C:\ENGINEERING\ENGINEERING DEPARTMENT\STANDARDS AND SPECIFICATIONS\2018 STANDARDS AND SPECIFICATIONS\TRAFFIC PLAN NOTES\INTERNAL FINAL FILES\PLAN NOTES\TECHNICAL DESIGN MANUAL_TRAFFIC PLAN NOTES.DWG - 2/26/2019 10:37:39 AM

TRAFFIC GENERAL NOTES (REVISED 01/05/2018)

UTILITY NOTIFICATION

AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCING CONSTRUCTION OPERATIONS IN AN AREA THAT MAY INVOLVE UTILITIES, THE CONTRACTOR SHALL NOTIFY THE PUBLIC WORKS DEPARTMENT, THE OHIO UTILITIES PROTECTION SERVICE AND THE OWNERS OF EACH UTILITY AFFECTED. A LIST OF UTILITIES AND OWNERS IS PROVIDED ON SHEET XX. THIS IS NOT TO BE CONSTRUED AS A COMPLETE LIST BUT RATHER A DIRECTORY OF THE MOST FREQUENTLY ENCOUNTERED COMPANIES.

WORK INSPECTION

THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH 72 HOUR NOTICE OF ANY WORK TO BE PERFORMED AT THE SITE SO THAT INSPECTION SERVICES CAN BE SUPPLIED.

MATERIALS

ALL MATERIALS FURNISHED FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATION (CMS) DATED AS SHOWN ON SHEET XX.

CONTRACTOR SHALL SUPPLY A PAPER COPY AND AN ELECTRONIC COPY IN PDF FORMAT TO THE PUBLIC WORKS DEPARTMENT.

SIGNAL NOTES

NEW TRAFFIC SIGNAL INSTALLATION

THIS WORK CONSISTS OF FURNISHING AND INSTALLING TRAFFIC SIGNAL EQUIPMENT, COMPLETE AND READY FOR SERVICE. THIS WORK ALSO INCLUDES NECESSARY EXCAVATION AND BACKFILL, DISPOSAL OF DISCARDED MATERIALS, RESTORATION OF DISTURBED FACILITIES AND SURFACES TO A CONDITION EQUAL TO THAT EXISTING BEFORE THE WORK STARTED, AND ELECTRICAL TESTING AS SPECIFIED.

PULL BOXES, CONDUITS, GROUND RODS, AND CABLE SPLICING KITS REQUIRED FOR TRAFFIC SIGNAL EQUIPMENT INSTALLATIONS ARE SPECIFIED IN ITEM 625.

BEFORE ANY WORK IS STARTED ON THE TRAFFIC SIGNAL, THE CITY OF DELAWARE PROJECT ENGINEER (740-203-1810) AND THE CONTRACTOR'S REPRESENTATIVE SHALL REVIEW AND RESOLVE ANY POTENTIAL PROBLEMS AT THE LOCATION WHERE THE NEW SIGNAL WILL BE CONSTRUCTED.

ALL OF THE REQUIRED PERMANENT SIGNS SHALL BE ERECTED AND THE REQUIRED PERMANENT PAVEMENT MARKINGS SHALL BE IN PLACE PRIOR TO THE FINAL ACCEPTANCE OF THE TRAFFIC SIGNAL.

PRIOR TO THE FINAL ACCEPTANCE OF THE COMPLETED TRAFFIC SIGNAL, THE PUBLIC WORKS DEPARTMENT'S REPRESENTATIVE AND THE CONTRACTOR'S REPRESENTATIVE, SHALL INSPECT AND RESOLVE ANY EXISTING PROBLEMS PRIOR TO THE ACCEPTANCE OF EACH NEW SIGNAL BY THE CITY OF DELAWARE.

MAINTENANCE OF TRAFFIC SIGNAL INSTALLATION

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC SIGNAL INSTALLATIONS WITHIN THE PROJECT LIMITS UNDER THE FOLLOWING CIRCUMSTANCES:

1. EXISTING SIGNAL INSTALLATION WHICH THE PLANS REQUIRE THE CONTRACTOR TO ADJUST, MODIFY, ADD ONTO OR REMOVE OR WHICH THE CONTRACTOR ACTUALLY ADJUST, MODIFIES, OR OTHERWISE DISTURBS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ENTIRE INSTALLATION (AT AN INTERSECTION) FROM THE TIME THE CONTRACTOR'S OPERATIONS FIRST DISTURB THE INSTALLATION UNTIL THE INSTALLATION HAS BEEN SUBSEQUENTLY REMOVED OR MODIFIED AND WORK IS ACCEPTED.
2. NEW SIGNAL INSTALLATION OR DEVICE, INSTALLED BY THE CONTRACTOR: THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF THIS FROM THE TIME OF INSTALLATION UNTIL THE WORK IS ACCEPTED.

THE CONTRACTOR SHALL CORRECT AS QUICKLY AS POSSIBLE ALL OUTAGES OR MALFUNCTIONS AND PROVIDE THE MAINTAINING AGENCY AND THE ENGINEER WITH THE NAME(S) AND PHONE NUMBER(S) OF THE CONTRACTOR'S REPRESENTATIVE(S) TO RECEIVE ALL CALLS AND DISPATCH THE NECESSARY MAINTENANCE FORCES TO CORRECT OUTAGES. SUCH A PERSON OR PERSONS MUST GIVE PROMPT ATTENTION TO THESE CALLS AND BE READILY AVAILABLE CONTINUOUSLY 24 HOURS A DAY, 7 DAYS A WEEK. ALL LAMP OUTAGES, CABLE OUTAGES, ELECTRICAL FAILURES, EQUIPMENT MALFUNCTIONS AND MISALIGNED SIGNAL HEADS SHALL BE CORRECTED TO THE SATISFACTION OF THE ENGINEER WITH THE SIGNAL BACK IN SERVICE WITHIN FOUR HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF AN OUTAGE.

IN THE EVENT NEW SIGNALS ARE DAMAGED PRIOR TO ACCEPTANCE, ALL DAMAGED EQUIPMENT EXCEPT POLES AND CONTROL EQUIPMENT SHALL BE REPLACED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER WITH THE NEW SIGNAL BACK IN SERVICE WITHIN 8 HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE OUTAGE. THE CONTRACTOR SHALL ARRANGE FOR FULL TRAFFIC CONTROL UNTIL THE SIGNAL IS BACK IN OPERATION.

IF POLES AND/OR CONTROLLERS ARE DAMAGED AND MUST BE REPLACED, THE CONTRACTOR SHALL MAKE TEMPORARY REPAIRS AS NECESSARY TO BRING THE SIGNAL BACK INTO OPERATION WITHIN THE ALLOWED 8 HOUR TIME PERIOD, AND SHALL MAKE PERMANENT REPAIRS OR REPLACEMENT AS SOON THEREAFTER AS POSSIBLE.

NONE OF THE ABOVE SHALL BE CONSTRUED AS COLLECTIVE OR CONSECUTIVE OUTAGE TIME PERIODS AT ANY ONE LOCATION. THAT IS, WHERE MORE THAN ONE OUTAGE OCCURS AT ANY ONE LOCATION THEN THE ALLOTTED TIME LIMIT SHALL BE FOR THE WORST SINGLE OUTAGE.

WHERE OUTAGES ARE THE DIRECT RESULT OF A VEHICLE ACCIDENT, THE RESPONSE OF THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COLLECTION OF ANY COMPENSATION FOR THIS WORK FROM THOSE PARTIES RESPONSIBLE FOR THE DAMAGE.

WHERE THE CONTRACTOR HAS FAILED OR CANNOT RESPOND TO AN OUTAGE OR SIGNAL EQUIPMENT MALFUNCTION, AT THESE LOCATIONS WITHIN HIS RESPONSIBILITY, WITHIN PERIODS AS SPECIFIED ABOVE, THE ENGINEER MAY INVOKE THE PROVISIONS OF SECTION 105.15 AND ANY SUBSEQUENT BILLINGS TO THE CITY FOR POLICE SERVICES AND MAINTENANCE SERVICES BY THE PROVIDING AGENCY FORCES SHALL BE DEDUCTED FROM MONIES DUE OR TO BECOME DUE. THE CONTRACTOR IN ACCORDANCE WITH PROVISIONS OF SECTION 105.15.

ANY VEHICULAR TRAFFIC SIGNAL HEAD EITHER NEW OR EXISTING THAT WILL BE OUT OF OPERATION SHALL BE COVERED IN THE MANNER DESCRIBED IN ODOT 632.25.

