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

IN ADDITION TO THE REQUIREMENTS OF C&MS 633 AND 733, POLE ATTACHMENT HARDWARE WILL BE INCLUDED FOR POLE-MOUNTED CABINETS, AND A CABINET RISER (8-INCH MINIMUM) AND ANCHOR BOLTS WILL BE PROVIDED FOR BASE-MOUNTED CABINETS. BEFORE PERFORMING THE WORK, THE CONTRACTOR, THE DISTRICT TRAFFIC ENGINEER AND THE PROJECT ENGINEER WILL PERFORM A SITE INSPECTION TO ESTABLISH THE LOCATION OF THE UPS CABINET AND FOUNDATION.

THE UPS CABINET SHALL INCLUDE A GENERATOR 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, AUTOMATIC TRANSFER SWITCH & A DOOR THAT SECURELY CLOSES OVER THE POWER CORD.

THE CABINET SHALL HAVE SLIDING DRAWERS TO ALLOW EASY REMOVAL AND INSTALLATION OF BATTERIES AND ACCESS TO THE CABLE IN THE BOTTOM OF THE CABINET.

THE CABINET SHALL HAVE A DOOR STOP MECHANISM & THERMOSTATICALLY CONTROLLED FAN. ADDITIONALLY, THE CABINET SHALL BE BUILT WITH ALL BATTERIES ALWAYS BELOW THE INVERTER TO AVOID POTENTIAL FURTHER BATTERY LEAKAGE ISSUES.

THE CABINET SHALL INCLUDE A BATTERY BALANCING DEVICE THAT REGULATES THE BATTERIES AND OPTIMIZES PERFORMANCE.

THE UPS FURNISHED SHALL BE LISTED ON THE TRAFFIC AUTHORIZED PRODUCTS (TAP) LIST.

AFTER FOUR (4) HOURS OF BATTERY RUNTIME, THE SYSTEM SHALL BE PROGRAMMED TO SWITCH THE INTERSECTION FROM FULL OPERATION TO CONTROLLER AUTOMATIC FLASH OPERATION THROUGH THE MONITOR. THE CONTROLLER SHALL BE PROGRAMMED SO THAT FLASH OPERATION SHALL BEGIN ONCE THE INTERSECTION RUNS MINOR STREET GREEN (TYP. PH. 4 & 8), ALL-RED CLEARANCE, AND THEN FLASH OPERATION.

THE UPS OUTPUT NOTIFICATIONS FOR ON BATTERY, BATTERY 2-HOUR TIMER & LOW BATTERY SHALL BE WIRED INTO THE TRAFFIC SIGNAL CABINET BACK PANEL WITH 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 MODULE SHOULD BE PLACED ON THE SIDE OF THE UPS CABINET FACING TOWARDS THE MAINLINE ROADWAY 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 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.

ADDED

ITEM 625 – UNDERGROUND WARNING/MARKING TAPE, AS PER PLAN

UNDERGROUND WARNING/MARKING TAPE SHALL BE IN ACCORDANCE WITH CMS 725.22 EXCEPT THE TAPE SHALL NOT BE FURNISHED WITH TRACER WIRE AND THE REQUIRED MINIMUM BREAK STRENGTH SHALL BE WAIVED.

ITEM 632 - POWER SERVICE, AS PER PLAN

THE CLOSEST POWER SOURCE IS ROUGHLY 1250' AWAY FROM THE CONTROLLERS AT THE 7/90 SIGNALS. ALL MATERIALS AND LABOR NEEDED TO ENERGIZE THE SIGNALS ARE INCLUDED IN THE PAY ITEM 632 POWER SERVICE, AS PER PLAN.

POWER SERVICE SHALL BE AS PER SPECIFICATION 632 AND STANDARD CONSTRUCTION DRAWING TC-83.10 WITH THE FOLLOWING EXCEPTIONS: 1) THE CONTRACTOR SHALL SUPPLY THE NECESSARY METER BASES. 2) ALL POWER SERVICES SHALL BE METERED. THE METER SHALL HAVE A LEVER OPERATED BYPASS. 3) THE POWER SERVICE BLIND HALF COUPLING SHALL BE TWENTY-SEVEN [27] INCHES ABOVE THE BOTTOM OF THE STRAIN POLE BASE PLATE AND SHALL BE WELDED TO THE STRAIN POLE. 4) CONDUIT FROM THE BOTTOM OF THE DISCONNECT SWITCH ENCLOSURE INTO THE BOTTOM OF THE CONTROLLER CABINET WILL NOT BE PERMITTED. POWER SERVICE WIRES FROM THE DISCONNECT SWITCH ENCLOSURE TO THE CONTROLLER CABINET SHALL BE ROUTED THROUGH THE STRAIN POLE.

DISCONNECT SWITCH ENCLOSURES FURNISHED SHALL INCLUDE A PADLOCK EQUAL TO MASTER NO. 4BKA 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.

STRAIN POLE AND PEDESTAL FOUNDATION ELEVATIONS

ELEVATIONS SHOWN IN THE PLANS FOR STRAIN POLE AND PEDESTAL FOUNDATIONS ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH TRAFFIC SCD TC-21.21 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-21.21 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.

