

TRAFFIC SIGNAL PAY QUANTITY NOTES (CONT.)

(SP-11 CONT)

- 4. UPS UNIT MINIMUM FEATURES
 - 4.1 1400 VA SHALL PROVIDE A TRUE SINE-WAVE OUTPUT WITH A MINIMUM RATING FOR WATTAGE OUTPUT OF 950 WATTS. UPS WILL FEATURE QUICK MAKE/BREAK CONNECTORS AND PLUGS (SYSTEMS REQUIRING HARD WIRING TERMINATION TO/FROM THE INVERTER ARE UNACCEPTABLE).
 - 4.2 UPS MUST PROVIDE FOR UTILITY SERVICE ISOLATION WHEN IN OPERATION.
 - 4.3 SURGE ENERGY WITHSTAND 480 JOULES, 6.5KA.
 - 4.4 COMMON MODE CLAMPING 0 NS 5 NS, TYPICAL UL 1449.
 - 4.5 CONDITIONED POWER-COMPUTER QUALITY.
 - 4.6 TRANSIENT LIGHTING PROTECTION = 160 JOULES.
 - 4.7 TRANSFER TO BATTERY TIME = 2 MS AND RETRANSFER TO UTILITY = 2 MS.
 - 4.8 EACH BATTERY SHALL BE 24 VOLTS 18 AH WITH HEAVY DUTY ANDERSON PLUGS AND ISOLATED FUSED (DEAD FRONT PANEL MOUNTED 30 AMP) CONNECTIONS TO THE UPS FOR GREATER SYSTEM RELIABILITY AND EASE OF MAINTENANCE. SERIES WIRING IS UNACCEPTABLE.
 - 4.9 FAN COOLING SHALL BE FUSED FOR LOCKED ROTOR CURRENT.
 - 4.10 COOLING AIR SHALL BE DUCTED TO COOL THE FRONT AND BACK OF EACH BATTERY WITH AIR SPACE ON ALL FOUR SIDES AND TOP OF EACH BATTERY.
 - 4.11 UPS COVERS SHALL BE 60% OPEN ON BOTH SIDES TO DIMINISH THE ENVIRONMENTAL EFFECTS OF EXTREME TEMPERATURE.
 - 4.12 INCLUDES RS-232, USB, AND DB9 COMPUTER INTERFACE PORTS.
 - 4.13 LOW VOLTAGE SAFETY DESIGN OF 24V DC (HIGHER VOLTAGE DC SYSTEMS ARE UNACCEPTABLE).
 - 4.14 TYPICAL BATTERY RECHARGE TIME: FROM FULL DISCHARGE TO 95% CAPACITY WITHIN 6 HOURS.
 - 4.15 WARRANTY: TWO (2) YEARS ON ALL BATTERY BACKUP SYSTEM COMPONENTS.
- 5. BATTERY SYSTEM
 - 5.1 BATTERIES SHALL BE MAINTENANCE-FREE AND SEALED 24V TYPE, ABSORBED GLASS MAT/VALVE REGULATED LEAD ACID (AGM/VRLA) AND CERTIFIED TO OPERATE IN TEMPERATURE RANGE OF -13 TO +165.2 DEGREES F.
 - 5.2 NUMBER OF BATTERIES AND AMP-HOUR RATING SHALL BE SUFFICIENT TO OPERATE THE BATTERY BACKUP SYSTEM IN FULL TIME SIGNAL OPERATION AT 950 WATTS FOR A MINIMUM OF 6 HOURS.
