

**CITY OF COLUMBUS
PUBLIC SERVICE DEPARTMENT
TRANSPORTATION DIVISION**

**SUPPLEMENTAL SPECIFICATION 1610
TRAFFIC SIGNAL SUPPLEMENT**

NOVEMBER 8, 2001

**[SENTENCES IN BRACKETS ARE EITHER OPTIONAL OR "FYI" TYPE].
CUSTOMIZE GENERAL NOTES FOR YOUR PARTICULAR PROJECT. READ & EDIT
!!!**

MAINTENANCE OF TRAFFIC NOTES [ALL JOBS]

"MOT" HEAD LOCATION AND SPACING REQUIREMENTS

THE CONSULTANT SHALL SHOW "MOT" SIGNAL HEAD LAYOUT GRAPHICALLY ON THE "MOT" SHEETS FOR EACH SIGNALIZED INTERSECTION AS FOLLOWS.

FOR 3+ LANES: POSITION HEADS ON EACH LANE LINE OR CHANNEL LINE.

FOR 2 THROUGH LANES WITH OR WITHOUT SAME LANE TURNING MOVEMENTS: POSITION HEADS ON THE CENTERLINE OF EACH THROUGH LANE.

FOR 1 THROUGH LANE WITH OR WITHOUT AN ADJACENT TURNING LANE:
POSITION HEADS 4 TO 5 FEET EACH SIDE OF THE CENTERLINE OF THE THROUGH LANE.

ADD THE FOLLOWING NOTES ON PLAN SHEET AS NEEDED.

THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING DIVISION'S MAINTENANCE SHOP (645-7393) 3 WORK DAYS PRIOR TO THE NEED FOR THE CITY TO REWIRE THE EXISTING CONFLICT MONITOR SO THE "MOT" PHASING WILL WORK. [e.g. REMOVAL OR INSTALLATION OF SIGNAL PHASE(S)]

THE CONTRACTOR SHALL BE RESPONSIBLE FOR SHIFTING HEADS AND MAKING SPLICES IN CABLE.

MICROWAVE UNITS ARE TO BE INCLUDED ON THESE SHEETS AS A SEPARATE BID ITEM.

CENTRAL COMMUNICATION, AS PER PLAN **(FOR MASTER COMMUNICATION JOBS)**

THE CONTRACTOR SHALL MAKE ARRANGEMENTS THROUGH THE SIGNAL MANAGEMENT SECTION, TRAFFIC ENGINEERING DIVISION (614-645-7790), AND THE LOCAL PHONE CARRIER TO HAVE A CENTREX DATA COMMUNICATION (PHONE) LINE INSTALLED. THE DATA LINE SHALL BE ROUTED TO AN EXTERNAL PHONE COMPANY JUNCTION BOX WHICH IS LOCATED NEXT TO OR NEAR THE CONTROLLER CABINET. THE DATA LINE SHALL THEN ENTER THE CABINET FOUNDATION VIA A SMALL PULLBOX AND A 1" PVC CONDUIT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE INSTALLATION OF THE LINE PLUS SERVICE FOR ONE MONTH. THE DATA LINE SHALL BE ACTIVATED WITHIN 7 DAYS AFTER THE SIGNAL IS PLACED ON "FLASH" BUT NOT PRIOR TO THE "FLASH" PERIOD. THE DATA LINE SHALL BE CONNECTED TO THE CITY CENTREX SYSTEM. THE BILLING ADDRESS SHALL BE TRANSFERRED TO THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, WITHIN 10 TO 30 DAYS AFTER IT HAS BEEN ACTIVATED. (BILLING NUMBER IS 614-645-7790)

ACCEPTANCE OF SIGNAL **(ALL JOBS)**

THE SIGNAL MANAGEMENT SECTION FOR THE TRAFFIC ENGINEERING DIVISION, CITY OF COLUMBUS, SHALL BE THE SOLE AGENCY TO ACCEPT ANY TRAFFIC SIGNAL INSTALLATION ON BEHALF OF THE CITY. (614-645-7790)

PROJECT ENGINEER AND PROJECT INSPECTION OR PLAN CHANGES **(DIV JOB)**

THE PROJECT ENGINEER SHALL BE FROM THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION. THE SIGNAL INSTALLATION WORK SHALL BE INSPECTED BY THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION. ANY CHANGES TO THESE PLANS SHALL BE APPROVED BY THE PROJECT ENGINEER PRIOR TO IMPLEMENTATION.

SIGNAL PRECONSTRUCTION CONFERENCE **(DIV JOB OR AS SPECIFIED)**

THE CONTRACTOR SHALL CONTACT THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, TO ARRANGE A TIME AND DATE FOR A SIGNAL PRECONSTRUCTION CONFERENCE TO DISCUSS THIS PROJECT. THE MEETING WILL BE HELD AT 109 NORTH FRONT STREET, 2nd FLOOR OR ON THE PROJECT SITE. NO SIGNAL WORK SHALL START PRIOR TO THIS MEETING.

EXISTING UTILITIES **(CITY & DIV JOB)**

THE CITY OF COLUMBUS ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE LOCATION OR THE DEPTHS OF THE UNDERGROUND FACILITIES SHOWN ON THESE PLANS. SUPPORT, PROTECTION, AND RESTORATION OF ALL EXISTING UTILITIES AND APPURTENANCES SHALL BE

THE CONTRACTOR'S RESPONSIBILITY. THE COST OF THIS WORK SHALL BE INCLUDED IN THE BID PRICE FOR THE VARIOUS ITEMS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OHIO UTILITIES PROTECTION SERVICE (OUPS) AND THE FOLLOWING CITY UTILITIES SO THEIR RESPECTIVE UTILITIES CAN BE MARKED. THE PROJECT ENGINEER SHALL NOT AUTHORIZE THE START OF ANY SIGNAL UNDERGROUND WORK UNTIL ALL UTILITIES HAVE BEEN MARKED.

SEWERS & DRAINS 645-7102 (FAX -8893)
TRAFFIC ENGINEERING 645-7393 (FAX -5967)

ELECTRICITY 645-7627 (FAX -7150)
WATER 645-7788 (FAX -0220)

PLAN AND SPECIFICATION COMPLIANCE (ALL JOBS)

THE CONTRACTOR SHALL FURNISH AND INSTALL TRAFFIC SIGNAL DEVICES IN COMPLIANCE WITH THESE PLANS AND SPECIFICATIONS, THE 1997 ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS AND ITS SUPPLEMENTAL SPECIFICATIONS, OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS, AND THE "TC" STANDARD CONSTRUCTION DRAWINGS ISSUED BY THE ODOT BUREAU OF DESIGN SERVICES (SUPPLEMENTS THE PLAN SPECIFICATIONS). THE SIGNAL MANAGEMENT SECTION, CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, SHALL DETERMINE WHETHER THE SUPPLIED ITEMS MEET OR EXCEED THESE SPECIFICATIONS.

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) AND/OR TS1-1989 : SECTIONS 1, 2, 5, 6, 8, 11, 13 AND 14
- (C) 1997 ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS 625, 632, 633, 732 & 733; SUPPLEMENT 1063 "SIGNAL CONSTRUCTION PERSONNEL REQUIREMENTS"

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

CONTRACTOR ACCESS TO EXISTING CONTROL CABINET (ALL JOBS)

A REPRESENTATIVE FROM THE TRAFFIC ENGINEERING DIVISION SHALL BE PRESENT ANYTIME THE CONTRACTOR REQUIRES ENTRY INTO AN EXISTING CONTROL CABINET TO PERFORM ANY CABINET WIRING CHANGE OR WIRING HOOKUP. THE CONTRACTOR SHALL CONTACT THE DIVISION'S ELECTRONIC SHOP SUPERVISOR AT 614-645-7933 TO MAKE ARRANGEMENTS. A THREE (3) CITY WORKDAY NOTICE SHALL BE GIVEN. THE REPRESENTATIVE SHALL ACT IN A SUPERVISORY AND/OR INFORMATIONAL CAPACITY ONLY UNLESS OTHERWISE STATED IN THESE PLANS. EXISTING CABINET WIRING WHICH WAS PREVIOUSLY DISCONNECTED BY THIS DIVISION SHALL BE CONNECTED BY THIS DIVISION IF CONNECTION IS REQUIRED FOR PROPER OPERATION OF THE TRAFFIC SIGNAL. ALL CONTRACTOR INSTALLED CABLE SHALL BE CONNECTED BY THE CONTRACTOR BUT OVERSEEN BY THE DIVISION'S REPRESENTATIVE. THERE IS NO CHARGE FOR THIS REPRESENTATIVE BETWEEN THE HOURS OF 8AM AND 3PM, MONDAY THROUGH FRIDAY. PRIOR TO OR AFTER THESE HOURS AND ON SATURDAYS THE HOURLY CHARGE IS \$30 WITH A

MINIMUM CHARGE OF \$120 ON SATURDAY. SUNDAY HOURLY CHARGE IS \$40 WITH A MINIMUM CHARGE OF \$160.

MATERIAL INFORMATION SUBMITTAL (ALL JOBS)

THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE CHIEF TRAFFIC ENGINEER, (ATTN. SIGNAL MANAGEMENT SECTION), CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, 109 NORTH FRONT STREET, COLUMBUS, OHIO 43215-9024, ONE (1) COMPLETE SET OF CATALOG CUTS, DIAGRAMS, SHOP DRAWINGS, BROCHURES OR OTHER DESCRIPTIVE MATERIAL FOR THE SIGNAL ITEMS THAT THE CONTRACTOR INTENDS TO FURNISH THAT HAVE NOT BEEN SPECIFICALLY NAMED IN THESE PLANS BY PRODUCT MODEL NUMBER. THE CONTRACTOR SHALL ALSO PROVIDE A DETAILED LIST OF ALL VARIANCES FROM ODOT SPECIFICATIONS AND FROM THE SPECIFICATIONS CONTAINED HEREIN FOR EACH NONSPECIFIED ITEM THAT DOES NOT COMPLY 100% WITH THESE SPECIFICATIONS. UNLESS OTHERWISE STATED BY THE CONTRACTOR THE SUPPLIED ITEMS WILL BE CONSIDERED AS BEING IN STRICT ACCORDANCE WITH ALL SPECIFICATIONS.

CABINET ASSEMBLY TESTING BY THE CITY OF COLUMBUS (ALL JOBS)

THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, SHALL BENCH TEST THE INTERSECTION CONTROLLER AND ITS COMPLETE CABINET ASSEMBLY PRIOR TO THE EQUIPMENT BEING INSTALLED IN THE FIELD. TESTING SHALL NOT BEGIN UNLESS COMPLETE AND CORRECT CABINET ASSEMBLY WIRING SCHEMATICS AND LOOP DETECTOR UNITS ARE SUBMITTED WITH THE CABINET. THE TEST PROCEDURES SHALL CONSIST OF OPERATING THE EQUIPMENT FOR A MINIMUM OF FORTY-EIGHT (48) HOURS. THE CONTRACTOR SHALL DELIVER THE CONTROLLER AND COMPLETE CABINET ASSEMBLY FOR TESTING TO THE TRAFFIC ENGINEERING DIVISION'S MAINTENANCE SHOP AT 1820 EAST 17th AVENUE; COLUMBUS, OHIO 43219. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOADING AND UNLOADING ALL EQUIPMENT AND OBTAINING A RECEIPT FROM SHOP PERSONNEL THAT LISTS ALL DELIVERED MATERIALS BY MANUFACTURER, MODEL NUMBER, AND SERIAL NUMBER. THE DIVISION WILL COMPLETE TESTING ON THE CONTROLLER AND CABINET ASSEMBLY WITHIN TEN (10) CITY WORKING DAYS. UPON COMPLETION OF THE TESTING THE DIVISION WILL NOTIFY THE CONTRACTOR THAT THE EQUIPMENT CAN BE PICKED UP. ANY DEVICE FOUND TO BE UNSATISFACTORY SHALL BE REPLACED, REPAIRED OR CORRECTED AS NECESSARY BY THE CONTRACTOR AND RESUBMITTED FOR TESTING. THE DIVISION WILL SCHEDULE TESTING OF THIS RETURNED EQUIPMENT AS QUICKLY AS POSSIBLE BUT WILL NOT GUARANTEE ANY TURN AROUND TIME PERIOD. ANY DELAY CAUSED BY THIS TESTING SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY. CONTROL EQUIPMENT WHICH HAS NOT PASSED TESTING OR WHICH HAS NOT BEEN TESTED BY THE DIVISION SHALL NOT BE INSTALLED IN THE FIELD TO CONTROL TRAFFIC. IT IS RECOMMENDED THAT THE CONTRACTOR HAVE A REPRESENTATIVE IN ATTENDANCE DURING THE TESTING PROCESS. THERE ARE NO COSTS ASSOCIATED WITH THE TESTING. ANY COST ASSOCIATED WITH THE DELIVERY AND PICK-UP SHALL BE INCIDENTAL TO THE COST OF THE EQUIPMENT. CONTACT THE ELECTRONIC SYSTEMS COORDINATOR AT 614-645-7933 FOR EQUIPMENT STATUS.

NEW SIGNAL FLASH OPERATION (ALL JOBS)

THE SIGNAL SHALL BE PLACED ON "FLASH" NO SOONER THAN EIGHT (8) DAYS PRIOR TO THE SITE

GENERATING THE VOLUMES REQUIRED TO MEET SIGNAL WARRANTS AT THIS LOCATION. THE SIGNAL SHALL NOT BE PLACED ON FLASH UNTIL THE SIGNAL MANAGEMENT SECTION, CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, HAS CHECKED THE INSTALLATION AND HAS GIVEN THE CONTRACTOR APPROVAL TO FLASH THE SIGNAL. ANY SIGNAL WITHIN AN ACTIVE INTERCONNECTED SYSTEM SHALL NOT BE PLACED ON FLASH UNTIL THE SYSTEM HAS ESTABLISHED RELIABLE COMMUNICATION WITH THE CONTROLLER. THE SIGNAL WILL NOT BE PLACED ON FLASH UNTIL THE PERMANENT PAVEMENT MARKINGS AND LANE CONTROL SIGNS HAVE BEEN INSTALLED. TEMPORARY PAVEMENT MARKINGS MAY BE USED IN LIEU OF PERMANENT PAVEMENT MARKINGS IF THEY REFLECT THE PERMANENT PAVEMENT MARKING LAYOUT. THE STOP LINES SHALL BE IN PLACE PRIOR TO THE SIGNAL BEING PLACED ON REGULAR OPERATION. DURING THE FLASH PERIOD THE "SIGNAL AHEAD" (W47-36) AND "NEW SIGNAL" (CW-318-24) SIGNS SHALL BE INSTALLED BY THE CONTRACTOR BUT REMAIN COVERED UNTIL THE SIGNAL IS PLACED ON REGULAR OPERATION. THE SIGNAL SHALL FLASH FOR SEVEN (7) DAYS PRIOR TO BEING PLACED ON REGULAR OPERATION. IF THE "NEW SIGNAL" FLASH SEQUENCE IS DIFFERENT FROM THE "AS PER PLAN" FLASH SEQUENCE, THEN THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING CHANGES AS NEEDED TO OBTAIN THE PROPER FLASH SEQUENCE FOR EACH TIME PERIOD. DURING THE "NEW SIGNAL" FLASH PERIOD THE MAINLINE SIGNALS SHALL FLASH YELLOW.