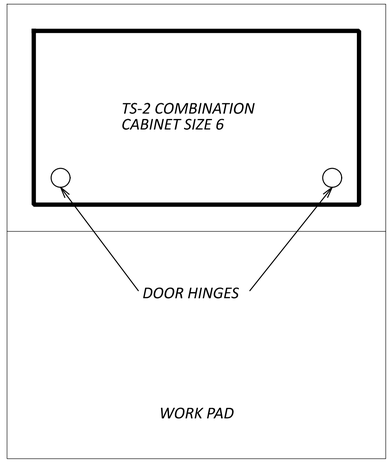
ITEM 633 CONTROLLER WORK PAD, AS PER PLAN

THIS ITEM SHALL INCLUDE THE EXCAVATION & CONCRETE NECESSARY TO INSTALL THE CONTROLLER CABINET WORK PAD FOR THE COMBINATION CONTROLLER & UNINTERRUPTIBLE POWER SUPPLY (UPS) CABINET.

IN ADDITION TO THE REQUIREMENTS OF CMS 633 & SCD TC-83.20, THE CONTRACTOR SHALL CONSTRUCT THE WORK PAD AS FOLLOWS:

-EXCAVATE A MINIMUM OF 9" BELOW GRADE
-PLACE COMPACT 6" OF MATERIAL CONFORMING TO 304.02
-INSTALL A CAST-IN-PLACE WORK PAD THAT IS A MINIMUM OF 4" THICK

PAYMENT FOR ITEM 633 CONTROLLER WORK PAD, AS PER PLAN SHALL INCLUDE ALL EQUIPMENT, LABOR, AND MATERIALS NECESSARY TO INSTALL A NEW CONCRETE WORK PAD.



NOTES:
1. THE SIZE OF THE FOUNDATION MAY VARY BASED ON THE CABINET SIZE PROVIDED.
2. CONDUIT AND WIRING FROM THE SIGNAL CABINET TO THE UPS SHALL BE INSTALLED THROUGH THE CABINET RISER.

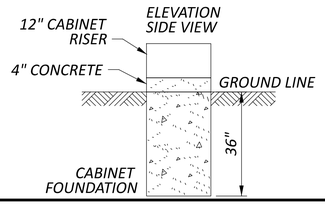
ITEM 633 CABINET FOUNDATION, AS PER PLAN

THIS ITEM SHALL INCLUDE THE EXCAVATION & CONCRETE NECESSARY TO INSTALL THE CONTROLLER CABINET FOUNDATION IN ORDER TO SUPPORT THE COMBINATION CONTROLLER & UNINTERRUPTIBLE POWER SUPPLY (UPS) CABINET. THE CONTROLLER & UPS CABINET FOUNDATION SHALL BE IN

ACCORDANCE WITH DETAILS BELOW, CMS 633, SCD TC-83.20, & PLAN INSERT SHEETS UNINTERRUPTIBLE POWER SUPPLY (UPS) FOUNDATION (PIS 208320).

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

CABINET FOUNDATION DETAIL



809 STOP-LINE RADAR DETECTION, AS PER PLAN
809 ADVANCE RADAR DETECTION, AS PER PLAN

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A WAVETRONIX SMARTSENSOR ADVANCE DETECTION UNIT (MODEL SS-200E). THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING:

1. POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET.
2. ALL REQUIRED INPUTS CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CALTRANS, NEMA TS1 AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.
3. THE UNIT SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM, AS RECOMMENDED BY THE MANUFACTURER. CABLE(S) SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.
4. SURGE PROTECTION DEVICES, AS RECOMMENDED BY THE MANUFACTURER SHALL BE INCLUDED BOTH AT THE POLE WHERE THE UNIT IS LOCATED TO PROTECT THE UNIT AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.
5. THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ONSITE TRAINING ON THE SETUP, OPERATION AND MAINTENANCE OF THE UNIT.
6. A SERIAL TO ETHERNET COMMUNICATIONS MODULE AND ETHERNET CABLE (MINIMUM 7 FEET).
7. THE POWER SUPPLY AND COMMUNICATION MODULES SHALL BE SECURED TO A SINGLE PANEL THAT CAN BE MOUNTED INTERIOR TO THE TRAFFIC CABINET. THE PANEL SHALL INCLUDE MODULAR-PLUG STYLE CONNECTIONS FOR UP TO FOUR (4) SENSOR CABLES. ADDITIONAL SENSORS MAY BE HARD-WIRED TO THE COMMUNICATION MODULES, AS NECESSARY.
8. THE CONTRACTOR SHALL INSTALL THE RADAR DETECTION PRIOR TO MILLING/DISABLING EXISTING LOOPS.
9. THE INSTALLATION SHALL INCLUDE ALL CONTROLLER PROGRAMMING FOR COMPLETE INSTALLATION, WHICH INCLUDES MODIFICATIONS FOR REMOVAL OF EXISTING DETECTION. PAYMENT FOR ITEM 809 ADVANCE RADAR DETECTION, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL DETECTION SYSTEM.

PAYMENT FOR ITEM 809 ADVANCE RADAR DETECTION, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT, CONNECTIONS TESTED AND ACCEPTED, AND ANY OTHER NECESSARY HARDWARE TO ESTABLISH A FULLY FUNCTIONAL DETECTION SYSTEM.

SIGNAL GENERAL NOTES

DESIGN AGENCY

DESIGNER JMW
REVIEWER RMM 07-02-26
PROJECT ID 124366
SHEET P.3 TOTAL 21

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GROUNDING AND BONDING

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

1. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH.
   - A. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (725.04) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR.
   - B. WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (725.05), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED.
   - C. METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END, AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.
   - D. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
   - E. IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS.
   - F. THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT.

