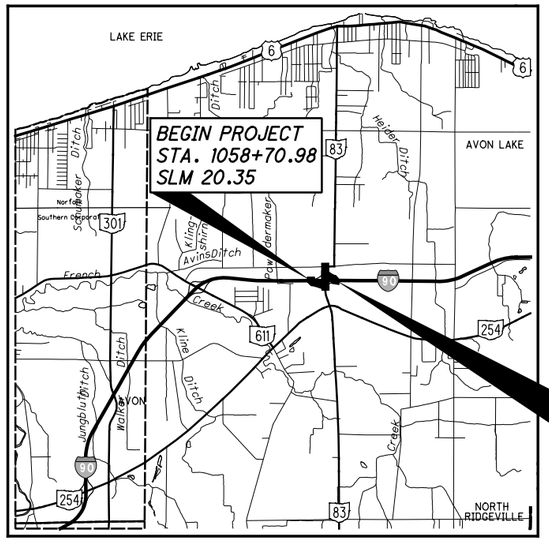


LOCATION MAP

LATITUDE: 41°27'52.10" LONGITUDE: 82°1'18.75"

SCALE IN MILES
0 1 2 3 4

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

DESIGN DESIGNATION

	U.S. 90 EB OFF-RAMP	U.S. 90 WB OFF-RAMP	S.R. 83 NORTH LEG	S.R. 83 SOUTH LEG
CURRENT ADT (2018)	5,925	10,180	31,380	31,425
DESIGN YEAR ADT (2039)	6,120	10,650	31,380	32,880
DESIGN HOURLY VOLUME (2039)	610	1,440	3,410	3,520
DIRECTIONAL DISTRIBUTION	100%	100%	51%	55%
TRUCKS (24 HOUR B&C)	429	426	1,256	987
DESIGN SPEED	70 MPH	70 MPH	50 MPH	50 MPH
LEGAL SPEED	65 MPH	65 MPH	45 MPH	45 MPH
DESIGN FUNCTIONAL CLASSIFICATION:	02 INTERSTATE OFF-RAMP (URBAN)	02 INTERSTATE OFF-RAMP (URBAN)	03 PRINCIPAL ARTERIAL (URBAN)	03 PRINCIPAL ARTERIAL (URBAN)
NHS PROJECT	YES	YES	NO	NO

DESIGN EXCEPTIONS

NONE REQUIRED

UNDERGROUND UTILITIES

CONTACT BOTH SERVICES
CALL TWO WORKING DAYS
BEFORE YOU DIG

CALL
1-800-362-2764
(TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

OIL & GAS PRODUCERS UNDERGROUND
PROTECTION SERVICE CALL: **1-800-925-0988**

PLAN PREPARED BY:
RESOURCE INTERNATIONAL INC.
6350 PRESIDENTIAL GATEWAY
COLUMBUS, OHIO 43231
(614) 823-4949

ENGINEERS SEAL:

STATE OF OHIO
MICHAEL HAFNER
69762
REGISTERED
PROFESSIONAL ENGINEER

SIGNED:
DATE: 4/9/18

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

LOR-90-20.55

CITY OF AVON
LORAIN COUNTY

INDEX OF SHEETS:

PROJECT DESCRIPTION

THE PROJECT WILL WIDEN THE EASTBOUND AND WESTBOUND OFF-RAMPS FROM IR 90 TO ALLOW FOR TWO LEFT AND TWO RIGHT TURNS FROM THE RAMPS ONTO SR 83. THE SIGNALS AT EACH RAMP INTERSECTION WILL BE REPLACED AND REDESIGNED.

NORTH OF THE INTERCHANGE AT THE SR 83/CHESTER RD INTERSECTION, NORTHBOUND SR 83 WILL WIDEN TO 4 LANES. ASSOCIATED IMPROVEMENTS WILL BE MADE, SUCH AS SIGNAL UPGRADES AND SIGNING.

EARTH DISTURBED AREAS

PROJECT EARTH DISTURBED AREA:	3.43 ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA:	1.00 ACRES
NOTICE OF INTENT EARTH DISTURBED AREA:	4.90 ACRES

LIMITED ACCESS

THIS IMPROVEMENT IS ESPECIALLY DESIGNED FOR THROUGH TRAFFIC AND HAS BEEN DECLARED A LIMITED ACCESS HIGHWAY OR FREEWAY BY ACTION OF THE DIRECTOR IN ACCORDANCE WITH THE PROVISIONS OF SECTION 5511.02 OF THE OHIO REVISED CODE.

2016 SPECIFICATIONS

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

I HEREBY APPROVED THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

BU3 - SIGNAL AND LIGHTING SUBMITTAL
4/26/18

STANDARD CONSTRUCTION DRAWINGS							SUPPLEMENTAL SPECIFICATIONS		SPECIAL PROVISIONS
HL-10.11	1/19/18	TC-81.10	7/15/16				800	7/21/17	
HL-10.12	1/20/17	TC-81.21	7/15/16				809	1/19/18	
HL-30.11	1/19/18	TC-83.10	1/19/18				813	10/21/16	
HL-30.22	1/17/14	TC-83.20	7/21/17			CITY OF AVON	815	1/19/07	
HL-60.11	7/21/17	TC-85.10	7/21/17				821	4/20/12	
TC-12.30	1/19/18	TC-85.20	1/15/16				832	1/17/14	
TC-21.20	1/19/18						906	10/15/10	
TC-22.10	10/18/13						913	4/21/17	
TC-22.20	1/17/14						916	1/19/18	
TC-52.10	10/18/13						921	4/20/12	
TC-52.20	1/19/18								

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

FEDERAL PROJECT NO. E160 (851)
PID NO. 102520
CONSTRUCTION PROJECT NO. 17-3016
RAILROAD INVOLVEMENT NONE
LOR-90-20.55
1 / 25

SCOPE

LABOR, SUPPLIES, EQUIPMENT AND MATERIALS SHALL BE FURNISHED TO PERFORM ALL OPERATIONS NECESSARY FOR THE ACCEPTABLE INSTALLATION OF THE TRAFFIC CONTROL DEVICES, IN STRICT ACCORDANCE WITH THESE PLANS, NOTES AND SPECIFICATIONS. THESE NOTES, SCHEDULES AND DRAWINGS ARE INTENDED TO PROVIDE FOR ALL MATERIAL AND LABOR REQUIRED TO FURNISH AND INSTALL A COMPLETE TRAFFIC CONTROL SYSTEM. ANY PERTINENT CITY OF AVON SIGNAL AND CONSTRUCTION PERMITS SHALL BE ACQUIRED AND SUBMITTED. THE COSTS INCURRED WITH THE PERMIT APPLICATIONS SHALL BE BORNE BY THE CONTRACTOR. ALL REQUIREMENTS FROM THE CITY OF AVON STANDARDS FOR ENGINEERING CONSTRUCTION SHALL BE ACQUIRED AND OBSERVED. DOCUMENTS SHALL BE OBTAINED FROM THE CITY OF ENGINEER'S OFFICE.

UNDERGROUND AND OVERHEAD UTILITIES

THE LOCATION OF ALL UNDERGROUND UTILITIES WITHIN THE WORK LIMITS SHALL BE VERIFIED. OVERHEAD UTILITY COMPANIES SHALL BE NOTIFIED AT LEAST TWO WORKING DAYS BEFORE INSTALLING SIGNAL POLES OR SUPPORTS. SPECIAL CARE SHALL BE TAKEN WHEN SETTING POLES OR SUPPORTS DUE TO CLOSE PROXIMITY OF OVERHEAD UTILITIES. COSTS FOR UTILITY VERIFICATION AND NOTIFICATION SHALL BE BORNE BY THE CONTRACTOR AND SHALL BE INCIDENTAL TO THE COST THE PROJECT.

MOBILIZATION AND CONSTRUCTION LAYOUT STAKES

THE COST FOR MOBILIZATION AND FOR CONSTRUCTION LAYOUT STAKES SHALL BE CONSIDERED INCIDENTAL TO, AND INCLUDED IN THE INDIVIDUAL ITEMS OF WORK. NO SEPARATE PAYMENT FOR MOBILIZATION OR CONSTRUCTION LAYOUT STAKES WILL BE MADE.

INSTALLATION LAYOUT

AN OHIO LICENSED PROFESSIONAL SURVEYOR SHALL BE PROVIDED TO MARK AND LAYOUT THE TRAFFIC SIGNAL SUPPORTS AND ALL OTHER STATIONED SIGNAL ITEMS USING THE STATIONS AND OFFSETS PROVIDED IN THESE PLANS. THE SURVEYOR SHALL SET THE PROPER POLE AND CABINET FOUNDATION ELEVATIONS. THE ENGINEER SHALL APPROVE THE POLE FOUNDATION LOCATIONS AND ELEVATIONS PRIOR TO THE INSTALLATION OF ANY ITEM. THE COSTS FOR THIS SERVICE SHALL BE MADE INCIDENTAL TO THE COST OF THIS PROJECT.

MAINTENANCE OF TRAFFIC SIGNAL FLASHER INSTALLATION

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC SIGNAL/FLASHER INSTALLATIONS WITHIN THE PROJECT UNDER THE FOLLOWING CONDITIONS:

1. EXISTING SIGNAL/FLASHER INSTALLATIONS WHICH REQUIRE THE CONTRACTOR TO ADJUST, MODIFY, ADD ONTO OR REMOVE, OR WHICH THE CONTRACTOR ACTUALLY ADJUSTS, MODIFIES OR OTHERWISE DISTURBS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ENTIRE INSTALLATION (AT AN INTERSECTION) FROM THE TIME HIS OPERATIONS FIRST DISTURB THE INSTALLATION UNTIL THE INSTALLATION HAS BEEN SUBSEQUENTLY REMOVED OR MODIFIED AND THE WORK IS ACCEPTED.
2. NEW OR REUSED SIGNAL/FLASHER INSTALLATIONS OR DEVICES, INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF THESE FROM THE TIME OF INSTALLATION UNTIL THE WORK IS ACCEPTED.

THE CONTRACTOR SHALL CORRECT AS QUICKLY AS POSSIBLE ALL OUTAGES OR MALFUNCTIONS. HE SHALL PROVIDE THE MAINTAINING AGENCY AND THE ENGINEER SUCH ADDRESSES AND PHONE NUMBERS WHERE HIS MAINTENANCE FORCES CAN BE CONTACTED. THE CONTRACTOR SHALL PROVIDE ONE OR MORE PERSONS TO RECEIVE ALL CALLS AND DISPATCH THE NECESSARY MAINTENANCE FORCES TO CORRECT OUTAGES. SUCH A PERSON OR PERSONS MAY BE USED TO PERFORM OTHER DUTIES AS LONG AS PROMPT ATTENTION IS GIVEN TO THESE CALLS AND A PERSON IS READILY AVAILABLE CONTINUOUSLY24 HOURS A DAY, 7 DAYS A WEEK. ALL LAMP OUTAGES, CABLE OUTAGES, ELECTRICAL FAILURES, EQUIPMENT MALFUNCTIONS AND MISALIGNED SIGNAL HEADS SHALL BE CORRECTED TO THE SATISFACTION OF THE ENGINEER WITH THE SIGNAL BACK TO SERVICE WITHIN FOUR HOURS AFTER THE CONTRACTOR HAS BEEN NOTIFIED OF THE OUTAGE.

