

DRAFT SIGNAL SPECIFICATIONS

(REV. DATE: 05-23-2019)

PLAN AND SPECIFICATION COMPLIANCE

THE CONTRACTOR SHALL FURNISH AND INSTALL TRAFFIC SIGNAL DEVICES IN COMPLIANCE WITH THESE PLANS AND SPECIFICATIONS, THE CURRENT ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS AND ITS SUPPLEMENTAL SPECIFICATIONS, OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, AND THE "TC", "HL" STANDARD CONSTRUCTION DRAWINGS ISSUED BY ODOT (SUPPLEMENTS THE PLAN SPECIFICATIONS). THESE SPECIFICATIONS SET FORTH THE DESIGN AND MINIMUM OPERATING REQUIREMENTS FOR TRAFFIC SIGNAL EQUIPMENT. THE DELAWARE COUNTY ENGINEER'S OFFICE SHALL DETERMINE WHETHER THE SUPPLIED ITEMS MEET OR EXCEED THESE REQUIREMENTS.

TRAFFIC SIGNAL CONTROL EQUIPMENT SHALL MEET OR EXCEED THE STANDARDS SPECIFIED IN THE FOLLOWING DOCUMENTS:

- A) SPECIFICATIONS LISTED IN THIS PLAN
- B) NEMA STANDARDS PUBLICATION NO. TS2-1992 (OR CURRENT NEMA ISSUE
- C) 2019 ~~2016~~ ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS

IN CASE OF A CONFLICTING SPECIFICATION STATEMENT, THE SPECIFICATION DOCUMENT HIERARCHY SHALL BE IN THE ORDER LISTED FROM (A), HIGHEST, TO (C), LOWEST.

TEN-DAY TEST REQUIREMENTS

DELAWARE COUNTY REQUIRES A 10 DAY TEST TO START AFTER INSTALLATION IS 100% COMPLETE. NO PARTIAL TESTS WILL BE CONDUCTED. THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST TO THE DELAWARE COUNTY TRAFFIC ENGINEER STATING THAT THE SIGNAL INSTALLATION IS 100% COMPLETED AND A START DATE FOR THE TEN DAY TEST IS REQUESTED. IF LESS THAN 100% COMPLETION IS DETECTED UPON INSPECTION BY THE COUNTY OR ANY MAJOR MALFUNCTION (CONTROLLER, INTERCONNECT EQUIPMENT, LOOP AMPLIFIERS, ETC.) IS DETECTED, THEN THE TEN-DAY SHALL BE COMPLETELY RESTARTED.

SIGNAL INSTALLATION INSPECTION

THE CONTRACTOR SHALL NOTIFY THE DELAWARE COUNTY TRAFFIC DEPARTMENT AT (740) 833-2429 ONE WORK DAY BEFORE STARTING ANY TRAFFIC SIGNAL WORK INCLUDING BUT NOT LIMITED TO SIGNAL POLE FOUNDATIONS, PULL BOX, TRAFFIC SIGNAL CONDUIT, OR SIGNAL WIRING/LASHING. IF THE CONTRACTOR STOPS ANY TRAFFIC SIGNAL INSTALLATION WORK FOR GREATER THAN 3 CONSECUTIVE WORKING DAYS FOR ANY REASONS, RE-NOTIFICATION IS REQUIRED.

ANY WORK COMPLETED WITHOUT NOTIFICATION, MAY BE REQUIRED TO BE REDONE AT THE CONTRACTOR'S EXPENSE AS DIRECTED BY THE ENGINEER.

TESTING

THE CONTRACTOR SHALL SUBMIT CERTIFIED DOCUMENTATION, IN ACCORDANCE WITH 632.28, FOR THE FOLLOWING TESTS (A FORM IS AVAILABLE FROM THE ODOT'S TEM):

1. GROUND TEST
2. SHORT-CIRCUIT TEST
3. CIRCUIT CONTINUITY TEST
4. CABLE INSULATION TEST
5. FUNCTIONAL TEST

AS AN ALTERNATIVE, THE CONTRACTOR MAY REQUEST THAT A PERSON FROM THE COUNTY'S TRAFFIC DEPARTMENT BE PRESENT. TO MAKE ARRANGEMENTS, CALL (740) 833-2429. **ANY TEST CONDUCTED AND NOT CERTIFIED (OR IF THE TEST IS CONDUCTED WITHOUT THE COUNTY'S TRAFFIC REPRESENTATIVE) SHALL BE RE-DONE.**

MATERIAL INFORMATION SUBMITTAL AND TESTING CERTIFICATION

THE CONTRACTOR SHALL SUBMIT, FOR COUNTY APPROVAL; DIAGRAMS, BROCHURES OR OTHER DESCRIPTIVE MATERIAL FOR THE ITEMS THE CONTRACTOR INTENDS TO FURNISH THAT HAVE NOT BEEN SPECIFICALLY NAMED BY PRODUCT NUMBER. WHEN REQUESTED, THE MANUFACTURER SHALL PROVIDE A CERTIFIED LETTER STATING THAT THE CONTROLLER, MALFUNCTION MANAGEMENT UNIT (MMU), LOAD SWITCH UNITS AND AC LINE FILTERS HAVE BEEN SUCCESSFULLY TESTED IN EXACT ACCORDANCE WITH THE NEMA ENVIRONMENTAL STANDARDS AND TEST PROCEDURES. SUCH TESTING SHALL HAVE OCCURRED NO MORE THAN SIX-MONTHS PRIOR TO THE DATE OF THIS CONTRACT. THIS SIX-MONTH REQUIREMENT MAY BE WAIVED BY THE DELAWARE COUNTY TRAFFIC ENGINEER IF THE MANUFACTURER CAN SATISFACTORILY DEMONSTRATE TO THE TRAFFIC ENGINEER THAT THE SUPPLIED EQUIPMENT IS IDENTICAL TO THE EQUIPMENT THAT WAS PREVIOUSLY TESTED AND THAT THE MANUFACTURER REQUEST THIS TESTING REQUIREMENT BE WAIVED. ANY REDESIGN OR CHANGES OF ANY TYPE INCLUDING ANY COMPONENT CHANGES WHICH WOULD MAKE THE BID CONTROL EQUIPMENT NOT IDENTICAL TO TESTED CONTROL EQUIPMENT WILL REQUIRE THE ABOVE EQUIPMENT TO BE RE-CERTIFIED.

GROUNDING AND BONDING

THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) AND THE HL AND TC SERIES OF STANDARD CONSTRUCTION DRAWINGS ARE MODIFIED AS FOLLOWS:

1. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH.
 - A. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (725.04) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR.
 - B. METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END, AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.

- C. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
- D. IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS.
- E. THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT.