[CONSULTANT NOTE: THIS GENERAL NOTE IS TO BE USED ONLY FOR PREVIOUSLY UNSIGNALIZED LOCATIONS (e.g. NEW SIGNAL). OMIT THIS PARAGRAPH IF AN EXISTING SIGNAL IS BEING MODIFIED OR REPLACED. THE SIGNAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE "SIGNAL" SIGNS SO INCLUDE 630 ITEMS.]

TEN DAY TEST REQUIREMENTS (ALL JOBS)

THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, REQUIRES A 10 DAY TEST TO START AFTER THE SIGNAL INSTALLATION IS 100% COMPLETE WHICH INCLUDES ESTABLISHING DATA COMMUNICATION IF PRESENT. NO PARTIAL TESTS WILL BE CONDUCTED. THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST TO THE DIVISION'S SIGNAL MANAGEMENT SECTION AT 109 N. FRONT STREET, 2ND FLOOR; COLUMBUS, OH 43215-9024 STATING THAT THE SIGNAL INSTALLATION IS 100% COMPLETE AND A START DATE FOR THE TEN DAY TEST IS REQUESTED. THIS DIVISION SHALL MONITOR THE TEST AND SHALL BE THE SOLE DIVISION TO ACCEPT THE SIGNAL INSTALLATION ON BEHALF OF THE CITY. IF LESS THAN 100% COMPLETION IS DETECTED UPON INSPECTION BY THIS DIVISION OR ANY MALFUNCTION IS DETECTED, THEN THE TEN DAY TEST SHALL BE COMPLETELY RESTARTED. FAX TRANSMISSION IS ACCEPTABLE. FAX NUMBER IS 614-645-7921.

INSTALLATION LAYOUT (CITY & DIV JOB)

THE TRAFFIC SIGNAL STRAIN POLES OR 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. FOR MASTARM STRUCTURES THE SURVEYOR SHALL ALSO SET CONTROLS SO THE MAST ARM ALIGNMENT CAN BE SET PROPERLY. COSTS INCURRED FOR THIS SERVICE SHALL BE INCIDENTAL TO THE COST OF THE PROJECT OR PROVIDED UNDER A CONSTRUCTION LAYOUT STAKE ITEM. THE SURVEYOR SHALL SET PROPER POLE AND CABINET FOUNDATION ELEVATIONS AND STAKE ALL RADII SO BASES CAN BE ALIGNED

PROPERLY. THE SURVEYOR SHALL SET AND MARK A PROPOSED TOP-OF-CURB ELEVATION STAKE AT THE BACK-OF-CURB OR IF NO CURB AN EDGE-OF-PAVEMENT ELEVATION STAKE AT THE PROPOSED EDGE-OF-PAVEMENT. RADIALLY ALIGN THIS ELEVATION STAKE WITH THE RADIUS HUB AND SIGNAL POLE LOCATION STAKE. THE SURVEYOR SHALL ALSO STAKE THE RIGHT-OF-WAY ANYTIME A STATIONED TRAFFIC SIGNAL ITEM IS WITHIN ONE (1) FOOT OF THE RIGHT-OF-WAY. THE TRAFFIC ENGINEERING DIVISION PERSONNEL SHALL APPROVE ALL POLE FOUNDATION LOCATIONS AND ELEVATIONS PRIOR TO THE CONTRACTOR INSTALLING ANY FOUNDATION.

[ADD NOTE IN PLANS IF THIS PROJECT INSTALLS A SIGNAL AT AN INTERSECTION THAT DOES NOT INCLUDE SURVEYED ROADWAY STATION NUMBERS. THE DIVISION WILL STAKE THE POLE LOCATIONS AND MARK THE LOCATION OF ALL STATIONED SIGNAL ITEMS.]

USE & CUSTOMIZE ITEM 614 MAINTAINING TRAFFIC PARAGRAPHS BELOW AS NEEDED

ITEM 614 MAINTAINING TRAFFIC, AS PER PLAN

[NOT REQUIRED IF ROADWAY PLANS HAVE A SEPARATE MAINTENANCE OF TRAFFIC SECTION/NOTES]

ALL TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE FURNISHED, ERECTED, MAINTAINED AND REMOVED BY THE CONTRACTOR IN ACCORDANCE WITH THE CURRENT ADDITION OF THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR CONSTRUCTION AND MAINTENANCE OPERATIONS. COPIES ARE AVAILABLE FROM THE OHIO DEPARTMENT OF TRANSPORTATION.

ALL MAINLINE TRAFFIC LANES SHALL BE FULLY OPEN TO TRAFFIC FROM 7:30 TO 8:30 AM AND 4:30 TO 6:00 PM. **[ADJUST TIMES TO FIT TRAFFIC FLOW]**

LANE CLOSURE LAYOUT SHALL BE PER THE OMUTCD SECTION ON CONSTRUCTION AND MAINTENANCE OPERATIONS AND MEET ALL TRAFFIC ENGINEERING DIVISION STANDARDS. CONTACT THE DIVISION'S CONSTRUCTION COORDINATOR FOR LAYOUT CONSULTATION. LAW ENFORCEMENT OFFICER (LEO) SHALL BE USED INSTEAD OF A FLAGGER UNLESS WRITTEN APPROVAL IS GIVEN TO THE CONTRACTOR BY THE DIVISION'S CONSTRUCTION COORDINATOR.

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

ITEM 614 MAINTENANCE OF TRAFFIC SIGNAL INSTALLATIONS (ALL JOBS)

WHEN AN OPERATING TRAFFIC SIGNAL MUST BE TAKEN OUT-OF-SERVICE BY THE CONTRACTOR BECAUSE OF CONSTRUCTION PROCEDURES AND PRIOR TO ITS PERMANENT REMOVAL, BOTH THE PROJECT ENGINEER AND THE SIGNAL MANAGEMENT SECTION, TRAFFIC ENGINEERING DIVISION (614-645-7790), SHALL BE NOTIFIED. THE TRAFFIC SIGNAL SHALL NOT BE OUT-OF-SERVICE BETWEEN THE HOURS OF 7:00 AM TO 8:30 AM AND 4:30 PM TO 6:00 PM MONDAY THROUGH FRIDAY **[WEEKEND HOURS MAY BE NEEDED ALSO]**. THE TRAFFIC SIGNAL SHALL ALWAYS BE IN FULL OPERATION FROM ONE (1) HOUR BEFORE SUNSET TO ONE-HALF (1/2) HOUR AFTER SUNRISE. **[THESE TIMES CAN BE REFLECTED IN LANE CLOSURE TIMES.]** OFF DUTY

UNIFORMED POLICE OFFICER(S), HIRED BY THE CONTRACTOR, SHALL BE REQUIRED TO DIRECT TRAFFIC AT ALL INTERSECTIONS TAKEN OUT-OF-SERVICE BY THE CONTRACTOR.

USE THE FOLLOWING ONLY WHEN DIRECTED: SOME INTERSECTION CONFIGURATIONS MAY LEND ITSELF TO A SIDE STREET STOP SIGN CONTROLLED OPERATION IN LIEU OF SIGNALIZED OPERATION DURING CERTAIN CONSTRUCTION PHASES. THE CONTRACTOR SHALL SEEK APPROVAL OF THIS TYPE OF OPERATION FROM THE SIGNAL MANAGEMENT SECTION, CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION (614-645-7790).

A) PROPOSED TRAFFIC SIGNAL INSTALLATION

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL PROPOSED TRAFFIC SIGNAL DEVICES UNDER THE FOLLOWING CONDITIONS FROM THE TIME OF INSTALLATION UNTIL THE DEVICE HAS BEEN ACCEPTED BY THE SIGNAL MANAGEMENT SECTION.

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 SIGNAL MANAGEMENT SECTION AND PROJECT ENGINEER WITH ADDRESSES AND 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 AND A PERSON IS CONTINUOUSLY AVAILABLE TWENTY-FOUR (24) HOURS A DAY AND 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 LOSES, 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 SIGNAL MANAGEMENT SECTION. ANY DAMAGED CABINET ASSEMBLY DEVICE IF REPAIRED SHALL BE TESTED ONCE AGAIN BY THE TRAFFIC ENGINEERING DIVISION 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) AND PROVIDE POLICE OFFICER(S) TO DIRECT TRAFFIC UNTIL THE SIGNAL IS BACK ON "FLASH" OR OPERATING PROPERLY.

IF A TRAFFIC STRAIN POLE IS DAMAGED AND THAT DAMAGE CAUSED POLE INSTABILITY, THEN THE CONTRACTOR SHALL TAKE IMMEDIATE ACTION (WITHIN 2 HOURS) TO STABILIZE THE POLE. 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 TRAFFIC ENGINEERING DIVISION MAY TAKE ACTION AS IT DEEMS NECESSARY TO CORRECT THE SITUATION. THIS ACTION MAY INCLUDE CONTROLLING THE INTERSECTION USING COLUMBUS POLICE 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 AND NOT INCLUDED IN ITEM 614 MAINTAINING TRAFFIC.

ANY NON-OPERATING VEHICULAR OR PEDESTRIAN SIGNAL HEAD OR PUSHBUTTON SHALL BE COVERED PER ODOT 632.24. 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. A MINIMUM OF TWO (2) VEHICULAR SIGNAL HEADS PER TRAVELLED DIRECTION (SPACED 8' APART MINIMUM AND 12' MAXIMUM) SHALL BE OPERATING AT ALL TIMES. %%UNO EXCEPTIONS!%%U

B) EXISTING TRAFFIC SIGNAL DEVICES

THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION (ELECTRONICS MAINTENANCE SHOP: 645-7933), SHALL PERFORM ROUTINE MAINTENANCE ON ALL EXISTING CABINET ASSEMBLY ITEMS ONLY. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL OTHER EXISTING TRAFFIC SIGNAL DEVICES ONCE ANY PROJECT SIGNAL WORK HAS STARTED. IF, IN THE COURSE OF WORK, THE GENERAL CONTRACTOR OR ANY PROJECT SUB-CONTRACTOR CAUSED DAMAGE TO ANY EXISTING TRAFFIC SIGNAL DEVICE OTHER THAN THE CABINET ASSEMBLY, THEN THE CONTRACTOR AT THE CONTRACTOR'S COST SHALL REPAIR AND/OR REPLACE THE DAMAGED DEVICE TO THE SATISFACTION OF THE TRAFFIC ENGINEERING DIVISION. DAMAGE TO THE CABINET ASSEMBLY BY A PROJECT CONTRACTOR SHALL BE REPAIRED BY THE TRAFFIC ENGINEERING DIVISION AND BILLED TO THE GENERAL CONTRACTOR.

C) TEMPORARY CONTROLLER OR TRAFFIC SIGNALS

IN ADDITION TO ITEM 614.03(F), THE FOLLOWING SHALL APPLY.

IF THE CONTRACTOR IS REQUIRED TO ERECT AND/OR INSTALL ANY TEMPORARY TRAFFIC CONTROL DEVICE OR TEMPORARY SIGNAL POLE THAT IS NOT SPECIFIED IN THESE PLANS, THEN THE CONTRACTOR SHALL SUBMIT THE DESIGN CHANGE TO THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, FOR APPROVAL PRIOR TO THEIR INSTALLATION. THE DIVISION ALSO RESERVES THE RIGHT TO MAKE OR HAVE THE CONTRACTOR MAKE CHANGES TO THE TRAFFIC SIGNAL OPERATION.

IF THE CONTRACTOR NEEDS TO INSTALL A TEMPORARY CONTROLLER AND/OR CABINET ASSEMBLY AT ANY INTERSECTION, THEN THE EQUIPMENT SHALL MEET NEMA STANDARDS TS1-1989 OR TS2-1992 (TYPE 2) AND SHALL BE APPROVED BY THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION.

ALL COSTS RESULTING FROM THE ABOVE REQUIREMENTS (A, B & C), EXCEPT AS NOTED, SHALL BE CONSIDERED TO BE INCLUDED IN THE LUMP SUM BID PRICE FOR ITEM 614 MAINTAINING TRAFFIC.

ITEM 625 GROUND ROD, AS PER PLAN (ALL JOBS)

THE GROUND WIRE CABLE SHALL BE CROSS-LINKED POLYETHYLENE, #6 AWG COPPER, STRANDED, RHW INSULATED, 600 VOLT RATED AND EXOTHERMICALLY WELDED TO THE GROUND ROD WITH INSULATING VARNISH APPLIED TO THE WELD. THE COPPER USED IN THE GROUND WIRE SHALL BE HARD ENOUGH TO WITHSTAND THE EXOTHERMAL WELDING PROCESS BUT SOFT ENOUGH TO MELT AND FORM A SOLID BOND TO THE ROD. THE OHM READING AT THE END OF THE UNATTACHED GROUND WIRE THROUGH THE GROUND ROD SHALL BE 10 OHMS OR LESS FOR THE GROUNDING SYSTEM ATTACHED TO THE CONTROL CABINET AND 25 OHMS OR LESS FOR THE GROUNDING SYSTEM ATTACHED TO THE SIGNAL STRAIN POLE. THE CONTROLLER CABINET SHALL HAVE TWO (2) GROUND RODS INSTALLED ONE (1) FOOT APART. A GROUND WIRE JUMPER THAT IS WELDED TO EACH ROD SHALL CONNECT THE RODS. THE STRAIN POLE THAT HAS A POLE MOUNTED CABINET ATTACHED TO IT SHALL HAVE A SEPARATE POLE GROUND ROD AND WIRE. THE GROUND WIRE ATTACHED TO THE CABINET STRAIN POLE SHALL HAVE A SEPARATE "EMT" AND BE ON THE OPPOSITE SIDE OF THE FOUNDATION FROM THE CABINET GROUNDING SYSTEM.