 - 5.3 BATTERIES SHALL BE PROVIDED WITH APPROPRIATE INTERCONNECT WIRING AND CORROSION-RESISTANT MOUNTING TRAYS AND BRACKETS FOR THE CABINET INTO WHICH THEY WILL BE INSTALLED.
 - 5.4 BATTERY CHARGING SYSTEM SHALL BE REGULATED AND TEMPERATURE COMPENSATED. BATTERY CHARGE MANAGEMENT SYSTEM SHALL BE PROVIDED FOR EACH BATTERY STRING.
 - 5.5 ALL INVERTER CONNECTIONS SHALL BE MADE WITHOUT THE USE OF TOOLS INCLUDING A/C INPUT, A/C OUTPUT, NORMALLY-OPEN, AND NORMALLY-CLOSED PROGRAMMABLE CONTACTS.
 - 5.6 BATTERIES SHALL BE FURNISHED WITH HEAVY-DUTY 50 AMP RATED SILVER-PLATED ANDERSON CONNECTORS AND A 100 AMP INTERNAL FUSE.
 - 5.7 BATTERIES SHALL BE WARRANTED FOR FULL REPLACEMENT FOR TWO (2) FULL YEARS.
 - 5.8 SYSTEM SHALL HAVE A HOT-SWAPPABLE BATTERY REPLACEMENT SYSTEM.
 - 5.9 BATTERY REPLACEMENT WARNING SYSTEM AUTOMATICALLY PERFORMS A SELF-TEST EVERY TWO WEEKS.
- 6. BATTERY CABINET
 - 6.1 BATTERY CABINET SHALL NOT EXCEED 46.0 INCHES H X 20.0 INCHES W X 10.25 INCHES D AND SHALL HOUSE ALL UNITS ASSOCIATED WITH BATTERY BACK-UP.
 - 6.2 BATTERY CABINET SHALL BE COMPLETELY ENCLOSED NEMA CABINET WITH FOUR SIDES, WELDED SEAMS, DETACHED FOR NEW INSTALLATIONS OR MOUNTABLE TO SIDE OF CONTROLLER CABINET FOR RETROFIT INSTALLATIONS, 0.125-INCH THICK ALUMINUM TYPE 5052-H32, POWDER-COATED BLACK (UNLESS SPECIFIED OTHERWISE ON THE PLANS), AND STURDY ALUMINUM SHELVES.
 - 6.3 ALL COVERS OR DOORS SHALL BE LOCKABLE. GENERATOR SET OPTION SHALL INCLUDE
 - 6.4 SHALL BE EQUIPPED WITH A LOCK KEYED WITH A #2 SIGNAL CABINET KEY. CABINET SHALL INCORPORATE A FULL-LENGTH PIANO HINGE, PAD-LOCKABLE DRAW LATCH, AND PAD-LOCKABLE WELDED-IN PLACE VANDAL-PROOF TABS RATED AT 2,000 POUNDS.
 - 6.5 AUTOMATIC TRANSFER SWITCH AND GENERATOR 30 AMP EXTERNAL REVERSE SERVICE PLUG.
 - 6.6 HEATER WITH THERMOSTAT.
 - 6.7 EXTERNAL INDICATING LIGHT INSTALLED INDICATING "ON BATTERY".