2. CONDUITS.

- A. THE 725.04 CONDUIT SHALL HAVE GROUNDING BUSHINGS INSTALLED AT ALL TERMINATION POINTS. THE BUSHING MATERIAL SHALL BE COMPATIBLE WITH GALVANIZED STEEL CONDUIT AND THE GROUNDING LUG MATERIAL SHALL BE COMPATIBLE FOR USE WITH COPPER WIRE. THREADED OR COMPRESSION TYPE BUSHINGS MAY BE USED.
- B. BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
- C. METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS UL APPROVED FOR THIS TYPE OF CONNECTION, WITH THE BOX BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.

3. WIRE FOR GROUNDING AND BONDING. USE INSULATED, COPPER WIRE FOR THE EQUIPMENT GROUNDING CONDUCTOR. BONDING JUMPERS IN BOXES AND ENCLOSURES MAY BE BARE OR INSULATED COPPER WIRE. WIRE SIZE SHALL BE AS FOLLOWS:

- A. USE 4 AWG BETWEEN THE POWER SERVICE AND SUPPORTS, POLES, PEDESTALS, CONTROLLER OR FLASHER CABINETS.
- B. THE INSULATION SHALL BE GREEN OR GREEN WITH YELLOW STRIPE(S). FOR 4 AWG OR LARGER, INSULATION MAY ALSO BE BLACK WITH GREEN TAPE/LABELS INSTALLED AT ALL ACCESS POINTS.

4. GROUND ROD

- A. A 3/4 INCH SCHEDULE 40 PVC CONDUIT WILL BE USED IN FOUNDATIONS AND CONCRETE WALLS FOR THE GROUNDING CONDUCTOR (GROUND WIRE) RACEWAY TO THE GROUND ROD. SHOULD METALLIC CONDUIT BE USED, BOTH ENDS OF THE CONDUIT SHALL BE BONDED TO THE GROUNDING CONDUCTOR.
- B. THE TYPICAL GROUNDING CONDUCTOR (GROUND WIRE) SHALL BE 4 AWG INSULATED, COPPER.

5. POWER SERVICE AND DISCONNECT SWITCH

- A. AT THE POWER SERVICE LOCATION, THE GROUNDING CONDUCTOR (GROUND WIRE) FROM THE DISCONNECT SWITCH NEUTRAL (AC-) BAR TO THE GROUND ROD SHALL BE A CONTINUOUS, UNSPLICED CONDUCTOR. IF SPLICED, IT SHALL BE AN EXOTHERMIC WELD BUTT SPLICE.

- B. THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.
- I. NEMA CONTROLLER CABINETS: IF A POWER SERVICE DISCONNECT SWITCH IS LOCATED BEFORE THE CONTROLLER CABINET, THE NEUTRAL (AC-) AND THE GROUNDING BARS IN THE CONTROLLER CABINET SHALL NOT BE CONNECTED TOGETHER AS SHOWN IN NEMA TS-2, FIGURE 5-4.
- II. IF SECONDARY DISCONNECT SWITCHES ARE CONNECTED AFTER THE PRIMARY DISCONNECT SWITCH, THE NEUTRAL (AC-) SHALL ONLY BE GROUNDED AT THE PRIMARY SWITCH. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BROUGHT TO THE PRIMARY SWITCH, BUT SHALL BE GROUNDED AT BOTH SECONDARY AND PRIMARY SWITCHES.

PAYMENT FOR THE ABOVE WORK SHALL BE INCIDENTAL TO THE VARIOUS BID ITEMS.

ITEM 625 PULL BOX, 725.06, (4,7,18) AS PER PLAN

PULL BOXES SHALL BE POLYMER CONCRETE AND SHALL BE MANUFACTURED BY STRONGWELL (QUAZITE) OR APPROVED EQUAL. ALL PULL BOXES SHALL BE PG STYLE WITH HA COVER. COVERS SHALL BE STAMPED "TRAFFIC" AND SHALL HAVE SKID RESISTANCE SURFACE. THE COVER SHALL BE SECURED TO THE BOX WITH TWO STAINLESS STEEL HEX-HEAD BOLTS, WASHERS, AND INSERTS.

ALL PULL BOXES SHALL BE SET TO FINAL GRADE OR FLUSH WITH PAVEMENT.

ITEM 633 ETHERNET RADIO, AS PER PLAN

THIS ITEM OR WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ETHERNET RADIO UNIT MANUFACTURED BY UBIQUITI (CURRENT MODEL NANOSTATION M5) OR APPROVED EQUAL.

PRIOR TO PROGRAMMING, THE CONTRACTOR SHALL CONTACT THE DELAWARE COUNTY TRAFFIC DEPARTMENT AT 740-833-2429. A COUNTY TRAFFIC DEPARTMENT REPRESENTATIVE SHALL BE PRESENT DURING THE PROGRAMMING OF THE SYSTEM.

PAYMENT FOR ITEM 633 ETHERNET RADIO, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL RADIO SYSTEM.

DESIGNER NOTE: TWO RADIOS REQUIRED AT EACH "MID" INTERSECTION

ITEM 633 ETHERNET RADIO, AS PER PLAN (ONLY USE IF DIRECTED BY DCEO)

THIS ITEM OR WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ETHERNET RADIO UNIT MANUFACTURED BY INTUICOM (CURRENT MODEL #EB6P) OR APPROVED EQUAL.

THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION OAND TESTIND AND SHALL PROVIDE ONSITE TRAINING ON THE SETUP, OPERATION AND MAINTENCE.

PRIOR TO PROGRAMMING, THE CONTRACTOR SHALL CONTACT THE DELAWARE COUNTY TRAFFIC DEPARTMENT AT 740-833-2429. A COUNTY TRAFFIC DEPARTMENT REPRESENTATIVE SHALL BE PRESENT DURING THE PROGRAMMING OF THE SYSTEM.

PAYMENT FOR ITEM 633 ETHERNET RADIO, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CAVINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL RADIO SYSTEM.

ITEM 633 ETHERNET RADIO ANTENNA, AS PER PLAN (ONLY USE IF DIRECTED BY DCEO)

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ETHERNET RADIO ANTENNA MANUFACTURED BY LARSEN (CURRENT MODEL #YA5900W) OR APPROVED EQUAL.

PAYMENT FOR ITEM 633 ETHERNET RADIO ANTENNA, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED MOUNTING BRACKETS, CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL ANTENNA.