PERSONNEL FROM THE CITY SIGNALS MANAGEMENT SECTION SHALL BE PRESENT WHEN ANY GROUND ROD READING IS TAKEN. THE CONTRACTOR SHALL HAVE ON SITE A TEST EQUIPMENT CALIBRATION CERTIFICATE ACCORDING TO ODOT 625.22 AND SHALL HAVE ON SITE THE OPERATING INSTRUCTION MANUAL FOR ALL TEST DEVICES SO SIGNALS PERSONNEL CAN FIELD VERIFY THE TEST PROCEDURE AND RESULTS. NO TEST SHALL BE CONDUCTED IF ANY TEST REQUIREMENT IS NOT MET.

ITEM 625 PULLBOX, AS PER PLAN (ALL JOBS)

THE PULLBOX ASSEMBLY SHALL BE RATED AS MEDIUM TO HEAVY DUTY, SHALL BE RATED TO BE INSTALLED IN CONCRETE WALKS AND SHALL HAVE ALL STAINLESS STEEL HARDWARE. THE PULLBOX COVER SHALL HAVE THE WORD "TRAFFIC" ON IT. THE COVER SHALL BE BOLTED TO THE BOX AND SHALL BE EITHER POLYMER CONCRETE OR STEEL PLATE. THE BOX DEPTH SHALL BE 15 INCHES MINIMUM TO 30" MAXIMUM. THE SUPPLIED PULLBOX ASSEMBLY SHALL BE A MODIFIED 18" ODOT STANDARD PULLBOX WHICH USES A GINGWAY PRODUCTS FRAME, A CARSON-BROOKS HIGH PERFORMANCE SERIES MODEL 1419-15 OR A CDR SYSTEMS MODEL SA32-1015-18. CONDUIT ELLS MAY BE USED TO BRING THE CONDUIT UP INTO THE HOUSING. EXTENSIONS, IF AVAILABLE, CAN BE USED TO ELIMINATE THE NEED FOR CONDUIT ELLS.

CONSULTANTS: THESE PULLBOXES ARE TO BE USED EXCLUSIVELY FOR HOUSING LOOP LEAD-IN TO HOMERUN CABLE SPLICES AND CAN BE PLACED OVER A CONDUIT BANK WITH THE LOOP CONDUIT ENCASED IN THE CONDUIT BANK.

ITEM 625 PULLBOX, 713.08, 24", AS PER PLAN

THE PULLBOX ASSEMBLY SHALL BE RATED AS MEDIUM TO HEAVY DUTY, SHALL BE RATED TO BE INSTALLED IN CONCRETE WALKS, SHALL HAVE THE WORD 'TRAFFIC' SECURELY ATTACHED TO THE GALVANIZED STEEL COVER (USE 3 RIVETS ON AN EMBOSSED TAG) AND SHALL HAVE STAINLESS STEEL PENTA OR HEX HEAD BOLTS FASTENING THE COVER TO THE GALVANIZED

STEEL FRAME. THE FRAME SHALL BE MANUFACTURED BY GINGWAY PRODUCTS, INC. (CONTACT MEREDITH BROTHERS FOR SPEC DETAILS. THE KNOCKOUT (4 EACH) ON THE 24" PULLBOX SHALL BE A 12"x12" AREA STARTING AT THE PULLBOX BOTTOM AND BEING CENTERED IN THE SIDEWALL.

ITEM 625 PULLBOX, 713.081, 36" x 36", AS PER PLAN [USE ONLY WHEN SPECIFIED]

ONE SPARE PULLBOX COVER AND FIVE PULL HANDLES PER PROJECT SHALL BE SUPPLIED (COST INCIDENTAL TO THE COST OF THE PULL BOX ITEM). THE HANDLES SHALL HAVE A 18 INCH "J" HOOKED SHAFT AND A CROSS HAND BAR THAT HAS INCORPORATED A 9/16" HEX HEAD SOCKET ON ONE END AND A 1/2" PENTA HEAD SOCKET ON THE OTHER. THE HANDLE WELD AND MATERIAL SHALL BE MADE TO WITHSTAND REPEATED APPLIED PULLING AND BENDING FORCES WITHOUT FAILURE. THE PULL BOX SHALL HAVE A NOMINAL COVER OPENING OF 36" x 36", A DEPTH RANGING FROM 30" TO 36" AND A OUTWARD TAPERING HOUSING COMPRISED OF ONE OR MORE PIECE CONSTRUCTION. IF JOINED, THE VERTICAL JOINT SHALL BE PERPENDICULAR TO THE CONDUIT SO THE JOINT IS NOT CUT. TWELVE (12) INCHES OF NUMBER 4 AGGREGATE SHALL BE PLACED IN THE BOTTOM OF THE PULLBOX. HOLES TO INSERT THE CONDUIT(S) SHALL BE CUT FROM THE INSIDE TO THE OUTSIDE. THE HOLES SHALL GIVE SUPPORT TO ALL CONDUIT AND BE CIRCULAR WITH A DIAMETER JUST LARGE ENOUGH TO FIT THE CONDUIT BUT BE SMALL ENOUGH TO PREVENT BACKFILL FROM ENTERING THE PULL BOX. THE BOTTOM OF ANY CONDUIT HOLE SHALL BE 24" FROM THE TOP OF THE HOUSING. NO CONDUIT SHALL PROTRUDE INSIDE THE BOX MORE THAN 1". THE INTERCONNECT CONDUIT SHALL BE OFFSET FROM THE CENTER OF THE BOX BY 12" TO 15" AND THE INCOMING AND OUTGOING CONDUIT SHALL BE PLACED ON THE SAME SIDE OF THE BOX.

[NOTE: ABOVE USES ONE CONDUIT FOR IC CABLE. REDO IF MULTIDUCTS ARE USED WITH THIS PULLBOX.]

THE COVER SHALL HAVE A FORMED WORD "TRAFFIC" ON IT, SHALL BE A SINGLE NON-SKID, SOLID STRUCTURE AND SHALL BE MADE OF A POLYMER CONCRETE MATERIAL WITH 100% SATURATION OF ALL FIBERS. TWO NON-CORROSIVE DOWEL PINS OR LIFTING RINGS SHALL BE INCORPORATED INTO THE COVER AND PLACED ON ONE CENTER LINE OF THE COVER EACH WITHIN 6" TO 8" OF THE EDGE AND ON THE OPPOSITE END FROM EACH OTHER. THE DOWEL PINS AND RING HINGE PINS SHALL BE ORIENTATED PERPENDICULAR TO THE PULLING FORCE NEEDED TO PULL THE COVER FROM THE HOUSING. THE PULLING FORCE SHALL BE PARALLEL TO A LINE THAT CONNECTS THE MIDPOINT OF EACH PIN. THE PINS SHALL BE STRUCTURALLY SOUND SO AS NOT TO BREAK FROM REPEATED PULLS ON THE COVER. BOTH RINGS SHALL OPEN TOWARDS THE CENTER OF THE PULL BOX. THE COVER SHALL BE CAPABLE OF BEING BOLTED TO THE HOUSING USING 9/16" HEX OR 1/2" PENTA HEAD STAINLESS STEEL BOLTS.

THE HOUSING SHALL BE MADE FROM 100% VIRGIN HIGH DENSITY POLYETHYLENE MATERIAL (95+% DENSE) USING A LOW PRESSURE INERT GAS, STRUCTURAL FOAM MOLDING PROCESS. THE HOUSING SHALL BE RIBBED TO ADD TO THE STRUCTURAL SUPPORT OF THE UNIT AND AID IN THE LOAD BEARING STRENGTH WHEN BURIED IN SOIL OR CONCRETE. TO PREVENT SINKING UNDER LOAD, THE BACKFILL SHALL BE FIRMLY COMPACTED AROUND THE HOUSING AND ITS RIBS. THE COVER SHALL BE BOLTED ON THE HOUSING BEFORE BACKFILLING AND COMPACTING THE BACKFILL. HOUSING CROSS BRACING CAN ALSO BE USED.

THE COVER PLUS HOUSING AS AN UNIT SHALL BE RATED TO WITHSTAND A 10K STATIC LOAD AND TESTED TO FAILURE AT OVER 15K LOAD (LOAD APPLIED OVER A 10" x 10" AREA). THE UNIT SHALL

BE RESISTANCE TO THE CHEMICALS FOUND IN COLUMBUS SOILS, IN CONCRETE, AND IN ASPHALT; SHALL NOT ABSORB WATER; SHALL BE RESISTANCE TO UV RAYS; AND SHALL HAVE STAINLESS STEEL FASTENERS. (SIMILAR TO CARSON-BROOKS MODEL #3636. THE 32" ROUND CONCRETE PULLBOX THAT MEETS CITY SPECS IS AN ACCEPTABLE SUBSTITUTION. THE 30" SQUARE CONCRETE PULLBOX WITH NEENAH CASTING R-6660-NH WHICH CONTAINS A HOLD-OPEN SAFETY BAR, TYPE B STEEL LIFTING RING (NON-HINGED) AND MEETS OTHER CITY SPECS IS AN ACCEPTABLE SUBSTITUTION ALSO. SUPPLY A CATALOG MATERIAL SHEET FOR APPROVAL.)

ITEM 625 ENCASED (#-SIZE) CONDUIT BANK, 713.07, SCH 40, AS PER PLAN

A NUMBER 10 GAUGE, STRANDED COPPER, POLYESTER OR CROSS LINKED POLYETHYLENE (XLPE) INSULATED TRACING WIRE SHALL BE INSTALLED IN THE CONDUIT CONCRETE ENCASEMENT AND PLACED NEXT TO THE CONDUIT WHETHER THE CONDUIT IS USED OR UNUSED. THE WIRE INSULATION SHALL BE RESISTANT TO MOISTURE ABSORPTION AND ABRASIVE ACTIONS. THE TRACING WIRE SHALL ENTER A PULLBOX THROUGH THE KNOCKOUT ON ONE SIDE AND BE ROUTED AROUND THE INSIDE PERIMETER OF THE PULLBOX TO THE OTHER SIDE AND THEN EXIT THE OPPOSING KNOCKOUT. THE TRACING WIRE SHALL BE CONTINUOUSLY RUN BETWEEN PULLBOXES (ABSOLUTELY NO SPLICES EXCEPT IN A PULLBOX). CONDUIT THAT BRANCHES OFF THE MAIN CONDUIT RUN SHALL HAVE ITS TRACING WIRE TERMINATED IN A PULLBOX OR CONTROLLER CABINET. THE WIRE SHALL BE TAGGED AS "TRACING WIRE", COILED (3 FEET IN LENGTH) AND LEFT DISCONNECTED AT EACH END (OPEN CIRCUIT). THE COST FOR THE TRACING WIRE AND ITS INSTALLATION SHALL BE INCIDENTAL TO THE COST OF THIS PAY ITEM.

ITEM 630 SIGNS, AS PER PLAN [FOR NEW SIGNALS ONLY]

THE CONTRACTOR SHALL INSTALL THE W47-36 "SIGNAL AHEAD" SIGNS AND THE CW-318-24 "NEW SIGNAL" SIGNS JUST PRIOR TO THE SIGNAL BEING PLACED ON FLASH. THE "NEW SIGNAL" AND "SIGNAL AHEAD" SIGNS SHALL BE COVERED UNTIL THE SIGNAL IS PLACED ON REGULAR OPERATION AT WHICH TIME THE CONTRACTOR SHALL UNCOVER THEM. THE CONTRACTOR SHALL REMOVE THE SIGNS AND POSTS, IF USED, 3 WEEKS AFTER THE SIGNAL IS PLACED ON REGULAR OPERATION. FAILURE TO REMOVE THE SIGNS SHALL RESULT IN THE CITY REMOVING THEM AND BILLING THE CONTRACTOR FOR ALL COSTS INVOLVED IN THEIR REMOVAL. ALL REMOVED MATERIAL SHALL BE CONSIDERED FORFEITED TO THE CITY.

ITEM 632 VEHICULAR SIGNAL HEAD, 3 & 5 SECTION, 8" & 12" LENS, 1 WAY, AS PER PLAN

ALL VEHICULAR SIGNAL HEADS SHALL BE SUPPLIED WITH GLASS LENSES AND A FIVE PAIR (FOR 3 OR 4 SECTION HEADS) OR SIX PAIR (FOR 5 SECTION HEADS), BARRIER TYPE TERMINAL BLOCK (NO QUICK-DISCONNECT SLIP-ON CONNECTORS ACCEPTABLE) THAT IS SCREW MOUNTED AT EACH END AND LOCATED IN THE RED SECTION. THE TERMINAL BLOCK SHALL MEET UL E62622, CSA LR15364, BE IEC COMPLIANT, CONTAIN #10-32 x 1/4" (MIN) ZINC PLATED STEEL PHILSLOT SCREWS THAT ARE INSTALLED BETWEEN BARRIERS WHOSE WIDTH OPENING IS A NOMINAL .41" AND HEIGHT IS A NOMINAL .45" ABOVE THE TERMINAL PLATE, BE RATED FOR 30 AMPS, AND SHALL HAVE A BREAKDOWN VOLTAGE OF 7500V RMS (SIMILAR TO BUSSMAN CIRCUIT COMPONENT SERIES TB345). THE LAMP SOCKET SHALL BE MADE FROM A HEAT RESISTANT

MATERIAL AND SHALL HAVE A BRASS LAMP SOCKET SHELL. THE ALZAK REFLECTOR SHALL BE HELD IN PLACE BY A METAL HOUSING. NO PLASTIC HOUSING IS PERMITTED. ALL BOLTS AND WASHERS FOR SECURING SECTIONS TOGETHER, ALL MOUNTING HARDWARE FOR THE LENS, ALL DOOR LATCHING BOLTS, AND ALL HINGE PINS SHALL BE STAINLESS STEEL. DOOR LATCHING BOLTS SHALL FIT THROUGH A SLOT IN THE DOOR PER CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, SPECIFICATIONS. CONTACT THE DIVISION'S SIGNAL MANAGEMENT SECTION FOR SPECIFICATION DETAILS.