(SP-12)

- THIS PROJECT INVOLVES THE INSTALLATION OF FIBER OPTIC CABLE TO INTERCONNECT THE BOYD ST. TRAFFIC SIGNALS. FROM BERRY RD. TO CLASSEN BLVD.
- 1. PULL BOXES, SPLICE POINTS, FIBER LOCATING
 - 1.1 ALL FIBER OPTIC GROUND BOXES SHALL BE GB36 POLYMER CONCRETE. ALL SPLICE POINT LOCATIONS SHALL BE IN R48 POLYMER CONCRETE GROUND BOXES. THE 100-FOOT MAINTENANCE LOOP IN EACH R48 GROUND BOX SHALL BE COILED USING A FIGURE 8 METHOD TO PREVENT DAMAGE TO THE FIBERS AND SECURED TO THE SIDES OF THE GROUND BOX.
 - 1.2 PAY ITEM IS FOR SEVEN (7), 12 STRAND ARMORED PIG TAILS TO BE INSTALLED ON THIS PROJECT TO RUN FROM EACH SIGNAL CONTROLLER CABINET AT BERRY RD, AT FLOOD AVE, AT CHAUTAUQUA AVE, AT ELM AVE, AT UNIVERSITY BLVD, AT ASP AVE, AND AT CLASSEN BLVD TO THE NEARBY SPLICE BOXES AT EACH INTERSECTION.
 - 1.3 ALL FIBER OPTIC CABLE NEEDS TO BE ARMORED FIBER OPTIC CABLING. INSTALLATION DEPTH SHOULD BE BETWEEN 36" AND 48". IF INSTALLATION IS CONSTRAINED SUCH THAT THESE DEPTHS ARE NOT ACHIEVABLE, NO LESS THAN 24" DEPTH SHALL BE ALLOWED. COMMSCOPE TERRASPEED OR CORNING ODOT STANDARD WILL BE ACCEPTABLE. THE CITY REQUIRES NO. 14 GAUGE, STRANDED COPPER CABLE BE USED TO COMPLETE GROUNDING AND UTILITY LOCATE CAPABILITIES FROM THE CONTROLLER CABINET TO THE FIBER OPTIC CABLE IN GROUND. ONCE ATTACHED TO THE ARMORED JACKET ON THE FIBER, THE UTILITY LOCATE CAPABILITY NEEDS TO BE CONFIRMED CAPABLE FOR THE DISTANCE OF THE FIBER RUN. SHIELD ISOLATION PEDESTALS MUST BE USED TO PROVIDE EASE OF UTILITY LOCATING. CITY OF NORMAN FIBER OPTIC SIGNAGE (PAID FOR WITH PAY ITEM *B18(G) 5570 (PL) FIBER OPTIC ROUTE SIGN INSTALLATION) PLACED ALONG THE PATH, AS WELL. THE CITY OF NORMAN CAN PROVIDE INFORMATION TO DEFINE THE SHIELD ISOLATION PEDESTALS, SIGNAGE, GROUND
- 2. FIBER
 - THE PAY QUANTITY IS FOR 144 STRAND, ARMORED, SINGLE-MODE FIBER OPTIC CABLE TO BE RUN FROM BERRY RD. TO CLASSEN BLVD., AS SHOWN IN THE PLANS.
- 3. SPLICE ENCLOSURES
 - SPLICE ENCLOSURES SHALL BE FULL COYOTE SPLICE ENCLOSURES, OR APPROVED EQUAL.
- 4. SPLICING RESPONSIBILITY
 - 4.1 SPLICING WILL BE REQUIRED AT JENKINS AVE INTO DESIGNATED PAIRS OF EXISTING FIBER. DIAGRAMS WILL BE PROVIDED WHEN NECESSARY TO THE SELECTED CONTRACTOR TO DEFINE THIS. 136 SPLICES ARE ANTICIPATED.
 - 4.2 SPLICES WILL BE REQUIRED TO BE DONE IN THE GROUND BOXES NEAR THE SIGNAL CONTROLLER CABINETS AT BERRY RD, FLOOD AVE, CHAUTAUQUA AVE, ELM AVE, UNIVERSITY BLVD, ASP AVE, AND CLASSEN BLVD. IN ADDITION, MISCELLANEOUS SPLICES ARE REQUIRED BACK TO THE CITY OF NORMAN STREETS DIVISION. THE TERMINATION POINTS WILL BE IN THE CONTROLLER CABINETS. GROUP 1 (BERRY TO UNIVERSITY) WILL HAVE 60 SPLICES AND 60 TERMINATIONS. GROUP 2 (ASP TO CLASSEN) WILL HAVE 24 SPLICES AND 24 TERMINATIONS. 24 SPLICES AT LINDSEY AND JENKINS, 24 SPLICES AT LINDSEY AND GEORGE, AND 24 TERMINATIONS AT STREETS.
- 5. PATCH PANEL
 - 5.1 PAY ITEM IS FOR THE INSTALLATION OF SEVEN (7) CORNING SINGLE-PANEL HOUSING, OR APPROVED EQUAL, 12 PORT WALL-MOUNTABLE PATCH PANEL. ALL 12 FIBERS SHALL TERMINATE AT EACH CONTROLLER USING SC CONNECTORS.
 - 5.2 ALSO INCLUDED IN THE PRICE BID FOR THESE PANELS SHALL BE THE COST OF SEVEN (7) CISCO IE-2000-8TC-G-B SWITCHES WITH LAN BASE IMAGE AND WITH SEVEN (7) SD-IE-1GB SD MEMORY CARDS. THESE SWITCHES WILL BE BOUGHT FROM AN AUTHORIZED CISCO DISTRIBUTOR IN THE CITY OF NORMAN'S NAME. ALL CISCO SWITCHES WILL INCLUDE ONE YEAR OF SMARTNET SERVICES CON-SNT-IE2K8TCG (SNTC-8X5XNBD IE 8 10/100, 2 TSFP) REGISTERED IN THE NAME OF CITY OF NORMAN.
- 6. MISCELLANEOUS
 - IN ORDER TO DEVELOP A SERVICEABLE INSTALLATION, ADDITIONAL FIBER AND COMMUNICATION EQUIPMENT IS REQUIRED. THIS WILL BE PAID FOR UNDER ITEM 819 8780 AND INCLUDES FIBER OPTIC MODULES ARE NEEDED TO PLUG INTO THE SWITCHES. THIS PROJECT WILL REQUIRE FOUR (4) CISCO GLC-LH-SM (1000BASE-LX SFP, SMF, 1310NM, LC CONNECTOR).