ITEM 632 VEHICULAR SIGNAL HEAD, LED, BLACK, (BY TYPE), 12" LENS, POLYCARBONATE, WITH BACKPLATE, AS PER PLAN:

IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732, THE FOLLOWING SHALL APPLY:

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK POLYCARBONATE PLASTIC WITH VISORS AS SPECIFIED AND MEET ITE SPECIFICATIONS.
2. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.
3. ALL UPPER SIGNAL SUPPORT HARDWARE AND PIPING UP TO AND INCLUDING THE WIRE INLET FITTING SHALL BE POWDER-COATED BLACK FERROUS METAL.
4. THE ENTRANCE FITTING SHALL BE OF THE TRI-STUD DESIGN WITH SERRATED RINGS IN ORDER TO ACHIEVE POSITIVE LOCKING. BEFORE CLOSING SERRATIONS, APPLY A BEAD OF ROOM-TEMPERATURE VULCANIZING (RTV) SILICONE TO ALL SERRATED SURFACES AND THEN TIGHTEN. RTV SILICONE SHALL BE WHITE TO FACILITATE VISUAL INSPECTION. ON HEADS WITH DUAL CONCENTRIC SERRATED

RINGS, COMPLETELY FILL THE SPACE BETWEEN THE RINGS WITH RTV SILICONE.

5. ALUMINUM BACKPLATES SHALL BE IN ACCORDANCE WITH CMS 732.22 AND INCLUDE A FLUORESCENT YELLOW REFLECTIVE BORDER.
6. THE LIGHT EMITTING DIODE (LED) SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF CMS 732.04-C. THE CONTRACTOR SHALL PROVIDE DELAWARE COUNTY, IN WRITING, WITH THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURE FOR ALL LED UNITS THAT ARE TO BE USED IN THE SIGNAL HEAD PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES.
7. SIGNAL HEADS SHALL HAVE A MINIMUM WALL THICKNESS OF 0.117 INCHES.
8. SIGNAL HEADS SHALL INCLUDE CUTAWAY TYPE VISORS.
9. APPLY A BEAD OF SILICONE TO THE SIGNAL HEAD, WASHER, AND ENTRANCE ADAPTER SERRATIONS TO PREVENT WATER INTRUSION. ALSO, FILL THE SPACE BETWEEN CONCENTRIC SERRATION RINGS ON THE TOP OF THE SIGNAL HEAD TO COMPLETELY EXCLUDE WATER FROM THE SPACE BETWEEN THE CONCENTRIC RINGS.

PAYMENT FOR ITEM 632 VEHICULAR SIGNAL HEAD, LED, BLACK, (BY TYPE), 12" LENS, POLYCARBONATE, WITH BACKPLATE, AS PER PLAN SHALL BE MADE FOR COMPLETE SIGNAL HEAD FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS, AND NEW ATTACHMENT HARDWARE.

ITEM 632 PEDESTRIAN SIGNAL HEAD (LED) COUNTDOWN, TYPE D2, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732 THE FOLLOWING SHALL APPLY:

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
2. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF BLACK POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF BLACK GALVANIZED STEEL OR BLACK ALUMINUM.
3. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.
4. THE PEDESTRIAN SIGNAL HEAD SHALL BE OF THE LED COUNTDOWN
5. PEDESTRIAN HEADS SHALL HAVE THE TWO PIECE HINGE BRACKET TO ATTACK TO THE STRAIN POLE, SIGNAL SUPPORT OR PEDESTAL.
6. THE SIGNAL INDICATIONS SHALL BE FULLY FILLED IN HAND/MAN SYMBOLS.
7. THE LIGHT EMITTING DIODE (LED) SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF C&MS 732.04-C. THE CONTRACTOR SHALL PROVIDE DELAWARE COUNTY, IN WRITING, WITH THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURE FOR ALL LED UNITS THAT ARE

TO BE USED IN THE SIGNAL HEAD PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES.

PAYMENT FOR ITEM 632 PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN SHALL BE MADE FOR THE NUMBER OF COMPLETE PEDESTRIAN SIGNAL HEADS FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS AND NEW ATTACHMENT HARDWARE.

ITEM 632 PEDESTRIAN PUSHBUTTON, AS PER PLAN (APS UNITS ONLY)

PEDESTRIAN PUSHBUTTONS SHALL BE NAVIGATOR APS TWO-WIRE CONFIGURATION AND SHALL BE MANUFACTURED BY POLARA INC. OR EQUAL. **OPTIONS TO BE INCLUDED SHALL BE "VOICE ON LOCATION" AND FACE PLATE A.** THE LEAD-IN CABLE FOR PEDESTRIAN PUSH BUTTONS SHALL BE LOOP DETECTOR LEAD-IN CABLE. MOUNT THE CENTER OF THE PUSHBUTTON 36" ABOVE PEDESTRIAN PATHWAY SURFACE.

ITEM 632 PEDESTRIAN PUSHBUTTON, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF 632.09 AND 732.06, THE PUSHBUTTONS SHALL INCLUDE A CONFIRMATION TONE WHEN PRESSED AND COLORED TO MATCH THE STRAIN POLE/PEDESTAL. **THE PUSHBUTTON SHALL BE POLARA BULLDOG WITH LEFT/RIGHT ARROW OR APPROVE EQUAL.**

~~ITEM 632 COVERING OF VEHICULAR (OR PEDESTRIAN) SIGNAL HEAD, AS PER PLAN~~

~~IN ADDITION TO 632, THE COVERING OF THE ENTIRE SIGNAL HEAD AND THE BACKPLATE IS REQUIRED. HEAVY DUTY PLASTIC BAGS SHALL BE PERMITTED. TWO BAGS PER HEAD SHALL BE USED. THE BAGS SHALL BE SECURELY LASHED DOWN SO THE WIND DOES NOT RIP THEM FROM THE SIGNAL HEAD. ALL SIGNAL HEADS, WHILE COVERED, SHALL BE DARK EITHER BY REMOVING, UNSCREWING, OR DISCONNECTING THE POWER TO THE BULBS. NO COVERED HEAD SHALL BLOCK THE VIEW OF AN OPERATING HEAD. ANY EXISTING VEHICULAR SIGNAL HEAD THAT IS NOT FUNCTIONAL SHALL BE REMOVED IMMEDIATELY OR COVERED.~~

ITEM 632 REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN

THE CONTRACTOR SHALL DELIVER THE FOLLOWING ITEMS TO THE DELAWARE COUNTY ENGINEER, TRAFFIC DEPARTMENT AT 50 CHANNING ST, DELAWARE, OH 43015: VEHICULAR SIGNAL HEADS ALONG WITH ALL MOUNTING HARDWARE, PUSH BUTTONS AND SIGNS, STREET NAME SIGNS (UNLESS OTHERWISE DIRECTED), PULL BOXES, CONTROL CABINET, CABINET EQUIPMENT AND ANCHOR BASE POLES, AS SPECIFIED IN THESE PLANS AND ANY OTHER SALVAGEABLE ITEM AS DIRECTED BY THE ENGINEER. ALL ITEMS NOT DESIGNATED FOR SALVAGE SHALL BE DISPOSED OF BY THE CONTRACTOR.