2. CONDUITS.
   - A. THE 725.04 CONDUIT SHALL HAVE GROUNDING BUSHINGS INSTALLED AT ALL TERMINATION POINTS. THE BUSHING MATERIAL SHALL BE COMPATIBLE WITH GALVANIZED STEEL CONDUIT AND THE GROUNDING LUG MATERIAL SHALL BE COMPATIBLE FOR USE WITH COPPER WIRE. THREADED OR COMPRESSION TYPE BUSHINGS MAY BE USED.
   - B. THE 725.05 CONDUIT SHALL HAVE THE INSIDE AND OUTSIDE DIAMETERS OF THE CONDUIT DEBURRED AT ALL TERMINATION POINTS.
   - C. BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
   - D. METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS 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 STRIPE(S). FOR 4 AWG OR LARGER, INSULATION MAY ALSO BE BLACK WITH GREEN TAPE/LABELS INSTALLED AT ALL ACCESS POINTS.
   - B. IN A HIGHWAY LIGHTING SYSTEM, THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THE SAME WIRE SIZE AS THE DUCT CABLE OR DISTRIBUTION CABLE CIRCUIT CONDUCTORS, WITH THE MINIMUM CONDUCTOR SIZE OF 4 AWG. BONDING JUMPERS WILL BE MINIMUM SIZE 4 AWG.

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

5. THE GREEN CONDUCTOR IN SIGNAL CABLES (CONDUCTOR #4) SHALL NOT BE USED TO SUPPLY POWER TO A SIGNAL INDICATION. IT WILL BE CONNECTED TO THE SIGNAL BODY AS AN EQUIPMENT GROUND IN ALUMINUM HEADS AND IT WILL BE UNUSED IN PLASTIC HEADS. UNUSED CONDUCTORS SHALL BE GROUNDED IN THE CABINET. TYPICAL USE OF CONDUCTORS IS AS FOLLOWS:

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.

625 ARC FLASH CALCULATIONS AND LABEL

THE CONTRACTOR SHALL SATISFY THE REQUIREMENTS OF ODOT SUPPLEMENTAL SPECIFICATION 825 FOR THE CONTROL CENTERS. THE CONTRACTOR MAY BE ABLE TO OBTAIN LABELS FOR THE ODOT MAINTAINED INSTALLATIONS FROM THE ODOT SIGN SHOP, 1606 WEST BROAD ST., COLUMBUS, OH 43223, FOR NON-ODOT MAINTAINED INSTALLATIONS THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE LABEL MADE FROM "ENGINEER GRADE" SIGN SHEETING OR AN EQUIVALENT LABEL MATERIAL

THE ODOT OFFICE OF ROADWAY ENGINEERING & THE DISTRICT OFFICE HAVE AN EXCEL SPREADSHEET AVAILABLE UPON REQUEST, TO ASSIST WITH MAKING & DOCUMENTING THE REQUIRED CALCULATIONS.

METHOD OF MEASUREMENT SHALL BE AS PER 825.06.

633 CABINET, TYPE TS-2, AS PER PLAN

THE CABINET SHALL BE FURNISHED AND INSTALLED ACCORDING TO CMS 633 AND 733 AND BE LISTED ON THE TRAFFIC AUTHORIZED PRODUCTS LIST (TAP).

THE GROUND-MOUNTED CABINET SHALL BE A NEMA TS-2, TYPE 1, CABINET SIZE 6 WITH 16 LOAD SWITCH BAYS, LED UNDER-SHELF LIGHTING, POWER HARNESSES FOR BOTH TS2 TYPE 1 AND TYPE 2 CONTROLLERS AND SHALL HAVE A MINIMUM OF THREE SHELVES.

THE GROUND MOUNTED CABINET SHALL BE A COMBINATION CONTROLLER AND UPS CABINET, ALUMINUM WITH NATURAL SATIN FINISH, MEASURING 58"H X 60"W X 26"D, INCLUDE 12" RISER, CONTAIN A PULL-OUT DOCUMENT DRAWER WITH HOLD-CLOSED AND LOCK-OPEN FEATURE WITH NON SKID SURFACE DESIGNED TO SUPPORT THE WEIGHT OF A TYPICAL LAPTOP COMPUTER BEING MOUNTED BELOW TH TIMER SHELF, AND SHALL COMPLY WIHT THE REQUIREMENTS OF 733.03

EACH CABINET SHALL COME EQUIPPED WITH TWO 16-CHANNEL CABINET DETECTOR RACKS (CDR) INCLUDING BUS INTERFACE UNITS (BIU). THE LOOP DETECTOR TERMINATION PANEL FOR THE SECOND DETECTOR RACK SHALL BE OMITTED.

CABINET SHALL INCLUDE 3 BREAKERS.

THE CABINET SHALL BE FURNISHED WITH AN EDI MMU AS ALLOWED ON THE TAP/APPROVED PRODUCTS LIST.

A .PDF COPY OF THE CABINET DRAWINGS SHALL BE SENT TO MICHELLE.CHANEY@DOT.OHIO.GOV

PAYMENT FOR ITEM 633 CABINET, TYPE TS-2, AS PER PLAN WILL BE AT THE CONTRACT BID PRICE PER EACH COMPLETE AND IN PLACE INCLUDING ALL CONNECTIONS TESTED AND ACCEPTED.

809 ATC CONTROLLER, AS PER PLAN (PROGRAM AND INSTALL ONLY)

ALL REQUIREMENTS OF SS 809 SHALL BE FOLLOWED, ALONG WITH THE ADDITIONAL DESCRIPTION AS STATED BELOW. THE ATC CONTROLLER WILL BE PROVIDED BY THE DISTRICT WITHOUT PROGRAMMING. IN THE CASE OF A 332/336 CABINET TYPE, THE CONTROLLER WILL BE PROVIDED WITH THE POWER CORD.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING THE CONTROLLER TO THE PROPOSED CONDITIONS ACCORDING TO THE PLANS. ODOT WILL NOT BE RESPONSIBLE FOR THE PROGRAMMING.