(SP-13)

THE 2-INCH HIGH DENSITY PE PIPE USED ON THIS PROJECT SHALL BE SDR II.

(SP-14)

FIBER SHOULD BE COMMSCOPE, LIGHTSCOPE, OUTSIDE PLANT, DOUBLE JACKET, SINGLE ARMORED, SINGLE MODE 144 STRAND AND 12 STRAND FIBER OR CORNING ALTOS, OUTSIDE PLANT, DOUBLE JACKET, SINGLE ARMORED, SINGLE MODE 144 STRAND AND 12 STRAND FIBER, OR APPROVED EQUAL.

(SP-15)

THE PREEMPTION CONTROL SYSTEM SHALL INTERFACE WITH THE TRAFFIC CONTROLLER TO GIVE EMERGENCY VEHICLES APPROACHING THE INTERSECTION A GREEN INDICATION WITH ALL OTHER INDICATIONS BEING RED. ALL EQUIPMENT IN THE SYSTEM SHALL MEET NEMA ENVIRONMENTAL STANDARDS.

(SP-15 CONT)

THE SYSTEM SHALL USE AN OPTICOM MULTIMODE EMITTER CAPABLE OF OPERATING IN BOTH INFRARED (IR) OR GPS MODES. THE EMITTER IS PURCHASED AS PART OF THE SERIES 2000 VEHICLE EMITTER KIT WHICH INCLUDES A HIGH PRIORITY RADIO/GPS CONTROL UNIT, A MULTIMODE HIGH PRIORITY EMITTER, A VEHICLE INTERFACE CABLE, AND A VEHICLE HARDWARE INSTALLATION KIT. EQUIPMENT AT THE INTERSECTION SHALL INCLUDE A PHASE SELECTOR (MODEL 764), AN AUXILIARY INTERFACE PANEL (MODEL 768), A GPS RECEIVER/RADIO UNIT (MODEL 3100), AND A CONNECTION BETWEEN THE GPS RECEIVER/RADIO UNIT AND THE PHASE SELECTOR WITH MODEL 1070 CABLE. THE OPTICOM MULTIMODE MODEL 764 PHASE SELECTOR MAY BE USED IN IR ONLY APPLICATIONS, IN GPS ONLY APPLICATIONS, OR IN IR/GPS APPLICATIONS SIMULTANEOUSLY.

