

LOCATION MAP

LATITUDE: 39° 49' 55" N LONGITUDE: 82° 59' 55" W
SCALE IN MILES



PORTION TO BE IMPROVED
INTERSTATE HIGHWAY
STATE & FEDERAL ROUTES
COUNTY & TOWNSHIP ROADS
OTHER ROADS

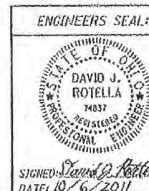
DESIGN DESIGNATION/EXCEPTIONS

SEE SHEET 2

UNDERGROUND UTILITIES
CONTACT BOTH SERVICES
CALL TWO WORKING DAYS
BEFORE YOU DIG
CALL
1-800-382-2764
(TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY
OIL & GAS PRODUCERS PROTECTIVE
SERVICE CALL: 1-800-825-0988

PLAN PREPARED BY:

JACOBS



INDEX OF SHEETS:

TITLE SHEET	1
SCHEMATIC PLAN AND DESIGN DESIGNATIONS	2
CENTERLINE WITNESSES	3
TYPICAL SECTIONS	4-8
GENERAL NOTES	9-11
MAINTENANCE OF TRAFFIC NOTES	12-15
MAINTENANCE OF TRAFFIC	16-32
GENERAL SUMMARY	33-36
SUBSUMMARIES AND CALCULATIONS	37-47
PROJECT SITE PLAN	48
PLAN AND PROFILE - S.R. 605/RELOC. S.R. 317	49-57
PLAN AND PROFILE - U.S. 23	58-61
CROSS SECTIONS - S.R. 605/RELOC. S.R. 317	62-81
CROSS SECTIONS - U.S. 23	82-89
SUPERELEVATION TABLE	90
PAVEMENT DETAILS	91-94
TRAFFIC CONTROL	96-106
TRAFFIC SIGNAL	107-115
RIGHT OF WAY	116-131
SOIL PROFILES	
SHEETS NOT USED	95

STANDARD CONSTRUCTION DRAWINGS										SUPPLEMENTAL SPECIFICATIONS
BP-3.1	10/19/07	DM-4.1	1/21/11	HW-1.1	7/30/07	MT-102.20	1/17/09	TC-12.20	1/21/11	809 4/20/12
BP-4.1	7/16/04	HW-2.2	7/30/07	MT-105.10	1/16/09	TC-52.10	1/19/07	TC-52.10	1/19/07	802 4/16/11
BP-5.1	7/28/00	CR-1.1	7/16/04	MT-120.00	1/16/09	TC-62.20	1/19/07	TC-62.20	1/19/07	816 7/19/07
CR-1.1	7/16/04	CR-2.1	1/16/04	MT-1.1	7/19/02	TC-65.10	1/21/05	TC-65.10	1/21/05	823 7/19/11
CR-1.2	7/16/05	CR-3.2	10/16/09	MT-1.2	1/20/06	TC-65.10	1/21/05	TC-65.10	1/21/05	832 6/19/09
CR-4.1	1/21/11	MT-35.10	4/28/07	RM-3.1	10/15/10	TC-71.10	1/21/11	TC-71.10	1/21/11	
CR-2.1	7/16/05	CR-4.2	1/19/07	MT-4.2	10/15/10	TC-81.21	10/21/11	TC-81.21	10/21/11	
CR-2.2	1/15/05	CR-5.3	4/16/10	MT-85.40	7/17/09	TC-83.10	1/19/07	TC-83.10	1/19/07	
CR-3.1	7/16/05	CR-6.1	1/19/10	MT-97.10	10/15/10	TC-41.20	1/19/07	TC-41.20	1/19/07	
CR-4.2	7/16/05	HL-10.13	10/10/09	MT-97.11	10/15/10	TC-41.20	1/19/07	TC-41.20	1/19/07	
CR-4.2	7/19/02	HL-20.11	1/18/07	MT-99.20	1/15/09	TC-41.30	1/19/07	TC-41.30	1/19/07	
DM-1.1	1/21/11	HL-30.11	10/16/09	MT-101.00	4/17/09	TC-41.40	7/16/04	TC-41.40	7/16/04	
DM-1.2	10/21/05	HL-30.21	1/19/07	MT-101.70	4/16/11	TC-41.41	1/21/11	TC-41.41	1/21/11	
DM-1.4	7/16/11	HL-30.22	1/19/09	MT-101.90	10/21/11	TC-41.50	1/19/07	TC-41.50	1/19/07	
				MT-102.10	7/17/09	TC-42.10	1/19/07	TC-42.10	1/19/07	

STATE OF OHIO

DEPARTMENT OF TRANSPORTATION

FRA-317-0.00

CITY OF COLUMBUS
HAMILTON TOWNSHIP
FRANKLIN COUNTY

PROJECT DESCRIPTION

CONSTRUCTION OF 2007 L.F. OF STATE ROUTE 317 ON A NEW ALIGNMENT. CONSTRUCTION OF LEFT AND RIGHT TURN LANES AT S.R. 317 RELOCATED/ U.S. 23/S.R. 605 INTERSECTION REMOVAL OF EXISTING MEDIAN OPENINGS ON U.S. 23. PROJECT INCLUDES GRADING, DRAINAGE, PAVING, AND TRAFFIC CONTROL. A NEW TRAFFIC SIGNAL WILL BE INSTALLED AT THE S.R. 317 RELOCATED/U.S. 23/S.R. 605 INTERSECTION. AN EXISTING TRAFFIC SIGNAL AT THE EXISTING S.R. 317 INTERSECTION WITH U.S. 23 WILL BE REMOVED.

PROJECT EARTH DISTURBED AREA: 6.01 ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA: 2.25 ACRES
NOTICE OF INTENT EARTH DISTURBED AREA: 8.26 ACRES

2010 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY EXCEPT FOR SHORT DURATION CLOSURES AS ALLOWED ON SHEETS 12,13 AND 17A AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY WILL BE AS SET FORTH ON PLANS AND ESTIMATES.

PLANS CERTIFIED BY:

NAME: *Elizabeth Winters for Holly Seim*
DATE: 11/8/11

DISTRICT SIX
OHIO DEPARTMENT OF TRANSPORTATION

CITY OF COLUMBUS SIGNATURES ON THIS PLAN SIGNIFY ONLY CONCURRENCE WITH THE GENERAL PURPOSES AND GENERAL LOCATION OF THE PROJECT. ALL TECHNICAL DETAILS REMAIN THE RESPONSIBILITY OF THE ENGINEER PREPARING THE PLANS.

APPROVED *[Signature]*
DATE: 11-10-11 DISTRICT DEPUTY DIRECTOR

APPROVED _____
DATE _____ DIRECTOR, DEPARTMENT OF TRANSPORTATION

RECORD NO. (2619 DFE)

FEDERAL PROJECT NO.
E07018861

PD NO.
25590

CONSTRUCTION PROJECT NO.

ROAD INVOLVEMENT
NONE

FRA-317-0.00

1
131

UTILITIES-COORDINATION

ELECTRIC SERVICE

ARRANGEMENTS FOR ELECTRIC SERVICE FOR THE NEW SIGNAL INSTALLATION SHALL BE MADE BY THE CONTRACTOR AT THE BEGINNING OF THE PROJECT.

THE METERED POWER SERVICE ADDRESS IS:
6291 SOUTH HIGH STREET
COLUMBUS, OHIO.

INSPECTION

THE CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE PROJECT ENGINEER TWO (2) WEEKS PRIOR TO THE NEW SIGNAL INSTALLATION GOING ON FLASH OPERATION. FOLLOWING COMPLETION OF THE SIGNAL INSTALLATION, THE CONTRACTOR SHALL PLACE THE SIGNAL ON FLASH OPERATION FOR A PERIOD OF NO LESS THAN SEVEN (7) DAYS. NO NEW SIGNAL INSTALLATION SHALL BE PLACED ON STOP AND GO OPERATION ON A FRIDAY, WEEKEND OR HOLIDAY.

