utility AC power, after a utility AC power outage and complete battery discharge, the UPS shall automatically restart and resume supplying power to the critical load. Also the battery charger shall automatically recharge the battery. This feature shall be enabled from the factory and shall be capable of being disabled by the user. The user shall also be able to program two auto restart delay settings: Battery capacity % level, Countdown timer.
- D. Bypass - The bypass shall provide an alternate path for power to the critical load that shall be capable of operating in the following manner:
 1. Automatic - In the event of an internal failure or should the inverter overload capacity be exceeded, the UPS shall perform an automatic transfer of the critical AC load from the inverter to the bypass source.
 2. Manual - Should the UPS need to be taken out of service for limited maintenance or repair, manual activation of the bypass shall cause an immediate transfer of the critical AC load from the inverter to the bypass source. The input converter, inverter, and battery charging operations shall continue to operate, provided the control enable switch is in the "On" position.

Performance Requirements.

System

- A. Configuration: The UPS system shall be upgradeable to a 12 bay frame system, 12.0 kVA to 16 kVA.
- B. Isolation. Input to output isolation shall be provided, via the output transformer, regardless of operating mode. (UPS or bypass)
- C. Remote Stop. The UPS shall provide provisions for remote stop capability.

AC Input to UPS

- A. Voltage Configuration: 208 VAC nominal, single-phase, 2-wire-plus-ground. The operating voltage range shall be variable based upon output loading percentages as follows:

<u>% UPS</u>	<u>Input Voltage</u>
80 – 100%	170 VAC
60 – 80%	144 VAC
30 – 60%	127 VAC
0 – 30%	110 VAC

- B. Frequency: 40 to 70 Hz.
- C. Input Current Distortion: 5% THD maximum at full load.
- D. Input Power Factor: 0.98 lagging at 100% rated load.
- E. Inrush Current: 150% of full load input current maximum for 3 cycles.
- F. Surge Protection: Sustains input surges without damage per criteria listed in IEEE C62.41, Category B.

AC Output

- A. Voltage Configuration: 208/120 VAC, single-phase, 3-wire-plus-ground. Field configurable to 240/120 VAC.
- B. Voltage Regulation: +/- 3% steady state.
- C. Frequency Regulation: 60 Hz, +/- 0.5%.
- D. Frequency Slew Rate: 5.0 Hertz per second maximum.
- E. Bypass Frequency Synchronization Range: +/- 5.0 Hertz.
- F. Voltage Distortion: 3% total harmonic distortion (THD) maximum into a 100% linear load, 7% THD maximum into a 100% non-linear load with crest factor ratio of 3:1.
- G. Load Power Factor Range: 0.5 lagging to 1.
- H. Output Power Rating: Rated kVA at: 0.7 lagging power factor.
- I. Overload Capability: >100% - 110% indefinitely, 111% -150% for 10 seconds, 151% - 200% for 0.25 seconds, The load shall be transferred to bypass when any of the above conditions are exceeded. >201% for min. 2 cycles, then shut down of UPS. Immediate shutdown into a short circuit.
- J. Voltage Transient Response: +/- 7% maximum for any load step up to and including 100% of the UPS rating.
- K. Transient Recovery Time: To within 1% of steady state output voltage within 96 milliseconds.

Batteries

- A. Internal Battery: The battery shall consist of gas recombination, valve regulated, lead acid cells. Flame retardant batteries shall be provided, which renders the UPS suitable for installation inside a computer room per requirements of UL Standard 1778.
- B. Reserve Time: (with ambient temperature between 20 and 25 deg C) The UPS shall contain an internal battery system to provide a reserve time of 20 minutes at 100% load with an equal number of power and battery modules fitted. The UPS shall contain provisions to fit additional internal battery modules. The UPS shall also interface with an external battery cabinet to extend reserve time capabilities.
- C. Battery Recharge: To prolong battery life, the UPS shall contain temperature-compensated battery charging. When equal number of power modules and battery modules are fitted the battery charger shall be able to recharge the internal batteries to 90% charge in three to five hours at nominal input voltage and nominal ambient temperature.

Environmental Conditions

- A. Ambient Temperature. Operating UPS 0 deg C to +40 deg C; battery 20 deg C to 25 deg C for optimum performance. Storage: UPS -20 deg C to +60 deg C; battery -20 deg C to 25 deg C for maximum 6 months.
- B. Relative Humidity. Operating: 5 to 95% non-condensing. Storage: 5 to 95% non-condensing.
- C. Altitude. Operating: To 10,000 feet. Derating or reduced operating temperature range required for higher altitudes. Storage: To 30,000 feet.
- D. Audible Noise. Noise generated by the UPS during normal operation shall not exceed 62 dBA measured at 1 meter from the surface of the UPS.
- E. Electrostatic Discharge. The UPS shall be able to withstand a minimum 15 kV without damage and shall not affect the critical load.

User Documentation. The specified UPS system shall be supplied with one (1) user's manual. Manuals shall include installation drawings and instructions, a functional description of the equipment with block diagrams, safety precautions, illustrations, step by step operating procedures, and routine maintenance guidelines.

Warranty. The UPS manufacturer shall warrant the UPS against defects in materials and workmanship for two (2) years. The warranty shall cover all parts for two (2) years and onsite labor for ninety (90) days. With start-up provided by the manufacturer or the manufacturer's authorized agent, the warranty shall cover all parts and onsite labor for two (2) years. Maintenance contract packages shall also be available.

Quality Assurance

Manufacturer Qualifications. A minimum of 30 years of experience in the design, manufacture, and testing of solid-state UPS systems is required.

Factory Testing. Before shipment, the manufacturer shall fully and completely test the system to assure compliance with the specification. These tests shall include operational discharge and recharge tests on the internal battery to guarantee rated performance.

Fabrication. All materials and components making up the UPS shall be new, of current manufacture, and shall not have been in prior service except as required during factory testing. The UPS shall be constructed of replaceable subassemblies. All active electronic devices shall be solid-state.

Wiring. Wiring practices, materials, and coding shall be in accordance with the requirements of the National Electrical Code (NFPA 70) and other applicable codes and standards.

Cabinet. The UPS unit comprised of: power module, battery module, control module, system interconnect module, and user interface module housed in a single free-standing enclosure and meets the requirements of IP20. The UPS system shall be designed such that the battery modules may be installed into any module bay in the cabinet and power modules into any module bay in the top half of the cabinet. The UPS cabinet shall be cleaned, primed, and painted with the manufacturer's standard color. Casters and leveling feet shall be provided. UPS cabinet dimensions shall not exceed 20 inches wide, 29 inches deep, and 53 inches high (12 bay frame).

Cooling. The UPS shall be forced air cooled by internally mounted fans.

Components

Input Converter

- A. General. Incoming AC power shall be converted to a regulated DC output by the input converter for supplying DC power to the inverter. The input converter shall provide input power factor and input current distortion correction.
- B. AC Input Current Limit. The input converter shall be provided with AC input over current protection.
- C. Input Protection. The UPS shall have built-in protection against undervoltage, overcurrent, and overvoltage conditions including low-energy surges introduced on the primary AC source and the bypass source. The UPS shall sustain input surges without damage per criteria listed in IEEE C62.41, Category A & B. The UPS cabinet shall contain an input breaker sized to supply full 16kVA rated load and to recharge the battery at the same time.

- D. Battery Recharge. To prolong battery life, the UPS shall contain temperature-compensated battery charging. When an equal number of power modules and battery modules are fitted the battery charger shall be able to recharge the internal batteries to 90% charge in six hours at nominal input voltage and nominal ambient temperature.
- E. Charger Output Filter. The battery charger shall have an output filter to minimize ripple current into the battery.

Inverter

- A. General. The inverter shall convert DC power from the input converter output, or the battery, into precise regulated sine wave AC power for supporting the critical AC load.
- B. Overload. The inverter shall be capable of supplying current and voltage for overloads exceeding 100% and up to 200% of full load current. A visual indicator and audible alarm shall indicate overload operation. For greater currents or longer time duration, the inverter shall have electronic current-limiting protection to prevent damage to components. The inverter shall be self-protecting against any magnitude of connected output overload. Inverter control logic shall sense and disconnect the inverter from the critical AC load without the requirement to clear protective fuses. The load shall be transferred to bypass when any of the above conditions are exceeded.
- C. Maximum Load Alarm. The user can set the alarm point to a value less than 100% rating such that the UPS will alarm before an overload condition or loss of redundancy is reached.
- D. Output Frequency. The output frequency of the inverter shall be controlled by an oscillator. The oscillator shall hold the inverter output frequency to +/- 0.5% for steady state and transient conditions. The inverter shall track the bypass continuously providing the bypass source maintains a frequency within the user selected synchronization range. If the bypass source fails to remain within the selected range, the inverter shall revert to the internal oscillator.
- E. Output Protection. The UPS inverter shall employ electronic current limiting.
- F. Battery over Discharge Protection. To prevent battery damage from over discharging, the UPS control logic shall control the shutdown voltage set point. This point is dependent on the rate of discharge.

Display and Controls

- A. General. The front panel will consist of multiple status LEDs, switches, and a four line by twenty character LCD display for additional alarm/configuration information. All mimic display LEDs shall be green in color and indicate the following: AC Input, On Battery, Load On/Off, On Inverter, On Bypass. The UPS fault indicator is used with additional indicators and audible alarms to notify the user that a UPS fault condition has occurred. The color of the fault indicator LED shall be amber in color and indicate the following: Replace Battery Module, Replace Power Module, Replace Control Module, On Bypass, Low Battery, OverTemp Warning, and UPS Shutdown. If there is a fault condition, the UPS shall attempt to maintain conditioned power to the load, or at minimum transfer to bypass. There shall also be indication on each module should the module fail and need to be replaced. In addition to a visual fault signal, the UPS shall also record fault occurrences in a rolling event log. The event log on the standard unit shall record up to 255 occurrences, with the oldest events discarded first, etc. The user shall have access to the event log through the LCD display. Every alarm and/or event recorded in the event log will contain a time and date stamp.
- B. Audible Alarms. The volume of all audible alarms shall be at least 65dBA at a distance of one meter (three feet). An audible alarm shall be used in conjunction with the LED/LCD indication to indicate a change in UPS status. The audible alarms shall enunciate for utility line loss, low battery (while on battery), and all other alarm conditions. For all alarm conditions, the user must look at the display to determine the cause of error/alarm. All alarm tones shall be a continual tone until the condition rectifies itself or the alarm is silenced. Once silenced, the audible alarm shall not sound until a new alarm condition is present.
- C. Alarm Silence Button. In addition to the load on/off switch, the user interface shall include an audible 'Alarm Silence' switch. If the alarm silence switch is pressed for one second, all current audible alarms shall be disabled. If a new alarm occurs, or a cancelled alarm condition disappears and then re-appears, the audible alarm is re-enabled.
- D. LCD Display. The LCD display shall be used to provide information to the user. The display shall also be used to program ALL information (voltage, frequency, etc.) into the UPS. Any display values that require time/date shall be 'year 2000' compliant.

Automatic Battery Test. The UPS shall initiate an automatic battery testing sequence periodically, at a programmed day and time of day, selectable by the end user. The user will be able to select the interval of the battery test and will be able to select 1, 2, 3, 4, or 6 week intervals, or can select to disable the automatic battery test.

Should a failure of the battery occur, the UPS will immediately return to normal mode and fault signals (visual, audible, and remote via serial) shall be communicated. No audible or remote (via serial/contact closures) indication of the battery test shall be communicated during the duration of the automatic battery test.

The automatic battery test factory default settings shall be enabled at a two week interval and to occur on Wednesdays at 0600hours (based on the twenty four hour clock).

Remote Emergency Power Off (REPO). The remote emergency power off function (REPO) shall allow the user to disable all UPS outputs in an emergency situation. The REPO, in order to be flexible, shall be able to interface with either normally open (N.O.) or normally closed (N.C.) systems. The REPO shall be activated when a pair of 'SELV' contacts, external to the UPS, are activated. The REPO connection shall be through a simple terminal block type connector.

The REPO function shall not operate if no system control modules are present in the UPS or if the manual bypass switch is in the bypass position. The user must also supply a means of interfacing with the REPO circuit to allow disconnecting the UPS input feeder breaker to remove all sources of power to the UPS and the connected equipment to comply with local wiring codes/regulations.

Regardless of the UPS mode of operation when the REPO is activated, the UPS output shall not be re-enabled until the following occurs:

- REPO contacts are reset (closed if N.C. contacts are used and open if N.O. contacts are used)
- Input circuit breaker is closed
- Control enable switch is turned on
- User interface on/off switch is depressed

Bypass

- A. General. A bypass circuit shall be provided as an integral part of the UPS. The bypass shall have an overload rating of 300% rated full load for 10 cycles and 1000% for sub-cycle fault clearing. The bypass control logic shall contain an automatic transfer control circuit that senses the status of the inverter logic signals, and operating and alarm conditions. This control circuit shall provide a transfer of the load to the bypass source, without exceeding the transient limits specified herein, when an overload or malfunction occurs within the UPS.
- B. Automatic Transfers. The transfer control logic shall automatically activate the bypass, transferring the critical AC load to the bypass source, after the transfer logic senses one of the following conditions:
 - Inverter overload capacity exceeded
 - Inverter over temperature
 - UPS fault condition

For inverter overload conditions, the transfer control logic shall inhibit an automatic transfer of the critical load to the bypass source if one of the following conditions exists:

- Inverter/Bypass voltage difference exceeding preset limits ($\pm 15\%$ of nominal)
 - Bypass frequency out of preset limits ($\pm 5\%$ of nominal frequency)
- C. Automatic Retransfer. Retransfer of the critical AC load from the bypass source to the inverter output shall be automatically initiated unless inhibited by manual control. The transfer control logic shall inhibit an automatic retransfer of the critical load to the inverter if one of the following conditions exists:
- Bypass out-of-synchronization range with inverter output
 - Overload condition exists in excess of inverter full load rating
 - UPS fault condition present
- D. Manual Transfer. In addition to the internal bypass function, the UPS shall have a manual bypass function. The manual bypass function shall be provided via a switch mounted on the bottom-front of the UPS, removal of the lower front bezel shall be required. The actual AC break time between inverter and bypass shall be less than four milliseconds.

The manual bypass shall also be a partial 'wrap-around' bypass, and shall be configured to wrap around the rectifier, battery charger, inverter, and battery in the same manner as the automatic bypass. The manual bypass shall not wrap around the EMI filtering, overcurrent protection or isolation transformer.

The UPS shall initiate an audible alarm upon transfer to manual bypass. The audible alarm shall be capable of being silenced by the user. The alarm shall continue to sound (unless silenced) while in bypass mode. This shall provide a reminder to the user that the load continues to be powered from utility supply alone.

Internal Battery. Flame retardant, valve regulated, gas recombination, lead acid batteries shall be used as a stored-energy source for the specified UPS system. The battery shall be housed in separate replaceable modules that slide into any open bay of the UPS cabinet, and sized to support the inverter at rated load and power factor, in an ambient temperature between 20° and 25° C, for a 6 minutes reserve time. The expected life of the battery shall be 3 to 5 years or a minimum 250 complete discharge cycles. For extended battery reserve time, additional battery modules may be added, if the frame size allows, external battery cabinets shall be also be available as an option.

Communications

The UPS shall allow for flexibility in communications. The UPS shall be able to communicate through two communications ports simultaneously; the media of either communications port may change without affecting the operation of the UPS. The use of relay contacts shall not affect the operation of the two communications ports.

Relay Contacts. The relay contacts shall be available through at least one DB-9F communication connector, and shall include a system of hardware and software that enables the UPS to communicate with multiple computers regarding UPS status and to execute an orderly shutdown sequence to protect systems and data. The UPS shall communicate via relay contact closure the following information: Low Battery, On Battery. One connector to provide relay contacts shall be fitted on all UPS models as standard (designated comm port 1). Relay contacts shall be rated 48 VDC, 1 A. Additional signals (such as on bypass and summary alarm) shall be provided.

The following pins for comm port 1 shall be used:

- Pin 1 Low Battery (normally open)
- Pin 4 Shutdown in battery mode (5 – 12 VDC for 1.5 sec)
- Pin 5 Common
- Pin 7 Low Battery common
- Pin 8 On Battery (normally open)
- Pin 9 On Battery common

The UPS shall provide a comment UPS Trouble Alarm to the SCADA RTU.

Serial Communications. The UPS shall be able to communicate through the following communication ports: comm port 2 (standard on UPS). The pin-out configuration for comm port 2 shall be as follows:

- Pin 2 Transmit Data
- Pin 3 Receive Data
- Pin 5 Common

Network Communications. The user shall have the option of installing an optional card to provide SNMP communication over a local area network. 10/100Mbit Ethernet support shall be included.

UPS Status Information. The software shall be able to retrieve all status information present in the UPS (and available on the display). Retrieval of data shall be through either serial communications or through a network connection.

External Battery Cabinets. The UPS shall have the capability to add external battery cabinets to the base product. These external battery cabinets with chargers and front access battery terminals, shall be installed in parallel to provide backup times as required. The connections between the UPS and the extended battery cabinets shall contain DC power only. All of these shall be able to be connected or disconnected safely by the user without interrupting power to the load

Modular Extended Battery Cabinets. The Modular Battery Cabinet shall be pre-configured with 1 to 12 Battery Modules installed. Battery Cabinets with less than 12 Battery Modules shall be field upgradable using the standard Battery Module Expansion Kit. Each Extended Battery Cabinet shall include (2) Battery Cards and (2) 10-foot communications cables. Each Extended Battery Cabinet shall require one unused card slot on the UPS and a maximum of four Extended Battery Cabinets shall be used with one UPS.

Maintenance Bypass Cabinet with optional COD. The Maintenance Bypass Cabinet shall provide complete “wrap-around” protection and shall allow the UPS to be pulled from service without interrupting power to the loads. The Maintenance Bypass Cabinet controls shall include a manual break before make bypass transfer switch, UPS input disconnect switch, and a branch rated output circuit breaker. The Maintenance Bypass Cabinet controls shall be located behind a lockable front panel to provide operation security.

Maintenance Bypass Cabinet models shall be available with and without an isolation transformer in the bypass path. The Maintenance Bypass Cabinet with Transformer option shall provide isolation in the bypass path as well as total flexibility with utility voltages.

Every Maintenance Bypass Cabinet model shall be able to be ordered with up to 10 output options. These options shall include receptacles as well as conduit fittings with branch rated breakers. Each receptacle or conduit fitting shall include a power available indicator lamp.

Field Quality Control. The following inspections and test procedures shall be performed by factory trained field service personnel during the UPS start-up.

Visual Inspection

- A. Inspect equipment for signs of shipping or installation damage.
- B. Verify installation per drawings.
- C. Inspect cabinets for foreign objects.
- D. Verify neutral and ground conductors are properly sized and configured.

Mechanical Inspection

- A. A. Check all power modules are correctly fitted.
- B. B. Check all battery modules are correctly fitted.
- C. C. Check all terminal screws, nuts, and/or spade lugs for tightness.

Electrical Inspection

- A. A. Confirm input voltage and phase rotation is correct.
- B. B. Verify bypass voltage jumper is correct for voltages being used.

Unit Start-Up and Site Testing. The manufacturer's field service personnel shall provide site testing if requested. Site testing shall consist of a complete test of the UPS system and the associated accessories supplied by the manufacturer. A partial battery discharge test shall be provided as part of the standard start-up procedure. The test results shall be documented, signed, and dated for future reference.

Manufacturer's Field Service

Service Personnel. The UPS manufacturer shall directly employ a nationwide service organization, consisting of factory trained Customer Engineers dedicated to the start-up, maintenance, and repair of UPS and power equipment. The organization shall consist of factory-trained Customer Engineers working out of District Offices in most major cities. An automated procedure shall be in place to insure that the manufacturer is dedicating the appropriate technical support resources to match escalating customer needs.

The manufacturer shall provide a fully automated national dispatch center to coordinate field service personnel schedules. One toll-free number shall reach a qualified support person 24 hours/day, 7 days/week, and 365 days/year. If emergency service is required, call back response time from a local Customer Engineer shall be 20 minutes or less.

Replacement Parts Stocking. Parts shall be available through an extensive network to ensure around- the-clock parts availability throughout the country. Local Customer Engineers shall stock replacement spare parts with back up available from District Service offices and the manufacturing location. Customer Support Parts Coordinators shall be on-call 24 hours a day, 7 days a week, 365 days a year for immediate parts availability.

UPS Maintenance Training. Maintenance training courses for customer employees shall be available by the UPS manufacturer. This training is in addition to the basic operator training conducted as a part of the system start-up.

The training course shall cover UPS theory, location of subassemblies, safety, battery considerations and UPS operational procedures. The course shall include AC to DC conversion and DC to AC inversion techniques as well as control and metering, Troubleshooting and fault isolation using alarm information and internal self-diagnostics shall be stressed.

Power Supply. The Shelter will need a 240V, 3 wire, 100A power supply. There is no obvious source of power adjacent to the shelter location, ComEd requires the ability to read meters from a location off the highway, and there is no access road behind the shelter. A proposed power source has been identified in field with ComEd that is some distance down the entrance ramp from the proposed shelter. Contractor shall install conduit and handholes for ComEd to install service entrance conductors from the existing source to a meter and disconnect stand located near the shelter, but still accessible by car. It is anticipated that the ComEd will need to install a step-down transformer adjacent to the meter and disconnect stand in order to provide 240V power.

ComEd will furnish and install conductors from the existing source through to the new meter socket, the transformer, and the meter. ComEd will also terminate conductors on the transformers and in the meter socket. All ComEd work will be included in the "Electric Utility Service Connection (ComEd)" pay item,

The contractor shall install conductors and handholes between the existing power source and the proposed transformer, and then from the transformer to the meter and disconnect stand. Conduit and handholes shall be individually measured; pull rope installed in the conduit for ComEd's use shall be incidental to the conduit. The Contractor shall install a transformer pad according to standard ComEd details, and as coordinated in the field with ComEd. Payment for the transformer pad will be included in the cost of the shelter. The Contractor shall install a meter and disconnect stand as detailed in the plans. The stand will include a foundation, a mounting frame, a meter socket labled for use by ComEd, and a fused service entrance rated disconnect switch. All items, including conduit and conductors between the meter socket and disconnect switch, shall be included in the cost of the equipment shelter.

The Contractor shall install conduit, conductors, and a handhole between the meter and disconnect stand and the shelter. These items shall be individually measured with the exception that the conduit between the last power handhole and the shelter shall be included in cost of shelter.

CONSTRUCTION REQUIREMENTS

All materials shall be furnished with the most recently developed product versions that meet or exceed these specifications. It is the Contractor's responsibility to ensure that all components comply with the performance requirements specified herein, within the plan set, and/or in the Contract. In case of conflict between the requirements of the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), the National Electrical Manufacturers Association (NEMA), the Underwriters Laboratories (UL) Incorporated, and local codes, permitting requirements, and requirements contained herein, within the plan set, and/or in the Contract, the most stringent specifications shall apply. All materials and practices shall comply with the applicable requirements of the United States Department of Labor's (USDOL) Occupational Safety and Health Standards.

Contractor Requirements. The Contractor is solely responsible for all designs, equipment, materials, and services proposed. The Contractor is responsible for verifying the completeness of the materials required and the suitability of devices used to meet these specifications. The Contractor shall provide and install, without claim, any additional equipment required for operation as required herein, within the plan set, and/or in the Contract.

The Contractor shall possess the qualifications, skills, and experience necessary to accomplish the work required herein, within the plan set, and/or in the Contract to construct, furnish, and install equipment shelter. The Contractor who performs the lightning protection system installation shall have documented experience and competency in the proper design and installation of lightning protection systems, and be certified by the Lightning Protection Institute (LPI). This requirement is in addition to the normal contractor licensing requirements of the State of Illinois.

General Installation. Equipment shelter installation shall meet or exceed the design requirements contained herein, within the plan set, and/or in the Contract. The Contractor shall be responsible for identifying local facilities for the delivery, storage, and legal disposition of post-installation materials. The Contractor shall also be responsible for locating and protecting any existing underground utilities at the work site. The Contractor shall repair any damage to existing installations at no additional cost to the Department.

The Contractor shall submit detailed drawings of the proposed installation to the engineer for approval. All concrete work shall be performed in accordance with IDOT's Standard Specifications for Road and Bridge Construction.

The Contractor shall supply a concrete mix design to the engineer for approval. The concrete mix design shall be signed and sealed by a professional engineer registered in the State of Illinois. When the concrete is delivered on site, the Contractor shall provide the actual mix design to the engineer for approval. If the concrete mix design does not meet the requirements of the signed and sealed concrete mix design, the Contractor shall not be permitted to use the concrete. At a minimum, the Contractor shall take five samples (i.e., cylinders) of concrete from each truckload. The Contractor is responsible for performing concrete break tests on the samples at 3-, 7-, 14-, and 28-day intervals. The Contractor shall use a fifth sample as a spare in the event that one of the other samples becomes damaged. The Contractor shall submit all concrete break tests in writing to the engineer. No construction or installation may begin on a concrete foundation until the concrete break tests indicate that the concrete has reached its design strength.

The Contractor shall also perform slump and temperature tests for each truckload. If the concrete is beyond the limits of the design or IDOT requirements, the Contractor shall not be permitted to use concrete. Some sites may be located in environmentally sensitive areas and require special treatment of the waste products associated with drilled shaft excavations.

Electrical Installation. The Contractor shall be responsible for providing and connecting electrical power to the shelter. Routing of wires and cables shall be neat and orderly. Electrical connectors and all costs associated with providing power shall be the Contractor's responsibility. The Contractor shall install the power service as required by IDOT's Standard Specifications for Road and Bridge Construction. Unless otherwise specified, the Contractor shall provide underground power service.

The Contractor shall provide all electrical connections from the service drop to the shelter's receptacles. The receptacles, switches, and light fixtures shall be wired using a minimum of #12 AWG copper wires. All wire shall be run in a minimum 0.50-inch electrical metallic tubing (EMT). The electrical loads shall be divided among as many load centers as necessary to contain the quantity of circuit breakers required to protect the communication shelter facility. The load centers shall contain separate, appropriately sized circuit breakers for the HVAC units as required for each major branch, receptacle, and remaining location in the 42-circuit panel. Power outlets consisting of quad receptacles shall be mounted on unistruts fastened to the overhead cable tray, above the equipment cabinet racks. In addition, a minimum of eight duplex outlets shall be mounted in the equipment shelter walls as shown on the contract drawings: two on each of the long walls and one on each of the shorter walls. A separate 20-amp single-pole circuit breaker shall be provided to protect the lighting circuits.

All electrical conduits shall be installed in a neat and orderly fashion. Symmetry shall be employed wherever possible. The main power shall enter the equipment shelter at a primary power switch to allow for the disconnection of commercial power and shall then be routed to an automatic transfer panel that will switch to emergency generator power in the event commercial power is lost. Emergency generator power shall also enter the equipment shelter through a power switch prior to connection to the automatic transfer panel. The main power from the automatic transfer switch shall be routed to a manual transfer switch with the mobile emergency generator connection installed on the outside of the shelter. The emergency generator connection shall allow IDOT personnel to power the site from a portable generator in the event that both the commercial power and emergency power is lost. The resulting main power shall then be routed to a 42-circuit distribution panel and through the associated AC SSD devices as described herein, within the plan set, and/or in the Contract.

Grounding. The purpose for installing a grounding system is to provide personnel safety and equipment lightning protection and to minimize the induced noise and static in the system. The grounding system shall comply with the specifications detailed herein, within the plan set, and/or in the Contract, and with National Electrical Code (NEC) requirements and National Fire Protection Agency (NFPA) standards detailed in NFPA-70, as well as all local grounding-related building codes.

The equipment shelter's exterior grounding system shall function as the primary ground sink. All grounds for the shelter shall be installed on the side of the shelter that the utilities, communication cables, and fiber enter. The grounding system for the surge protection devices shall be installed according to the manufacturer's recommendations and shall be connected to the existing grounding system with no less than the minimum wire size specified herein, within the plan set, and/or in the Contract, or the manufacturer's recommended wire size, whichever is larger, typically a #2 AWG stranded copper wire. The grounding system shall be bonded at a single point so that the communication cables, AC power, generator, signaling equipment, and equipment frames are connected by the shortest practical route to the grounding system. Lead lengths from each device to the device shall be protected and grounding shall be minimized for all devices according to installation requirements. The SSD device's lead lengths shall not exceed 10 inches. Any variance from the IDOT requirements shall be submitted in writing and pre-approved by the engineer for acceptance.

All belowground connections shall use an exothermic bonding process. The Contractor shall not backfill the openings where the underground exothermic bonds are made until the engineer has inspected and approved the grounding system.

All aboveground exterior connections shall use an exothermic bonding process to bond ground conductors on the exterior of the equipment shelter. Grounding connections to interior ground bus shall be mechanical connections using two bolts on a double lug connector. After a firm connection has been made to the connectors, an application of an anti-oxidant compound shall be required.

All connections to fence posts shall be exothermic bonds. Connections to top rails and fabric shall be mechanical connections. After a firm connection has been made to the connectors, an application of an anti-oxidant compound shall be required. See IDOT Fence Grounding Specifications for additional details.

Connection of conductors to interior equipment, such as panels and cable trays, shall use tow bolts on a double lug connector, or clamps appropriate to the size and type of wire, and the requirements of the equipment being grounded. Wires connected to lugs or clamps shall be crimped and soldered for reliable electrical contact. All non-conducting surface coatings shall be removed before each connection is made. Application of an anti-oxidant compound shall be required. Star washers, or another means that accommodates the fasteners used, shall be installed to ensure reliable electrical connections. The objective is to provide reliable, low-maintenance electrical and mechanical connections that will not deteriorate.

Ground Conductor Bending. Ground conductors shall be downward coursing and vertical and shall be as short and straight as possible. The minimum bending radius for interior shelter grounds shall be 8 inches. Sharp bends and multiple bends in conductors shall be avoided in all cases. Any deviation shall be submitted in writing and pre-approved in writing by the engineer.

Interior Grounding. One "halo" ground system consisting of an interior copper ground bus bar 0.25 inch x 2 inch, approximately 6 inches below the ceiling, with a vertical #2 AWG stranded copper drop through the floor at each corner, with a sufficient length of coiled wire slack at the drop to allow attachment to an exterior ring ground system.

The cable trays shall be mechanically connected to the upper interior perimeter ground using #2 AWG stranded copper wires with bolted terminal connectors at the cable tray ends. All points where cable tray sections meet shall be made electrically continuous by use of a short jumper wire with terminals attached at each end. All other metallic objects, such as door frames and doors, air conditioners, alarm systems, wall-mounted communication equipment, etc., shall be directly bonded to the closest interior upper or lower perimeter ground with the shortest possible #2 AWG stranded copper wire. The door shall be bonded to the doorframe using flexible welding cable. A bond shall be made between the lower and upper internal perimeter grounds using #2 AWG stranded copper wires at each corner of the room, and shall continue to provide a bond between the internal and external grounding systems. Bonds made to electrical equipment shall be completed using mechanical connections to bus bars or grounding lugs. Bonds made to other equipment shall be made with mechanical lugs whenever possible, but shall always be made to bare metal that is covered with anti-oxidant compound after installation.

Exterior Grounding. The shelter's exterior grounding system shall consist of a ground ring consisting of four ground rods placed a minimum of approximately 2 feet from the building foundation corners. Ground ring shall extend to encircle the generator foundation with two more ground rods installed halfway between the fence and generator. One pre-fabricated 10 inch ground inspection well shall be installed on the side of the shelter opposite the generator; the top of the ground rod within the inspection well shall be 6" below grade. All ground rods shall be bonded together using #2 AWG stranded copper wires and an exothermic bonding process. The bonding wires shall be buried a minimum of 2 feet below the finished grade. The following items shall also be bonded to the shelter's external grounding system using #2 AWG stranded copper wires:

- Ground rods provided by power or telephone utilities for grounding of AC power or surge protection devices, as permitted by local codes; and any metal object greater than 4 ft².
- There shall be two connections made to fence grounding
- There shall be a connection to the SDD
- There shall be two connections to the lightning protection system
- There shall be four connections to the shelter's halo ground

Site Preparation. IDOT shall provide site space for shelter installations. The Contractor shall install the shelter and other necessary facilities and equipment in the provided space and make all necessary electrical and mechanical connections. General site preparation, specific building tie-downs, and landscaping shall be the Contractor's responsibility. The Contractor shall comply with all environmental protection requirements and shall contact the engineer for specific information regarding shelter site preparation. The Contractor shall provide a weed barrier mat and concrete cover in the fenced-in compound as shown in plans.

Land Clearing. The Contractor shall be responsible for the clearing of brush, trees, or any other obstructions, including the removal of asphalt or concrete. The Contractor shall coordinate with the engineer as to the extent and schedule for all land clearing activities to ensure that there is no interference with concurrent operations at the site. Any tree stumps resulting from clearing shall be grubbed. The Contractor shall comply with all environmental protection requirements. The engineer shall pre-approve in writing any site clearing and tree trimming.

Debris Removal. After installation, inspection, and approval by the engineer as specified herein, within the plan set, and/or in the Contract, the Contractor shall remove all onsite debris, backfill, and compact all excavations, and return the grounds to their original condition. The Contractor shall comply with all environmental protection requirements.

Sanitary Provision. The Contractor shall provide and maintain neat and sanitary accommodations for the use of its employees as required for compliance with the Illinois Department of Health and all applicable county regulations. No nuisances shall be permitted.

Excess Garbage and Clutter Removal. The trash generated from the installation, including lunch bags and drinks, shall be stored in a neat manner until disposed of properly. The Contractor shall be responsible for removing and legally disposing of trash in a timely manner. Trash shall not be allowed to blow around or away from any construction site.

Fencing. The Contractor shall include and install galvanized steel fencing to provide complete perimeter security at the shelter site. The fence shall form a rectangle or square shape, unless otherwise specified herein, within the plan set, and/or in the Contract, and allow for 5 feet of space between the fence and any enclosed item whenever possible. The fence shall be a chain link as per IDOT Standard Detail 664001-01 "Chain Link Fence", and as modified per details on the contract drawings. The basic fence shall be a height of 6 feet and shall be topped with three strands of barbed wire. The barbed wire shall be held outward from the fence at a 45-degree angle with galvanized hardware. In addition, the fence fabric shall be fastened to a top rail and installed on top of the fence. The fence shall include a double-gate made of the same material as the fence material. The gate shall have a width of 12 feet and include a gate closing arrangement consisting of a female pipe receptacle anchored in the ground with concrete. A hardened, four-digit combination gate lock shall be provided by the Contractor, and the combination shall be set to the IDOT specifications.

Weed Prevention. The fenced compound area at all sites shall be treated with an IDOT-approved herbicide and covered with weed prevention material. The Contractor shall apply gravel or crushed rock to the area to a depth of 6 inches so that mowing and other requirements are minimized, unless otherwise specified herein, within the plan set, and/or in the Contract. A woven plastic weed barrier shall be placed on the ground before gravel installation. The barrier shall be installed according to the manufacturer's recommendations. The manufacturer's recommendations shall describe the minimum 10% overlap for each section and the method of securing the edges of the mat with stakes. See gravel section detail on contract drawings.

Compound Concrete Pad. The Contractor shall install a concrete pad within the fenced compound as per plans.

Fence Grounding. The fence shall be electrically grounded to prevent shock hazards from lightning or other electrical sources. One metal fence or gate post located adjacent to the exterior ground triad shall be grounded to one of three ground rods with #2 AWG stranded copper wire. The ground wire shall be buried two feet below finished grade. The gate and gatepost shall be bonded together with a flexible ground, such as welding cable wires. All connections to the ground wire shall be exothermically bonded. The fence's top rail shall be connected to the post.

Grounding Lead. Ground leads shall be #2 AWG stranded copper wires and shall be required for all above and below ground grounding wire installations.

Cutover Work. The Contractor shall relocate and re-terminate existing fiber optic cables as shown on the plans. This effort shall be considered a component of the installation of termination panels in the communications shelter.

In relocating and re-terminating these cables, the Contractor shall recognize that they are being used for operations. The Contractor shall maintain system operations during this work, with a minimum impact. The process of moving these cables or relocating termination equipment from the cabinets to the shelter shall be done during specific times identified by the Department. Typically the timeframes available to make these changes will be on non-holiday weekends. The Contractor shall assume that the work will be accomplished during this timeframe and provide the necessary resources to accomplish the work without causing an operational impact to the systems.

When splicing into existing fiber optic cables that are supporting operations, the Contractor shall take additional precautions to avoid disrupting Communications Center and Traffic System Center operations. The specific timeframes for performing the work shall be dictated by the Engineer. The Contractor shall commit adequate resources to finish the work during the authorized periods. In addition, the Contractor shall exercise additional precautions to ensure that only the fibers, conductors, or equipment that are assigned to this project, are accessed by the Contractor's technicians.

Prior to splicing or re-terminating any existing cables or fibers, the Contractor shall provide specific details of the work to be done to the Engineer with an anticipated timeframe to complete the work. This must be done a minimum of seven calendar days prior to commencing the work. The Engineer will grant approval for any operations 72 hours in advance of their commencement.

Prior to commencing any operations, the Contractor shall document the existing attenuation of any fibers using an OTDR and source/power meter. Subsequent to relocating and re-terminating the cable, the Contractor shall measure the attenuation of all fibers affected by the move. Any difference in attenuation greater than 0.5 dB shall be addressed and if necessary, the Contractor shall re-splice the fibers.

Wall Mounted Fiber Optic Termination Frame. The fiber optic termination frame shall be installed in the communication shelter as specified on the Plans. The frames 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.

Remote Terminal Units (RTUs)

Installation. Install the Remote Terminal Unit at the location indicated in the Contract Drawings and connect to the assigned terminals of the telephone terminal cabinet. Installation of the RTUs may necessitate the purchase of communications components from the RTU manufacturer to be installed at the control center. In addition, some field programming may be required.

Mounting. Mount enclosures as shown on the Contract Drawings, so that all equipment at the location is of uniform height. A grounding cable shall be attached mechanically to the enclosure such that it can be easily removed if necessary.

Verification. Following completion of the installation of all SCADA equipment at a site, the Contractor shall inspect all equipment wiring to verify that all mechanical connections are made and properly secured, all hardware is installed in its proper location, and all wiring is properly terminated. This inspection shall include conductor and shield continuity and isolation verification of all installation wiring. Data sheets containing evidence of such inspection, certified as correct by the Contractor's Quality Control Engineer for the project, shall be delivered to the Engineer for approval. The Contractor shall receive approval of such inspection certification before applying power to the SCADA equipment covered by such certification.

Grounding. Grounding of all of the equipment shall be provided as required by the Manufacturer's specifications and Electrical Grounding Section of this Specification, and shall be approved by the Engineer.

Documentation

The system shall include thorough documentation of all hardware and software to be supplied. Documentation for all procured Master Station equipment shall consist of the original manufacturer's manuals (one per unit supplied). Documentation delivered for hardware and software manufactured by the RTU vendor shall be subject to approval.

Hardware Documentation

System Manual. A System Manual shall be provided which includes a complete summary list of deliverable items: remote stations, spares, test equipment, consumables, and all documentation manuals and drawings.

Remote Station Manuals. The remote station manual shall include as a minimum the following items:

- Installation and startup instructions
- Instructions for expansion of the RTU module
- Theory of operation
- Maintenance and troubleshooting guidelines
- Functional block diagrams
- Layout drawings and interconnect drawings
- Schematics of each RTU module
- Replacement parts list.

Warranty. The equipment shelter shall carry a manufacturer's warranty of one year from the date of final IDOT acceptance. Said warranty shall be transferable from the Contractor to the IDOT upon the anniversary of the Contractor's one-year warranty period.

Training. The training for this section shall be in accordance with Specification – General Provisions.

Integration Testing

Integration testing of the complete SCADA system for the project shall follow completion of all work regarding the SCADA system under the Contract, including system testing at all stations and at the Control Center. Integration testing shall consist of exercising the overall SCADA system from the Control Center and locally to verify all is operational, and shall be done in accordance with the equipment Manufacturer's recommended System Testing.

Local Field Acceptance Tests

Perform local field acceptance test in accordance with the approved test procedures and furnish a report of each test.

Test SCADA system's rack equipment under power following approval of the Contractor's installation inspection by the Engineer. Installation testing shall demonstrate the full functional capability of the equipment.

Inspection and Verification. The inspection shall be performed by the Contractor and witnessed by the engineer or a designated representative. The Contractor shall notify the engineer at least 10 calendar days prior to completion of the installation. Following shelter equipment installation, the Contractor, in conjunction with the engineer or designated personnel, shall verify that all equipment is correctly installed and functional.

For ground system inspections, the Contractor shall notify the engineer at least 2 calendar days prior to completion of the installation. Below-grade ground installations and ground connections shall not be backfilled until inspected and approved by the engineer. All test results shall be recorded in a standardized format to be determined by the Contractor and approved by the engineer prior to testing. All recorded test report data shall be dated, witnessed, and signed by at least one representative of IDOT and the Contractor. The Contractor, at no cost to IDOT shall remedy all deficiencies.