THE MANUFACTURER OR MANUFACTURER'S REPRESENTATIVE SHALL PROVIDE ASSISTANCE TO THE CONTRACTOR OR AGENCY INSTALLING THE EQUIPMENT AS TO THE BEST LOCATION FOR THE DETECTOR PLACEMENT AT EACH INTERSECTION INVOLVED WITH THE PROJECT. COSTS ASSOCIATED WITH THIS ASSISTANCE SHALL BE INCLUDED IN THE COST OF OTHER ITEMS. ALL EQUIPMENT MUST BE PLAINLY MARKED AS TO THE MANUFACTURER OF THE EQUIPMENT TO PROVIDE CLEAR IDENTIFICATION AS TO THE MANUFACTURER'S MODEL AND SERIAL NUMBER OF EACH UNIT. NEMA CERTIFICATION AND TEST REPORTS SHALL BE PROVIDED UPON REQUEST BY THE ENGINEER.

(SP-16)

THE CONTROLLER(S) TO BE FURNISHED ON THIS PROJECT SHALL BE VEHICLE ACUATED SOLID STATE DIGITAL CONTROLLER WITH VOLUME DENSITY FEATURES. THE CONTRACTOR SHALL FURNISH THE CONTROLLER(S) AND MOUNTING FRAMES AS FOLLOWS:

INTERSECTION	TYPE	CONFLICT & USER FLASH
UNIVERSITY AVE. AT BOYD ST.	8P	ALL RED
CHAUTAUQUA AVE. AT BOYD ST.	8P	ALL RED
ASP AVE. AT BOYD ST.	8P	ALL RED

THE CONTROLLER(S) WITH 2P-4P CAPABILITY SHALL BE FURNISHED WITH 8 LOAD RECEPTACLE BAYS. CONTROLLER(S) WITH 5P-8P CAPABILITY SHALL BE FURNISHED WITH 16 LOAD SWITCH RECEPTACLE BAYS. ALL CORRESPONDING RECEPTACLE WIRING IN THE CABINET AND FIELD WIRING SHALL BE INSTALLED FOR THE CONTROLLER AS REQUIRED. EXCEPT FOR ADDITIONAL DETECTOR CONNECTING CABLES WHEN THE CONTROLLER IS EXPANDED, THE CONTROLLER(S) SHALL BE CAPABLE OF PERFORMING AS SHOWN ON PHASE & SEQUENCE DIAGRAMS. PEDESTRIAN ISOLATION SHALL BE PROVIDED IN THE CONTROLLER CABINET. ALL N.E.M.A. FUNCTIONS SHALL TERMINATE IN THE CONTROLLER CABINET.

CABINET SHALL HAVE A 120V RECEPTACLE INSTALLED INSIDE OF THE CABINET IN ADDITION TO OR IN LIEU OF A RECEPTACLE INSTALLED ON THE DOOR. ALSO, ALL CABINETS THAT ARE TO BE INSTALLED IN A SIGNAL INTERCONNECT SYSTEM SHALL HAVE A PULL-OUT COMPUTER SHELF AND DRAWER INSTALLED FOR LAPTOP USE AT THE CONTROLLER CABINET. CABINET SHALL BE POWDER-COATED BLACK.

(SP-17)

CONTROLLER UNIT, CONFLICT MONITOR, AND VIDEO DETECTION SYSTEM SHALL EACH BE EQUIPPED WITH 10/100-IX ETHERNET COMMUNICATIONS PORT. CONTROLLER CABINET SYSTEM COST SHALL INCLUDE A RUGGEDIZED INDUSTRIAL ETHERNET SWITCH WITH (8) 10/100/1000-TX PORTS AND (2) 1000-FX SINGLE MODE FIBER OPTIC PORTS AND ONE CLC-LH-SM CISCO OPTICAL TRANSCEIVER TO CONNECT TO THE SWITCH. FIBER OPTIC PORTS SHALL HAVE TYPE "SC" CONNECTORS. ETHERNET SWITCH SHALL BE RUGGEDCOM RS-900C-HI-N-2SCIO OR PRE-APPROVED EQUAL. ETHERNET SWITCH SHALL BE SUPPLIED WITH (2) DUPLEX SINGLE MODE JUMPERS, WITH "SC MALE" CONNECTORS ON ONE END AND "ST MALE" CONNECTORS ON THE OTHER END.