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

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

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

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

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

THE CONTRACTOR SHALL PROVIDE THE MAINTENANCE SERVICE ENTIRELY WITH HIS FORCES OR HE MAY CHOOSE TO ENTER INTO A COOPERATIVE UNDERSTANDING WITH THE LOCAL MAINTAINING AGENCY TO PROVIDE THE MAINTENANCE. THE CONTRACTOR SHALL INFORM THE ENGINEER, IN WRITING, OF THE MAINTENANCE METHOD SELECTED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO ANY TRAFFIC SIGNAL COMPONENTS REQUIRED TO BE HANDLED DURING THE RELOCATION OF POLES AND REVISIONS TO THE SIGNAL SYSTEM. WHEN A TRAFFIC SIGNAL MUST BE TAKEN OUT OF SERVICE BY THE CONTRACTOR, DUE TO CONSTRUCTION PROCEDURES, THIS OUTAGE SHALL NOT EXCEED 3 HOURS AND SHALL NOT INCLUDE THE HOURS OF 6 TO 9 AM, 12 TO 1 PM AND/OR 4 TO 7 PM. ANY SIGNALIZED INTERSECTION, WHERE THE SIGNAL IS OUT OF SERVICE DUE TO CONSTRUCTION PROCEDURES, OR DUE TO AN OUTAGE OR MALFUNCTION OR EQUIPMENT AS DESCRIBED ABOVE, SHALL BE PROTECTED, BY THE CONTRACTOR, BY OFF-DUTY CITY OF AVON POLICE, HIRED BY THE CONTRACTOR.

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

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

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

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

POWER SUPPLY FOR TRAFFIC SIGNALS

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

GROUNDING AND BONDING

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

1. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH.

A. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (725.04) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR.
B. WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (725.05), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED.
C. METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END, AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.
D. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
E. IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS.
F. THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT.
G. TRAFFIC SIGNAL COMPONENTS AND THE ENTIRE SYSTEM SHALL BE TESTED AS REQUIRED BY THE ODOT CONSTRUCTION AND MATERIALS SPECIFICATIONS. GROUND RODS SHALL BE TESTED FOR SATISFACTORY LOW RESISTANCE TO GROUND. A CIRCUIT TEST SHALL BE PERFORMED ON ALL CONDUCTORS TO MAKE SURE THERE ARE NO SHORTS, CROSSES, AND HIGH RESISTANCE OR OTHER IMPROPER CONNECTIONS. A CABLE INSULATION OR MEGGER TEST SHALL BE PERFORMED ON ALL CONDUCTORS TO VERIFY THE INTEGRITY OF THE INSULATION COVERING.

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 THE 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.
E. DISSIMILAR METALS SHALL NOT BE USED TOGETHER IN ORDER TO AVOID OXIDATION.

3.WIRING 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, CONTROLLERS 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.
C. IF A NEW CONDUIT CONTAINS CABLING, INSTALL AT FLAT WOVEN POLYESTER PULLING TAPE, RATED FOR 600 POUNDS MINIMUM, IN THE CONDUIT. IF THE CONDUIT IS TO REMAIN EMPTY, INSTALL AN HDPE INSULATED COPPER TRACER WIRE, 12 AWG MINIMUM, IN THE CONDUIT. ALLOW FOR 10 FEET OF SLACK IN EACH ADJACENT PULLBOX.

4.GROUND ROD.

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	EQUIP. GROUND	EQUIP. 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.

CALCULATED JMD CHECKED MJH

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

TRAFFIC SIGNAL NOTES

LOR-IR90-20.55

I02520CN001

GROUNDING AND BONDING, CONT'D

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.

GUARANTEE

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 180 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 MAINTAINING AGENCY FOLLOWING ACCEPTANCE OF THE EQUIPMENT.

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

PERSONNEL REQUIREMENTS

IN ADDITION TO THE REQUIREMENTS OF ODOT SECTION 108.05 OF THE C&MS, A FULL TIME SUPERVISOR SHALL BE ASSIGNED FOR THIS PROJECT TO ENSURE ADHERENCE TO THE PLAN REQUIREMENTS AND SPECIFICATIONS AS INTERPRETED AND INSTRUCTED BY THE ENGINEER. THE SUPERVISOR SHALL NOT BE CHANGED FOR THIS PROJECT WITHOUT PRIOR WRITTEN NOTICE TO THE ENGINEER.

ALL CONTROLLER WORK, AS DEFINED BELOW IN ITEMS 1 THROUGH 4 SHALL BE PERFORMED BY AN IMSA LEVEL TWO CERTIFIED TECHNICIAN:
1. BACK PANEL WIRING TERMINATIONS
2. PROGRAMMING
3. TURN-ON
4. TROUBLESHOOTING

A FOREMAN, WHO IS AN IMSA LEVEL ONE CERTIFIED TECHNICIAN, SHALL BE ASSIGNED TO EACH CREW PERFORMING WORK ON THIS PROJECT. THE FOREMAN SHALL BE PRESENT AT ALL TIMES WHEN WORK IS BEING PERFORMED BY THE CREW. PRIOR VERBAL OR WRITTEN NOTICE SHALL BE PROVIDED TO THE ENGINEER BEFORE REPLACING A CREW FOREMAN.

THE WORK, AS DEFINED BELOW IN ITEMS 1 THROUGH 7, SHALL BE PERFORMED BY IMSA LEVEL ONE CERTIFIED CRAFTPERSONS:
1. CABLE SPLICES
2. SIGNAL HEAD INSTALLATIONS
3. CABLE AND WIRE INSTALLATIONS
4. POWER SERVICE INSTALLATIONS
5. GROUND ROD TESTING
6. CABLE INSTALLATION TESTING
7. FIELD WIRE TERMINATIONS

THE IMSA CERTIFICATION PAPERS FOR ALL SIGNAL TECHNICIANS, FOREMAN AND CRAFTPERSONS WORKING ON THE PROJECT SHALL BE PRESENTED TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.

SUFFICIENT WORK FORCES OF PERSONNEL, QUALIFIED IN THE OPINION OF THE ENGINEER TO PERFORM THE WORK REQUIRED UNDER THIS CONTRACT, SHALL BE PROVIDED.

EACH FOREMAN OR FOREMAN'S WORK TRUCK SHALL BE EQUIPPED WITH A CELLULAR TELEPHONE. THE CELLULAR TELEPHONE NUMBER FOR EACH FOREMAN SHALL BE PROVIDED TO THE PROJECT ENGINEER.

UNDERDRAINS FOR PULL BOXES

REFERENCE ODOT TRAFFIC SCD HL-30-11 FOR DETAILS ABOUT DRAINING PULL BOXES. UNDERDRAINS FOR PULL BOXES SHALL BE USED AS DIRECTED BY THE ENGINEER AND SHALL BE PROVIDED WHERE THE LENGTH REQUIRED FOR A SATISFACTORY OUTLET DOES NOT EXCEED 20 FEET. THE FOLLOWING ESTIMATED QUANTITY IS CARRIED TO THE GENERAL SUMMARY FOR THIS PURPOSE:

ITEM 611 - 4" CONDUIT, TYPE E 480FT

TRENCHING UNDER EXISTING SIDEWALKS

WHERE CONDUIT FOR NEW TRAFFIC SIGNALS OR TRAFFIC SIGNAL INTERCONNECTION IS TO BE INSTALLED IN TRENCHES UNDER EXISTING SIDEWALK, DRIVE APRONS OR CURB RAMPS, EXISTING SIDEWALK, DRIVE APRONS, OR CURB RAMPS SHALL BE REMOVED UNDER ODOT ITEM 202 WALK REMOVED, AND NEW SIDEWALK, DRIVE APRONS OR CURB RAMPS SHALL BE INSTALLED UNDER THE APPROPRIATE PAY ITEMS. SIDEWALKS SHALL BE REMOVED AND INSTALLED IN WHOLE SLABS.

RESTORATION OF DISTURBED AREAS

ALL DISTURBED LANDSCAPE AREAS, PAVEMENT SURFACES, SIDEWALKS AND DRIVEWAYS SHALL BE RESTORED TO CONDITION EQUAL TO OR BETTER THAN THAT WHICH EXISTED PRIOR TO THE START OF WORK. RESTORATION SHALL BE PERFORMED WITH MATERIALS IDENTICAL TO THE EXISTING SURFACE, INCLUDING, BUT NOT LIMITED TO, ASPHALT AND CONCRETE PAVEMENT, ASPHALT, CONCRETE AND BRICK SIDEWALK, INTEGRAL CURB AND SPECIAL SURFACES (SUCH AS COLORED OR TEXTURED) AS ENCOUNTERED. CONCRETE SIDEWALKS OR DRIVEWAYS SHALL NOT BE PATCHED. SIDEWALKS AND DRIVEWAYS SHALL BE REPLACED IN ENTIRE ORIGINAL SLAB SECTIONS.

RESTORATION WORK SHALL BE PERFORMED IN ACCORDANCE WITH PERTINENT SPECIFICATION ITEMS AS DIRECTED BY THE ENGINEER. THE CITY OF AVON WILL CONSIDER ALL RESTORATION WORK, INCLUDING MATERIALS, EQUIPMENT, LABOR, INCIDENTALS, AND DISPOSAL OF ALL SURPLUS MATERIALS, INCIDENTAL TO THE VARIOUS ITEMS OF UNDERGROUND WORK. NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK.

SIGNAL ACTIVATION

PRIOR TO ACTIVATING THE NEW TRAFFIC SIGNAL TO STOP-AND-GO MODE AND/OR REMOVING THE EXISTING TRAFFIC SIGNAL FROM SERVICE, ALL ITEMS IN THE PROPOSED SIGNAL PLAN SHALL BE FULLY COMPLETED, (I.E., VEHICLE DETECTION, PEDESTRIAN SIGNAL HEADS, ETC). IF THERE ARE CONSTRUCTABILITY ISSUES (I.E., ROADWAY WIDENING, ETC.) THAT PREVENT THE SIGNAL FROM BEING COMPLETED PRIOR TO ACTIVATION, IT SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT ENGINEER AND DISTRICT TRAFFIC ENGINEER. THE DISTRICT TRAFFIC ENGINEER WILL THEN REVIEW, APPROVE OR REJECT PROPOSALS TO ACTIVATE THE TRAFFIC SIGNAL PRIOR TO COMPLETION.

THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER AND DISTRICT TRAFFIC ENGINEER AT LEAST 10 WORKING DAYS PRIOR TO SCHEDULING THE FINAL INSPECTION OF THE SIGNAL INSTALLATION. FINAL INSPECTION IS NOT CONSIDERED COMPLETE UNTIL DESIGNATED DISTRICT TRAFFIC PERSONNEL INSPECT THE TRAFFIC SIGNAL AND ISSUE WRITTEN APPROVAL. IF ISSUES ARE FOUND DURING THE FINAL INSPECTION THAT IMPACT THE SAFETY OF THE TRAVELING PUBLIC AND/OR THE EFFICIENCY OF THE INTERSECTION, THE SIGNAL SHALL NOT BE ACTIVATED ON THE PROPOSED DATE. ANY PUNCH LIST ITEMS THAT ARE FOUND SHALL BE CORRECTED AND REINSPECTED BY DISTRICT TRAFFIC PERSONNEL PRIOR TO FINAL ACCEPTANCE. ODOT FORCES SHALL ONLY ASSUME DAY TO DAY MAINTENANCE OF THE TRAFFIC SIGNAL AFTER FINAL WRITTEN ACCEPTANCE HAS BEEN ISSUED.

