SHEET NUM.													PART.	ITEM	ITEM EXT	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
							4	12	13	47			01/SAE/OT						
																		WATER WORK	
							90						90	SPECIAL	63820824	90	FT	INSTALL 1" COPPER WATER SERVICE CONNECTION (BCWS 2410)	4
																		TRAFFIC CONTROL	
									7				7	621	00100	7	EACH	RPM, 1-WAY (WHITE	
									7				7	621	00100	7	EACH	RPM, 2-WAY (WHITE/RED)	
									6				6	621	00100	6	EACH	RPM, 2-WAY 9YELLOW/YELLOW)	
								335					335	630	03100	335	FT	GROUND MOUNTED SUPPORT, NO. 3 POST	
								22					22	630	08600	22	EACH	SIGN POST REFLECTOR	
										6			6	630	79101	6	EACH	SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN	34
										1			1	630	79500	1	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED	
								121		27			148	630	80100	148	SF	SIGN, FLAT SHEET	
										3			3	630	80510	3	EACH	SIGN, STREET NAME	
										57			57	630	83000	57	SF	COVERING OF SIGN	
								20					20	630	84900	20	EACH	REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL	
								2					2	630	85100	2	EACH	REMOVAL OF GROUND MOUNTED SIGN AND REERECTION	
								20					20	630	86002	20	EACH	REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL	
									0.24				0.24	644	00104	0.24	MILE	EDGE LINE, 6", WHITE	
									0.03				0.03	644	00300	0.03	MILE	CENTER LINE, 4", SOLID DOUBLE YELLOW	
									389				389	644	00400	389	FT	CHANNELIZING LINE, 8"	
									99				99	644	00500	99	FT	STOP LINE, 24"	
									440				440	644	00600	440	FT	CROSSWALK LINE, 12"	
									20				20	644	00700	20	FT	TRANSVERSE/DIAGONAL LINE, 24", WHITE	
									4				4	644	01300	4	EACH	LANE ARROW, 6'	
									302				302	644	01500	302	FT	DOTTED LINE, 4", YELLOW	
									550				550	644	30000	550	FT	REMOVAL OF PAVEMENT MARKING	
																		TRAFFIC SIGNALS	
										3			3	625	00450	3	EACH	CONNECTION, FUSED PULL APART	
										3			3	625	00480	3	EACH	CONNECTION, UNFUSED PULL APART	
										2			2	625	18600	2	EACH	BRACKET ARM, MISC.: 30', INSTALLATION ONLY	
										310			310	625	33000	310	FT	NO. 4 AWG 600 VOLT DISTRIBUTION CABLE	
										150			150	625	23400	150	FT	NO. 10 AWG POLE AND BRACKET CABLE	
										28			28	625	25400	28	FT	CONDUIT, 2", 725.04	
										12			12	625	25402	12	FT	CONDUIT, 2", 725.05	
										51			51	625	25502	51	FT	CONDUIT, 3", 725.05	
										90			90	625	25602	90	FT	CONDUIT, 4", 725.05	
										327			327	625	25908	327	FT	CONDUIT, JACKED OR DRILLED, 725.052, 4"	
										2			2	625	26252	2	EACH	LUMINAIRE, CONVENTIONAL, SOLID STATE (LED), TYPE IV DISTRIBUTION, 194W, 120/277V	
										153			153	625	29000	153	FT	TRENCH	
										4			4	625	30706	4	EACH	PULL BOX, 725.08, 24"	
										4			4	625	31510	4	EACH	PULL BOX REMOVED	
										6			6	625	32000	6	EACH	GROUND ROD	
										153			153	625	36010	153	FT	UNDERGROUND WARNING/MARKING TAPE	
										2			2	625	75400	2	EACH	LIGHT POLE REMOVED	
										9			9	632	05007	9	EACH	VEHICULAR SIGNAL HEAD, (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, AS PER PLAN, BLACK, WITH BACKPLATE	34
										3			3	632	05087	3	EACH	VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, AS PER PLAN, BLACK, WITH BACKPLATE	34
										6			6	632	20731	6	EACH	PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AS PER PLAN	34
										12			12	632	25000	12	EACH	COVERING OF VEHICULAR SIGNAL HEAD	
										6			6	632	25010	6	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD	
										2			2	632	26000	2	EACH	PEDESTRIAN PUSHBUTTON	
										1,580			1,580	632	40500	1,580	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG	
										1,580			1,580	632	40700	1,580	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG	
										4			4	632	64010	4	EACH	SIGNAL SUPPORT FOUNDATION	
										1			1	632	64020	1	EACH	PEDESTAL FOUNDATION	
										45			45	632	68200	45	FT	POWER CABLE, 2 CONDUCTOR, NO. 6 AWG	
										1			1	632	70001	1	EACH	POWER SERVICE, AS PER PLAN	34

CALCULATED AAA
CHECKED JWB

GENERAL SUMMARY

BUT-4-13.90

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 WITH 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.