CONTROLLER SHALL BE ECONOLITE ASC/3-1000 TS-2 TYPE I, WITH NTCIP FIRMWARE, AND SHALL BE FULLY COMPATIBLE WITH AND ABLE TO USE ALL THE FEATURES OF THE CITY'S CENTRACS ADVANCED TRAFFIC MANAGEMENT SYSTEM. EACH ETHERNET-EQUIPPED COMPONENT SHALL COME WITH A 3' CAT5E NETWORK CABLE FOR CONNECTING TO A SWITCH. EQUIPMENT SUPPLIER SHALL BE REQUIRED TO SUBMIT A UNIT TEST CERTIFICATION OF THE ENTIRE CABINET ASSEMBLY PRIOR TO INSTALLATION IN THE FIELD.

CONFLICT MONITOR SHALL BE A RENO 1600GE.

(SP-18)

THIS ITEM INCLUDES ALL EQUIPMENT AND MATERIALS TO PROVIDE SERVICE FROM THE OG&E POWER SOURCE, TO BE DETERMINED AT A LATER DATE, TO THE CONTROLLER CABINET.

(SP-19)

ALL PEDESTRIAN PUSHBUTTONS, PEDESTRIAN SIGNAL HEADS AND TRAFFIC SIGNAL HEADS ARE TO BE BLACK.

(SP-20)

ALL SIGNAL POLE AND MAST ARM ASSEMBLIES SHALL CONFORM TO ODOT MINIMUM STANDARDS, INCLUDING WIND AND ICE LOADING. SIGNAL POLE, MAST ARM, AND LUMINAIRE ARM ASSEMBLIES SHALL BE PELCO PART NUMBERS SP-3056-OK-35, SP-3056-OK-40, SP-3056-OK-50, AND SP-3056-OK-25, THAT INCLUDE THE ORNAMENTAL POLE TOPS, ORNAMENTAL POLE BASES AND ANCHOR BOLTS. ALL POLES AND MOUNTING HARDWARE SHALL BE BLACK. ALUMINUM POLE TOPS AND POLE BASES SHALL BE POWDER COATED TEXTURED BLACK (P59) OVER HOT DIP GALVANIZE. ALL SIGNAL POLES THAT HAVE LUMINAIRES SHALL HAVE 4" X 6" REINFORCED HAND HOLE WITH GALVANIZED AND POWDER COATED P59 COVER AT THE MAST ARM. ALL SIGNAL POLES SHALL HAVE ITC ACCESS COMPARTMENT ASSEMBLY WITH BARRIER TYPE TERMINAL STRIP IN ACCORDANCE WITH PELCO PART NUMBER AP-1074-PNC TO INCLUDE ITC COVER ASSEMBLY WITH PELCO PART NUMBER AP-1087-P59

(SP-21)

THE PEDESTRIAN POLES TO BE SUPPLIED ON THIS PROJECT SHALL BE 10" DIAMETER POLES AND SHALL ALSO MATCH THE DECORATIVE DESIGN OF THE SIGNAL POLES DESCRIBED IN NOTE SP-21.

(SP-22)

ANY LANE CLOSURES NEEDED DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH TYPICAL APPLICATIONS TA-22 OR TA-23 IN THE MUTCD.

DESIGN	CEM	02/16	BOYD ST. AND UNIVERSITY BLVD.
DRAWN	CEM	02/16	
CHECKED	NDT	02/16	
APPROVED			
SQUAD	GARVER		

NOTES

STATE JOB NO. 24285(04) SHEET NO. 5