ITEM 632 STRAIN POLE FOUNDATION, AS PER PLAN

THE POLE BASE FOUNDATION SIDES SHALL BE ORIENTATED PARALLEL TO THE SIDEWALK OR BACK-OF-CURB OR EDGE-OF-PAVEMENT AS SHOWN ON THE SIGNAL PLANS. THE TOP OF THE FOUNDATION SHALL BE FLUSH WITH ANY ADJACENT SIDEWALK OR CONCRETE AREA EXCEPT WHERE THE GROUND RISES STEEPLY BEHIND THE SIDEWALK OR CONCRETE AREA. THEN THE BACK SIDE

OF THE FOUNDATION SHALL MATCH THE GROUND SLOPE AND THE STREET SIDE OF THE FOUNDATION SHALL BE ABOVE THE SIDEWALK OR CONCRETE AREA AND COMPLETELY OUT OF THE SIDEWALK OR CONCRETE AREA. ONE SPARE 2" CONDUIT ELL SHALL BE INSTALLED IN EACH POLE FOUNDATION. SEE POLE ORIENTATION CHART FOR ANGULAR POSITION. ALL ANCHOR BOLTS SHALL BE ASTM F-1554 GRADE 105 WITH ROLLED THREAD. BOLT COVERS SHALL BE INSTALLED. THE ANCHOR BOLTS AND CONDUIT ELLS ARE INCIDENTAL TO THIS ITEM.

ITEM 632 SIGNAL SUPPORT FOUNDATION, AS PER PLAN

THE POLE BASE FOUNDATION SIDES SHALL BE ORIENTATED PARALLEL TO THE SIDEWALK OR BACK-OF-CURB OR EDGE-OF-PAVEMENT AS SHOWN ON THE SIGNAL PLANS. THE TOP OF THE FOUNDATION SHALL BE FLUSH WITH ANY ADJACENT SIDEWALK OR CONCRETE AREA EXCEPT WHERE THE GROUND RISES STEEPLY BEHIND THE SIDEWALK OR CONCRETE AREA. THEN THE BACK SIDE OF THE FOUNDATION SHALL MATCH THE GROUND SLOPE AND THE STREET SIDE OF THE FOUNDATION SHALL BE ABOVE THE SIDEWALK OR CONCRETE AREA AND COMPLETELY OUT OF THE SIDEWALK OR CONCRETE AREA. ONE SPARE 2" CONDUIT ELL SHALL BE INSTALLED IN EACH POLE FOUNDATION. SEE POLE ORIENTATION CHART FOR ANGULAR POSITION. ALL ANCHOR BOLTS SHALL BE ASTM F-1554 GRADE 105 WITH ROLLED THREAD. BOLT COVERS SHALL BE INSTALLED. THE ANCHOR BOLTS AND CONDUIT ELLS ARE INCIDENTAL TO THIS ITEM.

ITEM 632, POWER SERVICE, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF THE SPECIFICATIONS, THE FOLLOWING IS ADDED:

THE POWER SUPPLYING AGENCY FOR THIS PROJECT IS:

POWER COMPANY - (POWER COMPANY)

ADDRESS - (STREET)

(CITY)

(PHONE)

CONTACT NAME - (NAME)

THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOK-UP. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE POWER COMPANY FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS. THE VOLTAGE SUPPLIED SHALL BE 120 VOLTS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND THE PAYING OF ALL FEES WITH THE EXCEPTION OF NORMAL MONTHLY ENERGY CHARGES.

WHERE THERE IS AN EXISTING POWER SERVICE THAT IS BEING REPLACED, THE CONTRACTOR SHALL COORDINATE WITH THE POWER COMPANY TO CONTINUE BILLING ON THE EXISTING DELAWARE COUNTY ACCOUNT. WHERE A NEW POWER SERVICE IS BEING INSTALLED, THE CONTRACTOR SHALL ESTABLISH THE ACCOUNT IN THE COUNTY'S NAME FROM THE ONSET. METER SERVICE SHALL BE BUILT PER AEP FIGURE #6. RISER SERVICE SHALL BE BUILT PER DS2007-B, DS2007-C.

PAYMENT WILL BE MADE AT THE UNIT BID PRICE FOR EACH CMS ITEM 632, "POWER SERVICE, AS PER PLAN" WHICH SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS AND INCIDENTALS REQUIRED TO COMPLETE THIS ITEM IN A SATISFACTORY AND WORKMANLIKE MANNER.

ITEM 632 SIGNAL SUPPORT, TYPE XX.XX, (DESIGN), AS PER PLAN
ITEM 632 COMBINATION SIGNAL SUPPORT, TYPE XX.XX, (DESIGN), AS PER PLAN

ITEM 632 STRAIN POLE, TYPE XX.XX, (DESIGN), AS PER PLAN

ALL SIGNAL SUPPORTS SHALL BE MANUFACTURED BY VALMONT, UNION METAL, OR MILLERBERND. ALL POLES AND ARMS SHALL BE SMOOTH-SIDED; MULTI-SIDED POLES OR ARMS SHALL NOT BE USED. THE EXTERIOR COLOR OF ALL SURFACES, INCLUDING ALL ANCHOR BOLT COVERS, SHALL BE BLACK (FEDERAL STANDARD 5958 COLOR NO. #27038 WITH A MINIMUM 5 YEAR REPAIR WARRANTY OF COATING DELAMINATION, BLISTERING OR CORROSION). THE POLES SHALL BE GALVANIZED AND POWDER COATED USING A FOUR-PART EPOXY PAINT SYSTEM (AMERON'S AMER-LOC PROCESS OR APPROVED EQUAL).

ALL ATTACHMENTS ON POLES SUCH AS MOUNTING BRACKETS, BANDING, WEATHERHEADS, RISERS AND DAMPERS ON POLES SHALL BE BLACK POWDER-COATED TO MATCH POLES AND BRACKET ARMS. IN ADDITION TO PROVISION OF THE ODOT C&MS, FURNISH AND INSTALL SIGNAL POLES AS SPECIFIED IN THE PLANS.