AN ALUMINUM, WEATHERPROOF TRI-STUD SINGLE WIRE ENTRANCE WITH THREE (3) 5/16" x 1-7/16" STAINLESS STEEL STUDS, LOCK WASHERS, AND HEX NUTS SHALL BE PROVIDED WITH EACH SIGNAL HEAD. THE WEATHER HEAD ENTRANCE SHALL HAVE A MINIMUM INSIDE DIAMETER OPENING OF 1-1/2", INCLUDING ANY RUBBER OR PLASTIC GROMMET THAT PROTECTS THE CABLE. THE OPENING AT THE TRI-STUD END MAY BE IRREGULARLY SHAPED, BUT IT MUST HAVE A MINIMUM OPENING OF 1-1/2" AT ITS WIDEST POINT AND A MINIMUM OPENING OF 11/16" AT ITS NARROWEST POINT. THE TRI-STUD WASHER MUST HAVE THE SAME OPENING AT THE ENTRANCE. THE TOP OF THE ENTRANCE SHALL HAVE ONLY ONE (1) CLEVIS HOLE AND IT MUST ACCOMMODATE A 5/8" STAINLESS STEEL CLEVIS PIN. THE CLEVIS ATTACHMENT, MEASURED AT THE CENTER OF THE CLEVIS HOLE, SHALL BE NO GREATER THAN 5/8" THICK OR GREATER THAN 1-3/4" IN WIDTH. (SIMILAR TO ENGINEERED CASTINGS MODEL # 2084-T1)

SPAN WIRE HANGER, PROVIDED WITH EACH SIGNAL HEAD, SHALL BE ALUMINUM, SHALL HAVE A 5/8" STAINLESS STEEL CLEVIS PIN AND SHALL BE CAPABLE OF MOUNTING TO SPAN WIRES UP TO 1/2" IN DIAMETER. THE HANGER SHALL BE PROVIDED WITH TWO (2) U-TYPE STAINLESS STEEL MOUNTING BOLTS WITH HEX NUTS AND LOCK WASHERS. THE HANGER SPACER SHALL BE CAST ALUMINUM. THE CLEVIS PIN HOLE SHALL HAVE A STAINLESS STEEL BUSHING INSERT AND SHALL BE LOCATED A MINIMUM OF 2-1/2" FROM THE OUTSIDE TOP OF THE HANGER. (SIMILAR TO ENGINEERED CASTINGS MODEL #2079-S)

FOR MASTARM STRUCTURES A 90 DEGREE 3/4" CLEVIS HANGER WITH PINS SIMILAR TO PELCO PART SE-0467 SHALL BE USED TO ALLOW THE SIGNAL HEAD TO FREELY SWING ON THE ARM. THE CLEVIS HANGER SHALL BE COATED DARK BRONZE.

ITEM 632 PEDESTRIAN SIGNAL HEAD, SYMBOLIC, AS PER PLAN

PEDESTRIAN SIGNAL HEAD SHALL BE L.E.D. SYMBOLIC UNITS, MODEL #SSHM-16-WH, WHICH IS MADE BY NATIONAL SIGN & SIGNAL COMPANY (616-963-2817) OR MODEL #PS16CFL301 MADE BY ECOLUX, INC. (514-636-5566). HEADS SHALL BE BLACK (DARK BRONZE FOR MASTARM POLES) AND SHALL BE MOUNTED ON BLACK (DARK BRONZE FOR MASTARM POLES), TWO-HINGED TYPE BRACKETS WHICH ARE BOLTED OR BANDED (2 BANDS PER BRACKET) TO THE POLE. BRACKETS USED ON MASTARM POLES SHALL BE BOLTED ONLY. THE HOUSING SHALL BE FIELD DRILLED AND REINFORCED (MANUFACTURER TO SUPPLY REINFORCEMENT) SO IT FITS TO THE HINGED BRACKET. WHEN TWO PEDESTRIAN HEADS ARE ATTACHED TO A SINGLE POLE, THE BOTTOM OF THE MAINLINE HEAD SHALL BE MOUNTED AT 8' ABOVE FOUNDATION LEVEL AND THE SECOND SIDE STREET HEAD MOUNTED ONE-HALF ITS HOUSING HEIGHT ABOVE THE FIRST. THE BRACKETS SHALL BE HINGED TO ALLOW THE PEDESTRIAN HEADS TO SWING AWAY FROM EACH OTHER.

ITEM 632 PEDESTRIAN PUSHBUTTON, AS PER PLAN

THE EXTERIOR PUSHBUTTON HOUSING SHALL BE YELLOW (COLOR 13655, FEDERAL STD. 595) AND HAVE A CURVED BACK (SIMILAR TO PELCO SE-0596-P26). ACCEPTABLE PUSHBUTTONS SHALL BE A REES MODEL #01371-412 OR A REES MODEL #04960-412. THE PUSHBUTTON SHALL BE RATED FOR MEDIUM OR HEAVY DUTY USAGE AND HAVE A BARRIER TYPE OF LUG TERMINAL FOR ATTACHMENT OF THE FIELD CABLE. A CLEAR BEAD OF SILICON SEALANT SHALL BE APPLIED TO THE TOP OF THE PUSHBUTTON HOUSING (1 INCH EACH SIDE OF TOP CENTER) AGAINST THE POLE TO PREVENT WATER FROM ENTERING THE BACK OF THE PUSHBUTTON HOUSING. TWO ALUMINUM SIGNS SHALL BE SUPPLIED WITH EACH PUSHBUTTON. THE BOTTOM OF THE SIGNS SHALL BE MOUNTED JUST ABOVE THE TOP OF THE PUSHBUTTON. MOUNT THE CENTER OF THE PUSHBUTTON 36" ABOVE GROUND LEVEL.

[CONSULTANTS: REPLACE ALL EXISTING NON-ADA PUSH BUTTONS WITH ADA TYPE & NEW SIGNS AS MENTIONED ABOVE]

ITEM 632 LOOP DETECTOR UNIT, AS PER PLAN (CITY & DIV JOBS)

THE UNIT SHALL BE A SOLID STATE, 2 CHANNEL, SHELF MOUNTED INTERSECTION DEVELOPMENT CORPORATION (IDC) MODEL 921-2TCSS-1. ALL SYSTEM DETECTOR COUNT OUTPUTS SHALL BE CONNECTED AS PER PLAN. PAYMENT SHALL BE PER UNIT REGARDLESS OF THE NUMBER OF CHANNELS.

ITEM 632 LOOP DETECTOR UNIT, AS PER PLAN [ODOT JOB]

THE UNIT SHALL MEET NEMA ENVIRONMENTAL REQUIREMENTS, SHALL BE SOLID STATE, SHALL BE SHELF MOUNTED, SHALL HAVE 2 SCANNING LOOP CHANNELS PER UNIT, SHALL HAVE A VEHICULAR COUNT OUTPUT PER CHANNEL, SHALL REMEMBER AND LOCK-IN AN INDICATION FOR AN INTERMITTENT AND/OR A FAILED LOOP ON A PER CHANNEL BASIS AND SHALL HAVE DELAY/EXTENSION TIMING. A PULSED COUNT OUTPUT SHALL BE INDEPENDENT OF THE LOCAL VEHICULAR DETECTION OUTPUT DELAY AND EXTENSION TIMING. THE UNIT SHALL RESET ITSELF AND OPERATE NORMALLY IF A FAILED OR INTERMITTENT PROBLEM NO LONGER EXISTS. THE UNIT SHALL HAVE ON A PER CHANNEL BASIS 9 SENSITIVITY SETTINGS, 3 LOOP FREQUENCY SETTINGS AND 3 OPERATIONAL MODES (PULSE, PRESENCE, AND COUNT). ON THE PRESENCE MODE SETTING THE COUNT AND LOCAL DETECTION OUTPUT SHALL BE A PRESENCE OUTPUT. ON THE PULSE MODE SETTING THE COUNT AND LOCAL DETECTION OUTPUT SHALL BE A PULSED OUTPUT. ON THE COUNT MODE SETTING THE COUNT OUTPUT SHALL BE PULSED AND THE LOCAL DETECTION OUTPUT SHALL BE PRESENCE. ALL SETTING SWITCHES SHALL BE GOLD CONTACT TYPE. THE UNIT SHALL SELF TUNE WITHIN 1 SECOND, SHALL AUTOMATICALLY ADJUST TO ENVIRONMENTAL CHANGES AND BE DESIGNED FOR LOW POWER CONSUMPTION. LOOP LEAD-INS SHALL BE ISOLATED VIA TRANSFORMER CIRCUITRY. THE UNIT SHALL OPERATE EVEN IF A LOOP HAS A SINGLE POINT-TO-GROUND FAULT. (SIMILAR TO IDC MODEL 921-2TCSS)

ITEM 632 DETECTOR LOOP, AS PER PLAN

IF AN EXISTING PAVED SHOULDER IS THREE (3) INCHES THICK OR MORE, THEN THE LOOP WIRE MAY BE INSTALLED IN A SAW SLOT CUT ACROSS THE SHOULDER. LOOP WIRE SHALL BE INSTALLED AS PER STANDARD DRAWING TC-82.10 WHERE SHOULDERS ARE LESS THAN THREE (3) INCHES THICK. LOOP SEALANT SHALL BE FOSROC GOLD LABEL FLEX OR 3M BRAND. THE

CONTRACTOR SHALL TAKE CARE IN THE PLACEMENT OF LOOP SEALANT SO THAT ALL SEALANT IS PLACED IN THE SAW SLOT. LOOP DETECTOR WIRE SHALL MEET IMSA 51-5 SPECIFICATIONS AND THE ENCASING TUBE SHALL BE POLYETHYLENE. THE LOOP WIRE SHALL BE TWISTED THREE (3) TO FIVE (5) TURNS PER FOOT FROM THE EXITING LOOP SPOT TO THE HOMERUN CABLE SPLICE. ONE 3/4" TO 1" RIGID CONDUIT RACEWAY SHALL BE USED FOR EACH LOOP LEAD-IN. RACEWAYS AND LOOP WIRE LEAD-INS SHALL BE SPACED ONE (1) FOOT APART.

ITEM 632 MICROWAVE UNIT, AS PER PLAN

THE MICROWAVE UNIT SHALL BE A MICROWAVE SENSORS, INC. MODEL TC-26B. THIS UNIT SHALL BE USED THROUGHOUT THE PROJECT DURATION UNTIL ALL PROPOSED NEAR THROUGH SENSORS ARE FUNCTIONING FOR THAT GIVEN APPROACH. THE CONTRACTOR SHALL HAVE THIS UNIT OPERATING WHEN ANY NEAR THROUGH APPROACH SENSOR THAT THE UNIT WILL REPLACE HAS BEEN DESTROYED BECAUSE OF ROADWAY CONSTRUCTION. THE UNIT NEED NOT OPERATE IF THE EXISTING NEAR APPROACH SENSORS ARE STILL OPERATING. THE UNIT SHALL BE BRACKET MOUNTED (BANDED TO POLE) AT 20 TO 25 FEET ABOVE GROUND LEVEL AND AIMED SO THE UNIT DETECTS INCOMING VEHICLES AT A DISTANCE FROM THE STOP LINE BACK 100 TO 200 FEET FOR THE MAINLINE AND 30 TO 50 FEET FOR THE SIDESTREET. THE FINAL POSITIONING OF THIS UNIT SHALL BE APPROVED BY TRAFFIC ENGINEERING DIVISION PERSONNEL. THE CONNECTING CABLE SHALL BE 1/4" IN DIAMETER, SHIELDED AND HAVE FOUR 18-22 AWG WIRES. THE CONNECTING CABLE SHALL BE TEMPORARILY ROUTED OVER EXISTING OR PROPOSED SPAN AND ATTACHED BY USING PLASTIC TIE WRAPS. IN CASES WHERE NO SPAN EXISTS, THE CONTRACTOR SHALL INSTALL 1/4" MESSENGER WIRE. THE COST OF ITS INSTALLATION IS TO BE INCIDENTAL TO THIS ITEM. THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES FOR ANY RADIO INTERFERENCE CAUSED BY THIS UNIT. THE CONTRACTOR SHALL AIM THE UNIT TO DECREASE OR ELIMINATE THE INTERFERENCE.

ALL UNITS EXCLUDING CABLE SHALL BE DELIVERED TO THE TRAFFIC ENGINEERING DIVISION'S MAINTENANCE SHOP (1820 EAST 17TH AVENUE) IN GOOD WORKING CONDITION AFTER THE PROJECT NO LONGER NEEDS THE UNIT. ANY NONFUNCTIONING UNIT SHALL BE REPAIRED AND THEN DELIVERED TO THE SHOP.

CONSULTANTS: ON THE MOT PLANS SHOW THIS ITEM AS A SEPARATE BID ITEM

ITEM 632 STRAIN POLE FOUNDATION, AS PER PLAN

ITEM 632 SIGNAL SUPPORT FOUNDATION, AS PER PLAN

ITEM 632 COMBINATION SIGNAL SUPPORT FOUNDATION, AS PER PLAN

THE ANCHOR BASE POLE 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 FOUNDATION SHALL MATCH THE BACK SIDE OF THE 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. A MINIMUM OF TWO 2" CONDUIT ELLS, USED OR UNUSED, SHALL BE INSTALLED IN EACH POLE FOUNDATION. SEE POLE ORIENTATION CHART FOR ANGULAR POSITION. THIS ITEM SHALL ALSO INCLUDE THE COST AND INSTALLATION OF THE ANCHOR BOLTS AND CONDUIT ELLS.

[CONSULTANT: IF A POLE MOUNTED CABINET IS TO BE MOUNTED ON AN ANCHOR BASE POLE, THEN PROVIDE 2'-2" PLUS 1'-3" FROM THAT POLE FOUNDATION IN THE DIRECTION OF A FUTURE BASE CABINET. IF THIS CABINET MAY BE CONNECTED TO A COAXIAL CABLE SYSTEM IN THE FUTURE, THEN ALSO RUN AN ONE INCH (1") PVC CONDUIT FROM THAT POLE FOUNDATION WITH THE ABOVE CONDUITS. FOR COAXIAL SYSTEMS, SHOW AN ONE INCH (1") PVC GOING FROM THE POLE NEXT TO THE CABINET FOUNDATION DIRECTLY INTO THE CABINET FOUNDATION (BYPASSES THE PULLBOX) AND LABEL THIS CONDUIT FOR "RG6 CABLE".

ITEM 632 SLEEVE FOR STRAIN POLE FOUNDATION, AS PER PLAN (FOR ALL JOBS)

A GALVANIZED CORRUGATED PIPE OR A CARDBOARD-LIKE CONCRETE FORM WITH THE SAME DIAMETER AND DEPTH DIMENSIONS AS THE SPECIFIED FOUNDATION SHALL BE USED AT THE DISCRETION OF THE PROJECT ENGINEER OR AS CALLED FOR IN THE PLANS. THE SLEEVE SHALL BE MEASURED AS A COMPLETE UNIT INSTALLED AND PROPERLY BACKFILLED.