Mechanical Inspection. Equipment that is to be mounted to the shelter walls shall be inspected to ensure adequate support has been provided. The HVAC system shall be tested for adequate heating, cooling, and dehumidification. The building shall be inspected for the proper sealing of conduit ports, telephone/signal cables, and ground wire penetrations. The Contractor shall be responsible for correcting any deficiencies.

Electrical Inspection. The shelter lights and smoke detectors shall be verified for proper operation. The Contractor shall verify proper power load balances and provide a report to the engineer prior to acceptance of the site. The Contractor shall be responsible for correcting any deficiencies.

Grounding Inspections. The grounding system shall be inspected for proper connection types, tightness, workmanship, as well as conformance to the approved design. Any exothermic bonds that are deemed unsatisfactory shall be repaired with new bonds. Any mechanical connections that are deemed unsatisfactory shall be repaired or replaced.

Site Inspection. The site shall be inspected and shown to be free of debris, and proof that excavations are backfilled and restored shall be provided.

Performance Testing. Following the completion of all acceptance testing and inspections, the installed site(s) shall be subjected to a minimum 20-day performance period. For the purpose of a successful performance period, failure of operation is defined as the failure of a major site component (i.e., HVAC systems, etc.). Degradation of performance is not a failure if function and proper operation is maintained. The performance verification shall be accomplished with the engineer or his designee present. Upon acceptance of the test criteria by the engineer, the 20-day performance period shall begin.

This requirement shall be accomplished during a period of time not to exceed 45 consecutive calendar days after equipment installation, testing, and inspection. If a successful performance period cannot be accomplished within 45 consecutive calendar days after the equipment testing and inspection, IDOT reserves the right to deem the Contractor in default and enforce the provisions set forth in the contract.

Construction. The Contractor shall confirm the orientation of the installation and its door side with the engineer, prior to installation. All conduit entrances into the service installation shall be sealed with a pliable waterproof material.

The Contractor shall confirm the orientation of the Cabinet Model 336 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.

The CCTV equipment cabinet shall meet the testing, documentation, warranty requirements of the Cabinet, Model 334.

Power Supply. Coordinate with ComEd in the field for location of existing power, proposed location of meter and disconnect stand, and location of step-down transformer. Coordinate with the Engineer to make sure ComEd reviews submittals for transformer pad and meter socket. No lightning protection is needed at the meter and disconnect stand due to its location near large and grounded objects, if ComEd requires a new location for the stand, then coordinate with the Engineer on the need for lightning protection. Contractor shall include in bid price the cost to furnish and install two 18" air terminals with two 8' runs of class 1 down conductors; two 10' x 3/4" copper clad steel ground rods connected with 20' bare #2 copper ring; as well as assorted mounts, welds and hardware.

Method of Measurement. The IDOT COMMUNICATIONS NODE shall be measured for payment on a lump sum basis for all work furnished, installed, configured, warranted, made fully operational, and tested according to the specifications detailed herein, within the plan set, and/or in the Contract. This includes shelter, shelter foundation, generator, generator foundation, ground ring and connection to fence ground, ground inspection well, lightning protection system, automatic transfer switch, manual transfer switch, portable generator receptacle, surge suppression device, distribution panels, uninterruptable power supply, halo ground, conduit, conductors, equipment racks, ComEd transformer pad, meter and disconnect stand, and all electronics noted above and as required for a complete solution furnished, installed, tested, labeled, documented, and accepted by Engineer. Also included are all on-site manufacturer representative inspections, testing, and training as described herein.

IDOT COMMUNICATIONS NODE does not include work associated with site grading, concrete pad inside the compound, access road, or fencing around the compound.

Basis of Payment. This work will be paid for at the lump sum price for ILLINOIS DEPARTMENT OF TRANSPORTATION COMMUNICATIONS NODE, for the size specified, which shall be reimbursement in full for the work described herein.

STEP-DOWN TRANSFORMER

Description

This item shall consist of furnishing and installing a new step-down, dry-type, encapsulated, single phase voltage transformer for the new communications shelter as shown on plans. The item shall also include installing a polymer concrete transformer pad with anchor bolts 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.

The functional requirements for the transformer are as follows:

- A. The line voltage to the transformer will be 480 V.A.C. 60 cycle, AC Source from a ComEd utility service.
- B. The transformer shall reduce the voltage to 120/240 V.A.C., 60 cycle, which is the voltage required to operate the communications shelter equipment.
- C. The transformer shall be required to have a rating of 25 KVA.

Materials

The material requirements for the transformer are as follows:

- 1. Provide a NEMA 3R compliant enclosure- approximately 22" W x 22" D x 36" H in size
- 2. Coil conductors shall be either aluminum or copper and must be continuous. The entire core and coil assembly shall be impregnated with a thermal setting varnish and cured to reduce hot spots in the coils and seal out moisture. Coils with exposed magnet wire will not be acceptable.
- 3. Provide UL listed transformer;
- 4. Conform to the requirements of ANSI/National Fire Protection Association 70 (National Electric Code), article 450.
- 5. Provide transformers capable of carrying a continuous 15 percent overload without exceeding 239 degrees Fahrenheit (F) rise in a 140 degrees F ambient.

6. Provide grounding in accordance with subsection 918.02 of the Standard Specifications for Construction. Ground the secondary of the transformer in accordance with NEC article 250, Part II such that no ground detection device is required.

7. Provide UL Class 220°C, flame retardant, insulation system, 150°C temperature rise under full load.

8. All transformer cores shall be constructed of low loss, high quality, electrical grade laminate steel. By design, the flux density is to be kept well below the saturation level to reduce audible sound level and minimize core losses. The core volume shall allow operation at 10% above rated primary voltage at no load without exceeding the temperature rise of the unit.

9. Transformers shall be provided with six 2.5% full capacity taps - two above and four below primary rated voltage.

The material requirements for the transformer pad are as follows:

1. Provide a polymer concrete pad- approximately 25" W x 25" D x 4" H (dependent on transformer size- pad must be large enough for minimum 2" additional space on all sides of transformer enclosure)

2. Provide one or more openings in the pad for bottom entry of minimum (2) 4" conduits

3. Surface of pad shall be skid/scratch proof and fire retardant

4. Provide unistruts and spring nuts per manufacturer requirements for mounting the transformer on the pad. 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). Use insulated #6 ground conductor exothermically welded to the ground rod and mechanically connected to a bus bar mounted inside the transformer enclosure.

Construction

a. The transformer shall be permanently mounted on the polymer concrete pad.

b. The line side of the transformer shall be fused at the utility service location. The load side of the transformer shall be connected to the 100 amp disconnect in the communications shelter.

c. If grade is irregular, a form shall be used to provide the proper dimension of the pad below the ground surface.

d. All conduit shall be installed rigidly in place before pad is set. Insulated bushings shall be provided at the ends of conduit.

e. After installation of cables, all conduit openings in pad shall be sealed with an approved mastic. The required number and size of galvanized steel conduits shall be installed as shown on the plans.

Method of Measurement

This work will be measured for payment as an each item for all material and labor to establish fully functioning pad-mounted transformer.

Basis of Payment

This work will be paid for at the contract each item price for STEP-DOWN TRANSFORMER which shall be for the specified herein. All necessary excavating, backfilling, disposal of surplus material and formwork and furnishing all materials, anchor bolts, mounting brackets, ground rod, grounding electrode conductor, and miscellaneous hardware shall be included in this pay item.

WELDED WIRE FABRIC 6X6

Description. This work shall consist of furnishing and placing welded wire fabric of the spacing and size shown in the plans. Welded wire fabric shall be epoxy coated where specified on the plans.

Materials. Materials shall be according to Article 1006.10 of the Standard Specifications. Epoxy coated welded wire fabric shall be according to Article 1006.10(b) and shall be epoxy coated according to AASHTO M284 and Article 1006.10(a)(2)(a), 1006.10(a)(2)(b) and 1006.10(a)(2)(c) of the Standard Specifications.

Method of Measurement. This work will be measured for payment in place and the area computed in square yards.

Basis of Payment. This work will be paid for at the contract unit price per square yard for WELDED WIRE FABRIC 6X6.

NIGHTTIME WORK ZONE LIGHTING (D-1)

Effective: November 1, 2008

Revised: June 15, 2010

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 \pm 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) Guardrail, Fence and High Tension Cable Barrier Median Repair. 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 all machines 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) 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.

- (d) Sweeping. The required lighting level shall be mounted on the sweeping train vehicles during the sweeping operations. Headlights may be operated in the work zone.
- (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.

Nighttime Work Zone Lighting will not be paid for as a separate item, but the cost shall be considered as included in the contract unit prices for the construction items involved, and no additional compensation will be allowed.

SHOULDER RUMBLE STRIP REMOVAL

Description. This work shall consist of the scarification of existing shoulder rumble strips constructed in hot-mix asphalt shoulders, and the furnishing and placement of hot-mix asphalt in the scarified area, prior to placing traffic onto the shoulder in a construction stage. This work shall take place per the limits shown on the Plans and/or as directed by the Engineer.

General Requirements. The nominal depth of scarification of the hot-mix asphalt shoulders shall be 2 inches. Unless otherwise shown in the Plans, the width of scarification shall be three (3) feet.

After removing all millings from the scarified limits, the surface shall be primed in accordance with Article 406.05(g) of the Standard Specifications.

The scarified area shall then be filled with hot-mix asphalt surface course and compacted flush with the adjoining pavement and shoulder surfaces. The mix to be used for this item shall be the IDOT Hot Mix Asphalt Surface Course, Mix D, N70, unless otherwise specified in the Contract.

Method of Measurement. This work will be measured for payment in square yards. Any portion of this work constructed outside the dimensions shown on the Plans or as directed by the Engineer will not be measured for payment.

Basis of Payment. This work will be paid at the contract unit price per square yard for SHOULDER RUMBLE STRIP REMOVAL, which payment shall constitute full compensation for scarifying the designated portion of hot-mix asphalt shoulder; cleaning the scarified area and removing all debris; applying prime, furnishing, placing and compacting hot-mix asphalt surface mix; and for all labor, equipment, tools and incidental necessary to complete the work as specified.

PERMANENT GROUND ANCHORS

Effective: October 4, 1995

Revised: January 1, 2012

This work shall consist of designing, furnishing, installing, testing and stressing permanent cement-grouted ground anchors according to the plans and the special provisions. This work also includes the furnishing and installing of the anchorage head assemblies.

This is a performance specification for a single ground anchor. The Contractor is given the responsibility for the ground anchor design, construction and performance. The anchor bond lengths shown on the plans are estimated based on the soil data and were determined according to AASHTO Specifications. The Contractor shall select the ground anchor type, the installation method and determine the bond length and anchor diameter. The Contractor shall be responsible for installing ground anchors that will develop the design capacity indicated on the Contract Plans according to the testing subsection of this Specification.

SITE GEOLOGY AND SOILS CONDITIONS

The geologic conditions for this project are represented by the boring information shown on the plans. The Contractor, utilizing his/her expertise, shall be responsible for interpreting the data, including but not limited to, the making of additional borings as necessary to be fully familiar with the existing conditions in order to design and successfully install the permanent ground anchors as specified. Variations in geologic deposits, rock surface or ground water elevations, etc., are to be expected between borings and shall not be considered a change in site conditions as defined by Article 104.03 of the Standard Specifications.

SUBMITTALS

Qualifications. The Contractor performing the work described in this Specification shall have installed permanent ground anchors for a minimum of three (3) years. At the time of the preconstruction meeting, the Contractor shall submit a list containing at least five (5) projects, completed within the last three (3) years, where the Contractor has installed permanent ground anchors. A brief description of each project and a reference shall be included for each project listed. As a minimum, the reference shall include an individual's name, company and current phone number.

The Contractor shall submit a list identifying the engineer, drill operators and on-site supervisors who shall be assigned to the project. The list shall contain a summary of each individual's experience and it shall be complete enough for the Engineer to determine whether or not each individual has satisfied the following qualifications.

The Contractor shall assign an engineer to supervise the work with at least three (3) years of experience in the design and construction of permanently anchored structures. The Contractor may not use consultants or manufacturer's representatives in order to meet the requirements of this section. Drill operators and on-site supervisors shall have a minimum of one (1)-year experience installing permanent ground anchors with the Contractor's organization.

Work shall not be started on any ground anchor wall system nor materials ordered until approval of the Contractor's qualifications are given. The Engineer may suspend the ground anchor work if the Contractor substitutes unqualified personnel for approved personnel during construction. If work is suspended due to the substitution of unqualified personnel, the Contractor shall be fully liable for additional costs resulting from the suspension of work and no adjustments to contract time resulting from suspension will be allowed.

Shop plans. At least four weeks before work is to begin, the Contractor shall submit to the Engineer for review and approval complete shop plans and design calculations describing the ground anchor system or systems intended for use. The submittal shall include the following:

- (1) A ground anchor schedule giving:
 - (a) Ground anchor number
 - (b) Ground anchor design load
 - (c) Type and size of tendon
 - (d) Minimum total anchor length
 - (e) Minimum bond length
 - (f) Minimum tendon length
 - (g) Minimum unbonded length

- (2) A drawing of the ground anchor tendon and the corrosion protection system, including details for the following:
 - (a) Spacers separating elements of tendon and their location
 - (b) Centralizers and their location
 - (c) Unbonded length corrosion protection system
 - (d) Bond length corrosion protection system
 - (e) Anchorage head assembly and trumpet
 - (f) Anchorage cover corrosion protection system
 - (g) Drilled or formed hole size
 - (h) Level of each stage of grouting
 - (i) Any revisions to structure details necessary to accommodate the ground anchor system intended for use.

- (3) The grout mix design and procedures for placing the grout.

No work on ground anchors shall begin until shop plans have been approved in writing by the Engineer. Such approval shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work.

MATERIALS

Prestressing Steel: Ground anchor tendons shall consist of single or multiple elements of one of the following prestressing steels:

- 1) Uncoated, seven-wire strands, conforming to AASHTO M203 (M203M)
- 2) Indented, seven-wire strands, conforming to ASTM A886 (A886M)
- 3) Epoxy coated, seven-wire strands, conforming to ASTM A882 (A882M)
- 4) Steel bars conforming to AASHTO M275 (M275M)

Prestressing Steel Couplers: Prestressing steel couplers shall be capable of developing 95 percent of the minimum specified ultimate tensile strength of the prestressing steel.

Grout: Cement shall be Type I, II or III portland cement conforming to Section 1001 of the Standard Specifications. Cement used for grouting shall be fresh and shall not contain any lumps or other indications of hydration or "pack set."

Aggregate shall conform to the requirements for fine aggregate Section 1003 of the Standard Specifications.

Admixtures may be used in the grout subject to the approval of the Engineer. Expansive admixtures may only be added to the grout used for filling sealed encapsulations, trumpets, anchorage head assemblies and covers. Accelerators shall not be used.

Water for mixing grout shall be according to Section 1002 of the Standard Specifications.

Steel Elements: Anchorage head assemblies, including bearing and wedge plates, shall be fabricated from steel conforming to AASHTO M270 (M270M) Grade 36 (250), or be a ductile iron casting conforming to ASTM A536.

Trumpets used to provide a transition from the anchorage head assembly to the unbonded length corrosion protection shall be fabricated from a steel pipe or tube conforming to the requirements of ASTM A53 (A53M) for pipe or ASTM A500 (A500M) for tubing. Minimum wall thickness shall be 0.20 inch (5 mm).

Anchorage covers used to enclose exposed anchorages shall be fabricated from steel, steel pipe, steel tube, or ductile cast iron conforming to the requirement of AASHTO M270 (M270M) Grade 36 (250) for steel, ASTM A53 (A53M) for pipe, ASTM A500 (A500M) for tubing, and ASTM A536 for ductile cast iron. Minimum thickness shall be 0.10 inch (2.5 mm).

Corrosion Protection Elements: Corrosion inhibiting grease shall conform to the requirements of the Post Tensioning Institute's "Specifications for Unbonded Single Strand Tendons," Section 3.2.5.

The sheath for the unbonded length of a tendon shall consist of one of the following:

- (1) Seamless polyethylene (PE) tube having a minimum wall thickness of 60 mils (1525 microns) plus or minus 10 mils (250 microns). The polyethylene shall be cell classification 334413 by ASTM D3350.
- (2) Seamless polypropylene tube having a minimum wall thickness of 60 mils (1525 microns) plus or minus 10 mils (255 microns). The polypropylene shall be cell classification PP210B55542-11 by ASTM D4101.

- (3) Heat shrinkable tube consisting of a radiation crosslinked polyolefin tube internally coated with an adhesive sealant. The minimum tube wall thickness before shrinking shall be 24 mils (610 microns). The minimum adhesive sealant thickness shall be 20 mils (510 microns).
- (4) A corrugated tube conforming to the requirement of the encapsulation for the tendon bond length.

Encapsulation for the tendon bond length shall consist of one of the following:

- (1) Corrugated high density polyethylene (HDPE) tube having a minimum wall thickness of 30 mils (760 microns) and conforming to AASHTO M252 requirements.
- (2) Deformed steel tube or pipe having a minimum wall thickness of 25 mils (635 microns).
- (3) Corrugated polyvinyl chloride (PVC) tube having a minimum wall thickness of 30 mils (760 microns). (ASTM D1784) class 13464-B
- (4) Fusion-bonded epoxy conforming to the requirements of AASHTO M284 (M284M), except that it shall have a film thickness of 15 mils (380 microns).

Miscellaneous Elements: The bondbreaker for a tendon shall consist of smooth plastic tube or pipe that is resistant to aging by ultra-violet light and that is capable of withstanding abrasion, impact and bending during handling and installation.

Spacers for separation of elements of a multi-element tendon shall permit the free flow of grout. They shall be fabricated from plastic, steel or material which is not detrimental to the prestressing steel. Wood shall not be used.

Centralizers shall be fabricated from plastic, steel or material which is not detrimental to either the prestressing steel or any element of the tendon corrosion protection. Wood shall not be used.

FABRICATION

Tendons for ground anchors may be either shop or field fabricated from materials conforming to this specifications requirements. Tendons shall be fabricated as shown on the approved shop plans.

Bond Length and Tendon Bond Length: The Contractor shall determine the bond length necessary to satisfy the load test requirements. The minimum bond length shall be 10 ft (3 m) in rock, 15 ft (4.6 m) in soil. The minimum tendon bond length shall be 10 ft (3 m).

Spacers shall be placed along the tendon bond length of multi-element tendons so that the prestressing steel will bond to the grout. They shall be located at 10 ft (3 m) maximum centers with the upper one located a maximum of 5 ft (1.5 m) from the top of the tendon bond length and the lower one located a maximum of 5 ft (1.5 m) from the bottom of the tendon bond length.

Centralizers shall be able to maintain the position of the tendon so that a minimum of 0.75 inches (19 mm) of grout cover is obtained on the tendons at all locations along the tendons. They shall be located at 5 ft (1.5 m) maximum centers with the lower one located 1 ft (305 mm) from the bottom of the bond length. Centralizers are not required on tendons installed utilizing a hollow-stem auger if it is grouted through the auger and the drill hole is maintained full of a stiff grout 9 inch (230 mm) slump or less during extraction of the auger, or when installed utilizing a pressure injection system in coarse grained soils using grout pressures greater than 150 psi (1035 kPa).

Encapsulation Protected Ground Anchor Tendon: The tendon bond length shall be encapsulated by a grout-filled corrugated plastic or deformed steel tube, or by a fusion-bonded epoxy coating. The tendon can be grouted inside the encapsulation prior to inserting the tendon in the drill hole or after the tendon has been placed in the drill hole. Punching holes in the encapsulation and allowing the grout to flow from the encapsulation to the drill hole, or vice versa, will not be permitted. The tendon shall be centralized within the encapsulation and the tube sized to provide an average of 0.20 inch (5 mm) of grout cover for the prestressing steel. The anchorage device of tendons protected with fusion-bonded epoxy shall be electrically isolated from the structure.

Unbonded Length: The unbonded length of the tendon shall be a minimum of 15 ft (4.6 m) or as indicated on the plans.

Corrosion protection shall be provided by a sheath completely filled with corrosion inhibiting grout, or a heat shrinkable tube. Continuity of corrosion protection shall be provided at the transition from the bonded length to unbonded length of the tendon.

If the sheath provided is not a smooth tube, then a separate bondbreaker must be provided to prevent the tendon from bonding to the anchor grout surrounding the unbonded length.

Anchorage and Trumpet: Nonrestressable anchorages may be used unless restressable anchorages are designated on the plans.

The trumpet shall be welded to the bearing plate. The trumpet shall have an inside diameter at least 1/4 inch (6 mm) larger than the hole in the bearing plate. The trumpet shall be long enough to accommodate movements of the structure during testing and stressing. For strand tendons with encapsulation over the unbonded length, the trumpet shall be long enough to enable the tendons to make a transition from the diameter of the tendon in the unbonded length to the diameter of the tendon at the anchorage head assembly without damaging the encapsulation. Trumpets shall be filled with grout and have a temporary seal provided between the trumpet and the unbonded length corrosion protection.

Tendon Storage and Handling: Tendons shall be stored and handled in such a manner as to avoid damage or corrosion. Damage to tendon prestressing steel as a result of abrasions, cuts, nicks, welds and weld splatter will be cause for rejection by the Engineer. Grounding of welding leads to the prestressing steel is not permitted. Prior to inserting a tendon into the drilled hole, its corrosion protection elements shall be examined for damage. Any damage found shall be repaired in a manner approved by the Engineer.

INSTALLATION

The first two (2) anchors of each level should be installed and performance tested successfully before drilling any other anchors at that level. In the event that one or both anchors fail the performance test, the Contractor shall re-evaluate the installation procedure and take necessary corrective action. In addition, the first two (2) anchors installed after the Contractor takes necessary corrective action shall be performance tested. The above process shall be repeated until these anchors pass the performance test.

The Contractor shall follow the same installation procedures that are used on the two (2) successful performance test anchors.

Drilling: The drilling method used may be core drilling, rotary drilling, percussion drilling, auger drilling or driven casing. The method of drilling used shall be that which prevents loss of ground above the drilled hole that may be detrimental to the structure or existing structures. Casing for anchor holes, if used, shall be removed, unless permitted by the Engineer to be left in place. Excessive amounts of water shall not be used in the drilling operation. Inclination and alignment shall be within plus or minus 3 degrees of the planned angle at the anchorage head assembly. Drilling in shale shall require the hole to be completed, tendon inserted, and grouted within the same working day.

Tendon Insertion: The tendon shall be inserted into the drilled hole to the desired depth without difficulty. When the tendon cannot be completely inserted it shall be removed and the drill hole cleaned or redrilled to permit insertion. Partially inserted tendons shall not be driven or forced into the hole.

Grouting: The grouting equipment shall produce a grout free of lumps and undispersed cement. A positive displacement grout pump shall be used. The pump shall be equipped with a pressure gauge to monitor grout pressures. The pressure gauge shall be capable of measuring pressures of at least 150 psi (1035 kPa) or twice the actual grout pressures used, whichever is greater. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The mixer shall be capable of continuously agitating the grout.

The grout shall be injected from the lowest point of the drilled hole. The grout may be pumped through grout tubes, casing, hollow-stem augers or drill rods. The grout may be placed before or after insertion of the tendon. The quantity of the grout and the grout pressures shall be recorded. The grout pressures and grout takes shall be controlled to prevent excessive heave of the ground or fracturing of rock formations.

Except where indicated below, the grout above the top of the bond length may be placed at the same time as the bond length grout, but it shall not be placed under pressure. The grout at the top of the drill hole shall stop 6 inches (150 mm) from the back of the trumpet.

If the ground anchor is installed in a fine-grained soil using a drilled hole larger than 6 inches (150 mm) in diameter, then the grout above the top of the bond length shall be placed after the ground anchor has been load tested. The entire drill hole may be grouted at the same time if it can be demonstrated that the ground anchor system does not derive a significant portion of its load resistance from the soil above the bond length portion of the ground anchor.

If grout protected tendons are used for ground anchors anchored in rock, then pressure grouting techniques shall be utilized. Pressure grouting requires that the drill hole be sealed and that the grout be injected until a 50 psi (345 kPa) grout pressure can be maintained on the grout within the bond length for a period of 5 minutes.

Upon completion of grouting, the grout tube may remain in the drill hole provided it is filled with grout.

After grouting, the tendon shall not be loaded for a minimum of three days.

Trumpet and Anchorage: The corrosion protection surrounding the unbonded length of the tendon shall extend into the trumpet a minimum of 6 inches (150 mm) beyond the bottom seal in the trumpet.

The corrosion protection surrounding the unbonded length of the tendon shall not contact the bearing plate or the anchorage head assembly during load testing or stressing.

The trumpet shall be completely filled with corrosion inhibiting grout. The grout shall be placed after the ground anchor has been load tested and locked off at the design load. The Contractor shall demonstrate that the procedures selected for placement of grout will produce a completely filled trumpet and anchorage head assembly.

Anchorage not encased in concrete wall fascia shall be covered with a corrosion inhibiting grout-filled steel enclosure.

TESTING AND STRESSING

Each ground anchor shall be load tested by the Contractor in the presence of the Engineer. No load greater than 10 percent of the design load may be applied to the ground anchor prior to load testing. The test load shall be simultaneously applied to the entire tendon.

Testing Equipment: Two dial gauges or vernier scales capable of measuring displacements to 0.001 inch (25 microns) shall be used to measure ground anchor movement on either side of the jack from two independent points. They shall have adequate travel so total ground anchor movement can be measured without resetting the devices.

A hydraulic jack and pump shall be used to apply the test load. The jack and a calibrated pressure gauge shall be used to measure the applied load. The pressure gauge shall be graduated in 100 psi (690 kPa) increments or less. When the theoretical elastic elongation of the total anchor length at the maximum test load exceeds the ram travel of the jack, the procedure for recycling the jack ram shall be included in the working drawings. Each increment of test load shall be applied in one minute or less.

A calibrated reference pressure gauge shall be available at the site. The reference gauge shall be calibrated with the test jack and pressure gauge.

An electrical resistance load cell and readout shall be provided when performing a creep test.

The stressing equipment shall be placed over the ground anchor tendon in such a manner that the jack, bearing plates, load cell and stressing anchorage are axially aligned with the tendon and the tendon is centered within the equipment.

Performance Test: Five percent of the ground anchors or a minimum of three ground anchors, whichever is greater shall be performance tested according to the following procedures. The Engineer shall select the ground anchors to be performance tested. The remaining anchors shall be tested according to the proof test procedures.

The performance test shall be made by incrementally loading and unloading the ground anchor according to the following schedule unless a different maximum test load and schedule are indicated on the plans. The load shall be raised from one increment to another immediately after recording the ground anchor movement. The ground anchor movement, on either side of the jack, shall be measured and recorded to the nearest 0.001 inch (25 micron) with respect to the independent fixed reference points at the alignment load and at each load increment. The load shall be monitored with a pressure gauge. The reference pressure gauge shall be placed in series with the pressure gauge during each performance test. If the load determined by the reference pressure gauge and the load determined by the pressure gauge differ by more than 10 percent, the jack, pressure gauge and reference pressure gauge shall be recalibrated. At load increments other than the maximum test load, the load shall be held just long enough to obtain the movement reading.

Performance Test Schedule

<u>Load</u>	<u>Load (Continued)</u>
AL	AL
0.25DL*	0.25DL
AL	0.50DL
0.25DL	0.75DL
0.50DL*	1.00DL
AL	1.20DL*
0.25DL	AL
0.50DL	0.25DL
0.75DL*	0.50DL
AL	0.75DL
0.25DL	1.00DL
0.50DL	1.20DL
0.75DL	1.33DL*
1.00DL*	(Max. test load)
	Reduce to lock-off load (1.00DL)

Where: AL = Alignment Load
 DL = Design load for ground anchor
 * = Graph required

The maximum test load in a performance test shall be held for 10 minutes. The jack shall be repumped as necessary in order to maintain a constant load. The load hold period shall start as soon as the maximum test load is applied and the ground anchor movement shall be measured and recorded at 1, 2, 3, 4, 5, 6 and 10 minutes. If the ground anchor movements between 1 minute and 10 minutes exceed 0.04 inch (1 mm), the maximum test load shall be held for an additional 50 minutes. If the load hold is extended, the ground anchor movement shall be recorded at 15, 20, 25, 30, 45 and 60 minutes.

A graph shall be constructed showing a plot of ground anchor movement versus load for each load increment marked with an asterisk (*) in the performance test schedule and a plot of the residual ground anchor movement of the tendon at each alignment load versus the highest previously applied load. Graph format shall be approved by the Engineer prior to use.

Proof Test: The proof test shall be performed by incrementally loading the ground anchor according to the following schedule. The load shall be raised from one increment to another immediately after recording the ground anchor movement. The ground anchor movement, on either side of the jack, shall be measured and recorded to the nearest 0.001 inch (25 micron) with respect to the independent fixed reference points at the alignment load and at each increment of load. The load shall be monitored with a pressure gauge. At load increments other than the maximum test load, the load shall be held just long enough to obtain the movement reading.

Proof Test Schedule

<u>Load</u>	<u>Load (Continued)</u>
AL	1.00DL
0.25DL	1.20DL
0.50DL	1.33DL
0.75DL	(Max. test load)
	Reduce to lock-off load (1.00DL)

Where: AL = Alignment Load
 DL = Design load for ground anchor

The maximum test load in a proof test shall be held for 10 minutes. The jack shall be repumped as necessary in order to maintain a constant load. The load hold period shall start as soon as the maximum test load is applied and the ground anchor movement shall be measured and recorded at 1, 2, 3, 4, 5, 6 and 10 minutes. If the ground anchor movement between 1 minute and 10 minutes exceeds 0.04 inch (1 mm), the maximum test load shall be held for an additional 50 minutes. If the load hold is extended, the ground anchor movement shall be recorded at 15, 20, 25, 30, 45 and 60 minutes. A graph shall be constructed showing a plot of ground anchor movement versus load for each load increment in the proof test.

Creep Test: Creep tests shall be performed only if required by the plans. The Engineer shall select the ground anchor(s) to be creep tested.

The creep test shall be made by incrementally loading and unloading the ground anchor according to the performance test schedule used. At the end of each loading cycle, the load shall be held constant for the observation period indicated in the creep test schedule below unless a different maximum test load is indicated on the plans. The times for reading and recording the ground anchor movement during each observation period shall be 1, 2, 3, 4, 5, 6, 10, 15, 20, 25, 30, 45, 60, 75, 90, 100, 120, 150, 180, 210, 240, 270 and 300 minutes as appropriate. Each load hold period shall start as soon as the test load is applied. In a creep test the pressure gauge and reference pressure gauge will be used to measure the applied load, and the load cell will be used to monitor small changes of load during a constant load hold period. The jack shall be repumped as necessary in order to maintain a constant load.

Creep Test Schedule

<u>Load</u>	<u>Observation Period (Minutes)</u>
AL	
0.25DL	10
0.50DL	30
0.75DL	30
1.00DL	45
1.20DL	60
1.33DL	300

A graph shall be constructed showing a plot of the ground anchor movement and the residual movement measured in a creep test as described for the performance test. Also, a graph shall be constructed showing a plot of the ground creep movement for each load hold as a function of the logarithm of time.

Ground Anchor Load Test Acceptance Criteria: A performance-tested or proof-tested ground anchor with a 10 minute load hold is acceptable if the:

- (1) Ground anchor resists the maximum test load with less than 0.04 inch (1 mm) of movement between 1 minute and 10 minutes; and
- (2) Total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length.

A performance-tested or proof-tested ground anchor with a 60 minute load hold or a creep tested ground anchor is acceptable if the:

- (1) Ground anchor resists the maximum test load with a creep rate that does not exceed 0.08 inch (2 mm) in the last log cycle of time; and
- (2) Total movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length.

If the total movement of the ground anchor at the maximum test load does not exceed 80 percent of the theoretical elastic elongation of the unbonded length, the ground anchor shall be replaced at the Contractor's expense.

A ground anchor which has a creep rate greater than 0.08 inch (2 mm) per log cycle of time can be incorporated into the structure at a design load equal to one-half of its failure load. The failure load is the load resisted by the ground anchor after the load has been allowed to stabilize for 10 minutes.

When a ground anchor fails, the Contractor shall modify the design and/or the installation procedures. These modifications may include, but are not limited to, installing a replacement ground anchor, reducing the design load by increasing the number of ground anchors, modifying the installation methods, increasing the bond length or changing the ground anchor type. Any modification which requires changes to the structure shall be approved by the Engineer. Any modifications of design or construction procedures shall be without additional cost to the Department and without extension of contract time.

Retesting of a ground anchor will not be permitted, except that regouted ground anchors may be retested each time they are regouted.

Lock Off: Upon successful completion of the load testing, the ground anchor load shall be reduced to the design load indicated on the plans and transferred to the anchorage device. The ground anchor may be completely unloaded prior to lock-off. After transferring the load and prior to removing the jack, a lift-off load reading shall be made. The lift-off load shall be within 10 percent of the specified lock-off load. If the load is not within 10 percent of the specified lock-off load, the anchorage shall be reset and another lift-off load reading shall be made. This process shall be repeated until the desired lock-off load is obtained.

METHOD OF MEASUREMENT

This work will be measured per each permanent ground anchor, installed according to the plans or as approved by the Engineer, and passing the testing program(s) required in this Special Provision.

BASIS OF PAYMENT

This work will be paid for at the contract unit price each for PERMANENT GROUND ANCHORS and shall be compensation in full for designing, furnishing, installing and testing the permanent ground anchors and anchorage head assemblies.

NOISE ABATEMENT WALL ANCHOR ROD ASSEMBLY

Description. This work shall consist of furnishing and installing Anchor Rod Assembly for future Noise Abatement Wall installation. It includes installation of threaded anchor rods, nuts and washers, anchor plate and an installation template plate as detailed in plans.

Material. Materials shall be according to the following articles of Section 601 - Materials:

<u>Item</u>	<u>Article/Section</u>
Structural Steel	1006.04
Anchor Bolts and Rods	1006.09
High Strength Steel Nuts and Washers	1006.08(a)

Construction. All structural steel related work shall be according to section 505 of the Standard Specifications.

All anchor rods shall be of the type and dimensions as shown on the plans. Fully threaded anchor rods shall be according to ASTM F 1554 Grade 105. Washers and nuts shall match with the hardness of the anchor rod.

Anchor rods, conforming to ASTM F 1554 shall satisfy the applicable specification for the grade specified and the supplemental Charpy V-Notch (CVN) toughness requirements herein specified. Grade 105 anchor rods shall satisfy Supplemental Requirement S5 and Table S1.2 of ASTM F 1554.

Welding of anchor rods is not permitted.

Anchor rods, nuts and washers shall be hot dipped galvanized according to the requirements of AASHTO M111.

Anchor Rod Assemblies shall be installed according to the Section 521.06 of the Standard Specification.

Method of Measurement. This work will be measured for payment as each. Each will be defined as complete anchor rod assembly which shall include furnishing and installing of anchor rods, washers, nuts, steel plates, installation template and galvanizing.

Basis of Payment. Anchor rod assembly furnished and installed will be paid for at the contract unit price each for NOISE ABATEMENT WALL ANCHOR ROD ASSEMBLY.

MAINTENANCE OF EXISTING TRAFFIC SURVEILLANCE

Effective: June 1, 1994

Revised: May 29, 2015

This item shall consist of maintaining the existing Traffic Surveillance locations in place as shown on the plans and as described herein. The energy charges for the operation of the Traffic Surveillance Installation shall be paid for by others.

The maintenance of existing Traffic Surveillance Installation shall meet the requirements of Section Art. 801.11 of the Standard Specifications, except as follows:

Full maintenance responsibility shall start as soon as the General Contractor or Subs begins any physical work on the Contract or any portion thereof. The General Contractor shall maintain the existing surveillance Installations located within the Contract limits, in compliance with the current State Electrical Maintenance Contract by a qualified electrical Sub-Contractor.

At least five days prior to maintenance assumption of the existing Traffic Surveillance Installation(s) under this Contract, the Contractor shall request that the Resident Engineer contact TSC for an inspection of the Installation(s). The TSC Engineer shall establish a date and time of inspection and at that time shall check the Installation to determine if any corrective work should be done by the State's Electrical Maintenance Contractor prior to the Contractor taking over maintenance of the Installation. The Resident Engineer, TSC Engineer, and the Contractor shall mutually agree on the date of maintenance transfer to the Contractor for this section.

Maintenance Procedures: The Electrical Sub-Contractor shall perform the following maintenance procedures for each existing Installation designated to remain in operation during Construction.

The electrical Sub-Contractor shall:

1. Patrol and inspect each surveillance Installation every two (2) weeks for general operation of the tone equipment and loop amplifiers to insure that they are functioning properly, check cabinet and or signal foundation tighten where necessary, check for proper alignment of signal heads (if applicable), lamp failures (if applicable), and shall be logged on the Surveillance Inspection and Repair Check List..
2. Provide immediate corrective action to replace burned out lamps or damaged sockets. When lamps are replaced, the reflector and lens shall be cleaned. All replacement lamps shall meet the approval of the Resident Engineer. The electrical Sub-Contractor shall repair or replace all defective equipment from any cause whatsoever.
3. Maintain in stock at all times a sufficient amount of materials and equipment to provide effective temporary and permanent repairs.
4. Provide immediate corrective action when any part or parts of the system fail to function properly. Two heads facing each approach shall be considered the minimum acceptable signal operation.
5. Replace defective or damaged equipment.
6. A Record tag shall be attached to each individual piece of equipment, with the following information: (1) date originally installed by the Engineer. The interval between successive dates of cleaning shall not exceed one year. Any component which fails in a manner which affects the intended operation of any Installation shall be repaired before it is returned to service. The Electrical Sub-Contractor shall be required to maintain the existing type of equipment during the period of time that the original equipment is being repaired.
7. Provide the Resident Engineer with the names, addresses, and telephone numbers of two (2) persons qualified and assigned to the maintenance of the Traffic Surveillance Installation. These people must be made available 24 hours per day, each and every day of the year for emergency calls by the Engineer.
8. Respond to all emergency calls from the Department within one hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the General Contractor at no additional charge to the State. The General Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the Traffic Surveillance Installation in proper operating condition or if the Resident Engineer cannot contact the Contractor's designated personnel, the Resident Engineer shall have the State's Electrical Maintenance Contractor perform the maintenance work required. The State's Electrical Maintenance Contractor shall bill the General Contractor for the total cost of the work. The General Contractor shall pay this bill within thirty (30) days of the date of receipt of the invoice or the cost of such work shall be deducted from the amount due the Contractor.

9. All dispatch tickets reporting malfunctions shall be responded to and cleared within one (1) hour, and immediate corrective action shall be taken to correct the problem. He shall report back via telephone his findings and clear any dispatch tickets. If follow-up work is necessary, it shall commence within 10 days of notice, and permanent repairs shall be completed within 45 days!

10. The Contractor shall maintain all devices and appurtenances at the surveillance locations including but not limited to tone equipment, loop detectors, CB radios, inductance loops, flashing beacons, interconnecting cables, and wooden posts.

11. Upon completion of all Contract work, it shall be required prior to inspection that the cabinet be vacuumed and dusted and all handholes be pumped.

Basis of Payment

This item shall be paid for at the Lump Sum Contract unit price for MAINTENANCE OF EXISTING TRAFFIC SURVEILLANCE, which price shall be payment in full for all materials, equipment, and labor needed to perform the work described herein.

FIBER OPTIC INTERCONNECT CABINET

Effective: April 1, 2016

Description. This item shall consist of furnishing and installing an outside plant fiber optic interconnect cabinet. The cabinet shall have sufficient space and mounting appurtenances to store a total of six 96-fiber cable splices. The splice enclosures used for determining the size shall be full size closures, i.e., not a "mini" variant. The cabinet shall be similar to a Multilink 4 Bay OTN cabinet. The minimum dimensions of the cabinet shall be 78"W x 36"D x 62"H, minimum, however the cabinet may need to be larger to accommodate the number of splice enclosures specified.

Enclosure.

Main Body: 1/8" Aluminum 5052-H32.
Hardware: Type 304 Stainless Steel.
Finish: Polyester Powder Coated.
Racks: 3/16" Aluminum, E.I.A. / T.I.A. spacing (10-32 threads).
Doors: Minimum of 4 with 3 point latches, padlock able.

2- 19"-23" Adjustable width racks, also adjustable front to rear position (43" tall)
2 - 19"23" Adjustable width racks, swing out for ease of rear equipment access (40" tall)
Minimum of 166" of total inches of rack space (95 RU)

The lock 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.

Patch Panels.

Patch panels and splice trays shall be provided for each fiber optic cable in the interconnect cabinet. The quantity of patch panels and associated splice trays shall be sufficient for all cables in the cabinet.

Fiber Optic Patch Panels and splice trays shall be manufactured by Siecor or Corning. The bulk heads shall be single mode SC compatible, ceramic ferrule.

Splice trays shall mount in a 19" rack and be housed in their own housing separate from the bulk heads.