THE SIGNAL SUPPORT DESIGNER SHALL PROVIDE DRAWINGS OF A SIGNAL SUPPORT WITH STRUCTURAL ASPECTS OF THE DESIGN AND MATERIALS IN COMPLIANCE WITH THE 2001 AASHTO STANDARD SPECIFICATIONS, WITH 2006 INTERIM REVISIONS, FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS. THE SIGNAL SUPPORT SHALL BE ASTM A595 GRADE A WITH A MINIMUM YIELD STRENGTH OF 50 KSI. THE FOLLOWING DESIGN PARAMETERS SHALL BE USED:

1. BASIC WIND SPEED = 90 MPH
2. DESIGN LIFE = 25 YEARS
3. FATIGUE CATEGORY = III
4. GALLOPING = NO
5. TRUCK INDUCED GUST = NO

SUBMIT, TO THE ENGINEER PRIOR TO INCORPORATION: TWO COPIES OF THE SIGNAL SUPPORT DRAWINGS AND SHOP DRAWING, WHICH IDENTIFY AND DESCRIBE EACH MANUFACTURED SIGNAL SUPPORT AND SIGNAL SUPORT ITEM WHICH IS BEING INCORPORATED INTO THE CONSTRUCTION. THE SIGNAL SUPPORT DRAWINGS AND SHOP DRAWINGS SHALL EACH BE REVIEWED, SEALED, STAMPED AND DATED BY TWO OHIO REGISTERED PROFESSIONAL ENGINEERS.

PAYMENT FOR ITEM 632 "SIGNAL SUPPORT, TYPE XX.XX, (DESIGN), AS PER PLAN" OR ITEM 632 "COMBINATION SIGNAL SUPPORT, TYPE XX.XX, (DESIGN) AS PER PLAN" OR ITEM 632 "STRAIN POLE, TYPE XX.XX, (DESIGN), AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE PER EACH COMPLETE AND IN PLACE, AND SHALL INCLUDE ALL SIGNAL SUPPORT DESIGN, LABOR, MATERIALS AND EQUIPMENT NECESSARY TO COMPLETE THE WORK.

ITEM 632 PEDESTAL, 10', TRANSFORMER BASE, AS PER PLAN

THE POLES SHALL BE GALVANIZED THEN COATED WITH A BLACK POWDER-COAT FINISH. THE GALVANIZING SHALL BE PROPERLY PREPARED SO THE POWDER-COATING WILL ADHERE TO THE GALVANIZING. TRANSFORMER BASE AND BOLT-NUT COVERS SHALL BE INSTALLED AND BE POWDER-COATED BLACK. THE EXTERIOR COATING FOR ALL POWDER-COATED ITEMS SHALL MEET FEDERAL STANDARD 595B COLOR #27038 SPECIFICATIONS AND HAVE A MINIMUM 5-YEAR REPAIR WARRANTY OF COATING DELAMINATION, BLISTERING OR CORROSION. THE POLES SHALL BE GALVANIZED AND POWDER COATED USING A FOUR-PART EPOXY PAINT SYSTEM (AMERON'S AMER-LOC PROCESS OR APPROVED EQUAL).

PAYMENT FOR ITEM 632 "PEDESTAL, 10', TRANSFORMER BASE, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE PER EACH COMPLETE AND IN PLACE, AND SHALL INCLUDE ALL PEDESTAL DESIGNS, LABOR, MATERIALS AND EQUIPMENT NECESSARY TO COMPLETE THE WORK.

ITEM 633 ADVANCED/DILEMMA ZONE DETECTION, RADAR, AS PER PLAN

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING ADVANCED/DILEMMA ZONE DETECTION UNIT MANUFACTURED BY WAVETRONIX (CURRENT MODEL #WX-SS-200V) OR APPROVED EQUAL.

THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ONSITE TRAINING ON THE SETUP, OPERATION AND MAINTENANCE OF THE UNIT.

THE UNIT SHALL COME WITH A 2-YEAR MANUFACTURER SUPPLIED WARRANTY.

PRIOR TO PROGRAMMING, THE CONTRACTOR SHALL CONTACT THE DELAWARE COUNTY TRAFFIC DEPARTMENT AT 740-833-2429. A COUNTY TRAFFIC DEPARTMENT REPRESENTATIVE SHALL BE PRESENT DURING THE PROGRAMMING OF THE SYSTEM.

PAYMENT FOR ITEM 633 ADVANCED/DILEMMA ZONE DETECTION, RADAR, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, AND CONNECTIONS, TESTED AND ACCEPTED.

ITEM 633 STOP BAR DETECTION, RADAR, AS PER PLAN

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING STOP BAR DETECTION UNIT MANUFACTURED BY WAVETRONIX (CURRENT MODEL #WX-SS-225) OR APPROVED EQUAL.

THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ONSITE TRAINING ON THE SETUP, OPERATION AND MAINTENANCE OF THE UNIT.

THE UNIT SHALL COME WITH A 2-YEAR MANUFACTURER SUPPLIED WARRANTY.

PRIOR TO PROGRAMMING, THE CONTRACTOR SHALL CONTACT THE DELAWARE COUNTY TRAFFIC DEPARTMENT AT 740-833-2429. A COUNTY TRAFFIC DEPARTMENT REPRESENTATIVE SHALL BE PRESENT SURING THE PROGRAMMING OF THE SYSTEM.

PAYMENT FOR ITEM 633 STOP BAR DETECTION, RADAR, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PROICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, AND CONNECTIONS, TESTED AND ACCEPTED.

ITEM 633 CONTROLLER UNIT, TYPE TS2/A2, WITH CABIBET, TYPE TS2, AS PER PLAN

THE CONTROLLER SHALL BE AN ECONOLITE COBALT - NEMA TS 2 TYPE TWO. THE REMAINDER OF THE CONTROLLER ASSEMBLY EQUIPMENT WILL BE NEMA TS2 TYPE ONE.

- THE CONTROLLER SHALL INCLUDE TWO ETHERNET PORTS & DATA KEY.
- THE CONTROLLER SHALL INCLUDE THE COBALT TOUCH SOFTWARE.
- BACK-UP PROTECTION SHALL BE ENABLED.
- A WIRELESS MODEM MANUFACTURED BY SIERRA WIRELESS (MODEL AIRLINK GX440) SHALL BE INCLUDED.
- FOUR 120VOLT GFI RECEPTACLES SHALL BE INSTALLED.
- THE CABINET SHALL INCLUDE A TERMINAL STRIP FOR EMERGENCY VEHICLE PREEMPTION.
- THE CONFLICT MONITOR WILL BE AN EDI MMU 16LEIP.
- THE CONTROLLER CABINET SHALL HAVE TWO (2) GROUND RODS INSTALLED ONE (1) FOOT APART. THE RODS SHALL BE CONNECTED BY A GROUND WIRE JUMPER THAT IS WELDED TO EACH ROD.
- THE WAVETRONIX LOOP DETECTOR UNIT SHALL BE LABELED TO IDENTIFY THE DIRECTION OF EACH UNIT
- THE CONTROLLER CABINET ENCLOSURES SHALL BE TS2 TYPE 5. THE TERMINAL FACILITIES SHALL BE TS2 CONFIGURATION 3 (12 LOAD SWITCH SOCKETS).

PAYMENT SHALL BE MADE AT THE UNIT PRICE BID PER EACH, COMPLETE AND IN PLACE, ALL CONNECTIONS TESTED AND ACCEPTED.