DETECTION MAINTENANCE

IF VEHICLE DETECTION BECOMES UNEXPECTEDLY DISABLED, REQUIRES MODIFICATION, OR IS SCHEDULED TO BE TEMPORARILY REMOVED DURING THE CONTRUCTION PROJECT, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER AND DISTRICT TRAFFIC ENGINEER.

IF THE LOSS OF VEHICLE DETECTION IS KNOWN PRIOR TO THE START OF CONSTRUCTION, IT SHALL BE DISCUSSED AT THE PRECONSTRUCTION MEETING. AT SUCH TIME, THE DISTRICT TRAFFIC ENGINEER SHALL ADVISE THE PROJECT ENGINEER AND CONTRACTOR ON THE APPROPRIATE ACTION TO RECTIFY ANY LOSS OF VEHICLE DETECTION. THIS MAY INCLUDE PLACING THE TRAFFIC SIGNAL ON MINIMUM OR MAXIMUM RECALL, MODIFYING THE MINIMUM GREEN TIMES, AND REMOVING THE MALFUNCTIONING DETECTION FROM SERVICE. WHERE NON-INTRUSTIVE DETECTION (I.E. VIDEO, RADAR) ALREADY EXISTS, THE CONTRACTOR SHALL INSURE THAT DETECTION IS OPERATING AND MAINTAINED BY RECONFIGURING THE DETECTION UNITS ACCORDINGLY DURING ALL CONSTRUCTION PHASES. THIS IS TO AVOID THE SIGNAL FROM MAXING OUT THE AFFECTED SIGNAL PHASE AND CREATING UNNECESSARY DELAYS.

LOCATIONS WHERE NON-INTRUSIVE DETECTION IS PROPOSED AND THE EXISTING VEHICLE DETECTION IS TO BE ABANDONED, THE NON-INTRUSIVE VEHICLE DETECTION SHALL BE INSTALLED, CONFIGURED AND MADE FULLY FUNCTIONAL PRIOR TO THE EXISTING DETECTION BEING DISABLED. THE CONTRACTOR SHALL CONTINUE TO MAINTAIN AND MODIFY THE DETECTION UNTIL FINAL ACCEPTANCE OF THE TRAFFIC SIGNAL. THIS IS TO ENSURE VEHICLE DETECTION REMAINS FULLY FUNCTIONAL THROUGHOUT CONSTRUCTION.

WORK INSPECTION

THE CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER AND DISTRICT TRAFFIC ENGINEER WITH 72 HOUR NOTICE OF ANY SIGNAL WORK TO BE PERFORMED AT THE INTERSECTION SITE(S) SO THAT INSPECTION SERVICES CAN BE SUPPLIED.

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-21.20 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 625 - LUMINAIRE, CONVENTIONAL, SOLID-STATE (LED), AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF ITEM 625 LUMINAIRES SHALL HAVE THE FOLLOWING REQUIREMENTS OR FEATURES:

LUMINAIRES SHALL BE SOLID-STATE (LED) RATED AT 120VAC WITH A NOMINAL WATTAGE OF 83 WATTS. THE INITIAL FIXTURE LIGHT OUTPUT SHALL BE 10,900 LUMENS. THE LUMINAIRE SHALL HAVE A TYPE III DISTRIBUTION AND HOUSED IN A DIE CAST ALUMINUM HOUSING. THE LENS SHALL BE GLASS. THE LIGHT SHALL HAVE A COOL WHITE COLOR TEMPERATURE. A SHORTING CAP SHALL BE PROVIDED WITH EACH FIXTURE AND EACH LUMINAIRE SHALL BE WIRED TO THE POWER SERVICE PEDESTAL WHERE ONE PHOTOCELL WILL BE PROVIDED TO POWER ALL LUMINAIRES TOGETHER.

THE LUMINAIRES SHALL BE A MODEL STREETSENSE AS MANUFACTURED BY DIALIGHT.

PAYMENT FOR "ITEM 625 LUMINAIRE, CONVENTIONAL, SOLID-STATE (LED), AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH AND SHALL INCLUDE ALL LABOR, EQUIPMENT, AND MATERIALS.

ITEM 625 - BRACKET ARM, BY LENGTH, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF THE C&MS AND STANDARD CONSTRUCTION DRAWINGS, THE FOLLOWING SHALL APPLY:

1.THE SPECIFIED BRACKET ARM SHALL BE "TRUSS ARM HIGH RISE" TYPE PER STANDARD DRAWING HL-10.11.

2.ARM TO POLE CONNECTION SHALL BE FIXED BRACKET PLATES LOCATED TO PROVIDE THE ARM ORIENTATION AS SHOWN IN THE PLANS. CLAMP-ON CONNECTIONS ARE NOT PERMITTED.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE BID, PER EACH "ITEM 625 - BRACKET ARM, BY LENGTH, AS PER PLAN" WHICH SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS AND INCIDENTALS REQUIRED TO COMPLETE THIS ITEM IN A SATISFACTORY AND WORKMANLIKE MANNER.

ITEM 625 - GROUND ROD, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF 625.16, A SEVEN (7) STRAND, NO. 4 AWG COPPER WIRE SHALL BE FURNISHED AND INSTALLED FROM THE TOP OF THE GROUND ROD AND ATTACHED TO THE NEUTRAL BAR IN THE CONTROLLER CABINET.

PAYMENT FOR "ITEM 625 - GROUND ROD, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH AND SHALL INCLUDE ALL LABOR, EQUIPMENT, AND MATERIALS.

ITEM 631 - INTERNALLY ILLUMINATED FIXED MESSAGE SIGN, BY SIZE, 1 FACE, LED EDGE LIT TYPE, AS PER PLAN

FURNISH AND INSTALL SIGNS WHICH ARE CAPABLE OF DISPLAYING ONE CLEARLY LEGIBLE MESSAGE AT A TIME IN ONE DIRECTION.

PROVIDE SIGNS WHICH DISPLAY THE PARTICULAR LEGEND, AND WITH A NOMINAL FACE SIZE SHOWN IN THE PLANS. FURNISH EACH SIGN IN AN ALUMINUM HOUSING WHICH IS RIGIDLY MOUNTED PERPENDICULAR (90 DEGREES) TO THE DIRECTION OF TRAFFIC IT FACES.

PROVIDE SIGNS WHICH OPERATE ON A 120 VAC POWER SOURCE. THE SIGNS SHALL BE POWERED FROM THE MILBANK POWER SERVICE BY SEPARATE CIRCUITS. THE SIGNS SHALL NOT BE CONNECTED OR SPLICED TOGETHER ON THE SAME CIRCUIT.

THE LIGHT SOURCE FOR THE SIGN SHALL BE LEDS (LIGHT EMITTING DIODES). LEDS SHALL BE MOUNTED ALONG BOTH THE TOP AND BOTTOM EDGES OF THE SIGN. THE LEDS SHALL EVENLY ILLUMINATE A LIGHT PANEL THAT IS THE SAME DIMENSIONS OF THE SIGN FACE. THE LEDS SHALL BE RATED TO OPERATE AT NO LESS THAN 70% OF THEIR INITIAL BRIGHTNESS FOR 6,000 HOURS. A MAXIMUM OF FOUR LEDS PER SQUARE FOOT SHALL BE USED.

ITEM 631 - INTERNALLY ILLUMINATED FIXED MESSAGE SIGN, BY SIZE, 1 FACE, LED EDGE LIT TYPE, AS PER PLAN, CONT'D

PROVIDE SIGNS WITH A BLUE BACKGROUND, WHITE BORDER AND WHITE LEGEND FORMED FROM UPPER AND LOWER CASE MUTCD CLEARVIEW, HIGHWAY E, SERIES C LETTERS, 12 INCHES HIGH ON SINGLE LINE STREET NAME AND 8 INCHES HIGH ON TWO LINE STREET NAME. PROVIDE A CITY OF AVON LOGO TO BE LOCATED TO THE LEFT OF THE STREET NAME LETTERING. THE CITY SHALL PROVIDE ARTWORK FOR THE LOGO.

PROVIDE SIGNS WITH ATSM TYPE IX RETROREFLECTIVE SHEETING (BOTH SIGN LEGEND AND BACKGROUND).

THE SIGNS SHALL BE MANUFACTURED BY TEMPLE EDGE LIT, DECATUR, ALABAMA.

THE SIGNS SHALL BE MOUNTED TO MAST ARMS USING PELCO AS-3009 BRACKETS. STAINLESS STEEL BANDING SHALL NOT BE USED.

PAYMENT FOR "ITEM 631 - INTERNALLY ILLUMINATED FIXED MESSAGE SIGN, BY SIZE, 1 FACE, LED EDGE LIT TYPE, AS PER PLAN" WILL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

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

IN ADDITION TO THE REQUIREMENTS OF THE ODOT C&MS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL APPLY:

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK POLYCARBONATE PLASTIC WITH VISORS AS SPECIFIED AND MEET ITE SPECIFICATIONS.

2. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.

3. ALL UPPER SIGNAL SUPPORT HARDWARE AND PIPING UP TO AND INCLUDING THE WIRE INLET FITTING SHALL BE FERROUS METAL.

4. THE ENTRANCE FITTING SHALL BE OF THE TRI-STUD DESIGN WITH SERRATED RINGS IN ORDER TO ACHIEVE POSITIVE LOCKING.

5. ALL SIGNAL HEADS SHALL BE RIGIDLY MOUNTED TO THE MAST ARM WITH THE YELLOW LENS LOCATED IN FRONT OF THE MAST ARM.

6. ALUMINUM BACK-PLATES SHALL BE IN ACCORDANCE WITH THE ODOT C&MS AND INCLUDE A FLUORESCENT YELLOW REFLECTIVE BORDER.

7. THE LIGHT EMITTING DIODE (LED) SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF THE ODOT C&MS 732.04-C. THE CONTRACTOR SHALL PROVIDE THE CITY OF AVON, IN WRITING, WITH THE LED MANUFACTURER NAME, SERIAL 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.

8. SIGNAL HEADS SHALL HAVE A MINIMUM WALL THICKNESS OF 0.117 INCHES.

9. SIGNAL HEADS SHALL INCLUDE CUTAWAY TYPE VISORS EXCEPT SIGNAL HEADS 4A, 4B, 4C, AND 4D AT THE I-90 WB RAMP INTERSECTION WHICH SHALL INCLUDE TUNNEL VISORS.

10. APPLY A BEAD OF SILICONE TO THE SIGNAL HEAD, WASHER, AND ENTRANCE ADAPTER SERRATIONS TO PREVENT WATER INTRUSION. ALSO, FILL THE SPACE BETWEEN CONCENTRIC SERRATION RINGS ON THE TOP OF THE SIGNAL HEAD TO COMPLETELY EXCLUDE WATER FROM THE SPACE BETWEEN THE CONCENTRIC RINGS.

11. BALANCE ADJUSTERS SHALL NOT BE USED ON ONE-WAY HEADS OR TETHERED HEADS.

PAYMENT FOR "ITEM 632 - VEHICULAR SIGNAL HEAD, (LED), (BY TYPE), POLYCARBONATE, AS PER PLAN" SHALL BE MADE FOR THE NUMBER OF COMPLETE SIGNAL HEADS FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS, AND NEW ATTACHMENT HARDWARE.ITEM 632 - PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF THE ODOT C&MS 632 AND 732, THE FOLLOWING SHALL APPLY:

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK, POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.

2. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.

3. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.