Patch Panels shall come with cable strain relief hardware and pull out labels 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 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 enough patch cable to complete the connections as indicated in the contract. The contractor shall also supply 12 additional patch cables with SC connectors to be stored within the cabinet.

A data pocket of high impact thermoplastic material shall be provided. The nominal dimensions of this pocket shall be 12 inches by 12 inches.

Collar studs shall be provided for mounting the stainless steel backboard panel.

Installation. The cabinet shall be installed on a concrete foundation as a part of this item. The Contractor shall confirm the orientation of the cabinet, with the Engineer, prior to installing the foundation. A reinforced portland cement concrete foundation shall be constructed in accordance with the cabinet manufacturer's instructions and shall be a minimum of 36" deep. The top of the foundation shall extend a minimum of 12-inches above grade.

Two 4-inch diameter galvanized steel conduit stub outs with large radius sweeps shall be provide on each side of the cabinet foundation for a total of eight.

The cabinet shall be set plumb and level on the foundation. It shall be fastened to the anchor rods with hot-dipped galvanized or stainless steel nuts and washers. The cabinet shall be caulked at the base with silicone.

All conduit entries shall be sealed with a rodent and dust/moisture barrier.

Work Pad. A poured, 5 inch thick concrete pad, extending not less than 48 in. from the foundation edge shall be provided around the cabinet.

Method Of Measurement. Fiber optic interconnect cabinet shall be counted, each installed.

Basis Of Payment. This item shall be paid at the contract unit each for **FIBER OPTIC INTERCONNECT CABINET** as specified.

ELECTRIC CABLE NO. 19 - 6 PAIR

TSC T421#2

Effective: June 1, 1994

Revised: December 18, 2015

DESCRIPTION

This item shall consist of furnishing and installing telephone cable intended for direct burial in P-duct or G.S. conduit. The number of conductors shall be twisted into pairs stranded into a cable core and enclosed in two polyethylene jackets, with a copper shield between the inner and outer jackets. All No. 19 electric cable shall conform with these specifications and the current addition of the Rural Electrification Specification for fully color-coded, polyethylene or crystalline propylene/ethylene copolymer-insulated, double polyethylene copolymer-insulated, double polyethylene-jacketed telephone cables for direct burial PE 39. The No. 19 cables shall be installed in complete spans.

MATERIAL AND TESTING

No. 19 electric cable shall meet the requirement set forth in the REA Specification **PE 39**.

CONSTRUCTION

CONDUCTORS: Each conductor shall be a solid round wire of commercially pure annealed copper. Conductors shall meet the requirements of ASTM Designation B-3, latest issue, except that the requirements for dimensions and permissible variations are waived.

CONDUCTOR INSULATION: Each conductor shall be insulated with colored insulating grade high density polyethylene or crystalline propylene/ethylene copolymer. The manufacturer shall have the option of using either of the above materials.

IDENTIFICATION OF PAIRS: The polyethylene or propylene copolymer compounds used for conductor insulation shall be colored so as to identify (1) the "tip" and "ring" conductor of each pair, and (2) each pair in the completed cable.

STANDARDS OF COLOR: The colors of insulated conductors supplied in accordance with this specification shall fall within the limits of standards of color as defined by the Munsell Color Notations specified in paragraph 4.031.

TWISTING OF PAIRS: The insulated conductors shall be twisted into pairs.

In order to provide sufficiently high crosstalk losses at voice and carrier frequencies, the pair twists shall be designed to enable the cable to meet the pair-to-pair capacitance unbalance requirements and the crosstalk requirements.

CORE COVERING: The core shall consist of an inner jacket of polyethylene applied over the completed core, a metal shield, and an outer jacket of polyethylene.

SHIELD: **A gopher-resistant corrugated shield of FULLY ANNEALED COPPER shall be applied longitudinally over the inner jacket.** The shield shall completely cover the inner jacket and shall be so constructed that the completed cable shall meet the bending requirements given in paragraph 9 of Rural Electrification Specification **PE-39**. The shield shall provide 100% electrical shielding plus **resistance to gopher attack** or other severe service conditions.

MUTUAL CAPACITANCE: The average mutual capacitance of all pairs in any reel shall be in accordance with the following table:

<u>Number of Cable Pairs</u>	<u>Average Mutual Capacitance mf/mile (mf/km)</u>
3	0.083 plus or minus 0.010 (0.052 plus or minus 0.006)
6, 12	0.083 plus or minus 0.007 (0.052 plus or minus 0.004)
18 or more	0.083 plus or minus 0.004 (0.052 plus or minus 0.002)

Mutual capacitance is the effective capacitance between the two wires of a pair.

CAPACITANCE UNBALANCE: (Pair to Pair): Pair-to-pair capacitance unbalances as measured on the completed cable at a frequency of 1000 plus or minus 100 Hz shall not exceed the following values:

<u>Number of Cable Pairs</u>	<u>Pair-to-Pair Capacitance Unbalance (Max) mmf/kft (mmf/km) Max. Individual</u>
Less than 12	100 (181.1)

CAPACITANCE UNBALANCE - (Crosstalk Loss): The r.m.s. output-to-output far-end crosstalk loss as measured on the completed cable at a frequency of 150 kHz shall be not less than 73 db per 1,000 feet (67.8 db per kilometer) for cable sizes of 6 pairs and larger. The r.m.s. calculation shall be based on the combined total of all adjacent and alternate pair combinations within the same layer and center to first layer pair combinations.

CAPACITANCE UNBALANCE - (Pair to Shield): Pair-to-shield direct capacitance unbalances as measured on the completed cable at a frequency of 1000 plus or minus 100 Hz shall not exceed the following values:

<u>Cable Pairs</u>	Pair-to-Shield Unbalance (Max) $\frac{\text{mmf/kf}}{\text{Max. Individual}}$ (mmf/km)
Less than 12	250 (820)

CONDUCTOR RESISTANCE: The d.c. resistance of any conductor as measured on the completed cable shall not exceed the following values when measured at or corrected to 20° C.

<u>AWG</u>	Maximum Resistance $\frac{\text{ohms/kf}}{\text{ohms/km}}$
19	8.7 (28.5)

BASIS OF PAYMENT

This work will be paid for at the contract price per lineal foot (meter) for ELECTRIC CABLE IN CONDUIT, COMMUNICATIONS, NO. 19 of the number of pairs specified, for furnishing all materials, making all electrical connection and installing the cable in place.

CITY OF CHICAGO DEPARTMENT OF WATER MANAGEMENT ENGINEERING SERVICES

Description: This item shall consist of payment for work performed by the City of Chicago Department of Water Management (CDWM) related to engineering, valve operation and water quality services in support of this contract. These services include operations related to the shutting down and startup of the existing water mains, testing and inspection during the installation of the proposed water main relocations, water quality testing, field supervision, technical assistance, reviews and other required services.

General: It shall be the Contractor's responsibility to arrange and coordinate all required services by CDWM. All necessary field work, including valve operations, shall be scheduled with CDWM in advance of the time period required. All work to be performed by CDWM is subject to CDWM work schedules and availability. Acceptance of complete water main by CDWM is based upon CDWM review of installation, presence during testing and disinfection operations and other roles as desired by CDWM and required in these special provisions.

Construction Requirements. The Contractor shall make the following submittals and notifications for the water facility work included in this contract:

- Submit five (5) copies of the shop drawings for all water main materials to be used to complete this water main installation. Shop drawings shall be sent to the Department of Water Management, Bureau of Engineering Services, Jardine Water Purification Plant, 1000 E. Ohio Street, Office 307, Chicago, Illinois 60611, attention to Bill Doyle.
- Notify Bill Doyle, at (312) 217-1636 and bill.doyle@ctrwater.net, two (2) weeks prior to the start of the water main work, so a resident engineer can be assigned to the project.
- Obtain a "B-Permit" prior to construction from the City of Chicago, Department of Buildings, Plumbing Permit and Plan Section, City Hall, 121 North LaSalle Street, Room 906, Chicago, Illinois, 60602.
- Contact John Flynn of the Department of Buildings, Plumbing Permit and Plan Section at (312) 744-7063 regarding the proposed water service installations.
- Submit as-built drawings within two (2) weeks of completion of the work. The as-built drawings should be submitted to the Department of Water Management, Bureau of Engineering Services, Jardine Water Purification Plant, 1000 E. Ohio Street, Room 306, Chicago, Illinois 60611, attention to Rolando Villalon.

Failure to comply with these requirements may result in additional expenses to the project to verify that all work conforms to the CDWM's standards.

Method of Payment: The Contractor will make payments to CDWM based upon the following schedule agreed to with CDWM:

The estimated cost for the DWM to provide services, valve operations, and water quality testing is \$203,300.00. 80% of the initial estimate of costs (\$162,640.00) required by CDWM as a deposit for this project. A certified check in the amount of \$162,640.00, payable to the City of Chicago, must be hand delivered to the Department of Buildings, Plumbing Permit and Plan Section, Room 906, 121 North LaSalle Street, Chicago, Illinois 60602, with a copy of the official letter from CDWM.

This payment shall be made to CDWM within ten (10) days of contract award using certified check. The receipt is to be provided to the Engineer for records.

The initial estimated cost of services is an assumption subject to the receipt of the actual final costs submitted from CDWM upon completion of their work. The initial assumption identified above is for bidding purposes only.

CDWM will invoice the final amount based upon labor, material, equipment, overhead charges and other costs actually incurred. CDWM will not be responsible for restoration.

The Contractor will be reimbursed based upon the requirements identified in Section 109.05, including administrative costs. The Contractor shall secure invoices from CDWM for work performed by CDWM. These invoices shall be submitted as documentation to the Department prior to or with any Contractor payment request for the remaining balance at the completion of work related to CDWM facilities.

For bidding purposes, this item shall be estimated as \$206,700.00, which includes the estimated cost from CDWM with additional administrative costs per Section 109.05.

Basis of Payment: This work will be paid for at the contract lump sum price for CITY OF CHICAGO DEPARTMENT OF WATER MANAGEMENT ENGINEERING SERVICES which shall be reimbursement in full, and with administrative costs as described in Section 109.05, for services provided by CDWM.

ABANDON EXISTING WATER MAIN, FILL WITH CLSM

Description. Work under this item be performed in accordance with section 561 of the Standard Specifications and Chicago Department Of Water Management Standard Specifications, and includes, but is not limited to, furnishing all labor, equipment, and material necessary to complete the work as specified, shown on the Plans, or as directed by the Engineer, and includes the following.

This work shall consist of plugging and filling existing water mains as shown on the plans and as directed by the Engineer.

This work shall be completed in accordance with applicable portions of Sections 593 of the Standard Specifications

Material. Material for filling abandoned water mains shall be Controlled Low-Strength Material (CLSM) in conformance with the applicable portions of Section 593 of the Standard Specifications.

Method of Measurement. Work under this item will be measured per linear foot of existing water main cut and capped, each fitting plugged, and per each fitting removed, and the existing pipe to be filled with CLSM according to the plans, as determined by the Engineer.

Basis of Payment. This work will be measured and paid for at the contract unit price per linear foot for WATER MAIN TO BE ABANDONED (FILL WITH CLSM), which prices shall include all labor, equipment and materials necessary to complete the work as shown on the plans.

DUCTILE IRON WATER MAIN

Description:

This work will consist of the installation of water main at the size specified, including all bends, fittings and all other appurtenances including proposed sleeves, connections, and pitometers with test taps. Reinstallation of existing sleeves to be used is included within this item.

Water main shall be installed according to Article 561 of the "Standard Specifications" and in conformance with City of Chicago Department of Water Management Standards and Technical Specifications.

The Contractor is advised that the work will be performed on a potable water system owned and operated by the Chicago Department of Water Management (CDWM). As such, all operations shall be performed in such a way as to avoid contamination of the water system through the introduction of contaminants or the process of the work. All work will require the review and approval of the CDWM prior to the commencement of work operations.

The water main shutdown required to perform the Work will only be allowed based upon scheduling by CDWM. The Work must be substantially complete in order to place the water main back into service prior to the start-up date established in coordination with the CDWM. The construction schedule must clearly indicate when testing of the new water main items will be made and for the water main to be inspected by CDWM.

The Contractor shall be aware that there are active services on the water mains and shutdown durations will be limited. Prior to beginning work, the contractor must coordinate with CDWM on the allowable shutdown durations.

Construction Requirements:

The furnishing and installation of ductile iron water main, fittings, and other appurtenances for the installation of the water main shall conform to the Contract and the applicable sections of the Chicago Department of Water Management's Technical Specifications for Water Main Construction shown below and included as part of this special provision.

Ductile Iron Pipe and Fittings	Section 33 11 13
Water Main Control Valves	Section 33 12 16
Fire Hydrants	Section 33 12 19
Hydrostatic Testing and Disinfecting Water Mains	Section 33 13 00

All temporary and proposed work required to connect to and transition from existing water main, including temporary caps, plugs, and all work to install temporary fire hydrants are included under this item.

Testing and disinfecting as required by the City of Chicago Department of Water Management is included under this item.

Any temporary support or bracing of existing utilities must be coordinated with the affected utilities.

Any water main dewatering required during the installation of water main pipe shall be considered included as part of the successful installation of the water main.

Method of Measurement:

This work shall be measured for payment according to Art. 561.04 of the "Standard Specifications".

Update section 561.04 METHOD OF MEASUREMENT as follows:

This work will be measured for payment in place in feet (meters). The length measured will include stops, steel supports, fittings, sleeves, tees, and reducers.

Excavation in rock will be measured for payment according to Article 502.12.

Trench backfill shall be constructed in accordance with Article 208.01 and 208.02.

Basis of Payment:

This work will be paid for at the contract unit price per foot for DUCTILE IRON WATER MAIN of the size specified, and includes all required transitions between existing and proposed water main, including the reuse of existing sleeves. TRENCH BACKFILL will be paid for separately.

Excavation in rock will be paid for according to Article 502.13.

Trench backfill will be paid for according to Article 208.04.

Removal and replacement of unsuitable material below plan bedding grade will be paid for according to Article 109.04.

WATER VALVES

Description:

This work shall consist of furnishing and installing new valves, at locations specified on the contract plans. Work under this item shall be performed in accordance with the Chicago Department Of Water Management Standard Specifications listed herein, and include, but not be limited to, furnishing all labor, equipment, and material necessary to complete the work as specified, shown on the Plans, or as directed by the Commissioner:

Work of the following Specification Sections are referenced under this Item.

- Section 31 23 10 – Excavation, Trenching and Backfilling.
- Section 31 23 19 – Dewatering Excavation.
- Section 33 11 13 – Ductile Iron Pipe Fittings.
- Section 33 11 15 – Thrust Restraint for Water Main Piping.
- Section 33 12 16 – Water Main Control Valves.
- Section 32 12 17 – Water Main Tapping Connections and Valves
- Section 33 12 20 – Water Main Valve Basins, Frames and Covers.
- Section 33 13 00 – Disinfection and Testing of Water Mains.

Measurement for Payment:

Measurement for payment to furnish and install valves (size) will be on a per EACH basis. Payment will be based upon actual quantity, of each valve furnished and installed, in accordance with the requirements of the Contract Documents. Payment will constitute full compensation for all Work necessary to install the valves, including, but not limited to, the purchase, delivery to the work site, on-site storage, delivery to the work areas, surface preparation, placement, and cleanup includes the following:

- a) Saw cutting to full pavement depth.
- b) Removal and disposal of existing surface features.
- c) Furnishing, placing and removing excavation protection systems.
- d) Dewatering excavations.
- e) Furnishing and installing valve, two (2) 1-Inch test taps, gaskets, polyethylene encasement, thrust restraint and appurtenances.
- f) Furnishing and installing valve basin, frame and lid.
- g) Furnishing, placing and compacting trench backfill and bedding.

Basis of Payment:

This work will be measured and paid for at the contract unit price per EACH for WATER VALVES, WATER MAIN LINE STOP, and TAPPING VALVES AND SLEEVES of the diameters specified.

STEEL CASING PIPE, BORED AND JACKED

Description:

This work shall consist of constructing bored and jacked casing pipes at locations shown on the Plans. All installation of mains, pipes, conduits, etc., under State pavements shall be done by approved Pipe Boring and Jacking methods contained herein.

Chicago Department of Water Management's Technical Specifications for Water Main Construction shown below and included as part of this special provision.

Section 31 23 10 – Excavation, Trenching and Backfilling.

Section 31 23 19 – Dewatering Excavations.

Section 33 05 21 – Utility Pipe Jacking.

Section 33 11 13 – Ductile Iron Pipe and Fittings.

Measurement for Payment:

STEEL CASING PIPE, BORED AND JACKED will be measured as LINEAR FOOT. Payment will constitute full compensation for all Work necessary for a complete installation including, but not limited to, labor, materials and supplies, and equipment required for the handling and installation of the casing and carrier pipe, augering or jacking the casing pipe, construction of access and receiving shaft, shaft support, shoring and bracing removal, groundwater control, annular space fill, spacers, casing end plugs and other associated materials and surface settlement monitoring, on-site storage, delivery to work areas, site preparation and restoration and clean-up.

Jacking pit size limit for measurement purposes will be ten (10) feet wide by forty (40) feet long to a depth as indicated on the plans, for Work which includes:

- a) Saw cutting to full pavement depth, removal and disposal of existing surface features.
- b) Excavation and disposal of spoils.
- c) Providing excavation protection system.
- d) Dewatering excavations.
- e) Providing a Class SI concrete "mud" slab on jacking pit floor.
- f) Furnishing, placing and compacting trench backfill and bedding.
- g) Finish grading.

Receiving pit size limit for measurement purposes will be ten (10) feet wide by ten (10) feet long to a depth as indicated on the plans, for Work which includes:

- a) Saw cutting to full pavement depth, removal and disposal of existing surface features.
- b) Excavation and disposal of spoils.
- c) Providing excavation protection system.
- d) Dewatering excavations.
- e) Furnishing, placing and compacting trench backfill and bedding.
- f) Finish grading.

Basis of Payment:

This work will be paid for at the contract unit price per foot for STEEL CASING PIPE, BORED AND JACKED of the diameters specified.

REMOVE EXISTING VALVE AND VAULT

Description. Work under this item will include the complete removal of existing water main valves and vault structures as part of the work shown on the Plans. After the removal of the cast iron frame and lid and the removal of all pipe, valves, fittings, taps and other water main elements, the brick or concrete structure must be broken down with the void in the affected area filled to grade as shown in the Plans and described in these special provisions. The work to remove existing valve and vaults shall conform to Article 605. The Contractor is advised that the work will be performed on a water system owned and operated by Chicago Department of Water Management (CDWM). As such, all operations shall be performed in such a way as to avoid contamination of the water system through the introduction of contaminants or the process of the work. All work will require a B-Permit be obtained from CDWM-Plumbing Section.

Construction Requirements. No work shall proceed prior to the shutdown of any water main passing through or adjacent to the vault structure to be removed. This work will consist of removing the frame and cover of an existing vault structure, removal of valves, fittings, taps and other elements of the water system within the vault, breaking down the structure walls, removing large debris, and backfilling the hole as required. If the vault is in a parkway, the hole must be filled level to the existing grade. The top six inches of fill must be of an approved soil mixture. Trench backfill must be utilized to fill the void if pavement is proposed. If proposed structures, including water main vaults or sewer structures, or water main or sewer pipe are planned for the same location as the structure to be removed, the Contractor may elect to utilize the void from the vault removal as excavation for proposed work. In this case, no backfill is necessary and any backfill for the proposed work will be considered part of those proposed items. Any frames, lids, valves, fittings, taps or other water main elements that are salvaged in reasonable condition in the opinion of the Engineer shall be offered to the Chicago Transit Authority. Any debris, including the frame, lid, valves, fittings, taps or other items must be disposed of off-site in an approved manner. The Contractor will pay for all disposal fees.

Method of Measurement. This work will be paid for per each vault removed including all existing water main pipe, valves, fittings, taps or other water main items. All backfill will be considered as part of the vault removal unless otherwise included within items that are placed within the area of the removed structure.

Basis of Payment. This work will be paid for at the contract unit price per each for REMOVE EXISTING VALVE AND VAULT which price will be payment in full for all labor, equipment and materials necessary to complete the work as described. Salvaging of any materials will be considered incidental to this item. Trench backfill will be paid for separately in accordance with Article 208.04.

PIPE UNDERDRAINS FOR STRUCTURES

Effective: May 17, 2000

Revised: October 9, 2009 January 22, 2010

Description. This work shall consist of furnishing and installing a pipe underdrain system as shown on the plans, as specified herein, and as directed by the Engineer.

Materials. Materials shall meet the requirements as set forth below:

The perforated pipe underdrain shall be according to Article 601.02 of the Standard Specifications. Outlet pipes or pipes connecting to a separate storm sewer system shall not be perforated.

The drainage aggregate shall be a combination of one or more of the following gradations, FA1, FA2, CA5, CA7, CA8, CA11, or CA13 thru 1516, according to Sections 1003 and 1004 of the Standard Specifications.

The fabric surrounding the drainage aggregate shall be Geotechnical Fabric for French Drains according to Article 1080.05 of the Standard Specifications.

Construction Requirements. All work shall be according to the applicable requirements of Section 601 of the Standard Specifications except as modified below.

The pipe underdrains shall consist of a perforated pipe drain situated at the bottom of an area of drainage aggregate wrapped completely in geotechnical fabric and shall be installed to the lines and gradients as shown on the plans.

Method of Measurement. Pipe Underdrains for Structures shall be measured for payment in feet (meters), in place. Measurement shall be along the centerline of the pipe underdrains. All connectors, outlet pipes, elbows, and all other miscellaneous items shall be included in the measurement. Concrete headwalls shall be included in the cost of Pipe Underdrains for Structures, but shall not be included in the measurement for payment.

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for PIPE UNDERDRAINS FOR STRUCTURES of the diameter specified. Furnishing and installation of the drainage aggregate, geotechnical fabric, forming holes in structural elements and any excavation required, will not be paid for separately, but shall be included in the cost of the pipe underdrains for structures.

STRUCTURAL REPAIR OF CONCRETE

Effective: March 15, 2006

Revised: August 29, 2014 April 1, 2016

Description. This work shall consist of structurally repairing concrete.

Materials. Materials shall be according to the following.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) R1 or R2 Concrete (Note 2)	
(c) Normal Weight Concrete (Notes 3 and 4)	
(d) Shotcrete (High Performance) (Notes 5 and 6)	
(e) Reinforcement Bars	1006.10
(f) Anchor Bolts	1006.09
(g) Water	1002
(h) Curing Compound	1022.01
(i) Cotton Mats	1022.02
(j) Protective Coat	1023.01
(k) Epoxy (Note 7)	1025
(l) Mechanical Bar Splicers	508.06(c)

Note 1. The concrete shall be Class SI, except the cement factor shall be a minimum 6.65 cwt/cu yd (395 kg/cu m), the coarse aggregate shall be a CA 16, and the strength shall be a minimum 4000 psi (27,500 kPa) compressive or 675 psi (4650 kPa) flexural at 14 days. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump, but a cement factor reduction according to Article 1020.05(b)(8) is prohibited. A self-consolidating concrete mixture is also acceptable per Article 1020.04, except the mix design requirements of this note regarding the cement factor, coarse aggregate, strength, and cement factor reduction shall apply.

Note 2. The R1 or R2 concrete shall be from the Department's approved list of Packaged, Dry, Rapid Hardening, Cementitious Materials for Concrete Repairs. The R1 or R2 concrete shall comply with the air content and strength requirements for Class SI concrete as indicated in Note 1. Mixing shall be per the manufacturer's recommendations, except the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated in Note 1. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump, and a retarder may be required to allow time to perform the required field tests. The admixtures shall be per the manufacturer's recommendation, and the Department's approved list of Concrete Admixtures shall not apply.

Note 3. The “high slump” packaged concrete mixture shall be from the Department’s approved list of Packaged, Dry, Formed, Concrete Repair Mixtures. The materials and preparation of aggregate shall be according to ASTM C 387. The cement factor shall be 6.65 cwt/cu yd (395 kg/cu m) minimum to 7.05 cwt/cu yd (418 kg/cu m) maximum. Cement replacement with fly ash or ground granulated blast-furnace slag shall be according to Section 1020. The “high slump” packaged concrete mixture shall have a water soluble chloride ion content of less than 0.40 lb/cu yd (0.24 kg/cu m). The test shall be performed according to ASTM C 1218, and the “high slump” packaged concrete mixture shall have an age of 28 to 42 days at the time of test. The ASTM C 1218 test shall be performed by an independent lab a minimum of once every two years, and the test results shall be provided to the Department. The coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm). The packaged concrete mixture shall comply with the air content and strength requirements for Class SI concrete as indicated in Note 1. Mixing shall be per the manufacturer’s recommendations, except the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated in Note 1. A high range water-reducing admixture shall be used to obtain a 5-7 in. (125-175 mm) slump. The admixture shall be per the manufacturer’s recommendation, and the Department’s approved list of Concrete Admixtures shall not apply. A maximum slump of 10 in. (250 mm) may be permitted if no segregation is observed by the Engineer in a laboratory or field evaluation.

Note 4 The “self-consolidating concrete” packaged concrete mixture shall be from the Department’s approved list of Packaged, Dry, Formed, Concrete Repair Mixtures. The materials and preparation of aggregate shall be according to ASTM C 387. The cement factor shall be 6.65 cwt/cu yd (395 kg/cu m) minimum to 7.05 cwt/cu yd (418 kg/cu m) maximum. Cement replacement with fly ash or ground granulated blast-furnace slag shall be according to Section 1020. The “self-consolidating concrete” packaged concrete mixture shall have a water soluble chloride ion content of less than 0.40 lb/cu yd (0.24 kg/cu m). The test shall be performed according to ASTM C 1218, and the “self-consolidating concrete” packaged concrete mixture shall have an age of 28 to 42 days at the time of test. The ASTM C 1218 test shall be performed by an independent lab a minimum of once every two years, and the test results shall be provided to the Department. The concrete mixture should be uniformly graded, and the coarse aggregate shall be a maximum size of 1/2 in. (12.5 mm). The fine aggregate proportion shall be a maximum 50 percent by weight (mass) of the total aggregate used. The packaged concrete mixture shall comply with the air content and strength requirements for Class SI concrete as indicated in Note 1. Mixing shall be per the manufacturer’s recommendations, except the water/cement ratio shall not exceed the value specified for Class SI concrete as indicated in Note 1. The admixtures used to produce self-consolidating concrete shall be per the manufacturer’s recommendation, and the Department’s approved list of Concrete Admixtures shall not apply. The packaged concrete mixture shall meet the following self-consolidating requirements of Article 1020.04.:

- The slump flow range shall be 22 in. (560 mm) minimum to 28 in. (710 mm) maximum and tested according to Illinois Test Procedure SCC-2.
- The visual stability index shall be a maximum of 1 and tested according to Illinois Test Procedure SCC-2.
- The J-Ring value shall be a maximum of 2 in. (50 mm) and tested according to Illinois Test Procedure SCC-3. The L-Box blocking ratio shall be a minimum of 80 percent and tested according to Illinois Test Procedure SCC-4. The Manufacturer has the option to select either the J-Ring or L-Box test.
- The hardened visual stability index shall be a maximum of 1 and tested according to Illinois Test Procedure SCC-6.

Note 5. Packaged shotcrete that includes aggregate shall be from the Department’s approved list of Packaged High Performance Shotcrete, and independent laboratory test results showing the product meets Department specifications will be required. The product shall be a packaged, pre-blended, and dry combination of materials, for the wet-mix shotcrete method according to ASTM C 1480. A non-chloride accelerator may be used according to the shotcrete manufacturer’s recommendations. The shotcrete shall be Type FA or CA, Grade FR, and Class I. The fibers shall be Type III synthetic according to ASTM C 1116.

The packaged shotcrete shall have a water soluble chloride ion content of less than 0.40 lb/cu yd (0.24 kg/cu m). The test shall be performed according to ASTM C 1218, and the hardened shotcrete shall have an age of 28 to 42 days at the time of test. The ASTM C 1218 test shall be performed by an independent lab a minimum of once every two years, and the test results shall be provided to the Department.

Each individual aggregate used in the packaged shotcrete shall have either a maximum ASTM C 1260 expansion of 0.16 percent or a maximum ASTM C 1293 expansion of 0.040 percent. However, the ASTM C 1260 value may be increased to 0.27 percent for each individual aggregate if the cement total equivalent alkali content ($\text{Na}_2\text{O} + 0.658\text{K}_2\text{O}$) does not exceed 0.60 percent. As an alternative to these requirements, ASTM C 1567 testing which shows the packaged shotcrete has a maximum expansion of 0.16 percent may be submitted. The ASTM C 1260, C 1293, or C 1567 test shall be performed a minimum of once every two years.

The 7 and 28 day compressive strength requirements in ASTM C 1480 shall not apply. Instead the shotcrete shall obtain a minimum compressive strength of 4000 psi (27,500 kPa) at 14 days.

The packaged shotcrete shall be limited to the following proportions:

The portland cement and finely divided minerals shall be 6.05 cwt/cu yd (360 kg/cu m) to 8.50 cwt/cu yd (505 kg/cu m) for Type FA and 6.05 cwt/cu yd (360 kg/cu. m) to 7.50 cwt/cu yd (445 kg/cu m) for Type CA. The portland cement shall not be below 4.70 cwt/cu yd (279 kg/cu m) for Type FA or CA.

The finely divided mineral(s) shall constitute a maximum of 35 percent of the total cement plus finely divided mineral(s).

Class F fly ash is optional and the maximum shall be 20 percent by weight (mass) of cement.

Class C fly ash is optional and the maximum shall be 25 percent by weight (mass) of cement.

Ground granulated blast-furnace slag is optional and the maximum shall be 30 percent by weight (mass) of cement.

Microsilica is required and shall be a minimum of 5 percent by weight (mass) of cement, and a maximum of 10 percent. As an alternative to microsilica, high-reactivity metakaolin may be used at a minimum of 5 percent by weight (mass) of cement, and a maximum of 10 percent.

Fly ash shall not be used in combination with ground granulated blast-furnace slag. Class F fly ash shall not be used in combination with Class C fly ash. Microsilica shall not be used in combination with high-reactivity metakaolin. A finely divided mineral shall not be used in combination with a blended hydraulic cement, except for microsilica or high-reactivity metakaolin.

The water/cement ratio as defined in Article 1020.06 shall be a maximum of 0.42.

The air content as shot shall be 4.0 – 8.0 percent.

Note 6 Packaged shotcrete that does not include pre-blended aggregate shall be from the Department's approved list of Packaged High Performance Shotcrete, and independent laboratory test results showing the product meets Department specifications will be required. The shotcrete shall be according to Note 5, except the added aggregate shall be according to Articles 1003.02 and 1004.02 in addition to each individual aggregate meeting the maximum expansion requirements of Note 5. The aggregate gradation shall be according to the manufacturer. The shotcrete shall be batched and mixed with added aggregate according to the manufacturer.

Note 7. In addition ASTM C 881, Type IV, Grade 2 or 3, Class A, B, or C may be used.

Equipment. Equipment shall be according to Article 503.03 and the following.

Chipping Hammer – The chipping hammer for removing concrete shall be a light-duty pneumatic or electric tool with a 15 lb. (7 kg) maximum class or less.

Blast Cleaning Equipment – Blast cleaning equipment for concrete surface preparation shall be the abrasive type, and the equipment shall have oil traps.

Hydrodemolition Equipment – Hydrodemolition equipment for removing concrete shall be calibrated, and shall use water according to Section 1002.

High Performance Shotcrete Equipment – The batching, mixing, pumping, hose, nozzle, and auxiliary equipment shall be for the wet-mix shotcrete method, and shall meet the requirements of ACI 506R.

Construction Requirements

General. The repair methods shall be either formed concrete repair or shotcrete. The repair method shall be selected by the Contractor with the following rules.

- (a) Rule 1. For formed concrete repair, a subsequent patch to repair the placement point after initial concrete placement will not be allowed. As an example, this may occur in a vertical location located at the top of the repair.
- (b) Rule 2. Formed concrete repair shall not be used for overhead applications.
- (c) Rule 3. If formed concrete repair is used for locations that have reinforcement with less than 0.75 in. (19 mm) of concrete cover, the concrete mixture shall contain fly ash or ground granulated blast-furnace slag at the maximum cement replacement allowed.
- (d) Rule 4. Shotcrete shall not be used for any repair greater than 6 in. (150 mm) in depth, except in horizontal applications, where the shotcrete may be placed from above in one lift.
- (e) Rule 5. Shotcrete shall not be used for column repairs greater than 4 in. (100 mm) in depth, unless the shotcrete mixture contains 3/8 in. (9.5 mm) aggregate.

Temporary Shoring or Cribbing. When a temporary shoring or cribbing support system is required, the Contractor shall provide details and computations, prepared and sealed by an Illinois licensed Structural Engineer, to the Department for review and approval. When ever possible the support system shall be installed prior to starting the associated concrete removal. If no system is specified, but during the course of removal the need for temporary shoring or cribbing becomes apparent or is directed by the Engineer due to a structural concern, the Contractor shall not proceed with any further removal work until an appropriate and approved support system is installed.

Concrete Removal. The Contractor shall provide ladders or other appropriate equipment for the Engineer to mark the removal areas. Repair configurations will be kept simple, and squared corners will be preferred. The repair perimeter shall be sawed a depth of 1/2 in. (13 mm) or less, as required to avoid cutting the reinforcement. Any cut reinforcement shall be repaired or replaced at the expense of the Contractor. If the concrete is broken or removed beyond the limits of the initial saw cut, the new repair perimeter shall be recut. The areas to be repaired shall have all loose, unsound concrete removed completely by the use of chipping hammers, hydrodemolition equipment, or other methods approved by the Engineer. The concrete removal shall extend along the reinforcement bar until the reinforcement is free of bond inhibiting corrosion. Reinforcement bar with 50 percent or more exposed shall be undercut to a depth of 3/4 in. (19 mm) or the diameter of the reinforcement bar, whichever is greater.

If sound concrete is encountered before existing reinforcement bars are exposed, further removal of concrete shall not be performed unless the minimum repair depth is not met.

The repair depth shall be a minimum of 1 in. (25 mm). The substrate profile shall be $\pm 1/16$ in. (± 1.5 mm). The perimeter of the repair area shall have a vertical face.

If a repair is located at the ground line, any excavation required below the ground line to complete the repair shall be included in this work.

The Contractor shall have a maximum of 14 calendar days to complete each repair location with concrete or shotcrete, once concrete removal has started for the repair.

The Engineer shall be notified of concrete removal that exceeds 6 in. (150 mm) in depth, one fourth the cross section of a structural member, more than half the vertical column reinforcement is exposed in a cross section, more than 6 consecutive reinforcement bars are exposed in any direction, within 1.5 in. (38 mm) of a bearing area, or other structural concern. Excessive deterioration or removal may require further evaluation of the structure or installation of temporary shoring and cribbing support system.

Surface Preparation. Prior to placing the concrete or shotcrete, the Contractor shall prepare the repair area and exposed reinforcement by blast cleaning. The blast cleaning shall provide a surface that is free of oil, dirt, and loose material.

If a succeeding layer of shotcrete is to be applied, the initial shotcrete surface and remaining exposed reinforcement shall be free of curing compound, oil, dirt, loose material, rebound (i.e. shotcrete material leaner than the original mixture which ricochets off the receiving surface), and overspray. Preparation may be by lightly brushing or blast cleaning if the previous shotcrete surface is less than 36 hours old. If more than 36 hours old, the surface shall be prepared by blast cleaning.

The repair area and perimeter vertical face shall have a rough surface. Care shall be taken to ensure the sawcut face is roughened by blast cleaning. Just prior to concrete or shotcrete placement, saturate the repair area with water to a saturated surface-dry condition. Any standing water shall be removed.

Concrete or shotcrete placement shall be done within 3 calendar days of the surface preparation or the repair area shall be prepared again.

Reinforcement. Exposed reinforcement bars shall be cleaned of concrete and corrosion by blast cleaning. After cleaning, all exposed reinforcement shall be carefully evaluated to determine if replacement or additional reinforcement bars are required.

Reinforcing bars that have been cut or have lost 25 percent or more of their original cross sectional area shall be supplemented by new in kind reinforcement bars. New bars shall be lapped a minimum of 32 bar diameters to existing bars. A mechanical bar splicer shall be used when it is not feasible to provide the minimum bar lap. No welding of bars shall be performed.

Intersecting reinforcement bars shall be tightly secured to each other using 0.006 in. (1.6 mm) or heavier gauge tie wire, and shall be adequately supported to minimize movement during concrete placement or application of shotcrete.

For reinforcement bar locations with less than 0.75 in. (19 mm) of cover, protective coat shall be applied to the completed repair. The application of the protective coat shall be according to Article 503.19, 2nd paragraph, except blast cleaning shall be performed to remove curing compound.

The Contractor shall anchor the new concrete to the existing concrete with 3/4 in. (19 mm) diameter hook bolts for all repair areas where the depth of concrete removal is greater than 8 in. (205 mm) and there is no existing reinforcement extending into the repair area. The hook bolts shall be spaced at 15 in. (380 mm) maximum centers both vertically and horizontally, and shall be a minimum of 12 in. (305 mm) away from the perimeter of the repair. The hook bolts shall be installed according to Section 584.

Repair Methods. All repair areas shall be inspected and approved by the Engineer prior to placement of the concrete or application of the shotcrete.

- (a) Formed Concrete Repair. Falsework shall be according to Article 503.05. Forms shall be according to Article 503.06. Formwork shall provide a smooth and uniform concrete finish, and shall approximately match the existing concrete structure. Formwork shall be mortar tight and closely fitted where they adjoin the existing concrete surface to prevent leakage. Air vents may be provided to reduce voids and improve surface appearance. The Contractor may use exterior mechanical vibration, as approved by the Engineer, to release air pockets that may be entrapped.

The concrete for formed concrete repair shall be a Class SI Concrete, or a packaged R1 or R2 Concrete with coarse aggregate added, or a packaged Normal Weight Concrete at the Contractor's option. The concrete shall be placed and consolidated according to Article 503.07. The concrete shall not be placed when frost is present on the surface of the repair area, or the surface temperature of the repair area is less than 40 °F (4 °C). All repaired members shall be restored as close as practicable to their original dimensions.

Curing shall be done according to Article 1020.13.

If temperatures below 45°F (7°C) are forecast during the curing period, protection methods shall be used. Protection Method I according to Article 1020.13(d)(1), or Protection Method II according to Article 1020.13(d)(2) shall be used during the curing period.

The surfaces of the completed repair shall be finished according to Article 503.15.

- (b) Shotcrete. Shotcrete shall be tested by the Engineer for air content according to Illinois Modified AASHTO T 152. The sample shall be obtained from the discharge end of the nozzle by shooting a pile large enough to scoop a representative amount for filling the air meter measuring bowl. Shotcrete shall not be shot directly into the measuring bowl for testing.

For compressive strength of shotcrete, a 18 x 18 x 3.5 in. (457 x 457 x 89 mm) test panel shall be shot by the Contractor for testing by the Engineer. A steel form test panel shall have a minimum thickness of 3/16 in. (5 mm) for the bottom and sides. A wood form test panel shall have a minimum 3/4 in. (19 mm) thick bottom, and a minimum 1.5 in. (38 mm) thickness for the sides. The test panel shall be cured according to Article 1020.13 (a) (3) or (5) while stored at the jobsite and during delivery to the laboratory. After delivery to the laboratory for testing, curing and testing shall be according to ASTM C 1140.

The method of alignment control (i.e. ground wires, guide strips, depth gages, depth probes, and formwork) to ensure the specified shotcrete thickness and reinforcing bar cover is obtained shall be according to ACI 506R. Ground wires shall be removed after completion of cutting operations. Guide strips and formwork shall be of dimensions and a configuration that do not prevent proper application of shotcrete. Metal depth gauges shall be cut 1/4 in. (6 mm) below the finished surface. All repaired members shall be restored as close as practicable to their original dimensions.

For air temperature limits when applying shotcrete in cold weather, the first paragraph of Article 1020.14(b) shall apply. For hot weather, shotcrete shall not be applied when the air temperature is greater than 90°F (32°C). The applied shotcrete shall have a minimum temperature of 50°F (10°C) and a maximum temperature of 90°F (32°C). The shotcrete shall not be applied during periods of rain unless protective covers or enclosures are installed. The shotcrete shall not be applied when frost is present on the surface of the repair area, or the surface temperature of the repair area is less than 40°F (4°C). If necessary, lighting shall be provided to provide a clear view of the shooting area.

The shotcrete shall be applied according to ACI 506R, and shall be done in a manner that does not result in cold joints, laminations, sandy areas, voids, sags, or separations. In addition, the shotcrete shall be applied in a manner that results in maximum densification of the shotcrete. Shotcrete which is identified as being unacceptable while still plastic shall be removed and re-applied.

The nozzle shall normally be at a distance of 2 to 5 ft. (0.6 to 1.5 m) from the receiving surface, and shall be oriented at right angles to the receiving surface. Exceptions to this requirement will be permitted to fill corners, encase large diameter reinforcing bars, or as approved by the Engineer. For any exception, the nozzle shall never be oriented more than 45 degrees from the surface. Care shall be taken to keep the front face of the reinforcement bar clean during shooting operations. Shotcrete shall be built up from behind the reinforcement bar. Accumulations of rebound and overspray shall be continuously removed prior to application of new shotcrete. Rebound material shall not be incorporated in the work.