THE CONTROLLER SHALL BE LISTED ON THE TAP AND BE AN ECONOLITE COBALT AND COMPATIBLE WITH THE CABINET TYPE BEING INSTALLED.

PAYMENT SHALL BE MADE ONCE THE CONTROLLER IS PROGRAMMED, INSTALLED, TESTED, FUNCTIONING ACCORDING TO THE PLANS, AND SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS TO COMPLETE THE WORK.

REVISED

ITEM SPECIAL - AS-BUILT CONSTRUCTION PLANS

PRIOR TO FINAL ACCEPTANCE OF THE WORK, THE CONTRACTOR SHALL FURNISH THE DEPARTMENT FORMAL AS-BUILT CONSTRUCTION PLANS. THE FORMAL AS-BUILT CONSTRUCTION PLANS SHALL INCLUDE ALL RED-LINED CHANGES. RED-LINE CHANGE SHALL BE DENOTED UTILIZING CLOUDING IN MICROSTATION (OR OTHER CAD SOFTWARE) OR CLOUDING IN PDF EDITING SOFTWARE. THE AS-BUILT CONSTRUCTION PLANS SHALL HAVE A SIGNED VERIFICATION ON THE TITLE SHEET FROM THE CONTRACTOR INDICATING THAT ALL RED-LINED AND FIELD CHANGES HAVE BEEN INCORPORATED INTO AS-BUILT CONSTRUCTION PLANS.

THE CONTRACTORS VERIFICATION STATEMENT INDICATES ALL KNOWN FIELD MODIFICATIONS MADE HAVE BEEN INCLUDED IN THE FORMAL AS-BUILT CONSTRUCTION PLANS. THE CONTRACTORS VERIFICATION STATEMENT SHALL BE SIGNED BY THE CONTRACTORS PROJECT MANAGER (OR ACCEPTABLE REPRESENTATIVE).

IN ADDITION TO THE INFORMATION SHOWN ON THE CONSTRUCTION PLANS, THE AS-BUILT CONSTRUCTION PLANS SHALL SHOW THE FOLLOWING:

1. ALL DEVIATIONS FROM THE ORIGINAL APPROVED CONSTRUCTION PLANS WHICH RESULT IN A CHANGE OF LOCATION, MATERIAL, TYPE OR SIZE OF WORK.
2. ANY UTILITIES, PIPES, WELLHEADS, ABANDONED PAVEMENTS, FOUNDATIONS OR OTHER MAJOR OBSTRUCTIONS DISCOVERED AND REMAINING IN PLACE WHICH ARE NOT SHOWN, OR DO NOT CONFORM TO LOCATIONS OR DEPTHS SHOWN IN THE PLANS. UNDERGROUND FEATURES SHALL BE SHOWN AND LABELED ON THE AS-BUILT CONSTRUCTION PLANS IN TERMS OF STATION, OFFSET AND ELEVATION.
3. THE FINAL OPTION AND SPECIFICATION NUMBER SELECTED FOR THOSE ITEMS WHICH ALLOW SEVERAL MATERIAL OPTIONS UNDER THE SPECIFICATION (E.G., CONDUIT).
4. CHANGES TO THE PAY ITEMS AND FINAL QUANTITIES AS PAID SHALL BE SHOWN ON THE GENERAL SUMMARY AND SUBSUMMARIES.
5. ADDITIONAL PLAN SHEETS MAY BE NEEDED IF NECESSARY TO SHOW WORK NOT INCLUDED IN THE CONSTRUCTION PLANS. IF ADDITIONAL PLAN SHEETS ARE NEEDED, THEY ARE REQUIRED TO BE PREPARED IN CONFORMANCE WITH THE LOCATION AND DESIGN MANUAL, VOLUME 3, SECTION 1200 - PLAN PREPARATION.

NOTATION SHALL ALSO BE MADE OF LOCATIONS AND THE EXTENT OF USE OF MATERIALS, OTHER THAN SOIL, FOR EMBANKMENT CONSTRUCTION (ROCK, BROKEN CONCRETE WITHOUT REINFORCING STEEL, ETC.).

THE PLAN INDEX SHALL SHOW THE PLAN SHEETS WHICH HAVE CHANGES APPEARING ON THEM.

TWO COPIES OF THE AS-BUILT CONSTRUCTION PLANS SHALL BE DELIVERED TO THE PROJECT ENGINEER FOR APPROVAL UPON COMPLETION OF THE PHYSICAL WORK BUT PRIOR TO THE REQUEST FOR FINAL PAYMENT. AFTER THE DEPARTMENT HAS APPROVED THE AS-BUILT CONSTRUCTION PLANS, THE ASSOCIATED ELECTRONIC FILES SHALL BE DELIVERED TO THE DISTRICT CAPITAL PROGRAMS ADMINISTRATOR. ACCEPTANCE OF THESE PLANS AND DELIVERY OF THE ASSOCIATED ELECTRONIC FILES IS REQUIRED PRIOR TO THE WORK BEING ACCEPTED AND THE FINAL ESTIMATE APPROVED.

PAYMENT FOR ALL THE ABOVE SHALL BE LUMP SUM UPON PROPER EXECUTION OF ALL WORK OF THIS ITEM AS DETERMINED BY THE PROJECT ENGINEER.