THE SIGNAL SHALL BE INSPECTED JUST PRIOR TO THE TEN DAY PERFORMANCE TEST SPECIFIED IN THE CMS 632.28. ALL OTHER PAY ITEMS SHALL BE COMPLETED INCLUDING THE ELECTRICAL TESTS SPECIFIED IN 632.28 (G) AND FUNCTIONAL TEST SPECIFIED IN 632.28 (F). ALL DEFICIENCIES FOUND DURING THE FINAL INSPECTION SHALL BE CORRECTED BEFORE THE COMPLETION OF THE TEN DAY PERFORMANCE TEST. ANY MAJOR DEFICIENCY WHICH MAY EFFECT THE OPERATION OF THE SIGNAL SHALL CONSTITUTE A RE-START OF THE TEN DAY PERFORMANCE TEST. THE TEST SHALL NOT RE-START UNTIL ALL OF THESE CORRECTIONS ARE COMPLETED. THE TEN DAY PERFORMANCE TEST MUST BE COMPLETED SUCCESSFULLY BEFORE THE SIGNAL WILL BE APPROVED.

GUARANTEE

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 120 DAYS FOLLOWING COMPLETION OF THE 10-DAY PERFORMANCE TEST. IN THE EVENT OF UNSATISFACTORY OPERATION THE CONTRACTOR SHALL CORRECT FAULTY INSTALLATIONS, MAKE REPAIRS AND REPLACE DEFECTIVE PARTS WITH NEW PARTS OF EQUAL OR BETTER QUALITY. EQUIPMENT, MATERIAL AND LABOR COSTS INCURRED IN CORRECTING AN UNSATISFACTORY OPERATION SHALL BE BORNE BY THE CONTRACTOR.

THE GUARANTEE SHALL COVER THE FOLLOWING ITEMS OF THE TRAFFIC CONTROL SYSTEM: CONTROLLERS AND ASSOCIATED EQUIPMENT, DETECTOR UNITS, INTERCONNECTION ITEMS AND MASTER CONTROL EQUIPMENT.

CUSTOMARY MANUFACTURER'S GUARANTEES FOR THE FOREGOING ITEMS SHALL BE TURNED OVER TO THE STATE OR THE MAINTAINING AGENCY FOLLOWING ACCEPTANCE OF THE EQUIPMENT.

THE COST OF GUARANTEEING THE TRAFFIC CONTROL SYSTEM WILL BE INCIDENTAL TO AND INCLUDED IN THE CONTRACT UNIT PRICE OF THE VARIOUS ITEMS MAKING UP THE SYSTEM.

MATERIALS

ALL MATERIALS FURNISHED FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATIONS (CMS) DATED AS SHOWN ON SHEET 1. FURNISH NEW MATERIALS AND EQUIPMENT OF FIRST QUALITY, OF CURRENT DESIGN AND FREE FROM DEFECTS. NO USED MATERIAL WILL BE PERMITTED.

CONTRACTOR SHALL SUPPLY A PAPER COPY AND AN ELECTRONIC COPY IN ADOBE ADOBE ACROBAT FORMAT TO THE PROJECT AND DISTRICT TRAFFIC ENGINEER FOR APPROVAL.

POWER SUPPLY FOR TRAFFIC SIGNALS

ELECTRIC POWER SHALL BE OBTAINED FROM THE POWER POLE AT THE LOCATION INDICATED ON THE PLANS. POWER SUPPLIED SHALL BE 120 VOLTS.

SIGNAL POLE FOUNDATION ELEVATIONS

ELEVATIONS SHOWN IN THE PLANS FOR SIGNAL POLE FOUNDATIONS ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20 PROVIDED THE EXISTING SLOPE IS LESS THAN 6:1.

AT LOCATIONS WHERE THE EXISTING SLOPE IS 6:1 OR GREATER, THE BURIED DEPTH OF FOUNDATION, AS SHOWN IN SCD TC-21.20 SHALL APPLY TO THE LOW SIDE OF THE SLOPE. THE TOP OF THE FOUNDATION SHALL BE SET 2 INCHES ABOVE THE EXISTING SURFACE ON THE HIGH SIDE OF THE SLOPE. THE ADDITIONAL DEPTH OF FOUNDATION NECESSARY TO MEET THESE REQUIREMENTS SHALL BE ADDED TO THE FORMED TOP.

ITEM 632 - POWER SERVICE, AS PER PLAN

POWER SERVICE SHALL BE AS PER CMS ITEM 632 AND SCD TC-83.10 WITH THE FOLLOWING EXCEPTIONS:

1. THE METER BASE MOUNTING HEIGHT SHALL BE NO MORE THAN 5 FEET HIGH TO THE CENTER OF THE METER BASE FROM THE GROUND.
2. THE CONTRACTOR SHALL SUPPLY THE NECESSARY METER BASES.
3. ALL POWER SERVICES SHALL BE METERED. THE METER SHALL HAVE A LEVER OPERATED BYPASS.

DISCONNECT SWITCH ENCLOSURES FURNISHED IN ACCORDANCE WITH CMS ITEM 632, POWER SERVICE, AS PER PLAN, SHALL INCLUDE A PADLOCK EQUAL TO MASTER NO. 48KA OR WILSON BOHANNON 660, WITH LOCK BODY OF BRONZE OR BRASS AND KEYING SHALL BE TO THE STATE MASTER.

THE CONTRACTOR SHALL CONTACT THE METER SECTION OF THE POWER COMPANY FOR INFORMATION REGARDING THE METER BASE INSTALLATION PRIOR TO ORDERING POLES. THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOK UP. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE POWER COMPANY FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS. THE VOLTAGE SUPPLIED SHALL BE NOMINALLY 120 VOLTS. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND THE PAYING OF ALL FEES. THE CONTRACTOR SHALL PAY ALL POWER CHARGES UNTIL THE SIGNAL IS ACCEPTED BY THE MAINTAINING AGENCY.

ITEM 632 - REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN

TRAFFIC SIGNAL INSTALLATIONS, INCLUDING SIGNAL HEADS, CABLE, MESSENGER WIRE, STRAIN POLES, CABINET, CONTROLLER, ETC., SHALL BE REMOVED IN ACCORDANCE WITH CMS 632.26 AND AS INDICATED ON SHEET 112. REMOVED ITEMS SHALL BE DISPOSED OF OR STORED ON THE PROJECT SITE FOR SALVAGE BY ODOT IN ACCORDANCE WITH THE LISTING GIVEN HEREIN.

ITEMS TO BE REMOVED FOR STORAGE SHALL BE DELIVERED TO 400 E. WILLIAM STREET, DELAWARE, OHIO 43015 NO MORE THAN 1 WEEK AFTER REMOVAL. CONTACT THE DISTRICT 6 TRAFFIC ENGINEER AT 740-833-8198 FOR DETAILS.

ITEM 632 - VEHICULAR SIGNAL HEAD, (LED), (BY TYPE), WITH BACKPLATE, AS PER PLAN

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

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK POLYCARBONATE PLASTIC WITH VISORS AS SPECIFIED AND MEET ITS 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 WITH REFLECTIVE BORDER WILL BE IN ACCORDANCE WITH CMS 732.22.
6. THE LIGHT EMITTING DIODE (LED) SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF CMS 732.04-C. THE CONTRACTOR SHALL PROVIDE ODOT, 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. ALL SIGNAL HEADS SHALL BE RIGIDLY MOUNTED TO THE MAST ARM PER SCD TC-85.20 WITH THE RED LENS CENTERED VERTICALLY ON THE MAST ARM.