THE CONTRACTOR SHALL MAINTAIN COMPLETE RECORDS OF MALFUNCTIONS INCLUDING:

1. TIME OF NOTIFICATION OF MALFUNCTION;
2. TIME OF WORK CREWS ARRIVAL TO CORRECT THE MALFUNCTION;
3. ACTIONS TAKEN TO CORRECT THE MALFUNCTION, INCLUDING A LIST OF PARTS REPAIRED AND REPLACED;
4. A DIAGNOSIS OR REASON FOR THE MALFUNCTION AND PROBABILITY OF REOCCURRENCE;
5. TIME OF COMPLETION OF THE REPAIR AND SYSTEM RESTORED TO FULL SERVICE.

A COPY OF THESE RECORDS SHALL BE PROVIDED TO THE ENGINEER WITHIN THREE (3) WORKING DAYS FOLLOWING COMPLETION OF EACH REPAIR.

ALL COST RESULTING FROM THE ABOVE REQUIREMENTS SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 614, MAINTAINING TRAFFIC.

GROUNDING AND BONDING

THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (CMS) AND THE 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. WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (725.05), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED.
   C. 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.
   D. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
   E. 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.
   F. 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. THE 725.05 CONDUIT SHALL HAVE THE INSIDE AND OUTSIDE DIAMETERS OF THE CONDUIT DEBURRED AT ALL TERMINATION POINTS.
   C. BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
   D. METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS APPROVED FOR THIS TYPE OF CONNECTION, WITH THE BOX BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
3. WIRE FOR GROUNDING AND BONDING
   A. USE INSULATED, COPPER WIRE FOR THE EQUIPMENT GROUNDING CONDUCTOR. BONDING JUMPERS IN BOXES AND ENCLOSURES MAY BE BARE OR INSULATED COOPER WIRE. WIRE SIZED SHALL BE AS FOLLOWS:
      I. USE 4 AWG BETWEEN THE POWER SERVICE AND SUPPORTS, POLES, PEDESTALS, CONTROLLER OR FLASHER CABINETS.
      II. USE A MINIMUM 8 AWG BETWEEN LOOP DETECTOR PULL BOXES AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE.
      III. USE A MINIMUM 8 AWG BETWEEN THE "PREPARE TO STOP WHEN FLASHING" INSTALLATION (INCLUDING SUPPORT) AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE.
      IV. 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.
   B. IN A HIGHWAY LIGHTING SYSTEM, THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THE SAME WIRE SIZE AS THE DUCT CABLE OR DISTRIBUTION CABLE CIRCUIT CONDUCTORS, WITH THE MINIMUM CONDUCTOR SIZE 4 AWG.
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. THE GREEN CONDUCTOR IN SIGNAL CABLES (CONDUCTOR #4) SHALL NOT BE USED TO SUPPLY POWER TO A SIGNAL INDICATION. IT WILL BE CONNECTED TO THE SIGNAL BODY AS AN EQUIPMENT GROUND IN ALUMINUM HEADS AND IT WILL BE UNUSED IN PLASTIC HEADS. UNUSED CONDUCTORS SHALL BE GROUNDED IN THE CABINET. TYPICAL USE OF CONDUCTORS IS AS FOLLOWS:

COLOR CHART - PED UNIT		
PED UNIT LOCATION	CROSSWALK DISPLAY	WIRE COLOR
SOUTH CROSSWALK	WALK	BLACK
	DON'T WALK	ORANGE
WEST CROSSWALK	WALK	GREEN
	DON'T WALK	RED
NORTH CROSSWALK	WALK	BLUE
	DON'T WALK	WHITE W/ BLACK TRACER
EAST CROSSWALK	WALK	GREEN W/ BLACK TRACER
	DON'T WALK	RED W/ BLACK TRACER

SIGNAL HEAD & CABINET FIELD WIRING	
SIGNAL DISPLAY	WIRE COLOR PER APPROACH
THRU R	RED
THRU Y	ORANGE
THRU G	GREEN
L/T R	BLACK (FUTURE USE ONLY)
L/T Y	WHITE W/ BLACK TRACER
L/T G	BLUE
R/T R	NOT USED BY CITY
R/T Y	RED W/ BLACK TRACER
R/T G	GREEN W/ BLACK TRACER

WHITE SHALL BE USED FOR THE COMMON. SPLICE ALL WIRES IN THE SIGNAL HEAD OR PED UNIT. USE A #14 AWG 2 WIRE SPADE TERMINAL FOR EVERY 2 WIRES PER CONNECTION AND A #14 AWG 1 WIRE SPADE TERMINAL FOR EACH SINGLE WIRE CONNECTION TO CONNECT ALL WIRES TO ALL FIELD TERMINALS. USE BUTT SPLICES ON ALL THROUGH WIRES. ALL UNUSED WIRES SHALL BE SPLICED THROUGH AND SHALL HAVE A DEAD-END TERMINAL AT THE END OF THE WIRE.

6. POWER SERVICE AND DISCONNECT SWITCH.
   A. AT THE POWER SERVICE LOCATION, THE GROUNDING CONDUCTOR (GROUND WIRE) FROM THE DISCONNECT SWITCH NEUTRAL (AC-) BAD 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.
7. PAYMENT OF ALL MATERIALS AND WORK REQUIRED TO COMPLETE THE EFFECTIVE GROUND FAULT CURRENT PATH SYSTEM ARE INCIDENTAL TO THE CONDUCTORS INSTALLED BY CONTRACT.

ITEM 614 - LAW ENFORCEMENT OFFICER WITH PATROL CAR FOR ASSISTANCE

USE OF LAW ENFORCEMENT OFFICERS (LEOS) BY CONTRACTORS OTHER THAN THE USES SPECIFIED BELOW WILL NOT BE PERMITTED AT PROJECT COST. LEOS SHOULD NOT BE USED WHERE THE OMUTCD INTENDS THAT FLAGGERS BR USED.

IN ADDITION TO THE REQUIREMENTS OF C&MS 614 AND THE OMUTCD, A UNIFORMED LEO WITH AN OFFICIAL PATROL CAR (CAR WITH TOP-MOUNTED EMERGENCY FLASHING LIGHTS AND COMPLETE MARKING OF THE APPROPRIATE LAW ENFORCEMENT AGENCY) SHALL BE PROVIDED FOR THE FOLLOWING TRAFFIC CONTROL TASKS:

- DURING THE ENTIRE ADVANCE PREPARATION AND CLOSURE SEQUENCE WHERE COMPLETE BLOCKAGE OF TRAFFIC IS REQUIRED.
- DURING A TRAFFIC SIGNAL INSTALLATION WHEN IMPACTING THE NORMAL FUNCTION OF THE SIGNAL OR THE FLOW OF TRAFFIC OR WHEN TRAFFIC NEEDS TO BE DIRECTED THROUGH AN ENERGIZED TRAFFIC SIGNAL CONTRARY TO THE SIGNAL DISPLAY (E.G., DIRECTING MOTORISTS THROUGH A RED LIGHT).

IN ADDITION TO THE REQUIREMENT OF C&MS 614 AND THE OMUTCD, A UNIFORMED LEO WITH AN OFFICIAL PATROL CAR (CAR WITH TOP-MOUNTED EMERGENCY FLASHING LIGHTS AND COMPLETE MARKINGS OF THE APPROPRIATE LAW ENFORCEMENT AGENCY) SHOULD BE PROVIDED FOR THE FOLLOWING TRAFFIC CONTROL TASKS:

- FOR LANE CLOSURES: DURING INITIAL SET-UP PERIODS, TEAR DOWN PERIODS, SUBSTANTIAL SHIFTS OF A CLOSURE POINT OR WHEN NEW LANE CLOSURE ARRANGEMENTS ARE INITIATED FOR LONG-TERM LANE CLOSURES/SHIFTS (FOR THE FIRST AND LAST DAY OF MAJOR CHANGES IN TRAFFIC CONTROL SETUP). IN GENERAL, LEOS SHOULD BE POSITIONED AT THE POINT OF LANE RESTRICTION OR ROAD CLOSURE AND TO MANUALLY CONTROL TRAFFIC MOVEMENTS THROUGH INTERSECTIONS IN WORK ZONES.
- WHEN CONSTRUCTION VEHICLES ARE ENTERING/EXITING THE ZONE DIRECTLY FROM/INTO AN OPEN LANE OF TRAFFIC. IF A LANE HAS BEEN CLOSED TO PROVIDE AN ACCELERATION/DECELERATION LANE FOR THE VEHICLE, THE LEO WILL NOT BE REQUIRED.

LEOS SHOULD NOT FORGO THEIR TRAFFIC CONTROL RESPONSIBILITIES TO APPREHEND MOTORISTS FOR ROUTINE TRAFFIC VIOLATIONS. HOWEVER, IF A MOTORIST'S ACTIONS ARE CONSIDERED TO BE RECKLESS, THEN PURSUIT OF THE MOTORIST IS APPROPRIATE.