ITEM 632 STRAIN POLE, TYPE TC-81.10, ANCHOR BASE, (DESIGN & SIZE), AS PER PLAN

STRAIN POLES SHALL BE MANUFACTURED BY UNION METAL OR VALMONT ONLY. THE POLES SHALL BE GALVANIZED THEN COATED WITH A DARK BRONZE POWDER COATING. THE GALVANIZING SHALL BE PROPERLY PREPARED SO THE POWDER COATING WILL ADHERE TO THE GALVANIZING. ANCHOR BOLTS CAN BE A36/M55 FOR DESIGN 7 OR SMALLER POLES. FOR LARGER POLES THE ANCHOR BOLTS SHALL MEET ODOT REQUIREMENTS OR BE AS SPECIFIED BY THE MANUFACTURER. BOLT-NUT COVERS SHALL BE INSTALLED AND COATED DARK BRONZE.

ITEM 632 STRAIN POLE, TYPE TC-81.10, EMBEDDED, (DESIGN & SIZE), AS PER PLAN

[FYI: IF ANY EXISTING POLE IS REUSED, ALL POLES SHALL BE COLOR MATCHED. ANY EXISTING PAINTED POLE SHALL BE REPAINTED BY THE CONTRACTOR AND SO NOTED IN THIS SPEC PARAGRAPH AS INCIDENTAL TO THE POLE COST.]

STRAIN POLES SHALL BE MANUFACTURED BY UNION METAL OR VALMONT ONLY. THE POLES SHALL BE GALVANIZED THEN COATED WITH A DARK BRONZE POWDER COATING. THE GALVANIZING SHALL BE PROPERLY PREPARED SO THE POWDER COATING WILL ADHERE TO THE GALVANIZING. THE LENGTH OF THE POLE BUTT THAT IS BELOW GROUND LEVEL SHALL EQUAL THE DEPTH OF THE FOUNDATION THUS ELIMINATING THE NEED FOR A REBAR CAGE. THE LENGTH INDICATED IS THE OVERALL POLE LENGTH (POLE HEIGHT + BUTT LENGTH). A MINIMUM OF TWO 1" CONDUIT ELLS, USED OR UNUSED, SHALL BE INSTALLED IN EACH POLE FOUNDATION UNLESS SPECIFIED OTHERWISE. THE POLE SHALL BE SUPPLIED WITH A CAP, "J" HOOK, 2 FOOT GROUND SLEEVE (8" OF IT BELOW GROUND LEVEL), AND A GROUND WIRE FASTENER. THE CONTRACTOR SHALL BE HELD DIRECTLY RESPONSIBLE FOR INSTALLING THE POLES AT THEIR RESPECTIVE DEPTHS AS INDICATED ON ODOT TC-21.20 DRAWING. FIELD DRILLING OF HOLES ARE PERMITTED PER TC-85.10. TO PREVENT WATER FROM FILLING THE POLE, CAPS SHALL BE MOUNTED ON THE POLE WHEN THE POLE IS INSTALLED OR THE POLE WILL NOT BE INSTALLED.

THE CONTRACTOR SHALL SANDWICH EXPANSION MATERIAL BETWEEN THE POLE AND CONDUIT

ELBOWS IF ANY PORTION OF THE POLE IS IN THE SIDEWALK.

[FYI: ANY NEW POLE SHALL HAVE A BUILT-IN "BHC" FOR THE WEATHERHEAD. "BHC" FOR PED BRACKET ARMS ARE OPTIONAL AND ONLY USED WHEN SPECIFIED BY THE CITY.]

[CONSULTANT NOTE: CURRENT PROCEDURE IS TO REPLACE OLD STRAIN POLES UNLESS SPECIFICALLY TOLD TO KEEP OLD POLE. DISCUSS THIS ISSUE IF A FIELD PLACEMENT PROBLEM DEVELOPS THAT IS OF A CRITICAL NATURE BETWEEN THE NEW & OLD POLE POSITIONS. REPLACE ANY POLE AUTOMATICALLY IF THAT POLE IS WITHIN 3 FEET OF THE FACE OF CURB OR IF NO CURB WITHIN 6 FEET OF THE EDGE OF PAVEMENT. FIELD VERIFICATION OF THIS DISTANCE IS REQUIRED.]

ITEM 632 INTERCONNECT CABLE, 6 PAIR, #19 AWG, PE 22-CA OR PE 39-BJFA AS PER PLAN

ELECTRICAL CHARACTERISTICS FOR INTERCONNECT CABLE SHALL BE AS SPECIFIED BY THE CONTROLLER MANUFACTURER. INTERCONNECT CABLE SHALL RUN CONTINUOUSLY FROM CONTROL CABINET TO CONTROL CABINET. NO SPLICES SHALL BE ALLOWED. THE INTERCONNECT CABLE SHALL HAVE ITS SHIELD GROUNDED PER THE CONTROLLER MANUFACTURER'S RECOMMENDATION. THE CONTRACTOR SHALL BE REQUIRED TO TEST ALL CONDUCTORS FOR PROPER ELECTRICAL INTEGRITY. UNUSED CABLE PAIRS SHALL BE BENT BACK AND TIE WRAPPED TO ITS CABLE JACKET. THE CONTRACTOR SHALL CONTACT THE CITY OF COLUMBUS SIGNAL MANAGEMENT SECTION AT 614-645-7790 TO MAKE ARRANGEMENTS TO GAIN ENTRY TO THE CONTROL CABINET AT **(NAME OF EXISTING INTERSECTION "A")** FOR THE PURPOSE OF CONNECTING THE INTERCONNECT CABLE TO THE EXISTING ARTERIAL SYSTEM. INTERCONNECT CABLE SHALL NOT BE CONNECTED AT **(NAME OF EXISTING INTERSECTION "A")** UNTIL THE INTERCONNECT CABLE AT **(NAME OF PROPOSED INTERSECTION "B")** IS CONNECTED AND CHECKED OUT BY THE CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION. THE INTERCONNECT CABLE SHALL BE ROUTED DIRECTLY TO THE CONTROL CABINET VIA 2" OR 3" METAL OR ENCASED CONDUIT. AERIAL INTERCONNECT CABLE SHALL BE ROUTED TO THE CONTROL CABINET VIA THE INSIDE OF THE STRAIN POLE, THE 24" PULL BOX, AND THROUGH ITS OWN SEPARATE 2" CONDUIT (DETECTOR HOMERUN CABLE CAN ALSO BE PLACED IN THIS CONDUIT. SIGNAL CABLES SHALL BE PLACED IN THE OTHER 3" CONDUIT). CABLE ENTRANCE INTO THE POLE SHALL BE THROUGH A SEPARATE 2" POLE MOUNTED WEATHERHEAD. THE ORANGE/WHITE PAIR SHALL BE CONNECTED TO THE LOCAL COMMAND (TERMINAL 1 FOR ORANGE & TERMINAL 2 FOR WHITE) LOCATED ON THE TIO TELEMETRY INTERFACE BOARD. THE GREEN/WHITE PAIR SHALL BE CONNECTED TO THE LOCAL FEEDBACK (TERMINAL 5 FOR GREEN & TERMINAL 6 FOR WHITE) LOCATED ON THE TIO TELEMETRY INTERFACE BOARD.

ITEM 632 FIBER OPTIC RETRO-FIT ASSEMBLY, SUPPLY ONLY, AS PER PLAN

THIS ASSEMBLY SHALL CONSIST OF TWO (2) ECONOLITE FIBER OPTIC PLUG-IN MODEMS, AN ECONOLITE MODEM WIRING BOARD, AN ECONOLITE PLUG-IN FIBER OPTIC TELEMETRY MODULE, TWO (2) ZIP CORDS AND A SIECOR WIC-012 WALL MOUNTABLE INTERCONNECT CENTER.

ZIPCORDS SHALL BE PROVIDED TO CONNECT THE INTERCONNECT CENTER ADAPTERS TO THE PLUG-IN MODEMS. EACH ZIPCORD SHALL BE CONSTRUCTED USING TWO SINGLE-FIBER PATCH CORDS THAT ARE CONTINUOUSLY JOINED TOGETHER. EACH FIBER END SHALL HAVE A "ST" CONNECTOR AS DESCRIBED BELOW ATTACHED TO IT. THE ZIPCORDS SHALL BE SIMILAR TO

SIECOR ZIPCORD CABLE (5050-02K5141-006F).

EACH INTERCONNECT CENTER SHALL CONTAIN A WIC-CP1-15 PANEL, A WXC-SEAL-KIT, TWO (2) BUFFER TUBE FAN OUT KITS SIMILAR TO SIECOR FAN-OD25-06 KIT, AND FOUR (4) "ST" COMPATIBLE CONNECTORS. THE "ST" CONNECTOR SHALL BE DESIGNED FOR A 62.5/125 MICROMETER, MULTIMODE FIBER AND SHALL HAVE A CERAMIC FERRULE WITH A COMPOSITE HOUSING. THE CONNECTOR SHALL BE A SIECOR UNICAM 95-000-51 CONNECTOR ONLY.

PERSONNEL FROM THE TRAFFIC ENGINEERING DIVISION SHALL INSTALL ONE ASSEMBLY IN EACH OF THE EXISTING CABINETS AT **(SPECIFY LOCATION)**.

ITEM 632 FIBER OPTIC CABLE, AS PER PLAN

THE FIBER OPTIC CABLE SHALL BE RATED FOR OUTDOOR USE (-30 TO +120 DEGREES FAHRENHEIT), SHALL BE PULLED THROUGH AN UNDERGROUND CONDUIT/PULLBOX SYSTEM, SHALL BE DESIGNED WITH WATER-BLOCKING OR FLOODED MATERIAL AND HAVE A PULLING TENSILE STRENGTH OF 600 POUNDS OR MORE. THE FIBER OPTIC CABLE SHALL BE 62.5/125 MICROMETER, LOOSE TUBE, MULTIMODE, 6 FIBER CABLE. ALL FIBERS SHALL BE IN A SINGLE BUFFER TUBE. THE ONLY APPROVED FIBER OPTIC CABLE SUPPLIERS ARE SIECOR, BELDEN, AMP, MOHAWK, LUCENT, 3M, SUPERIOR, BERTECH, COMMSCOPE OR OPTICAL CABLE. THE FIBER CABLE SHALL ALSO MEET ALL REQUIREMENTS STIPULATED BY ECONOLITE CONTROLS FOR THEIR FIBER OPTIC INTERCONNECT TRAFFIC CONTROL SYSTEM. EACH CONTROL CABINET SHALL HAVE SIX (6) FEET OF FIBER CABLE COILED NEATLY INSIDE. EACH INTERCONNECT PULLBOX SHALL HAVE SIX (6) TURNS OF CABLE (50 FEET) COILED NEATLY INSIDE.

ITEM 632 FIBER OPTIC QUBE TAP ASSEMBLY, SUPPLY ONLY, AS PER PLAN

THIS ASSEMBLY SHALL CONSIST OF A dB 25 QUBE TAP (#32727P1) WITH HARNESS AND A FIO BOARD (#32680G3). PERSONNEL FROM THE TRAFFIC ENGINEERING DIVISION SHALL INSTALL ONE ASSEMBLY IN THE CONTROL CABINET AT **(SPECIFY LOCATION)**.

ITEM 632 POWER CABLE, 2 CONDUCTOR, CU, #8 AWG, AS PER PLAN

[CONSULTANT FYI NOTE: THE POWER CABLE IF ROUTED UNDERGROUND DIRECTLY FROM A POWER SOURCE SHALL BE ROUTED DIRECTLY TO THE CABINET FOUNDATION VIA A 2" METAL CONDUIT. (OR) POWER CABLE IF ROUTED OVERHEAD SHALL BE ROUTED TO THE CONTROL CABINET VIA THE INSIDE OF THE ANCHOR BASE STRAIN POLE. REMOVE SENTENCES WHEN PLANS REFLECT THIS.]

POWER SHALL BE SUPPLIED BY AMERICAN ELECTRIC POWER (AEP), SHALL BE 120VAC, AND SHALL BE FROM THE APPROXIMATE LOCATION AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL CONTACT AEP AND MAKE ARRANGEMENTS FOR THE CONNECTION OF POWER TO THE CONTROLLER CABINET. CONTACT RON PHILLIPS (614-883-7937) A MINIMUM OF FOUR (4) WORK WEEKS PRIOR TO THE NEED FOR POWER.

[REMINDER: CHECK FOR MELP SERVICE. ADJUST SECTION ACCORDINGLY. FYI: IF EXISTING POWER IS USED, THE "AS PER PLAN" NOTE MAY NOT BE NEEDED. DELETE IF NOT NEEDED.]

[ERASE PARAGRAPH IF POWER SOURCE EXISTS] THE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH AMERICAN ELECTRIC POWER (AEP) TO HAVE A TRANSFORMER INSTALLED **[PAD MOUNTED OR POLE MOUNTED ON POLE (#X,Y)]**. THE TRANSFORMER INSTALLATION COST SHALL BE INCIDENTAL TO THE COST OF INSTALLING THE POWER CABLE. PER AEP, THE ESTIMATED INSTALLATION COST IS \$?????.?? (PRICE GOOD THROUGH XX-XX-XX). CONTACT AEP 16 WEEKS PRIOR TO THE NEED FOR THE TRANSFORMER. CONTACT RON PHILLIPS (614-883-7937) FOR VERIFICATION AND ADDITIONAL DETAILS.

SERVICE CABLE ITEM: [CONSULTANT NOTE: RUN NEW POWER SERVICE UNLESS SPECIFICALLY TOLD TO REUSE OLD SERVICE CABLE. FIELD CHECK OLD SERVICE ROUTING...NEW ROUTING MAY BE IN ORDER.]