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

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

THE ELECTRICAL TRAFFIC CONTROL EQUIPMENT PROVIDED SHALL MEET THE FOLLOWING SPECIFICATIONS 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 TS-2, 1992 STANDARD FOR ACTUATED CONTROLLER UNITS. THE CATALOG NUMBER FOR THE GROUND MOUNTED P CABINET SHALL BE EL 712 OR NEWER. THE CABINET SHALL BE ALUMINUM WITH THE NATURAL ALUMINUM FINISH INSIDE AND OUTSIDE. THE LOAD BAY SHALL BE THE TF5016 OR NEWER, WITH 16 LOAD SWITCH POSITIONS. PROVIDE ONLY THE EXACT NUMBER OF LOAD SWITCHES REQUIRED. EACH LOAD SWITCH SHALL HAVE LIGHT EMITTING DIODES (LEDs) FOR THE CONTROLLER OUTPUT AND LOAD SWITCH OUTPUT. ALSO PROVIDE 8 FLASH RELAY POSITIONS (BUT ONLY SUPPLY THE EXACT NUMBER OF RELAYS NEEDED FOR EACH SPECIFIC INTERSECTION), 1 NEMA 2-CIRCUIT FLASHER, AND AN MMU MONITOR. EACH CABINET SHALL COME EQUIPPED WITH A CABINET DETECTOR RACK (CDR) INCLUDING A BUS INTERFACE UNIT (BIU) AND THE EXACT NUMBER OF FOUR CHANNEL DETECTOR CARDS WITH SOFTWARE REQUIRED FOR EACH INTERSECTION. THE CABINET SHALL BE EQUIPPED WITH A CABINET POWER SUPPLY (CPS). THE POLICE PANEL ON THE INSIDE OF THE CABINET DOOR SHALL HAVE A FLASH SWITCH AND A SWITCH FOR AUTOMATIC OR MANUAL OPERATION. A CABINET DOOR OPEN SWITCH AND A CABINET LIGHT ON/OFF SWITCH SHALL ALSO BE SUPPLIED.

CONTROLLER CABINET LABELING TO IDENTIFY THE WIRING AND FUNCTION

LOOP DETECTOR LEAD-IN CABLE
PHASE NUMBER SERVICE, DIRECTION, MOVEMENT TYPE, AND LOOP PLAN NUMBER.

SIGNAL HEAD FIELD WIRING
PHASE NUMBER, DIRECTION, MOVEMENT TYPE, AND COLOR (RED, YELLOW, GREEN, YELLOW ARROW, GREEN ARROW) OR PEDESTRIAN MOVEMENT.

THE CONTROLLER TIMER SHALL BE THE GENESIS, EPAC3***M52 (OR MOST CURRENT MODEL) NEMA TS-2 TYPE 2 AND COME EQUIPPED WITH ALL INTERNAL COMPONENTS TO MAKE IT FULLY SYSTEM READY FOR THE ACTRA (OR LATEST) SYSTEM, INCLUDING THE INTERNAL MODEM. 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 TS2/A2, WITH CABINET, TYPE TS2, AS PER PLAN" WILL BE AT THE CONTRACT BID PRICE COMPLETE AND IN PLACE AND CONNECTIONS TESTED AND ACCEPTED.

CALCULATED
JAS
CHECKED
DJR

TRAFFIC SIGNAL GENERAL NOTES

FRA -317 - 0.00

107
131

ITEM 633 - ADVANCE/DILEMMA ZONE DETECTION SYSTEM

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ADVANCE/DILEMMA ZONE DETECTION SYSTEM CAPABLE OF INTERSECTION ADVANCE DETECTION CONTROL UTILIZING ABOVE GROUND DIGITAL WAVE RADAR DETECTION TECHNIQUES. THE SYSTEM SHALL BE NON-INTRUSIVE AND SHALL DETECT VEHICLES FROM 100 FEET UP TO 500 FEET FROM THE SENSOR. THE SYSTEM SHALL DETECT VEHICLE PRESENCE, SPEED AND SHALL IDENTIFY VEHICLES WITHIN THE DILEMMA ZONE AND SHALL PROVIDE UP TO 8 DETECTION ZONES SIMULTANEOUSLY FOR INTERSECTION CONTROL. ONE SENSOR SHALL BE PROVIDED PER APPROACH, COVERING MULTIPLE LANES WHERE ADVANCE DETECTION IS REQUIRED. THE DETECTION SYSTEM SHALL INCLUDE THE FOLLOWING LIST OF FEATURES AND CAPABILITIES:

THE SYSTEM SHALL PROVIDE ACCURATE PRESENCE-DETECTION OF MOVING VEHICLES OR CLUSTER OF VEHICLES. THE SENSOR SHALL BE MOUNTED IN A FORWARD-FIRE POSITION, LOOKING AT EITHER APPROACHING OR DEPARTING TRAFFIC AND SHALL ONLY DETECT VEHICLES IN ONE DIRECTION OF TRAVEL. IT SHALL MAINTAIN ACCURATE PERFORMANCE IN ALL WEATHER CONDITIONS AND SHALL BE TESTED TO MEET NEMA TS2 ENVIRONMENTAL STANDARDS.

THE SYSTEM SHALL DYNAMICALLY TRACK THE SPEED, ARRIVAL TIME AND RANGE OF ALL 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 SYSTEM SHALL INCLUDE A SIMPLE SETUP ROUTINE THAT WILL AUTOMATICALLY CONFIGURE AND CALIBRATE THE SENSOR FOR PROPER OPERATION DURING INSTALLATION. THE SENSOR SHALL ALSO BE CAPABLE OF BEING PROGRAMMED AND UPDATED FROM A LAPTOP COMPUTER OR OTHER PORTABLE PROGRAMMING DEVICE SUCH AS A POCKET PC. SOFTWARE SHALL BE PROVIDED. THE GRAPHICAL USER INTERFACE SHALL OPERATE ON A WINDOWS PLATFORM.

THE SENSOR SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM AS RECOMMENDED BY THE MANUFACTURER. CABLE 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 SENSOR IS LOCATED TO PROTECT THE SENSOR AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.

POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET. THE SENSOR SHALL CONSUME LESS THAN 10 WATTS AND OPERATE FROM A DC INPUT BETWEEN 12VDC AND 28VDC. 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 THAT ARE COMPATIBLE WITH 170, 2070, 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 PROVIDE A 6-HOUR TRAINING COURSE ON THE SETUP, OPERATION AND MAINTENANCE OF THE SYSTEM.

ITEM 633 - ADVANCE/DILEMMA ZONE DETECTION SYSTEM (CTD.)

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

ITEM 633 - UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF CMS 633 AND 733, A 12-INCH CABINET RISER AND ANCHOR BOLTS SHALL BE PROVIDED WITH THE BASE MOUNTED CABINET.

THE UPS CABINET SHALL INCLUDE AN AUXILIARY POWER PANEL WITH A HEAVY DUTY POWER RELAY VERSUS THE LINE VOLTAGE GENERATOR SWITCH. THE GENERATOR INLET SHALL BE A RECESSED PANEL WITH A DOOR THAT IS FLUSH WITH THE EXTERNAL SIDE OF THE UPS CABINET. IT SHALL INCLUDE A RECESSED PLUG, MANUAL TRANSFER SWITCH AND A DOOR THAT SECURELY CLOSURES OVER THE POWER CORD.

THE UPS OUTPUT NOTIFICATIONS FOR ON BATTERY, BATTERY 2 HOUR TIMER, AND LOW BATTERY SHALL BE WIRED INTO THE TRAFFIC SIGNAL CABINET BACK PANEL TO PROVIDE SPECIAL STATUS ALARMS FOR EACH OUTPUT INTO THE SIGNAL CONTROLLER.

THIS ITEM SHALL INCLUDE A RED LED STATUS INDICATOR LAMP TO ALLOW MAINTENANCE PERSONNEL AND LAW ENFORCEMENT TO QUICKLY ASSESS WHETHER A TRAFFIC SIGNAL CABINET IS BEING POWERED BY A UPS. THE LED HOUSING SHALL BE NEMA 4X, IP65 OR IP66, RATED FOR OUTDOOR USE AND BE TAMPER/SHATTER RESISTANT. IT SHALL BE A DOMED ENCLOSURE CONTAINING A RED LENS WITH LED THAT IS VISIBLE FROM 100 FOOT MINIMUM. THE ENCLOSURE AND LED LAMP UNIT SHOULD BE PLACED AND CENTERED ON THE TOP SURFACE OF THE UPS CABINET AND SEALED FROM WATER INTRUSION. IT SHOULD BE WIRED USING MINIMUM 20GA STRANDED, INSULATED HOOKUP WIRE TO THE STATUS RELAY OUTPUTS OF THE UPS. THE WIRES SHALL BE TERMINATED BY LUGS AT THE DISPLAY END AND PERMANENTLY LABELED "BACKUP POWER STATUS DISPLAY," WITH WIRE POLARITY INDICATED. THE RED LED SHALL ONLY ILLUMINATE TO INDICATE THE CABINET IS OPERATING UNDER UPS BACKUP POWER (THE "BACKUP" OPERATING CONDITION). THIS ITEM ALSO INCLUDES PROGRAMMING THE UPS STATUS RELAY OUTPUTS TO PRODUCE THE LAMP STATUS DISPLAYS. THESE STATUS DISPLAYS WILL BE SOLID 100% DUTY CYCLE (NOT FLASHING) DISPLAYS. THE OPERATING VOLTAGE OF THE LED LAMP SHALL BE 120V AC UNLESS OTHERWISE INDICATED.