THE LEOS WORK AT THE DIRECTION OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR SECURING THE SERVICES OF THE LEOS WITH THE APPROPRIATE AGENCIES AND COMMUNICATING THE INTENTIONS OF THE PLANS WITH RESPECT TO DUTIES OF THE LEOS. THE ENGINEER SHALL HAVE FINAL CONTROL OVER THE LEOS' DUTIES AND PLACEMENT AND WILL RESOLVE ANY ISSUES THAT MAY ARISE BETWEEN THE TWO PARTIES.

THE LEO SHALL REPORT IN TO THE CONTRACTOR PRIOR TO THE START OF THE SHIFT, IN ORDER TO RECEIVE INSTRUCTIONS REGARDING SPECIFIC WORK ASSIGNMENTS DURING THEIR SHIFT. THE LEO IS EXPECTED TO STAY AT THE PROJECT SITE FOR THE ENTIRE DURATION OF THEIR SHIFT. THE LEO SHALL REPORT TO THE CONTRACTOR AT THE END OF THEIR SHIFT. ONCE THE LEO HAS COMPLETED THE DUTIES DESCRIBED ABOVE AND STILL HAS TIME REMAINING ON THEIR SHIFT, THE LEO MAY BE ASKED TO PATROL THROUGH THE WORK ZONE (WITH FLASHING LIGHTS OFF) OR BE PLACED AT A LOCATION TO DETER MOTORISTS FROM SPEEDING. SHOULD IT BE NECESSARY TO LEAVE THE PROJECT SITE, THE LEO SHALL NOTIFY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE THE LEO WITH A TWO-WAY COMMUNICATION DEVICE WHICH SHALL BE RETURNED TO THE CONTRACTOR AT THE END OF THEIR SHIFT.

LEOS (WITH PATROL CAR) REQUIRED BY THE TRAFFIC MAINTENANCE TASKS ABOVE SHALL BE PAID FOR ON A UNIT PRICE (HOURLY) BASIS UNDER ITEM 614, LAW ENFORCEMENT OFFICER (WITH PATROL CAR) FOR ASSISTANCE. THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY.

ITEM 614, LAW ENFORCEMENT WITH PATROL CAR FOR ASSISTANCE - XX HOURS

THE HOURS PAID SHALL INCLUDE ANY MINIMUM SHOW-UP TIME REQUIRED BY THE LAW ENFORCEMENT AGENCY INVOLVED.

ANY ADDITIONAL COSTS (ADMINISTRATIVE OR OTHERWISE) INCURRED BY THE CONTRACTOR TO OBTAIN THE SERVICES OF A LEO ARE INCLUDED WITH THE BID UNIT PRICE FOR ITEM 614, LAW ENFORCEMENT OFFICER WITH PATROL CAR ASSISTANCE.

ITEM 625 - PULL BOX, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF 625 AND 725, THE PULL BOXES INSTALLED SHALL BE POLYMER CONCRETE 30" X 48" X 24" DEEP WITH A 2 PIECE OVERLAPPING COVER (20,000 POUND MINIMUM DESIGN LOAD) THAT BOLTS DOWN TO THE PULL BOX. THE PULL BOXES SHALL BE MANUFACTURED BY QUAZITE AND SHALL BE PG STYLE WITH HH COVER SERIES.

EACH PULL BOX MUST BE MARKED WITH A 4 X 4 WYE POLE PAINTED ORANGE AT THE TOPE AND SHALL REMAIN UNTIL THE FIBER CABLE IS INSTALLED.

PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH ITEM 625 - PULL BOX, AS PER PLAN INSTALLED AND ACCEPTED.

ITEM 625 - CONDUIT, MISC.: INTERCONNECT DUCT BANK

IN ADDITION TO THE REQUIREMENTS OF 625 AND 725, THE THREE (3) 1-1/4" CONDUITS, FOR FUTURE FIBER OPTIC INTERCONNECT USE, SHALL BE SDR11 HDPE MATERIAL AND INSTALLED EMPTY. THE THREE (3) CONDUITS SHALL BE INSTALLED AT ALL LOCATIONS SHOWN ON THE PLANS AND ONE EACH SHALL BE BLUE, ORANGE AND GREEN IN COLOR.

PLASTIC CAUTION TAPE SHALL BE INSTALLED ABOVE THE INTERCONNECT CONDUITS AND SHALL BE PLACED 18" BELOW THE FINISHED GRADE.

TRACER WIRE SHALL BE INSTALLED DIRECTLY ABOVE THE INTERCONNECT CONDUITS AND SHALL BE 12 AWG, 250# PULL RATED AND SHALL BE COPPERHEAD REINFORCED TRACER WIRE BY COPPERHEAD INDUSTRIES.

THE CONDUITS SHALL BE INSTALLED SO THEY ENTER THE BOTTOM OF EACH PULL BOX.

THE CONDUITS SHALL MAINTAIN A MINIMUM OF 1.5' SEPARATION FROM ALL UTILITIES EXCEPT THE SIGNAL CONDUITS SINCE THEY WILL BE SHARING A TRENCH AND PULL BOXES.

PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER FOOT OF ITEM 625 - CONDUIT, MISC.: INTERCONNECT DUCT BANK INSTALLED AND ACCEPTED.

ITEM 625 TRENCH, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF ODOT C&MS AND THE STANDARD CONSTRUCTION DRAWINGS, WITHIN EACH TRENCH, THE LOCATION OF UNDERGROUND CABLE OR CONDUIT SHALL BE MARKED BY THE USE OF A CONTINUOUS IDENTIFYING TAPE BURIED IN THE TRENCH ABOVE THE LINE. ONE STRIP OF MARKING TAPE SHALL BE PLACED BETWEEN 6-INCHES AND 12-INCHES BELOW FINISHED GRADE WITH A TAPE LENGTH EQUAL TO THE LENGTH OF CONDUIT OR CABLE. THE TAPE SHALL BE PLACED PARALLEL WITH THE FINISHED SURFACE. THE CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO INSURE THAT THE TAPE IS NOT PULLED, DISTORTED, OR OTHERWISE MISPLACED IN THE COMPLETION OF THE TRENCH BACKFILL. THE TAPE SHALL BE AN INERT MATERIAL HIGHLY RESISTANT TO ALKALIS, ACIDS AND OTHER CHEMICAL COMPONENTS LIKELY TO BE ENCOUNTERED IN SOILS. THE TAPE SHALL BE 3-INCHES TO 6-INCHES WIDE AND A HIGH VISIBILITY COLOR SUCH AS ORANGE OR RED, THE TAPE SHALL BE PRINTED WITH THE WORD "ELECTRIC" APPROXIMATELY EVERY SIX (6) FEET IN BLACK LETTERS WITH INK THAT WILL NOT CHANGE WHEN EXPOSED TO ACIDS AND OTHER DESTRUCTIVE SUBSTANCES COMMONLY FOUND IN SOIL. THE TAPE SHALL BE SUPPLIED IN CONTINUOUS ROLLS WITH THE IDENTIFYING LETTERING REPEATED CONTINUOUSLY THE FULL LENGTH OF THE TAPE.

PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER FOOT OF ITEM 625 TRENCH, AS PER PLAN, COMPLETE AND IN PLACE.

ITEM 625 - LUMINAIRE, CONVENTIONAL, AS PER PLAN

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

LUMINAIRES FOR CONVENTIONAL LIGHTING UNITS WITH AN IES III-MC DISTRIBUTION AND (WATTAGE TBD) WATT HIGH PRESSURE SODIUM LAMPS SHALL BE AMERICAN ELECTRIC "SERIES 125" COOPER "OVF" (FLAT GLASS), GENERAL ELECTRIC "M-400" (CUTOFF), OR EQUAL AS APPROVED BY THE ENGINEER AND SHALL HAVE A BLACK HOUSING FROM THE MANUFACTURER. THE LUMINAIRE SHALL INCLUDE INDIVIDUAL PHOTOELECTRIC CONTROL.

PAYMENT WILL BE MADE AT THE UNIT BID PRICE FOR EACH CMS ITEM 625, "LUMINAIRE, CONVENTIONAL, AS PER PLAN (TBD W MH, 120 VOLT, TYPE III, WITH PE CELL)" 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, (BY SIZE), AS PER PLAN

THIS ITEM SHALL BE PER 625 AND 713 EXCEPT THE ARM SHALL HAVE A BLACK FINISH AND SHALL BE TREATED AND PAINTED BLACK BY THE MANUFACTURER AS PER ITEM 632 COMBINATION SIGNAL SUPPORT, TYPE TC-81.21, (BY DESIGN), AS PER PLAN.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE AND WILL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND OTHER INCIDENTALS NECESSARY FOR EACH SUPPORT FURNISH, IN PLACE, COMPLETE AND ACCEPTED.