DESIGNER NOTE: DCEO REQUESTS THAT THE CONTROLLER UNIT BE LOCATED IN THE OPTIMAL LOCATION MAKING SURE THE POWER SOURCE LOCATION IS TAKEN INTO ACCOUNT.

ITEM 633 CABINET FOUNDATION, AS PER PLAN

THE CABINET FOUNDATION SHALL BE SIZED TO ACCOMMODATE THE UPS CABINET ON THE SAME FOUNDATION.

ITEM 633 CONTROLLER WORK PAD, AS PER PLAN

THE CONTROLLER WORK PAD SHALL BE SIZED TO ACCOMMODATE THE UPS CABINET ON THE SAME WORK PAD.

ITEM 633 CONTROLLER ITEM, MISC.: UNINTERRUPTIBLE POWER SUPPLY (UPS), 1,700 WATT, 48 VOLTS, SIDE MOUNT, AS PER PLAN

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A BATTERY BACKUP UPS SYSTEM TO PROVIDE UNINTERRUPTIBLE, RELIABLE, EMERGENCY POWER TO A TRAFFIC SIGNAL INTERSECTION IN THE EVENT OF A POWER FAILURE OR INTERRUPTION. THE TRANSFER FROM UTILITY POWER TO BATTERY POWER SHALL NOT INTERFERE WITH THE NORMAL OPERATIONS OF THE TRAFFIC CONTROL SYSTEM. THE SYSTEM SHALL BE SELF-CONTAINED INCLUDING ALL UPS HARDWARE, THE REQUIRED NUMBER OF BATTERIES AND ITS OWN SEPARATE VENTILATED ENCLOSURE. CABINET RISER FOR THE UPS CABINET SHALL BE INCLUDED.

PAYMENT SHALL BE MADE AT THE UNIT PRICE BID PER EACH, COMPLETE AND IN PLACE, ALL CONNECTIONS TESTED AND ACCEPTED.

~~ITEM 630 SIGNING MISC., STREET NAME BRACKETS, AS PER PLAN~~

~~STREET NAME BRACKETS SHALL BE MANUFACTURED BY SIGNFIX OR EQUAL. THE 36", 42", AND 48" SIGN BRACKETS SHALL BE SIGNFIX SS O/S WITH HDPE OR EQUAL. THE 54", 60", 66", OR 72" SIGN BRACKETS SHALL BE SIGNFIX DBL O/S WITH HDPE OR EQUAL. BRACKET LENGTHS ARE DETERMINED BY THE SIZE OF THE STREET NAME SIGN (SEE DCEO STANDARD DRAWING R2185).~~

~~ALL BANDING MATERIAL USED TO INSTALL THE STREET NAME SIGNS SHALL BE THE SAME COLOR AS THE POLES (BANDS AND BRACKETS). THE BANDING SHALL BE ULTRA LOK 200 SERIES, 3/4" WIDTH WITH A THICKNESS OF 0.030" OR APPROVED EQUAL.~~

ITEM 633, PREEMPTION, AS PER PLAN

THIS ITEM CONSISTS OF PROVIDING AND INSTALLING PREEMPTION EQUIPMENT IN THE LOCATIONS AND LOCAL AS SHOWN ON THE PLANS.

THE PREEMPTION SHALL CONFORM TO ODOT SPECIFICATION 633 AND SHALL UTILIZE COMMUNICATIONS TO IDENTIFY THE PRESENCE OF AN EMERGENCY VEHICLE.

THE COMMUNICATIONS MEDIUM SHALL EMPLOY RADIO/GPS DETECTION TECHNIQUES TO DETERMINE AND LOG THE PRESENCE OF THE VEHICLE BY DETECTING THE RF/GPS LOCATION OF THE APPROACHING VEHICLE. THE SYSTEM SHALL BE COMPLETELY COMPATIBLE WITH NEMA CONTROLLERS AND BE COMPLETELY WIRED AND TESTED. THE SYSTEM SHALL BE ABLE TO

DETECT THE DIRECTION AND THE ESTIMATED TIME OF ARRIVAL (ETA) OF APPROACHING VEHICLES FROM A DISTANCE OF 2,500 FEET OR MORE.

THE INTERSECTION SHALL BE EQUIPPED WITH THE FOLLOWING COMPONENTS:

1. PREEMPTION ANTENNA
2. PREEMPTION ANTENNA WIRING
3. PREEMPTION PHASE SELECTOR UNIT AN WIRING INTERFACE PANEL (IF REQUIRED)
4. TWO-WAY CONFIRMATION LIGHTS AND WIRING (2 EACH)

THE DETECTION ANTENNA AND CONFIRMATION LIGHTS SHALL BE RIGID MOUNTED TO THE MAST ARMS WITH MOUNTING HARDWARE (COLORED TO MATCH THE MAST ARMS) AS RECOMMENDED BY THE EQUIPMENT SUPPLIER. THE SYSTEM SHALL BE CAPABLE OF DETECTING ALL EQUIPPED VEHICLES BY DIRECTION, ETA, SPEED, AND TURN SIGNAL STATUS.

THE CONFIRMATION LIGHTS SHALL BE RIGID MOUNTED TO THE MAST ARMS AND ARE FOR THE PURPOSE OF PROVIDING MOTORISTS A VISUAL INDICATION THAT AN EMERGENCY VEHICLE IS APPROACHING THE INTERSECTION. THE CONFIRMATION LIGHT FOR ALL APPROACHES SHALL DISPLAY A STEADY WHITE LIGHT DURING PREEMPTION.

THE LIGHT FIXTURES SHALL BE A DUAL INDICATION, WEATHERPROOF FIXTURES UTILIZING A STANDARD OUTDOOR SPOTLIGHT.

THE CONTRACTOR SHALL THOROUGHLY INSPECT THE INSTALLED SYSTEM. AT A MINIMYUM THE CONTRACTOR SHALL VERIFY THAT ALL CONNECTIONS ARE PROPERLY MADE TO THE CONTROLLER CABINET. THE CONTRACTOR SHALL CHECK THAT THE PHASE SELECTOR STATUS LIGHTS FOR RADIO AND GPS ARE CORRECT, AND THE CONTRACTOR SHALL ENSURE THAT THE PHASE SELECTOR IS SELECTING THE PROPER PHASE AND TIMING.

THE PREEMPTION SYSTEM SHALL BE MODEL OPTICOM RADIO/GPS. THE SYSTEM SHALL INCLUDE: OPTICOM RADIO/GPS POWER SUPPLY (IF NEEDED), PHASE SELECTOR AND RADIO/GPS ANTENNA AS MANUFACTURED BY GLOBAL TRAFFIC TECHNOLOGIES.