SIGNAL GENERAL NOTES

DESIGN AGENCY

DESIGNER JMW

REVIEWER RMM 07-02-26

PROJECT ID 124366

SHEET P.4 TOTAL 21

ATB-45/7-19.93/28.84

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																		ROADWAY	
	25											25		202	38201	25	FT	GUARDRAIL REMOVED FOR REUSE, AS PER PLAN	P.2
		LS										LS		SPECIAL	69091000	LS		AS-BUILT CONSTRUCTION PLANS	P.4
																		EROSION CONTROL	
												1,000		832	30000	1,000	EACH	EROSION CONTROL	
																		TRAFFIC CONTROL	
				64	56							120		630	80224	120	SF	SIGN, OVERHEAD EXTRUSHEET	
				4	2							4	2	630	84900	6	EACH	REMOVAL OF GROUND MOUNTED SIGN	
				1									1	630	89705	1	EACH	REMOVAL OF OVERHEAD SIGN SUPPORT, SINGLE ARM CANTILEVER TYPE, AS PER PLAN, STORAGE	P.10
							42	26				68		642	30000	68	FT	REMOVAL OF PAVEMENT MARKING	
						38	77	87				164	38	646	10400	202	FT	STOP LINE	
																		TRAFFIC SIGNALS	
	18											18		611	00400	18	FT	4" CONDUIT, TYPE E	
				58	28							55	31	625	25500	86	FT	CONDUIT, 3", 725.04	
				331	173							345	159	625	25902	504	FT	CONDUIT, JACKED OR DRILLED, 725.04, 4"	
				58	28							55	31	625	29400	86	FT	TRENCH IN PAVED AREA	
				4	2							4	2	625	30706	6	EACH	PULL BOX, 725.08, 24"	
				6	3							6	3	625	32000	9	EACH	GROUND ROD	
				58	28							55	31	625	36011	86	FT	UNDERGROUND WARNING/MARKING TAPE, AS PER PLAN	P.3
				1									1	625	76000	1	EACH	ARC FLASH CALCULATIONS AND LABEL (ATB 45 CONTROLLER)	
				1	1							2		625	76000	2	EACH	ARC FLASH CALCULATIONS AND LABEL (ATB 7 CONTROLLER)	
				12	7							14	5	632	05006	19	EACH	VEHICULAR SIGNAL HEAD, (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, BLACK	
				2	1							2	1	632	05086	3	EACH	VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, BLACK	
				14	8							16	6	632	25000	22	EACH	COVERING OF VEHICULAR SIGNAL HEAD	
				553	214							416	351	632	40500	767	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG	
				428	305							609	124	632	40700	733	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG	
				4	2							4	2	632	64000	6	EACH	POLE FOUNDATION, TYPE TC-21.21	
				60	30							60	30	632	69300	90	FT	POWER CABLE, 3 CONDUCTOR, NO. 4 AWG	
				2	1							2	1	632	70001	3	EACH	POWER SERVICE, AS PER PLAN	P.3
				1									1	632	72140	1	EACH	SIGNAL SUPPORT, TYPE TC-81.22, DESIGN 13	
				1	1							2		632	72150	2	EACH	SIGNAL SUPPORT, TYPE TC-81.22, DESIGN 14	
				2	1							2	1	632	78368	3	EACH	COMBINATION SIGNAL SUPPORT, TYPE TC-12.31 DESIGN 10 POLE, WITH MAST ARMS TC-81.22 DESIGN 13 AND DESIGN 12	P.12
				2	1							2	1	633	65511	3	EACH	CABINET, TYPE TS-2, AS PER PLAN	P.4
				2	1							2	1	633	67101	3	EACH	CABINET FOUNDATION, AS PER PLAN	P.3
				2	1							2	1	633	67201	3	EACH	CONTROLLER WORK PAD, AS PER PLAN	P.3
				2	1							2	1	633	75001	3	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN	P.3
				4	2							4	2	809	69001	6	EACH	ADVANCE RADAR DETECTION, AS PER PLAN	P.3
				4	2							4	2	809	69101	6	EACH	STOP LINE RADAR DETECTION, AS PER PLAN	P.3
				2	1							2	1	809	69123	3	EACH	ATC CONTROLLER, AS PER PLAN, (PROGRAM AND INSTALL ONLY)	P.4
			50									50		614	11110	50	HOUR	**MAINTENANCE OF TRAFFIC** LAW ENFORCEMENT OFFICER WITH PATROL CAR FOR ASSISTANCE	
												LS		614	11000	LS		**INCIDENTALS** MAINTAINING TRAFFIC	
												10		619	16010	10	MNTH	FIELD OFFICE, TYPE B	
												LS		623	10000	LS		CONSTRUCTION LAYOUT STAKES AND SURVEYING	
												LS		624	10000	LS		MOBILIZATION	