ITEM 632 - VEHICULAR SIGNAL HEAD (LED), BLACK, (BY TYPE), WITH BACKPLATE, AS PER PLAN
AND
ITEM 632 - VEHICULAR SIGNAL HEAD, (LED), 1 SECTION, 12" LENS, 1-WAY 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 FERROUS METAL.
4. THE ENTRANCE FITTING SHALL BE OF THE TRI-STUD DESIGN WITH SERRATED RINGS IN ORDER TO ACHIEVE POSITIVE LOCKING.
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 THE CITY OF DELAWARE 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), WITH BACKPLATE, AS PER PLAN AND ITEM 632 VEHICULAR SIGNAL HEAD, (LED), 1 SECTION, 12" LENS, 1-WAY, 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 ITEM 632 AND 732, THE PEDESTRIAN SIGNAL HEADS SHALL CONTAIN THE FOLLOWING:

- LED PED GE MODULE
- HAVE A FULL HAND/MAN OVERLAY
- 18 OVERLAY
- PLUS COUNTDOWN UNIFORM

PAYMENT FOR THIS ITEM SHALL BE AT THE UNIT PRICE BID, COMPLETE AND IN PLACE, CONNECTIONS TESTED AND ACCEPTED.

ITEM 632 - PEDESTRIAN PUSHBUTTON, AS PER PLAN

ALL PUSHBUTTONS SHALL BE POLARA BRAND 2' ADA PUSHBUTTONS IN YELLOW WITH AN ULTRA-BRIGHT LED AND BEEPER (BULLDOG MODEL BDLM-Y REAR HOUSING) OR APPROVED EQUAL. ALL UNITS SHALL BE WIRED INDIVIDUALLY TO SEPARATE PED INPUT AND WIRED ACCORDINGLY. ALL PUSHBUTTONS SHALL BE ADA COMPLIANT AND BE LOCATED TO CONFORM TO ALL ADA REQUIREMENTS.

ITEM 632 - REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN (INCLUDE ONLY IF REMOVING SIGNAL WITH PROJECT)

TRAFFIC SIGNAL INSTALLATION AT INSERT INTERSECTION (INCLUDING SPAN

S:\ENGINEERING\ENGINEERING DEPARTMENT\STANDARDS AND SPECIFICATIONS\2018 STANDARDS_SPECIFICATIONS_AND TECHNICAL DESIGN MANUAL\INTERNAL FINAL FILES\PLAN NOTES\TRAFFIC PLAN NOTES.DWG - 2/26/2019 10:38:40 AM

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

THE ELECTRICAL CONTROL EQUIPMENT PROVIDED SHALL MEET THE FOLLOWING SPECIFICATION AND BE MANUFACTURED BY EAGLE TRAFFIC CONTROL SYSTEMS. THE EQUIPMENT PROVIDED AS PART OF THIS CONTRACT SHALL BE THE LATEST MODEL CURRENTLY UNDER PRODUCTION AND NEW. THE CONTROLLER CABINET AND ACCESSORIES SHALL MEET THE NEMA TS2 STANDARD FOR ACTUATED CONTROLLER UNITS. THE CABINET SHALL BE A TYPE P CABINET. THE CABINET SHALL BE ALUMINUM, WITH THE NATURAL ALUMINUM FINISH INSIDE AND THE OUTSIDE SHALL BE POWDER COATED BLACK TO MATCH THE COLOR OF THE SIGNAL SUPPORTS. A PAINT CHIP SHALL BE SUBMITTED TO THE PUBLIC WORKS DEPARTMENT FOR FINAL APPROVAL. BIU'S SHALL BE EDI BRAND 700 SERIES. THE LOAD BAY SHALL BE THE TF5012 OR NEWER, WITH 12 LOAD SWITCH POSITIONS. LOAD SWITCHES SHALL BE BRAND TSC 200-OI AND 12 LOAD SWITCHES PROVIDED (UNUSED LOAD SWITCHES SHALL BE IN A SEPARATE BOX IN THE CABINET). EACH LOAD SWITCH SHALL HAVE LIGHT EMITTING DIODES (LEDS) FOR THE CONTROLLER OUTPUT AND LOAD SWITCH OUTPUT, 8 FLASH RELAY POSITIONS (UNUSED FLASH RELAY SHALL BE IN A SEPARATE BOX IN THE CABINET), ONE NEMA 2-CIRCUIT FLASHER AND A MALFUNCTION MANAGEMENT UNIT (EBERLY DESIGN MMU16LE).

THERE SHALL BE NO LAG LEFT OPERATION. PHASE OMIT SHALL BE ACHIEVED THROUGH OMITTED CALL PROGRAMMING TO PREVENT A LAG LEFT SIGNAL OPERATION.

A POWER BACK UP IS TO BE INSTALLED PER ITEM 633 - UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN. THE BATTERY BACKUP SHALL BE PAID FOR SEPARATELY.

A GENERATOR POWER PANEL AND ENCLOSURE SHALL BE MOUNTED ON THE OUTSIDE OF THE UPPER SECTION OF THE CONTROLLER CABINET, ON THE SAME SIDE AS THE CIRCUIT BREAKERS. THE STANDARD DRAWING FOR THE GENERATOR POWER PANEL IS INCLUDED IN THIS PLAN AND SHALL MEET THOSE SPECIFICATIONS.

THE POLICE PANEL ON THE INSIDE OF THE CABINET DOOR SHALL HAVE VEHICLE DETECTOR AND PEDESTRIAN DETECTOR PUSH BUTTONS TO CALL PHASES 1 TO 8 INDIVIDUAL, A STOP TIMING SWITCH, CABINET LIGHT SWITCH, AND AN AUTO FLASH SWITCH SHALL ALSO BE SUPPLIED ON THE POLICE PANEL ON THE OUTSIDE OF THE CABINET DOOR.

A CABINET DOOR OPEN SWITCH AND A CABINET LIGHT ON/OFF SWITCH SHALL ALSO BE SUPPLIED.

THE CONTROLLER SHALL HAVE A LIQUID CRYSTAL DISPLAY WITH ADJUSTABLE BACKLIGHT. THE DISPLAY SHALL BE OF SUFFICIENT SIZE TO DISPLAY A MINIMUM OF FOUR (4) LINES OF TEXT WITH A MINIMUM OF 20 CHARACTERS PER LINE. THE DISPLAY SHALL BE READABLE IN DIRECT LIGHT OR DARKNESS.

THE FOLLOWING INFORMATION SHALL BE ON ALL LABELS IN THE CONTROLLER CABINET TO IDENTIFY THE WIRING FUNCTIONS:
LOOP DETECTOR LEAD IN CABLE: PHASE NUMBER SERVICED, DIRECTION, MOVEMENT TYPE, AND LOOP PLAN NUMBER.
SIGNAL HEAD FIELD WIRING: PHASE NUMBER SERVICED, DIRECTION, MOVEMENT TYPE AND COLOR (RED YELLOW, GREEN YELLOW ARROW, GREEN ARROW) OR PEDESTRIAN MOVEMENT.

THE CONTROLLER TIMER SHALL BE THE MOST CURRENT SIEMENS MODEL EPAC WITH INTEGRAL LATEST VERSION SEPAC LOCAL CONTROLLER SOFTWARE AND LATEST VERSION SEMARC MASTER CONTROLLER SOFTWARE AND SHALL HAVE A BUILT-IN EXTERNAL 10 BASE-T ETHERNET PORT WITH CONFIGURABLE IP. EACH CONTROLLER TIMER SHALL HAVE 6 MODES OF COORDINATION, ADAPTIVE TRAFFIC CONTROL, REPORTS, PREEMPTION/PRIORITY, DIAGNOSTICS AND INTERNAL TIME BASE CONTROL.

EACH CONDUIT ENTRANCE TO THE CABINET SHALL BE SEALED WITH A RUBBER PIPE/CONDUIT SEAL GASKET. THE SEAL SHALL BE OF A MATERIAL AND TYPE TIGHTLY FITTING AND ABLE TO SEAL OUT WATER, INSECTS, RODENTS, AND DIRT. THE SEAL SHALL BE EASILY REMOVED FOR SERVICE INSTALLATIONS OR CABLE REPLACEMENTS.

PAYMENT FOR ITEM 633 - CONTROLLER UNIT TYPE TSA/A2, WITH CABINET TYPE TS2 TYPE 1, AS PER PLAN, WILL BE AT THE CONTRACT BID PRICE COMPLETE AND IN PLACE INCLUDING ALL CONNECTIONS TESTED AND ACCEPTED.