4. THE PEDESTRIAN SIGNAL HEAD SHALL BE OF THE LED COUNTDOWN TYPE.

5. NEW ATTACHMENT HARDWARE AND FITTINGS SHALL BE USED. PEDESTRIAN SIGNAL HOUSINGS SHALL NOT BE BANDED TO STEEL POLES. THE OPTIONAL 2-PIECE HINGED BRACKET WITH STAINLESS STEEL FASTENERS, AS PER ODOT SCD TC-85.10, SHALL BE USED.

ITEM 632 - VEHICULAR SIGNAL HEAD, (LED), (BY TYPE), POLYCARBONATE, AS PER PLAN, CONT'D

6. THE LIGHT EMITTING DIODE (LED) SIGNAL LAMP UNITS SHALL MEET THE REQUIREMENTS OF C&MS 732.04-C. THE CONTRACTOR SHALL PROVIDE THE CITY OF AVON, 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.

PAYMENT FOR "ITEM 632 - PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AS PER PLAN" SHALL BE MADE FOR THE NUMBER OF COMPLETE SIGNAL HEADS FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS AND NEW ATTACHMENT HARDWARE.

ITEM 632 - COVERING OF VEHICULAR SIGNAL HEAD, AS PER PLAN

COVER VEHICULAR SIGNAL HEADS IF ERECTED AT INTERSECTIONS WHERE TRAFFIC IS MAINTAINED BEFORE ENERGIZING THE SIGNALS. USE A STURDY OPAQUE COVERING MATERIAL SPECIFICALLY MADE FOR USE WITH TRAFFIC SIGNALS, AND ENSURE THAT THE COLOR OF THE COVER IS DIFFERENT THAN THE SIGNAL HEAD, TAN OR BEIGE, SO THAT IT IS CLEAR TO DRIVERS THE HEADS ARE COVERED, NOT DARK. USE A METHOD OF COVERING TO COVER ATTACHMENT AND MATERIALS, INCLUDING BACKPLATES, AS APPROVED BY THE ENGINEER. COVERS SHALL BE FREE OF TEXT, PICTURES, OR ANY TYPE OF ADVERTISING. MAINTAIN COVERS AND REMOVE THEM WHEN DIRECTED BY THE ENGINEER.

PAYMENT FOR "ITEM 632 - COVERING OF VEHICULAR SIGNAL HEAD, AS PER PLAN" SHALL BE MADE FOR THE NUMBER OF COMPLETE COVERINGS FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, AND MATERIALS.

ITEM 632 - SIGNAL SUPPORT FOUNDATION, AS PER PLAN

PRIOR TO ORDERING THE SIGNAL SUPPORTS, THE CONTRACTOR SHALL CONTACT OUPS TO HAVE ALL THE UTILITIES LOCATED IN THE FIELD THEN MEET WITH THE PROJECT ENGINEER TO LOCATE THE PROPOSED SUPPORT LOCATIONS TO INSURE THERE ARE NO CONFLICTS WITH UTILITIES. IF THERE ARE ISSUES, THE PROJECT ENGINEER SHALL PROVIDE GUIDANCE AS TO THE RELOCATION OF THE SUPPORT POLES.

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

ITEM 632 - POWER SERVICE, AS PER PLAN

POWER SERVICE SHALL BE AS PER CMS 632.24 AND STANDARD CONSTRUCTION DRAWING TC-83.10. POWER SERVICE SHALL ALSO INCLUDE THE FOLLOWING:

1. DISCONNECT SWITCH ENCLOSURES SHALL BE A COMMERCIAL PEDESTAL TYPE SWITCHED LOAD CENTER USING TYPE 3R CONSTRUCTION. IT SHALL BE A MILBANK MODEL CP3B51119A22OCSSP1 OR PRE-APPROVED EQUAL AND SHALL INCLUDE A PADLOCK EQUAL TO WILSON BOHANNON 660, WITH LOCK BODY AND SHACKLE OF BRONZE OR BRASS AND KEYING SHALL BE TO THE STATE MASTER. THE PEDESTAL SHALL INCLUDE A PAD MOUNT BASE THAT IS EMBEDDED IN THE CONCRETE FOUNDATION. THE CABINET SHALL BE UNPAINTED NATURAL ALUMINUM.

2. THE POWER SERVICE SHALL INCLUDE A RINGLESS SOCKET WITH LEVER BYPASS. THE METER BASE SHALL BE 100 AMP MINIMUM AND INCLUDE A LEVER OPERATED JAW RELEASE, A BYPASS SWITCH RATED FOR 100% CONTINUOUS DUTY. THE METER SOCKET JAWS MUST BE TIN PLATED COPPER AND SPRING SUPPORTED. THE METER BASE SOCKET SHALL HAVE A PLASTIC PROTECTOR TO BE REMOVED BY THE POWER COMPANY ONCE THE METER IS INSTALLED.

3. THE PEDESTAL SHALL HAVE SEPARATE CIRCUITS TO CONTROL THE TRAFFIC SIGNAL, THE LIGHTED STREET NAME SIGNS, THE LIGHTING LUMINAIRES AND THE DUPLEX RECEPTACLES ON THE MAST ARM SUPPORTS. THE STREET NAME SIGNS AND THE LIGHTING LUMINAIRES SHALL BE CONTROLLED BY PHOTOCELLS MOUNTED IN THE ENCLOSURE WITH A WINDOW AND SHIELD. THE PEDESTAL SHALL BE MOUNTED ON THE CONTROLLER PAD SO THAT THE PHOTOCELL WINDOW IS FACING NORTH.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOKUP. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE POWER COMPANY FOR ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLES INTO THE POWER COMPANY'S CIRCUITS. THE VOLTAGE SUPPLIED SHALL BE NOMINALLY 120 VOLTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND PAYING OF ALL FEES RELATING TO THE POWER SERVICE CONNECTION. THE CONTRACTOR SHALL PAY ALL POWER CHARGES UNTIL THE SIGNAL IS ACCEPTED BY THE MAINTAINING AGENCY, THE CITY OF AVON.

IN ADDITION TO THE REQUIREMENTS OF THIS NOTE, PAYMENT WILL INCLUDE ALL NECESSARY LABOR, MISCELLANEOUS HARDWARE AND EQUIPMENT REQUIRED TO PROVIDE FOR THIS ITEM OF WORK IN ACCORDANCE WITH SPECIFICATION 632. PAYMENT WILL BE AT THE CONTRACT UNIT PRICE PER EACH.

ITEM 632 - SIGNAL SUPPORT BY TYPE, AS PER PLAN

PEDESTRIAN SIGNAL HEADS SHALL BE ATTACHED TO THE POLES UTILIZING THE OPTIONAL 2-PIECE HINGED BRACKET (CLAM SHELL) AS SHOWN ON TC-85.10. BOLT THE HINGED BRACKET TO THE POLE USING STAINLESS STEEL SCREWS. STAINLESS STEEL BANDING SHALL NOT BE USED.

A 20 AMP ELECTRICAL DUPLEX OUTLETS SHALL BE SUPPLIED AND INSTALLED 13 FEET FROM THE TOP OF FOUNDATION ON THE BACKSIDE OF THE SIGNAL SUPPORT. THE 20 AMP DUPLEX OUTLET SHOULD BE SPECIFIED TO BE POWERED FROM THE MILBANK POWER SERVICE FROM SEPARATE GFI CIRCUITS. THE OUTLETS SHALL EACH HAVE A WEATHERPROOF "BUBBLE" COVER.

DUE TO THE POSSIBILITY OF CONFLICTS WITH EXISTING OR PROPOSED UNDERGROUND OBSTRUCTIONS (INCLUDING THE POSSIBILITY OF UNRECORDED OBSTRUCTIONS) WHICH COULD AFFECT THE LOCATION OF THE FOUNDATIONS FOR THESE ITEMS, AND CONSEQUENTLY, THE DESIGN OF THE VARIOUS SUPPORTS, AND/OR ARMS, DO NOT PLACE FINAL ORDERS FOR THESE ITEMS UNTIL THE FOUNDATIONS HAVE BEEN INSTALLED AND WRITTEN NOTICE TO PROCEED WITH THE ORDERS FOR THESE ITEMS HAS BEEN RECEIVED FROM THE ENGINEER.

WHEN DEVELOPING THE PROGRESS SCHEDULE, AND THOSE OF THE SUB-CONTRACTORS, ENSURE THAT THE FOUNDATIONS ARE INSTALLED AT THE EARLIEST TIME AS FEASIBLE AND PRACTICAL, AND INCLUDE SUFFICIENT TIME IN THE PROGRESS SCHEDULE FOR THE ORDERING, MANUFACTURE, DELIVERY, AND INSTALLATION OF THESE ITEMS AFTER THE FOUNDATIONS ARE IN PLACE.

PAYMENTS WILL NOT BE MADE FOR DELIVERED MATERIALS FOR THESE ITEMS UNTIL THE FOUNDATIONS ARE IN PLACE, AND, IF CHANGES IN THE DESIGN OF THESE ITEMS ARE REQUIRED, NO PAYMENTS WILL BE MADE FOR ITEMS MANUFACTURED TO THE ORIGINAL DESIGNS.

PAYMENT FOR ACCEPTED QUANTITIES OF "ITEM 632 - SIGNAL SUPPORT, AS PER PLAN" WILL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH SIGNAL SUPPORT FURNISHED AND INSTALLED.

ITEM 632 - SIGNAL SUPPORT, MECHANICAL DAMPER FOR TC-81.21 MAST ARM (GREATER THAN 59' IN LENGTH), AS PER PLAN

THIS ITEM SHALL CONSIST OF THE CONTRACTOR INSTALLING A TUNED MECHANICAL STOCKBRIDGE OR MASS-SPRING TYPE DAMPER ON A TC-81.21 MAST ARM SIGNAL SUPPORT TO REDUCE THE POSSIBILITY OF HARMONIC VIBRATIONS CAUSED BY WIND LOADS. A MECHANICAL DAMPER SHALL BE APPLIED TO ALL MAST ARMS OVER 59 FEET IN LENGTH. THE INSTALLED DAMPER SHALL BE CAPABLE OF REDUCING THE LOADED MAXIMUM VERTICAL MOVEMENT AT THE TIP OF THE ARM TO 8 INCHES MEASURED FROM THE HIGHEST TO THE LOWEST POINT OF DEFLECTION AT WIND SPEEDS OF 5-20 MPH. ALL ATTACHMENT HARDWARE CONNECTIONS SHALL BE STAINLESS STEEL. STOCKBRIDGE- TYPE DAMPERS SHALL HAVE A STAINLESS STEEL SAFETY CHAIN ANCHORED TO THE MAST ARM TO PREVENT WEIGHTS FROM FALLING SHOULD THEY BECOME SEPARATED FROM THE REST OF THE ASSEMBLY. THE DAMPER SHALL BE ATTACHED TO THE ARM WITHIN 8 FEET OF MAST ARM TIP. INSTALLATION SHALL BE PER THE MANUFACTURER'S GUIDELINES. STATIC DAMPERS SUCH AS HORIZONTAL FLAT SIGN MOUNTINGS SHALL NOT BE USED. ACCEPTABLE DEVICES INCLUDE THE FOLLOWING OR APPROVED EQUAL:

1.UNION METAL ALCOA DAMPER DEVICE - DWG NO. 2G-1817-C1
2.VALMONT STRUCTURES ALCOA DEVICE - DWG. NO. OH104242P1
3. VALMONT STRUCTURES MITIGATOR - MODEL TR1
4.FLORIDA DOT SPRING-MASS DAMPER - DRAWING INDEX NO. 17749
5. PATHMASTER DAMPER ASSEMBLY - DWG. U2G-1817-C
6. HUBBELL 607 SERIES DAMPER - MILLERBERND DWG. NO. HUBBELL-6072014

PAYMENT FOR "ITEM 632 - SIGNAL SUPPORT, MECHANICAL DAMPER FOR TC-81.21 MAST ARM (GREATER THAN 59' IN LENGTH), AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE PER EACH COMPLETE AND IN PLACE, AND SHALL INCLUDE ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE WORK.