GROUNDING AND BONDING

THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (CMS) AND THE TC SERIES OF STANDARD CONSTRUCTION DRAWINGS ARE MODIFIED AS FOLLOWS:

- I. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDING 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.

GROUNDING AND BONDING (CTD.)

- 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 UL 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 COPPER WIRE. WIRE SIZE 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 STRIPES. 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 OF 4 AWG. BONDING JUMPERS WILL BE MINIMUM SIZE 4 AWG.

GROUNDING AND BONDING (CTD.)

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:

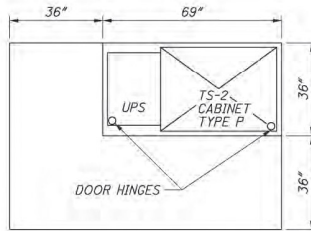
COND. NO.	COLOR	VEHICLE SIGNAL	PEDESTRIAN SIGNAL
1	BLACK	GREEN BALL	#1 WALK
2	WHITE	AC NEUTRAL	AC NEUTRAL
3	RED	RED BALL	#1 DW/FDW
4	GREEN	EQUIPMENT GROUND	EQUIPMENT GROUND
5	ORANGE	YELLOW BALL	#2 DW/FDW
6	BLUE	GREEN ARROW	#2 WALK
7	WHITE/BLACK STRIPE	YELLOW ARROW	NOT USED

6. POWER SERVICE AND DISCONNECT SWITCH.

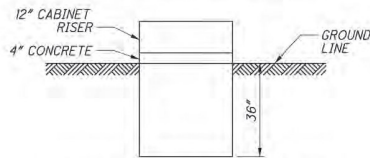
- A. AT THE POWER SERVICE LOCATION, THE GROUNDING CONDUCTOR (GROUND WIRE) FROM THE DISCONNECT SWITCH NEUTRAL (AC-) BAR TO THE GROUND ROD SHALL BE A CONTINUOUS, UNSPLICED CONDUCTOR. IF SPliced, IT SHALL BE AN EXOTHERMIC WELD BUTT SPLICE.
- B. THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.
 - I. NEMA CONTROLLER CABINETS: IF A POWER SERVICE DISCONNECT SWITCH IS LOCATED BEFORE THE CONTROLLER CABINET, THE NEUTRAL (AC-) AND THE GROUNDING BARS IN THE CONTROLLER CABINET SHALL NOT BE CONNECTED TOGETHER AS SHOWN IN NEMA TS-2, FIGURE 5-4.
 - II. IF SECONDARY DISCONNECT SWITCHES ARE CONNECTED AFTER THE PRIMARY DISCONNECT SWITCH, THE NEUTRAL (AC-) SHALL ONLY BE GROUNDED AT THE PRIMARY SWITCH. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BROUGHT TO THE PRIMARY SWITCH, BUT SHALL BE GROUNDED AT BOTH SECONDARY AND PRIMARY SWITCHES.

7. PAYMENT - ALL MATERIALS AND WORK REQUIRED TO COMPLETE THE EFFECTIVE GROUND FAULT CURRENT PATH SYSTEM ARE INCIDENTAL TO THE CONDUCTORS INSTALLED BY CONTRACT.

CONTROLLER CABINET FOUNDATION AND WORKPAD DETAIL



CABINET AND WORK PAD PLAN VIEW



CABINET FOUNDATION ELEVATION SIDE 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 RISERS.

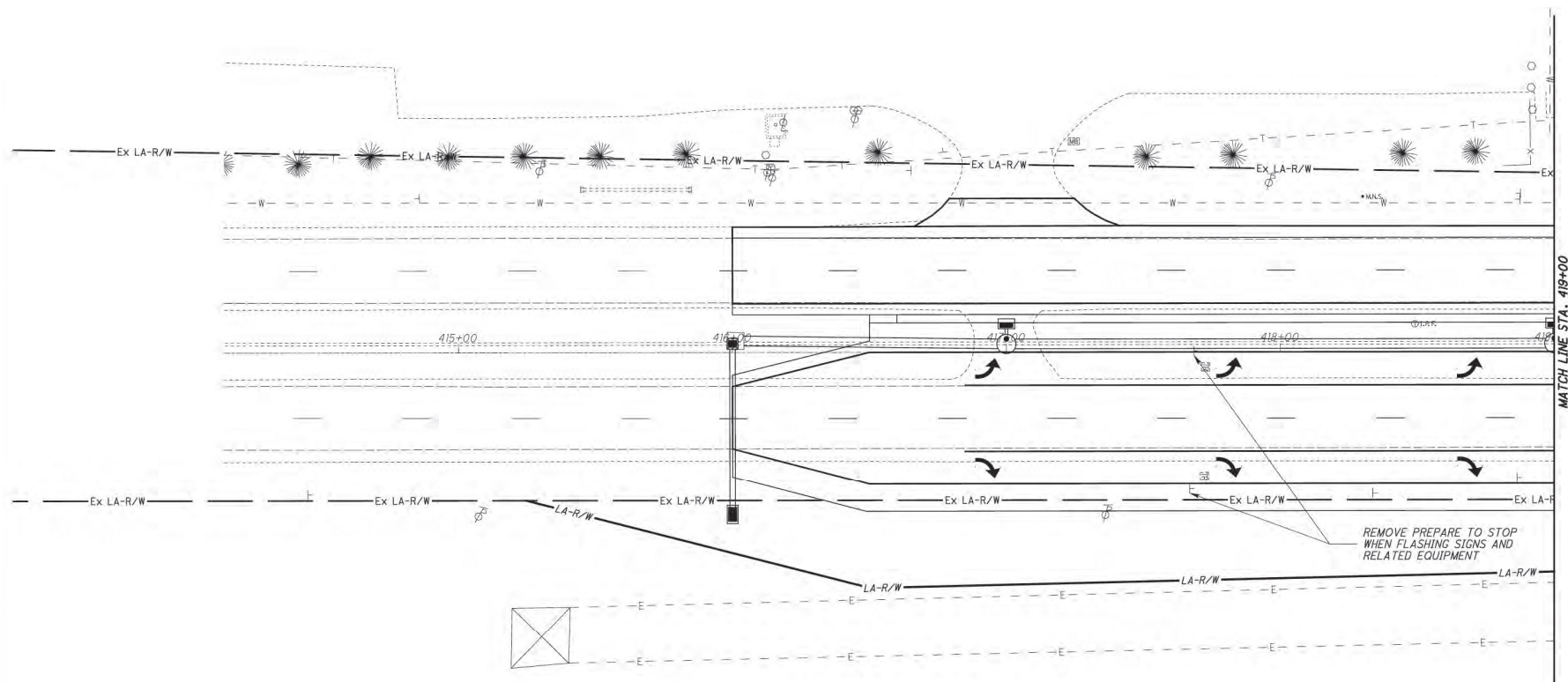
ITEM 816 - VIDEO DETECTION SYSTEM, AS PER PLAN

THIS ITEM CONSISTS OF FURNISHING AND INSTALLING A VIDEO DETECTION CAMERA SYSTEM IN CONFORMANCE WITH SUPPLEMENTAL SPECIFICATIONS 816 AND 907 FOR USE IN LIEU OF A CONVENTIONAL VEHICLE DETECTOR LOOP INSTALLATION.