ITEM 633 - UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN

IT IS THE INTENT OF THESES PLANS THAT A BATTERY BACKUP SYSTEM BE PROVIDED AND SHALL MEET THE FOLLOWING:

THE UNIT SHALL BE AN ALPHA TECHNOLOGIES BRAND ALPHA FXM UNINTERRUPTIBLE POWER SUPPLY MODULE FXM1100, AN ALPHA OUTDOOR ENCLOSURE SIDE MOUNT 6 WITH LOCKING GENERATOR ACCESS DOOR AND L5-30 F1 PLUG OR APPROVED EQUAL, IN ALL CASES THIS ITEM SHALL MEET ODOT SPECIFICATIONS.

THE UNIT SHALL INCLUDE THE ALPHAGUARD BATTERY CHARGE MANAGEMENT SYSTEM AND ALL ASSOCIATED WIRING.

A MANUAL BY-PASS/DISCONNECT SWITCH INTERNAL TO THE CABINET SHALL BE INCLUDED. A UNIVERSAL GENERATOR TRANSFER SWITCH SHALL ALSO BE INCLUDED.

THE BATTERY BACK UP CABINET SHALL BE ATTACHED TO THE LEFT SIDE OF THE CONTROLLER CABINET (TO THE LEFT OF THE CABINET DOOR), AND THE EXTERIOR OF CABINET SHALL MATCH THE COLOR OF THE CONTROLLER CABINET. ALL HOOKUPS, CABLE ATTACHMENT HARDWARE, AND MISCELLANEOUS MATERIALS FOR BOTH ATTACHING THE CABINETS AND FOR FULL OPERATION OF THE BATTERY BACKUP SYSTEM SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THIS ITEM.

THE BACKUP CABINET SHALL BE MOUNTED ON A FOUNDATION PAD TO MATCH THE HEIGHT ABOVE GRADE OF THE ADJACENT CONTROLLER CABINET. THE WORK PAD IN FRONT OF THE FOUNDATION SHALL MATCH THE 35-INCH DIMENSION FOR THE CONTROLLER WORK PAD. THE FOUNDATION AND WORK PADS SHALL BE PAID SEPARATELY.

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

ITEM 633 - UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN, ALPHA TECHNOLOGIES - ALTERNATE BID (IF NEEDED PER CITY OF DELAWARE)

THIS ITEM REPLACES THE ITEM 633 UNINTERRUPTIBLE POWER SUPPLY, AS PER PLAN PER THE ALPHA TECHNOLOGIES SPECIFICATION LISTED BELOW.

THE UNINTERRUPTIBLE POWER SUPPLY SHALL MEET ALL THE REQUIREMENTS IN THE ALPHA TECHNOLOGIES SPECIFICATION FOR ALPHA FXM UNINTERRUPTIBLE POWER SUPPLY MODULE FXM 1100, DOCUMENT #048-157-10 REV 08/09.

PAYMENT FOR ITEM 633 UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN, ALPHA TECHNOLOGIES ALTERNATE BID SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING HARDWARE, PROCESSOR CARD(S), CABLES, CONDUIT, AND CONNECTIONS TESTED AND ACCEPTED, SETUP SUPPORT AND SYSTEM TRAINING.

ITEM 633 - CONTROLLER ITEM, MISC.: PREEMPTION

THIS ITEM CONSISTS OF PROVIDING AND INSTALLING PREEMPTION EQUIPMENT IN THE LOCATIONS AND LOCAL CONTROLLER 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 SYSTEM SHALL CAUSE THE SIGNAL CONTROLLER TO SELECT A PRE-PROGRAMMED PREEMPTION PLAN THAT WILL DISPLAY AND HOLD THE DESIRED SIGNAL PHASE FOR THE DIRECTION OF THE 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 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 AND WIRING INTERFACE PANEL (IF REQUIRED)
4. CONFIRMATION LIGHT AND WIRING.

THE DETECTION ANTENNA AND CONFIRMATION LIGHTS SHALL BE RIGID MOUNTED TO THE MAST ARMS WITH MOUNTING HARDWARE 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 HAVE LED BULBS.

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 FACING THE APPROACH FROM WHICH THE VEHICLE HAS BEEN DETECTED SHALL BE A FLASHING WHITE LIGHT DURING PREEMPTION.

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

THE CONTRACTOR SHALL THOROUGHLY INSPECT THE INSTALLED SYSTEM. AT A MINIMUM 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 RADIO/GPS. THE SYSTEM SHALL INCLUDE; RADIO/GPS POWER SUPPLY (IF NEEDED), PHASE SELECTOR AND RADIO/GPS ANTENNA.

PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH ITEM 633 PREEMPTION SYSTEM, AS PER PLAN, IN PLACE AND FULLY OPERATIONAL AS SHOWN ON THE PLANS.

PAYMENT FOR ITEM 633 CONTROLLER ITEM, MISC.: PREEMPTION, AS PER PLAN SHALL INCLUDE CABLES, ALL MOUNTING HARDWARE, ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND INCIDENTALS TO FURNISH AND INSTALL THE UNIT, TESTED AND ACCEPTED.

ITEM 633 - CONTROLLER ITEM, MISC.: PREEMPTION, OPTICOM - ALTERNATE BID (IF REQUIRED BY CITY OF DELAWARE)

THIS ITEM REPLACES THE ITEM 633 CONTROLLER ITEM, MISC.: PREEMPTION PER THE OPTICOM EQUIPMENT SPECIFIED BELOW.

THE SIGNAL PREEMPTION SHALL MEET ALL REQUIREMENTS IN THE OPTICOM SPECIFICATION FOR THE FOLLOWING OPTICOM EQUIPMENT:

- OPTICOM MODEL 1010 GPS RADIO UNIT CONTAINING A GPS RECEIVER WITH ANTENNA AND A 2.4 GHZ SPREAD SPECTRUM TRANSCEIVER WITH ANTENNA
- OPTICOM MODEL 764 MULTIMODE PHASE SELECTOR
- OPTICOM MODEL 1070 GPS INSTALLATION CABLE
- OPTICOM MODEL 575 CONFIRMATION LIGHTS

PAYMENT FOR ITEM 633 CONTROLLER ITEM, MISC.: PREEMPTION, OPTICOM SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING HARDWARE, PROCESSOR CARD(S), CABLES, CONDUIT, AND CONNECTIONS TESTED AND ACCEPTED, SETUP SUPPORT AND SYSTEM TRAINING.

ITEM 633 - ADVANCE/DILEMMA ZONE DETECTION SYSTEM (VERIFY DETECTION TYPE (CAMERA OR RADAR) PRIOR TO PLAN PREPARATION)

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ADVANCE/DILEMMA ZONE DETECTION UNIT CAPABLE OF INTERSECTION ADVANCE DETECTION CONTROL UTILIZING ABOVE GROUND DIGITAL WAVE RADAR TECHNIQUES. THE UNIT SHALL BE NON-INTRUSIVE AND SHALL DETECT VEHICLES FROM 50 FT. (15.2 M) UP TO 600 FT. (182.8 M) FROM THE UNIT AND THE ABILITY TO DETECT HIGH REFLECTIVE VEHICLES UP TO 900' FROM THE UNIT. THE SYSTEM SHALL DYNAMICALLY TRACK THE SPEED, ARRIVAL TIME AND RANGE OF VEHICLES AS THEY APPROACH THE STOP LINE. THE SYSTEM SHALL CALCULATE ON A CONTINUOUS BASIS WHICH VEHICLES ARE WITHIN THE PREDETERMINED DILEMMA ZONE AND PLACE A CALL TO THE CONTROLLER. GAPS WITHIN THE DILEMMA ZONE SHALL THEN BE IDENTIFIED SUCH THAT THE CORRESPONDING PHASE CALL WILL BE DROPPED AND THE PHASE SAFELY TERMINATED. THE UNIT SHALL PROVIDE UP TO 8 DETECTION ZONES SIMULTANEOUSLY FOR INTERSECTION CONTROL. ONE UNIT SHALL BE PROVIDED PER APPROACH, WHERE SPECIFIED IN THE PLANS, COVERING MULTIPLE LANES WHERE ADVANCE DETECTION IS REQUIRED. THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING LIST OF FEATURES AND CAPABILITIES.