THE PREEMPTION SYSTEM SHALL MEET THE MINIMUM REQUIREMENTS OF THE OPTICOM RADIO/GPS MODEL AS MANUFACTURED BY GLOBAL TRAFFIC TECHNOLOGIES, OR AN APPROVED EQUAL. PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH ITEM 633 CONTROLLER ITEM, MISC.: PREEMPTION, AS PER PLAN, IN PLACE AND FULLY OPERATIONAL AS SHOWN ON THE PLANS.

PAYMENT FOR ITEM 633 PREEMPTION, AS PER PLAN SHALL INCLUDE CABLES ALL MOUNTING HARDWARE (COLORED TO MATCH THE POLES), ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND INCIDENTALS TO FURNISH AND INSTALL THE UNITES (FOR 1 EA.) TESTED AND ACCEPTED.

SIGNAL INSTALLATION & MAINTENANCE PERSONNEL REQUIREMENTS

THE CONTRACTOR SHALL ASSIGN A SUPERVISOR FOR THIS PROJECT. THE SUPERVISOR SHALL BE A FULL TIME EMPLOYEE OF THE CONTRACTOR. THE CONTRACTOR SHALL NOT CHANGE A SUPERVISOR ASSIGNED TO A PROJECT WITHOUT WRITTEN NOTICE. AN IMSA LEVEL 2 CERTIFIED TRAFFIC CONTROL TECHNICIAN(S) SHALL BE AVAILABLE ON A 24-HOUR PER DAY PER WEEK BASIS. NAMES, LOCAL ADDRESSES, TELEPHONE NUMBERS AND COPIES OF ALL CERTIFICATIONS MUST BE SUBMITTED TO THE ENGINEER. ALL CONTROLLER WORK AS DEFINED BELOW IN ITEMS 1 THROUGH 4 SHALL BE PERFORMED BY AN INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION (IMSA) LEVEL TWO CERTIFIED TECHNICIAN.

1. BACK PANEL WIRING TERMINATIONS
2. PROGRAMMING
3. TURN ON
4. TROUBLESHOOTING

THE CONTRACTOR SHALL ALSO HAVE A FOREMAN ASSIGNED TO EACH CREW PERFORMING WORK FOR THIS PROJECT. A FOREMAN SHALL BE PRESENT AT ALL TIMES WHEN WORK IS PERFORMED BY THE CREW. EACH FOREMAN SHALL BE AN IMSA LEVEL ONE CERTIFIED TECHNICIAN. THE CONTRACTOR SHALL PROVIDE PRIOR VERBAL NOTICE TO THE PROJECT ENGINEER IN ORDER TO REPLACE A CREW FOREMAN.

IN ADDITION, ANY TRADE PERSON PERFORMING WORK AS DEFINED BELOW IN ITEMS 1 THROUGH 7 SHALL BE AN IMSA LEVEL ONE CERTIFIED TECHNICIAN.

1. CABLE SPLICES
2. SIGNAL HEAD INSTALLATION
3. CABLE AND WIRE INSTALLATION
4. POWER SERVICE INSTALLATION
5. GROUND ROD TESTING
6. CABLE INSULATION TESTING
7. FIELD WIRING TERMINATIONS

INSTALLATION LAYOUT

ALL TRAFFIC SIGNAL SUPPORTS AND ALL OTHER STATIONED SIGNAL ITEMS SHALL BE LOCATED AND MARKED BY A PROFESSIONAL SURVEYOR USING THE STATION NUMBERS AND OFFSETS PROVIDED IN THESE PLANS. THE SURVEYOR SHALL SET PROPER POLE AND CABINET FOUNDATION ELEVATIONS AND STAKE EACH POLE FOUNDATION ANGLE SO IT MATCHES THE WALK CONCRETE ANGLE. PROJECT PERSONNEL SHALL APPROVE ALL FOUNDATION LOCATIONS AND ELEVATIONS PRIOR TO THE CONTRACTOR INSTALLING THEM. COSTS INCURRED FOR THIS SERVICE SHALL BE INCIDENTAL TO THE COST OF THE PROJECT OR PROVIDED UNDER A CONSTRUCTION LAYOUT STAKE ITEM.

MAINTENANCE OF TRAFFIC SIGNAL INSTALLATIONS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL EXISTING & PROPOSED TRAFFIC SIGNAL DEVICES UNDER THE FOLLOWING CONDITIONS FROM THE TIME OF AWARD OF THE PROJECT UNTIL THE DEVICE HAS BEEN ACCEPTED BY THE DELAWARE COUNTY ENGINEER'S OFFICE.

THE CONTRACTOR SHALL PROVIDE ONE OR MORE CONTACT PERSONS WHO CAN RECEIVE ALL DEVICE OUT-OF-SERVICE CALLS THAT FALL UNDER THE CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL DISPATCH MAINTENANCE PERSONNEL TO CORRECT THE PROBLEM. THE CONTRACTOR SHALL PROVIDE THE DELAWARE COUNTY ENGINEER'S OFFICE & THE PROJECT ENGINEER WITH ADDRESSES & PHONE NUMBERS OF THESE CONTACT PERSONS.

MAINTENANCE PERSONNEL MAY BE USED TO PERFORM OTHER DUTIES AS LONG AS PROMPT ATTENTION IS GIVEN TO THESE CALLS & A PERSON IS CONTINUOUSLY AVAILABLE TWENTY-FOUR (24) HOURS A DAY & SEVEN (7) DAYS A WEEK. THE CONTRACTOR SHALL PROVIDE MAINTENANCE SERVICE ENTIRELY WITH HIS PERSONNEL.

THE CONTRACTOR SHALL CORRECT ALL BULB OUTAGES, DEVICE MALFUNCTIONS OF ANY TYPE, INTERNAL CABINET POWER LOSSES, SPAN OR CABLE PROBLEMS AND MISALIGNED OR DAMAGED VEHICULAR OR PEDESTRIAN SIGNAL HEADS WITHIN TWO (2) HOURS AFTER THE CONTRACTOR'S CONTACT PERSON HAS BEEN NOTIFIED OF ANY ONE OF THE ABOVE. IN THE EVENT A NEW SIGNAL DEVICE IS DAMAGED PRIOR TO ACCEPTANCE, THE DAMAGED DEVICE EXCEPT POLES SHALL BE REPLACED OR REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE DELAWARE COUNTY ENGINEER'S OFFICE. ANY DAMAGED CABINET ASSEMBLY DEVICE IF REPAIRED SHALL BE TESTED ONCE AGAIN BY DELAWARE COUNTY BEFORE THE DEVICE CAN BE INSTALLED.