THE CAMERA SYSTEM SHALL INCLUDE THE CAMERA, CABINET, VIDEO CONTROL COMPONENTS, COMMUNICATION CABLES, CONNECTORS, MOUNTING HARDWARE, PC SOFTWARE AND ALL OTHER NECESSARY COMPONENTS TO INSTALL A VIDEO DETECTION CAMERA SYSTEM COMPLETE IN PLACE THAT IS FULLY FUNCTIONAL WITH THE TRAFFIC SIGNAL INSTALLATION. THE VIDEO DETECTION CABINET HARDWARE SHALL BE CAPABLE OF RUNNING ALL THE DESIGNATED CAMERAS SHOWN IN THE PLANS AT THE INTERSECTION. THE CAMERAS SHALL BE CONFIGURED TO PERFORM VEHICLE DETECTION AND TRAFFIC COUNTS AS SPECIFIED. A PORTABLE TYPE, BATTERY OPERATED, 7" MINIMUM SCREEN, COLOR LCD MONITOR, AND A BATTERY OPERATED COLOR VIDEO VIEWING EYEPiece SHALL BE PROVIDED TO VIEW AND CONFIGURE THE VIDEO DETECTION CAMERAS.

TEN (10) BUSINESS DAYS PRIOR TO INSTALLATION OF THE VIDEO DETECTION SYSTEM, THE CONTRACTOR SHALL CONTACT THE DISTRICT 6 TRAFFIC ENGINEER SO AN ODOT REPRESENTATIVE CAN BE PRESENT FOR THE CONFIGURATION OF THE VIDEO DETECTION CAMERA SYSTEM.

PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, CABINET AND MOUNTING HARDWARE, AND OTHER INCIDENTALS NECESSARY FOR EACH VIDEO DETECTION CAMERA, COMPLETE IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED, AND ACCEPTED. THIS ITEM WILL BE PAID AT THE CONTRACT UNIT PRICE PER EACH CAMERA.



NOTES

1. PAVEMENT MARKINGS ARE SHOWN FOR INFORMATION ONLY
2. STATIONS AND OFFSETS SHOWN BASED OFF OF CONSTRUCTION U.S. 23
3. REMOVAL OF PISMF SIGNS ARE INCLUDED AS PART OF ITEM 632 REMOVAL OF SIGNAL INSTALLATION, AS PER PLAN



HORIZONTAL
SCALE IN FEET

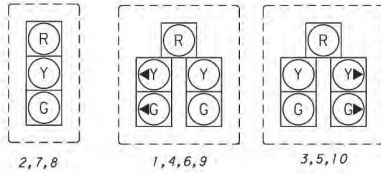
CALCULATED
JAS
CHECKED
DJR

SIGNAL PLAN
U.S. 23 STA. 415+00 TO STA. 419+00

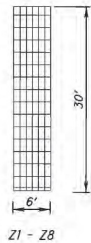
FRA -317 - 0.00

110
131

VEHICULAR SIGNAL HEADS, 12" POLYCARBONATE
LED LAMP UNITS W/ REFLECTIVE BACKPLATES
ATTACHED WITH RIGID SIGNAL HEAD MOUNTS



VIDEO DETECTION ZONE



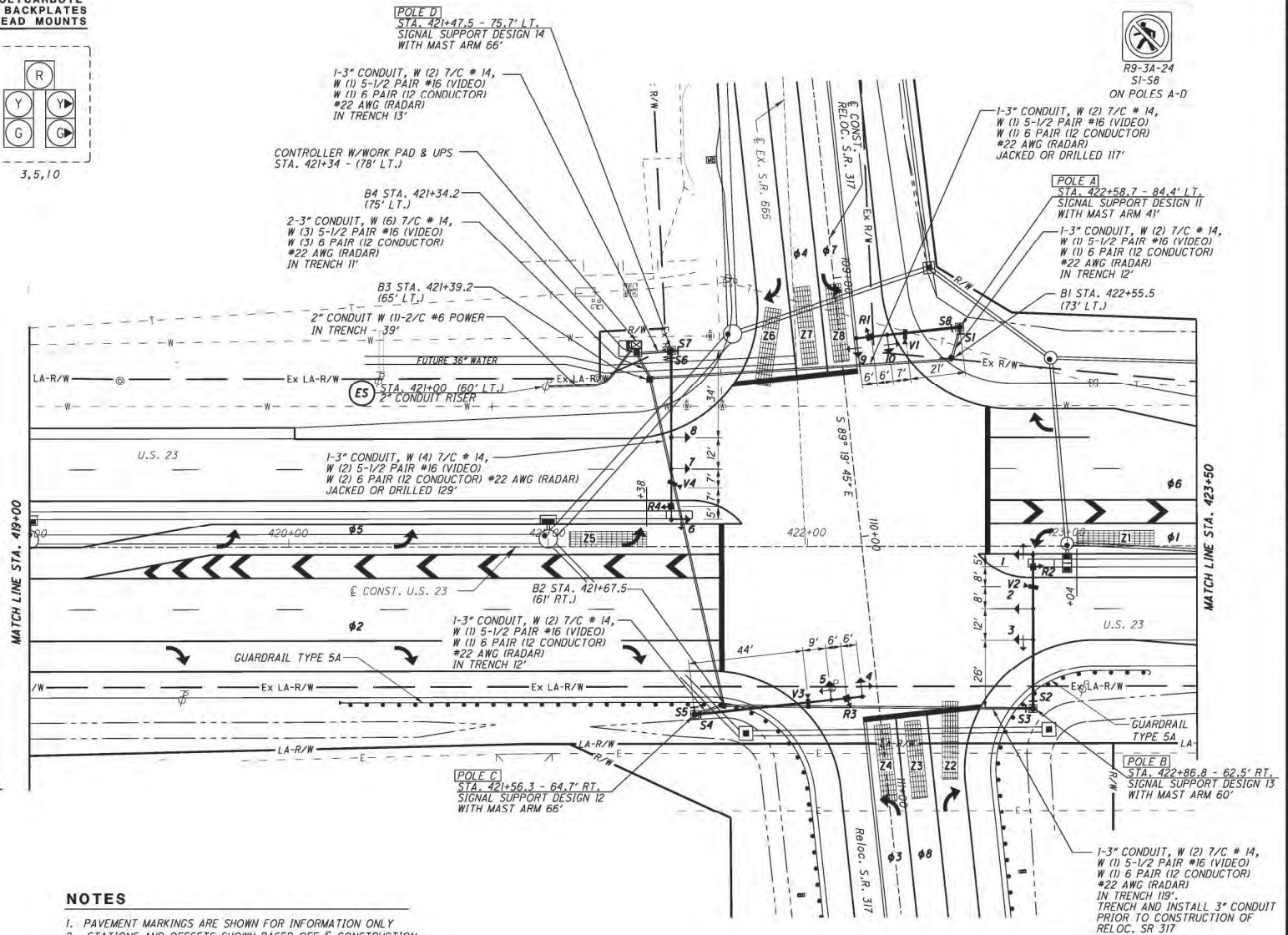
LEGEND

- VEHICULAR SIGNAL HEAD
- SIGNAL SUPPORT & MAST ARM
- GROUND MOUNTED CONTROLLER
W/ UNINTERRUPTIBLE POWER SUPPLY
- ADVANCE DILEMMA ZONE DETECTION
- VIDEO DETECTION CAMERA
- PULL BOX
- TRAFFIC SIGN
- VIDEO DETECTION ZONE
- CONDUIT
- POWER SERVICE

NOTES

1. PAVEMENT MARKINGS ARE SHOWN FOR INFORMATION ONLY
2. STATIONS AND OFFSETS SHOWN BASED OFF \pm CONSTRUCTION U.S. 23
3. REMOVAL OF PTSWF SIGNS ARE INCLUDED AS PART OF ITEM 632 REMOVAL OF SIGNAL INSTALLATION, AS PER PLAN
4. LOCATION OF CONTROLLER TO BE FIELD VERIFIED
5. ALL PULL BOXES ARE 24" UNLESS OTHERWISE NOTED