ITEM 632 COVERING OF VEHICULAR AND PEDESTRIAN SIGNAL HEAD AS PER PLAN. (ALL JOBS)

ALL SIGNAL HEADS THAT ARE INSTALLED PRIOR TO BEING USED TO CONTROL TRAFFIC OR PEDESTRIANS SHALL BE COVERED. IF PLASTIC BAGS ARE USED, ONLY 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 OR PEDESTRIAN 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 CITY OF COLUMBUS, TRAFFIC ENGINEERING DIVISION, AT 1820 EAST 17th AVENUE: PEDESTRIAN SIGNAL HEADS ALONG WITH ALL MOUNTING HARDWARE, PUSH BUTTONS AND SIGNS, STREET NAME SIGNS (UNLESS OTHERWISE DIRECTED), SPAN AND POLE ATTACHED SIGNS, COMPLETE CABINET ASSEMBLY, ANCHOR BASE STRAIN POLES. DISPOSE OF ALL OTHER ITEMS INCLUDING ABANDONED PULLBOXES, REMOVED CABLE BACK TO ITS TERMINUS POINT, AND EMBEDDED POLES UNLESS OTHERWISE SPECIFIED. PULL ALL EMBEDDED POLES THAT ARE IN THE ROADWAY AREA. IN OTHER AREAS REMOVE THE POLE AT LEAST ONE FOOT BELOW SUBGRADE OR DIRT LINE AND FILL THE TUBE FULL OF CONTROLLED DENSITY FILL OR CONCRETE. **[IT MAY BE NECESSARY TO DESCRIBE ALL ITEMS CONTAINED IN THIS PAY ITEM SO THE CONTRACTOR BIDS THIS ITEM APPROPRIATELY.]**

ITEM 632 REUSE OF (SPECIFY ITEM)

[IT MAY BE NECESSARY TO DESCRIBE EXACTLY WHAT IS BEING REUSED AND WHAT THE CONTRACTOR IS TO SUPPLY TO BE ABLE TO REUSE THE ITEM. THIS DIVISION DOES NOT EXPECT THE CONTRACTOR TO RESTORE DAMAGED ITEMS. EXISTING DAMAGED ITEMS WILL BE REPLACED BY THE DIVISION ON A "SUPPLY ONLY" STATUS.]

ANYTIME THE CONTRACTOR NEEDS TO GAIN ENTRANCE INTO A CITY OF COLUMBUS CONTROL CABINET TO MAKE WIRING CHANGES IN THAT CABINET, PERSONNEL FROM THE TRAFFIC ENGINEERING DIVISION MUST BE PRESENT. THE CONTRACTOR SHALL GIVE THIS DIVISION A THREE (3) WORKDAY NOTICE OF THE NEED FOR DIVISION PERSONNEL TO BE PRESENT ON SITE. CONTACT THE ELECTRONIC SYSTEMS COORDINATOR AT 614-645-7933.

[IF THE CABINET ASSEMBLY ITEMS ARE 4 YEARS OR OLDER, THEN REPLACE ALL CABINET ASSEMBLY ITEMS BECAUSE YEARS MAY ELAPSE BEFORE THE PROJECT IS COMPLETED. THUS, MORE AGE TO THE ELECTRONIC COMPONENTS. DISCUSS THIS ISSUE WITH US.

IF THE EXISTING POLE CABINET ASSEMBLY IS REUSED, THEN ADD THE FOLLOWING IN LIEU OF A "POWER SERVICE" ITEM...THE COST FOR FURNISHING AND INSTALLING ALL CABLE CONDUIT RISERS INCLUDING POWER CABLE, THEIR FITTINGS, MOUNTING FASTENERS AND WEATHERHEAD SHALL BE INCIDENTAL TO THE COST OF REUSING THE POLE MOUNTED CABINET ASSEMBLY. POWER CONDUIT RISER SHALL BE 1 TO 1-1/2 INCH. CONDUIT RISER FOR OTHER CABLE SHALL BE 2 TO 2-1/2 INCH.]

FOR REUSE OF VEHICULAR AND/OR PEDESTRIAN HEADS THE CONTRACTOR SHALL PROPERLY RELAMP ALL REUSED UNITS. [ADD NOTE TO PLANS REFLECTING THIS.]

ITEM 633 CONCRETE FOR CABINET FOUNDATION, AS PER PLAN

THE 12 INCH FOUNDATION HEIGHT AS SHOWN ON TC-83.20, CONTROLLER FOUNDATION, SHALL BE 4 INCHES. THE OVERALL DIMENSIONS SHALL BE 48"W x 30"D x 40"H. THE COST AND INSTALLATION OF THE ANCHOR BOLTS AND CONDUIT ELLS SHALL BE INCIDENTAL TO THE COST OF THIS ITEM.

ITEM 633 ARTERIAL MASTER, AS PER PLAN

THE CABINET AT **(SPECIFY LOCATION HERE)** SHALL CONTAIN A MENU STYLE MASTER (ASC/2M-1000), MODEM, A SMALL VOICE COMMUNICATION PHONE PLUS ALL ITS CONNECTORS, AND ALL HARDWARE ATTACHMENTS. THE MASTER AND ITS ASSOCIATED ITEMS SHALL BE COMPLETELY WIRED IN PLACE.

ITEM 633 CONTROLLER, 8 PH ACTUATED WITH 8 PH BASE CABINET, AS PER PLAN

ITEM 633 CONTROLLER, 4 PH ACTUATED WITH 4 PH BASE CABINET, AS PER PLAN

ITEM 633 CONTROLLER, 2 PH ACTUATED WITH 2 PH POLE CABINET, AS PER PLAN

[CONSULTANT NOTE: REVISE ITEM 633 TO REFLECT THE TYPE OF INTERCONNECT SYSTEM YOUR PROJECT USES.]

[FYI--WORDING FOR COAXIAL SYSTEMS:]

IN ADDITION TO THE OTHER REQUIREMENTS OF ODOT 633 & 733, THE CONTROLLER (TS2, TYPE 2/TS1 COMPATIBLE) SHALL BE ECONOLITE ASC/2S-2100 MODEL OR EAGLE GENESIS EPAC 3108-M40 MODEL. CABINET ASSEMBLY SHALL BE COMPLETELY WIRED (INCLUDES ALL PANELS & HARNESSSES) FOR 8 **[4]** PHASE OPERATION AND FOR COAXIAL SYSTEM OPERATION. THE

COLUMBUS MUTCD FLASH CIRCUITRY SHALL BE INSTALLED AS A PANEL MOUNTED, CABINET ASSEMBLY ITEM. THE CABINET ASSEMBLY SHALL MEET ALL CITY STANDARDS AS SET FORTH BETWEEN THE SUPPLIERS AND THIS DIVISION. CONTACT THE TRAFFIC ENGINEERING DIVISION'S ELECTRONIC SYSTEMS SUPERVISOR FOR DETAILS (614-645-7933).

[REMINDER: YOU'LL NEED A 'CICU' CHART AND ADDITIONAL COAX GENERAL NOTES. CALL MARK STEPHENOFF FOR THESE. 645-7746]

-OR-

[FYI---WORDING FOR ARTERIAL SYSTEMS:]

IN ADDITION TO THE OTHER REQUIREMENTS OF ODOT 633 & 733, THE CONTROLLER (TS2, TYPE 2/TS1 COMPATIBLE) SHALL BE ECONOLITE ASC/2S-2110-2-0 CLOSED LOOP MODEL. THE CABINET ASSEMBLY SHALL BE COMPLETELY WIRED FOR 8 [4] PHASE OPERATION, A FSK (**FIBER OPTIC**) CLOSED LOOP SYSTEM OPERATION AND CONTAIN AN EXPANDABLE SYSTEM DETECTOR TYPE OF CONFIGURATION PROM. EACH LOCAL CONTROLLER SHALL BE SHIPPED WITH TWO (2) SYSTEM COMPATIBLE INTERNAL TELEMETRY MODULE BOARDS (ONE SHALL BE A SPARE). THE CABINET ASSEMBLY SHALL MEET ALL CITY STANDARDS AS SET FORTH BETWEEN THE SUPPLIERS AND THIS DIVISION. CONTACT THE DIVISION'S ELECTRONIC SYSTEMS SUPERVISOR FOR DETAILS (614-645-7933).

WHEN SPECIFIED ADD: ADDITIONAL SPARE COMPONENTS SHALL ALSO BE PROVIDED: ONE TIO BOARD WITH ALL CONNECTING HARNESSSES AND MOUNTING HARDWARE, TWO BLANK RACK PROGRAM BOARDS, ONE COLUMBUS MUTCD FLASH CIRCUIT BOARD WITH HARNESS, AND ONE CONFLICT MONITOR. COST FOR THE ADDITIONAL SPARE COMPONENTS SHALL BE INCIDENTAL TO THE COST OF THE CONTROL EQUIPMENT.

IN ADDITION TO THE OTHER SPECIFICATION DOCUMENTS, THE CABINET ASSEMBLY SHALL MEET THE FOLLOWING SPECIFICATIONS.

- (A) ALL LABELS SHALL BE PERMANENTLY SECURED TO THE CABINET. PLASTIC LABEL MAKER TAPE IS NOT CONSIDERED TO BE PERMANENT. CROY TYPE LABELS ARE ACCEPTABLE.
- (B) TO ILLUMINATE THE BACK PANEL THE 120 VAC CONVENIENCE OUTLET/LAMP ASSEMBLY SHALL BE MOUNTED ON THE RIGHT SIDE OF THE CABINET BELOW THE BOTTOM SHELF NEAR THE UPPER PART OF THE BACK PANEL. THE OUTLET/LAMP ASSEMBLY SHALL NOT INTERFERE WITH THE REMOVAL OR INSTALLATION OF ANY EQUIPMENT. A DOOR MOUNTED FLEX LIGHT THAT ILLUMINATES THE ENTIRE BACK PANEL MAY BE USED IN LIEU OF A LAMP ASSEMBLY. (ALSO SEE ODOT 733.04(9))
- (C) LOAD SWITCHES SHALL BE EDI MODEL 510 WITH LIGHTS PERMANENTLY LABELLED AS R, Y, G OR A, B, C. A LOAD SWITCH SHALL BE PROVIDED FOR EACH BACK PANEL LOAD SWITCH SOCKET POSITION WHETHER USED OR UNUSED. ALL LOAD SWITCHES SHALL REST IN A SUPPORT RACK. LOAD SWITCH POSITIONS 9-12 SHALL BE USED FOR EITHER A PEDESTRIAN OR OVERLAP LOAD SWITCH UNLESS SPECIFIED OTHERWISE. (ALSO SEE ODOT 733.04(2))
- (D) LIGHTNING PROTECTION DEVICES SUCH AS ITT, SURRESTOR, GENERAL ELECTRIC, OR APPROVED EQUAL (AS DETERMINED BY THE COLUMBUS TRAFFIC ENGINEERING DIVISION)

SHALL BE PROVIDED. (ALSO SEE ODOT 733.04(6))

- (E) THE MAIN CABINET DOOR LOCK SHALL HAVE A LOCK COVER AND SHALL BE KEYED TO THE CITY OF COLUMBUS MASTER, CORBIN KEY NO. 2 (IR 6380). THE POLICE PANEL DOOR LOCK SHALL HAVE A LOCK COVER AND SHALL BE KEYED TO THE CITY OF COLUMBUS MASTER, BRASS CORBIN POLICE PANEL KEY NO. 0357SG. (ALSO SEE ODOT 733.03 PARAGRAPH #8)
- (F) ERPEL DESIGN CORPORATION (EDC) P44 (LSD554426) **[M36 (LSD503617)] [K (LSD512516)]**, HENNESSEY P-44 **[8PH OR MASTER CAB] [M] [K]** OR ECONOLITE P55 **[M] [K]** CABINET WITH 8 **[4] [2]** PHASE BACK PANEL SHALL BE SUPPLIED. THE CABINET MATERIAL SHALL BE 5052 MARINE GRADE, .125 INCH THICK ALUMINUM SHEETING WITH A 32 HARDNESS IN ITS NATURAL COLOR AND SHALL BE PAINTED WHITE ON THE INSIDE. THE INSIDE OF THE CABINET SHALL BE TREATED WITH A THREE (3) STAGE IRON PHOSPHATE COATING AND A ZINC CHROMATE PRIMER COATING. A BAKED WHITE ALKALI ENAMEL FINISH SHALL THEN BE APPLIED. ALL COATINGS SHALL BE PROPERLY DRIED AND APPLIED SUCH THAT THE INSIDE WHITE PAINT WILL NOT PEEL FOR A GUARANTEED PERIOD OF TWO (2) YEARS. ALL EXTERIOR SEAMS SHALL BE EITHER CONTINUOUSLY WELDED, TACK WELDED, SEALED WITH A 15 TO 20 YEAR SILICONE SEALER, AND/OR OVERLAPPED SUCH THAT WATER DOES NOT ENTER THE CABINET. ALL CABINET EDGES SHALL BE SMOOTH (FREE OF ANY SHARP EDGES). THE CABINET DOOR SHALL BE HINGED USING A HEAVY GAUGE CONTINUOUS HINGE THAT HAS A STAINLESS STEEL HINGE PIN. THE HINGE SHALL BE BOLTED TO THE CABINET SO THE DOOR CAN BE REMOVED. THE BOLTS AND NUTS SHALL BE MADE OF STAINLESS STEEL AND SECURELY FASTENED TO PREVENT VIBRATIONS FROM LOOSENING THE NUTS. THE DOOR, SEALED WITH A NEOPRENE GASKET, SHALL BE EQUIPPED WITH A THREE (3) POINT LATCHING MECHANISM AND A HANDLE WHICH CAN BE PADLOCKED. THE DOOR SHALL BE DESIGNED SUCH THAT THE DOOR CAN BE LOCKED IN AN OPEN POSITION AT 90, 135, AND 180 DEGREES TO THE CABINET FACE (NOMINAL VALUES). THE POLICE DOOR AND MAIN CABINET DOOR SHALL HAVE A KEYHOLE COVER. (ALSO SEE ODOT 733.03 PARAGRAPH #3 AND #4)
- (G) A THYRECTOR SURGE PROTECTOR WITH A RMS INPUT OF 150 VOLTS AND INPUT PEAK OF 210 VOLTS SHALL BE PROVIDED IN ADDITION TO ITEM D. THE THYRECTOR SHALL BE PLACED ACROSS THE INPUT AC POWER LINE.
- (H) A 35 AMP LINE FILTER SHALL BE SUPPLIED AND SHALL BE MOUNTED ON THE POWER DISTRIBUTION PANEL. (ALSO SEE ODOT 733.04(8))
- (I) TWO (2) CIRCUIT SOLID STATE FLASHER, EDI MODEL 810, RATED AT 15 AMPS PER CIRCUIT SHALL BE PROVIDED (NEMA TYPE III). CIRCUIT 1 SHALL CONTROL THE MAINLINE FLASHING SIGNAL INDICATIONS. CIRCUIT 2 SHALL CONTROL THE SIDE STREET FLASHING SIGNAL INDICATIONS. (ALSO SEE ODOT 733.04(4))

[CONSULTANT NOTE: IF A PROTECTED ONLY LEFT TURN PHASE NEEDS TO FLASH RED BECAUSE OF A DOUBLE LEFT TURN SITUATION OR BECAUSE OF A SIGHT DISTANCE PROBLEM, THEN USE AN ALL RED FLASH FOR THESE CONDITIONS. FOR A SINGLE PROTECTED ONLY LEFT TURN PHASE THAT HAS NO SIGHT DISTANCE PROBLEM, FLASH THE YELLOW ARROW ALONG WITH THE MAINLINE FLASHING YELLOW. LEFT TURN PHASE AND MAINLINE PHASE MUST FLASH THE SAME COLOR IN A GIVEN DIRECTION.]