revised

SIGNAL GENERAL SUMMARY

DESIGN AGENCY

DESIGNER JMW

REVIEWER RMM 07-02-26

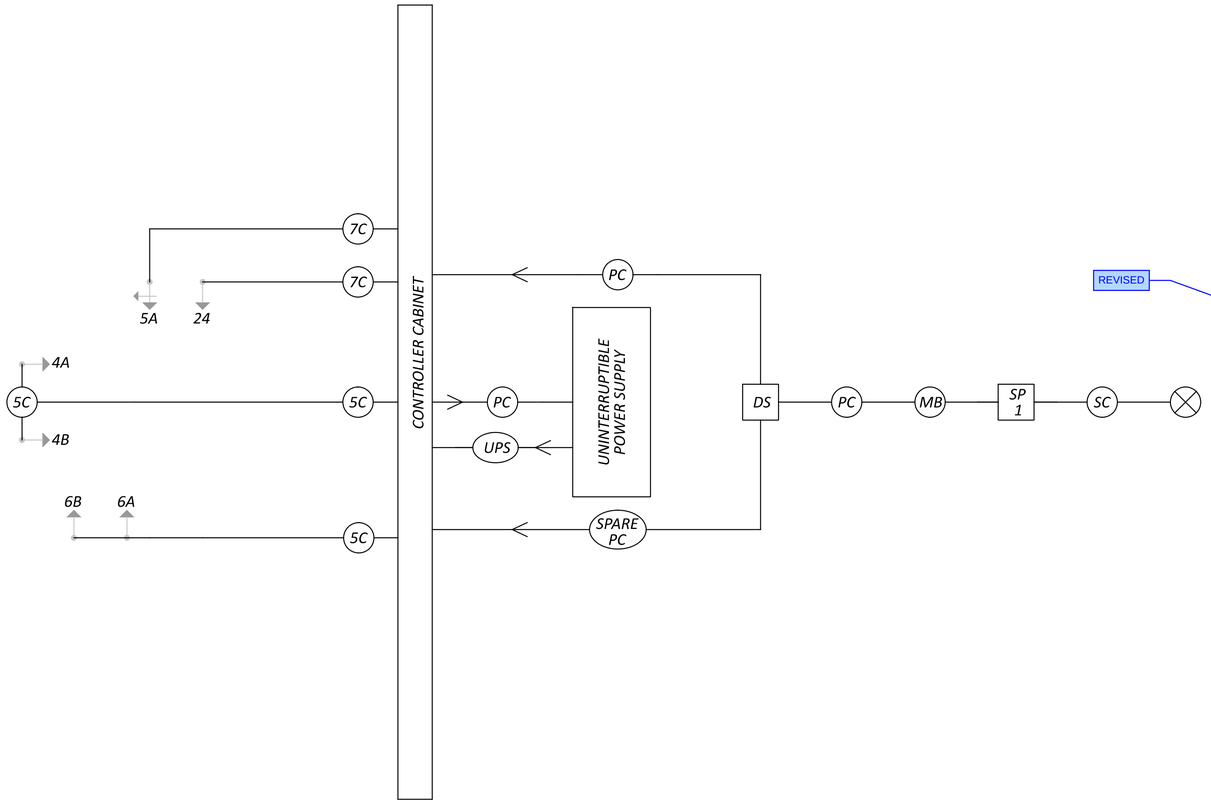
PROJECT ID 124366

SHEET P.7 TOTAL 21

ATB-45/7-19.93/28.84

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WIRING DIAGRAM



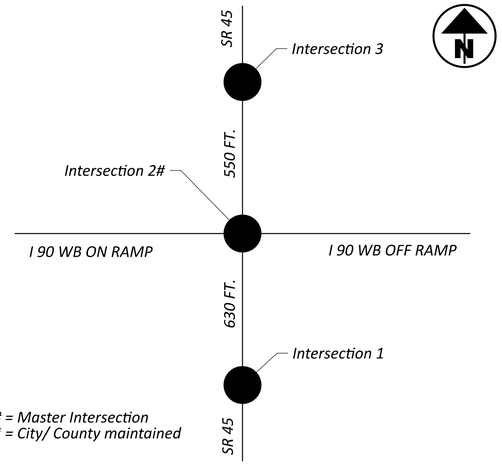
FIELD WIRING HOOK-UP CHART

TEM Form 496-16 Field Wiring Hook-up Chart			
SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A (NB)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
	-	-	
	-	-	
5A (NB LT)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
	<--Y---	Φ5 Y	
	<--G---	Φ5 G	
4A,4B (WB)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
	-	-	
	-	-	
6A,6B (SB)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	
	-	-	
	-	-	

LEGEND

- TRAFFIC SIGNAL, 2 UNIT, 3 UNIT, OR PHB HEAD 12"
- TRAFFIC SIGNAL, 5 UNIT, 12"
- D — DILEMMA ZONE RADAR DETECTION UNIT
- S — STOP LINE RADAR DETECTION UNIT
- 5C — SIGNAL CABLE, 5 CONDUCTOR, NO. XX AWG
- 7C — SIGNAL CABLE, 7 CONDUCTOR, NO. XX AWG
- RC — RADAR DETECTION CABLE
- INT — INTERCONNECT CABLE
- POWER SOURCE
- SC — SERVICE CABLE, 3 CONDUCTOR, NO. X AWG
- PC — POWER CABLE, 2 CONDUCTOR, NO. X AWG
- SP 1 — SIGNAL SUPPORT POLE NO. __
- MB — METER BASE
- DS — SIGNAL DISCONNECT SWITCH
- UPS — UNINTERRUPTIBLE POWER SUPPLY CABLE
- HOA — HAND/ OFF/ AUTO SWITCH

COORDINATION PLAN



PROPOSED TIMING										
"INTERSECTION 1"										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	NB	-	EB	-	SB	-	-		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
10	-	45	-	25	-	45	-	-	28	-
30	-	55	-	25	-	55	-	-	14	-
"INTERSECTION 3"										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	NB	-	EB	-	SB	-	WB		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
10	-	43	-	27	-	43	-	27	0	-
30	-	53	-	27	-	53	-	27	0	-
"INTERSECTION 2"										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	NB	-	-	NBL	SB	-	WB		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
10	-	54	-	-	15	39	-	16	2	-
30	-	62	-	-	12	50	-	18	71	-