ITEM 632 - PEDESTRIAN PUSHBUTTON, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF 632 AND 732.06, PEDESTRIAN PUSHBUTTONS SHALL BE PROVIDED WITH THE FOLLOWING FEATURES:

PUSHBUTTONS SHALL BE FURNISHED THAT ARE RATED AS WATERPROOF AND WHICH INCORPORATE A SOLID NEOPRENE RUBBER GASKET TO SEAL ITSELF AGAINST MOISTURE.

PUSHBUTTONS SHALL BE FURNISHED THAT ARE PRESSURE ACTIVATED AND WHICH INCORPORATE A PIEZO DRIVEN SOLID STATE SWITCH, TWO TONE ACTIVATION BEEP AND LED INDICATOR THAT MOMENTARILY FLASHES.

THE PUSHBUTTON HOUSING SHALL BE SEALED TO THE SIGNAL SUPPORT, PEDESTAL OR POLE WITH A HIGH QUALITY SILICONE SEALANT.

PAYMENT FOR "ITEM 632 PEDESTRIAN PUSHBUTTON, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH IN PLACE, COMPLETELY INSTALLED AT THE LOCATIONS SHOWN IN THE PLANS, WIRED, TESTED, AND ACCEPTED.

CALCULATED JMD CHECKED MJH

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

TRAFFIC SIGNAL NOTES

LOR-IR90-20.55

I02520CN003

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 632.26 AND AS INDICATED ON THE PLANS. REMOVED ITEMS SHALL BE REUSED AS PART OF A NEW INSTALLATION ON THE PROJECT OR STORED ON THE PROJECT FOR SALVAGE IN ACCORDANCE WITH THE LISTING GIVEN HEREIN.

THE FOLLOWING ITEMS SHALL BE REMOVED (UNLESS OTHERWISE NOTED ON THE PLANS) AND STORED SO AS NOT TO ALLOW DAMAGE:

	STORAGE	DISPOSAL
VEHICULAR SIGNAL HEADS	X	
PEDESTRIAN SIGNAL HEADS	X	
PEDESTRIAN PUSHBUTTONS	X	
FLAT SHEET SIGNS	X	
PULL BOXES	X	
STRAIN POLES	X	
CONTROLLER & CABINET	X	
RADAR DETECTION EQUIPMENT	X	
SPREAD SPECTRUM RADIO	X	
MESSENGER WIRE		X
CONDUIT		X
CABLES	X	
FOUNDATIONS		X

FOUNDATIONS DEEPER THAN 3.5' SHALL BE REMOVED AS SPECIFIED IN C&MS 632.26.

THE CONTRACTOR SHALL BE PAID FOR EACH REMOVAL OF TRAFFIC SIGNAL INSTALLATION. PAYMENT FOR ITEMS NOT SPECIFICALLY CALLED OUT TO BE ABANDONED OR REMOVED BUT NEED TO BE REMOVED TO ALLOW FOR THE COMPLETE CONSTRUCTION OF THE PROPOSED TRAFFIC SIGNALS SHALL BE CONSIDERED INCIDENTAL TO THE OVERALL CONTRACT.

EXISTING TRAFFIC SIGNAL INSTALLATION SHALL REMAIN IN OPERATION THROUGHOUT CONSTRUCTION PER TRAFFIC SIGNAL MAINTENANCE OF TRAFFIC REQUIREMENTS. NO ITEMS SHALL BE REMOVED UNTIL MAINTENANCE OF TRAFFIC REQUIREMENTS ARE COMPLETED.

IN THE EVENT THE ITEMS STORED ON THE PROJECT FOR SALVAGE BY THE LOCAL AGENCY ARE NOT REMOVED, THE CONTRACTOR SHALL, WHEN DIRECTED IN WRITING BY THE APPROPRIATE AGENCY, REMOVE AND DISPOSE OF THE ITEMS AT NO ADDITIONAL COST TO THE PROJECT.

ITEM 632 - SIGNALIZATION, MISC.: UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM CAPABLE OF INTERSECTION ADVANCE DETECTION AND STOP BAR PRESENCE DETECTION UTILIZING ABOVE GROUND DIGITAL RADAR DETECTION TECHNIQUES. THE RADAR UNIT SHALL BE AN ACCUSCAN600C (FORMERLY BRANDED AS THE SMARTMICRO 3D/UHD STOP BAR + ADVANCE), AS MANUFACTURED BY ECONOLITE. THE SYSTEM SHALL BE NON-INTRUSIVE AND SHALL DETECT VEHICLES UP TO 4 LANES WIDE AT THE STOP BAR AND SIMULTANEOUSLY DETECT VEHICLES UP TO 160 METERS (500 FEET) FROM THE SENSOR. THE SYSTEM SHALL DETECT INDIVIDUAL VEHICLE PRESENCE, SPEED, WRONG WAY, QUEUE LENGTH AS WELL AS USER DEFINED CUSTOM APPLICATIONS. THE SYSTEM SHALL TRACK AND CLASSIFY UP TO 64 OBJECTS SIMULTANEOUSLY (OBJECTS INCLUDE TRUCKS, VEHICLES, BICYCLES AND PEDESTRIANS) WITHIN THE RANGE OF THE SENSOR. ONE OR MORE SENSORS AS REQUIRED TO ACHIEVE THE DETECTION OBJECTIVE AS SHOWN IN THE PLANS SHALL BE PROVIDED PER APPROACH, COVERING MULTIPLE LANES WHERE STOP BAR AND ADVANCE DETECTION IS REQUIRED. THE DETECTION SYSTEM SHALL INCLUDE THE FOLLOWING FEATURES AND CAPABILITIES:

THE UNIVERSAL MEDIUM RANGE RADAR (UMRR) SHALL OPERATE IN THE 24.0 TO 24.5 GHZ (K BAND) AND SHALL PROVIDE ACCURATE PRESENCE-DETECTION OF STOPPED, MOVING OR A 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 BY LANE. IT SHALL MAINTAIN ACCURATE PERFORMANCE IN ALL WEATHER CONDITIONS INCLUDING RAIN, FREEZING, RAIN, SNOW, WIND, DUST, FOG, CHANGES IN TEMPERATURE, OR CHANGES IN LIGHTING AND SHALL BE TESTED TO MEET NEMA TS2 ENVIRONMENTAL STANDARDS.

THE SYSTEM SHALL TRACK ALL VEHICLES BY LANE AS THEY APPROACH THE SENSOR.

THE SYSTEM SHALL INCLUDE A SIMPLE SETUP ROUTINE TO CONFIGURE AND CALIBRATE THE SENSOR FOR PROPER OPERATION DURING INSTALLATION. THE SENSOR SHALL BE CAPABLE OF BEING PROGRAMMED AND UPDATED FROM A LAPTOP COMPUTER OR OTHER PORTABLE PROGRAMMING DEVICE. SOFTWARE SHALL BE PROVIDED. THE SOFTWARE SHALL SUPPORT TCP/IP CONNECTIVITY, UNIT CONFIGURATION, BACK-UP AND RESTORE AND VIRTUAL SENSOR CONNECTIONS. THE GRAPHICAL USER INTERFACE SHALL OPERATE ON A WINDOWS PLATFORM.

THE 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.

ITEM 632 - SIGNALIZATION, MISC.: UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM, CONT'D

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.

THE TRAFFIC MANAGEMENT INTERFACE BOARD (TMIB) SHALL CONNECT UP TO FOUR (4) UMRR RADAR SENSORS IN A SINGLE RACK MOUNT PLUG-IN ASSEMBLY. THE ASSEMBLY SHALL CONTAIN ALL SURGE AND OVERVOLTAGE PROTECTION CIRCUITRY FOR FOUR (4) LONG CABLE RUNS. THE TMIB SHALL PROVIDE FULL NEMA TS2 SDLC INTERFACE TO THE TRAFFIC CONTROLLER AND PROVIDE UP TO 64 PROGRAMMABLE DETECTION ZONES. A SINGLE FIELD TERMINATION PANEL SHALL BE PROVIDED THAT INTERFACES UP TO FOUR (4) UMRR SENSORS TO THE TMIB VIA INDUSTRY STANDARD PLUG-IN CAT6 CABLES. THE FIELD TERMINATION PANEL SHALL CONTAIN A SEPARATE AND ISOLATED POWER SUPPLY TO PROVIDE THE APPROPRIATE POWER TO EACH UMRR SENSOR.

ALL MAJOR RADAR SYSTEM COMPONENTS, INCLUDING THE UMRR SENSOR, TMIB INTERFACE AND SYSTEM SOFTWARE SHALL BE FROM THE SAME MANUFACTURER.

THE MANUFACTURER'S REPRESENTATIVE SHALL PROVIDE A SIX (6) HOUR TRAINING COURSE ON THE SETUP, OPERATION AND MAINTENANCE OF THE SYSTEM.

CONSTRUCTION - - LOCATE AND MOUNT DETECTOR IN ACCORDANCE WITH MANUFACTURE SPECIFICATIONS.

PAYMENT FOR "ITEM 809 - UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED PROGRAMMING, CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONNECTIONS TESTED AND ACCEPTED.

ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET TYPE TS1, AS PER PLAN

THIS ITEM SHALL BE IN ACCORDANCE WITH ODOT ITEM 633 IN ADDITION TO THE FOLLOWING. THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING AN ACTUATED, SOLID STATE DIGITAL MICROPROCESSOR TYPE CONTROLLER WITH MENU DRIVEN PROMPTS, INTERNAL TBC, ETHERNET TELEMETRY PORT AND ALL OTHER ACCESSORIES THAT ARE REQUIRED TO MAKE THE CONTROLLER COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

THE CONTROLLER ASSEMBLY SHALL INCLUDE A NEMA TS2 TYPE A2 CONTROLLER UNIT, NEMA TS2 TYPE 2 CONFIGURATION 4 (16 POSITION) TERMINALS AND FACILITIES AND A NEMA TS2, TYPE 16, MALFUNCTION MANAGEMENT UNIT COMPLETE IN A NEMA TS1 CABINET ASSEMBLY. THE CONTROLLER UNIT SHALL BE MANUFACTURED BY ECONOLITE CONTROL PRODUCTS OF ANAHEIM, CA, MODEL COBALT WITH OPTIONAL 3.3V DATA KEY (8MB) AND GRAPHICAL TOUCH SCREEN.

1. LOAD SWITCHES AND FLASH TRANSFER RELAYS SHALL BE EDI SUPPLIED IN SUFFICIENT QUANTITY TO PERFORM THE OPERATION AS SHOWN IN THE PLANS. THE LOAD SWITCHES PROVIDE INDICATORS ON THE INPUTS OF EACH CIRCUIT.

2. THE CONTROLLER UNIT SHALL BE 16-PHASE FULLY ACTUATED AND SHALL MEET ALL REQUIREMENTS FOR A NEMA TS2 TYPE 2 INCLUDING SDLC (PORT 1), 25 PIN SERIAL (PORT 2), AND 9 PIN CONSOLE SERIAL PORTS. THE CONTROLLER SHALL ALSO INCLUDE A 10/100BASET ETHERNET PORT AND DATA-KEY TO MAINTAIN BACK-UP TIMING. MANUFACTURE SPECIFIC "D" CONNECTORS SHALL BE INCLUDED.