Whenever possible, shotcrete shall be applied to the full thickness in a single layer. The maximum thickness shall be according to Rules 4 and 5 under Construction Requirements, General. When two or more layers are required, the minimum number shall be used and shall be done in a manner without sagging or separation. A flash coat (i.e. a thin layer of up to 1/4 in. (6 mm) applied shotcrete) may be used as the final lift for overhead applications.

Prior to application of a succeeding layer of shotcrete, the initial layer of shotcrete shall be prepared according to the surface preparation and reinforcement bar cleaning requirements. Upon completion of the surface preparation and reinforcement bar treatment, water shall be applied according to the surface preparation requirements unless the surface is moist. The second layer of shotcrete shall then be applied within 30 minutes.

Shotcrete shall be cut back to line and grade using trowels, cutting rods, screeds or other suitable devices. The shotcrete shall be allowed to stiffen sufficiently before cutting. Cutting shall not cause cracks or delaminations in the shotcrete. For depressions, cut material may be used for small areas. Rebound material shall not be incorporated in the work. For the final finish, a wood float shall be used to approximately match the existing concrete texture. A manufacturer approved finishing aid may be used. Water shall not be used as a finishing aid. All repaired members shall be restored as close as practicable to their original dimensions.

Contractor operations for curing shall be continuous with shotcrete placement and finishing operations. Curing shall be accomplished using wetted cotton mats, membrane curing, or a combination of both. Cotton mats shall be applied according to Article 1020.13(a)(5) except the exposed layer of shotcrete shall be covered within 10 minutes after finishing, and wet curing shall begin immediately. Curing compound shall be applied according to Article 1020.13(a)(4), except the curing compound shall be applied as soon as the shotcrete has hardened sufficiently to prevent marring the surface, and each of the two separate applications shall be applied in opposite directions to ensure coverage. The curing compound shall be according to Article 1022.01. Note 5 of the Index Table in Article 1020.13 shall apply to the membrane curing method.

When a shotcrete layer is to be covered by a succeeding shotcrete layer within 36 hours, the repair area shall be protected with intermittent hand fogging, or wet curing with either burlap or cotton mats shall begin within 10 minutes. Intermittent hand fogging may be used only for the first hour. Thereafter, wet curing with burlap or cotton mats shall be used until the succeeding shotcrete layer is applied. Intermittent hand fogging may be extended to the first hour and a half if the succeeding shotcrete layer is applied by the end of this time.

The curing period shall be for 7 days, except when there is a succeeding layer of shotcrete. In this instance, the initial shotcrete layer shall be cured until the surface preparation and reinforcement bar treatment is started.

If temperatures below 45°F (7°C) are forecast during the curing period, protection methods shall be used. Protection Method I according to Article 1020.13(d)(1), or Protection Method II according to Article 1020.13(d)(2) shall be used during the curing period

Inspection of Completed Work. The Contractor shall provide ladders or other appropriate equipment for the Engineer to inspect the repaired areas. After curing but no sooner than 28 days after placement of concrete or shooting of shotcrete, the repair shall be examined for conformance with original dimensions, cracks, voids, and delaminations. Sounding for delaminations will be done with a hammer or by other methods determined by the Engineer.

The acceptable tolerance for conformance of a repaired area shall be within 1/4 in. (6 mm) of the original dimensions. A repaired area not in dimensional conformance or with delaminations shall be removed and replaced.

A repaired area with cracks or voids shall be considered as nonconforming. Exceeding one or more of the following crack and void criteria shall be cause for removal and replacement of a repaired area.

1. The presence of a single surface crack greater than 0.01 in. (0.25 mm) in width and greater than 12 in. (300 mm) in length.
2. The presence of two or more surface cracks greater than 0.01 in. (0.25 mm) in width that total greater than 24 in. (600 mm) in length.
3. The presence of map cracking in one or more regions totaling 15 percent or more of the gross surface area of the repair.
4. The presence of two or more surface voids with least dimension 3/4 in. (19 mm) each.

A repaired area with cracks or voids that do not exceed any of the above criteria may remain in place, as determined by the Engineer.

If a nonconforming repair is allowed to remain in place, cracks greater than 0.007 in. (0.2 mm) in width shall be repaired with epoxy according to Section 590. For cracks less than or equal to 0.007 in. (0.2 mm) in width, the epoxy may be applied to the surface of the crack. Voids shall be repaired according to Article 503.15.

Publications and Personnel Requirements. The Contractor shall provide a current copy of ACI 506R to the Engineer a minimum of one week prior to start of construction.

The shotcrete personnel who perform the work shall have current American Concrete Institute (ACI) nozzlemen certification for vertical wet and overhead wet applications, except one individual may be in training. This individual shall be adequately supervised by a certified ACI nozzlemen as determined by the Engineer. A copy of the nozzlemen certificate(s) shall be given to the Engineer.

Method of Measurement. This work will be measured for payment in place and the area computed in square feet (square meters). For a repair at a corner, both sides will be measured.

Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for STRUCTURAL REPAIR OF CONCRETE (DEPTH GREATER THAN 5 IN. (125 MM)), STRUCTURAL REPAIR OF CONCRETE (DEPTH EQUAL TO OR LESS THAN 5 IN. (125 MM)).

When not specified to be paid for elsewhere, the work to design, install, and remove the temporary shoring and cribbing will be paid for according to Article 109.04.

With the exception of reinforcement damaged by the Contractor during removal, the furnishing and installation of supplemental reinforcement bars, mechanical bar splicers, hook bolts, and protective coat will be paid according to Article 109.04.

STRUCTURAL ASSESSMENT REPORTS FOR CONTRACTOR'S MEANS AND METHODS

Effective: March 6, 2009

Revised October 5, 2015

Description. This item shall consist of preparing and submitting, to the Engineer for approval, Structural Assessment Reports (SARs) for proposed work on structure(s) or portions thereof. Unless noted otherwise, a SAR shall be required when the Contractor's means and methods apply loads to the structure or change its structural behavior. A SAR shall be submitted and approved prior to beginning the work covered by that SAR. Separate portions of the work may be covered by separate SARs which may be submitted at different times or as dictated by the Contractor's schedule.

Existing Conditions. An Existing Structure Information Package (ESIP) will be provided by the Department to the Contractor upon request. This package will typically include existing or "As-Built" plans, and the latest National Bridge Inspection Standards (NBIS) inspection report. The availability of structural information from the Department is solely for the convenience and information of the Contractor and shall not relieve the Contractor of the duty to make, and the risk of making, examinations and investigations as required to assess conditions affecting the work. Any data furnished in the ESIP is for information only and does not constitute a part of the Contract. The Department makes no representation or warranty, express or implied, as to the information conveyed or as to any interpretations made from the data.

Removal SARs. A SAR for removal of existing structures, or portions thereof, shall demonstrate that the Contractor's proposed means and methods to accomplish the work do not compromise the structural adequacy of the bridge, or portions thereof that are to remain in service, at any time during the work activities being performed. Each phase of the operation shall be accounted for, as well as the existing condition of the structure.

Construction SARs. A SAR for new construction or for construction utilizing existing components shall demonstrate that the Contractor's proposed means and methods to accomplish the work do not compromise the structural adequacy of the bridge or portions thereof at any time during the work activities being performed. For construction activities applying less than 10 tons (9 metric tons) of total combined weight of equipment and stockpiled materials on the structure at any one time, a SAR submittal shall not be required provided the Contractor submits written verification to the Engineer stating the applied loads do not exceed this threshold. The verification shall be submitted prior to the start of the activity. This SAR exemption shall not relieve the Contractor from responsibility for the structure. A SAR shall be submitted in all cases where the existing structure is posted for less than legal loads or the Contract plans indicate a live load restriction is in place.

Requirements

a) General. All work specified shall be performed according to the Contract plans, Special Provisions and/or Standard Specifications governing that work.

Submittals for falsework and forming for concrete construction shall be according to Articles 503.05 and 503.06 and does not require a SAR. Moving construction equipment across a structure, or portions thereof, open to traffic shall be addressed according to Article 107.16 and does not require a SAR. Operating equipment on an in-service structure and/or using a portion of an in-service structure as a work platform shall require a SAR and Article 107.16 shall not apply.

The Contractor may move vehicles across the existing bridge without a SAR after closure and prior to removal of any portion of the structure provided:

- The vehicles satisfy the requirements of Section 15-111 of the Illinois Vehicle Code (described in the IDOT document "Understanding the Illinois Size & Weight Laws") or of the Federal Highway Administration document "Bridge Formula Weights" (available at: http://www.ops.fhwa.dot.gov/freight/publications/brdg_frm_wgghts/index.htm)
- The Contractor submits written verification to the Engineer stating the vehicles meet these requirements. The verification shall be submitted prior to allowing the vehicles on the structure.

This SAR exemption shall not relieve the Contractor from responsibility for the structure. This SAR exemption shall not be allowed where the existing structure is posted for less than legal loads or the Contract plans indicate a live load restriction is in place. No stockpiling of material is allowed under this exemption.

All SARs shall detail the procedures and sequencing necessary to complete the work in a safe and controlled manner. When appropriate, supporting design calculations shall be provided verifying the following:

- The effects of the applied loads do not exceed the capacity at Operating level for any portions of the structure being utilized in the demolition of the structure provided those portions are not to be reused.
- The effects of the applied loads do not exceed the capacity at Inventory level for new construction or for portions of the existing structure that are to be reused.
- The condition of the structure and/or members has been considered.

See AASHTO Manual for Bridge Evaluation for further information on determining the available capacities at the Operating and Inventory levels.

b) Confidential Documents. Due to the sensitivity of the inspection reports and bridge condition reports to bridge security, the following confidentiality statement applies to these reports:

“Reports used by the Contractor and the contents thereof are the property of the Department, and are subject to the control of the Department in accordance with State and Federal law. The distribution, dissemination, disclosure, duplication or release of these reports or the content thereof in any manner, form or format without the express permission of the keeper of this record is prohibited. The owner is the official keeper of these records, except for state owned bridges, where the official keeper of these records is the Regional Engineer.”

c) Submittals. The Contractor shall be pre-approved to prepare SAR(s) or shall retain the services of a pre-qualified engineering firm to provide these services. Pre-approval of the Contractor will be determined by the Illinois Department of Transportation and will allow SAR(s) preparation by the Contractor unless otherwise noted on the plans. For engineering firms, pre-qualification shall be according to the Department in the category of “Highway Bridges-Typical” unless otherwise noted on the plans. Firms involved in any part of the project (plan development or project management) will not be eligible to provide these services. Evidence of pre-approval/pre-qualification shall be submitted with all SAR(s). The SAR(s) shall be prepared and sealed by an Illinois Licensed Structural Engineer. The Contractor shall submit SAR(s), complete with working drawings and supporting design calculations, to the Engineer for approval, at least 30 calendar days prior to start of that portion of the work.

At a minimum a Structural Assessment Report shall include the following:

1. A plan outlining the procedures and sequence for the work, including staging when applicable.
2. A demolition plan (when removal is included as an item of work in the contract) including details of the proposed methods of removal.
3. A beam erection plan (when beam erection is included as an item of work in the contract) including details of the proposed methods of erection.
4. Pertinent specifications for equipment used during the work activity.
5. The allowable positions for that equipment during the work activity.
6. The allowable positions and magnitudes of stockpiled materials and/or spoils, if planned to be located on the structure.
7. Design and details for temporary shoring and/or bracing, if required by the Contractor’s means and methods.

Approval or acceptance of a Structural Assessment Report shall not relieve the Contractor of any responsibility for the successful completion of the work.

Revisions to the Contractor’s means and methods resulting in no increased load effects to the structure, as determined by the Contractor’s Structural Engineer, shall not require a SAR resubmittal. However, the Contractor’s Structural Engineer shall submit to the Engineer written verification that there is no increased load effect. The written verification shall specify the revisions and shall be submitted prior to the start of the revised activities.

The Contractor shall be responsible for following the approved SAR related to the work involved.

Method of Measurement. Structural Assessment Reports will not be measured for payment.

Basis of payment. Structural Assessment Reports will not be paid for separately but shall be considered as included in the contract unit price(s) for the work item(s) specified.

GRANULAR BACKFILL FOR STRUCTURES

Effective: April 19, 2012

Revised: August 17/October 30, 2012

Revise Section 586 of the Standard Specifications to read:

SECTION 586. Granular Backfill for structures

586.01 Description. This work shall consist of furnishing, transporting and placing granular backfill for abutment structures.

586.02 Materials. Materials shall be according to the following.

Item	Article/Section
(a) Fine Aggregate.....	1003.04
(b) Coarse Aggregates	1004.05

CONSTRUCTION REQUIREMENTS

586.03 General. This work shall be done according to Article 502.10 except as modified below. The backfill volume shall be backfilled, with granular material as specified in Article 586.02, to the required elevation as shown in the contract plans. The backfill volume shall be placed in convenient lifts for the full width to be backfilled. Unless otherwise specified in the contract plans, mechanical compaction will not be required. A deposit of gravel or crushed stone placed behind drain holes shall not be required. All drains not covered by geocomposite wall drains or other devices to prevent loss of backfill material shall be covered by sufficient filter fabric material meeting the requirements of Section 1080 and Section 282 with either 6 or 8 oz/sq yd (200 or 270 g/sq m) material allowed, with free edges overlapping the drain hole by at least 12 in. (300 mm) in all directions.

The granular backfill shall be brought to the finished grade as shown in the contract plans. When concrete is to be cast on top of the granular backfill, the Contractor, subject to approval of the Engineer, may prepare the top surface of the fill to receive the concrete as he/she deems necessary for satisfactory placement at no additional cost to the Department.

586.04 Method of Measurement. This work will be measured for payment as follows.

- (a) Contract Quantities. The requirements for the use of contract quantities shall conform to Article 202.07(a).
- (b) Measured Quantities. This work will be measured for payment in place and the volume computed in cubic yards (cubic meters). The volume will be determined by the method of average end areas behind the abutment.

586.05 Basis of Payment. This work will be paid for at the contract unit price per cubic yard (cubic meter) for GRANULAR BACKFILL FOR STRUCTURES.

Revise the first paragraph of Article 1003.04 (c) of the Standard Specifications to read:

- “(c) Gradation. The granular fine aggregate gradations for Embankment, Backfill, Bedding, Trench Backfill for Pipe Culverts and Storm Sewers shall be FA 1, FA 2, or FA 6 though FA 21.”

Revise Article 1004.05 (c) of the Standard Specifications to read:

- “(c) Gradation. The coarse aggregate gradation for Blotter shall be CA 15.

The granular coarse aggregate gradations for Embankment, Backfill, Bedding, and Trench Backfill for Pipe Culverts and Storm Sewers shall be CA 6, CA 9, CA 10, CA 12, CA 17 thru CA19.

The porous granular coarse aggregate gradations for Embankment, Backfill, and French Drains shall be CA 7, CA 8, CA 11, CA 15, CA 16 and CA 18.”

**WEEP HOLE DRAINS FOR ABUTMENTS, WINGWALLS, RETAINING WALLS AND
CULVERTS**

Effective: April 19, 2012

Revised: October 22, 2013

Delete the last paragraphs of Articles 205.05 and 502.10 and replace with the following.

“If a geocomposite wall drain according to Section 591 is not specified, a prefabricated geocomposite strip drain according to Section 1040.07 shall be placed at the back of each drain hole. The strip drain shall be 24 inches (600 mm) wide and 48 inches (1.220 m) tall. The strip drain shall be centered over the drain hole with the bottom located 12 inches (300 mm) below the bottom of the drain hole. All form boards or other obstructions shall be removed from the drain holes before placing any geocomposite strip drain.”

Revise the last sentence of the first paragraph of Article 503.11 to read as follows.

“Drain holes shall be covered to prevent the leakage of backfill material according to Article 502.10.”

Revise the title of Article 1040.07 to Geocomposite Wall Drains and Strip Drains.

BUTT JOINTS (BDE)

Effective: July 1, 2016

Add the following to Article 406.08 of the Standard Specifications.

“(c) Temporary Plastic Ramps. Temporary plastic ramps shall be made of high density polyethylene meeting the properties listed below. Temporary plastic ramps shall only be used on roadways with permanent posted speeds of 55 mph or less. The ramps shall have a minimum taper rate of 1:30 (V:H). The leading edge of the plastic ramp shall have a maximum thickness of 1/4 in. (6 mm) and the trailing edge shall match the height of the adjacent pavement ± 1/4 in. (± 6 mm).

The ramp will be accepted by certification. The Contractor shall furnish a certification from the manufacturer stating the temporary plastic ramp meets the following requirements.

Physical Property	Test Method	Requirement
Melt Index	ASTM D 1238	8.2 g/10 minutes
Density	ASTM D 1505	0.965 g/cc
Tensile Strength @ Break	ASTM D 638	2223 psi (15 MPa)
Tensile Strength @ Yield	ASTM D 638	4110 psi (28 MPa)
Elongation @ Yield ^{1/} , percent	ASTM D 638	7.3 min.
Durometer Hardness, Shore D	ASTM D 2240	65
Heat Deflection Temperature, 66 psi	ASTM D 648	176 °F (80 °C)
Low Temperature Brittleness, F ₅₀	ASTM D 746	<-105 °F (<-76 °C)

1/ Crosshead speed -2 in./minute

The temporary plastic ramps shall be installed according to the manufacturer’s specifications and fastened with anchors meeting the manufacturer’s recommendations. Temporary plastic ramps that fail to stay in place or create a traffic hazard shall be replaced immediately with temporary HMA ramps at the Contractor’s expense.”

COARSE AGGREGATE QUALITY (BDE)

Effective: July 1, 2015

Revise Article 1004.01(b) of the Standard Specifications to read:

“(b) Quality. The coarse aggregate shall be according to the quality standards listed in the following table.

COARSE AGGREGATE QUALITY				
QUALITY TEST	CLASS			
	A	B	C	D
Na ₂ SO ₄ Soundness 5 Cycle, ITP 104 ^{1/} , % Loss max.	15	15	20	25 ^{2/}
Los Angeles Abrasion, ITP 96 ^{11/} , % Loss max.	40 ^{3/}	40 ^{4/}	40 ^{5/}	45
Minus No. 200 (75 μm) Sieve Material, ITP 11	1.0 ^{6/}	---	2.5 ^{7/}	---
Deleterious Materials ^{10/}				
Shale, % max.	1.0	2.0	4.0 ^{8/}	---
Clay Lumps, % max.	0.25	0.5	0.5 ^{8/}	---
Coal & Lignite, % max.	0.25	---	---	---
Soft & Unsound Fragments, % max.	4.0	6.0	8.0 ^{8/}	---
Other Deleterious, % max.	4.0 ^{9/}	2.0	2.0 ^{8/}	---
Total Deleterious, % max.	5.0	6.0	10.0 ^{8/}	---
Oil-Stained Aggregate ^{10/} , % max	5.0	---	---	---

1/ Does not apply to crushed concrete.

2/ For aggregate surface course and aggregate shoulders, the maximum percent loss shall be 30.

3/ For portland cement concrete, the maximum percent loss shall be 45.

4/ Does not apply to crushed slag or crushed steel slag.

5/ For hot-mix asphalt (HMA) binder mixtures, except when used as surface course, the maximum percent loss shall be 45.

6/ For crushed aggregate, if the material finer than the No. 200 (75 μm) sieve consists of the dust from fracture, essentially free from clay or silt, this percentage may be increased to 2.5.

- 7/ Does not apply to aggregates for HMA binder mixtures.
- 8/ Does not apply to Class A seal and cover coats.
- 9/ Includes deleterious chert. In gravel and crushed gravel aggregate, deleterious chert shall be the lightweight fraction separated in a 2.35 heavy media separation. In crushed stone aggregate, deleterious chert shall be the lightweight fraction separated in a 2.55 heavy media separation. Tests shall be run according to ITP 113.
- 10/ Test shall be run according to ITP 203.
- 11/ Does not apply to crushed slag.

All varieties of chert contained in gravel coarse aggregate for portland cement concrete, whether crushed or uncrushed, pure or impure, and irrespective of color, will be classed as chert and shall not be present in the total aggregate in excess of 25 percent by weight (mass).

Aggregates used in Class BS concrete (except when poured on subgrade), Class PS concrete, and Class PC concrete (bridge superstructure products only, excluding the approach slab) shall contain no more than two percent by weight (mass) of deleterious materials. Deleterious materials shall include substances whose disintegration is accompanied by an increase in volume which may cause spalling of the concrete.”

CONCRETE END SECTIONS FOR PIPE CULVERTS (BDE)

Effective: January 1, 2013

Revised: April 1, 2016

Description. This work shall consist of constructing cast-in-place concrete and precast concrete end sections for pipe culverts. These end sections are shown on the plans as Highway Standard 542001, 542006, or 542011, or 542016. This work shall be according to Section 542 of the Standard Specifications except as modified herein.

Materials. Materials shall be according to the following Articles of Division 1000 – Materials of the Standard Specifications.

Item	Article/Section
(a) Portland Cement Concrete (Note 1)	1020
(b) Precast Concrete End Sections (Note 2)	
(c) Coarse Aggregate (Note 3)	1004.05
(d) Structural Steel (Note 4)	1006.04
(e) Anchor Bolts and Rods (Note 5)	1006.09
(f) Reinforcement Bars	1006.10(a)
(g) Nonshrink Grout	1024.02
(h) Chemical Adhesive Resin System	1027
(i) Mastic Joint Sealer for Pipe	1055
(j) Hand Hole Plugs	1042.16

Note 1. Cast-in-place concrete end sections shall be Class SI, except the 14 day mix design shall have a compressive strength of 5000 psi (34,500 kPa) or a flexural strength of (800 psi) 5500 kPa and a minimum cement factor of 6.65 cwt/cu yd (395 kg/cu m).

Note 2. Precast concrete end sections shall be according to Articles 1042.02 and 1042.03(b)(c)(d)(e) of the Standard Specifications. The concrete shall be Class PC according to Section 1020, and shall have a minimum compressive strength of 5000 psi (34,000 kPa) at 28 days.

Joints between precast sections shall be produced with reinforced tongue and groove ends according to the requirements of ASTM C 1577.

Note 3. The granular bedding placed below a precast concrete end section shall be gradation CA 6, CA 9, CA 10, CA 12, CA 17, CA 18, or CA 19.

Note 4. All components of the culvert tie detail shall be galvanized according to the requirements of AASHTO M 111 or M 232 as applicable.

Note 5. The anchor rods for the culvert ties shall be according to the requirements of ASTM F 1554, Grade 105 (Grade 725).

CONSTRUCTION REQUIREMENTS

The concrete end sections may be precast or cast-in-place construction. Toe walls shall be either precast or cast-in-place, and shall be in proper position and backfilled according to the applicable paragraphs of Article 502.10 of the Standard Specifications prior to the installation of the concrete end sections. If soil conditions permit, cast-in-place toe walls may be poured directly against the soil. When poured directly against the soil, the clear cover of the sides and bottom of the toe wall shall be increased to 3 in. (75 mm) by increasing the thickness of the toe wall.

- (a) Cast-In-Place Concrete End Sections. Cast-in-place concrete end sections shall be constructed according to the requirements of Section 503 of the Standard Specifications and as shown on the plans.
- (b) Precast Concrete End Sections. When the concrete end sections will be precast, shop drawings detailing the slab thickness and reinforcement layout shall be submitted to the Engineer for review and approval.

The excavation and backfilling for precast concrete end sections shall be according to the requirements of Section 502 of the Standard Specifications, except a layer of granular bedding at least 6 in. (150 mm) in thickness shall be placed below the elevation of the bottom of the end section. The granular bedding shall extend a minimum of 2 ft (600 mm) beyond each side of the end section.

Anchor rods connecting precast sections shall be brought to a snug tight condition followed by an additional 2/3 turn on one of the nuts. Match marks shall be provided on the bolt and nut to verify relative rotation between the bolt and the nut.

When individual, precast end sections are placed side-by-side for a multi-pipe culvert installation, a 3 in. (75 mm) space shall be left between adjacent end section walls and the space(s) filled with Class SI concrete.

Method of Measurement. This work will be measured for payment as each, with each end of each culvert being one each.

Basis of Payment. This work will be paid for at the contract unit price per each for CONCRETE END SECTION, STANDARD 542001; CONCRETE END SECTION, STANDARD 542006; or CONCRETE END SECTION, 542011; or CONCRETE END SECTION, 542016, of the pipe diameter and slope specified.

CONSTRUCTION AIR QUALITY – DIESEL RETROFIT (BDE)

Effective: June 1, 2010

November 1, 2014

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 ^{1/}	600-749	2002
	750 and up	2006
June 1, 2011 ^{2/}	100-299	2003
	300-599	2001
	600-749	2002
	750 and up	2006
June 1, 2012 ^{2/}	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/cleandiesel/verification/verif-list.htm>), or verified by the California Air Resources Board (CARB) (<http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm>); or
- b) Retrofitted with a non-verified diesel retrofit emission control device if verified retrofit emission control devices are not available for equipment proposed to be used on the project, and if the Contractor has obtained a performance certification from the retrofit device manufacturer that the emission control device provides a minimum PM emission reduction of 50 percent.

Note: Large cranes (Crawler mounted cranes) which are responsible for critical lift operations are exempt from installing retrofit emission control devices if such devices adversely affect equipment operation.

Diesel powered off-road equipment with engine ratings of 50 hp and above, which are unable to be retrofitted with verified emission control devices or if performance certifications are not available which will achieve a minimum 50 percent PM reduction, may be granted a waiver by the Department if documentation is provided showing good faith efforts were made by the Contractor to retrofit the equipment.

Construction shall not proceed until the Contractor submits a certified list of the diesel powered off-road equipment that will be used, and as necessary, retrofitted with emission control devices. The list(s) shall include (1) the equipment number, type, make, Contractor/rental company name; and (2) the emission control devices make, model, USEPA or CARB verification number, or performance certification from the retrofit device manufacturer. Equipment reported as fitted with emissions control devices shall be made available to the Engineer for visual inspection of the device installation, prior to being used on the jobsite.

The Contractor shall submit an updated list of retrofitted off-road construction equipment as retrofitted equipment changes or comes on to the jobsite. The addition or deletion of any diesel powered equipment shall be included on the updated list.

If any diesel powered off-road equipment is found to be in non-compliance with any portion of this special provision, the Engineer will issue the Contractor a diesel retrofit deficiency deduction.

Any costs associated with retrofitting any diesel powered off-road equipment with emission control devices shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed. The Contractor's compliance with this notice and any associated regulations shall not be grounds for a claim.

Diesel Retrofit Deficiency Deduction

When the Engineer determines that a diesel retrofit deficiency exists, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency continues to exist. The calendar day(s) will begin when the time period for correction is exceeded and end with the Engineer's written acceptance of the correction. The daily monetary deduction will be \$1,000.00 for each deficiency identified.

The deficiency will be based on lack of diesel retrofit emissions control.

If a Contractor accumulates three diesel retrofit deficiency deductions for the same piece of equipment in a contract period, the Contractor will be shutdown until the deficiency is corrected. Such a shutdown will not be grounds for any extension of the contract time, waiver of penalties, or be grounds for any claim.

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)

Effective: September 1, 2000

Revised: January 2, 2016 July 2, 2016

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, which may include, but is not limited to:

- (a) Withholding progress payments;
- (b) Assessing sanctions;
- (c) Liquidated damages; and/or
- (d) Disqualifying the Contractor from future bidding as non-responsible.

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

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. The determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform **26.00%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will only award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set for in this Special Provision:

- (a) The bidder documents 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 shall consult the IL UCP DBE Directory as a reference source for DBE-certified companies. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217) 785-4611, or by visiting the Department's website at:

<http://www.idot.illinois.gov/doing-business/certifications/disadvantaged-business-enterprise-certification/il-ucp-directory/index>.

BIDDING PROCEDURES. Compliance with this Special Provision is required prior to the award of the contract and the failure of the low bidder to comply will render the bid not responsive.

In order to assure the timely award of the contract, the low bidder shall submit:

- (a) The bidder shall submit a Disadvantaged BusinessDBE Utilization Plan on completed Department forms SBE 2025 and 2026.
 - (1) The final Utilization Plan must be submitted within five calendar days after the date of the letting in accordance with subsection (a)(2) of Bidding Procedures.
 - (2) To meet the five day requirement, the bidder may send the Utilization Plan electronically by scanning and sending to **DOT.DBE.UP@illinois.gov** or faxing to (217) 785-1524. The subject line must include the bid Item Number and the Letting date. The Utilization Plan should be sent as one .pdf file, rather than multiple files and emails for the same Item Number. It is the responsibility of the bidder to obtain confirmation of email or fax delivery.

Alternatively, the Utilization Plan may be sent by certified mail or delivery service within the five calendar day period. If a question arises concerning the mailing date of a Utilization Plan, the mailing date will be established by the U.S. Postal Service postmark on the original certified mail receipt from the U.S. Postal Service or the receipt issued by a delivery service when the Utilization Plan is received by the Department. It is the responsibility of the bidder to ensure the postmark or receipt date is affixed within the five days if the bidder intends to rely upon mailing or delivery to satisfy the submission day requirement. The Utilization Plan is to be submitted to:

Illinois Department of Transportation
Bureau of Small Business Enterprises
Contract Compliance Section
2300 South Dirksen Parkway, Room 319
Springfield, Illinois 62764

The Department will not accept a Utilization Plan if it does not meet the five day submittal requirement and the bid will be declared not responsive. In the event the bid is declared not responsive due to a failure to submit a Utilization Plan or failure to comply with the bidding procedures set forth herein, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty, and may deny authorization to bid the project if re-advertised for bids. The Department reserves the right to invite any other bidder to submit a Utilization Plan at any time for award consideration or to extend the time for award.

- (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 Utilization 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 scanned or 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 Utilization 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; the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor is selected over a DBE for work on the contract.

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 that enough DBE participation has been obtained or document that good faith efforts of the bidder, in the event enough DBE participation has not been obtained, before the Department will commit to the performance of the contract by the bidder. The Utilization Plan will be approved by the Department if the Utilization Plan documents sufficient commercially useful DBE work to meet the contract goal or the bidder submits sufficient documentation of a good faith effort to meet the contract goal pursuant to 49 CFR Part 26, Appendix A. The Utilization Plan will not be approved by the Department if the Utilization Plan does not document 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. In accordance with subsection (c)(6) of the above Bidding Procedures, the documentation of good faith efforts must include copies of each DBE and non-DBE subcontractor quote submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract.
- (5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.
 - (6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.
 - (7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.
 - (8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.

- (b) If the Department determines 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 or that a good faith effort has not been made, the Department will notify the responsible company official designated in the Utilization Plan that the bid is not responsive. The notification shall include a statement of reasons for the determination. If the Utilization Plan is not approved because it is deficient as a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no more than a five calendar day period in order to cure the deficiency.
- (c) The bidder may request administrative reconsideration of a determination adverse to the bidder within the five working days after the 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 or argument concerning the issues raised in the determination statement of reasons, provided the documentation and arguments address efforts made prior to submitting the bid. The request will be 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 documentation and whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for consideration, 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 is receives as a result of the lease arrangement.
- (e) DBE as a material supplier:
 - (1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.
 - (2) 100 percent goal credit for the cost of materials of supplies obtained from a DBE manufacturer.
 - (3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a DBE regular dealer or DBE manufacturer.

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

- (a) NO AMENDMENT. No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be 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) CHANGES TO WORK. Any deviation from the DBE condition-of-award or contract plans, specifications, or special provisions must be approved, in writing, by the Department as provided elsewhere in the Contract. The Contractor shall notify affected DBEs in writing of any changes in the scope of work which result in a reduction in the dollar amount condition-of-award to the contract. Where the revision includes work committed to a new DBE subcontractor, not previously involved in the project, then a Request for Approval of Subcontractor, Department form BC 260A or AER 260A, must be signed and submitted. If the commitment of work is in the form of additional tasks assigned to an existing subcontract, 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.
- (c) SUBCONTRACT. The Contractor must provide DBE subcontracts to IDOT upon request. Subcontractors shall ensure that all lower tier subcontracts or agreements with DBEs to supply labor or materials be performed in accordance with this Special Provision.

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

- (1) 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 reasonable competitive price. If this occurs, the Contractor shall substitute other work of equivalent value to a certified DBE or provide documentation of good faith efforts to do so.

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

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

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

- (1) The listed DBE subcontractor fails or refuses to execute a written contract;
- (2) The listed DBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
- (3) The listed DBE subcontractor fails or refuses to meet the prime Contractor's reasonable, nondiscriminatory bond requirements;
- (4) The listed DBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (5) The listed DBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1200 or applicable state law.
- (6) You have determined that the listed DBE subcontractor is not a responsible contractor;
- (7) The listed DBE subcontractor voluntarily withdraws from the projects and provides to you written notice of its withdrawal;
- (8) The listed DBE is ineligible to receive DBE credit for the type of work required;
- (9) A DBE owner dies or becomes disabled with the result that the listed DBE subcontractor is unable to complete its work on the contract;
- (10) Other documented good cause that compels the termination of the DBE subcontractor. Provided, that good cause does not exist if the prime Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the prime Contractor can self-perform the work for which the DBE contractor was engaged or so that the prime Contractor can substitute another DBE or non-DBE contractor after contract award.

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

- (f) PAYMENT RECORDS. 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 Resident Engineer. If full and final payment has not been made to the DBE, the DBE Payment Agreement shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes 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 (h) of this part.
- (g) ENFORCEMENT. The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.
- (h) RECONSIDERATION. Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department. The result of the reconsideration process is not administratively appealable to the U.S. Department of Transportation.

ENGINEER'S FIELD OFFICE (BDE)

Effective: April 1, 2016

Revise the fifth 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 remain the property of the Contractor after release by the Engineer, except the Department will pay that portion of the monthly long distance, monthly local telephone, and online data usage that, when combined, exceed \$250."

EQUAL EMPLOYMENT OPPORTUNITY (BDE)

Effective: April 1, 2015

FEDERAL AID CONTRACTS. Revise the following section of Check Sheet #1 of the Recurring Special Provisions to read:

"EQUAL EMPLOYMENT OPPORTUNITY

In the event of the Contractor's noncompliance with the provisions of this Equal Employment Opportunity Clause, the Illinois Human Rights Act, or the Illinois Department of Human Rights Rules and Regulations, the Contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political sub-divisions or municipal corporations, and the contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.

During the performance of this Contract, the Contractor agrees as follows:

- (1) That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status, or an unfavorable discharge from military service; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
- (2) That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability (according to the Illinois Department of Human Rights Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.

- (3) That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status or an unfavorable discharge from military service.
- (4) That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations. If any labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Illinois Department of Human Rights and IDOT and will recruit employees from other sources when necessary to fulfill its obligations thereunder.
- (5) That it will submit reports as required by the Illinois Department of Human Rights Rules and Regulations, furnish all relevant information as may from time to time be requested by the Illinois Department of Human Rights or IDOT, and in all respects comply with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.
- (6) That it will permit access to all relevant books, records, accounts, and work sites by personnel of IDOT and the Illinois Department of Human Rights for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.
- (7) That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so that the provisions will be binding upon the subcontractor. In the same manner as with other provisions of this contract, the Contractor will be liable for compliance with applicable provisions of this clause by subcontractors; and further it will promptly notify IDOT and the Illinois Department of Human Rights in the event any subcontractor fails or refuses to comply with these provisions. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations."

STATE CONTRACTS. Revise Section II of Check Sheet #5 of the Recurring Special Provisions to read:

“II. EQUAL EMPLOYMENT OPPORTUNITY

In the event of the Contractor's noncompliance with the provisions of this Equal Employment Opportunity Clause, the Illinois Human Rights Act or the Illinois Department of Human Rights Rules and Regulations, the Contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political sub-divisions or municipal corporations, and the contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.

During the performance of this Contract, the Contractor agrees as follows:

1. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status, or an unfavorable discharge from military service; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
2. That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability (according to the Illinois Department of Human Rights Rules and Regulations) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
3. That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, sexual orientation, marital status, order of protection status, national origin or ancestry, citizenship status, age, physical or mental disability unrelated to ability, military status, or an unfavorable discharge from military service.
4. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations. If any labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Illinois Department of Human Rights and IDOT and will recruit employees from other sources when necessary to fulfill its obligations thereunder.

5. That it will submit reports as required by the Illinois Department of Human Rights Rules and Regulations, furnish all relevant information as may from time to time be requested by the Illinois Department of Human Rights or IDOT, and in all respects comply with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.
6. That it will permit access to all relevant books, records, accounts and work sites by personnel of IDOT and the Illinois Department of Human Rights for purposes of investigation to ascertain compliance with the Illinois Human Rights Act and the Illinois Department of Human Rights Rules and Regulations.
7. That it will include verbatim or by reference the provisions of this clause in every subcontract it awards under which any portion of the contract obligations are undertaken or assumed, so that the provisions will be binding upon the subcontractor. In the same manner as with other provisions of this contract, the Contractor will be liable for compliance with applicable provisions of this clause by subcontractors; and further it will promptly notify IDOT and the Illinois Department of Human Rights in the event any subcontractor fails or refuses to comply with these provisions. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.”

ERRATA FOR THE 2016 STANDARD SPECIFICATIONS (BDE)

Effective: April 1, 2016

- Page 84 Article 204.02. In the seventh line of the first paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”.
- Page 90 Article 205.06. In the first sentence of the third paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”.
- Page 91 Article 205.06. In the first sentence of the fourth paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”, and in the second sentence change “AASHTO T 224” to “Illinois Modified AASHTO T 99 (Annex A1)”.
- Page 91 Article 205.06. In the second line of the fifth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”.
- Page 91 Article 205.06. In the sixth line of the eighth paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”.
- Page 148 Article 302.09. In the second sentence of the fifth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”, and in the third sentence change “AASHTO T 99” to “Illinois Modified AASHTO T 99”.

- Page 152 Article 310.09. In the second sentence of the second paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”, and in the third sentence change “AASHTO T 99” to “Illinois Modified AASHTO T 99”.
- Page 155 Article 311.05(a). In the first sentence of the fifth paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”, and in the second sentence change “AASHTO T 224” to “Illinois Modified AASHTO T 99 (Annex A1)”.
- Page 155 Article 311.05(a). In the second line of the sixth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”.
- Page 163 Article 351.05(a). In the second sentence of the fifth paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”, and in the third sentence change “AASHTO T 224” to “Illinois Modified AASHTO T 99 (Annex A1)”.
- Page 163 Article 351.05(a). In the second line of the sixth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”.
- Page 169 Article 352.11. In the second sentence of the fourth paragraph change “AASHTO T 191” to “Illinois Modified AASHTO T 191”, and in the third sentence change “AASHTO T 134 (Method B)” to “Illinois Modified AASHTO T 134 (Method B)”.
- Page 169 Article 352.12. In the first sentence of the first paragraph change “AASHTO T 22” to “Illinois Modified AASHTO T 22”, and in the second sentence change “AASHTO T 134 (Method B)” to “Illinois Modified AASHTO T 134 (Method B)”.
- Page 196 Article 406.07(a). After the footnotes in Table 1 - Minimum Roller Requirements for HMA add the following:

“EQUIPMENT DEFINITION

- V_s - Vibratory roller, static mode, minimum 125 lb/in. (2.2 kg/mm) of roller width. Maximum speed = 3 mph (5 km/h) or 264 ft/min (80 m/min). If the vibratory roller does not eliminate roller marks, its use shall be discontinued and a tandem roller, adequately ballasted to remove roller marks, shall be used.
- V_D - Vibratory roller, dynamic mode, operated at a speed to produce not less than 10 impacts/ft (30 impacts/m).
- P - Pneumatic-tired roller, max. speed 3 1/2 mph (5.5 km/h) or 308 ft/min (92 m/min). The pneumatic-tired roller shall have a minimum tire pressure of 80 psi (550 kPa) and shall be equipped with heat retention shields. The self-propelled pneumatic-tired roller shall develop a compression of not less than 300 lb (53 N) nor more than 500 lb (88 N) per in. (mm) of width of the tire tread in contact with the HMA surface.

T_B - Tandem roller for breakdown rolling, 8 to 12 tons (7 to 11 metric tons), 250 to 400 lb/in. (44 to 70 N/mm) of roller width, max. speed = 3 1/2 mph (5.5 km/h) or 308 ft/min (92 m/min).

T_F - Tandem roller for final rolling, 200 to 400 lb/in. (35 to 70 N/mm) of roller width with minimum roller width of 50 in. (1.25 m). Ballast shall be increased if roller marks are not eliminated. Ballast shall be decreased if the mat shoves or distorts.

3W- Three wheel roller, max. speed = 3 mph (5 km/h) or 264 ft/min (80 m/min), 300 to 400 lb/in. (53 to 70 N/mm) of roller width. The three-wheel roller shall weigh 10 to 12 tons (9 to 11 metric tons)."