SIGNING



SCALE IN FEET
0 20 40
HORIZONTAL
VERTICAL

CALCULATED JAS
CHECKED DUR

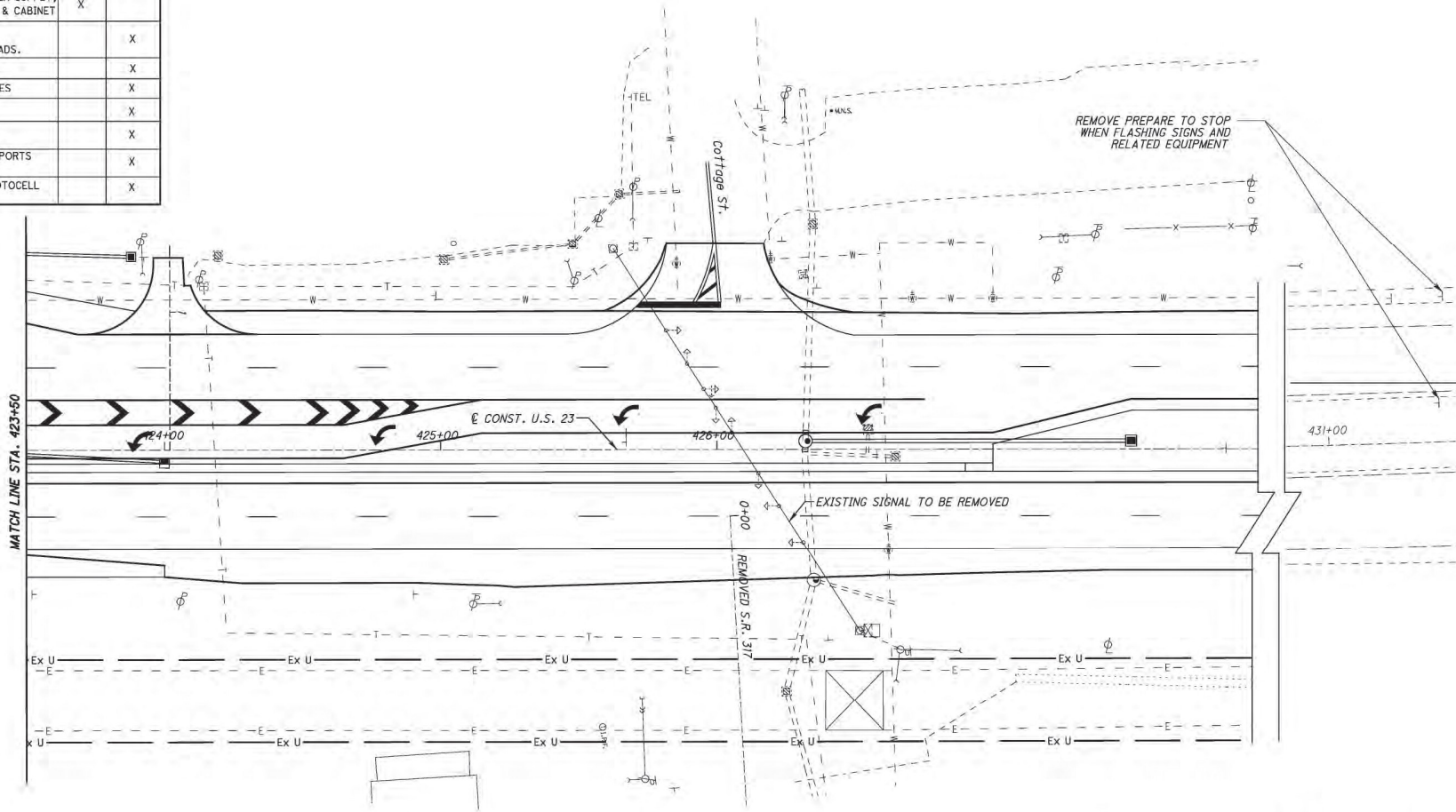
SIGNAL PLAN
RELOC. S.R. 317 AND U.S. 23

FRA -317-0.00

111
131

ITEM 632 - REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN

DESCRIPTION OF ITEM TO BE REMOVED BY CONTRACTOR	STORED FOR 90 DAYS L. DIST. 6	DISPOSED OF BY CONTRACTOR
SIGNAL CABLE		X
TS-2 CONTROLLER, CABINET AND MMU CONFLICT MONITOR	X	
UNINTERRUPTIBLE POWER SUPPLY, BATTERIES EQUIPMENT & CABINET	X	
(7) 3 SEC. 1 WAY & (1) 5 SEC. 2 WAY VEHICULAR SIGNAL HEADS.		X
MESSANGER WIRE		X
(4) ANCHOR BASE POLES		X
(4) ANCHOR BASE FOUNDATIONS		X
(2) OVERHEAD SIGNS		X
(4) PTSWF SIGNS, SUPPORTS AND FOUNDATIONS		X
(4) LUMINAIRES W/PHOTOCELL		X



NOTES

1. PAVEMENT MARKINGS ARE SHOWN FOR INFORMATION ONLY
2. TRAFFIC SIGNAL TO BE REMOVED FOR STORAGE SHALL BE DELIVERED TO 400 E. WILLIAM ST. DELAWARE, OH 43015 NO MORE THAN 1 WEEK AFTER REMOVAL. CALL THE DISTRICT 6 TRAFFIC ENGINEER FOR DETAILS (740) 833-8198
3. STATIONS AND OFFSETS SHOWN ARE BASED OFF E CONSTRUCTION U.S. 23
4. REMOVAL OF PTSWF SIGNS ARE INCLUDED AS PART OF ITEM 632 REMOVAL OF SIGNAL INSTALLATION, AS PER PLAN



0 20 40
HORIZONTAL
SCALE IN FEET

CALCULATED JAS
CHECKED DUR

SIGNAL PLAN
INTERSECTION U.S. 23 AND COTTAGE ST.

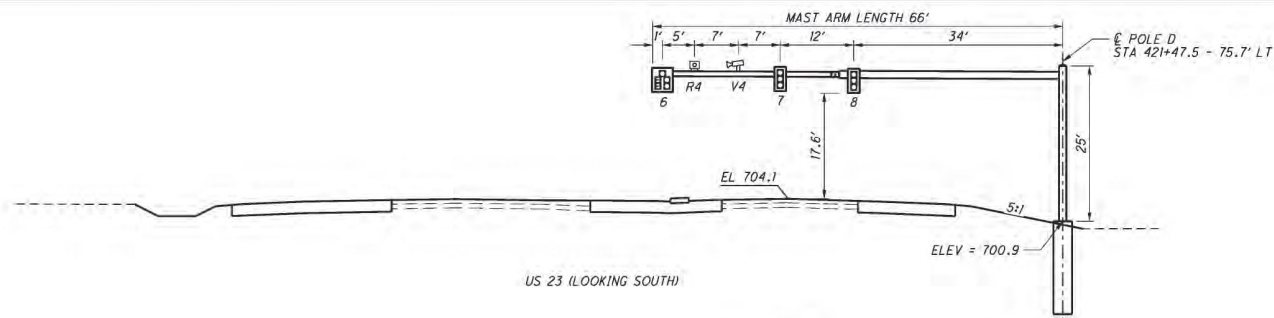
FRA -317-0.00

112
131

POLE D DESIGN

$$K = (34' \times 8.7 \text{ ft}^2) + (46' \times 8.7 \text{ ft}^2) + (53' \times 1.5 \text{ ft}^2) + (60' \times 1 \text{ ft}^2) + (65' \times 12.4 \text{ ft}^2) = 1641.5 < 2691$$

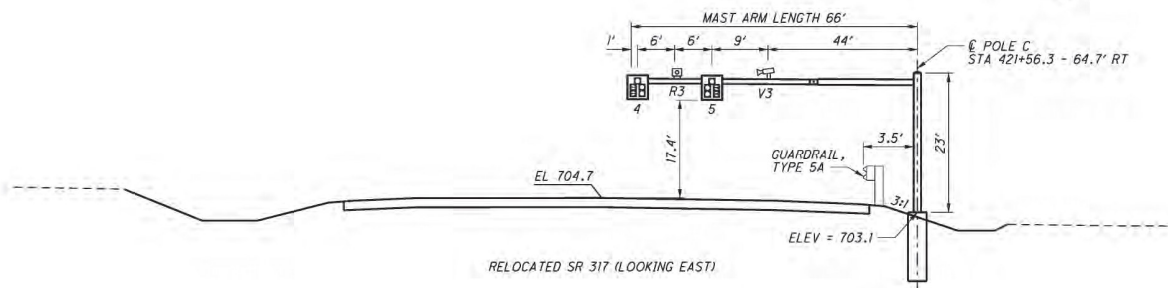
DESIGN = 14



POLE C DESIGN

$$K = (44' \times 1.5 \text{ ft}^2) + (53' \times 12.4 \text{ ft}^2) + (59' \times 1 \text{ ft}^2) + (65' \times 12.4 \text{ ft}^2) = 1588.2 < 2691$$