3. THE NEMA EDI TS2 TYPE 16 MALFUNCTION MANAGEMENT UNIT SHALL BE PROVIDED WITH AN LCD DISPLAY AND AN IP ADDRESSABLE ETHERNET PORT. THE CABINET SHALL BE WIRED FOR APPROACH MONITORING. AN SDLC CABLE ASSEMBLY SHALL BE PROVIDED TO CONNECT PORT 1 OF THE CONTROLLER TO AN 8 PORT HUB AND FROM THE 8 PORT HUB TO PORT 1 OF THE MMU. THIS WILL ENABLE THE ADVANCED ERROR CHECKING, EVENT REPORTING AND LOGGING FEATURES AS DEFINED BY NEMA. THE MMU SHALL PASS ALL TESTS AS PERFORMED BY AN AUTOMATIC MONITOR TESTER. TEST RESULTS SHALL BE PRINTED AND SUPPLIED WITH EACH CABINET.

4. THE FOLLOWING SWITCHES SHALL BE ACCESSIBLE VIA THE POLICE PANEL:

A. SIGNAL ON/OFF
B. FLASH CONTROL
C. AUTOMATIC/MANUAL TRANSFER
D. MANUAL PUSHBUTTON AND 10' COILED HAND CORD

5. THE FOLLOWING SWITCHES SHALL BE MOUNTED ON A TECHNICIANS SWITCH PANEL ON THE INSIDE OF THE MAIN CABINET DOOR:

A. STOP TIME ON/OFF
B. FLASH CONTROL
C. TIMER POWER ON/OFF
D. DETECTOR TEST, MOMENTARY PUSHBUTTON

ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET TYPE TS1, AS PER PLAN, CONT'D

6. THE MAINTENANCE PANEL AND POLICE PANEL SHALL BE INSTALLED IN THE CABINET AS A COMPLETE AND INDEPENDENT ASSEMBLY. A SINGLE MULTI-PIN CONNECTOR ASSEMBLY SHALL BE USED TO INTERFACE TO THE MAIN BACKPANEL. DIRECT WIRING FROM THE BACKPANEL TO THE MAINTENANCE/POLICE PANEL WILL NOT BE ALLOWED. THE MAINTENANCE/POLICE PANEL ASSEMBLY SHALL BE HINGED WITH A STAINLESS STEEL HINGE TO THE POLICE PANEL TO ALLOW EASY ACCESS TO THE WIRING WITHIN THE ASSEMBLY.

7. AN LED CABINET LAMP KIT WITH DOOR ACTIVATED PUSHBUTTON SHALL BE PROVIDED AND SHALL CONSIST OF TWO (2) LED LIGHT SOURCES, THE FIRST MOUNTED TO THE FAN PANEL TO ILLUMINATE THE ENTIRE CABINET, THE SECOND MOUNTED UNDERNEATH THE BOTTOM SHELF TO ILLUMINATE THE ENTIRE LOAD BAY AREA. EACH LIGHT SOURCE SHALL BE A MINIMUM OF 30" IN LENGTH AND BE LOW PROFILE SO NOT TO INTERFERE WITH THE REMOVAL OR MAINTENANCE OF ANY CABINET EQUIPMENT.

8. THE CABINET SHALL BE ALUMINUM, WITH A NATURAL SATIN FINISH, MEASURING 55"H X 60"W X 26"D AND SHALL COMPLY WITH THE REQUIREMENTS OF 733.03. THE INTERIOR SHALL BE PAINTED WHITE IN COLOR. THE CABINET SHALL BE DOUBLE DOOR AND COMPARTMENTALIZED SO THAT THE CONTROLLER CAN BE HOUSED IN ONE COMPARTMENT AND A UPS IN THE OTHER.

9. THE CONTRACTOR SHALL FURNISH, FOR APPROVAL, A CABINET PLAN SHOWING COMPONENT LAYOUT.

10. THE MAIN POWER SURGE PROTECTOR SHALL BE PLUG-IN TYPE, INCLUDE A FAILURE INDICATOR AND A SET OF DRY CONTACTS TO INDICATE THE UNIT HAS FAILED. THE UNIT SHALL BE AN EDCO MODEL SHA1250 INCLUDING BASE. THE FAIL CONTACTS OF THE SURGE PROTECTOR SHALL BE WIRED TO AN ALARM INPUT FOR REPORTING A FAILED DEVICE TO A CENTRAL COMPUTER.

11. THE FOLLOWING LIST OF FEATURES SHALL BE INCORPORATED INTO THE CABINET AND TERMINALS FACILITY:

A. THE FIELD TERMINALS FOR SIGNAL HOOK-UP SHALL BE MOUNTED TO A PANEL AND ANGLED AT 45 DEGREES FOR EASE OF INSTALLATION AND MAINTENANCE. NO WIRES, LUGGED OR OTHERWISE, SHALL BE PERMITTED ON THE SIGNAL HOOK-UP SIDE OF THE FIELD TERMINAL BLOCKS, EXCEPT THE PANEL SHALL BE WIRED FROM THE FACTORY SUCH THAT THE PHASING CAN BE REWIRED AT TRAFFIC PHASING, OVERLAPS OR PEDESTRIAN SIGNALS USING JUMPS FROM THE FRONT OF THE PANEL WITHOUT THE REMOVAL OF THE BACKBOARD AND WITHOUT A NEED FOR SOLDERING. ALL UNUSED WIRES IN THE MMU AND CONTROLLER WILL BE WIRED TO THE CONNECTOR AND BUNDLED FOR FUTURE USE IN THE PANEL.

B. WIRE CONNECTIONS TO THE BACKPANEL SHALL BE MADE WITH CRIMP TERMINALS AND THREADED FASTENERS. SOLDER CONNECTIONS MAY BE USED ON THE BACKSIDE OF A PANEL THAT UTILIZES FEED THRU STYLE TERMINAL BLOCKS. PRINTED CIRCUIT BOARDS SHALL NOT BE USED ON ANY PART OF THE MAIN BACKPANEL ASSEMBLY.

C. ALL WIRE FASTENED TO THE LOAD SWITCH, FLASHER, AND FLASH TRANSFER RELAY SOCKETS SHALL BE SOLDERED IN PLACE. A GOOD MECHANICAL CONNECTION MUST BE MADE PRIOR TO SOLDERING.

D. THE BACKPANEL SHALL BE PROVIDED WITH A UNITIZED SELF-LEVELING/SELF-ADJUSTING HINGED MOUNTING MECHANISM TO ALLOW EASY ACCESS TO ALL WIRING ON THE REAR OF THE PANEL. THE BACKPANEL SHALL SLIDE ONTO THE HINGE SUPPORT BRACKETS AND BE SECURED IN THE CABINET WITH STAINLESS STEEL MOUNTING HARDWARE SECURELY FASTENED AT NO MORE THAN TWO (2) POINTS. COMPLETE REMOVAL AND REPLACEMENT OF THE MAIN BACKPANEL ASSEMBLY SHALL BE ACCOMPLISHED WITH THE USE OF SIMPLE HAND TOOLS.

E. THE BACKPANEL SHALL BE DESIGNED SUCH THAT IT CAN BE EASILY REMOVED AND REPLACED WITHIN THE CABINET. CONNECTORS SHALL BE USED TO CONNECT ALL SIDE PANELS TO THE BACKPANEL. INCLUDING THE DETECTOR PANEL, MAINTENANCE/POLICE PANEL, CABINET FAN PLATE AND ANY AUXILIARY PANEL. THE MAIN BACKPANEL ASSEMBLY SHALL BE EASILY REMOVED AND REPLACED WITHOUT REMOVING OR RE-WIRING ANY OF THE SIDEWALL MOUNTED PANELS.

F. ALL WIRING OF HARNESSES AND INTER-PANEL WIRING, INCLUDING WIRING TO THE POLICE PANEL SHALL BE PROTECTED WITH A NYLON MESH OR "SNAKE SKIN". ANY EXPOSED WIRES, OR THE USE OF CABLE TIES TO HOLD THE WIRE BUNDLES TOGETHER SHALL NOT BE ALLOWED.

G. ALL BACKPANEL TERMINALS AND COMPONENTS SHALL HAVE SILK-SCREENED TERMINAL/SOCKET FUNCTION IDENTIFICATION LABELS SUCH AS AC COM, PHASE 3 GREEN, ETC. SILK-SCREENED TERMINAL REFERENCE NUMBERS SHALL ALSO BE PROVIDED. LOAD SWITCH FIELD TERMINALS SHALL BE LABELED WITH THE LOAD SWITCH NUMBER, COLOR AND TERMINAL REFERENCE NUMBER.

H. ALL SWITCHES SHALL BE IDENTIFIED WITH PERMANENT TYPE LABELS. THE USE OF PLASTIC MARKING TAPE OR "CROY" TYPE TAPE IS NOT ACCEPTABLE.

I. ALL MAIN POWER PANEL DEVICES SHALL BE MOUNTED TO THE LOWER RIGHT PORTION OF THE MAIN PANEL, INCLUDING ALL CIRCUIT BREAKERS, LINE FILTERS AND LOAD RELAYS. AS AN ALTERNATE, A SEPARATE POWER PANEL MOUNTED TO THE RIGHT SIDE WALL OF THE CABINET WILL BE PERMITTED.

CALCULATED JMD CHECKED MJH

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

TRAFFIC SIGNAL NOTES

LOR-IR90-20.55

I02520CN004

ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET TYPE TS1, AS PER PLAN, CONT'D

J. FIELD TERMINATIONS FOR LOOP AND PEDESTRIANS PUSHBUTTONS SHALL BE ON THE LEFT SIDE WALL. THE TERMINAL BLOCK FOR THESE ITEMS SHALL BE MOUNTED VERTICALLY. TERMINATING OF FIELD WIRES OVER TOP OF OTHER TERMINAL BLOCKS SHALL NOT BE ALLOWED.

K. ALL EQUIPMENT HARNESSES SHALL BE ATTACHED TO THE UNDERSIDE OF THE SHELVES WITH APPROPRIATE CABLE TIE MOUNTING BLOCKS. FOR EASE OF MAINTENANCE, ALL HARNESSES SHALL BE OF SUFFICIENT LENGTH TO PLACE THE EQUIPMENT ON TOP OF THE CABINET AND BE OPERATIONAL.

L. A COLOR-CODED WIRING SYSTEM SHALL BE USED THROUGHOUT THE WIRING OF THE CABINET. THE WIRING COLOR-CODE SHALL BE AS FOLLOWS:

I.CONTROLLER UNIT - BLUE, 22 GAUGE
II.MMU - VIOLET, 22 GAUGE
III.RED LOAD SWITCH OUTPUT - RED, 16 GAUGE
IV.YELLOW LOAD SWITCH OUTPUT - YELLOW, 16 GAUGE
V.GREEN LOAD SWITCH OUTPUT - BROWN, 16 GAUGE
VI.AC LINE POWER - BLACK, VARIES*
VII.AC NEUTRAL - WHITE, VARIES*
VIII.EARTH GROUND - GREEN, VARIES*
IX.LOGIC GROUND - GRAY, 22 GAUGE
X.FLASH PROGRAMMING - ORANGE, 16 GAUGE

*SIZED APPROPRIATELY TO HANDLE THE VARYING CURRENT REQUIREMENTS

12. A DETECTOR TERMINATION PANEL SHALL BE INSTALLED AND MOUNTED ON THE LEFT-SIDE WALL OF THE CABINET. A SINGLE MULTI-PIN CONNECTOR SHALL BE USED TO INTERFACE THE DETECTOR PANEL TO THE MAIN BACKPANEL. DIRECT WIRING FROM THE MAIN BACKPANEL TO THE DETECTOR PANEL WILL NOT BE ALLOWED, EXCEPT FOR THE AC SERVICE TO THE PANEL.