- THE UNIT SHALL PROVIDE ACCURATE PRESENCE-DETECTION OF BOTH STOPPED AND MOVING VEHICLES. THE UNIT SHALL BE MOUNTED IN A FORWARD-FIRE, LOOKING AT EITHER APPROACHING OR DEPARTING TRAFFIC AND SHALL ONLY DETECT VEHICLES IN ONE DIRECTION OF TRAVEL.
- THE UNIT SHALL BE TESTED TO MEET NEMA TS2 ENVIRONMENTAL STANDARDS AND MAINTAIN ACCURATE PERFORMANCE IN THE FOLLOWING OPERATING CONDITIONS:
  * RAIN UP TO 4 IN. (10.2 CM) PER HOUR
  * FREEZING RAIN
  * SNOW
  * WIND
  * DUST
  * FOG
  * CHANGING TEMPERATURE
  * CHANGING LIGHTING
- THE RADAR DESIGN FOR EACH UNIT SHALL CONFORM TO THE FOLLOWING:
  * OPERATING FREQUENCY: 10.510.55 GHZ (X-BAND)
  * NO MANUAL TUNING TO CIRCUITRY
  * TRANSMITS MODULATED SIGNALS GENERATED DIGITALLY
  * NO TEMPERATURE-BASED COMPENSATION NECESSARY
  * BANDWIDTH STABLE WITHIN 1 %
  * PRINTED CIRCUIT BOARD ANTENNAS
  * ANTENNA VERTICAL 6 DB BEAM WIDTH (TWO-WAY PATTERN): 80 DEGREES
  * ANTENNA HORIZONTAL 6 DB BEAM WIDTH (TWO-WAY PATTERN): 10.5 DEGREES
  * ANTENNA TWO-WAY SIDELOBES: -40 DB
  * TRANSMIT BANDWIDTH: 45 MHZ
  * UN-WINDOWED RESOLUTION: 11 FT. (3.4 M)
  * RF CHANNELS: 4
- THE UNIT SHALL INCLUDE A SIMPLE SETUP ROUTINE THAT SHALL AUTOMATICALLY CONFIGURE AND CALIBRATE THE UNIT FOR PROPER OPERATION CURING INSTALLATION. THE UNIT SHALL ALSO BE CAPABLE OF BEING PROGRAMMED AND UPDATED FROM A LAPTOP COMPUTER OR OTHER PORTABLE PROGRAMMING DEVICE, SUCH AS A POCKET PC, VIA A LOCAL OR REMOTE ETHERNET CONNECT USING VENDOR SUPPLIED SOFTWARE. THE SOFTWARE SHALL SUPPORT TCP/IP CONNECTIVITY, UNIT CONFIGURATION BACK-UP AND RESTORE AND VIRTUAL SENSOR CONNECTIONS. THE GRAPHICAL USER INTERFACE SHALL OPERATE ON A WINDOWS PLATFORM.
- THE UNIT SHALL HAVE ONE FILL-DUPLEX RS2-232 AND ONE HALF-DUPLEX RS-485 COMMUNICATION PORTS AND SHALL THE ABILITY TO UPGRADE FIRMWARE OVER ANY COMMUNICATION PORT.
- THE UNIT SHALL BE CAPABLE OF ETHERNET COMMUNICATION.
- THE UNIT SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM, AS RECOMMENDED BY THE MANUFACTURER. CABLE(S) SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.
- SURGE PROTECTION DEVICES, AS RECOMMENDED BY THE MANUFACTURER, SHALL BE INCLUDED BOTH AT THE POLE WHERE UNIT IS LOCATED TO PROTECT THE UNIT AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.
- POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET. THE UNIT SHALL CONSUME LESS THAN 10 WATTS AND OPERATE FROM A DC INPUT BETWEEN 9 VDC AND 28 VDC. COMPLETE AND AUTOMATIC RECOVERY FROM A POWER FAILURE SHALL BE WITHIN 15 SECONDS AFTER RESUMPTION OF NORMAL POWER.
- ALL REQUIRED INPUT CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CALTRANS, NEMA TS1 AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.
- 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 CITY OF DELAWARE PROJECT ENGINEER (740-203-1810). A PUBLIC WORKS DEPARTMENT REPRESENTATIVE SHALL BE PRESENT DURING THE PROGRAMMING OF THE SYSTEM.

PAYMENT FOR ITEM 633 ADVANCE/DILEMA ZONE DETECTION SYSTEM 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 DETECTION SYSTEM.

OR

ITEM 816, VIDEO DETECTION SYSTEM, AS PER PLAN (VERIFY DETECTION SYSTEM TYPE PRIOR TO PLAN PREPARATION)
THE VIDEO DETECTION SYSTEM SHALL MEET ALL REQUIREMENTS IN ODOT SUPPLEMENT SPECIFICATION 907. THE VIDEO DETECTION SYSTEM SHALL MEET ALL REQUIREMENTS IN THE ITERIS SPECIFICATION FOR MODULAR VIDEO DETECTION SYSTEM, DOCUMENT NO. 4934579, REV:B, RZ-4 ADVANCED WDR PREMIUM VIDEO DETECTION CAMERA, VANTAGE EDGE 2 PROCESSOR, VANTAGE TS2-IM BIU MODULE, AND VANTAGE VRACKS.

PAYMENT FOR ITEM 816 VIDEO DETECTION SYSTEM SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING HARDWARE, PROCESSOR CARD(S), CABLES, CONDUIT AND CONNECTIONS TESTED AND ACCEPTED, SET UP SUPPORT AND SYSTEM TRAINING.

ITEM 633 - STOP BAR DETECTION RADAR

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A STOP-BAR DETECTION UNIT CAPABLE OF INTERSECTION DETECTION CONTROL UTILIZING ABOVE GROUND DIGITAL WAVE RADAR TECHNIQUES. THE UNIT SHALL BE NONINTRUSIVE AND SHALL DETECT VEHICLES FROM 6 FT. (1.8 M) UP TO 140 FT. (42.7 M) FOR A 90 DEGREE FIELD OF VIEW FROM THE UNIT. THE UNIT SHALL PROVIDE REAL-TIME PRESENCE DATA FOR AT LEAST 10 LANES. THE UNIT SHALL PROVIDE AT LEAST SIXTEEN DETECTION ZONES SIMULTANEOUSLY FOR INTERSECTION CONTROL. ONE UNIT SHALL BE PROVIDED PER APPROACH, WHERE SPECIFIED IN THE PLANS, COVERING MULTIPLE LANES WHERE STOP-BAR DETECTION IS REQUIRED. THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING LIST OF FEATURES AND CAPABILITIES:

- THE UNIT SHALL PROVIDE ACCURATE PRESENCE-DETECTION OF BOTH MOVING AND STOPPED VEHICLES. THE UNIT SHALL BE MOUNTED IN A FORWARD-FIRE OR SIDE-FIRE POSITION, LOOKING AT EITHER APPROACHING OR DEPARTING TRAFFIC AND SHALL ONLY DETECT VEHICLES IN ONE DIRECTION OF TRAVEL.
- THE UNIT SHALL BE TESTED TO MEET NEMA TS2 ENVIRONMENTAL STANDARDS AND MAINTAIN ACCURATE PERFORMANCE IN THE FOLLOWING OPERATING CONDITIONS:
  * RAIN UP TO 1 IN. (2.5 CM) PER HOUR
  * FREEZING RAIN
  * SNOW
  * WIND
  * DUST
  * FOG
  * CHANGING TEMPERATURE
  * CHANGING LIGHTING
- THE RADAR DESIGN FOR EACH UNIT SHALL CONFORM TO THE FOLLOWING:
  * OPERATING FREQUENCY: 24.024.25 GHZ (K-BAND)
  * MATRIX OF 16 RADARS
  * NO MANUAL TUNING TO CIRCUITRY
  * TRANSMITS MODULATED SIGNALS GENERATED DIGITALLY
  * NO TEMPERATURE-BASED COMPENSATION NECESSARY
  * BANDWIDTH STABLE WITHIN 1%
  * PRINTED CIRCUIT BOARD ANTENNAS
  * ANTENNA VERTICAL 6 DB BEAM WIDTH (TWO-WAY PATTERN): 65 DEGREES
  * HORIZONTAL FIELD OF VIEW: 90 DEGREES
  * ANTENNA TWO-WAY SIDELOBES: -40 DB
  * TRANSMIT BANDWIDTH: 245 MHZ
  * UN-WINDOWED RESOLUTION: 2 FT. (0.6 M)
  * RF CHANNELS: 8
  * SELF-TEST FOR VERIFYING HARDWARE FUNCTIONALITY
  * DIAGNOSTICS MODE FOR VERIFYING SYSTEM FUNCTIONALITY
- THE UNIT SHALL INCLUDE A SIMPLE SETUP ROUTINE THAT SHALL AUTOMATICALLY CONFIGURE AND CALIBRATE THE UNIT FOR PROPER OPERATION DURING INSTALLATION. THE UNIT SHALL ALSO BE CAPABLE OF BEING PROGRAMMED AND UPDATED FROM A LAPTOP COMPUTER OR OTHER PORTABLE PROGRAMMING DEVICE, SUCH AS A POCKET PC, VIA A LOCAL OR REMOTE ETHERNET CONNECTION USING VENDOR SUPPLIED SOFTWARE. THE SOFTWARE SHALL SUPPORT TCP/IP CONNECTIVITY, UNIT CONFIGURATION BACK-UP AND RESTORE, AND REAL-TIME TRAFFIC VISUALIZATION FOR PERFORMANCE VERIFICATION AND TRAFFIC DISPLAY. THE GRAPHICAL USER INTERFACE SHALL OPERATE ON A WINDOWS PLATFORM.