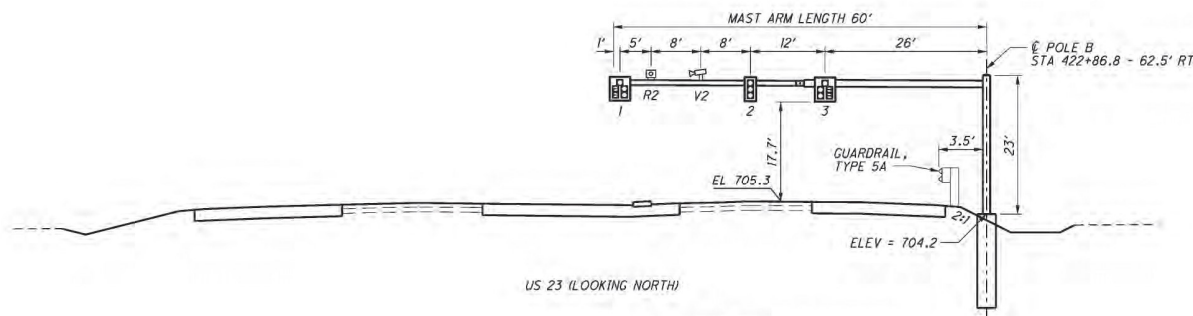
DESIGN = 14



POLE B DESIGN

$$K = (26' \times 12.4 \text{ ft}^2) + (38' \times 8.7 \text{ ft}^2) + (46' \times 1.5 \text{ ft}^2) + (54' \times 1 \text{ ft}^2) + (59' \times 12.4 \text{ ft}^2) = 1507.6 < 2380$$

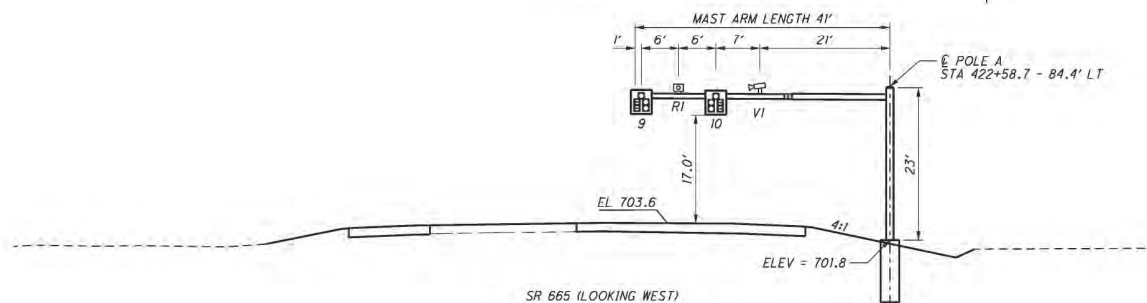
DESIGN = 13



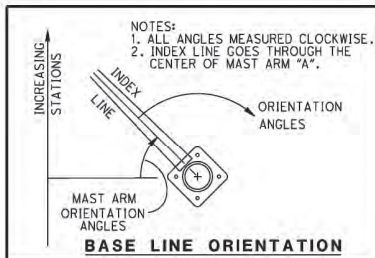
POLE A DESIGN

$$K = (21' \times 1.5 \text{ ft}^2) + (28' \times 12.4 \text{ ft}^2) + (34' \times 1 \text{ ft}^2) + (40' \times 12.4 \text{ ft}^2) = 908.7 < 1780$$

DESIGN = 11



NOTE:
ALL SIGNAL HEADS ARE TO BE ATTACHED
WITH THE CENTER OF THE RED LAMPS TO
THE CENTER OF THE MAST ARMS WITH RIGID
SIGNAL HEAD MOUNTS PER SCD TC-85.20.



STATION & OFFSET	POLE DESIGNATION	TC 81.2 DESIGN NUMBER			POLE HEIGHT (FT.)	MAST ARM ATTACHMENT DISTANCE FROM SUPPORT						ORIENTATION ANGLES (DEG.)	MAST ARM "A"	HANDHOLE POWER SERVICE 1/2" BHC 27" FROM POLE BASE	ANGLES (DEG.) FROM INDEX LINE	
						LENGTH (FT.)	ATTACHMENT 1 (FT.)	ATTACHMENT 2 (FT.)	ATTACHMENT 3 (FT.)	ATTACHMENT 4 (FT.)	ATTACHMENT 5 (FT.)					ATTACHMENT 6 (FT.)
422+58.7 84.4' LT.	A	11	23	41	21	28	34	40			84	180				
422+86.8 62.5' RT.	B	13	23	60	26	38	46	54	59		0	180				
421+56.3 64.7' RT.	C	14	23	66	44	53	59	65			84	180				
421+47.5 75.7' LT.	D	14	25	66	34	46	53	60	65		0	180	90			

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
1 (NB LT)	R	Ø2		7 (SB)	R	Ø6	
	Y	Ø2			Y	Ø6	
	G	Ø2	Y		G	Ø6	
	Ø5						
	Ø5						
2 (NB)	R	Ø2		8 (SB)	R	Ø6	
	Y	Ø2	Y		Y	Ø6	
	G	Ø2			G	Ø6	
	Ø5						
	Ø5						
3 (NB RT)	R	Ø2		9 (WB LT)	R	Ø8	
	Y	Ø2			Y	Ø8	
	G	Ø2	Y		G	Ø8	
	Ø5				Ø5		
	Ø5				Ø5		
4 (EB LT)	R	Ø4		10 (WB RT)	R	Ø8	
	Y	Ø4			Y	Ø8	
	G	Ø4	R		G	Ø8	R
	Ø7				Ø7		
	Ø7				Ø7		
5 (EB RT)	R	Ø4					OUT
	Y	Ø4					OUT
	G	Ø4	R				
	Ø4						
	Ø4						
6 (SB LT)	R	Ø6					
	Y	Ø6					
	G	Ø6	Y				
	Ø1						
	Ø1						

OLA = LS9 OLC = LS11
OLB = LS10 OLD = LS12

ACTUATED TRAFFIC SIGNAL CONTROLLER TIMING CHART
INTERSECTION: US 23 @ SR 665/ RELOCATED SR 317
MAINTAINING AGENCY: ODOT

START IN: Y/R FLASH Ø ALL RED Ø
TIME FOR FLASH OR ALL RED: 10
FIRST PHASE(S) * 28 * 6
COLOR DISPLAYED: GREEN Ø YELLOW Ø

DUAL ENTRY Ø
REST IN RED: RING 2 Ø

OVERLAP	A	B	C	D
PHASES	Ø1	Ø5	Ø7	Ø3

CONTROLLER MOVEMENT NUMBER

INTERVAL OR FEATURE	1	2	3	4	5	6	7	8
MINIMUM GREEN (INITIAL) (SEC.)	7	20	7	7	7	20	7	7
ADDED INITIAL * (SEC./ACTUATION)	1.0					1.0		
PASSAGE TIME (PRESET GAP) (SEC.)	5.0	**	3.0	**	5.0	**	3.0	**
TIME BEFORE REDUCTION * (SEC.)	15					15		
MINIMUM GAP * (SEC.)	3.0					3.0		
TIME TO REDUCE * (SEC.)	15					15		
MAXIMUM GREEN I (SEC.)	11	62	16	20	9	61	9	18
MAXIMUM GREEN II (SEC.)	15	69	26	23	16	71	18	40
YELLOW CHANGE (SEC.)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
ALL RED CLEARANCE (SEC.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
WALK (SEC.)								
PEDESTRIAN CLEARANCE (SEC.)								