A. ALL LOOP DETECTOR HARNESSES SHALL INCLUDE AN APPROPRIATE 10-PIN LOCKING TYPE CONNECTOR TO PLUG INTO THE DETECTOR TERMINATION PANEL. THE LOOP HARNESS SHALL LOCK INTO A MATING CONNECTOR ON THE DETECTOR TERMINATION PANEL.

B. THE PANEL SHALL BE PROVIDED WITH PROVISIONS AND FULLY WIRED FOR A MINIMUM OF EIGHT (8) LOOP DETECTORS INCLUDING CONNECTORS AND LOOP TERMINATION BLOCKS. CONNECTORIZED PLUG-IN STYLE LOOP DETECTOR HARNESSES SHALL BE PROVIDED IN SUFFICIENT QUANTITY TO PERFORM THE REQUIRED SEQUENCE.

C. THE DETECTOR TERMINATION PANEL SHALL BE FULLY PROGRAMMABLE. ALL DETECTOR FUNCTIONS SHALL BE PROGRAMMABLE ON THE DETECTOR PANEL INCLUDING PHASE CALLS, DELAY DEFEAT AND DETECTOR COUNT OUTPUTS.

D. TERMINATION POINTS SHALL BE PROVIDED FOR FOUR (4) PEDESTRIAN PUSHBUTTONS.

E. PROVISIONS FOR INTERFACING SYSTEM DETECTORS AND ADDITIONAL DETECTOR INPUTS SHALL BE INCLUDED ON THE PANEL.

F. THE DETECTOR TERMINATION PANEL SHALL ALLOW FOR EASY EXPANSION. ADDITIONAL DETECTORS TERMINATION PANELS SHALL BE ADDED BY MEANS OF A SINGLE CONNECTING HARNESS ASSEMBLY THAT INCLUDES ALL FUNCTIONS AS REQUIRED TO ACHIEVE THE DESIRED SEQUENCE AND OPERATION INCLUDING PHASE CALLS, PHASE GREENS AND AUXILIARY SYSTEM FUNCTIONS.

13. ALL LOOP DETECTOR HARNESSES SHALL BE TAGGED WITH A WHITE CIRCULAR PLASTIC TAG, AND SHALL IDENTIFY WITH PERMANENT MARKER, THE LOOP NUMBER, DIRECTION OF TRAVEL AND DESIGNATE THE LANE FOR WHICH THE LOOP IS PLACE. IT SHALL ALSO INCLUDE ANY NOMENCLATURE AS SHOWN ON THE DRAWINGS USED FOR IDENTIFICATION OF THE HARNESS.

14. A CLOSED LOOP SYSTEMS INTERFACE PANEL SHALL BE MOUNTED ON THE LEFT SIDEWALL, ABOVE THE DETECTOR TERMINATION PANEL(S). TERMINAL BLOCKS SHALL BE FEED-THRU TYPE AND MOUNTED VERTICALLY. ALL SYSTEMS FUNCTIONS OF THE CONTROLLER SHALL BE TERMINATED ON A SINGLE PANEL. AT A MINIMUM, THE SYSTEMS PANELS SHALL INCLUDE TERMINATION POINTS FOR 16 ADDITIONAL DETECTOR INPUTS, 6 PREEMPT INPUTS, 6 PREEMPT OUTPUTS AND 4 SPECIAL FUNCTION OUTPUTS. THE SYSTEMS PANEL SHALL INCLUDE AN EDCO PC642C-008D SURGE PROTECTOR WITH SUPPORT BRACKET AND TERMINATION BLOCK FOR PAIRED INTERCONNECT. THE SYSTEMS INTERFACE PANEL SHALL CONNECT TO THE MAIN BACKPANEL ASSEMBLY AND THE DETECTOR PANEL WITH THE USE OF MULTI-PIN CONNECTORS. DIRECT WIRING FROM THE MAIN BACKPANEL TO THE CLOSED LOOP SYSTEMS INTERFACE PANEL WILL NOT BE ALLOWED.

15. THE CABINET SHALL CONTAIN A PULL-OUT DOCUMENT DRAWER WITH HOLD-CLOSED AND LOCK-OPEN FEATURE. THE DOCUMENT DRAWER SHALL MEASURE 22"W X12"D X2.5"H. THE DOCUMENT DRAWER SHALL INCLUDE A NON-SKID SURFACE DESIGNED TO SUPPORT THE WEIGHT OF A TYPICAL LAPTOP COMPUTER AND SHALL BE MOUNTED BELOW THE TIMER SHELF.

16. THE CABINET SHALL BE FULLY WIRED TO ACCOMMODATE THE PREEMPTION EQUIPMENT AND PERFORM THE PREEMPTION SEQUENCES AS SPECIFIED IN THESE PLANS.

ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET TYPE TS1, AS PER PLAN, CONT'D

17. THE CABINET ASSEMBLY SHALL BE FULLY TESTED, WITH ALL COMPONENTS INSTALLED, AT THE FACTORY PRIOR TO SHIPMENT. THE CONTROLLER, MONITOR AND DETECTORS SHALL BE FULLY PROGRAMMED PER THE PLANS AND SPECIFICATIONS, BY A TRAINED FACTORY REPRESENTATIVE. THE COMPLETE AND FULLY PROGRAMMED CABINET ASSEMBLY SHALL BE FACTORY TESTED FOR A MINIMUM OF 24 HOURS, PRIOR TO SHIPMENT. THE SUPPLIER SHALL CERTIFY IN WRITING THAT THE TESTS HAVE BEEN SUCCESSFULLY PERFORMED PRIOR TO INSTALLATION IN THE FIELD. ALL TESTING SHALL BE SUPERVISED BY A LICENSED PROFESSIONAL ENGINEER.

18. THE HEIGHT OF THE CONTROLLER SHOULD BE AROUND 6 FEET TO THE TOP OF THE CABINET SO THE FIELD TECHNICIAN CAN WORK COMFORTABLY ON IT. THE CONTROLLER WILL NOT SIT ON THE GROUND, IT MUST HAVE A PEDESTAL. THE CABINET DOOR WILL FACE AWAY FROM TRAFFIC, AND SHALL NOT FACE TOWARDS THE PATH OF SNOW REMOVAL. A CONCRETE PAD WILL BE IN FRONT OF THE CABINET.

19. INCLUDE ALL MANUALS AND SOFTWARE FOR ALL COMPONENTS IN THE CABINET.

20. ALL USED PARTS AND SPARE STOCK WILL BE RETURNED TO THE CITY OF AVON.

PAYMENT FOR "ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2 WITH CABINET TYPE TS1, AS PER PLAN" SHALL BE MADE AT THE CONTRACT PRICE BID. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, TESTING, CERTIFICATIONS AND OTHER INCIDENTALS NECESSARY TO FURNISH THE CONTROLLER COMPLETE IN PLACE, INCLUDING ALL CONNECTIONS MADE AND WIRING COMPLETE, TESTED AND ACCEPTED.

ITEM 633 - CABINET FOUNDATION, AS PER PLAN
ITEM 633 - CONTROLLER WORK PAD, AS PER PLAN

THE SIZE OF THE CABINET FOUNDATION AND THE CONTROLLER WORK PAD SHALL BE INCREASED TO ACCOMMODATE THE PROPOSED CONTROLLER CABINET WITH UNINTERRUPTIBLE POWER SUPPLY AND PEDESTAL MOUNTED POWER SERVICE FROM THOSE SHOWN ON TC-83.20. THE CABINET FOUNDATION SHALL BE 90" W X 36" D X 36" H AND THE CONTROLLER WORK PAD SHALL BE 90" X 30". ALL OTHER DETAILS SHALL BE AS SHOWN ON TC-83.20.

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

IN ADDITION TO THE REQUIREMENTS OF 633 AND 633.18, PROVIDE AN UNINTERRUPTIBLE POWER SUPPLY WITH THE FOLLOWING FEATURES:

THIS WORK IS FOR THE FURNISHING AND INSTALLATION OF AN UNINTERRUPTIBLE POWER SYSTEM (UPS) WITH AUTOMATIC GENERATOR/VEHICLE INVERTER DISCONNECT. THE UPS SHALL BE A CLARY CORPORATION SP1250LX SERIES OR APPROVED EQUAL AND SHALL FULLY COMPLY WITH THE FOLLOWING SPECIFICATIONS:

MATERIAL
1.DESCRIPTION - SYSTEM SHALL BE A DIGITAL, TRUE ON-LINE DOUBLE CONVERSION, POWER CONDITIONER AND UNINTERRUPTIBLE POWER SYSTEM (UPS) WITH BATTERY BACKUP CAPABILITY. THE UPS INVERTER SHALL BE IN OPERATION AT ALL TIMES SUPPLYING CLEAN REGULATED POWER (BOTH VOLTAGE AND FREQUENCY) TO ALL LOADS, AT ALL TIMES. THE UPS, BATTERIES AND POWER INTERFACE MODULE SHALL BE CERTIFIED BY AN INDEPENDENT LABORATORY TO OPERATE FROM -40F TO +165F. THE COMPLETE SYSTEM INCLUDING BATTERIES SHALL HAVE A TWO YEAR FACTORY WARRANTY.
2.DESIGN - THE TRUE ON-LINE FULL DOUBLE CONVERSION UPS UNIT SHALL USE DIGITAL TECHNOLOGY (IRON CORE TRANSFORMERS WILL NOT BE ACCEPTED) TO CONTINUOUSLY CREATE AND CONTROL PURE SINE WAVE OUTPUT POWER. THE UPS SHALL ISOLATE THE CONNECTED EQUIPMENT AGAINST SPIKES, SAGS AND LINE NOISE BY CONVERTING THE UTILITY AC TO DC AND THEN REGENERATE CLEAN AC AT A NOMINAL 120 VOLTS WITH A FREQUENCY OF 60HZ. WHEN OPERATING ON BATTERY POWER THE UPS SHALL MAINTAIN +/- .0005% FREQUENCY STABILITY TO PREVENT TIME DRIFT PROBLEMS WITH THE TRAFFIC CONTROLLER'S INTERNAL TBC CLOCK. THE BATTERY CHARGING SYSTEM SHALL BE A SEPARATE DISTINCT 3 STAGE DESIGN INCORPORATING A PULSE CHARGE CAPABILITY. THE DOUBLE CONVERSION OPERATION OF THE UPS SHALL WORK NORMALLY EVEN WITH BATTERIES DISCONNECTED OR CHARGING. THE SYSTEM SHALL SUPPORT A MAXIMUM 865 WATT LOAD FOR APPROX. 1.8 HOURS AT AMBIENT TEMPERATURE. THE UPS SYSTEM SHALL, IN THE ABSENCE OF AC, BE ABLE TO BE COLD STARTED USING ONLY BATTERY POWER. THE UPS SHALL INCORPORATE ALARM OUTPUTS THAT CAN BE USED FOR REMOTE MONITORING AS WELL AS OUTPUTS THAT CAN BE USED FOR OPERATING THE INTERSECTION IN A COMBINATION OF FULL OPERATION AND FLASH.