- THE UNIT SHALL HAVE TWO HALF-DUPLEX RS-485 COMMUNICATION PORTS AND SHALL HAVE THE ABILITY TO UPGRADE FIRMWARE OVER ANY COMMUNICATION PORT.
- THE UNIT SHALL BE CAPABLE OF ETHERNET COMMUNICATION.
- THE UNIT SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM, AS RECOMMENDED BY THE MANUFACTURER. CABLE(S) SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.
- SURGE PROTECTION DEVICES, AS RECOMMENDED BY THE MANUFACTURER, SHALL BE INCLUDED BOTH AT THE POLE WHERE THE UNIT IS LOCATED TO PROTECT THE UNIT AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.
- POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET. THE UNIT SHALL CONSUME LESS THAN 10 WATTS AND OPERATE FROM A DC INPUT BETWEEN 9 VDC AND 28 VDC. COMPLETE AND AUTOMATIC RECOVERY FROM A POWER FAILURE SHALL BE WITHIN 15 SECONDS AFTER RESUMPTION OF NORMAL POWER.
- ALL REQUIRED INPUTS CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CALTRANS, NEMA TS1 AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.
- 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 CITY OF DELAWARE PROJECT ENGINEER AT 740-203-1810. A PUBLIC WORKS DEPARTMENT REPRESENTATIVE SHALL BE PRESENT DURING THE PROGRAMMING OF THE SYSTEM.

PAYMENT FOR ITEM 633 STOP BAR DETECTION RADAR 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 - CONTROLLER WORK PAD, AS PER PLAN

WORK PADS FOR THE UNINTERRUPTIBLE POWER SUPPLY (UPS) AND CONTROLLER CABINETS SHALL BE AS SHOWN ON THIS SHEET. EXCAVATE A MINIMUM OF 9" BELOW GRADE. PLACE AND COMPACT 6" OF MATERIAL CONFORMING TO 304.02. INSTALL A CAST-IN-PLACE WORK PAD THAT IS A MINIMUM OF 4" THICK.

ITEM 633 - CABINET FOUNDATION, AS PER PLAN

THIS ITEM SHALL PROVIDE A FOUNDATION FOR THE CONTROLLER AND UNINTERRUPTIBLE POWER SUPPLY (UPS) AS SHOWN ON SHEET XX. THE FOUNDATION SHALL BE CONSTRUCTED IN ACCORDANCE WITH NEMA CABINET FOUNDATION SHOWN ON TC-83.20.

PAYMENT FOR ITEM 633, CABINET FOUNDATION, AS PER PLAN, SHALL INCLUDE ALL EQUIPMENT, LABOR AND MATERIALS TO INSTALL THE FOUNDATION, INCLUDING CONDUIT ELLS AND ANCHOR BOLTS. RESTORATION OF DISTURBED AREA AND DISPOSAL OF SURPLUS MATERIAL AS PER CMS 104.04.

ITEM 815 - SPREAD SPECTRUM RADIO, AS PER PLAN (IF REQUIRED BY CITY OF DELAWARE)

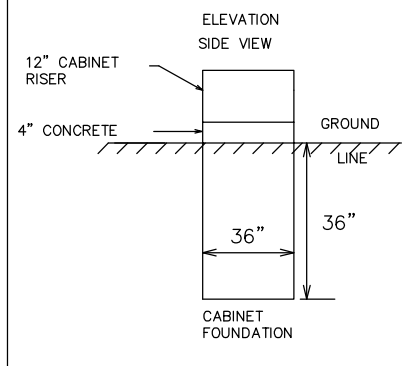
A SPREAD SPECTRUM RADIO COMMUNICATION SYSTEM SHALL BE INSTALLED AT THIS INTERSECTION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING EQUIPMENT:

1. UBIQUITI NANOSTATION M5, MSM5, 5 GHz
2. CAT5E CABLE, SHIELDED, PE OUTDOOR RATED, WEATHERPROOF JACKET, UBIQUITI TOUGH CABLE TC-PRO OR EQUIVALENT
3. CAT5E CONNECTORS, SHIELDED, WITH CRIMP CONNECTION FOR CABLE DRAIN WIRE, UBIQUITI TC-CONN-100 OR EQUIVALENT
4. ETHERNET SURGE PROTECTION THAT SUPPORTS POE (POWER OVER ETHERNET)
5. DIN RAIL MOUNTING BRACKET FOR MOUNTING MSM5 POWER SUPPLY IN DIN RAIL
6. MANAGED INDUSTRIAL ETHERNET SWITCH, LAYER 2, EIGHT (8) RJ45 PORTS AT 10 / 100 MBPS, TWO (2) SFP 1GBPS FIBER OPTIC PORTS, CISCO IE-3000-TC8.
7. RADIO/ANTENNA

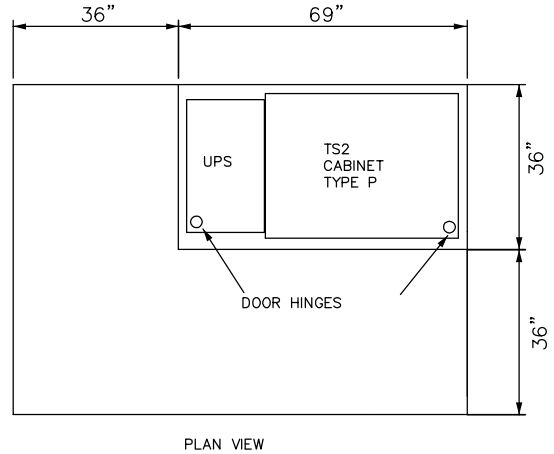
THE RADIO/ANTENNA SHALL BE MOUNTED NO LESS THAN 24" ABOVE THE TOP OF THE TRAFFIC SIGNAL POLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE AIMING AND PROPER LOCATION OF THE RADIO ANTENNA FOR ACHIEVING FULL COMMUNICATIONS WITH THE MASTER SIGNAL CONTROLLER. THE RADIO ANTENNA SHALL BE PLACED ON THE TRAFFIC POLE SHOWN IN THE PLANS.

PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR ITEM 815 - SPREAD SPECTRUM RADIO, AS PER PLAN AND SHALL INCLUDE ALL CABLES, MOUNTING HARDWARE, LABOR, MATERIALS, TOOLS, EQUIPMENT AND INCIDENTALS TO FURNISH AND INSTALL THE SYSTEM, TESTED AND ACCEPTED.

CABINET FOUNDATION DETAIL



CABINET & WORK PAD DETAIL



PLAN VIEW

NOTES:

1) THE SIZE OF THE UPS FOUNDATION MAY VARY BASED ON THE CABINET SIZE PROVIDED.
2) UPS FOUNDATION ELEVATION SHOULD MATCH CABINET FOUNDATION ELEVATION.
3) THE UPS CABINET SHALL BE MOUNTED FLUSH UP AGAINST THE SIGNAL CABINET AND SEALED.
4) CONDUIT AND WIRING FROM THE SIGNAL CABINET TO THE UPS SHALL BE INSTALLED THROUGH THE CABINET RISER.

REVISIONS			
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TRAFFIC SIGNAL GENERAL NOTES

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Public Works Department

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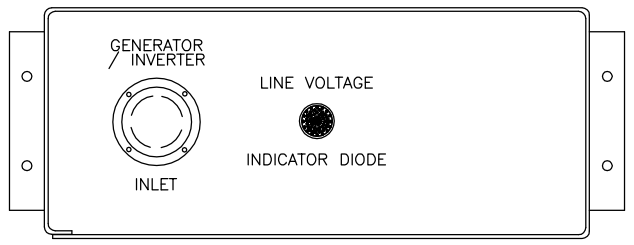
MATERIAL SPECIFICATIONS FOR GENERATOR / INVERTER POWER PANEL EQUIPMENT

GENERATOR INLET --- The inlet shall be 30 amp, 125/250V, locking, four (4) wire grounding and meet the NEMA configuration number L14-30-P 30A 125/250V specification. The inlet shall be a Hubbell catalog #2715.