- (J) ONE (1) 30 AMP CIRCUIT BREAKER, LABELLED AS "MAIN", SHALL BE WIRED AS THE MAIN

POWER DISTRIBUTION BREAKER. A SECOND CIRCUIT BREAKER, LABELLED AS "PED" AND RATED AT 10 AMPS, SHALL BE SUPPLIED FOR THE PEDESTRIAN SIGNAL LOAD ONLY. THE PEDESTRIAN SIGNAL BREAKER SHALL BE WIRED IN SERIES WITH BUT AFTER THE MAIN POWER BREAKER. A THIRD CIRCUIT BREAKER, LABELLED AS "AUX" AND RATED AT 15 AMPS, SHALL SUPPLY A SEPARATE BRANCH OF AC+ POWER TO THE VENTILATING FAN, CONVENIENCE 'GFI' OUTLET AND LIGHT SO THAT THEY MAY OPERATE INDEPENDENTLY OF THE MAIN POWER BREAKER. THE POWER TO THE FAN AND LIGHT SHALL ALSO BE INTERRUPTED BY THE 'GFI' OUTLET. ALL BREAKERS SHALL BE MOUNTED SIDE-BY-SIDE ON THE POWER DISTRIBUTION PANEL. (ALSO SEE ODOT 733.04(7))

- (K) ALL CONTROLLER MS CONNECTOR HARNESSES SHALL HAVE A CONDUCTOR FOR EACH PLUG PIN EXCEPT THE REMOTE RESET FUNCTION FOR THE CONFLICT MONITOR. THE CONTROLLER AND CONFLICT MONITOR MS HARNESS CONDUCTORS SHALL BE CONNECTED TO A BACK PANEL TERMINAL STRIP WHICH IS ACCESSIBLE FROM THE FRONT OF THE PANEL. DETECTOR UNIT HARNESS CONDUCTORS SHALL BE CONNECTED TO A LEFT SIDE CABINET MOUNTED TERMINAL STRIP. OTHER EQUIPMENT SHALL BE CONNECTED AS APPROPRIATE. (ALSO SEE ODOT 733.04 (15))
- (L) THE CABINET ASSEMBLY SHALL CONTAIN ALL PEDESTRIAN SIGNAL CIRCUITRY FOR EACH NEMA DEFINED THROUGH PHASE.
- (M) A POLICE DOOR MOUNTED SIGNAL SHUTDOWN SWITCH WITH SWITCH POSITIONS LABELLED AS "SIG ON" AND "SIG OFF" SHALL BE INSTALLED. (ALSO SEE ODOT 733.04 (11.a))
- (N) A POLICE DOOR MOUNTED SIGNAL-FLASH SWITCH WITH SWITCH POSITIONS LABELLED AS "ON SIG" AND "ON FLASH" SHALL NOT ONLY PLACE THE SIGNALS ON FLASH BUT ALSO STOP-TIME THE CONTROLLER UNIT. A RUN/STOP-TIME SWITCH WITH SWITCH POSITIONS LABELLED AS "CONT. RUN" AND "STOP-TIME" SHALL BE INSTALLED ON THE INSIDE OF THE CABINET DOOR. THE RUN/STOP-TIME SWITCH SHALL ALLOW THE CONTROLLER UNIT TO TIME NORMALLY BUT KEEP THE SIGNALS ON FLASH. THE SIGNAL-FLASH SWITCH SHALL NOT RETURN THE SIGNALS TO NORMAL OPERATION UNLESS THE RUN/STOP-TIME SWITCH IS RESET TO THE STOP-TIME POSITION SO THE SIGNAL-FLASH SWITCH CAN AGAIN STOP-TIME THE CONTROLLER UNIT. THE SIGNAL-FLASH SWITCH SHALL NOT REMOVE POWER TO THE CONTROLLER UNIT OR ITS AUXILIARY EQUIPMENT. (ALSO SEE ODOT 733.04 (11.b AND 11.d))
- (O) A POLICE DOOR MOUNTED AUTO-MANUAL TRANSFER SWITCH WITH SWITCH POSITIONS LABELLED AS "AUTO" AND "MANUAL" SHALL BE INSTALLED. A MANUAL PUSH BUTTON CONTROL SHALL NOT BE INSTALLED UNLESS SPECIFIED, BUT WIRING FOR A PUSH BUTTON CONTROL SHALL BE PROVIDED UP TO THE POINT WHERE THE PUSH BUTTON WOULD HAVE BEEN CONNECTED. (ALSO SEE ODOT 733.04 (11c))
- (P) A CONTROLLER SHUTDOWN SWITCH WITH SWITCH POSITIONS LABELLED AS "CONT ON" AND "CONT OFF" AND A COORDINATED/FREE SWITCH WITH SWITCH POSITIONS LABELLED AS "COORD" AND "FREE" SHALL BE INSTALLED INSIDE THE CABINET NEXT TO THE RUN/STOP-TIME SWITCH. A COORDINATED/FREE SWITCH SHALL NOT BE REQUIRED IF THE CONTROLLER HAS A BUILT-IN COORD/FREE SWITCH. (ALSO SEE ODOT 733.04 (11.e AND 11.f))
- (Q) AFTER A NEMA DEFINED POWER INTERRUPTION THE CONFLICT MONITOR SHALL CAUSE

THE INTERSECTION SIGNALS TO FLASH AS PER PLAN FOR 10 SECONDS BEFORE THE INITIALIZED CONTROLLER UNIT TAKES CONTROL OF THE INTERSECTION SIGNALS. THE CONFLICT MONITOR SHALL BE EDI MODEL SERIES SSM LE AND SHALL CONTAIN SUFFICIENT CHANNELS AS CALLED FOR IN THESE PLANS.

- (R) THE CONFLICT MONITOR SHALL BE CONNECTED DIRECTLY TO THE FIELD TERMINALS. USING JUMPERS OR LINKS ON THE BACK PANEL TO FORM A CIRCUIT FOR THE CONFLICT MONITOR SHALL NOT BE ACCEPTABLE.
- (S) THE CONFLICT MONITOR SETTINGS FOR MINIMUM YELLOW TIMING ON ALL CHANNELS SHALL BE SET AT THREE AND ONE HALF (3.5) SECONDS.
- (T) THE WATCH DOG TIMER SHALL CAUSE THE CONTROLLER TO GO INTO A FLASH OPERATION IF A MICROPROCESSOR FAILURE IS DETECTED.
- (U) ALL BACK PANEL HARDWARE SHALL BE MOUNTED WITH SCREWS. ALL SCREWS SHALL BE COMPLETELY SCREWED DOWN. RIVETS OR OTHER NON-REMOVABLE FASTENERS ARE NOT ACCEPTABLE.
- (V) WIRE CONNECTIONS ON THE BACK PANEL SHALL BE MADE WITH CRIMP TERMINALS AND THREADED FASTENERS. TELEPHONE TYPE KNIFE CONNECTORS (SOLDERED OR OTHERWISE) ARE NOT ACCEPTABLE.
- (W) ALL WIRES FASTENED TO THE LOAD SWITCH AND FLASHER PLUGS SHALL BE SOLDERED IN PLACE.
- (X) THE BACK PANEL AND POWER DISTRIBUTION PANEL SHALL HAVE SILK SCREENED TERMINAL/SOCKET FUNCTION IDENTIFICATION LABELS SUCH AS AC COM, PHASE 3 GREEN, 115 VAC, SIGNAL BUS, ETC. REFERENCE NUMBERS SHALL NOT BE ACCEPTABLE IN LIEU OF FUNCTION LABELS BUT THEY CAN SUPPLEMENT THEM. ADDITIONAL TERMINAL BLOCKS AND AUXILIARY PANELS SHALL USE SILK SCREENED REFERENCE NUMBERS TO IDENTIFY TERMINAL CONNECTIONS.
- (Y) ALL TERMINAL STRIPS IN CLOSE PROXIMITY OF SHELF MOUNTED CONTROL DEVICE EQUIPMENT SHALL BE COVERED WITH NON-CONDUCTIVE MATERIAL TO PREVENT ACCIDENTAL CONTACT WITH THE DEVICES. ALL TERMINAL STRIPS SHALL BE READILY ACCESSIBLE WITHOUT REMOVAL OF ANY EQUIPMENT.
- (Z) THE CABINET SHALL HAVE TWO (2) NON-VENTED (SOLID) SHELVES SPACED AT LEAST 9" APART. BOTH SHELVES SHALL HAVE A WIDTH OF 13" AND THE BACK EDGE OF THE SHELF SHALL BE LIPPED WITH THE LIP POINTING UP. THE FRONT EDGE OF THE SHELF SHALL BE LIPPED WITH THE LIP POINTING DOWN. ALL LIP EDGES SHALL BE ROUNDED. THE SHELVES SHALL BE ATTACHED TO THE CABINET SIDE PANELS. THE SHELF ARRANGEMENT SHALL BE DESIGNED SO ALL SHELF DEVICES FIT ON THEM.
- (AA) THERE SHALL BE A MINIMUM OF ONE (1) INCH EMPTY SPACE BETWEEN ALL ITEMS ATTACHED TO THE DOOR AND ALL SHELF-MOUNTED DEVICES INCLUDING ITS CONNECTING HARNESS(ES), ALL LOAD SWITCHES, FLASHER AND ALL SIDE-PANEL-MOUNTED ITEMS.
- (BB) "P" AND "M" SIZED CABINETS SHALL HAVE TWO VENTILATION FANS. THE THERMOSTAT

CONTROLLING THE VENTILATING FAN CIRCUIT SHALL BE SET AT 95 DEGREES FAHRENHEIT.
(ALSO SEE ODOT 733.04 (1))

- (CC) ALL FLASH TRANSFER RELAYS SHALL BE WIRED FOR FAIL-SAFE OPERATION (ENERGIZED DURING NORMAL OPERATION) AND WIRED WITH A MAXIMUM OF TWO PHASES PER RELAY.
- (DD) THE CONTROLLER ASSEMBLY, WHEN PLACED IN OR COMING OUT OF AN AUTOMATIC FLASHING MODE, SHALL CONFORM TO THE AUTOMATIC FLASHING CRITERIA SET FORTH IN THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, SECTION 6B-18, INCLUDING THE FOLLOWING ADDITIONS.
 - 1) A VEHICULAR CALL SHALL BE PLACED ON ALL PHASES IMMEDIATELY PRIOR TO ENTERING THE "FLASH" MODE SO THE CONTROLLER WILL CYCLE TO THE "FLASH" POINT. IT IS OPTIONAL TO HAVE ONE EXTERNAL VEHICULAR CALL PLACED IMMEDIATELY ON ALL PHASES WHEN THE "FLASH" MODE TERMINATES. THE CONTROLLER SHALL OPERATE NORMALLY ONCE THE "FLASH" MODE SEQUENCE IS TERMINATED.
 - 2) THE CONTROLLER SHALL ENTER THE "FLASH" MODE AT THE END OF THE THROUGH SIDE STREET PHASE(S) YELLOW (OR DURING THE SIDESTREET PHASE(S) RED CLEARANCE INTERVAL) BUT JUST PRIOR TO ANY MAIN STREET GREEN.

THE FLASH TRANSFER LOGIC DEVICE SHALL TRIGGER THE "FLASH" OPERATION, SHALL BE SOLID STATE, SHALL BE EXTERNAL TO THE CONTROLLER (A CABINET ASSEMBLY DEVICE), AND SHALL FUNCTION WITH ANY NEMA CONTROLLER. **[THIS CIRCUITRY SHALL BE SUPPLIED IN ADDITION TO ANY INTERNAL CONTROLLER FLASH LOGIC PROVIDED BY THE CONTROLLER.]**

EXCEPTION: FOR ON-STREET MASTER ARTERIAL CONTROLLERS ONLY, INTERNAL IC LOGIC CAN BE USED IN LIEU OF AN EXTERNAL DEVICE AS LONG AS THE INTERNAL IC LOGIC MEETS THE STANDARDS SET FORTH ABOVE. (ALSO SEE ODOT 733.04(11.b))

- (EE) THE POWER CABLE SHALL BE CONNECTED TO AN ACCESSIBLE TERMINAL STRIP WHICH SHALL BE LOCATED NEAR THE BOTTOM OF THE CABINET AND SHALL BE OF SUFFICIENT SIZE TO ACCEPT A SUPPLIED #8 WIRE LUG. THE TERMINAL STRIP SHALL BE COVERED OR SHIELDED TO MINIMIZE ACCIDENTAL CONTACT DURING NORMAL SERVICING OPERATIONS. THE COVER SHALL BE SNAPPED ON/OFF OR SECURED BY STANDARD SCREWS. THE POWER CABLE LUG TERMINAL CONNECTION SHALL BE LOCATED IMMEDIATELY BELOW THE MAIN POWER DISTRIBUTION BREAKER. POWER SHALL BE JUMPERED TO THE MAIN POWER DISTRIBUTION BREAKER. THE POWER DISTRIBUTION PANEL SHALL BE LOCATED IN THE BOTTOM RIGHT SIDE OF THE CABINET OR IT SHALL BE AN INTEGRAL PART OF THE RIGHT SIDE OF THE BACK PANEL. THERE SHALL BE A MINIMUM OF TWO (2) INCHES CLEARANCE BETWEEN THE POWER TERMINAL AND THE BOTTOM OF THE CABINET.
- (FF) A #4 WIRE LUG SHALL BE PROVIDED FOR ATTACHING A GROUNDING WIRE FROM A GROUND ROD. THE GROUNDING WIRE LUG SHALL BE ATTACHED TO THE POWER DISTRIBUTION PANEL (LOWER LEFT CORNER), OR IF NONE, TO THE BACK PANEL (BOTTOM MIDDLE).
- (GG) A SINGLE POLE MERCURY PLUNGER RELAY SHALL BE INSTALLED WHICH WILL ALLOW POWER TO BE REMOVED FROM THE VEHICULAR AND PEDESTRIAN POWER BUSES. THE

MERCURY RELAY SHALL BE RATED AT 35 AMPS AND THE RELAY COIL WIRED WITH A NOISE SUPPRESSION DEVICE.