IN THE EVENT OF A LOSS OF POWER TO THE SIGNAL INDICATIONS OTHER THAN AN ELECTRIC COMPANY GENERAL POWER OUTAGE, THE CONTRACTOR AT HIS EXPENSE SHALL IMMEDIATELY TAKE ACTION [WITHIN 30 MINUTES] TO PROPERLY ERECT TEMPORARY STOP SIGN(S) & PROVIDE POLICE OFFICER(S) TO DIRECT TRAFFIC UNTIL THE SIGNAL IS BACK ON "FLASH" OR OPERATING PROPERLY.

IF A TRAFFIC SIGNAL POLE IS DAMAGED & THAT DAMAGE CAUSED POLE INSTABILITY, THEN THE CONTRACTOR SHALL TAKE IMMEDIATE ACTION (WITHIN 2 HOURS) TO STABILIZE IT. THE CONTRACTOR SHALL STILL BE RESPONSIBLE FOR PROVIDING THE PROJECT WITH A NEW UNDAMAGED POLE. WHERE OUT-OF-SERVICE CALLS ARE THE DIRECT RESULT OF A VEHICULAR ACCIDENT THE RESPONSE OF THE CONTRACTOR SHALL BE AS OUTLINED ABOVE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COLLECTION OF ANY COMPENSATION FROM THOSE PARTIES RESPONSIBLE FOR THE DAMAGE TO THE CONTRACTOR'S MATERIALS.

WHERE THE CONTRACTOR HAS FAILED TO RESPOND OR CANNOT RESPOND TO AN OUT-OF-SERVICE CALL WITHIN THE TIME PERIOD SPECIFIED ABOVE AT LOCATIONS UNDER HIS RESPONSIBILITY, THE DELAWARE COUNTY ENGINEER'S OFFICE MAY TAKE ACTION AS IT DEEMS NECESSARY TO CORRECT THE SITUATION. THIS ACTION MAY INCLUDE CONTROLLING THE INTERSECTION USING DELAWARE COUNTY LAW ENFORCEMENT OFFICERS, COMPLETELY REMOVING OR REPLACING ANY MALFUNCTIONING TRAFFIC CONTROL DEVICE, AND/OR INSTALLING ANY DEVICE(S) REQUIRED TO RETURN THE INTERSECTION TO REGULAR SIGNAL OPERATION. ALL COSTS ASSOCIATED WITH THESE ACTIONS SHALL BE BILLED DIRECTLY TO THE CONTRACTOR & NOT INCLUDED IN ITEM 614 MAINTAINING TRAFFIC.

ANY NON-OPERATING VEHICULAR OR PEDESTRIAN SIGNAL HEAD OR PUSHBUTTON SHALL BE COVERED AS REFERENCED TO IN THESE PLANS. ALL SIGNAL HEADS WHILE COVERED SHALL BE DARK BY DISCONNECTING POWER TO THE SIGNAL INDICATIONS. NO COVERED HEAD SHALL BLOCK THE VIEW OF AN OPERATING HEAD. A MINIMUM OF TWO (2) VEHICULAR SIGNAL HEADS

PER TRAVELED DIRECTION (SPACED 8' APART MINIMUM AND 12' MAXIMUM) SHALL BE OPERATING AT ALL TIMES. NO EXCEPTIONS!

ALL COSTS RESULTING FROM THE ABOVE REQUIREMENTS, EXCEPT AS NOTED, SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM BID PRICE FOR ITEM 614 MAINTAINING TRAFFIC, AS PER PLAN.

ITEM 625, LUMINAIRE, CONVENTIONAL, SOLID STATE (LED), 55 WATTS, 120 VOLTS, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF ODOT'S CONSTRUCTION AND MATERIAL SPECIFICATIONS, LUMINAIRES FOR CONVENTIONAL LIGHTING UNITS SHALL BE AS FOLLOWS:

THIS ITEM CONSISTS OF INSTALLING A LUMINAIRE ON A MAST ARM POLE AT THE POSITION INDICATED ON THE PLANS. FURNISH NEW MATERIALS AND EQUIPMENT OF FINEST QUALITY, OF CURRENT DESIGN, AND FREE FROM DEFECTS. ENSURE THE LUMINAIRE IS LEVEL AND ALIGNED VERTICALLY AND HORIZONTALLY TO THE ROADWAY AS SPECIFIED. THE LUMINAIRE SUPPLIED SHALL BE NAVION NVN MODEL NVN-AE-01-D-U-T3-10K-4N7-LCF-BK. THE LIGHTING SYSTEM SHALL HAVE PHOTOCELL MODEL OA-RA1014. THE PHOTOCELL SHALL BE MOUNTED ON THE LUMINAIRE CLOSEST TO THE TRAFFIC SIGNAL CABINET.

LUMINAIRES SHALL BE POWDER-COAT PAINTED BY THE MANUFACTURER USING SIMILAR AND EQUAL METHODS AND TO THE SAME STANDARDS AS SPECIFIED IN CMS 632 COMBINATION SIGNAL SUPPORT, TYPE XX.XX, (DESIGN), AS PER PLAN.

PAYMENT WILL BE MADE AT THE UNIT BID PRICE FOR EACH CMS ITEM 625, "LUMINAIRE, CONVENTIONAL, SOLID STATE (LED), 55 WATTS, 120 VOLTS, AS PER PLAN" FOR EACH LUMINAIRE WHICH SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS AND INCIDENTALS REQUIRED TO COMPLETE THIS ITEM IN A SATISFACTORY AND WORKMANLIKE MANNER.

ITEM 625, BRACKET ARM, XX', AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF ODOT'S CONSTRUCTION AND MATERIAL SPECIFICATIONS, BRACKET ARMS SHALL BE AS FOLLOWS:

THE BRACKET ARM SHALL BE A MONOTUBE DESIGN MANUFACTURED BY VALMONT, UNION METAL, OR MILLERBERND. FURNISH NEW MATERIALS AND EQUIPMENT OF FINEST QUALITY, OF CURRENT DESIGN, AND FREE FROM DEFECTS. THE EXTERIOR COLOR OF ALL SURFACES, INCLUDING ALL ATTACHMENT HARDWARE, SHALL BE BLACK (FEDERAL STANDARD 5958 COLOR NO. #27038 WITH A MINIMUM 5 YEAR REPAIR WARRANTY OF COATING DELAMINATION, BLISTERING OR CORROSION). THE ARMS SHALL BE GALVANIZED AND POWDER COATED USING A FOUR-PART EPOXY PAINT SYSTEM (AMERON'S AMER-LOC PROCESS OR APPROVED EQUAL).

PAYMENT FOR ITEM 625 "BRACKET ARM, XX', AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE PER EACH COMPLETE AND IN PLACE, AND SHALL INCLUDE ALL SIGNAL SUPPORT DESIGN, LABOR, MATERIALS AND EQUIPMENT NECESSARY TO COMPLETE THE WORK.