PROPOSED				
COORDINATION TIMING PLANS				
DAY(S) OF WEEK	PLAN NAME	HOURS	PLAN NO. OR CYCLE/SPLIT/OFFSET	CYCLE LENGTH (SEC)
MON-FRI	FREE	0000-0600	FREE	-
MON-FRI	AM Plan	0600-0800	10	70
MON-FRI	FREE	0800-1400	FREE	-
MON-FRI	PM Plan	1400-1800	30	80
MON-FRI	FREE	1800-2400	FREE	-
SAT-SUN	FREE	0000-2400	FREE	-

SIGNAL DETAILS
ATB IR 90 WB AT SR 45

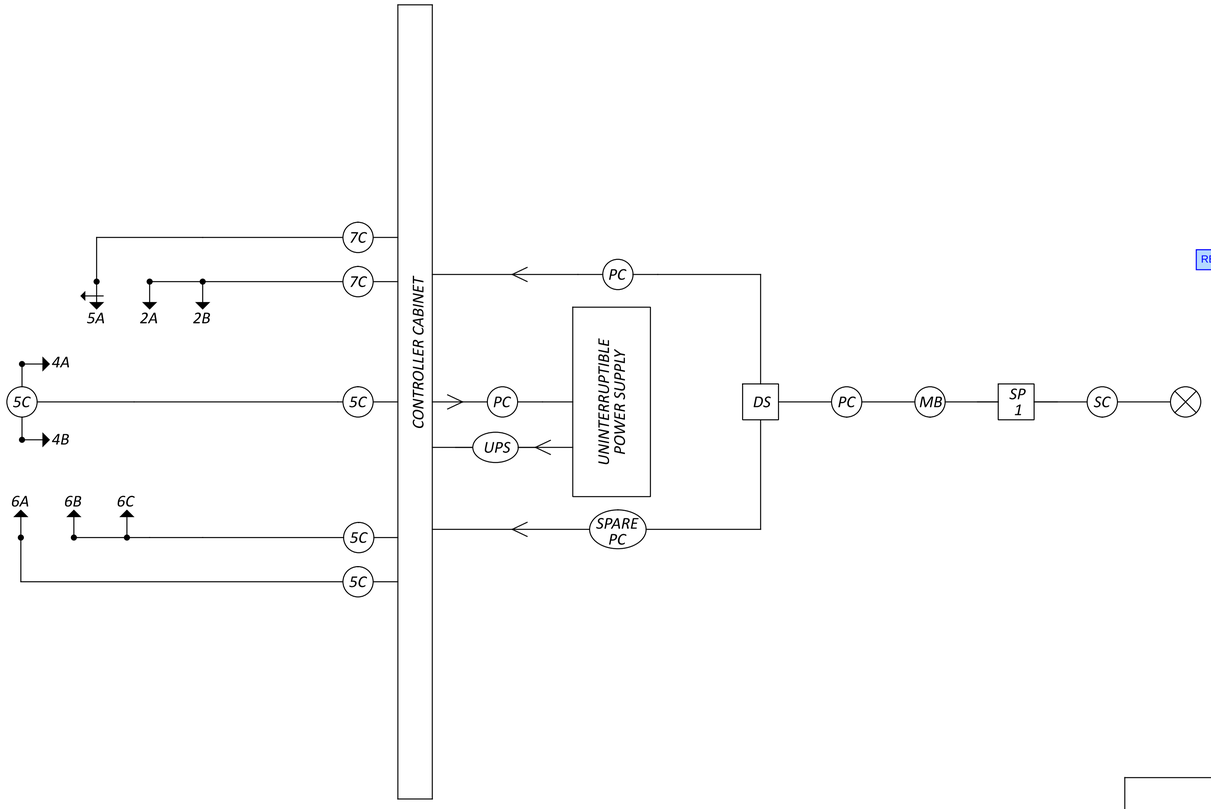
DESIGN AGENCY

DESIGNER JMW
REVIEWER RMM 07-02-26
PROJECT ID 124366
SHEET P.13 TOTAL 21

ATB-45/7-19.93/28.84

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

REVISED

TEM Form 496-16 Field Wiring Hook-up Chart			
SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A,2B (NB)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
	-	-	
	-	-	
5A (NB LT)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
	<--Y---	Φ5 Y	
	<--G---	Φ5 G	
4A,4B (WB)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
	-	-	
	-	-	
6A,6B,6C (SB)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	
	-	-	
	-	-	

LEGEND

- TRAFFIC SIGNAL, 2 UNIT, 3 UNIT, OR PHB HEAD 12"
- TRAFFIC SIGNAL, 5 UNIT, 12"
- DILEMMA ZONE RADAR DETECTION UNIT
- STOP LINE RADAR DETECTION UNIT
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- STRUCTURE MOUNTED LUMINAIRE
- 5C — SIGNAL CABLE, 5 CONDUCTOR, NO. XX AWG
- 7C — SIGNAL CABLE, 7 CONDUCTOR, NO. XX AWG
- RC — RADAR DETECTION CABLE
- INT — INTERCONNECT CABLE
- POWER SOURCE
- SC — SERVICE CABLE, 3 CONDUCTOR, NO. X AWG
- PC — POWER CABLE, 2 CONDUCTOR, NO. X AWG
- SP 1 — SIGNAL SUPPORT POLE NO. __
- MB — METER BASE
- NX — NO. X AWG DISTRIBUTION CABLE
- NXX — SIGNAL CABLE, 4 CONDUCTOR, NO. XX AWG
- DS — SIGNAL DISCONNECT SWITCH
- DL — LIGHTING DISCONNECT SWITCH
- UPS — UNINTERRUPTIBLE POWER SUPPLY CABLE
- HOA — HAND/ OFF/ AUTO SWITCH