RECALL

MAXIMUM (ON/OFF)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
MINIMUM (ON/OFF)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
PEDESTRIAN (ON/OFF)								

MEMORY (ON/OFF)

NL	OFF	OFF	OFF	NL	OFF	OFF	OFF	OFF
----	-----	-----	-----	----	-----	-----	-----	-----

CALL TO NON-ACTUATED

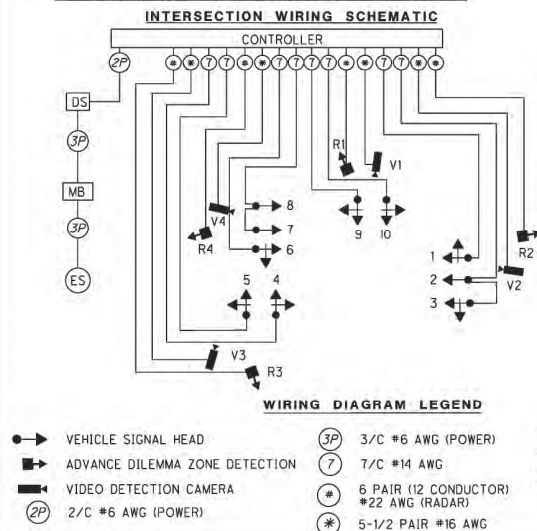
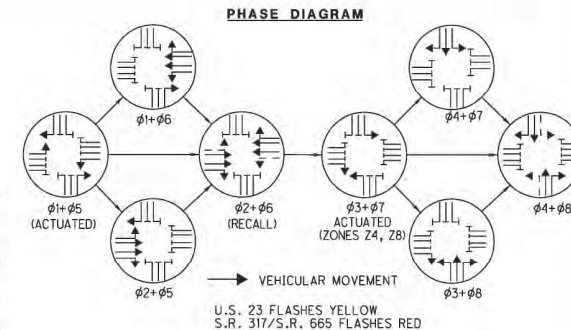
NUMBER 1	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
NUMBER 2								

PHASE 2 & 6 WILL FLASH YELLOW
* VOLUME DENSITY CONTROLS
** RADAR DILEMMA ZONE DETECTORS SHALL BE PROGRAMMED TO CAPTURE APPROACHING VEHICLES BETWEEN 100' AND 500' FROM THE SENSOR.

VIDEO DETECTION ZONES

ZONE	SIZE	ASSOC. PHASE	TYPE	DELAY (SEC.)	VIDEO CAMERA
Z1	6'X30'	Ø1	PRESENCE		V4
Z2	6'X30'	Ø8	PRESENCE	15	V1
Z3	6'X30'	Ø8	PRESENCE		V1
Z4	6'X30'	Ø3	PRESENCE		V1
Z5	6'X30'	Ø5	PRESENCE		V2
Z6	6'X30'	Ø4	PRESENCE	15	V3
Z7	6'X30'	Ø4	PRESENCE		V3
Z8	6'X30'	Ø7	PRESENCE		V3

ITEM	TOTAL	UNIT	DESCRIPTION
625	39	FT	CONDUIT, 2", 725.04
625	178	FT	CONDUIT, 3", 725.04
625	246	FT	CONDUIT, JACKED OR DRILLED, 3"
625	206	FT	TRENCH
625	4	EACH	PULL BOX, 725.08, 24"
625	5	EACH	GROUND ROD
630	8	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	32.0	SQ FT	SIGN, FLAT SHEET
632	3	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3 SECTION, 12" LENS, 1-WAY, POLYCARBONATE WITH BACKPLATE, AS PER PLAN
632	7	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 5 SECTION, 12" LENS, 1-WAY, POLYCARBONATE WITH BACKPLATE, AS PER PLAN
632	10	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	1955	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	4	EACH	SIGNAL SUPPORT FOUNDATION
632	55	FT	POWER CABLE, 2 CONDUCTOR, NO. 6 AWG
632	50	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	1	EACH	CONDUIT RISER, 2" DIAMETER
632	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 11
632	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 13
632	2	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 14
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS2, AS PER PLAN
633	1	EACH	CABINET RISER
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
633	1	EACH	CONTROLLER WORK PAD, AS PER PLAN
633	4	EACH	ADVANCE/DILEMMA ZONE DETECTION SYSTEM
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
816	4	EACH	VIDEO DETECTION SYSTEM, AS PER PLAN



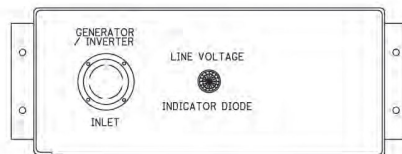
MATERIAL SPECIFICATIONS FOR GENERATOR / INVERTER POWER PANEL EQUIPMENT

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.

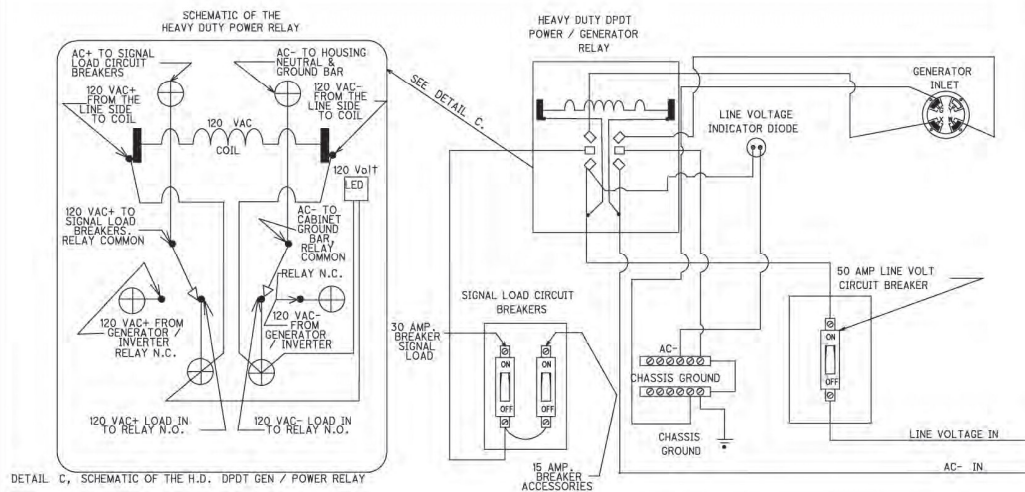
HEAVY DUTY POWER RELAY shall be 30 amp, 120 VAC, DPDT and SHALL BE an OMRON, Model (MGN2C-M).
(The MG seriee dust cover is required) To order, call 1-800-556-6766

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

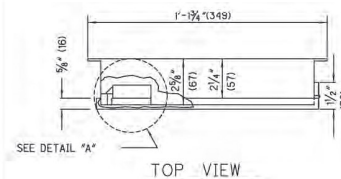


ELECTRICAL HOOKUP DETAIL FOR THE GENERATOR POWER PANEL

GENERATOR POWER PANEL ENCLOSURE

NOTES:

1. The enclosure shall be constructed of $\frac{1}{4}$ "(3.2) thick aluminum.
2. The lock shall be the standard police door type, keyed with the standard 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 material.
6. All metric dimensions in parentheses are in millimeters unless otherwise noted.

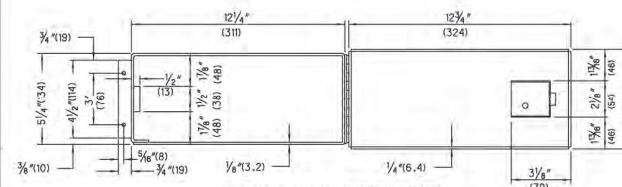


TOP VIEW

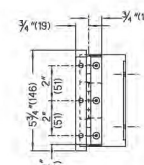


SEE DETAIL "B"

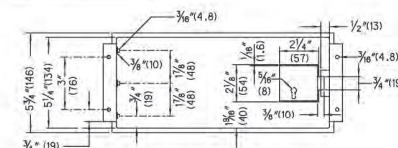
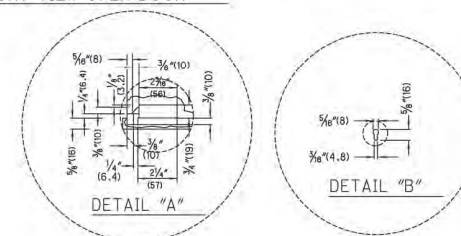
FRONT VIEW CLOSED DOOR



FRONT VIEW OPEN DOOR



RIGHT SIDE VIEW
CLOSED DOOR



BACK VIEW CLOSED DOOR