ITEM 625 BRACKET ARM, MISC.: 30', INSTALLATION ONLY

THE CONTRACTOR IS TO PICKUP THE PEDESTAL AND TRANSFORMER BASE FROM DISTRICT 8 COMPLEX, 3701 TYTUS AVENUE, MIDDLETOWN, OHIO 45042. THE CONTRACTOR IS TO CONTACT ALEX BAIR, PROJECT ENGINEER, AT 513.933.6729 TO COORDINATE PICKUP OF EQUIPMENT. THE PEDESTAL WILL BE AVAILABLE FOR PICKUP ON JULY 1, 2021.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH AND WILL BE FULL COMPENSATION FOR ALL LABOR, TOOLS, EQUIPMENT AND OTHER INCIDENTALS NECESSARY FOR INSTALLATION OF ITEM 625 BRACKET ARM, MISC.: 30', *INSTALLATION ONLY.*

CALCULATED GSH
CHECKED SAK

SIGNAL NOTES

BUT-4-13.90

SUBSUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	3	EACH	CONNECTION, FUSED PULL APART
625	3	EACH	CONNECTION, UNFUSED PULL APART
625	2	EACH	BRACKET ARM, MISC.: 30', INSTALLATION ONLY
625	310	FT	NO. 4 AWG 600 VOLT DISTRIBUTION CABLE
625	150	FT	NO. 10 AWG POLE AND BRACKET CABLE
625	28	FT	CONDUIT, 2", 725.04
625	12	FT	CONDUIT, 2", 725.05
625	51	FT	CONDUIT, 3", 725.05
625	90	FT	CONDUIT, 4", 725.05
625	327	FT	CONDUIT, JACKED OR DRILLED, 725.052, 4"
625	2	EACH	LUMINAIRE, CONVENTIONAL, SOLID STATE (LED)
625	153	FT	TRENCH
625	4	EACH	PULL BOX, 725.08, 24"
625	4	EACH	PULL BOX REMOVED
625	6	EACH	GROUND ROD
625	153	FT	UNDERGROUND WARNING/MARKING TAPE
625	2	EACH	LIGHT POLE REMOVED
630	6	EACH	SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN
630	1	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	27	SF	SIGN, FLAT SHEET
630	3	EACH	SIGN, STREET NAME
630	57	SF	COVERING OF SIGN
632	9	EACH	VEHICULAR SIGNAL HEAD, (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, AS PER PLAN, BLACK, WITH BACKPLATE
632	3	EACH	VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, AS PER PLAN, BLACK, WITH BACKPLATE
632	6	EACH	PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AS PER PLAN
632	12	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	6	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	2	EACH	PEDESTRIAN PUSHBUTTON
632	1580	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	1580	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	4	EACH	SIGNAL SUPPORT FOUNDATION
632	1	EACH	PEDESTAL FOUNDATION
632	45	FT	POWER CABLE, 2 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	4	EACH	SIGNAL SUPPORT, MISC.: SIGNAL SUPPORT, INSTALLATION ONLY, AS PER PLAN
632	1	EACH	PEDESTAL, MISC.: PEDESTAL, TRANSFORMER BASE, INSTALLATION ONLY, AS PER PLAN
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION
632	1	EACH	REUSE OF STRAIN POLE
633	1	EACH	CABINET, TYPE 332, AS PER PLAN
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
633	1	EACH	CONTROLLER WORK PAD
633	1	EACH	COMMUNICATIONS, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
809	1	EACH	CCTV IP-CAMERA SYSTEM, DOME-TYPE, AS PER PLAN
809	3	EACH	ADVANCE RADAR DETECTION, AS PER PLAN
809	4	EACH	STOP LINE RADAR DETECTION, AS PER PLAN
809	1	EACH	ATC V6.24 CONTROLLER, AS PER PLAN

CALCULATED GSH
CHECKED SAK

TRAFFIC SIGNAL PLAN DETAILS
STATE ROUTE 4 & STATE ROUTE 747

BUT-4-13.90