SIGNAL DETAILS
ATB IR 90 WB AT SR 7

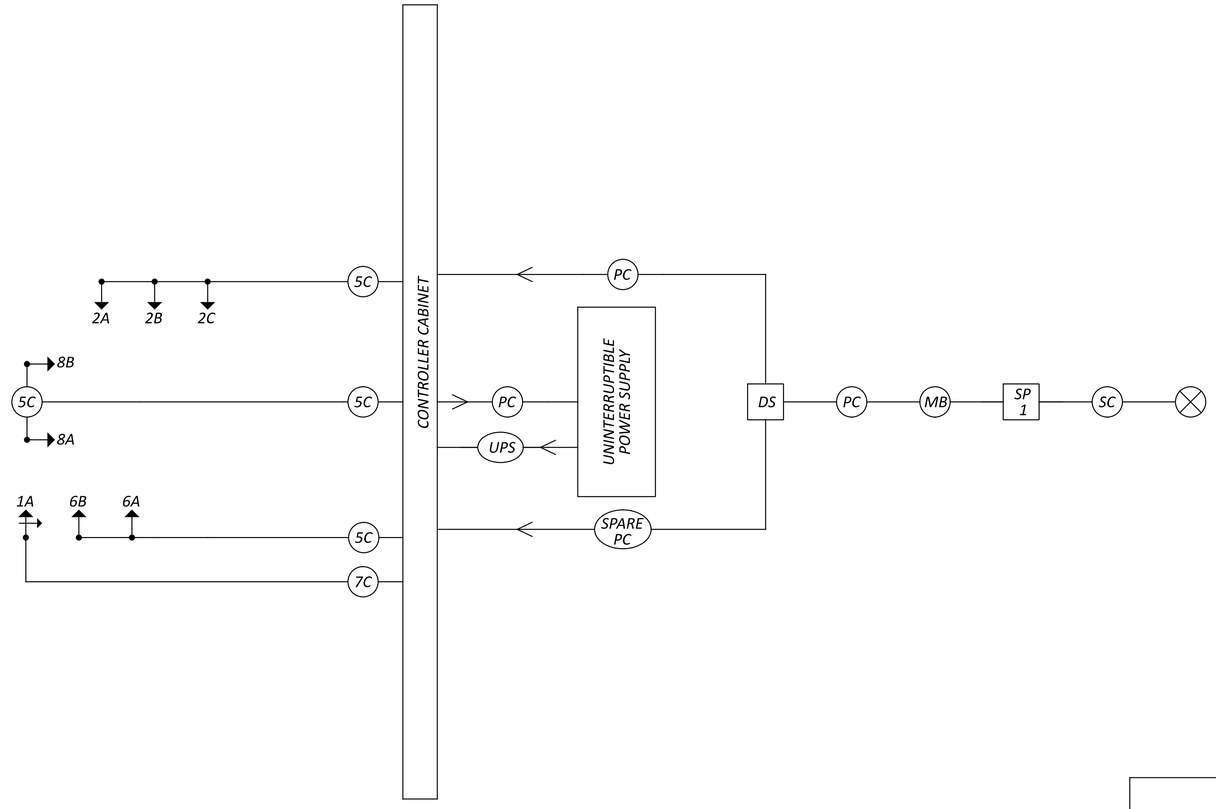
DESIGN AGENCY

DESIGNER JMW
REVIEWER RMM 07-02-26
PROJECT ID 124366
SHEET P.17 TOTAL 21

ATB-45/7-19.93/28.84

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

REVISED

TEM Form 496-16 Field Wiring Hook-up Chart			
SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A,2B,2C (NB)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
	-	-	
	-	-	
6A,6B (SB)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
	-	-	
	-	-	
1A (SB LT)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	
	<--Y---	Φ1 Y	
	<--G---	Φ1 G	
8A,8B (EB)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	
	-	-	
	-	-	

LEGEND

- TRAFFIC SIGNAL, 2 UNIT, 3 UNIT, OR PHB HEAD 12"
- TRAFFIC SIGNAL, 5 UNIT, 12"
- DILEMMA ZONE RADAR DETECTION UNIT
- STOP LINE RADAR DETECTION UNIT
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- STRUCTURE MOUNTED LUMINAIRE
- 5C — SIGNAL CABLE, 5 CONDUCTOR, NO. XX AWG
- 7C — SIGNAL CABLE, 7 CONDUCTOR, NO. XX AWG
- RC — RADAR DETECTION CABLE
- INT — INTERCONNECT CABLE
- POWER SOURCE
- SC — SERVICE CABLE, 3 CONDUCTOR, NO. X AWG
- PC — POWER CABLE, 2 CONDUCTOR, NO. X AWG
- SP 1 — SIGNAL SUPPORT POLE NO. __
- MB — METER BASE
- NX — NO. X AWG DISTRIBUTION CABLE
- NXX — SIGNAL CABLE, 4 CONDUCTOR, NO. XX AWG
- DS — SIGNAL DISCONNECT SWITCH
- DL — LIGHTING DISCONNECT SWITCH
- UPS — UNINTERRUPTIBLE POWER SUPPLY CABLE
- HOA — HAND/ OFF/ AUTO SWITCH

SIGNAL DETAILS
ATB IR 90 EB AT SR 7

DESIGN AGENCY

DESIGNER JMW

REVIEWER RMM 07-02-26

PROJECT ID 124366

SHEET P.21 | TOTAL 21

ATB-45/7-19.93/28.84

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