Page 331 Article 505.04(p). Under Range of Clearance in the first table change "in. x 10⁻⁶" to "in. x 10⁻³".

Page 444 Article 542.03. In the Notes in Table IIIB add "CPP Corrugated Polypropylene (CPP) pipe with smooth interior".

Page 445 Article 542.03. In the fourth column in Table IIIB (metric) change the heading for Type 5 pipe from "CPE" to "CPP".

Page 445 Article 542.03. In the Notes in Table IIIB (metric) change "PE Polyethylene (PE) pipe with a smooth interior" to "CPP Corrugated Polypropylene (CPP) pipe with smooth interior".

Page 449 Article 542.04(f)(2). In the third line of the second paragraph change "AASHTO T 99 (Method C)" to "Illinois Modified AASHTO T 99 (Method C)".

Page 544 Article 639.03. In the first sentence of the first paragraph change "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, Traffic Signals," to "AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals,"".

Page 546 Article 640.03. In the first sentence of the first paragraph change "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" to "AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals"".

Page 548 Article 641.03. In the first sentence of the first paragraph change "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaire and Traffic Signals," to "AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals,"".

Page 621 Article 727.03. In the first sentence of the third paragraph change "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" to "AASHTO "LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals"".

- Page 629 Article 734.03(a). In the fourth line of the second paragraph change “AASHTO T 99 (Method C)” to “Illinois Modified AASHTO T 99 (Method C)”.
- Page 649 Article 801.02. In the first sentence of the first paragraph change “AASHTO’s Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 742 Article 1003.04(c). Under Gradation in the table change “(see Article 1003.02(c))” to “(see Article 1003.01(c))”.
- Page 755 Article 1004.03(b). Revise the third sentence of the first paragraph to read “For Class A (seal or cover coat), and other binder courses, the coarse aggregate shall be Class C quality or better.”.
- Page 809 Article 1020.04(e). In the third line of the first paragraph change “ITP SCC-3” to “ITP SCC-4”.
- Page 945 Article 1069.05. In the first sentence of the tenth paragraph change ““Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals”” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 961 Article 1070.04(b)(1). In the third sentence of the first paragraph change ““Standard Specifications of Structural Supports for Highway Signs, Luminaires and Traffic Signals” published by AASHTO” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 989 Article 1077.01. In the second sentence of the first paragraph change “Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, as published by AASHTO” to “AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals””.
- Page 1121 Article 1103.13(a). In the first line of the first paragraph change “Bridge Deck Approach Slabs.” to “Bridge Deck and Approach Slabs.”.

GROOVING FOR RECESSED PAVEMENT MARKINGS (BDE)

Effective: November 1, 2012

Revised: January 1, 2013 August 1, 2014

Description. This work shall consist of grooving the pavement surface in preparation for the application of recessed pavement markings.

Equipment. Equipment shall be according to the following.

- (a) Pavement Marking Tape Installations: The grooving equipment shall have a free-floating saw blade cutting head equipped with gang-stacked diamond saw blades. The diamond saw blades shall be of uniform wear and shall produce a smooth textured surface. Any ridges in the groove shall have a maximum height of 15 mils (0.38 mm).
- (b) Liquid and Thermoplastic Pavement Marking Installations: The grooving equipment shall be equipped with either a free-floating saw blade cutting head or a free-floating grinder cutting head configuration with diamond or carbide tipped cutters and shall produce an irregular textured surface.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall supply the Engineer with a copy of the pavement marking material manufacturer's recommendations for constructing a groove.

Pavement Grooving Methods. The grooves for recessed pavement markings shall be constructed using the following methods.

- (a) Wet Cutting Head Operation. When water is required or used to cool the cutting head, the groove shall be flushed with high pressure water immediately following the cut to avoid build up and hardening of slurry in the groove. The pavement surface shall be allowed to dry for a minimum of 24 hours prior to the final cleaning of the groove and application of the pavement marking material.
- (b) Dry Cutting Head Operation. When used on HMA pavements, the groove shall be vacuumed or cleaned by blasting with high-pressure air to remove loose aggregate, debris, and dust generated during the cutting operation. When used on PCC pavements, the groove shall be flushed with high pressure water or shot blasted to remove any PCC particles that may have become destabilized during the grooving process. If high pressure water is used, the pavement surface shall be allowed to dry for a minimum of 24 hours prior to the final cleaning of the groove and application of the pavement marking material.

Pavement Grooving. Grooving shall not cause ravels, aggregate fractures, spalling or disturbance of the joints to the underlying surface of the pavement. Grooves shall be cut into the pavement prior to the application of the pavement marking material. Grooves shall be cut such that the width is 1 in. (25 mm) greater than the width of the pavement marking line as specified on the plans. Grooves for letters and symbols shall be cut in a square or rectangular shape so that the entire marking will fit within the limits of the grooved area. The position of the edge of the grooves shall be a minimum of 4 in. (100 mm) from the edge of all longitudinal joints. The depth of the groove shall not be less than the manufacturer's recommendations for the pavement marking material specified, but shall be installed to a minimum depth of 110 mils (2.79 mm) and a maximum depth of 200 mils (5.08 mm) for pavement marking tapes thermoplastic markings and a minimum depth of 40 mils (1.02 mm) and a maximum depth of 80 mils (2.03 mm) for liquid markings. The cutting head shall be operated at the appropriate speed in order to prevent undulation of the cutting head and grooving at an inconsistent depth.

At the start of grooving operations, a 50 ft (16.7 m) test section shall be installed and depth measurements shall be made at 10 ft (3.3 m) intervals within the test section. The individual depth measurements shall be within the allowable ranges according to this Article. If it is determined the test section has not been grooved at the appropriate depth or texture, adjustments shall be made to the cutting head and another 50 ft (16.7 m) test section shall be installed and checked. This process shall continue until the test section meets the requirements of this Article.

For new HMA pavements, grooves shall not be installed within 14 days of the placement of the final course of pavement.

Final Cleaning. Immediately prior to the application of the pavement marking material or primer sealer, the groove shall be cleaned with high-pressure air blast.

Method of Measurement. This work will be measured for payment in place, in feet (meter) for the groove width specified.

Grooving for letter, numbers and symbols will be measured in square feet (square meters).

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for GROOVING FOR RECESSED PAVEMENT MARKING of the groove width specified, and per square foot (square meter) for GROOVING FOR RECESSED PAVEMENT MARKING, LETTERS AND SYMBOLS.

The following shall only apply when preformed plastic pavement markings are to be recessed:

Add the following paragraph after the first paragraph of Article 780.07 of the Standard Specifications.

“The markings shall be capable of being applied in a grooved slot on new and existing portland cement concrete and HMA surfaces, by means of a pressure-sensitive, precoated adhesive, or liquid contact cement which shall be applied at the time of installation. A primer sealer shall be applied with a roller and shall cover and seal the entire bottom of the groove. The primer sealer shall be recommended by the manufacturer of the pavement marking material and shall be compatible with the material being used. The Contractor shall install the markings in the groove as soon as possible after the primer sealer cures according to the manufacturer’s recommendations. The markings placed in the groove shall be rolled and tamped into the groove with a roller or tamper cart cut to fit the groove and loaded with or weighing at least 200 lb (90kg). Vehicle tires shall not be used for tamping. The Contractor shall roll and tamp the material with a minimum of 6 passes to prevent easy removal or peeling.”

HOT-MIX ASPHALT - DENSITY TESTING OF LONGITUDINAL JOINTS (BDE)

Effective: January 1, 2010

Revised: April 1, 2012 April 1, 2016

Description. This work shall consist of testing the density of longitudinal joints as part of the quality control/quality assurance (QC/QA) of hot-mix asphalt (HMA). Work shall be according to Section 1030 of the Standard Specifications except as follows.

Quality Control/Quality Assurance (QC/QA). Delete the second and third sentence of the third paragraph of Article 1030.05(d)(3) of the Standard Specifications.

Add the following paragraphs to the end of Article 1030.05(d)(3) of the Standard Specifications:

“Longitudinal joint density testing shall be performed at each random density test location. Longitudinal joint testing shall be located at a distance equal to the lift thickness or a minimum of 4 in. (100 mm), from each pavement edge. (i.e. for a 5 in. (125 mm) lift the near edge of the density gauge or core barrel shall be within 5 in. (125 mm) from the edge of pavement.) Longitudinal joint density testing shall be performed using either a correlated nuclear gauge or cores.

a. Confined Edge. Each confined edge density shall be represented by a one-minute nuclear density reading or a core density and shall be included in the average of density readings or core densities taken across the mat which represents the Individual Test.

b. Unconfined Edge. Each unconfined edge joint density shall be represented by an average of three one-minute density readings or a single core density at the given density test location and shall meet the density requirements specified herein. The three one-minute readings shall be spaced 10 ft (3 m) ten feet apart longitudinally along the unconfined pavement edge and centered at the random density test location.”

Revise the Density Control Limits table in Article 1030.05(d)(4) of the Standard Specifications to read:

"Mixture Composition	Parameter	Individual Test (includes confined edges)	Unconfined Edge Joint Density Minimum
IL-4.75	Ndesign = 50	93.0 – 97.4% ^{1/}	91.0%
IL-9.5, IL-12.5	Ndesign ≥ = 90	92.0 – 96.0%	90.0%
IL-9.5,IL-9.5L, IL-12.5	Ndesign < 90	92.5 – 97.4%	90.0%
IL-19.0, IL-25.0	Ndesign ≥ = 90	93.0 – 96.0%	90.0%
IL-19.0, IL-19.0L, IL-25.0	Ndesign < 90	93.0 ^{2/} – 97.4%	90.0%
SMAAll Other	Ndesign = 50 & 80 Ndesign = 30	93.5 – 97.4% 93.0 - 97.4%	91.0% "90.0%"

LIGHT POLES (BDE)

Effective: July 1, 2016

Revise the second paragraph of Article 1069.01 of the Standard Specifications to read:

“The detailed design and fabrication of the pole shaft, arms, tenons, and attachments shall be according to AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” current at the time the project is advertised. Light poles shall be designed for ADT > 10,000 and Risk Category Typical. If Fatigue design is required, light poles shall be designed for Importance Category I.”

Revise the fifth paragraph of Article 1069.01(a) of the Standard Specifications to read:

“Deflection of the pole top as caused by the combined effect of deadload referenced above and wind speed prescribed by AASHTO shall be as required by AASHTO. Pole deflection and loading compliance, certified by the manufacturer, shall be noted on the pole submittal.”

LIGHT TOWER (BDE)

Effective: July 1, 2016

Revise the third paragraph of Article 1069.08 of the Standard Specifications to read:

“The design shall be based upon AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” in effect on the date of invitation for bids, however the width of reinforced opening requirement in Chapter 5, Section 5.6.6.1 shall not apply. Light Towers shall be designed for ADT > 10,000, Risk Category Typical, and Fatigue Importance Category I.”

MAST ARM ASSEMBLY AND POLE (BDE)

Effective: July 1, 2016

Revise Article 1077.03(a)(1) of the Standard Specifications to read:

“(1) Loading. The mast arm assembly and pole, and combination mast arm assembly and pole shall be designed for the loading shown on the Highway Standards or elsewhere on the plans, whichever is greater. The design shall be according to AASHTO “LRFD Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals” 2015 Edition. However, the arm-to-pole connection for tapered signal and luminaire arms shall be according to the “fillet welded, ring stiffened box connection” detail as shown in Figure C5.6.7-2. The mast arm and pole shall be designed assuming the ADT > 10,000, Risk Category Typical, and Fatigue Category I Natural Wind Gust only.”

OVERHEAD SIGN STRUCTURES – CERTIFICATION OF METAL FABRICATOR (BDE)

Effective: November 1, 2015

Revised: April 1, 2016

Revise Article 106.08 of the Supplemental Standard Specifications to read:

“106.08 Certification of Metal Fabricator. All fabricators performing work on metal components of structures shall be certified under the appropriate category of the AISC Certification Program for Steel Bridge Fabricators as follows.

- (a) Fabricators of the main load carrying steel components of box girder, trusses over 200 ft (61 m) in length, arch, cable supported, moveable, and curved (radii under 1000 ft (305 m)) structures shall be certified under Category Advanced Bridges.
- (b) Fabricators of the main load carrying steel components of spliced rolled beams, welded plate girders, either simple span or continuous, trusses under 200 ft (61 m) in length, and curved (radii over 1000 ft (305 m)) structures, shall be certified under Category Intermediate Bridges.
- (c) Fabricators of the main load carrying steel components of unspliced rolled beam sections shall be certified under Category Simple Bridges.
- (d) Fabricators of overhead sign structures shall be on the Department’s list of pre-qualified Overhead Sign Structure Fabricators and certified under either (a), (b), (c) or Category Bridge and Highway Metal Component Manufacturers.
- (e) Fabricators of steel or other non-ferrous metal components of structures, not certified under (a), (b), or (c) above, shall be certified under the AISC program for Bridge and Highway Metal Component Manufacturers.

In addition, fabricators of fracture critical main load carrying steel components of bridges shall also have the Fracture Critical Endorsement.”

PROGRESS PAYMENTS (BDE)

Effective: November 2, 2013

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

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

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

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

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

SPEED DISPLAY TRAILER (BDE)

Effective: April 2, 2014

Revised: April 1, 2016

Add the following to Article 701.15(l) of the Standard Specifications:

“(m) Speed Display Trailer. A speed display trailer shall be utilized on freeways and expressways as part of Highway Standard 701400. The trailer shall be placed on the right hand side of the roadway adjacent to, or within 100 ft (30 m) beyond, the first work zone speed limit sign.

Whenever the speed display trailer is not in use, it shall be considered non-operating equipment and shall be stored according to Article 701.11.”

Add the following to Article 701.20 of the Standard Specifications:

“(k) Speed Display Trailer will be paid for at the contract unit price per calendar month or fraction thereof for each trailer as SPEED DISPLAY TRAILER.”

Add the following to Article 1106.02 of the Standard Specifications:

“(o) Speed Display Trailer. The speed display trailer shall consist of a LED speed indicator display with self-contained, one-direction radar mounted on an orange see-through trailer. The height of the display and radar shall be such that it will function and be visible when located behind concrete barrier.

The speed measurement shall be by radar and provide a minimum detection distance of 1000 ft (300 m). The radar shall have an accuracy of ± 1 mile per hour.

The speed indicator display shall face approaching traffic and shall have a sign legend of “YOUR SPEED” immediately above or below the speed display. The digital speed display shall show two digits (00 to 99) in mph. The color of the changeable message legend shall be a yellow legend on a black background. The minimum height of the numerals shall be 18 in. (450 mm), and the nominal legibility distance shall be at least 750 ft (250 m).

The speed indicator display shall be equipped with a violation alert that flashes the displayed detected speed when the posted limit is exceeded. The speed indicator shall have a maximum speed cutoff. The display shall include automatic dimming for nighttime operation.

The speed indicator measurement and display functions shall be equipped with the power supply capable of providing 24 hours of uninterrupted service.”

STEEL SLAG IN TRENCH BACKFILL (BDE)

Effective: January 1, 2016

Revise the second sentence of Article 1003.01(a)(8) of the Standard Specifications to read:

“Crushed steel slag shall be the nonmetallic product which is developed in a molten condition simultaneously with steel in an open hearth, basic oxygen, or electric arc furnace.”

Revise Article 1003.04(a) of the Standard Specifications to read:

“(a) Description. The fine aggregate shall consist of sand, stone sand, chats, wet bottom boiler slag, slag sand, or granulated slag sand. Crushed concrete sand, construction and demolition debris sand, and steel slag sand produced from an electric arc furnace may be used in lieu of the above for trench backfill.”

TEMPORARY CONCRETE BARRIER (BDE)

Effective: January 1, 2015

Revised: July 1, 2015

Revise Article 704.02 of the Standard Specifications to read:

“**704.02 Materials.** Materials shall be according to the following.

Item	Article/Section
(a) Precast Temporary Concrete Barrier	1042
(b) Reinforcement Bars (Note 1)	1006.10(a)
(c) Connecting Pins and Anchor Pins (Note 21)	
(d) Connecting Loop Bars (Note 32)	
(e) Packaged Rapid Hardening Mortar or Concrete	1018

Note 1. Reinforcement bars shall be Grade 60 (Grade 400).

Note 21. Connecting Pins and Anchor Pins shall be according to the requirements of ASTM F 1554 Grade 36 (Grade 250).

Note 32. Connecting loop bars shall be smooth bars according to the requirements of ASTM A 36 (A 36M).”

Revise Article 704.04 of the Standard Specifications to read:

“**704.04 Installation.** The barriers shall be seated on bare, clean pavement or paved shoulder and connected together in a smooth, continuous line at the locations provided by the Engineer.

Except on bridge decks, or where alternate anchoring details are shown on the plans, the barrier unit at each end of an installation shall be anchored to the pavement or paved shoulder using six anchor pins and protected with an impact attenuator as shown on the plans. When pinning of additional barrier units within the installation is specified, three anchor pins shall be installed in the traffic side holes of the required barriers.

Where both pinned and unpinned barrier units are used in a continuous installation, a transition shall be provided between them. The transition from pinned to unpinned barrier shall consist of two anchor pins installed in the end holes on the traffic side of the first barrier beyond the pinned section and one anchor pin installed in the middle hole on the traffic side of the second barrier beyond the pinned section. The third barrier beyond the pinned section shall then be unpinned.

Barriers located on bridge decks shall be restrained as shown on the plans. Anchor pins shall not be installed through bridge decks, unless otherwise noted.

Barriers or attachments damaged during transportation or handling, or by traffic during the life of the installation, shall be repaired or replaced. The Engineer will be the sole judge in determining which units or attachments require repair or replacement.

The barriers shall be removed when no longer required by the contract. After removal, all anchor holes in the pavement or paved shoulder shall be filled with a rapid hardening mortar or concrete. Only enough water to permit placement and consolidation by rodding shall be used and the material shall be struck-off flush.”

Add the following after the first paragraph of Article 704.05 of the Standard Specifications:

“Anchor pins, except for the six anchor pins for the barrier unit at each end of an installation, will be measured for payment as each, per anchor pin installed.”

Add the following after the second paragraph of Article 704.06 of the Standard Specifications:

“Anchor pins, except for the six anchor pins for the barrier unit at each end of an installation, will be paid for at the contract unit price per each for PINNING TEMPORARY CONCRETE BARRIER.”

TRAINING SPECIAL PROVISIONS (BDE)

Effective: October 15, 1975

This Training Special Provision supersedes Section 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," and is in implementation of 23 U.S.C. 140(a).

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved. The number of trainees to be trained under this contract will be 4. In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within the reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the Illinois Department of Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Illinois Department of Transportation and the Federal Highway Administration. The Illinois Department of Transportation and the Federal Highway Administration shall approve a program, if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved by not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Illinois Department of Transportation and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirement of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program.

It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The Contractor shall provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

Method of Measurement. The unit of measurement is in hours.

Basis of Payment. This work will be paid for at the contract unit price of 80 cents per hour for TRAINEES. The estimated total number of hours, unit price, and total price have been included in the schedule of prices.

IDOT TRAINING PROGRAM GRADUATE ON-THE-JOB TRAINING SPECIAL PROVISION (TPG)

Effective: August 1, 2012

Revised: February 1, 2014

In addition to the Contractor's equal employment opportunity affirmative action efforts undertaken as elsewhere required by this Contract, the Contractor is encouraged to participate in the incentive program to provide additional on-the-job training to certified graduates of IDOT funded pre-apprenticeship training programs outlined by this Special Provision.

It is the policy of IDOT to fund IDOT pre-apprenticeship training programs throughout Illinois to provide training and skill-improvement opportunities to assure the increased participation of minority groups, disadvantaged persons and women in all phases of the highway construction industry. The intent of this IDOT Training Program Graduate (TPG) Special Provision is to place certified graduates of these IDOT funded pre-apprentice training programs on IDOT project sites when feasible, and provide the graduates with meaningful on-the-job training intended to lead to journey-level employment. IDOT and its sub-recipients, in carrying out the responsibilities of a state contract, shall determine which construction contracts shall include "Training Program Graduate Special Provisions." To benefit from the incentives to encourage the participation in the additional on-the-job training under this Training Program Graduate Special Provision, the Contractor shall make every reasonable effort to employ certified graduates of IDOT funded Pre-apprenticeship Training Programs to the extent such persons are available within a reasonable recruitment area.

Participation pursuant to IDOT's requirements by the Contractor or subcontractor in this Training Program Graduate (TPG) Special Provision entitles the Contractor or subcontractor to be reimbursed at \$15.00 per hour for training given a certified TPG on this contract. As approved by the Department, reimbursement will be made for training persons as specified herein. This reimbursement will be made even though the Contractor or subcontractor may receive additional training program funds from other sources for other trainees, provided such other source does not specifically prohibit the Contractor or subcontractor from receiving other reimbursement. For purposes of this Special Provision the Contractor is not relieved of requirements under applicable federal law, the Illinois Prevailing Wage Act, and is not eligible for other training fund reimbursements in addition to the Training Program Graduate (TPG) Special Provision reimbursement.

No payment shall be made to the Contractor if the Contractor or subcontractor fails to provide the required training. It is normally expected that a TPG will begin training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project through completion of the contract, so long as training opportunities exist in his work classification or until he has completed his training program. Should the TPG's employment end in advance of the completion of the contract, the Contractor shall promptly notify the designated IDOT staff member under this Special Provision that the TPG's involvement in the contract has ended and supply a written report of the reason for the end of the involvement, the hours completed by the TPG under the Contract and the number of hours for which the incentive payment provided under this Special Provision will be or has been claimed for the TPG.

The Contractor will provide for the maintenance of records and furnish periodic reports documenting its performance under this Special Provision.

METHOD OF MEASUREMENT: The unit of measurement is in hours.

BASIS OF PAYMENT: This work will be paid for at the contract unit price of \$15.00 per hour for certified TRAINEES TRAINING PROGRAM GRADUATE. The estimated total number of hours, unit price and total price have been included in the schedule of prices.

The Contractor shall provide training opportunities aimed at developing full journeyworker in the type of trade or job classification involved. The initial number of TPGs for which the incentive is available under this contract is 4. During the course of performance of the Contract the Contractor may seek approval from the Department for additional incentive eligible TPGs. In the event the Contractor subcontracts a portion of the contract work, it shall determine how many, if any, of the TPGs are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this Special Provision. The Contractor shall also insure that this Training Program Graduate Special Provision is made applicable to such subcontract if the TPGs are to be trained by a subcontractor and that the incentive payment is passed on to each subcontractor.

For the Contractor to meet the obligations for participation in this TPG incentive program under this Special Provision, the Department has contracted with several entities to provide screening, tutoring and pre-training to individuals interested in working in the applicable construction classification and has certified those students who have successfully completed the program and are eligible to be TPGs. A designated IDOT staff member, the Director of the Office of Business and Workforce Diversity (OBWD), will be responsible for providing assistance and referrals to the Contractor for the applicable TPGs. For this contract, the Director of OBWD is designated as the responsible IDOT staff member to provide the assistance and referral services related to the placement for this Special Provision. For purposes of this Contract, contacting the Director of OBWD and interviewing each candidate he/she recommends constitutes reasonable recruitment.

Prior to commencing construction, the Contractor shall submit to the Department for approval the TPGs to be trained in each selected classification. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. No employee shall be employed as a TPG in any classification in which he/she has successfully completed a training course leading to journeyman status or in which he/she has been employed as a journeyman. Notwithstanding the on-the-job training purpose of this TPG Special Provision, some offsite training is permissible as long as the offsite training is an integral part of the work of the contract and does not comprise a significant part of the overall training.

Training and upgrading of TPGs of IDOT pre-apprentice training programs is intended to move said TPGs toward journeyman status and is the primary objective of this Training Program Graduate Special Provision. Accordingly, the Contractor shall make every effort to enroll TPGs by recruitment through the IDOT funded TPG programs to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that it has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance and entitled to the Training Program Graduate Special Provision \$15.00 an hour incentive.

The Contractor or subcontractor shall provide each TPG with a certificate showing the type and length of training satisfactorily completed.

WARM MIX ASPHALT (BDE)

Effective: January 1, 2012

Revised: November 1, 2014 April 1, 2016

Description. This work shall consist of designing, producing and constructing Warm Mix Asphalt (WMA) in lieu of Hot Mix Asphalt (HMA) at the Contractor's option. Work shall be according to Sections 406, 407, 408, 1030, and 1102 of the Standard Specifications, except as modified herein. In addition, any references to HMA in the Standard Specifications, or the special provisions shall be construed to include WMA.

WMA is an asphalt mixture which can be produced at temperatures lower than allowed for HMA utilizing approved WMA technologies. WMA technologies are defined as the use of additives or processes which allow a reduction in the temperatures at which HMA mixes are produced and placed. WMA is produced by the use of additives, a water foaming process, or combination of both. Additives include minerals, chemicals or organics incorporated into the asphalt binder stream in a dedicated delivery system. The process of foaming injects water into the asphalt binder stream, just prior to incorporation of the asphalt binder with the aggregate.

Approved WMA technologies may also be used in HMA provided all the requirements specified herein, with the exception of temperature, are met. However, asphalt mixtures produced at temperatures in excess of 275 °F (135 °C) will not be considered WMA when determining the grade reduction of the virgin asphalt binder grade.

Equipment.

Revise the first paragraph of Article 1102.01 of the Standard Specifications to read:

“1102.01 Hot-Mix Asphalt Plant. The hot-mix asphalt (HMA) plant shall be the batch-type, continuous-type, or dryer drum plant. The plants shall be evaluated for prequalification rating and approval to produce HMA according to the current Bureau of Materials and Physical Research Policy Memorandum, “Approval of Hot-Mix Asphalt Plants and Equipment”. Once approved, the Contractor shall notify the Bureau of Materials and Physical Research to obtain approval of all plant modifications. The plants shall not be used to produce mixtures concurrently for more than one project or for private work unless permission is granted in writing by the Engineer. The plant units shall be so designed, coordinated and operated that they will function properly and produce HMA having uniform temperatures and compositions within the tolerances specified. The plant units shall meet the following requirements.”

Add the following to Article 1102.01(a) of the Standard Specifications.

“(1311) Equipment for Warm Mix Technologies.

- a. Foaming. Metering equipment for foamed asphalt shall have an accuracy of ± 2 percent of the actual water metered. The foaming control system shall be electronically interfaced with the asphalt binder meter.
- b. Additives. Additives shall be introduced into the plant according to the supplier's recommendations and shall be approved by the Engineer. The system for introducing the WMA additive shall be interlocked with the aggregate feed or weigh system to maintain correct proportions for all rates of production and batch sizes.”

Mix Design Verification.

Add the following to Article 1030.04 of the Standard Specifications.

“(e) Warm Mix Technologies.

- (1) Foaming. WMA mix design verification will not be required when foaming technology is used alone (without WMA additives). However, the foaming technology shall only be used on HMA designs previously approved by the Department.
- (2) Additives. WMA mix designs utilizing additives shall be submitted to the Engineer for mix design verification.”

Construction Requirements.

Revise the second paragraph of Article 406.06(b)(1) of the Standard Specifications to read:

“The HMA shall be delivered at a temperature of 250 to 350 °F (120 to 175 °C).
WMA shall be delivered at a minimum temperature of 215 °F (102 °C).”

Basis of Payment.

This work will be paid at the contract unit price bid for the HMA pay items involved. Anti-strip will not be paid for separately, but shall be considered as included in the cost of the work.

WEEKLY DBE TRUCKING REPORTS (BDE)

Effective: June 2, 2012

Revised: April 2, 2015

The Contractor shall provide submit a weekly report of Disadvantaged Business Enterprise (DBE) trucks hired by the Contractor or subcontractors (i.e. not owned by the Contractor or subcontractors) that are used for DBE goal credit on the jobsite; or used for the delivery and/or removal of equipment/material to and from the jobsite. The jobsite shall also include offsite locations, such as plant sites or storage sites, when those locations are used solely for this contract.

The report shall be submitted to the Engineer on the form provided by the Department form "SBE 723" within ten business days following the reporting period. The reporting period shall be Monday through Sunday for each week reportable trucking activities occur. The report shall be submitted to the Engineer and a copy shall be provided to the district EEO Officer.

Any costs associated with providing weekly DBE trucking reports shall be considered as included in the contract unit prices bid for the various items of work involved and no additional compensation will be allowed.

WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING (BDE)

Effective: January 1, 2012

Description. This work shall consist of furnishing and applying thermoplastic pavement markings with a wet reflective media. Work shall be according to Section 780 of the Standard Specifications, except as modified herein.

Revise the seventh paragraph of Article 780.05 of the Standard Specifications to read:

"Thermoplastic marking shall be placed with drop on glass beads and wet reflective media uniformly applied to ensure adequate dry and wet retroreflectivity. The combination of thermoplastic material, glass beads, and wet reflective media used shall preclude the surface beads and wet reflective media from sinking deeply into the thermoplastic."

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) of applied line width, as specified, for WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING – LINE; and/or per square foot (square meter) for WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING – LETTERS AND SYMBOLS.

Delete the last sentence of Article 1095.01(f) of the Standard Specifications.

Add the following to Article 1095.01 of the Standard Specifications.

“(g) Wet Reflective Media. The wet reflective media shall be according to the manufacturer’s specifications. Once applied, the wet reflective thermoplastic pavement markings shall meet the following retroreflectivity requirements when tested according to ASTM E2177 and ASTM E2176. The readings shall be obtained with a portable retroreflectometer meeting ASTM E1710.

Wet Retroreflectivity Requirements R_L (mcc/lx/m ²)		
	White	Yellow
Wet Recovery (ASTM E2177)	350	275
Wet Continuous (ASTM E2176)	100	75”

MENTOR-PROTÉGÉ PROGRAM (BDE)

Effective: June 1, 2007

Revised: February 1, 2013

Eligibility. This contract is eligible for the Department’s Mentor-Protégé Program for those bidders with an approved Mentor-Protégé Development Plan.

In order for a Mentor-Protégé relationship to be recognized as part of this contract, the Protégé shall be used as a subcontractor and a Mentor-Protégé Agreement for Contract Assistance and Training shall be fully executed and approved. The Mentor-Protégé Agreement for Contract Assistance and Training shall be completed on the form provided by the Department and submitted with the DBE Utilization Plan for approval by the Department. If approved, the Mentor-Protégé Agreement for Contract Assistance and Training shall become part of the contract. In the event the Mentor-Protégé Agreement for Contract Assistance and Training is not approved, the contract shall be performed in accordance with the DBE Utilization Plan exclusive of the Agreement.

DBE Goal Reduction. The DBE participation goal set for this contract may, at the discretion of the Department, be reduced according to the Mentor-Protégé Program Guidelines when the Protégé is used as a subcontractor. When submitting the DBE Utilization Plan, the bidder shall indicate whether the Protégé will be used as a subcontractor and to what extent.

Quarterly Reports. The Mentor shall submit quarterly progress reports as outlined in the Mentor-Protégé Program Implementation document. The reports shall indicate the progress toward each of the Plan’s stated goals. The reports shall be signed by an authorized principal of each firm and submitted to the Engineer of Construction.

Failure to timely submit reports, or submission of incomplete reports may result in dissolution of relationship.

Reimbursement of Mentor Expenses. The direct and indirect expenses of the Mentor, as detailed in the approved Mentor-Protégé Agreement for Contract Assistance and Training will be reimbursed by the Department.

BITUMINOUS MATERIALS COST ADJUSTMENTS (BDE) (RETURN FORM WITH BID)

Effective: November 2, 2006

Revised: August 1, 2013 July 1, 2015

Description. Bituminous material cost adjustments will be made to provide additional compensation to the Contractor, or credit to the Department, for fluctuations in the cost of bituminous materials when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments.

The adjustments shall apply to permanent and temporary hot-mix asphalt (HMA) mixtures, bituminous surface treatments (cover and seal coats), and preventative maintenance type surface treatments that are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply to bituminous prime coats, tack coats, crack filling/sealing, or joint filling/sealing, or extra work paid for at a lump sum price or by force account.

The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments.

Method of Adjustment. Bituminous materials cost adjustments will be computed as follows.

$$CA = (BPI_P - BPI_L) \times (\%AC_V / 100) \times Q$$

Where: CA = Cost Adjustment, \$.

BPI_P = Bituminous Price Index, as published by the Department for the month the work is performed, \$/ton (\$/metric ton).

BPI_L = Bituminous Price Index, as published by the Department for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price, \$/ton (\$/metric ton).

%AC_V = Percent of virgin Asphalt Cement in the Quantity being adjusted. For HMA mixtures, the % AC_V will be determined from the adjusted job mix formula. For bituminous materials applied, a performance graded or cutback asphalt will be considered to be 100% AC_V and undiluted emulsified asphalt will be considered to be 65% AC_V.

Q = Authorized construction Quantity, tons (metric tons) (see below).

For HMA mixtures measured in square yards: $Q, \text{ tons} = A \times D \times (G_{mb} \times 46.8) / 2000$. For HMA mixtures measured in square meters: $Q, \text{ metric tons} = A \times D \times (G_{mb} \times 1) / 1000$. When computing adjustments for full-depth HMA pavement, separate calculations will be made for the binder and surface courses to account for their different G_{mb} and % AC_V.

For bituminous materials measured in gallons: $Q, \text{ tons} = V \times 8.33 \text{ lb/gal} \times \text{SG} / 2000$
For bituminous materials measured in liters: $Q, \text{ metric tons} = V \times 1.0 \text{ kg/L} \times \text{SG} / 1000$

Where: A = Area of the HMA mixture, sq yd (sq m).
D = Depth of the HMA mixture, in. (mm).
 G_{mb} = Average bulk specific gravity of the mixture, from the approved mix design.
V = Volume of the bituminous material, gal (L).
SG = Specific Gravity of bituminous material as shown on the bill of lading.

Basis of Payment. Bituminous materials cost adjustments may be positive or negative but will only be made when there is a difference between the BPI_L and BPI_P in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(BPI_L - BPI_P) \div BPI_L\} \times 100$$

Bituminous materials cost adjustments will be calculated for each calendar month in which applicable bituminous material is placed; and will be paid or deducted when all other contract requirements for the work placed during the month are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Return With Bid

**ILLINOIS DEPARTMENT
OF TRANSPORTATION**

**OPTION FOR
BITUMINOUS MATERIALS COST ADJUSTMENTS**

The bidder shall submit this completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments. After award, this form, when submitted, shall become part of the contract.

Contract No.: _____

Company Name: _____

Contractor's Option:

Is your company opting to include this special provision as part of the contract?

Yes No

Signature: _____ **Date:** _____

FUEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)

Effective: April 1, 2009

Revised: July 1, 2009/2015

Description. Fuel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in fuel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name and sign and date the form shall make this contract exempt of fuel cost adjustments for all categories of work. Failure to indicate "Yes" for any category of work will make that category of work exempt from fuel cost adjustment.

General. The fuel cost adjustment shall apply to contract pay items as grouped by category. The adjustment shall only apply to those categories of work checked "Yes", and only when the cumulative plan quantities for a category exceed the required threshold. Adjustments to work items in a category, either up or down, and extra work paid for by agreed unit pricework added by adjusted unit price will be subject to fuel cost adjustment only when the category representing the added work was subject to the fuel cost adjustment. Added work paid for by time and materials Extra work paid for at a lump sum price or by force account will not be subject to fuel cost adjustment. Category descriptions and thresholds for application and the fuel usage factors which are applicable to each are as follows:

(a) Categories of Work.

- (1) Category A: Earthwork. Contract pay items performed under Sections 202, 204, and 206 including any modified standard or nonstandard items where the character of the work to be performed is considered earthwork. The cumulative total of all applicable item plan quantities shall exceed 25,000 cu yd (20,000 cu m). Included in the fuel usage factor is a weighted average 0.10 gal/cu yd (0.50 liters/cu m) factor for trucking.
- (2) Category B: Subbases and Aggregate Base Courses. Contract pay items constructed under Sections 311, 312 and 351 including any modified standard or nonstandard items where the character of the work to be performed is considered construction of a subbase or aggregate, stabilized or modified base course. The cumulative total of all applicable item plan quantities shall exceed 5000 tons (4500 metric tons). Included in the fuel usage factor is a 0.60 gal/ton (2.50 liters/metric ton) factor for trucking.
- (3) Category C: Hot-Mix Asphalt (HMA) Bases, Pavements and Shoulders. Contract pay items constructed under Sections 355, 406, 407 and 482 including any modified standard or nonstandard items where the character of the work to be performed is considered HMA bases, pavements and shoulders. The cumulative total of all applicable item plan quantities shall exceed 5000 tons (4500 metric tons). Included in the fuel usage factor is 0.60 gal/ton (2.50 liters/metric ton) factor for trucking.

- (4) Category D: Portland Cement Concrete (PCC) Bases, Pavements and Shoulders. Contract pay items constructed under Sections 353, 420, 421 and 483 including any modified standard or nonstandard items where the character of the work to be performed is considered PCC base, pavement or shoulder. The cumulative total of all applicable item plan quantities shall exceed 7500 sq yd (6000 sq m). Included in the fuel usage factor is 1.20 gal/cu yd (5.94 liters/cu m) factor for trucking.
- (5) Category E: Structures. Structure items having a cumulative bid price that exceeds \$250,000 for pay items constructed under Sections 502, 503, 504, 505, 512, 516 and 540 including any modified standard or nonstandard items where the character of the work to be performed is considered structure work when similar to that performed under these sections and not included in categories A through D.

(b) Fuel Usage Factors.

English Units		
Category	Factor	Units
A - Earthwork	0.34	gal / cu yd
B – Subbase and Aggregate Base courses	0.62	gal / ton
C – HMA Bases, Pavements and Shoulders	1.05	gal / ton
D – PCC Bases, Pavements and Shoulders	2.53	gal / cu yd
E – Structures	8.00	gal / \$1000

Metric Units		
Category	Factor	Units
A - Earthwork	1.68	liters / cu m
B – Subbase and Aggregate Base courses	2.58	liters / metric ton
C – HMA Bases, Pavements and Shoulders	4.37	liters / metric ton
D – PCC Bases, Pavements and Shoulders	12.52	liters / cu m
E – Structures	30.28	liters / \$1000

(c) Quantity Conversion Factors.

Category	Conversion	Factor
B	sq yd to ton	0.057 ton / sq yd / in depth
	sq m to metric ton	0.00243 metric ton / sq m / mm depth
C	sq yd to ton	0.056 ton / sq yd / in depth
	sq m to metric ton	0.00239 m ton / sq m / mm depth
D	sq yd to cu yd	0.028 cu yd / sq yd / in depth
	sq m to cu m	0.001 cu m / sq m / mm depth

Method of Adjustment. Fuel cost adjustments will be computed as follows.

$$CA = (FPI_P - FPI_L) \times FUF \times Q$$

Where: CA = Cost Adjustment, \$
FPI_P = Fuel Price Index, as published by the Department for the month the work is performed, \$/gal (\$/liter)
FPI_L = Fuel Price Index, as published by the Department for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price, \$/gal (\$/liter)
FUF = Fuel Usage Factor in the pay item(s) being adjusted
Q = Authorized construction Quantity, tons (metric tons) or cu yd (cu m)

The entire FUF indicated in paragraph (b) will be used regardless of use of trucking to perform the work.

Progress Payments. Fuel cost adjustments will be calculated for each calendar month in which applicable work is performed; and will be paid or deducted when all other contract requirements for the items of work are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Final Quantities. Upon completion of the work and determination of final pay quantities, an adjustment will be prepared to reconcile any differences between estimated quantities previously paid and the final quantities. The value for the balancing adjustment will be based on a weighted average of FPI_P and Q only for those months requiring the cost adjustment. The cost adjustment will be applicable to the final measured quantities of all applicable pay items.

Basis of Payment. Fuel cost adjustments may be positive or negative but will only be made when there is a difference between the FPI_L and FPI_P in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(FPI_L - FPI_P) \div FPI_L\} \times 100$$

Fuel cost adjustments will be calculated for each calendar month in which applicable work is performed; and will be paid or deducted when all other contract requirements for the items of work are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Return With Bid

**ILLINOIS DEPARTMENT
OF TRANSPORTATION**

**OPTION FOR
FUEL COST ADJUSTMENT**

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of fuel cost adjustments in all categories. Failure to indicate "Yes" for any category of work at the time of bid will make that category of work exempt from fuel cost adjustment. After award, this form, when submitted shall become part of the contract.

Contract No.: _____

Company Name: _____

Contractor's Option:

Is your company opting to include this special provision as part of the contract plans for the following categories of work?

- | | | |
|--|-----|--------------------------|
| Category A Earthwork. | Yes | <input type="checkbox"/> |
| Category B Subbases and Aggregate Base Courses | Yes | <input type="checkbox"/> |
| Category C HMA Bases, Pavements and Shoulders | Yes | <input type="checkbox"/> |
| Category D PCC Bases, Pavements and Shoulders | Yes | <input type="checkbox"/> |
| Category E Structures | Yes | <input type="checkbox"/> |

Signature: _____ **Date:** _____

STEEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)

Effective: April 2, 2004

Revised: April 1, 2009 July 1, 2015

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form or failure to indicate contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

- Metal Piling (excluding temporary sheet piling)
- Structural Steel
- Reinforcing Steel

Other steel materials such as dowel bars, tie bars, mesh reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), and frames and grates will be subject to a steel cost adjustment when the pay items they are used in has have a contract value of \$10,000 or greater.