- (HH) ALL EXTERNAL RELAY COILS SHALL HAVE NOISE SUPPRESSION DEVICES.
- (II) THE DOOR FILTER (U.L. LISTED CLASS 2, STANDARD 900) SHALL CONSIST OF THREE DISTINCT LAYERS OF FILTERING MEDIA. THE FIRST AIR ENTERING LAYER SHALL BE COMPOSED OF A DUAL FIBER BLEND OF 100% NON-WOVEN POLYESTER TO TRAP LARGER SIZED PARTICLES. THE NEXT LAYER SHALL BE A DUAL PLY, DUAL DENIER, 100% NON-WOVEN POLYESTER OF SMALLER SIZE TO TRAP FINER PARTICLES PASSING THROUGH THE FIRST LAYER. A NON-TOXIC, NON-MIGRATORY, ODORLESS TACKIFIER SHALL BE APPLIED TO THESE LAYERS. ADHESIVES SPRAYED ON THE LAYERS ARE NOT ACCEPTABLE. THE TACKIFIER SHALL BE INCORPORATED INTO THE LAYER MEDIA DURING THE MANUFACTURING PROCESS OF THE RAW MATERIAL. A 10 GAUGE MESH SHALL BE INCORPORATED IN THE FILTER DESIGN FOR RIGIDITY. SUFFICIENT MEDIA OVERLAP SHALL BE PRESENT ABOUT THE WIRE PERIMETER TO INSURE POSITIVE SELF SEAL. THE DOOR FILTER HOLDER SHALL BE DESIGNED SO THE FILTER MAKES POSITIVE CONTACT WITH THE CABINET DOOR AT ALL TIMES AND UNDER ALL CONDITIONS AND SITUATIONS.
- (JJ) ALARM 1 CIRCUITRY SHALL BE ASSOCIATED WITH A DOOR SWITCH: DOOR OPEN = TRUE; DOOR CLOSED = FALSE.

ALARM 2 CIRCUITRY SHALL BE ASSOCIATED WITH THE LOOP FAILED CHANNEL OUTPUTS OF ALL IDC 262FC UNITS: LOOP FAILED = TRUE; LOOP OKAY = FALSE.

SYSTEM DETECTORS "A1" THROUGH "D2" CAN BE HARDWIRED DIRECTLY TO THE SCREW TERMINALS ON THE TIO BOARD. ALL "D" HARNESS WIRES SHALL BE ROUTED THROUGH A LABELLED TERMINAL STRIP WHICH IS MOUNTED ON THE LEFT SIDE OF THE CABINET. THE J18 SYSTEM DETECTOR HARNESS SHALL BE USED FOR SYSTEM DETECTOR OR EXPANDED DETECTOR PULSED INPUTS TO THE TIO BOARD OR TO THE "D" CONNECTOR TERMINAL BLOCK STRIP.

FYI: (OMIT JJ IF SPECS ARE FOR COAXIAL SYSTEMS)

FOUR (4) SETS OF CABINET WIRING SCHEMATICS, TWO (2) SERVICE MANUAL AND TWO (2) INSTRUCTIONAL MANUAL SHALL BE PROVIDED PER CABINET. DELIVERY OF THESE DIAGRAMS & MANUALS SHALL ACCOMPANY THE CABINET. THE CONTRACTOR SHALL CLEARLY NOTE ANY DEVIATIONS, CHANGES, ADDITIONS OR OTHER MODIFICATIONS ON THE DIAGRAMS AND MANUALS THAT ARE APPROPRIATE TO REFLECT THE EXACT EQUIPMENT TO BE PROVIDED. THE COST FOR THIS MATERIAL SHALL BE INCIDENTAL TO THE COST OF THE SIGNAL EQUIPMENT. THE COPIES OF DIAGRAMS AND MANUALS SHALL BE STORED IN A PLASTIC ENVELOPE MOUNTED HORIZONTALLY AND SECURELY FASTENED TO THE INSIDE OF THE MAIN CABINET DOOR. THE ENVELOPE OPENING SHALL BE TO THE RIGHT OR LEFT. THE ENVELOPE SHALL NOT BLOCK ANY PART OF THE AIR FILTER OR THE AIR INTAKE LOCATED IN THE DOOR.

SERVICE & INSTRUCTIONAL MANUALS SHALL INCLUDE SECTIONS COVERING THE GENERAL DESCRIPTION OF EQUIPMENT, EQUIPMENT INSTALLATION PROCEDURES, EQUIPMENT PROGRAMMING PROCEDURES, THEORY OF OPERATION WITH SYSTEM DESCRIPTION INCLUDING BLOCK DIAGRAMS AND DETAILED CIRCUIT DIAGRAMS, PREVENTIVE MAINTENANCE, FIELD

TROUBLE ANALYSIS, BENCH TROUBLE ANALYSIS, TROUBLESHOOTING ANALYSIS CHART, WAVE FORMS, VOLTAGE MEASUREMENTS, VOLTAGE MEASUREMENT CHARTS, PARTS LIST, ELECTRICAL INTERCONNECTION DRAWINGS, SCHEMATIC AND LOGIC DIAGRAMS, ASSEMBLY DRAWINGS WITH PICTORIAL DIAGRAMS SHOWING PHYSICAL LOCATIONS AND IDENTIFICATION OF EACH COMPONENT.

QUANTITIES DESCRIPTION

ITEM	QUAN	DESCRIPTION	<i>[information data]</i>
608		CONCRETE WALK	
614		MAINTAINING TRAFFIC, AS PER PLAN	<i>[place on CITY, DIV GENSUM sheet only]</i>
624		MOBILIZATION	<i>[place on CITY, DIV GENSUM sheet only]</i>
625		GROUND ROD, AS PER PLAN	
625		PULLBOX, AS PER PLAN	<i>[for sensor hr cable]</i>
625		PULLBOX, 713.08, 18" & 24", AS PER PLAN	<i>[conc]</i>
625		PULLBOX, 30" SQUARE CONCRETE, AS PER PLAN	<i>[for IC conduit runs]</i>
625		PULLBOX, 32" ROUND CONCRETE, AS PER PLAN	<i>[for IC conduit runs]</i>
625		TRENCH	
625		TRENCH, AS PER PLAN	
625		TRENCH IN PAVED AREAS, TYPE _____	<i>[A < 6, B >= 6]</i>
625		CONDUIT, 713.04, 2 INCH	<i>[for underground power]</i>
625		CONDUIT, 713.04, 3 INCH	<i>[for under road or for protection]</i>
625		CONDUIT, 713.07 SCH 40, TC-2, 1 INCH	<i>[for underground RG-6]</i>
625		CONDUIT, 713.07 SCH 40, TC-2, 1 OR 1 1/2 OR 2 INCH	<i>[for 2C DET HR]</i>
625		CONDUIT, 713.07 SCH 40, TC-2, 3 INCH	<i>[for IC & 5,7 & 9C in the CB PB]</i>
625		CONDUIT, 713.07 SCH 40, ENCASED, 2" OR 3"	<i>[PVC: for under road or for protection]</i>
625		CONDUIT, DIRECTIONAL BORING, _____ INCH	
625		ENCASED (#-SIZE) CONDUIT, 713.07 SCH 40, 2 INCH	<i>[for power or for protection]</i>
625		ENCASED (#-SIZE) CONDUIT BANK, 713.07, SCH 40, AS PER PLAN	
630		SIGN HANGER ASSEMBLY, (SPAN WIRE, MAST ARM)	<i>[signal contractor to install all span/mast arm signs]</i>
630		SIGNS, FLAT SHEET, TYPE G	
630		SIGNS, AS PER PLAN	<i>(9 sqft SIGNAL AHEAD W-47-36; 3 sqft NEW SIGNAL CW-318-24)</i>
630		SIGNS, DOUBLE FACED, FLAT SHEET, TYPE G	
630		COVERING OF SIGN	<i>[SQ FT units]</i>
632		VEHICULAR SIGNAL HEAD, 3-SECTION, 8-INCH LENS, 1-WAY, AS PER PLAN	
632		VEHICULAR SIGNAL HEAD, 3-SECTION, 12-INCH LENS, 1-WAY, AS PER PLAN	
632		VEHICULAR SIGNAL HEAD, 4-SECTION, (8)12-INCH LENS, 1-WAY, AS PER PLAN	<i>[3 tier design]</i>
632		VEHICULAR SIGNAL HEAD, 5-SECTION, 12-INCH LENS, 1-WAY, AS PER PLAN	
632		PEDESTRIAN SIGNAL HEAD, LED SYMBOLIC, AS PER PLAN	
632		PEDESTRIAN PUSHBUTTON, AS PER PLAN	
632		LOOP DETECTOR UNIT, AS PER PLAN	
632		DETECTOR LOOP, AS PER PLAN	
632		MICROWAVE UNIT, AS PER PLAN	
632		STRAIN POLE FOUNDATION, AS PER PLAN	
632		SIGNAL SUPPORT FOUNDATION, AS PER PLAN	
632		COMBINATION SIGNAL SUPPORT FOUNDATION, AS PER PLAN	
632		PEDESTAL FOUNDATION, AS PER PLAN	
632	1	SLEEVE FOR STRAIN POLE FOUNDATION, AS PER PLAN	<i>[include ONLY ONE on the entire plan to establish an item BID price...more if actually needed]</i>
632		SIGNAL SUPPORT, MAST ARM, _____ FEET ARM, AS PER PLAN	
632		COMBINATION SIGNAL SUPPORT, MASTARM, _____ FEET ARM, AS PER PLAN	
632		STRAIN POLE, TYPE TC-81.10M DESIGN _____, ANCHOR BASE, _____ FEET, AS PER PLAN	

- 632 COMBINATION STRAIN POLE, TYPE TC-81.10M, DESIGN ____, ANCHOR BASE, ____ FEET, AS PER PLAN
- 632 STRAIN POLE, TYPE TC-81.10M, DESIGN ____, EMBEDDED, ____ FEET, AS PER PLAN
- 632 10.7' BRONZE TRAFFIC PEDESTAL POLE ASSEMBLY, AS PER PLAN
- 632 17.5' BRONZE TRAFFIC PEDESTAL POLE ASSEMBLY, AS PER PLAN
- 632 TRAFFIC PEDESTAL ASSEMBLY WITH LUMINAIRE BRACKET, AS PER PLAN
- 632 (SIZE) LUMINAIRE BRACKET, AS PER PLAN
- 632 (SIZE) HAPCO #B74376 MOUNTING BRACKET, AS PER PLAN
- 632 CONDUIT RISER, ____ INCH DIAMETER, **[specify 713.04 or 713.07]**
- 632 MESSENGER WIRE, 7 STRAND, 3/8 INCH DIA. WITH ACCESSORIES
- 632 MESSENGER WIRE, 7 STRAND, 1/4 INCH DIA. WITH ACCESSORIES
- 632 SIGNAL CABLE, 2-CONDUCTOR, NO. 14 AWG, AS PER PLAN
- 632 SIGNAL CABLE, 7-CONDUCTOR, NO. 14 AWG
- 632 SIGNAL CABLE, 9-CONDUCTOR, NO. 14 AWG
- 632 INTERCONNECT CABLE, 6 PAIR, PE 22-CA, #19 AWG, AS PER PLAN
- [aerial installation]**
- INTERCONNECT CABLE, 6 PAIR, PE 39-BJFA, #19 AWG, AS PER PLAN
- 632 **[underground conduit installation]**
- 632 INTERCONNECT CABLE, INTEGRAL TYPE, 6 PAIR, PE 38-CAK, #19 AWG, AS PER PLAN **[use only if specified]**
- 632 INTERCONNECT CABLE, FIBER OPTICS, 6 FIBERS, AS PER PLAN
- 632 LOOP DETECTOR LEAD-IN CABLE, IMSA 50-2 (SEE NOTE #____) **[used as ped PB cable too]**
- 632 POWER CABLE, 2-CONDUCTOR, NO. 8 AWG, CU, AS PER PLAN
- 632 SERVICE CABLE, 2 CONDUCTOR, NO. 6 AWG, ALUM
- 632 COVERING OF VEHICULAR AND PEDESTRIAN SIGNAL HEAD, AS PER PLAN
- 632 REMOVAL OF (ITEM) AND (STORAGE OR REERECTION)
- 632 REMOVAL OF CABLE AND MESSENGER WIRE **[IC, 3 dial, coaxial]**
- 632 REUSE OF (ITEM), AS PER PLAN
- 633 CONTROLLER, 8 PH WITH 2 PH "K" POLE CABINET ASSY, AS PER PLAN
- 633 CONTROLLER, 8 PH WITH 4 PH "M" BASE CABINET ASSY, AS PER PLAN
- 633 CONTROLLER, 8 PH WITH 8 PH "P44/P55" BASE CABINET ASSY, AS PER PLAN
- 633* CONTROLLER, 8 PH WITH 4 PH "M" POLE CABINET ASSY, AS PER PLAN
- 632 ARTERIAL MASTER, AS PER PLAN
- 633 CABINET, W/O CONTROLLER, PREWIRED 8 PH, P44/P55 BASE MOUNT, (SUPPLY ONLY)
- 633 CABINET (SUPPLY ONLY), (SIZE i.e. P44) BASE MOUNT, AS PER PLAN
- 633 1.3 CONCRETE FOR CABINET FOUNDATION, AS PER PLAN
- 633 CONTROLLER WORK PAD (48"w x 36"d x 4"h) **[for all cabinet types]**
- 633 INTERSECTION TRANSCEIVER UNIT, AS PER PLAN **[for coaxial systems only]**
- SPEC CENTRAL COMMUNICATION, AS PER PLAN

- * THIS ITEM IS TO BE USED "**ONLY**" WHEN PERMITTED BY THIS DIVISION AND ON EXISTING POLES THAT ARE NOT BEING REMOVED AND THAT HAVE AN EXISTING POLE MOUNTED CABINET ON IT. ADD SPECS TO BOLT AN ALUMINUM BOTTOM TO THE CABINET USING STAINLESS STEEL FASTENERS SPACED AT A MAX OF 10 INCHES (CENTER-TO-CENTER) STARTING AT 1 INCH FROM THE CORNERS.