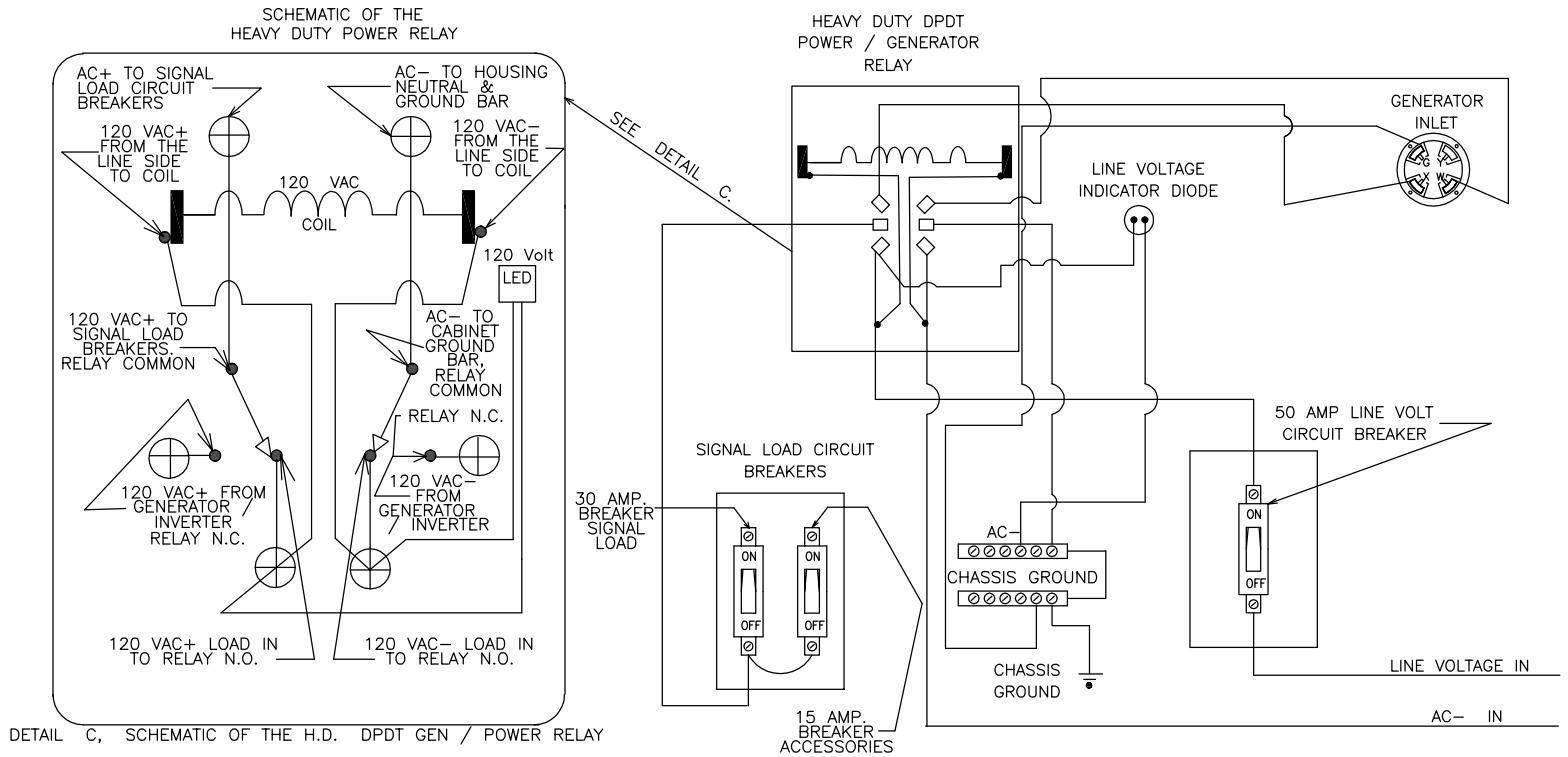
HEAVY DUTY POWER RELAY shall be 30 amp and 120 VAC.

LINE VOLTAGE INDICATOR LIGHT --- The indicator light shall be a 120 V AC light emitting diode with a red lens.

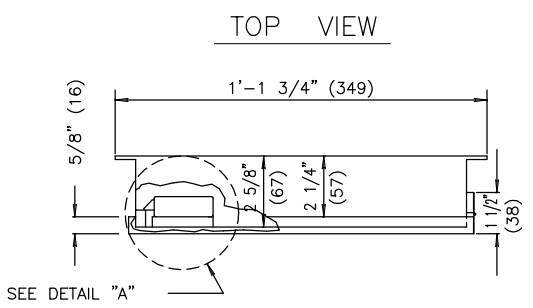
LINE VOLTAGE CIRCUIT BREAKER --- The circuit breaker shall be single pole single throw and a minimum of 30 amps. The amperage shall be increased to accomodate greater loads, if necessary. The gauge of the power cable shall be of proper size per the N.E.C.



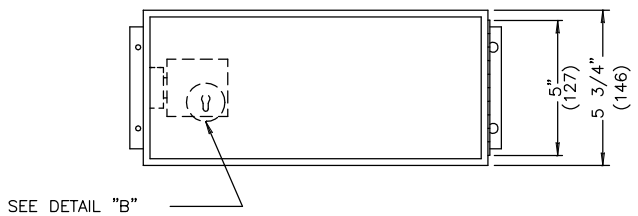
FRONT VIEW OF GENERATOR / INVERTER POWER PANEL



ELECTRICAL HOOKUP DETAIL FOR THE GENERATOR POWER PANEL



TOP VIEW

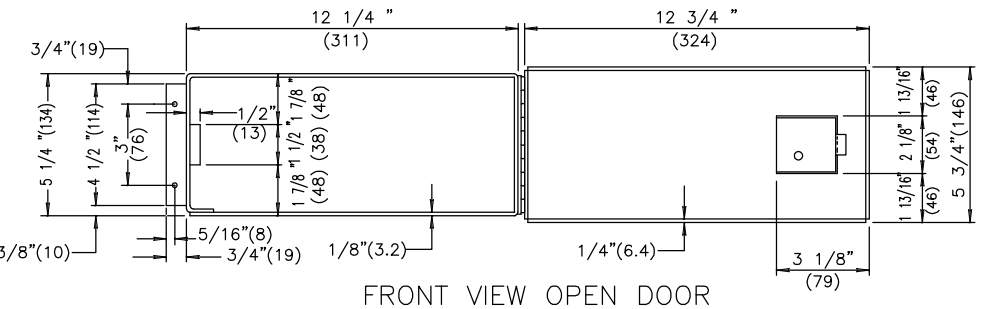


FRONT VIEW CLOSED DOOR

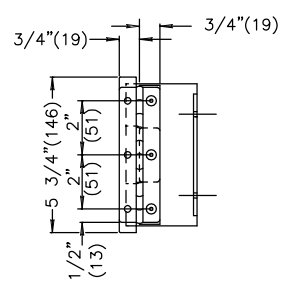
GENERATOR POWER PANEL ENCLOSURE

NOTES:

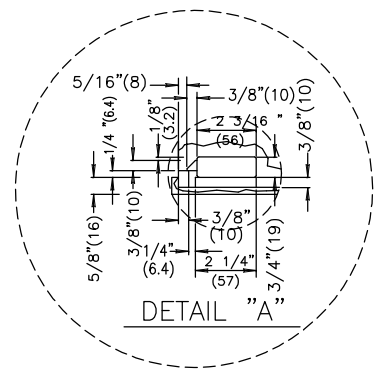
1. The enclosure shall be constructed Of 1/8 "(3.2) thick aluminum.
2. The lock shall be the standard po- lice door type, keyed with the stand- ard flasher door skeleton key.
3. The door shall be sealed with a foam rubber gasket to prevent moisture from entering the enclosure.
4. The enclosure shall be mounted onto the outside of the controller cabinet with non-accessible bolts and sealed with a high quality silicon caulk at all surfaces touching the cabinet.
5. The hinge shall be of stainless steel or equivalent corrosive-resistant ma- terial.
6. All metric dimensions in parentheses are in millimeters unless otherwise noted.

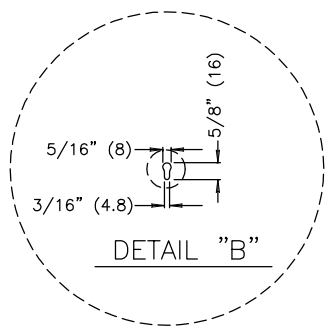


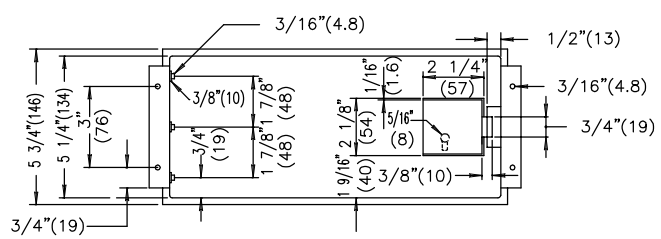
FRONT VIEW OPEN DOOR



RIGHT SIDE VIEW CLOSED DOOR







BACK VIEW CLOSED DOOR

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