The adjustments shall apply to the above items when they are part of the original proposed construction, or added as extra work and paid for by agreed unit prices. The adjustments shall not apply when the item is added as extra work and paid for at a lump sum price or by force account.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

- (a) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.
- (b) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

$$SCA = Q \times D$$

Where: SCA = steel cost adjustment, in dollars
Q = quantity of steel incorporated into the work, in lb (kg)
D = price factor, in dollars per lb (kg)

$$D = MPI_M - MPI_L$$

Where: MPI_M = The Materials Cost Index for steel as published by the Engineering News-Record for the month the steel is shipped from the mill. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

MPI_L = The Materials Cost Index for steel as published by the Engineering News-Record for the month prior to the letting for work paid for at the contract price; or for the month the agreed unit price letter is submitted by the Contractor for extra work paid for by agreed unit price,. The indices will be converted from dollars per 100 lb to dollars per lb (kg).

The unit weights (masses) of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the MPI_M will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the MPI_L and MPI_M in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(MPI_L - MPI_M) \div MPI_L\} \times 100$$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Attachment

Item	Unit Mass (Weight)
Metal Piling (excluding temporary sheet piling)	
Furnishing Metal Pile Shells 12 in. (305 mm), 0.179 in. (3.80 mm) wall thickness)	23 lb/ft (34 kg/m)
Furnishing Metal Pile Shells 12 in. (305 mm), 0.250 in. (6.35 mm) wall thickness)	32 lb/ft (48 kg/m)
Furnishing Metal Pile Shells 14 in. (356 mm), 0.250 in. (6.35 mm) wall thickness)	37 lb/ft (55 kg/m)
Other piling	See plans
Structural Steel	See plans for weights (masses)
Reinforcing Steel	See plans for weights (masses)
Dowel Bars and Tie Bars	6 lb (3 kg) each
Mesh Reinforcement	63 lb/100 sq ft (310 kg/sq m)
Guardrail	
Steel Plate Beam Guardrail, Type A w/steel posts	20 lb/ft (30 kg/m)
Steel Plate Beam Guardrail, Type B w/steel posts	30 lb/ft (45 kg/m)
Steel Plate Beam Guardrail, Types A and B w/wood posts	8 lb/ft (12 kg/m)
Steel Plate Beam Guardrail, Type 2	305 lb (140 kg) each
Steel Plate Beam Guardrail, Type 6	1260 lb (570 kg) each
Traffic Barrier Terminal, Type 1 Special (Tangent)	730 lb (330 kg) each
Traffic Barrier Terminal, Type 1 Special (Flared)	410 lb (185 kg) each
Steel Traffic Signal and Light Poles, Towers and Mast Arms	
Traffic Signal Post	11 lb/ft (16 kg/m)
Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft (9 - 12 m)	14 lb/ft (21 kg/m)
Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft (13.5 - 16.5 m)	21 lb/ft (31 kg/m)
Light Pole w/Mast Arm, 30 - 50 ft (9 - 15.2 m)	13 lb/ft (19 kg/m)
Light Pole w/Mast Arm, 55 - 60 ft (16.5 - 18 m)	19 lb/ft (28 kg/m)
Light Tower w/Luminaire Mount, 80 - 110 ft (24 - 33.5 m)	31 lb/ft (46 kg/m)
Light Tower w/Luminaire Mount, 120 - 140 ft (36.5 - 42.5 m)	65 lb/ft (97 kg/m)
Light Tower w/Luminaire Mount, 150 - 160 ft (45.5 - 48.5 m)	80 lb/ft (119 kg/m)
Metal Railings (excluding wire fence)	
Steel Railing, Type SM	64 lb/ft (95 kg/m)
Steel Railing, Type S-1	39 lb/ft (58 kg/m)
Steel Railing, Type T-1	53 lb/ft (79 kg/m)
Steel Bridge Rail	52 lb/ft (77 kg/m)
Frames and Grates	
Frame	250 lb (115 kg)
Lids and Grates	150 lb (70 kg)

Return With Bid

**ILLINOIS DEPARTMENT
OF TRANSPORTATION**

**OPTION FOR
STEEL COST ADJUSTMENT**

The bidder shall submit this completed form with his/her bid. Failure to submit the form or properly complete contract number, company name, and sign and date the form shall make this contract exempt of steel cost adjustments for all items of steel. Failure to indicate "Yes" for any item of work will make that item of steel exempt from steel cost adjustment. After award, this form, when submitted shall become part of the contract.

Contract No.: _____

Company Name: _____

Contractor's Option:

Is your company opting to include this special provision as part of the contract plans for the following items of work?

- | | | |
|--|-----|--------------------------|
| Metal Piling | Yes | <input type="checkbox"/> |
| Structural Steel | Yes | <input type="checkbox"/> |
| Reinforcing Steel | Yes | <input type="checkbox"/> |
| Dowel Bars, Tie Bars and Mesh Reinforcement | Yes | <input type="checkbox"/> |
| Guardrail | Yes | <input type="checkbox"/> |
| Steel Traffic Signal and Light Poles, Towers and Mast Arms | Yes | <input type="checkbox"/> |
| Metal Railings (excluding wire fence) | Yes | <input type="checkbox"/> |
| Frames and Grates | Yes | <input type="checkbox"/> |

Signature: _____ **Date:** _____

STORM WATER POLLUTION PREVENTION PLAN



Storm Water Pollution Prevention Plan



Route Interstate 90	Marked Route F.A.I. 90	Section (1517 & 1415) R-3
Project Number C-91-376-14	County Cook	Contract Number 60Y38

This plan has been prepared to comply with the provisions of the National Pollutant Discharge Elimination System (NPDES) Permit No. ILR10 (Permit ILR10), issues by the Illinois Environmental Protection Agency (IEPA) for storm water discharges from construction site activities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Print Name John Fortmann, PE	Title Dep. Dir. of Highways, Reg. 1 Eng	Agency Illinois Dept. of Transportation
Signature 		Date 3-16-16

I. Site Description

A. Provide a description of the project location (include latitude and longitude):

The project is located at Interstate 90, a distance approximately 700' west of the Cumberland Avenue Bridge over I-90 to Harlem Avenue. The latitude is 41°59'00" and the longitude is 87°49'00". A legal description of the project is Section 1, 2; Township 40 N, Range 12 E from the Third Principal Meridian. The location map is included on the front sheet of the Highway Plan Set.

The design, installation, and maintenance of BMPs at these locations are within an area where annual erosivity (R value) is less than or equal to 160. Erosivity is less than 5 in all two-week periods between October 12 and April 15, which would qualify for a construction rainfall erosivity waiver under the US Construction General Permit requirements. At these locations, erosivity is highest in spring and summer, April 16 - October 11.

B. Provide a description of the construction activity which is subject of this plan:

The project consists of resurfacing and widening the roadway from 700' west of Cumberland Avenue Bridge to Harlem Avenue. The mainline is to be resurfaced and the existing inside shoulder along the CTA barrier is to be reconstructed. The widening will include removing the existing outside shoulder and constructing an auxiliary lane and new outside shoulder. Three retaining walls, storm sewer, roadway ramps and moment slab for the proposed noise wall on Higgins Ave. frontage road are to be constructed and in addition one retaining wall will be repaired. Higgins Ave. frontage road will be resurfaced from Oriole Ave. to overpass at Harlem Ave. Ramp A. ITS/Communication conduit and cable, conventional high mast lighting and foundations of sign structures are to be installed along with the grading of detention basin and ditches/swales.

The project will be completed in three stages; pre-stage and two main construction stages.

B. Continued

Pre-stage Sub-stage A:

- Install Erosion and Sediment Control measure for Pre-stage Sub-stage A work areas.
- Remove and resurface EB I-90 mainline outside shoulder rumble strips from Sta. 3041+40 to Sta. 3118+25.
- Widen EB I-90 outside shoulder, Cumberland Ave. Ramps BB and B pavement at locations identified on the plans.
- Install temporary lighting, construct overhead right sign support as shown on the plans prior to shifting mainline traffic to Pre-stage Sub-stage B.

Pre-stage Sub-stage B:

- Install Erosion and Sediment Control measure for Pre-stage Sub-stage B work areas.
- Construct drainage laterals at three locations on EB I-90 mainline and one location along WB I-90 and overhead left sign support as shown on the plans.
- Reconstruct EB I-90 inside shoulder and install proposed sign trusses and cantilever truss at locations shown on the plans.

Stage 1:

- Install Erosion and Sediment Control measure for Stage 1.
- Construct proposed EB I-90 mainline fourth lane and outside shoulder, construct Cumberland Ave. Ramps B and BB, Canfield Ave. Ramp B and Harlem Ave. Ramp A as shown on the plans.
- Repair existing retaining wall EXEB#A according to retaining wall repair plans.
- Construct moment slab along W. Higgns Ave. frontage road as shown on plans.

Stage 1 Sub-stage A:

- Install Erosion and Sediment Control measure for Stage 1 Sub-stage A.
- Continue construction of EB mainline, Cumberland Ave. Ramps B and BB as shown on the plans.
- Construct temporary pavement for Cumberland Ave. Ramp BB temporary alignment as shown on the plans.

Stage 1 Sub-stage B:

- Install Erosion and Sediment Control measure for Stage 1 Sub-stage B.
- Continue construction of EB mainline, Cumberland Ave. Ramp BB, Harlem Ave. Ramp A as shown on the plans.

Stage 1 Sub-stage C:

- Install Erosion and Sediment Control measure for Stage 1 Sub-stage C.
- Complete construction of EB mainline, Cumberland Ave. ramps, Harlem Ave. ramp as shown on the plans.

Stage 2 Sub-stage A:

- Install Erosion and Sediment control measure for Stage 2 Sub-stage A.
- Mill and resurface EB I-90 mainline lane #3 as shown on the plans.

Stage 2 Sub-stage B:

- Install Erosion and Sediment control measure for Stage 2 Sub-stage B.
- Mill and resurface EB I-90 mainline lane #1 and lane #2 as shown on the plans.

C. Provide the estimated duration of this project:

Approximately 18 months.

D. The total area of the construction site is estimated to be 19.14 acres.

The total area of the site estimated to be disturbed by excavation, grading or other activities is 5.18 acres.

E. The following is a weighted average of the runoff coefficient for this project after construction activities are completed:

C=0.58 (Proposed); C=0.56 (Existing)

F. List all soils found within project boundaries. Include map unit name, slope information and erosivity:

533 - Urban Land
805B - Orthents, clayey, undulating, .32 erosivity
2811A - Urban land-Alfic Udarents, clayey, complex, 0 to 2 percent slopes
2822A - Alfic Udarents, clayey-Urban land-Elliott complex, 0 to 2 percent slopes, .37 erosivity

G. Provide an aerial extent of wetland acreage at the site:

No wetlands were identified within the project limits.

H. Provide a description of potentially erosive areas associated with this project:

Potentially erosive areas include: the embankment slopes adjacent to EB I-90 mainline from Cumberland Ave. Ramp BB to Harlem Ramp A and the embankments slopes adjacent to Cumberland Ave Ramps BB and B, Canfield Ave. Entrance Ramp, and Harlem Ramp A.

I. The following is a description of soil disturbing activities by stages, their locations, and their erosive factors (e.g. steepness of slopes, length of scopes, etc.):

A description of soil distributing activities by stages is included in item 1B. The steepness of proposed embankment slopes varies up to 1V:3H.

J. See the erosion control plans and/or drainage plans for this contract for information regarding drainage patterns, approximate slopes anticipated before and after major grading activities, locations where vehicles enter or exit the site and controls to prevent off site sediment tracking (to be added after contractor identifies locations), areas of soil disturbance, the location of major structural and non-structural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands) and locations where storm water is discharged to surface water including wetlands.

K. Identify who owns the drainage system (municipality or agency) this project will drain into:

The existing and proposed drainage system along I-90 - Illinois Department of Transportation.

L. The following is a list of General NPDES ILR40 permittees within whose reporting jurisdiction this project is located.

Illinois Department of Transportation

M. The following is a list of receiving water(s) and the ultimate receiving water(s) for this site. The location of the receiving waters can be found on the erosion and sediment control plans:

The storm water from the project is directed to storm sewer that outlets to the Des Plaines River outside the project limits. The Des Plaines River is located approximately 4,500 feet west of the project limits. The Des Plaines River is tributary to the Illinois River. The Des Plaines and the Illinois River are not identified by the IDNR as "biologically significant streams". The location of the receiving waters are not located on the erosion and sediment control plans.

N. Describe areas of the site that are to be protected or remain undisturbed. These areas may include steep slopes, highly erodible soils, streams, stream buffers, specimen trees, natural vegetation, nature preserves, etc.

All locations within the construction limits are expected to be disturbed through construction site activities and should be protected. The existing construction area primarily consists of existing roadway within IDOT right-of-way. Embankments associated with the EB I-90 mainline and ramps include steep slopes. Procedures to minimize damages to these areas are described in the Controls section of the SWPPP.

O. The following sensitive environmental resources are associated with this project, and may have the potential to be impacted by the proposed development:

- Floodplain
- Wetland Riparian
- Threatened and Endangered Species
- Historic Preservation
- 303(d) Listed receiving waters for suspended solids, turbidity, or siltation
- Receiving waters with Total Maximum Daily Load (TMDL) for sediment, total suspended solids, turbidity, or siltation
- Applicable Federal, Tribal, State or Local Programs
- Other

1. 303(d) Listed receiving waters (fill out this section if checked above):

Des Plaines River
Illinois River

a. The name(s) of the listed water body, and identification of all pollutants causing impairment:

The direct receiving water for the project is the Des Plaines River. The Des Plaines River is tributary to the Illinois River. The Des Plaines River and the Illinois River are not identified by the IDNR as

"biologically significant streams".

The Des Plaines River (segment IL_G-15) is listed on the 2014 IEPA 303(d) list as impaired. The 2014 303(d) list identifies the following uses of the Des Plaines River as being impaired:

- aquatic life use being impaired by chloride, total phosphorus, dissolved oxygen, pH, and sedimentation/siltation
- fish consumption use being impaired by mercury and polychlorinated bi-phenyls
- primary contact recreation use as being impaired by fecal coliform

The Illinois River (segment IL_D-10) is listed on the 2014 IEPA 303(d) list as impaired. The 2014 303(d) list identifies the fish consumption use as being impaired by mercury and polychlorinated bi-phenyls.

No TMDLs are currently being developed for these impairments.

b. Provide a description of how erosion and sediment control practices will prevent a discharge of sediment resulting from a storm event equal to or greater than a twenty-five (25) year, twenty-four (24) hour rainfall event:

The erosion and sediment control practices as described in the following section and as shown on the Erosion and Sediment Control Drawings will be installed and maintained by the contractor. These practices will also be observed by the Resident Engineer and if necessary, instruction will be given to the Contractor to provide additional erosion and sediment control practices. The potential that construction activities performed onsite will impact the impaired Des Plaines River is reduced by the construction BMPs (perimeter erosion barrier, drainage structure inlet filters, temporary ditch check, temporary seeding with erosion control blanket, temporary sediment basin, temporary fence for tree trunk protection, storm water outlet, stone riprap, proposed ditch) in this plan. It is unlikely for there to be quantities of soluble phosphorus, fluoride, mercury, zinc, or PCBs discharged. Portable toilets will be placed away from inlets and water courses. Chloride will discharge, especially during winter application of ice melters required for safety.

c. Provide a description of the location(s) of direct discharge from the project site to the 303(d) water body:

The drainage system drains into an existing 66 inch storm sewer which discharges to the Des Plaines River.

d. Provide a description of the location(s) of any dewatering discharges to the MS4 and/or water body:

The design and implementation of dewatering systems as needed to construct facilities included in this contract are the responsibility of the Contractor. At the start of construction the Contractor will be required to submit a dewatering plan which includes a description and location of dewatering discharges.

2. TMDL (fill out this section if checked above)

a. The name(s) of the listed water body:

b. Provide a description of the erosion and sediment control strategy that will be incorporated into the site design that is consistent with the assumptions and requirements of the TMDL:

c. If a specific numeric waste load allocation has been established that would apply to the project's discharges, provide a description of the necessary steps to meet the allocation:

P. The following pollutants of concern will be associated with this construction project:

- | | |
|--|---|
| <input checked="" type="checkbox"/> Soil Sediment
<input checked="" type="checkbox"/> Concrete
<input checked="" type="checkbox"/> Concrete Truck waste
<input checked="" type="checkbox"/> Concrete Curing Compounds
<input checked="" type="checkbox"/> Solid waste Debris
<input checked="" type="checkbox"/> Paints
<input checked="" type="checkbox"/> Solvents
<input checked="" type="checkbox"/> Fertilizers / Pesticides | <input checked="" type="checkbox"/> Petroleum (gas, diesel, oil, kerosene, hydraulic oil / fluids)
<input checked="" type="checkbox"/> Antifreeze / Coolants
<input checked="" type="checkbox"/> Waste water from cleaning construction equipment
<input type="checkbox"/> Other (specify) _____
<input type="checkbox"/> Other (specify) _____
<input type="checkbox"/> Other (specify) _____
<input type="checkbox"/> Other (specify) _____
<input type="checkbox"/> Other (specify) _____ |
|--|---|

II. Controls

This section of the plan addresses the controls that will be implemented for each of the major construction activities described in I.C. above and for all use areas, borrow sites, and waste sites. For each measure discussed, the Contractor will be responsible for its implementation as indicated. The Contractor shall provide to the Resident Engineer a plan for the implementation of the measures indicated. The Contractor and subcontractors, will notify the Resident Engineer of any proposed changes, maintenance, or modifications to keep construction activities compliant with the Permit ILR10. Each such Contractor has signed the required certification on forms which are attached to, and are a part of, this plan:

A. **Erosion and Sediment Controls:** At a minimum, controls must be coordinated, installed, and maintained to:

1. Minimize the amount of soil exposed during construction activity;
2. Minimize the disturbance of steep slopes;
3. Maintain natural buffers around surface waters, direct storm water to vegetated areas to increase sediment removal and maximize storm water infiltration, unless infeasible;
4. Minimize soil compaction and, unless infeasible, preserve topsoil.

B. **Stabilization Practices:** Provided below is a description of interim and permanent stabilization practices, including site- specific scheduling of the implementation of the practices. Site plans will ensure that existing vegetation is preserved where attainable and disturbed portions of the site will be stabilized. Stabilization practices may include but are not limited to: temporary seeding, permanent seeding, mulching, geotextiles, sodding, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Except as provided below in II(B)(1) and II(B)(2), stabilization measures shall be initiated immediately where construction activities have temporarily or permanently ceased, but in no case more than one (1) day after the construction activity in that portion of the site has temporarily or permanently ceases on all disturbed portions of the site where construction will not occur for a period of fourteen (14) or more calendar days.

1. Where the initiation of stabilization measures is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.

2. On areas where construction activity has temporarily ceased and will resume after fourteen (14) days, a temporary stabilization method can be used.

The following stabilization practices will be used for this project:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Preservation of Mature Vegetation | <input checked="" type="checkbox"/> Erosion Control Blanket / Mulching |
| <input type="checkbox"/> Vegetated Buffer Strips | <input type="checkbox"/> Sodding |
| <input checked="" type="checkbox"/> Protection of Trees | <input type="checkbox"/> Geotextiles |
| <input checked="" type="checkbox"/> Temporary Erosion Control Seeding | <input checked="" type="checkbox"/> Other (specify) <u>Short term seeding</u> |
| <input type="checkbox"/> Temporary Turf (Seeding, Class 7) | <input checked="" type="checkbox"/> Other (specify) <u>Mulch method 2</u> |
| <input type="checkbox"/> Temporary Mulching | <input type="checkbox"/> Other (specify) _____ |
| <input checked="" type="checkbox"/> Permanent Seeding | <input type="checkbox"/> Other (specify) _____ |

Describe how the stabilization practices listed above will be utilized during construction:

Stabilization controls runoff volume and velocity, peak runoff rates and volumes of discharge to minimize exposed soil, disturbed slopes, sediment discharges from construction, and provides for natural buffers and minimization of soil compaction. Existing vegetated areas where disturbance can be avoided will not require stabilization.

Where possible, temporary stabilization of the initial Stage should be completed before work is moved to subsequent stages.

1. Preservation of Mature Vegetation - Mature vegetation shall be protected by "temporary fencing" as directed by the engineer and in accordance with Article 201.05 of Illinois Department of Transportation's Standard Specifications of Road and Bridge Construction.
2. Temporary Erosion Control Seeding shall be applied in accordance with Special Provision. Seed mixture will depend on the time of year it is applied. Oats will be applied from January 1 to July 31 and Hard Red Winter Wheat from August 1 to December 31.
3. Short Term Seeding - Seeding Class 2A shall be used to protect bare earth from more than just one or two summer-winter cycles. Due to the length and complexity of this project, it is necessary that short term, final graded slopes be short term seeded as directed by the Engineer.
4. Protection of Trees - Shall consist of items "temporary fencing" and "tree trunk protection" as directed by the engineer and in accordance with Article 201.05 of the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction.
5. Permanent Seeding - All areas disturbed by construction will be stabilized as soon as permitted with permanent seeding following the finished grading, but always within seven days with Temporary Erosion Control Seeding. Erosion Control Blankets will be installed over fill slopes, which have been brought to final grade and have been seeded to protect the slopes from rill and gully erosion and allow seeds to germinated properly.
6. Erosion Control Blankets and Mulching - Erosion control blankets will be installed over fill slopes with slopes less than 1V:3H. Mulch will be applied in relatively flat areas to prevent erosion.
7. Mulch Method 2 - Mulch Method 2 should be applied to slopes for temporary stabilization prior to seasons when Temporary seed will not germinate, for example in mid-July or February.

Describe how the stabilization practices listed above will be utilized after construction activities have been completed:

At the completion of grading and application of final seeding, temporary stabilization practices shall be removed.

C. **Structural Practices:** Provided below is a description of structural practices that will be implemented, to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include but are not limited to: perimeter erosion barrier, earth dikes, drainage swales, sediment traps, ditch checks, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. The installation of these devices may be subject to Section 404 of the Clean Water Act.

The following stabilization practices will be used for this project:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Perimeter Erosion Barrier | <input checked="" type="checkbox"/> Rock Outlet Protection |
| <input checked="" type="checkbox"/> Temporary Ditch Check | <input checked="" type="checkbox"/> Riprap |
| <input checked="" type="checkbox"/> Storm Drain Inlet Protection | <input type="checkbox"/> Gabions |
| <input type="checkbox"/> Sediment Trap | <input type="checkbox"/> Slope Mattress |
| <input type="checkbox"/> Temporary Pipe Slope Drain | <input checked="" type="checkbox"/> Retaining Walls |
| <input checked="" type="checkbox"/> Temporary Sediment Basin | <input type="checkbox"/> Slope Walls |
| <input type="checkbox"/> Temporary Stream Crossing | <input type="checkbox"/> Concrete Revetment Mats |
| <input checked="" type="checkbox"/> Stabilized Construction Exits | <input type="checkbox"/> Level Spreaders |
| <input type="checkbox"/> Turf Reinforcement Mats | <input checked="" type="checkbox"/> Other (specify) <u>Duct control</u> |
| <input type="checkbox"/> Permanent Check Dams | <input checked="" type="checkbox"/> Other (specify) <u>Stable conveyance</u> |
| <input type="checkbox"/> Permanent Sediment Basin | <input checked="" type="checkbox"/> Other (specify) <u>Dewatering basin</u> |
| <input type="checkbox"/> Aggregate Ditch | <input type="checkbox"/> Other (specify) _____ |
| <input type="checkbox"/> Paved Ditch | <input type="checkbox"/> Other (specify) _____ |

Describe how the structural practices listed above will be utilized during construction:

1. Sediment Control, Stabilized Construction Exits - Coarse aggregate overlaying a geotextile fabric will be placed in locations necessary for contractor access. The aggregate surface of the access points will capture soil debris, reducing the amount of soil deposits placed on to the roadway by vehicles leaving the work zones.

All work associated with installation and maintenance of Stabilized Construction Entrances, concrete washouts, and in-stream work are incidental to the contract.

2. Storm Drain Inlet Protection - Inlet filters will be placed in every inlet, catch basin or manhole with an open lid, which will drain water during at least a 10-year storm event. The Erosion Control Plan identifies the structures requiring inlet filters. Avoid using the INLET AND PIPE PROTECTION shown on the Highway Standard Sheets 280001. Straw bales and silt fence should not be used as inlet and pipe protection. Inlet and pipe protection should be comprised of ditch checks, temporary seeding and temporary erosion control blanket and will be installed at all storm sewer and culverts. Inlet filters, as specified in Article 1081.15(h) of the Standard Specifications (current edition) will be installed at all inlets, catch basins, and manholes for the duration of construction. Inlet filters will be cleaned on a regular basis. Ensure proper quantities of inlet filters, ditch checks, temporary seeding and temporary erosion control blanket are included in the contract.

3. Perimeter Erosion Barrier - A sediment control silt fence will be placed at the locations shown on the erosion control plans to intercept waterborne silt and prevent it from leaving the site. Silt fence should only be used as PEB in areas where the work area is higher than the perimeter. The use of silt fence at the top of the slope/elevations higher than the work area should always be avoided. If necessary, temporary fence should be utilized in these locations (where the top of slope/elevation is higher than the work area) in lieu of silt fence.

4. Temporary Ditch Checks - Rolled excelsior ditch checks will be placed in swales at the rate of one for every 1 foot in vertical drop, or as directed by the Engineer, in order to prevent downstream erosion.

5. Sediment Control, Dewatering Basin - This item will be provided at wherever the contractor is removing and discharging water from excavated areas and the water is not being routed through a sediment trap or basin.

6. Stone Riprap - Class A4 stone riprap with filter fabric will be used as protection at the discharge end of storm sewer outfalls to prevent scouring and downstream erosion.

7. Temporary Sediment Basin - A temporary sediment basin will be located in the infield between Cumberland Ramp BB and Ramp B to collect and temporarily detain storm water runoff, providing settling time before runoff discharges from site.

8. Covers will be placed on open ends of pipes in trenches.

9. Dust control - Dust control measures will be performed for the duration of the construction.

10. Retaining Walls - Retaining walls will be constructed along I-90 from Canfield Ave. Bridge to Canfield Ave. Entrance Ramp and Oriole Avenue to Harlem Ave. Ramp A, and along Canfield Ave. Entrance Ramp to Oriole Avenue Bridge.

11. Stable Conveyance During Storm Sewer Installation - Contractor is to provide a plan for conveyance of runoff during storm sewer demolition and construction. The plan will provide that runoff does not erode and convey sediment into storm sewer under construction. This plan may be by sequencing or stabilization. Lack of an approved plan or failure to comply will result in an ESC Deficiency Deduction.

Describe how the structural practices listed above will be utilized after construction activities have been completed:

When final grading is completed and all storm water management systems are in place, structural practices shall be removed. At locations where riprap is to remain from the "interim" construction condition, the contractor shall investigate each site and repair/replace the riprap as directed by the engineer in the field.

D. Treatment Chemicals

Will polymer flocculents or treatment chemicals be utilized on this project: Yes No

If yes above, identify where and how polymer flocculents or treatment chemicals will be utilized on this project.

E. Permanent Storm Water Management Controls: Provided below is a description of measures that will be installed during the construction process to control volume and pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the Clean Water act.

1. Such practices may include but are not limited to: storm water detention structures (including wet ponds), storm water retention structures, flow attenuation by use of open vegetated swales and natural depressions, infiltration of runoff on site, and sequential systems (which combine several practices).

The practices selected for implementation were determined on the basis of the technical guidance in Chapter 41 (Construction Site Storm Water Pollution Control) of the IDOT Bureau of Design & Environment Manual. If practices other than those discussed in Chapter 41 are selected for implementation or if practices are applied to situations different from those covered in Chapter 41, the technical basis for such decisions will be explained below.

2. Velocity dissipation devices will be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

Description of permanent storm water management controls:

1. Storm sewer pipe at Sta. 3074+98 that leads to the existing storm sewer will be oversized for detention.
2. Lengths of ditches will be maximized to aid in pollutant filtering along with the oversizing of storm sewers and ditches.
3. Temporary sediment basins located outside the final clear zone and below the elevation of the roadway subgrade will be left in place upon the completion of the project.
4. Permanent measures for storm water management controls will be placed as soon as possible during construction:
 - a. All ditches will be vegetated, where feasible, which will provide a buffering effect for run off contaminates.
 - b. Ditches will receive permanent seeding after the final grading and topsoil have been placed.
 - c. In turf areas where low maintenance seeding is required, native prairie grasses will be used in the final landscaping design.
 - d. Wet bottom ditches will be employed before outfalls. The ditches will be oversized to contribute to detention, where feasible, if wet bottom ditches are not feasible, the ditches will be lined with riprap.

- F. Approved State or Local Laws:** The management practices, controls, and provisions contained in this plan will be in accordance with IDOT specifications, which are at least as protective as the requirements contained in the Illinois Environmental Protection Agency's Illinois Urban Manual. Procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials shall be described or incorporated by reference in the space provided below. Requirements specified in sediment and erosion site plans, site permits, storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI, to be authorized to discharge under the Permit ILR10 incorporated by reference and are enforceable under this permit even if they are not specifically included in the plan.

Description of procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials:

See the Erosion and Sediment Control Plans and Landscaping Plans for means and methods utilized.

G. Contractor Required Submittals: Prior to conducting any professional services at the site covered by this plan, the Contractor and each subcontractor responsible for compliance with the permit shall submit to the Resident Engineer a Contractor Certification Statement, BDE 2342a.

1. The Contractor shall provide a construction schedule containing an adequate level of detail to show major activities with implementation of pollution prevention BMPs, including the following items:
 - Approximate duration of the project, including each stage of the project
 - Rainy season, dry season, and winter shutdown dates
 - Temporary stabilization measures to be employed by contract phases
 - Mobilization time frame
 - Mass clearing and grubbing/roadside clearing dates
 - Deployment of Erosion Control Practices
 - Deployment of Sediment Control Practices (including stabilized construction entrances/exits)
 - Deployment of Construction Site Management Practices (including concrete washout facilities, chemical storage, refueling locations, etc.)
 - Paving, saw-cutting, and any other pavement related operations
 - Major planned stockpiling operations
 - Time frame for other significant long-term operations or activities that may plan non-storm water discharges such as dewatering, grinding, etc.
 - Permanent stabilization activities for each area of the project
2. The Contractor and each subcontractor shall provide, as an attachment to their signed Contractor Certification Statement, a discussion of how they will comply with the requirements of the permit in regard to the following items and provide a graphical representation showing location and type of BMPs to be used when applicable:
 - Vehicle Entrances and Exits - Identify type and location of stabilized construction entrances and exits to be used and how they will be maintained.
 - Material delivery, Storage, and Use - Discuss where and how materials including chemicals, concrete curing compounds, petroleum products, etc. will be stored for this project.
 - Stockpile Management - Identify the location of both on-site and off-site stockpiles. Discuss what BMPs will be used to prevent pollution of storm water from stockpiles.
 - Waste Disposal - Discuss methods of waste disposal that will be used for this project.
 - Spill Prevention and Control - Discuss steps that will be taken in the event of a material spill (chemicals, concrete curing compounds, petroleum, etc.).
 - Concrete Residuals and Washout Wastes - Discuss the location and type of concrete washout facilities to be used on this project and how they will be signed and maintained.
 - Litter Management - Discuss how litter will be maintained for this project (education of employees, number of dumpsters, frequency of dumpster pick-up, etc.).
 - Vehicle and Equipment Cleaning and Maintenance - Identify where equipment cleaning and maintenance locations for this project and what BMPs will be used to ensure containment and spill prevention.
 - Dewatering Activities - Identify the controls which will be used during dewatering operations to ensure sediments will not leave the construction site.
 - Polymer Flocculants and Treatment Chemicals - Identify the use and dosage of treatment chemicals and provide the Resident Engineer with Material Safety Data Sheets. Describe procedures on how the chemicals will be used and identify who will be responsible for the use and application of these chemicals. The selected individual must be trained on the established procedures.
 - Additional measures indicated in the plan.

III. Maintenance

When requested by the Contractor, the Resident Engineer will provide general maintenance guides to the Contractor for the practices associated with this project. The following additional procedures will be used to maintain, in good and effective operating conditions, the vegetation, erosion and sediment control measures and other protective measures identified in this plan. It will be Contractor's responsibility to attain maintenance guidelines for any manufactured BMPs which are to be installed and maintained per manufacture's specifications.

All ESC measures will be maintained in accordance with the IDOT Erosion and Sediment Control Field Guide for Construction Inspection and IDOT's Best Management Practices – Maintenance Guide:

III. Continued

(<http://www.idot.illinois.gov/transportation-system/environment/erosion-and-sediment-control>).

All maintenance of ESC systems is the responsibility of the contractor.

The Contractor shall check all ESC measures weekly and after each rainfall, 0.5 inches or greater in a 24 hour period, or equivalent snowfall. Additionally, during winter months, all measures should be checked by the Contractor after each significant snow melt.

Maintenance procedures as outlined in the Field Guide and/or BMP Maintenance Guide are also described below for each ESC measure:

Perimeter Erosion Barrier (PEB)

- Repair tears, gaps, or undermining. Restore PEB and ensure taut.
- Repair or replace any missing or broken stakes immediately.
- Clean PEB if sediment reaches one-third height of barrier.
- Remove PEB once final stabilization establishes since PEB is no longer necessary and should be removed.
- Repair PEB if undermining occurs anywhere along its entire length.

Temporary Erosion Control Seeding

- Reapply seed if stabilization hasn't been achieved.
- Apply temporary mulch to hold seed in place if seed has been washed away or found to be concentrated in ditch bottoms.
- Restore rills, greater than 4 inches deep, as quickly as possible on slopes steeper than 1V:4H to prevent sheet-flow from becoming concentrated flow patterns.
- Mow, if necessary to promote seed soil contact when excessive weed development occurs, a common indication of ineffective temporary seeding.
- Supplement BMP if weather conditions (extreme heat or cold) are not conducive for germination.

Mulch

- Repair straw if blown or washed away, or if hydraulic mulch washes away.
- Place tackifier or an Erosion Control Blanket if mulch does not control erosion.

Soil and Mulch Binders

- Reapply soil binders after heavy rainfall if spot failures occur.
- Check manufacturer's specification for re-application criteria.

Erosion Control Blanket (ECB)

- Repair damage due to water running beneath the blanket and restore ECBs when displacement occurs. Reseeding may be necessary.
- Replace all displaced ECBs and restaple.

III. Continued

Temporary Ditch Check

- Remove sediment from upstream side of ditch check when sediment has reached 50% of height of structure.
- Repair or replace ditch checks whenever tears, splits, unraveling or compressed excelsior are apparent.
- Replace torn fabric mat that may allow water to undermine the ditch check. Remove debris (garbage) when observed on check. Reestablish the flow over the center of the ditch check. Water or sediment going around the ditch check indicates incorrect installation. Device needs lengthening or the selected device is inappropriate for the site conditions.
- Remove ditch checks once all upslope areas are stabilized, seed or otherwise stabilize TDC area(s).

Storm Drain Inlet Protection (Inlet Filters)

- Remove sediment from inlet filter basket when basket is 25% full or 50% of the fabric pores are covered with silt.
- Remove ponded water on road surfaces immediately.
- Clean filter if there is water standing in the filter for more than 1 hour following a rain event.
- Remove trash accumulated around or on top of practice. Replace filter if tears are observed.

Outlet Protection

- Restore dislodged protection at outlet structures and correct erosion that may occur.
- Remove sediment buildup that deposits in the protection.
- Remedy deficient areas, prone to increased erosion, immediately to prevent greater deficiencies.
- Remove sediment when voids are full and replace protection. Protection is reusable if the accumulated sediment is removed.
- Temporary devices (temporary pipe slope drains) should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.
- Correct erosion at outlet and provide stabilization if necessary.
- Repair areas that allow seepage from the basin.
- Implement other BMPs, such as an Advance Treatment System (anionic polymers); if sediment discharges or other pollutants are identified at the discharge point to appropriately address pollutants.
- Replace/augment armoring at the outfall as needed to reestablish outfall integrity.
- The presence of stagnant water can result in mosquito larvae, requiring treatment. Mosquito larvae will trigger pumping through an Advanced Treatment System (anionic polymers) or treatment with larvicide. Contact District Environmental staff for guidance.
- Regrade base if ponding observed.

III. Continued

<p>Protect Existing Vegetation & Natural Features</p> <ul style="list-style-type: none">-Replace damaged vegetation with similar species. Check with designer for appropriate replacements.-Restore areas disturbed or damaged by the Contractors to pre-construction conditions or better at no additional expense to the contract.-Trim any cuts, skins, scrapes or bruises to the bark of the vegetation and utilize local nursery accepted procedures to seal damaged bark.-Prune all tree branches broken, severed or damaged during construction. Cut all limbs and branches, one-half inch or greater in diameter, at the base of the damage, flush with the adjacent limb or tree trunk.-Smoothly cut, perpendicular to the root, all cut, broken, or severed, during construction, roots one inch or greater in diameter.-Cover roots exposed during excavation with moist earth and/or backfill immediately to prevent roots from drying. <p>Stockpile Management</p> <ul style="list-style-type: none">-Repair and/or replace perimeter control and stabilization measures when stockpile material has potential to be discharged or leave the limits of protection.-Remove all off-tracked material by sweeping or other methods.-Update the SWPPP anytime a stockpile location has been removed, relocated, added, or required maintenance.-Handle contaminated soil stockpiles according to Article 669.11 Temporary Staging in the Standard Specifications.-During summer months, water stockpiles to maintain the crop cover. <p>Stabilized Construction Exits</p> <ul style="list-style-type: none">-Replenish stone or replace exit if vehicles continue to track sediment into the roadway from the construction site.-Sweep sediment on roadway from construction activities immediately.-Ensure culverts are free from damage.-Use street sweeping in conjunction with this BMP to remove sediment not removed by the stabilized construction exit. <p>Tire Wash Station</p> <ul style="list-style-type: none">-Adjust truck activity through better fueling operation, fixing leaks and wiping off excess grease to minimize pollutant discharge. Inspect tire wash discharge for evidence of oils, grease, petrol or other chemicals removed by the tire wash procedures. Alternatively, additional containment removal procedures may be required to remove petrochemicals.

III. Continued

<p>Temporary Concrete Washout Facilities</p> <ul style="list-style-type: none">-Remove washout water from high volume facilities with a vacuum truck and dispose of properly. Do not discharge wastewater into the environment. (Note: acidity, not particulates, is environmentally hazardous)-Do not discharge washout water into the environment; facilitate evaporation of low volume washout water.-Clean and remove any discharges within 24 hours of discovery.-If effluent cannot be removed prior to the anticipated rainfall event, place and secure a non-collapsing, non-water collecting cover over the washout facility to prevent accumulation and precipitation overflow.-Replace damaged liner immediately.-Remove temporary concrete washout facilities when no longer needed and restore disturbed areas to original condition.-Dispose of solidified concrete waste, considered Lean Construction or Demolition Debris (CCDD) as per the IEPA Act (415 ILCS5). <p>Material Delivery & Storage</p> <ul style="list-style-type: none">-Document the various types of materials delivered and their storage locations in the SWPPP.-Update the SWPPP anytime significant changes occur to material storage or handling locations and when they have been removed.-Cleanup spills immediately.-Remove empty containers. <p>Solid Waste Management</p> <ul style="list-style-type: none">-If containers are full, empty them immediately.-Update the SWPPP anytime a Contractors' trash management plan significantly changes.-Correct items discarded outside of designated areas. <p>Vehicle and Equipment Fueling, Cleaning and Maintenance</p> <ul style="list-style-type: none">-Cleanup spills immediately.-Contractor must provide documentation that spills were cleaned, materials disposed of and impacts mitigated.-Update the SWPPP when a designated location has been removed, relocated, added or required maintenance.-Any spills discharged through a drainage system will require the submission of an ION.-In the event of a spill into a storm drain, waterway or onto a paved suRface such as a parking lot, street, driveway or other surface connect to the storm water drainage system, the owner of the fuel must immediately take action to contain the spill.-Once contained, clean up the spill. As initial step this may involve collecting any bulk material and placing it in a secure container for later disposal. Follow up cleaning will also be required to remove residues from paved or other hard surfaces.

III. Continued

Extended Work Cessation/Shutdown

- Maintain ESC during a shutdown. This includes winter shutdown and spring snowmelt prior to construction restart where the Contractor must install appropriate BMPs and provide timely regular maintenance.
- Inspection frequencies during winter or project shutdown are as required under the ILR10 Permit.
- The important aspect of winter shutdown inspection is to ensure there is limited sediment and other pollutants to escape the project site.
- Seeding is the most cost effective erosion control practice. Seeding must be laid down and mulched so the plants are viable before the first frost, through the shutdown, and are ready for the spring thaw. While snow cover is a viable winter temporary cover, spring will be a challenge if the seeding is not viable. Plants that are too young at first frost die. Most seeders are extremely busy in fall. Therefore, a good approach to winter shutdown seeding is to seed as many areas as possible as close to the fall seeding start date as possible.
- Inspect periodically for scour or dislodged stones and replace stones as needed.
- Remove woody vegetation.

Dust Control

- Implement the Dust Control Plan as required by IDOT Standard Specifications for Road and Bridge Construction.

IV. Inspections

Qualified personnel shall inspect disturbed areas of the construction site which have not yet been finally stabilized, structural control measures, and locations where vehicles and equipment enter and exit the site using IDOT Storm Water Pollution Prevention Plan Erosion Control Inspection Report (BC 2259). Such inspections shall be conducted at least once every seven (7) calendar days and within twenty-four (24) hours of the end of a storm or by the end of the following business or work day that is 0.5 inch or greater or equivalent snowfall.

Inspections may be reduced to once per month when construction activities have ceased due to frozen conditions. Weekly inspections will recommence when construction activities are conducted, or if there is 0.5" or greater rain event, or a discharge due to snowmelt occurs.

If any violation of the provisions of this plan is identified during the conduct of the construction work covered by this plan, the Resident Engineer shall notify the appropriate IEPA Field Operations Section office by e-mail at: epa.swnoncomp@illinois.gov, telephone or fax within twenty-four (24) hours of the incident. The Resident Engineer shall then complete and submit an "Incidence of Non-Compliance" (ION) report for the identified violation within five (5) days of the incident. The Resident Engineer shall use forms provided by IEPA and shall include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance. All reports of non-compliance shall be signed by a responsible authority in accordance with Part VI. G of the Permit ILR10.

The Incidence of Non-Compliance shall be mailed to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Compliance Assurance Section
1021 North Grand East
Post Office Box 19276
Springfield, Illinois 62794-9276

Additional Inspections Required:

All Offsite Borrow, Waste, and Use areas are part of the construction site and are to be inspected according to the language in this section.

V. Failure to Comply

Failure to comply with any provisions of this Storm Water Pollution Prevention Plan will result in the implementation of a National Pollutant Discharge Elimination System/Erosion and Sediment Control Deficiency Deduction against the Contractor and/or penalties under the Permit ILR10 which could be passed on to the Contractor.



Contractor Certification Statement



Prior to conducting any professional services at the site covered by this contract, the Contractor and every subcontractor must complete and return to the Resident Engineer the following certification. A separate certification must be submitted by each firm. Attach to this certification all items required by Section II.G of the Storm Water Pollution Prevention Plan (SWPPP) which will be handled by the Contractors/subcontractor completing this form.

Route Interstate 90	Marked Route F.A.I. 90	Section (1517 & 1415) R-3
Project Number C-91-376-14	County Cook	Contract Number 60Y38

This certification statement is a part of SWPPP for the project described above, in accordance with the General NPDES Permit No. ILR10 issued by the Illinois Environmental Protection Agency.

I certify under penalty of law that I understand the terms of the Permit No. ILR10 that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification.

In addition, I have read and understand all of the information and requirements stated in SWPPP for the above mentioned project; I have received copies of all appropriate maintenance procedures; and, I have provided all documentation required to be in compliance with the Permit ILR10 and SWPPP and will provide timely updates to these documents as necessary.

- Contractor
- Sub-Contractor

Print Name 	Signature
Title 	Date
Name of Firm 	Telephone
Street Address 	City/State/Zip

Items which the Contractor/subcontractor will be responsible for as required in Section II.G. of SWPPP:

CTA REQUIREMENTS FOR CONTRACTORS WORKING ALONG THE RIGHT-OF-WAY (R.O.W.)



CTA REQUIREMENTS FOR CONTRACTORS WORKING ALONG THE RIGHT-OF-WAY (R.O.W.)

General Comments:

Contractor performing construction work adjacent to the CTA Right-of-Way (R.O.W.) can present hazards to CTA's property. The contractor shall have CTA flagmen present to assist them on the R.O.W. The CTA may also require inspectors and infrastructure trades (Linemen, Signal Maintainers, etc.). The cost of these services is the responsibility of the contractor and the must be prepaid.

Prior to the start of any work in close proximity of the CTA's R.O.W. the contractor shall meet with a CTA representative to determine the requirements for the flagmen and other trades, if required and other necessary items related to the work activities next to the CTA facilities and to receive CTA's approval for the contractor's proposed operations.

All Contractor and Subcontractor employees assigned to work on, over or near the CTA R.O.W. shall be required to attend an all-day Rail Right-of-Way Safety Training Session. The cost of this training is currently \$200 per employee, paid by the Contractor in advance.

The contractor shall notify the CTA representative at least 30 days prior to the performance of any work. The CTA's representative for all outside construction work will be:

Abdin Carrillo
Project Manager, Construction Oversight
567 West Lake Street, 9th floor
Chicago, IL. 60661-1465 (312)
681-3913
ADJConstruction@transitchicago.com
Cc: acarrillo@transitchicago.com

The Chicago Transit Authority reserves the right to restrict or prohibit work in or adjacent to the R.O.W. in an emergency and to the extent the Chicago Transit Authority determines that such work has adverse impacts on CTA Transit Operations. NO work may be performed during "Rush Hour" periods (Monday through Friday, from 0500 to 0900 and from 1500 to 1900 hours).

Workers from adjacent construction projects are prohibited to enter the CTA's R.O.W, unless CTA permission has been granted and workers have completed the Rail Right-of-Way Safety Training Session (no workers are allowed on the CTA R.O.W. without the presence of CTA Flaggers). Use of cranes or other equipment directly above the CTA's R.O.W. is also prohibited.

Contractors performing work within 50 feet of the CTA R.O.W. and/or property are required to obtain Railroad Protective Insurance coverage.

When installing deep foundations (or jacking under the CTA R.O.W.) the contractor shall continuously monitor the existing CTA's at-grade track and elevated structure footing for movement or other signs of distress. Appropriate remedial measures must be approved by CTA.

Once the excavation for any caissons that progress deeper than 8 feet, or to the water table, whichever is smallest, the work on that caisson shall be carried on continuously, 24 hours a day, including Saturday's, Sunday's, and holiday's until the caisson has been completed.

If at any time, work on any caisson is not continuous, for any reason, and not approved by the CTA, all caissons, which have been installed, shall be filled with sand or slurry at the contractor's expense.

Should any of the proposed work require the contractor to enter upon, or perform work above Chicago Transit Authority property, the contractor must first provide payment of \$1,000; this payment is the fee for the CTA to process a Right of Entry document; this fee is non-refundable.

In order for CTA to process the Right of Entry document, the contractor must furnish scope of work, insurance, Letter of Commitment, and deposit for Flagger/Inspector charges (all of these requirements are covered in this R.O.W. requirements document).

Please include a property plat or site plan that is the subject of your request, which identifies your client's property and CTA's property.

Five (5) weeks prior to the start of any work that may impact CTA Rail Operations (work in close proximity to CTA tracks that may cause service disruptions, etc.), the Contractor is required to attend a weekly Rail Operations meeting at the CTA Headquarters (date/time to be furnished); the Contractor is to bring a 5-week look-ahead schedule detailing dates/times of work, # of CTA Flaggers required, direction of track affected by work, whether track needs to be closed and/or whether power needs to be shut off (all of the aforementioned are contingent upon the prior approval of CTA).

Further, any work that affects the safety or causes disruptions of service or inconvenience to transit users, CTA Operations or impacts CTA Right-of-Way requires a "Construction Process Plan" Twenty-One (21) days PRIOR to work. A Construction Process Plan contains scope of work, timing of work (days and hours), impacts to CTA operations (and/or how you will mitigate impacts), contingency plans, weather limitations, contact info, Drawings/Sketches of work and relation to CTA tracks, Job Hazard Analysis, Hospital route map, equipment specs, lift plan, etc.

Respectfully,



Abdin Carrillo
Project Manager, Construction Oversight

copies: C. Bushell
R. Wittmann
S. Mascheri
J. Harper

File: Right of Way Requirements-Revised 10082013a REV E 10-20-14

**CHICAGO TRANSIT AUTHORITY
INSURANCE AND BOND REQUIREMENTS**
[Short Form – General Right of Entry]

ROE DESCRIPTION: **SAMPLE**

PART I. REQUIRED INSURANCE COVERAGES

A. WORKERS COMPENSATION

Coverage A: **STATUTORY** in form and in accordance with the laws of the State of Illinois.

Coverage B: Employers Liability:

\$1,000,000 Bodily Injury by Accident
\$1,000,000 Bodily Injury by Disease, Policy Limit

B. COMPREHENSIVE OR COMMERCIAL GENERAL LIABILITY:

\$2,000,000 General Aggregate (Per Location)
\$2,000,000 Products/Completed Operations Aggregate
\$1,000,000 Personal Injury and Advertising Injury
\$1,000,000 Per Occurrence

The Commercial General Liability policy shall include, without limitation: (i) Broad Form Contractual Liability, (ii) Products/Completed Operations to be maintained in full force and effect for a period of two (2) years following final completion of the work under the Contract, (iii) Independent Contractors' Protective Liability, (iv) Premises/Operations, including deletion of explosion, collapse and underground (XCU) exclusions, (v) Broad Form Property Damage, including Products/Completed Operations, (vi) Personal Injury Liability, (vii) Severability of Interest and Cross Liability endorsement and (viii) Contractor expressly agrees to waive, and will require its insurer to waive, its rights, benefits and entitlement under the "Other Insurance" clause of its Commercial General Liability policy, with respect to the CTA.

If any work is to be performed within fifty (50) feet of rail right-of-way Contractor must:

1. Provide Railroad Protective Liability Insurance policy in the amount of **\$2,000,000 per occurrence / \$6,000,000 aggregate**

C. AUTOMOBILE LIABILITY

\$1,000,000 Combined Single Limit (Bodily Injury and Property Damage)

PART II. GENERAL INSTRUCTIONS AND REQUIREMENTS

A. WAYS TO COMPLY WITH CTA INSURANCE REQUIREMENTS.

1. HOW TO COMPLY IF CGL, OWNERS PROTECTIVE LIABILITY, BUILDER'S RISK INSURANCE AND/OR PROFESSIONAL LIABILITY ARE REQUIRED BY PART III OF THIS DOCUMENT.

There are three ways to satisfy the CTA's insurance requirements for Comprehensive General Liability, Owners Protective Liability, Builder's Risk and Professional Liability. For Comprehensive General Liability, Owners Protective Liability, Builder's Risk and Professional Liability the Contractor must provide the CTA with one of the following insurance documents:

- a) Certified copy of the insurance policy,
- b) An insurance binder, *or*
- c) The CTA Certificate of Coverage on the CTA approved form. The CTA Certificate of Coverage may be completed only by an authorized representative of the insurance company, an agent, broker, or underwriter.

2. HOW TO COMPLY IF *RAILROAD PROTECTIVE INSURANCE* IS REQUIRED BY PART III OF THIS DOCUMENT.

There are two ways to satisfy the CTA's insurance requirements for Railroad Protective. The Contractor must provide the CTA with one of the following insurance documents:

- a) Certified copy of the insurance policy *or*
- b) An insurance binder

Method b) is a temporary method that is valid only for 90 days. A certified copy of the railroad protective insurance policy must be furnished prior to the expiration of this 90-day period.

3. HOW TO COMPLY FOR ALL OTHER TYPES OF REQUIRED INSURANCE.

For all other insurance required by Part III of this document, an ACORD™ certificate is acceptable.

B. DEADLINE FOR INITIAL SUBMITTAL OF CONTRACTOR'S INSURANCE AND BOND DOCUMENTS.

The Contractor must furnish all required insurance, performance, and payment bond documents within fourteen days of the date that the Contractor receives a letter (the "Insurance Submittal Letter") from the CTA's General Manager of Purchasing requesting the Contractor to submit the documents required by these Insurance and Bond Requirements. CTA will not execute the Contract until the required insurance and bond documents are delivered to CTA and approved by CTA. Failure to deliver the required documents within fourteen days of receipt of the Insurance Submittal Letter is a material failure to comply with the specifications and may result in any or all of the following at the CTA's sole discretion:

- 1) Debarment or suspension, and
- 2) Determination of Contractor non-responsibility.

C. CTA ADDRESS.

All notices and documents must be mailed to the CTA at:

Tamika Press
Insurance Coordinator
Risk Management Department
567 W. Lake Street
Chicago, IL. 60661-1498

D. OBLIGATION TO MAINTAIN CONTINUOUS COMPLIANCE

1. The Contractor expressly agrees that failure to comply and maintain compliance with all insurance and bond requirements shall constitute a material breach of the Contract which may result in default and, if uncured, termination for default under the contract. In addition, such failure, if uncured, may result in debarment and suspension.
2. The Contractor is prohibited from performing any work if Contractor has allowed any of the required insurance policies to expire.

PART III. MISCELLANEOUS INSURANCE REQUIREMENTS

- A.** The CTA must be named as an Additional Insured and Certificate Holder. When the CTA is an additional insured, the coverage shall be primary.
- B.** The CTA must be the Named Insured on the Owners Protective Liability, Railroad Protective Liability, or Builders Risk Insurance policies.
- C.** The Commercial General Liability and Owners Protective Liability, General Aggregate Limit of Liability, if any, must apply on a per location, per project basis by endorsement to the policy.
- D.** All insurance carriers must be acceptable to the CTA. All insurance companies shall have at least a B+ VII POLICY HOLDER RATING, or better, by the A.M. Best Co., Inc. Insurance companies with lower ratings will not be accepted. Carriers licensed to do business in the State of Illinois must issue all insurance, with the exception of Railroad Protective.
- E.** To the extent permitted by the Contractor's insurance policies required by the CTA, the Contractor and its insurers waive all rights of subrogation against the CTA.
- F.** The insurance to be carried shall in no way be subject to limitations, if any, expressed in the indemnity section of the General Conditions (or any statutory, judicial or common law limitations).
- G.** CTA MUST BE ADDITIONAL INSURED ON GENERAL LIABILITY.

INSURANCE CERTIFICATE OF COVERAGE

Named Insured: _____ RFP#: _____ Specification #: _____
 Address: _____ Project #: _____
 _____ (NUMBER & STREET) Contract #: _____
 _____ (CITY) (STATE) (ZIP)

Description of Operation/Location	
-----------------------------------	--

The insurance policies and endorsements indicated below have been issued to the designated named insured with the policy limits as set forth herein covering the operation described within the contract involving the named insured and the Chicago Transit Authority. The Certificate issuer agrees that in the event of cancellation, non-renewal or material change involving the indicated policies, the issuer will provide at least sixty (60) days prior written notice of such change to the Chicago Transit Authority at the address shown on this Certificate. This certificate is issued to the Chicago Transit Authority in consideration of the contract entered into with the named insured, and it is mutually understood that the Chicago Transit Authority relies on this certificate as a basis for continuing such agreement with the named insured.

Type of insurance	Insurer Name	Policy Number	Policy Period	Limits of Liability All Limits in Thousands
Commercial General Liability				
<input type="checkbox"/> Occurrence <input type="checkbox"/> Claims made				Each Occurrence \$ _____
<input type="checkbox"/> Premise-Operations				General Aggregate \$ _____
<input type="checkbox"/> Explosion/Collapse Underground				Products/Completed Operations Aggregate \$ _____
<input type="checkbox"/> Products/Completed Operations				
<input type="checkbox"/> Blanket Contractual				
<input type="checkbox"/> Broad Form Property Damage				
<input type="checkbox"/> Independent Contractors				
<input type="checkbox"/> Personal Injury				
<input type="checkbox"/> Pollution				
Commercial General Liability Form #: CG 00 01 _____				
Automobile Liability (Any Auto)				Each Occurrence \$ _____
Excess Liability				
<input type="checkbox"/> Umbrella Liability				Each Occurrence \$ _____
Workers' Compensation and Employer's Liability				Statutory/Illinois Employers Liability \$ _____
Builders' Risk/Course of Construction				Amount of Contract \$ _____
Professional Liability				\$ _____
Owner Contractors Protective				\$ _____
Other				_____

- a) Each insurance policy required by this agreement, except policies for workers' compensation and professional liability, will read:
 "The Chicago Transit Authority is an additional insured as respects to operations and activities of, or on behalf of the named insured, performed under contract with or permit from the Chicago Transit Authority".
- b) The General, Automobile and Excess/Umbrella Liability Policies described provide for separation of insureds applicable to the named insured and the CTA.
- c) Workers Compensation and Property insurer shall waive all rights of subrogation against the Chicago Transit Authority.
- d) The receipt of this certificate by the CTA does not constitute agreement by the CTA that the insurance requirements in the contract have been fully met, or that the insurance companies indicated by this certificate are in compliance with all contract requirements.

Name and Address of Certificate Holder and Receipt of Notice	Signature of Authorized Representative
Certificate Holder/Additional Insured	_____
Chicago Transit Authority Risk Management P.O. Box 7564 Chicago, IL 60680	Agent/Company Address _____ _____ Telephone _____



CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

Letter of Commitment

A Signed Contractual Agreement or Written Letter of Commitment serves as a formal agreement between the company and the CTA for the work to be performed.

The following Information should be included in your Letter:

1. Company's name, address, phone, and fax number
2. Company's contact person/project manager
3. Scope, Location, and Duration of the Project
4. Authorization to employ our service and bill your company
5. Authorized signature from project manager or officer of company



567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

SAMPLE: Letter of Commitment

Chicago Transit Authority
567 W. Lake
Chicago, IL 60661

Contractor: Company Name
 Address
 City, State, Zip Code
Phone: (XXX) XXX-XXXX
Fax: (XXX) XXX-XXXX

Contact person/Project Manager:

Work Location: Address
 City, State, Zip Code

Scope of Work:

Duration of Project: XXXX

To Whom It May Concern:

(Insert company name) is the Contractor for the building at **(insert address/project location)**, and intends to **(insert type of work to be performed)** at the said location. The property is adjacent to the CTA's **(i.e. Red, Brown, Purple, Blue, Orange, Yellow, or Pink)** line. The work will be completed in **(insert number)** days.

If any of CTA's services are required, I authorize the employment of and payment for such services.

Sincerely,

XXXXX
(Company Name to be billed for services)



CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

CTA Deposit Requirements

All Contractors performing work on or near the Chicago Transit Authority's (CTA) property will be required to provide a deposit in advance equal to CTA's estimate. No contractor will be permitted to work prior to submission of the deposit. The estimated amount includes, but is not limited to the following CTA services: Flagging Charges, Slow Zone Charges (signage and initial supplies), Inspector Charges, and other services as required (i.e. electricians, signal maintainers, switch persons, etc.)

Flagging Charges

The Contractor must provide CTA with a minimum of seventy-two (72) week day hours to schedule flagmen for a project (this means that flagmen required for the following Monday must be requested by 12:00PM (Noon) the previous Wednesday). Flagmen are scheduled for a minimum of eight (8) hours. Cancellations of flagmen orders require a twenty-four (24) hour advance notice, otherwise, the Contractor will be charged for the scheduled workers.

Slow Zones and Supplies

If a project requires the use of slow zones (work that is in close proximity to CTA tracks that requires Trains to reduce speeds), CTA will supply the signage for a fee. The contractor will be charged a fee of \$1,600.00 for each set of slow zone signage and associated equipment issued. The initial set of batteries for the lighting supplies will be provided by the CTA; however the contractor will need to supply any subsequent batteries/bulbs. Additionally, the contractor will be responsible for setting up, maintaining, removing, and securing the slow zones (Note: Contractor workers must have completed the Rail Right-of-Way Safety Training Session). The contractor will be refunded the balance remaining from the slow zone charge, less \$200.00 per ninety (90) days of usage and the cost of unreturned equipment.

Inspector Charges

Projects scheduled during weekend hours count as overtime for CTA inspectors. Weekend hours begin Saturday at 5:00 AM and end Monday at 5:00 AM. CTA requires a five (5) day advance notice from Contractors to schedule inspectors for weekend projects. If the Contractor's initial deposit amount is expended prior to the completion of the project, CTA will require an additional deposit to cover the remaining work for the project. CTA will not provide services if additional funds are not provided. After official project completion, all unused funds will be returned to the contractor.

All checks must be payable to the:

Chicago Transit Authority,
567 West Lake Street
Chicago, IL 60661

To ensure prompt service, please include the estimate sheet, your Commitment Letter, and address it to the attention of Abdin Carrillo. If you have any questions, please contact me at (312) 681.3913

Sincerely

A handwritten signature in blue ink that reads "Abdin Carrillo".

Abdin Carrillo
Manager, Construction Management Oversight



CHICAGO TRANSIT AUTHORITY

567 West Lake Street
Chicago, Illinois 60661-1498
TEL 312 664-7200
www.transitchicago.com

Rail Safety Training

All Contractor/Subcontractor/Consultant personnel assigned to work on, under, above, or adjacent to the CTA Right-Of-Way (R.O.W) and inside Rail Maintenance Facilities adjacent to six-hundred (600) VDC, are required to successfully complete a one-day (8-hour) Rail Safety Training (R.S.T.) Course administered by CTA in order to qualify for a Rail Right-Of-Way Safety Card. The course identifies the dangers that exist on the Rail System, including moving trains and the 600-volt DC Traction Power Distribution System. The CTA Representative (Abdin Carrillo) will determine if specific situations may not require R.S.T. (e.g., all work will be outside CTA's R.O.W. and there is NO chance that personnel, material or equipment will penetrate CTA R.O.W. or impact Rail Operations).

The General Contractor is responsible for requesting Rail Safety Training for Contractor/Subcontractor employees by either calling or providing an email to Ora Hardaway, CTA (contact info below). The General Contractor (no Subcontractors are to contact CTA) shall give the full names and the last 4 digits of the social security numbers for each individual proposed for the training. The Contractor shall include a check payable to the "Chicago Transit Authority", for the individual charges of the "Rail Safety Training Fee" multiplied by the number of individuals proposed for training. The "Rail Safety Training Fee" is currently \$200.00 (payable in advance) and is non-refundable. Individuals that fail to report for training or are rejected for training must reschedule (additional training fees will apply).

Scheduling Procedures

1. Contact: Ora Hardaway, ohardaway@transitchicago.com, (312) 681-3951 to register for class at least two (2) weeks in advance (it is recommended that Contractors schedule even further in advance due to high volume of work).
2. Once approved, you will receive a faxed or email confirmation and information packet.

**CHICAGO DEPARTMENT OF TRANSPORTATION DIVISION OF ELECTRICAL
OPERATIONS SPECIFICATIONS (DEO)**

**ITEM 67, CODE *, POLE, ALUMINUM, DAVIT, ARTERIAL, 32' -6" MH,
ANODIZED**

1. **DESCRIPTION.** This item will consist of furnishing, installing and setting plumb an anodized aluminum anchor base pole and aligning an anodized aluminum davit mast arm to which a street light luminaire will be attached. The pole and mast arm will be anodized black or in a color described by the Commissioner. The pole will be set on a separate foundation and affixed with anchor rods or bolts. The mast arm will be attached to an aluminum pole constructed to accept the arm. These arms are designed to fit the arterial davit pole.
2. **MATERIAL.** The pole must meet the requirements of Material Specification 1452. In addition, the arterial pole must meet the requirements and dimensions of Standard Drawing 975.
ANODIZING
 - (a) An anodized finish will be either gloss black or gloss bronze. A color sample must be submitted for approval before any factory production. The anodizing process must include cleaning, etching, anodizing, and sealing the mast. The contractor must submit his anodizing process for approval before any factory production.
 - (b) Color must be black unless noted otherwise in the order. A paint chip must be submitted for approval prior to fabrication.
 - (c) Anodized pole and arm shall be spiral wrapped with foam backed 5-mil polyethylene film of sufficient tensile and elongation characteristics to ensure protection during handling and shipping. Shafts shall be placed in cardboard tubes prior to shipment. Curved product shall be wrapped in burlap. The product shall be bundled with sufficient dunnage and strapping to prevent damage during shipment.
 - (d) **Warranty.** The Anodizing company shall warrant its applied anodized coatings against excessive fading due to normal climatic exposure for a period of one (1) year from the date of shipment. This warranty shall apply to the repair or replacement (at the manufacturer's discretion) of the material involved and shall not include reimbursement of consequential expenses such as installation or removal of equipment or transportation costs.
4. **INSTALLATION.** The pole must be installed on a concrete foundation or a steel helix foundation designed for the particular pole usage. When using double-nut construction please follow the details as shown on Standard Drawing 837. Double nut construction provides proper ventilation, as well as providing a way to plumb the pole. When using a helix foundation, double nutting is not feasible. Any exposed portions of anchor rods extending above the nuts which interfere with the installation of the bolt covers must be cut off to provide the necessary clearance. The excess must not be burned off. The pole must be set secure and plumb using the nuts and washer provided with the foundation pay item. The bolt

Specification 1452
Page 2

covers, and handhole cover must be securely attached. The pole must be properly orientated in relation to the street, so that the davit arm will be perpendicular to the direction of the roadway.

5. **METHOD OF MEASUREMENT.** This item will be measured per unit installed, complete. Work will consist of anodizing the pole, attaching the pole to the foundation, application of nut covers, attachment of handhole door, and plumbing of the pole.

6. **BASIS OF PAYMENT.** This work will be paid for at the Contract unit price each for "POLE, ALUMINUM, DAVIT, ARTERIAL, 32'-6" MH, ANODIZED", which will be payment in full for furnishing and installing the anodized pole complete in place. Bolt covers and the handhole door will be included as incidentals. The light pole standard foundation (including nuts and washers), davit arm, and luminaire will not be included in this pay item but will be paid for separately.

MATERIAL SPECIFICATION
1452 1453

DRAWINGS
975

ITEM 73, MAST ARM, ALUMINUM, DAVIT, ARTERIAL, 8 FOOT, ANODIZED

1. **DESCRIPTION.** This item will consist of furnishing, installing and aligning an aluminum davit mast arm to which a street light luminaire will be attached. The arm will be attached to an aluminum pole constructed to accept the arm. These arms are designed to fit the arterial davit pole.

2. **MATERIAL.** The mast arm must meet the requirements of Material Specification 1453. The mast arm for a davit arterial pole must meet the requirements and dimensions of Standard Drawing 945. The davit arm will have a 6 inch outside diameter at the base, where the arm slips over the top of the pole.
ANODIZING
 - (a) An anodized finish will be either gloss black or gloss bronze. A color sample must be submitted for approval before any factory production. The anodizing process must include cleaning, etching, anodizing, and sealing the mast. The contractor must submit his anodizing process for approval before any factory production.
 - (b) Color must be black unless noted otherwise in the order. A paint chip must be submitted for approval prior to fabrication.
 - (c) Anodized pole and arm shall be spiral wrapped with foam backed 5-mil polyethylene film of sufficient tensile and elongation characteristics to ensure protection during handling and shipping. Shafts shall be placed in cardboard

tubes prior to shipment. Curved product shall be wrapped in burlap. The product shall be bundled with sufficient dunnage and strapping to prevent damage during shipment.

- (d) Warranty. The Anodizing company shall warrant its applied anodized coatings against excessive fading due to normal climatic exposure for a period of one (1) year from the date of shipment. This warranty shall apply to the repair or replacement (at the manufacturer's discretion) of the material involved and shall not include reimbursement of consequential expenses such as installation or removal of equipment or transportation costs.
3. INSTALLATION. The mast arm must be installed on the aluminum pole as shown on the appropriate standard drawing. The davit arm must be attached to the pole by slipping the arm over the top of the pole and securing the arm to the pole with two stainless steel hex-head bolts. Details of the installation may be found on the appropriate standard drawing. The pole and arm must be properly orientated in relation to the street.

MATERIAL SPECIFICATION
1453

DRAWINGS
945

ITEM 86, CODE *, LUMINAIRE, LED, (400W HPSV EQUIVALENT), 240V, ARTERIAL, CUT-OFF

- 1 DESCRIPTION. This item will consist of furnishing and installing a street lighting luminaire, complete with internal driver, and LED SSL lamp of the proper wattage and input voltage, on a street light mast arm attached to a street light pole, and connecting the unit to either an underground cable distribution system or an aerial wire distribution system at the location shown on the plans, or as directed by the Engineer.
- 2 MATERIAL. The luminaire must meet material specification 1584 for the lamp wattage and type of distribution specified. Luminaires to be either black or gray, or as specified by Commissioner.
- 3 INSTALLATION. The luminaire must be securely installed on the mast arm. The vertical axis of the luminaire must be in a vertical plane, and the longitudinal axis must be leveled as specified in shop drawings supplied by the manufacturer to produce the desired distribution pattern with the lamp socket secured in the required position for that distribution.

For an aerial distribution system, the primary wiring to the driver must consist of 2 1/C #12 AWG wires, with 150 degree C. irradiated polyolefin insulation, connected to the terminal board "line" terminals. They must extend through the mast arm and exit from the mast arm through the grommet in the hole provided for this purpose, and extend further forming a drip loop and connect with aerial circuit wires. Connection to the aerial

ITEM 144, ROD AND CLEAN DUCT IN EXISTING CONDUIT SYSTEM

1. **DESCRIPTION AND SCOPE.** This work will consist of inserting a duct rod or electrical fish rod or tape of sufficient length and rigidity into an electrical conduit opening in one electrical manhole or handhole, and pushing the said rod through the conduit to emerge at the next or subsequent manhole in the conduit system at the location shown on the plans. The duct rod may be inserted and removed by any standard construction method which causes no damage to the conduit system. The size of the conduit may vary from two inch (2") to four inch (4"), but there will be no differentiation in cost for the size of the conduit.

The conduit system which is to be rodded and cleaned may exist with various amounts of standing water in the manholes. The contractor must pump the water or sufficient water from the manholes to drain the conduit and to afford compatible working conditions for the installation of the duct rods and/or cables. The pumping of the manholes will be incidental to the work of rodding and cleaning of the conduit.

Any manhole which, in the opinion of the Resident Engineer contains excessive debris, dirt or other materials to the extent that conduit rodding and cleaning is not feasible, will be cleaned at the Engineer's order and payment approved as a separate pay item, and not a part of this specification.

Prior to removal, of the duct rod, a duct cleaning attachment such as a properly sized wire brush or cleaning mandrel must be attached to the duct rod, which by removal of the duct rod will be pulled through the conduit to remove sand, grit, or other light obstructions from the duct to provide a clean, clear passage for the installation of cable. Whenever the installation of cables is not performed as an adjunct to or immediately following the cleaning of the duct, a light weight pulling line such as a 1/8" polyethylene line or conduit measuring tape must be placed and will remain in the conduit to facilitate future work. When great difficulty of either inserting the duct rod or removal of the cleaning mandrel is encountered, the duct may require further cleaning by use of a compressed air gun, or a low pressure water hose. In the case of a broken duct line, the conduit must be excavated and repaired. The existence and location of breaks in the duct line may be determined by rodding, but the excavation and repair work required will not be a part of this pay item.

ITEM 249, ELECTRIC CABLE IN CONDUIT, TRIPLEX 2 1/C NO.6,1/C NO.8

1. Description This work will consist of furnishing and installing electric cable that is triplexed. The cable must be rated at 600 volts and must consist of two number 6 conductors and one number 8 conductor. The cable will be installed in conduit underground.
2. Material The cable must meet all requirements of Material Specification 1534 of the Bureau of Electricity, City of Chicago.
3. Construction Method All cables must be installed with care to prevent damage to the cable. Any defects found in the cable must be reported to the resident engineer. Damaged cable must be replaced.

The cable must be pulled into the conduit with a minimum of dragging on the ground or pavement. This will be accomplished by means of reels mounted on jacks or other suitable devices located for unreeling cable directly into duct. Lubricants must be used to facilitate installation if deemed necessary by the contractor.

Bends in the cable will conform to the recommended minimum radii as outlined in the National Electric Code.

Cable passing through manholes must be trained and racked around the sides of the manhole into a permanent position. If racks are non-existent or in poor condition, the contractor must install racks. The material must be approved by the resident engineer. Any material and labor involved in training and racking the cable will be considered incidental to the cost of this pay item.

Where cable runs continue from manhole to manhole without tapping within a light pole, they will be continuous without splices unless authorized by the resident engineer.

The cable installation must be color coded so that each lead of all circuits may be easily identified and lighting units connected to the proper leg as indicated on the plans. The equipment grounding conductor (no. 8) must be color coded green.

All wire or cable in the distribution panels and control cabinets must be properly trained and have sufficient slack provided for any rearrangement of equipment or future additions.

There must be at least three feet of slack in a street light pole base or street light controller base. A handhole must have at least five feet of slack and a manhole at least ten feet of slack.

MATERIAL SPECIFICATION

1534

ITEM 504, ELECTRICAL EQUIPMENT REMOVAL AND SALVAGE

1. **DESCRIPTION.** This work will consist of the removal, salvage, and delivery of existing electrical equipment, including but not limited to light poles, arms, and luminaires, as specified on the plans or as directed by the Engineer. Salvaged electrical equipment must be delivered to the Bureau of Electricity yard at Cicero and 41st Street or to another City of Chicago location as directed by the Engineer.
2. **GENERAL REQUIREMENTS.** Electrical equipment to be removed and salvaged must be disassembled as required for the complete and safe removal and transport of the item from the work site. Electrical equipment must be hoisted, loaded and secured on adequate transport with care to prevent damage. Removal will include all incidental work and items associated with the equipment as directed by the Engineer.

**SPECIFICATION 1452
BUREAU OF ELECTRICITY
DEPARTMENT OF STREETS AND SANITATION
CITY OF CHICAGO
REVISED SEPTEMBER 1, 2006**

POLE: ANCHOR BASE, ALUMINUM, TAPERED TUBULAR SHAFT

SUBJECT

1. This specification states the requirements for tapered, tubular, aluminum anchor base poles. They will support street light luminaires mounted on either truss type arms or davit style arms. The poles will be served by underground cables.

GENERAL

2. (a) **Specifications.** The poles must conform in detail to the requirements herein stated, and to the Specifications and Methods of Test

Specification 1452

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of the American Society for Testing and Materials cited by ASTM Designation Number, and to the requirements of the American Welding Society, of which the most recently published revisions will govern.

- (b) Acceptance. Poles not conforming to this specification will not be accepted. The Commissioner will be the sole judge in determining if the poles meet this specification.
- (c) Bidders Drawings. Bidders must submit with their bids detailed scale drawings of the mast showing actual dimensions, details, and welds. Shop drawings must be original engineering drawings created by the manufacturer. The drawings must show every dimension necessary to show how all parts will fit each other and be properly held in assembly. These drawings must also be submitted in electronic format, preferably Microstation 95, if so requested by the City.
- (d) Drawings. The drawings mentioned herein are drawings of the Department of Streets and Sanitation being an integral part of this specification cooperating to state necessary requirements.
- (e) Sample. If requested by the Chief Procurement Officer, one completely assembled anchor-base pole of the manufacture intended to be furnished, must be submitted for review by the Commissioner within fifteen (15) business days after receipt of receiving notice.
- (f) Warranty. The manufacturer must warrant the performance and construction of the light poles to meet the requirements of this Specification and must warrant all parts, components, and appurtenances against defects due to design, workmanship, or material developing within a period of three years after the light poles have been delivered. This will be interpreted particularly to mean structural or mechanical failure of any element or weld. The warranty must be furnished in writing guaranteeing material replacement including shipment, free of charge to the City. The Commissioner will be the sole judge in determining which replacements are to be made. The Commissioner's decision will be final.

STANDARDS

- 3. (a) Assembly. Each anchor base pole must consist of an aluminum mast with handhole entry, aluminum hinged entry door, grounding nut, mast base plate, top cap for non-davit masts, bolt covers, and all necessary hardware required for complete assembly of these parts, ready for assembly, without special tools.
- (b) Interchangeability. Members of each pole type must be mutually interchangeable for assembly, so that no reworking will be required to

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make any member fit properly in the place of any other similar member of any other similar pole.

(c) Design. Each pole type must conform in design and dimensions to the pertinent drawing(s) listed in Table "A".

MASTS

4. (a) Mast Size. The outside diameters of the mast of each pole type must be as listed in Table A. The mast taper will be approximately 0.14 inches per foot.

(b) Material. The shaft must be fabricated from one length of 6063-T4 wrought aluminum alloy meeting the requirements of ASTM B221. After all welding operations are completed, the mast must be brought to a T6 temper having minimum physical characteristics of ASTM B221. The wall thickness of the shaft and the diameter of the shaft must be as listed in Table A and as shown on the appropriate standard drawing. Material certification must be provided from the tube manufacturer.

(c) Fabrication. The mast must be fabricated with no longitudinal or lateral welds in the tube. The completed masts must have smooth external surfaces free from protuberances, dents, cracks or other imperfections marring their appearance. Each mast must be rotary sand finished. Each mast must be straight and centered on its longitudinal axis.

(d) Base. The mast base must be a permanent mold aluminum casting conforming to the requirements for aluminum alloy 356-T6 of ASTM B-108 or ASTM B-26. The base must be similar in shape and dimensions to that shown on the appropriate standard drawing for the specific mast. The base must consist of a collar, flange, and any other members necessary to provide strength and reduce the concentration of anticipated stresses. The shaft must extend into the base as shown on the appropriate standard drawing and be circumferentially welded to the base casting at the top outer surface and the lower inner surface of the base. Bases must be attached to the mast so that the bearing surface of the base is at right angles to the longitudinal axis of the mast.

Non-metallic removable bolt covers which completely cover the anchor bolts and nuts must be provided. The covers must be attached with stainless steel screws or another type of non-seizing fastener, as approved by the Commissioner. The covers must enclose the anchor bolts and be secured in an approved manner.

All anchor rod openings for each pole type must have a width as listed in Table "A". Each opening must be sized to have a circumferential slot

length equal to 15° of the circumference.

- (e) Cable Entry for Conventional Poles. An opening of approximately one and one quarter inches (1-1/4") in diameter, rimmed with a rubber or nylon grommet, must be furnished and installed at the point on the shaft where the clamp on the upper member of the mast arm bracket meets the pole. Certain masts may require two cable entries, depending on the order. There will be no extra compensation for the extra cable entry. This cable entry requirement does not apply to pole masts designed for davit style arms. This requirement does apply to conventional poles (Drawings 890, 938, and 939).
- (f) Cable Entry for Residential Davit Pole. An opening for the residential davit pole (Drawing 940) of approximately one and one-quarter inches (1-1/4") in diameter, rimmed with a rubber or nylon grommet, must be furnished and installed at ten feet six inches from the bottom of the base to the center of the hole, or as directed in the order. In addition, two (2) holes must be drilled to accept two (2) rivnuts for mounting a City back plate for a residential mid-mount luminaire. All three (3) holes must be properly spaced and aligned to accept the City standard back plate for the residential mid-mount luminaire. The rivnuts (3/8-16) must be inserted in the pole. The holes must be properly aligned with the handhole.
- (g) Top of Shaft for Davit Arm. The top one foot of the mast must be formed as shown on the appropriate standard drawing. An adapter ring may be provided if required. Two sets of holes 9/16 inches in diameter must be drilled through the mast to accommodate two bolts to attach a davit arm. One set (two holes) must be in line with the handhole. The other set must be 90° apart from the other. These requirements apply to pole masts designed for davit style arms.

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(h) Provision for Ground. A tapped hole must be provided on an extension or offset, centered on the handhole door frame's interior vertical surface, to accept a 1/2"-13 bolt for a ground connection.

(i) Entry. A vertical doorframe for reinforcing a door opening which provides access to the interior of the mast must be welded on the inside of the pole and be centered approximately 18 inches above the bottom of the base. The doorframe must be formed and welded of aluminum alloy 6063-T6 with a cross section to adequately reinforce the opening of the mast. The doorframe must be as indicated on the appropriate standard drawing. The actual door opening must be as indicated on the appropriate standard drawing and will be sized to perfectly match the door size. The vertical centerline of the entry must be at a right angle clockwise to the vertical centerline of the mast arm. An internal flange must be welded to the inside of the pole at the bottom of the door opening. This flange will be drilled to accept a bolt. The bolt will be used to attach a hinged door to the pole. An aluminum tab must be welded to the inside upper portion of the door opening. A hole must be drilled into the tab that will accept a 1/4 inch screw. The hole must be centered horizontally in the door opening and must be centered 3/8 of an inch down from the uppermost portion of the door opening. A steel spring clip must be mounted to the tab. The clip must be made to accept a 1/4"-20 machine screw.

(j) Door. The removable door must be formed of the same aluminum as the pole. The door must fit the pole opening within a tolerance of 1/8 of an inch. The door must be flush with the pole surface in the closed position and appear as part of the original mast. The door must be attached to an internal hinge which will allow the door to open out and down. The hinge must be bolted to a flange on the inside of the pole at the bottom of the door opening, so that the door and hinge may be un-bolted and replaced if need be. The door opening must be sized according to the appropriate standard drawing. A hole must be drilled in the top of the door in alignment with the hole on the mast. A 1/4"-20 Allen head button machine screw must be provided to fasten the door to the doorframe. The screw must have a stainless steel core with a nylon threaded body. Other types of non-seizing fasteners may be considered. All doors of the same size must be interchangeable. The door and attachment method will be subject to approval by the Commissioner or his duly authorized representative.

(k) Tag. To each pole must be attached immediately below the handhole, by mechanical means and not by adhesive, a stainless steel tag with a stamped or embossed legend which must include the pole outside diameter at the base, the overall length, and the wall thickness.

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- (I) Structural Requirements. The mast must be manufactured in accordance with AASTHO's 1994 version of the "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals". The shaft and base assembly must be designed to meet AASTHO's 1994 criteria for 80 MPH wind loading with a 30% gust factor. The poles must be designed appropriately for Chicago street lighting applications, including mast arm and luminaires. Thirty - foot davit poles and thirty-foot conventional poles for arterial streets must also allow for banner and flower basket attachments. The pole manufacturer must provide load calculations that verify that the poles are designed properly.

TOP CAP FOR NON-DAVIT POLES

5. The top cap must be aluminum alloy. It must have smooth surfaces, neat edges and corners and be free from fins, holes, or other casting flaws. Three stainless steel set screws not less than 1/2 inches long must be equally spaced in tapped holes around the skirt to securely hold the top in place.

VIBRATION DAMPER

6. Each pole shaft will have an internal vibration damper, if required, located at a position as shown on the appropriate standard drawing. The vibration damper must be welded or bolted to the inside of the pole shaft. If the standard drawing does not show a vibration damper none should be provided. The design of the vibration damper is subject to approval by the Commissioner or his representative.

HARDWARE

7. All the hardware necessary to complete the assembly of the pole must be furnished. All hardware will be as specified elsewhere in these specifications. Hardware not specified elsewhere must be stainless steel, or equal corrosion-resistant non-seizing metal, or a non-metallic material subject to approval by the Commissioner.

WELDING

8. (a) General. Every welded joint must be made in conformity with the proper interpretation of the standard welding symbols of the American Welding Society as indicated on the drawings; however, each bidder must submit with his proposal a drawing showing the sizes and types of welds, must state the type of electrode, and must describe the welding methods, he proposes to use in fabricating the pole.

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- (b) Testing. All welds of five percent (5%) of the poles in every lot must be inspected for penetration and soundness of the welds by radiography, or by a penetrant method. Acceptance or rejection will be governed by the same conditions as in the TESTING Section.
- (c) Certifications. Welders must have proper certification for the welding operations required. Welding by non-certified personnel will not be allowed. Certifications must be available upon request.

MAST TEST

9. (a) General. All completed masts must be available for testing for maximum deflection and set. The masts must meet the structural requirements of Section 4(k). Unless specifically authorized in writing, all tests must be made at the works of the manufacturer. A record of every test must be made and a certified copy of the test record must be submitted to the Engineer of Electricity before the masts are shipped. An engineer from the Bureau of Electricity, Engineering Division, must be present during the testing procedures, if so requested by the City.
- (b) Lot. Tests for deflection of the mast must be made upon five (5%) percent of all the masts in every lot (two (2) min.). The selection of masts for testing must be random from the entire completed lot. If any of the masts in any lot fail to meet the test, an additional three (3%) percent of the masts of the same lot must be tested (two (2) min.). If any of these masts fail to meet the test requirements, the entire lot will be subject to rejection, except that the manufacturer may subject each mast in the lot to the test, and those which fulfill the requirement will be accepted. After testing, each base weld must be inspected by radiography or the penetrant method to determine that the welds have not been affected. After testing, no permanent set should be visible or apparent. The mast should appear straight.
- (c) Mast Requirements. With base rigidly anchored, a test load of 500 pounds must be applied at a point approximately eighteen inches (18") from the free end. The load must be applied at right angles to the center line of the mast and in the same vertical plane. With no failure of any component part, the deflection must not be greater than 7.5% of the pole height. After removal of the load, the deflection measurement device must be reset to zero and the test load must be reapplied. The deflection must not change from the deflection noted in the first test by more than $\pm 5\%$.
- (d) The contractor must include in his bid, the cost of travel, food and lodging for one (1) engineer. Travel for 150 miles or greater must utilize a

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major airline. Lodging accommodations must be equal to those provided at a Holiday Inn. The engineer must be given ten (10) working days notice of travel arrangements.

PACKAGING

10. (a) General. The poles must be shipped in twelve (12) to twenty-five (25) pole bundles. Each pole or bundle must not be wrapped so that the poles can receive proper air circulation to prevent water stains during outdoor storage.
- (b) Bundles. The poles in each bundle must be laid base to top to form an approximately rectangular cylinder. Materials such as lumber (2" x 4" min.), non-marring banding, and other appropriate bundling materials must be used to make a rigid, long lasting, bundle capable of being handled, shipped and stored without shifting of contents or breaking. Any bundles, in which either poles or packaging is received broken, damaged or with contents shifted, will not be accepted and it will be the responsibility of the supplier to return the bundle to its original destination at no cost to the City of Chicago. The bundles should be capable of being stacked two (2) high without breaking, or shifting of the contents. Each bundle must be capable of being lifted by a fork lift truck or crane and the bundles must be shipped on a flat bed truck to facilitate unloading.
- (c) Hardware. The bolt covers and their attachment devices must be shipped with each bundle. The package must be labeled and placed in a prominent position to facilitate accessibility, and must be attached to, or within, the bundle in such a manner as to assure safe delivery. Payment will be withheld for any bundle delivered without the accompanying hardware. Pole caps must be attached at the manufacturer's facilities, or be packed separately in a manner similar to the bolt covers, and the same payment conditions will prevail. Cracked, broken or chipped parts will be considered as an incomplete delivery as regards payment.
- (d) Delivery. All poles will be delivered to the Bureau of Electricity storage yard at 4101 South Cicero Avenue in Chicago, or to another location within the City as indicated on the order. Light pole information must include any recommendations of the manufacturer for storage.

INSPECTION

11. An inspector representing the City must have free entry at all times, while the work on the contract is being performed, to all parts of the manufacturer's works which concern the manufacture of poles. The manufacturer must afford the inspector, without charge, all reasonable

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facilities to satisfy him that the poles are being furnished in accord with these specifications. The final inspection must be made at point of delivery. Any poles rejected as defective must be removed and disposed of by the contractor at his sole cost.

TABLE A

POLE	T H I C K N E S S	BOLT CIRCLE	ANCHOR ROD	BASE P L A T E	M A X. D E F L	D R A W I N G
7"x4.5"x12'-5"	.156"	10"	1.0"	0.75"	11"	940
7"x4.5"x20'-0"	.156"	10"	1.0"	0.75"	18"	890
8"x4.5"x29'-5"	.312"	11.5"	1.0"	1.00"	26"	942
8"x4.5"x32'-10.5"	.312"	11.5"	1.0"	1.00"	29"	939
10"x6"x24'-5"	.312"	15"	1.25"	1.25"	22"	941
10"x6"x27'-10.5"	.312"	15"	1.25"	1.25"	25"	938

THIS SPECIFICATION MUST NOT BE ALTERED

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DIVISION OF ELECTRICAL
OPERATIONS SPECIFICATIONS (DEO)

SPECIFICATION 1453
BUREAU OF ELECTRICITY
DEPARTMENT OF STREETS AND SANITATION
CITY OF CHICAGO
REVISED JANUARY 29, 2002

MAST ARMS: ALUMINUM, TRUSS TYPE AND DAVIT TYPE

SUBJECT

1. This specification covers the requirements for aluminum mast arms for supporting street light luminaires. The aluminum arms will be supported by aluminum light poles.

GENERAL

2. (a) Specifications. The mast arms must conform in detail to the requirements herein stated and to the Specifications and Methods of Test of the American Society for Testing and Materials cited by ASTM Designation Number, and to the requirements of the American Welding Society, of which the most recently published revisions will govern.
- (b) Acceptance. Mast arms not conforming to this specification will not be accepted. The Commissioner will be the sole judge in determining if the arms meet this specification.
- (c) Bidders Drawings. Bidders must submit with their bids detailed scale drawings of the mast arm and bracket attachment proposed to be welded to the mast arm as the means for attaching these mast arms to poles. For davit arms, drawings must show how the davit is attached to the top of the light pole and is secured. The drawings must give every dimension necessary to show how the parts will fit each other and be properly held in assembly. These drawings must also be submitted in electronic format, preferably Microstation 95, if so requested by the City.
- (d) Drawings. The drawings mentioned herein are drawings of the Department of Streets and Sanitation being an integral part of this specification cooperating to state the necessary requirements.
- (e) Sample. If requested by the Chief Procurement Officer, one complete mast arm of the manufacture intended to be furnished, must be submitted within fifteen (15) business days upon receipt of such request.

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- (f) Warranty. The manufacturer must warrant the performance and construction of the mast arms to meet the requirements of this specification and must warrant all parts, components, and appurtenances against defects due to design, workmanship, or material developing within a period of three years after the mast arms have been delivered. This will be interpreted particularly to mean structural or mechanical failure of any element or weld. The warranty must be furnished in writing guaranteeing material replacement including shipment, free of charge to the City. The Commissioner will be the sole judge in determining which replacements are to be made. The Commissioner's decision will be final.
- (g) Structural Requirements. The arms must be manufactured in accordance with AASTHO's 1994 version of the Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. The arms must be designed to meet AASTHO's 1994 criteria for 80 MPH wind loading with a 30% gust factor. The arms must be designed for Chicago street lighting applications. The arm manufacturer must provide structural calculations that verify that the arms are designed properly.

TRUSS ARM DESIGN

3. (a) Each mast arm must be a truss type fabricated of two (2) inch "standard" aluminum pipe or tube 6063-T4 alloy conforming to the requirements of ASTM B429, or ASTM B221, or other approved design. The arm must be heat treated to a T-6 temper after fabrication and welding.
- (b) Mast Arm Attachment. The mast must be attached to the pole by means of an extruded aluminum clamp with a bolting arrangement to hold the arm firmly in place. The extrusion must be aluminum alloy 6061-T6 conforming to the requirements of ASTM B221, B308, or an approved equal. The clamps must be designed to securely fasten the mast arm to the pole so that the arm cannot be dislodged vertically or horizontally from its intended position on the pole by wind gusts, vibrations or other normally anticipated natural phenomena.
- (c) Dimensions. The truss type arm must have the dimensions indicated on Standard Drawing 943 or Standard Drawing 944 for the appropriate arm specified. Truss arms will be available in nominal horizontal lengths of 4 foot, 6 foot, 8 foot, 12 foot, and 15 foot, with either 4.5 inch or 6 inch clamps. The distance between the lower and upper members, measured between the vertical centers of the upper and lower attachment plates, must be 1'-9". With the arm attached to the pole intended to be supplied, the vertical rise from the center of the top

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attachment plate to the horizontal centerline of the end of the arm must be no greater than 2'-8". The horizontal axis of the free end of the upper member, when attached to the pole, must not exceed 3° above the true horizontal without the luminaire weight, nor be less than 1/2° above the true horizontal with a 35 lb. weight supported at the free end of the arm.

- (d) Mating of Members. The upper and lower members must be mated in such a manner as to assure that they will not separate due to vibration, weather conditions such as high wind gusts, icing, etc., or any other normally anticipated stress condition.
- (e) Interchangeability. Members of each truss arm size must be mutually interchangeable for assembly, so that no reworking will be required to make any member fit properly in the place of any other similar member of any other similar arm.

DAVIT ARM DESIGN

- 4. (a) Each arm must be fabricated from either 4.5 inch diameter or 6.0 inch diameter aluminum tubing of 6063-T4 alloy. After all fabrication and welding, the arm must be heat treated to a T6 temper.
- (b) The arm must be attached to the mast by slipping the bottom of the arm tube over the top of the mast. The arm must have four (4) holes pre-drilled at its base to accommodate two(2) through bolts set 90° apart, as shown on the Standard Drawings. The bottom bolt will be in direct line with the length of the arm. The holes must match the holes in the mast so that after assembly the arm and mast appear as a single continuous unit. When bolted to the pole, the arm must not shift or become dislodged by wind gusts, vibrations, or other phenomena.
- (c) The davit arm must be dimensioned as indicated on Standard Drawing 945, 946, 947, 948, 949, or 950, for the appropriate arm specified. Davit arms must be available in nominal horizontal lengths of 8 foot, 12 foot, and 15 foot; for both 4.5 inch and 6 inch pole tops. Davit arms will be single or twin as specified. A 2 3/8 inch diameter tenon will be attached to the end of each arm. The horizontal axis of the tenon, when the arm is attached to the pole, must not exceed 3° above the true horizontal without the luminaire weight, nor be less than 1/2° above the true horizontal with a 35 lb. weight supported by the tenon.
- (d) Interchangeability. All davit arms for a 4.5 inch pole top must be interchangeable with each other. The same is required of davit arms for a 6 inch pole top.

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WELDING

5. (a) General. Every welded joint must be made in conformity with the proper interpretation of the standard welding symbols of the American Welding Society as indicated on the drawings; however, each bidder must submit with his proposal a drawing showing the sizes and types of welds, must state the type of electrode, and must describe the welding methods, he proposes to use in fabricating the arms.
- (b) Testing. All welds of five percent (5%) of the arms in every lot must be inspected for penetration and soundness of the welds by radiography or by penetrant inspection. Acceptance or rejection will be governed by the same conditions as in the TESTING Section.
- (c) Certifications. Welders must have proper certification for the welding operations required. Welding by non-certified personnel will not be allowed. Certifications must be made available upon request.

HARDWARE

6. All hardware furnished for attachment of mast arm to pole must be series 300 stainless steel. All hardware necessary to complete the assembly of the arm to the pole must be provided.

MAST ARM TESTS

7. (a) General. Five percent (5%) of the mast arms of each size in every order must be tested for structural integrity.
- (b) Tests. The mast arms, when securely attached to a suitable and proper supporting structure, must withstand a horizontal (sideward) pulling force as indicated in Table A, and a vertical (downward) load as indicated in Table A. These loads may be applied independently. Each load must be applied at the end of the arm without any apparent permanent set, or damage to the welds joining the arm and mast arm attachment. The appropriate loading for each arm is indicated in Table A. On twin arms each arm extension must be tested.
- (c) Rejection. If the mast arms fail to meet the test, an additional three percent (3%) of the mast arms in the same lot must be tested. If any of these mast arms fail to meet the test requirements, the entire lot will be subject to rejection, except that the manufacturer may subject each mast arm in the lot to the test, and those which fulfill the requirements will be accepted.

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- (d) Witness Tests. If requested by the City, tests may be witnessed by an Engineer from the Bureau of Electricity. The contractor must include in his bid, the cost of travel, food and lodging for one (1) Engineer. Travel for 150 miles or greater must utilize a major airline. Lodging accommodations must be equal to those provided at a Holiday Inn. The Engineer must be given ten (10) working days notice of all travel arrangements.

PACKAGING

8. (a) General. The mast arms must be shipped in fifty (50) to seventy five (75) mast arm bundles without any wrapping on the individual arms or the entire bundle. All wrapping is to be omitted to assure proper air circulation over and between the arms to prevent water stains during outdoor storage.
- (b) Bundles. The bundles must consist of fifty (50) to seventy five (75) arms laid to form an approximately rectangular bundle. Materials such as lumber (2"x4"), stainless steel banding, and other appropriate bundling materials must be used to make a rigid, long lasting, bundle capable of being handled, shipped and stored without shifting of contents or breaking, subject to approval. Any bundles received broken, damaged, or with contents shifted, either the arms or the packaging, will not be accepted, and it will be the responsibility of the supplier to return the bundle to its original destination at no cost to the City of Chicago. The bundles should be capable of being stacked two (2) high without breaking, or shifting of the contents. Each bundle must be capable of being lifted by a fork lift truck or crane and the bundles must be shipped on a flat bed truck to facilitate unloading.
- (c) Hardware. The clamp backs and mounting hardware must be attached to the clamp fronts on the end of the arm, and must be shipped with each mast arm bundle. Mounting hardware for the davit arms must be packed and shipped with each davit arm bundle. Payment will be withheld for any bundle delivered without the accompanying hardware. Cracked, broken or chipped parts will be considered as an incomplete delivery as regards payment.

INSPECTION

9. An inspector representing the City must have free entry at all times while the work on the contract is being performed, to all parts of the manufacturer's works which concern the manufacture of these mast arms. The manufacturer must afford the inspector, without charge, all reasonable facilities to satisfy him that the mast arms

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are being furnished in accord with this specification. The final inspection must be made at point of delivery. Any mast arms rejected as defective must be removed and disposed of by the contractor at his sole cost.

TABLE A

ALUMINUM ARM	HORIZONTAL LOAD	VERTICAL LOAD	DRAWING #
Truss 4.5"x 4'	100#	250#	943
Truss 4.5"x 6'	100#	250#	943
Truss 4.5"x 8'	100#	250#	943
Truss 4.5"x 12'	100#	250#	943
Truss 4.5"x 15'	100#	250#	943
Truss 6.0"x 4'	100#	250#	944
Truss 6.0"x 6'	100#	250#	944
Truss 6.0"x 8'	100#	250#	944
Truss 6.0"x 12'	100#	250#	944
Truss 6.0"x 15'	100#	250#	944
Davit 4.5"x 8'	100#	250#	945
Davit 4.5"x 12'	100#	200#	946
Davit 4.5"x 15'	100#	200#	947
Davit 6.0"x 8'	100#	250#	948
Davit 6.0"x 12'	100#	250#	949
Davit 6.0"x 15'	100#	250#	950

THIS SPECIFICATION MUST NOT BE ALTERED

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SPECIFICATION 1534
BUREAU OF ELECTRICITY
DEPARTMENT OF STREETS AND SANITATION
CITY OF CHICAGO
SEPTEMBER 25, 2006

CABLE: SINGLE-CONDUCTOR, COPPER 600 VOLT

SUBJECT

1. This specification states the requirements for cables intended to be used as conductors in 120/240 VAC, 60 cycle, single phase, street lighting circuits. The cables will be installed in underground ducts or conduit.

GENERAL

2. (a) **Specifications.** The cable must conform in detail to the requirements herein stated, and to the applicable portions of the latest revisions of the specifications and methods of test of the following agencies:
- (1) ICEA Specification S-95-658
 - (2) IEEE Standard 383
 - (3) ASTM Standard E662-06
 - (4) ASTM Standard D470-05
 - (5) U.L. 44
 - (6) U.L. 854
- (b) **Acceptance.** Cable not in accordance with this specification will not be accepted.
- (c) **Sample.** If requested by the Chief Procurement Officer, a three (3) foot sample of the cable intended to be provided under this specification must be sent to the attention of the Engineer of Electricity within fifteen (15) days of receipt of such request.
- (d) **Warranty.** The manufacturer must warrant the cable to be first class material throughout. In lieu of other claims against them, if the cables are installed within twelve (12) months of date of shipment, the manufacturer must replace any cable failing during normal and proper use within two years of date of installation. All replacements under this warranty must be made free of charge F.O.B. delivery point of the original contract.

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CONSTRUCTION

3. This cable must consist of a round copper conductor with a tight fitting, free stripping, concentric layer of ethylene propylene (EPR) insulation and a concentric low lead chlorosulfonated polyethylene (CSPE) jacket extruded in tandem with, and bonded to, the insulation, or ethylene propylene (EPR) insulation only. The cable must be rated for continuous duty in wet or dry conditions at 90° C operating temperature, 130° C emergency overload temperature and 250° C short circuit temperature.

CONDUCTOR

4. (a) Material. The conductor must either be soft or annealed round copper wire.
- (b) Specifications. The conductor must meet the requirements of ASTM B3, B8 or B258, as applicable.
- (c) Sizes. The conductor size must be as stated in the PROPOSAL and in accordance with all requirements in Table A of this specification.
- (d) Stranding. The number of strands, must be as indicted in Table A. Stranding must meet the requirements of ASTM B8, Class B.

INSULATION

5. (a) Type. The insulation must be ethylene propylene rubber compound meeting the physical and electrical requirements specified herein.
- (b) Thickness. The insulation must be circular in cross-section, concentric to the conductor, and must have an average thickness not less than that set forth in Table A of this specification, and a spot thickness not less than ninety percent (90%) of the average thickness.

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(c) Initial Physical Requirements:

1. Tensile strength, min., psi. 1,200
2. Elongation at rupture, min. % 250

(d) Air Oven Exposure Test. After conditioning in an air oven at 121 +/- 1°C for 168 hours using methods of test described in ASTM-D 573:

Tensile strength, minimum percent of unaged value.....75

Elongation at rupture, minimum percent of unaged value.....75

(e) Mechanical Water Absorption:

GRAVIMETRIC METHOD: After 168 hours in water at 70 +/- 1°C:
water absorption, maximum, milligrams per square inch.....5

(f) Cold Bend Test Requirements. The completed cable must pass the "Cold-Bend, Long-Time Voltage Test on Short Specimens" of ASTM D-470 except that the test temperature must be minus (-) 25°C.

(g) Electrical Requirements

1. Voltage Test. The completed cable must meet an A.C. and D.C. voltage test in accordance with ASTM D-470 and D-2655.
2. Insulation Resistance. The completed cable must have an insulation resistance constant of not less than 20,000 when tested in accordance with methods shown in ASTM D-470.

JACKET

6. (a) Type. If the cable is jacketed, the jacket must be a chlorosulfonated polyethylene (CSPE) compound meeting the physical and electrical requirements specified herein. The CSPE jacket must meet CFR Title 40, Part 261, for leachable lead.
- (b) Thickness. The jacket must be circular in cross-section, concentric with the insulation, must have an average thickness not less than that set forth in Table A of this specification and a spot thickness not less than ninety percent (90%) of the average thickness.

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- (c) Initial Physical Requirements:
1. Tensile strength minimum PSI 1800
 2. Elongation at rupture, minimum percent 300
- (d) Air Oven Exposure Test. After conditioning in an air oven at 121 +/- 1°C for 168 hours:
1. Tensile strength, minimum percent of unaged value 75
 2. Elongation at rupture, minimum percent of unaged value 60
- (e) Mechanical Water Absorption. After 168 hours at 70 +/- 1°C:
1. Milligrams per square inch, maximum 20

TESTING

7. (a) General. Tests must be performed on insulation, jacket and completed cables in accordance with applicable standards as listed in these specifications. Where standards are at variance with each other or with other portions of this specification, the most stringent requirements, as determined by an engineer from the Bureau of Electricity, will apply. All tests must be conducted on cable produced for this order. Where cable insulation and/or jacket thickness preclude obtaining samples of sufficient size for testing, special arrangements must be made with the engineer to obtain samples of unprocessed materials directly from the extrusion feed bins which will be separately processed and prepared for tests.
- (b) Number Of Tests. Insulation and jacket tests must be conducted on samples taken every 25,000 feet or fraction thereof of each conductor size. In no case must samples be taken closer than 15,000 feet apart.
- (c) Witness Tests. Where the quantity of cable on a single purchase order is 250,000 feet or more, all insulation and jacket tests must be witnessed by an engineer from the Bureau of Electricity, if so requested by the City. Included in these tests will be a 70,000 BTU per hour flame test in accordance with IEEE 383. Reels to be tested will be selected at random. The contractor must include in his bid, the cost of travel, food and lodging for one (1) engineer. Travel for 150 miles or greater must utilize a major airline. Lodging accommodations must be equal to those provided at a Holiday Inn. The engineer must be given ten (10) working days notice of all travel arrangements.
- (d) Test Reports. No cable may be shipped until certified copies of all factory tests, including witness tests where applicable, have been reviewed and

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approved by the engineer.

- (e) Acceptance. Samples must be taken from each reel and must successfully conform to all tests specified herein. Reels from which samples fail to conform, will be rejected.

PACKAGING

- 8. (a) Cable Marking. The cable must be identified by a permanently inscribed legend in white lettering as follows:

1/c No. (conductor size) AWG-600V-90°C-EPR or EPR/CSPE

The legend must be repeated at approximately eighteen (18) inch intervals on the outside surface of the cable parallel to the longitudinal axis of the conductor. A sequential footage marking must be located on the opposite side from the legend.

- (b) All cable will be black pigmented. When three conductors (triplex) are specified, one conductor will be black, another will be red or black with a red tracer, the smaller of the conductors must have a green colored jacket and the three conductors must be triplexed with a 16"-18" lay. The insulation color must not be unduly affected by cable installation, or prolonged exposure to either direct sunlight or moisture. Where the quantity of triplex cable exceeds 80,000 feet, witness testing as outlined in section 7(c) will apply.
- (c) Reels. The completed cable must be delivered on sound substantial, non-returnable reels. Both ends of each length of cable must be properly sealed against the entrance of moisture and other foreign matter by the use of clamp-on cable caps, such as the Reliable Electric Company neoprene cable cap No. 1405, or equal. The ends must be securely fastened so as not to become loose in transit. Before shipment, all reels must be wrapped with cardboard or other approved wrapping.
- (d) Footage. Each reel must contain the length of cable as set forth in Table A of this specification. Alternate lengths may be considered.
- (e) Reel Marking. A metal tag must be securely attached to each reel indicating the reel number, contract number, date of shipment, gross and tare weights, description of the cable, the total footage, and the beginning and ending sequential footage numbers. Directions for unrolling the cable must be placed on the reel with an approved permanent marking material such as oil-based paint or a securely attached metal tag.

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TABLE "A"

CONDUCTOR		INSULATION/JACKET THICKNESS		A-C TEST	REEL LENGTH
<u>AWG</u>	<u>STRANDS</u>	<u>MILS</u>	<u>MILS</u>	<u>VOLTS</u>	<u>FEET</u>
14	7	30	15	5500	2000
8	7	45	15	5500	2000
6	7	45	30	5500	2000
4	7	45	30	5500	2000
2	7	45	30	5500	1000
0	19	55	45	7000	1000
00	19	55	45	7000	1000
000	19	55	45	7000	1000
0000	19	55	45	7000	1000
250 MCM	37	65	65	8000	1000

THIS SPECIFICATION MUST NOT BE ALTERED

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ELECTRICAL SPECIFICATION 1584
DIVISION OF ELECTRICAL OPERATIONS
DEPARTMENT OF TRANSPORTATION
CITY OF CHICAGO
JANUARY 14, 2014
LUMINAIRE: COBRA-HEAD, ARTERIAL,
LED (400 WATT LAMP HPS EQUIVALENT), IES CUTOFF
TYPE II/III DISTRIBUTION

SUBJECT

1. This specification states the requirements for an LED street lighting luminaire with driver. The luminaire shall be equivalent to a luminaire with a 400 watt HPS lamp and an IES Type II/III medium cutoff distribution. The overall shape of the luminaire shall be the cobra-head as presently used by the City for arterial streets.

GENERAL

2. (a) Information Required. Each bidder shall submit with his proposal the following information relative to the luminaire he proposes to furnish:
1. Outline drawing.
 2. Complete description and weight.
 3. Candlepower distribution curve showing the light distribution in the 70° degree cone and in a vertical plane through the maximum beam.
 4. Isolux curves.
 5. Utilization efficiency charts.
 6. Luminaire efficiency.
 7. Projected area in square feet.
 8. Manufacturer's name and catalogue designation of the luminaire.
 9. IES formatted photometric curve in electronic format.
- (b) Sample. One completely assembled luminaire of the manufacture intended to be furnished, must be submitted upon request of the Chief Procurement Officer within fifteen (15) business days of such request.
- (c) Assembly. Each luminaire must be delivered completely assembled,

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wired, and ready for installation. It must consist of aluminum die-cast housing, LED arrays, tempered glass refractor, terminal block, driver-door panel, electronic driver, gaskets, slip fitter, photocontrol receptacle (if required) and all necessary hardware.

- (d) Warranty. The manufacturer shall warrant the performance and construction of these luminaires to meet the requirements of this specification, and must warrant all parts, components and appurtenances against defects due to design, workmanship or material developing within a period of ten (10) years from the date of manufacture as indicated on the luminaire. A reduction of lighting output of more than 10% within the ten years will constitute luminaire failure. Any luminaire or part thereof, not performing as required, or developing defects within this period must be replaced by the manufacturer without expense to the City.
- (e) Organizations. The following organizations' specifications are mentioned herein.

ANSI – American National Standards Institute
ASTM – American Society for Testing and Materials
IEC – International Electrotechnical Commission
UL – Underwriters Laboratories
IESNA – Illuminating Engineering Society of North America

CONSTRUCTION

3. (a) Weight and Area. The net weight of this luminaire must not be more than 46 pounds. The effective projected area (EPA) must not exceed 1.0 square feet.
- (b) Housing. The housing shall be a precision aluminum die-casting composed of aluminum meeting ASTM Specification A380. It must be substantial and adequate enough to withstand the strains likely to be imposed on the housing when installed and in service. The housing must enclose the slipfitter, LED arrays, glass refractor, photocontrol receptacle, terminal board, and the electronic driver, with provision for proper mounting of these parts. The housing must have provision on its top surface to permit leveling with a spirit level. The housing must have integral heat sink characteristics, such that all enclosed components will operate within their designed operating temperatures under expected service conditions. No extra items shall be installed as heat shields or heat sinks. All heat shields and heat sinks shall be integral to the luminaire. The housing will have an appearance similar to existing cobra-head housings

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typically in use on Chicago's arterial streets.

- (c) Slip Fitter. The slip fitter shall be suitable for attachment over the end of a two (2) inch steel pipe with an approved means of clamping it firmly in place, and must provide a cast-in pipe-stop. It may be integral with, or may be attached to, the housing. The slip fitter must be designed to permit adjustment of not less than five (5) degrees above and below the axis of the mounting bracket. The slip fitter must contain an approved shield around the pipe entrance to block entry of birds.
- (d) Refractor. The refractor shall be crystal clear, heat-resistant, tempered glass, well annealed, homogeneous, and free from imperfections and striations. It must be flat.
- (e) Refractor Holder. The refractor holder must be die cast of aluminum alloy A380. The refractor must be securely held in the refractor holder with a number of stainless steel screws.
- (f) Driver Door-Panel. The driver components must be completely assembled and mounted on a die-cast aluminum door-panel composed of aluminum alloy A380. The door-panel must be hinged to the luminaire housing, suitably latched and fastened at the closing end. It must be made to be removed easily. The hinge and fastening devices must be captive parts which will not become disengaged from the door panel. An adhesive backed vinyl-impregnated cloth marker with an ID designation in 2" high black numbers on a red/white background must be attached to the door. The marker must be identifiable from the ground when the luminaire is mounted at a height of 30 feet.
- (g) Gaskets. Wherever necessary, in order to make a completely dustproof optical assembly, gaskets of silicone rubber or other specifically approved material must be provided. The reflector gasket must fit around and over the flange of the reflector.
- (h) Hardware. All machine screws, locknuts, pins and set screws necessary to make a firm assembly, and for its secure attachment to the mast arm, must be furnished in place. All hardware must be of stainless steel, copper silicon alloy or other non-corrosive metal, and where necessary must be suitably plated to prevent electrolytic action by contact with aluminum.
- (i) Finish. The luminaire shall have a polyester powder coat with a minimum 2.0 mil thickness. Surface texture and paint quality will be subject to approval. Color must be gloss black or gray Munsell No. 5BG 7.0/0.4 (designated A.S.A. No. 70) as specified in the order. A paint chip must be submitted as a sample upon request.

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- (j) Ingress Protection. The luminaire shall have an ingress protection rating of IP65 or better as described in IEC standard 60529 (also ANSI C136.25-2009).
- (k) The luminaire shall be UL listed. It shall be suitable for wet locations per UL 1598.
- (l) The luminaire shall be rated to operate between -40° to +50° Centigrade.
- (m) The luminaire shall have the option of adding a house side shield.
- (n) A bar code with pertinent information for warranty and maintenance shall be attached to the inside of the housing. A separate bar code label shall be on the inside of the driver door.

ELECTRICAL COMPONENTS

- 4. (a) LED Optical Array. The LED arrays shall be optimized for the required roadway photometrics. The arrays must be properly secured at the factory and must not require field adjustment for optimum photometric performance. The LEDs shall deliver a minimum of 70% of initial lumen output at 50,000 hours. LEDs shall provide a color rendition index (CRI) of 70. The color temperature of the LEDs shall be 4000 degrees Kelvin. The optical unit shall have an IP66 rating.
- (b) Terminal Block. A divisible-type terminal block of molded phenolic plastic must be provided within the housing in a readily accessible location on the main housing mounted directly over the driver door. It must be easily accessible when opening the driver door. The terminal block must be rated for 600 volts and must provide the terminals needed to completely prewire all luminaire components. The terminal block must be connected to a quick disconnect so that power to all components can be removed. The terminal block will have plated copper or plated brass, clamp-type pressure terminals of an approved type which will accommodate an incoming wire size of #12 AWG. The terminals for connection of the incoming wiring must be the polarized quick disconnect type.
- (c) Driver Requirements:
 - 1. Voltage. The electronic driver shall operate at a nominal input voltage range of between 120 and 277 volts, 60 Hertz.

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2. The driver shall provide the proper operating voltage to the LED arrays. Output frequency must be equal to or greater than 120 Hertz to avoid flicker.
 3. Power Factor. The power factor of the driver over the design range of input voltages specified above must not be less than 90%.
 4. The driver input current must have Total Harmonic Distortion (THD) of less than 20% when operated at nominal line voltage.
 5. The driver must be thermally protected to shut off when operating temperatures reach unacceptable levels.
 6. The driver must meet the requirements of the FCC rules and regulations, Title 47 CFR, part 15 and 18.
 7. The driver shall have a Class A sound rating per ANSI C63.4.
 8. Surge protection. The driver must have internal surge protection of 10kV/5kA per ANSI C62.41.2 - 2002.
 9. The standard drive current shall be 525mA.
- (d) The off-state power consumption of the luminaire shall not exceed 2.5 watts.
- (e) The minimum luminaire efficacy shall be 80 lumens per watt.
- (f) Mounting. The driver shall be mounted and fastened on the driver door in a manner such that the driver will remain secure and capable of withstanding the vibrations and shocks likely to occur when installed and in service. The driver must be readily removable for replacement.
- (g) Wiring. All components must be completely factory wired with non-fading, color coded leads. These leads must be insulated with an approved class of insulation and must be #16 AWG conductor minimum. All wires within a single circuit path must be of the same size. No wire nuts will be allowed. No unnecessary splices will be allowed. The use of wiring smaller than #16 AWG will require the written approval of the Commissioner. Color coding will be in a manner approved by the Commissioner. A complete wiring diagram must be displayed at an approved location on the interior of the luminaire and must include all luminaire and component identification and ratings. The wiring diagram must be provided on high quality material that will be resistant to

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cracking, yellowing, and fading in a luminaire environment. Quick disconnects must be provided for all components.

- (h) Option:Photo-control Receptacle and Cap. If the contract calls for photo-control, a standard three-prong, twist lock receptacle for a photo-control meeting ANSI standard C136.10 must be mounted in the housing with provision for proper positioning of the photo-control. The receptacle must be able to be repositioned without the use of tools. The photo-control is not required to be furnished, but a shorting cap with a three-prong plug having line-load prongs shorted together and meeting ANSI standard C136.10 must be provided. If the contract calls for no photo-control capability, a shorting cap must be provided.
- (i) Component Mounting.
 - 1. Modular Construction. All electrical components must be securely mounted in such manner that individual components can be easily maintained or replaced. Permanent straps or tie-wraps will not be permitted. The entire assembly should be easily disconnected and removed for replacement.
 - 2. Interchangeability. Components must be mutually field interchangeable so that units can be restored to working condition without trouble shooting components.

PHOTOMETRIC REQUIREMENTS

- 5. (a) The manufacturer must demonstrate that the luminaires will meet or exceed the specified photometric requirements. The manufacturer must provide photometric calculations using published luminaire data as part of the submitted package. The proposal must contain luminaire photometric performance with results equal to or better than those listed in this specification. Submittal information must include computer calculations based on the controlling given conditions which demonstrate achievement of all listed performance requirements. Computer calculations must be performed for roadway lighting and for sidewalk/parkway lighting. The submitted roadway lighting calculations must be done in accordance with I.E.S. RP-8-00, and must include point-by-point illuminance, luminance and veiling luminance as well as listings of all indicated averages and ratios. The submitted sidewalk/parkway calculations must be done in accordance with I.E.S. RP-8-00, and must include point-by-point horizontal illuminance and vertical illuminance as well as listings of all indicated averages and ratios.

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(b) Unless otherwise indicated, the light distribution will be I.E.S. classified as medium-cutoff-Type II/III (M-C-II/III), as defined in the "American National Standard Practice for Roadway Lighting" approved June 27, 2000 by the "American National Standards Institute" (ANSI).

(c) Performance Requirements (0.7 light loss factor):

1. Roadway Illuminance:

Average Horizontal	1.7 fc
Uniformity Ratio Av/Min	3:1

2. Roadway Luminance:

Average Luminance	1.2 cd/m ²
Uniformity Ratio Av/Min	3:1
Uniformity Ratio Max/Min	5:1
Max Veiling Luminance	0.3

(d) The photometrics shall be run for the specific requirements. If the luminaires are to be obtained for no specific project, the luminaires must meet the performance requirements for the following physical conditions:

Right-of-way	100'
Curb-to-curb	80'
Mounting height	30'
Setback	3'
Arm length	8'
Sidewalk width	6'
Parkway width	4'
Spacing (opposite)	120'
Pavement	R3

TESTING

6. (a) Testing. All testing must be done on a prototype of the actual luminaire to be provided under this specification. If recent test results are available, they may be considered as meeting the testing requirements of this specification. The Commissioner or Commissioner's representative will have the final approval of which tests are adequate.

(b) The manufacturer will be responsible for all costs associated with the specified testing, incidental to this contract.

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- (c) Photometric testing must be in accordance with IES recommendations. The tests, at a minimum, must yield:
1. An isofootcandle chart with maximum candela and half maximum candela trace.
 2. An isocandela diagram.
 3. Maximum plane and maximum cone plots of candela.
 4. A candlepower table (house and street side).
 5. A coefficient of utilization chart.
 6. A luminous flux distribution table.
- (d) The luminaire must meet the electrical and photometric requirements of IESNA LM -79.
- (e) The luminaire must meet the lumen maintenance requirements of IESNA LM -80.
- (f) The luminaire must meet the requirements of IESNA TM -21 for long term maintenance of LED light sources.
- (g) The LEDs must meet the requirements for chromaticity per ANSI C78.377.
- (h) The following applicable UL standards shall be met:
1. 8750 LED Light Sources in Lighting Products
 2. 1598 Luminaires
 3. 1012 power units other than Class 2
 4. 1310 Class 2 power units
 5. 2108 low voltage lighting systems
- (i) Additional Types of Testing.
1. Interchangeability of all component parts.
 2. Thermal testing in accordance with U.L. Standard 1572 or Standard 1598. The fixture must be placed in a controlled 25° Celsius environment and be energized for a minimum of 8 hours. At no time will any of the components exceed the manufacturer's recommended operating temperatures. At no time will any surface of the refractor exceed the manufacturer's recommended

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temperature limits.

3. 2G vibration testing in accordance with ANSI Standard C136.31. Upon completion of the test, all set screws, castings, and components must be secure and undamaged. The luminaire will not be energized for this test. However, the luminaire must be fully operational after the test.
4. Moisture testing in accordance with U.L. Standard 1572 or Standard 1598. The luminaire will be subjected to a water spray from various directions for a sufficient amount of time. After the water spray the inside of the refractor must remain dry and the fixture should be demonstrated to operate properly.

PACKAGING

7. (a) Packing. Each luminaire assembly must be packed in a suitable carton so secure that it must not be damaged in shipment and handling.
- (b) Marking. Each carton containing a luminaire must be clearly marked on the outside in letters not less than three-eighths (3/8) inch tall with the legend: "LUMINAIRE, LED, (400WHPS EQUIVALENT), IES CUTOFF TYPE II/III", the appropriate City Commodity Code Number, the name of the manufacturer, the date of manufacture, and the contract number under which the luminaire is furnished.

THIS SPECIFICATION SHALL NOT BE ALTERED

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 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 contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or 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 minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, 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 its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color,

religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. Davis-Bacon and Related Act Provisions

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics 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 issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics 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 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) 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.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. 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 shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, 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.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor 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, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, 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 contracting agency 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.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) 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 shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each 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 Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) 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 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, 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 FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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 U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or 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 Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen 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 worker 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 on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under 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 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's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

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 journeymen 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 determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

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 U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman 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 wage rate on the wage determination which provides for less than full fringe benefits for apprentices. 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.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor 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. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. 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.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for

debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys 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 (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

(2) the prime contractor remains responsible for the quality of the work of the leased employees;

(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

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. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded,"

as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

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 is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with

commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

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," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the

certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

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 participating in covered transactions 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.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 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 its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

Contract Provision - Cargo Preference Requirements

In accordance with Title 46 CFR § 381.7 (b), the contractor agrees—

“(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.”

Provisions (1) and (2) apply to materials or equipment that are acquired solely for the project. The two provisions do not apply to goods or materials that come into inventories independent of the project, such as shipments of Portland cement, asphalt cement, or aggregates, when industry suppliers and contractors use these materials to replenish existing inventories.

**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.