THE BATTERY SET SHALL BE CERTIFIED TO MEET OR EXCEED THE SAFETY REQUIREMENTS OF MIL-SPEC #MIL-B-8565J. THE BATTERY SET SHALL BE COMPRISED OF EXTREME TEMPERATURE, DEEP CYCLE, AGM/VRLA (ABSORBED GLASS MAT/VALVE REGULATED LEAD ACID) BATTERIES. ALL TERMINALS SHALL HAVE ANDERSON POWER POLE CONNECTORS WITH WIRE LEADS WELDED TO THE BATTERY TERMINALS THUS ELIMINATING THE NEED TO PERIODICALLY RETIGHTEN MECHANICAL CONNECTIONS. ALL BATTERY TERMINALS SHALL BE PERMANENTLY SEALED AGAINST CORROSION BY THE BATTERY MANUFACTURER. BOLT ON BATTERY CABLES AND EXPOSED BATTERY TERMINALS WILL NOT BE ACCEPTED. BATTERIES SHALL BE 51AH AND NOT TO EXCEED 25LBS EACH. ALL BATTERIES SHALL BE PLACED ON THERMOSTATICALLY CONTROLLED BATTERY HEATER MATS IN THE ENCLOSURE.

ITEM 633 UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN, CONT'D

THE POWER INTERFACE MODULE (PIM) SHALL CONTAIN A TERMINAL STRIP FOR INPUT AND OUTPUT POWER CONNECTIONS IN ADDITION TO NEUTRAL AND GROUND CONNECTIONS. THIS MODULE SHALL HAVE AN INTERFACE THAT WILL ALLOW AN EXTERNAL GENERATOR OR VEHICLE INVERTER TO BE PLUGGED INTO THE SYSTEM. THE UPS SHALL SUPPLY FULLY REGENERATED CLEAN AND CONDITIONED POWER FROM THE GENERATOR/INVERTER POWER SOURCE (WITHOUT SWITCHING TO BATTERIES) IN ADDITION TO MAINTAINING THE 3 STAGE BATTERY CHARGING SYSTEM. A/C INDICATION WILL BE ON OUTSIDE OF CABINET. ONE FOR LINE VOLTAGE (GREEN) AND ONE FOR UPS VOLTAGE (RED).

GENERAL
1.THE UPS MANUFACTURER SHALL BE ISO9001:2008 CERTIFIED AND ALL MANUFACTURING PROCESSES SHALL BE DONE IN THE UNITED STATES AND FULLY COMPLY WITH THE "MADE IN USA" STANDARD. THE UPS SHALL BE FIELD PROVEN WITH A MINIMUM OF THREE YEARS OF USE FOR TRAFFIC SIGNAL APPLICATIONS WITHIN THE UNITED STATES.

PAYMENT FOR "ITEM 633 UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID FOR EACH IN PLACE, COMPLETELY INSTALLED AT THE LOCATIONS SHOWN IN THE PLANS, INCLUDING EXTRA CABINET SPACE, CABINET FOUNDATION AND WORK PAD.

ITEM 633 - PREEMPTION, AS PER PLAN

THE PREEMPTION SHALL CONFORM TO ODOT SPECIFICATION 633 AND SHALL UTILIZE COMMUNICATIONS TO IDENTIFY THE PRESENCE OF AN EMERGENCY PRIORITY VEHICLE. IT SHALL CAUSE THE TRAFFIC SIGNAL CONTROLLER TO SELECT A PRE-PROGRAMMED, PREEMPTION PLAN THAT WILL DISPLAY AND HOLD THE DESIRED SIGNAL PHASE FOR THE DIRECTION OF THE EMERGENCY VEHICLE. THE PREEMPTION SYSTEM SHALL BE MODEL SONEM 2000 AS MANUFACTURED BY TRAFFIC SYSTEMS.

THE COMMUNICATIONS MEDIUM SHALL EMPLOY SIREN ACTIVATED DETECTION TECHNIQUES TO DETERMINE AND LOG THE PRESENCE OF THE EMERGENCY VEHICLE. THE SYSTEM SHALL DETECT THE PRESENCE OF THE VEHICLE THROUGH A SIREN LOCATED ON THE EMERGENCY VEHICLE. THE SYSTEM SHALL ACTIVATE THE PREEMPTION SEQUENCE BY APPLYING A SIGNAL TO ONE OF THE CONTROLLER'S PREEMPT DISCRETE INPUTS. THE SYSTEM SHALL BE COMPLETELY COMPATIBLE WITH THE NEMA SPECIFIED CONTROLLER.

THE EQUIPMENT SHALL BE RACK-MOUNTED, BE EASILY REMOVABLE AND REPLACEABLE WITHIN THE CABINET WITHOUT THE USE OF HARNESSES OR PLUG-IN STYLE CONNECTORS. THE EQUIPMENT SHALL BE SUPPLIED COMPLETELY WIRED IN THE CONTROLLER CABINET AND TESTED.

THE SYSTEM SHALL BE CAPABLE OF PREEMPTING AND RECEIVING PRIORITY FOR EACH APPROACH TO THE INTERSECTION. IT SHALL BE POSSIBLE TO DETECT THE EMERGENCY VEHICLE UP TO 1200 FEET FROM THE INTERSECTION. THE SUPPLIER SHALL CERTIFY IN WRITING THAT NO FALSE DETECTION CAN OCCUR.

EACH INTERSECTION SHOWN IN THE PLANS SHALL BE SUPPLIED WITH THE FOLLOWING COMPONENTS, EACH BID SEPARATELY:
A. PREEMPTION RECEIVING UNIT
B. PREEMPT DETECTOR CABLE
C. PREEMPT PHASE SELECTOR ASSEMBLY AND INTERFACE WIRING PANEL
D. PREEMPT CONFIRMATION LIGHT

THE PREEMPTION RECEIVING UNITS SHALL CONSIST OF FURNISHING AND INSTALLING A LIGHTWEIGHT, WEATHERPROOF AND DIRECTIONAL ASSEMBLY. EACH RECEIVING UNIT SHALL BE 360 DEGREE ADJUSTABLE. THE RECEIVING UNIT SHALL BE CAPABLE OF SENDING THE PROPER ELECTRICAL SIGNAL TO THE TRAFFIC SIGNAL CONTROLLER VIA THE PREEMPTION DETECTOR HOME RUN CABLE. DETECTORS SHALL BE SUPPLIED WITH BRACKET ARM MOUNTING HARDWARE. THE DETECTORS WILL FACE OUTBOUND (TO MINIMIZE FALSE CALLS FROM TURNING EMERGENCY VEHICLES) MOUNTED AS TO POINT DOWN THE CENTER OF ROADWAY. AT TEE INTERSECTIONS, THE LOCATION OF THE DETECTORS MAY BE MOUNTED INBOUND.

THE CONTRACTOR SHALL THOROUGHLY TEST THE INSTALLED SYSTEM. AS A MINIMUM, THE CONTRACTOR SHALL VERIFY THAT ALL CONNECTIONS ARE PROPERLY MADE TO THE CONTROLLER CABINETS. THE CONTRACTOR SHALL CHECK THAT THE RANGE SETTING IS PROPER FOR EACH APPROACH. THE CONTRACTOR SHALL DETERMINE THAT ALL PHASE SELECTORS ARE SELECTING THE PROPER PHASE AND TIMING ACCURATELY. THE CONTRACTOR SHALL VERIFY THAT ALL VEHICLE EMITTERS ARE BEING PROPERLY DETECTED.

THE CONTRACTOR SHALL PROVIDE TRAINING FOR UP TO FIFTEEN (15) PEOPLE IN THE OPERATION OF THE SYSTEM. IT SHALL BE PROVIDED WITHIN 48 HOURS OF THE SYSTEM INSTALLATION. IT SHALL CONSIST OF HANDS-ON INSTRUCTION FOR A MINIMUM OF SIXTEEN (16) HOURS. THE CONTRACTOR SHALL PROVIDE EIGHT (8) HOURS OF TRAINING FOR UP TO FOUR (4) PEOPLE AND COVER INSTALLATION AND MAINTENANCE OF THE SYSTEM. ALL TRAINING SHALL BE HELD IN A LOCATION AS SPECIFIED BY THE CITY AND CONDUCTED BY SOMEONE WHO HAS PERFORMED THE TRAINING WITHIN THE LAST YEAR AND DOES IT ON A REGULAR BASIS. THE COST OF TRAINING, INCLUDING COURSE MATERIAL, TRAVEL SUBSISTENCE AND RELATED COSTS SHALL BE ENTIRELY BORNE BY THE CONTRACTOR AND SHALL BE INCIDENTAL TO THE COST OF THE PREEMPT EQUIPMENT.

ALL CABLES, CONNECTORS, TERMINALS, AND INTERFACE RACKS TO PROVIDE A COMPLETE PRIORITY CONTROL SYSTEM SHALL BE INCIDENTAL TO THIS ITEM. PAYMENT SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH "ITEM 633 - PREEMPTION, AS PER PLAN", IN PLACE AND FULLY OPERATIONAL AS SHOWN IN THE PLANS, EXCEPT FOR THOSE ITEMS BID SEPARATELY.

ITEM 633 - PREEMPT CONFIRMATION LIGHT, LED. AS PER PLAN

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT CONFIRMATION LIGHT INCLUDING HARDWARE ANJ) ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE PREEMPT CONFIRMATION LIGHT COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

A CONFIRMATION LIGHT SHALL BE SUPPLIED FOR EACH INTERSECTION TO INDICATE THAT THE EMERGENCY VEHICLE HAS ACHIEVED CONTROL OF THE TRAFFIC SIGNAL.

THE CONFIRMATION LIGHT SHALL BE A VAPOR TIGHT, ALUMINUM LIGHTING FIXTURE WITH A BAKED-ON EPOXY FINISH, BLUE LED CLUSTER LIGHT OUTPUT, AND STAINLESS STEEL MOUNTING HARDWARE TO ATTACH TO THE TRAFFIC SIGNAL MAST ARM. THE CONFIRMATION LIGHT SHALL BE POWERED BY A LOAD SWITCH IN THE TRAFFIC SIGNAL CONTROLLER CABINET DEDICATED TO FOR THAT PURPOSE. SIGNAL CABLE CONFORMING TO 732.19 SHALL BE USED FOR CONFIRMATION LIGHTS. A MINIMUM OF 4-CONDUCTOR CABLE SHALL BE USED WITH THE GREEN WIRE SERVING AS THE SAFETY GROUND CONDUCTOR.

THE CONTROLLER SHALL BE PROGRAMMED TO FLASH THE CONFIRMATION LIGHT IN THE DIRECTION OF THE EMERGENCY VEHICLE. ALL OTHER CONFIRMATION LIGHTS SHALL BE STEADY ON.

THE CONFIRMATION LIGHT SHALL BE A MODEL 7100 SERIES MANUFACTURED BY TOMAR OR PRE-APPROVED EQUAL.

PAYMENT FOR "ITEM 633 - PREEMPT CONFIRMATION LIGHT, LED, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH LIGHT IN PLACE, COMPLETELY INSTALLED IN THE LOCATION SHOWN IN TUE PLANS, WIRED, TESTED AND ACCEPTED. LOAD SWITCH, CONTROLLER WIRING AND CONTROLLER PROGRAMMING SHALL BE CONSIDERED INCIDENTAL AND INCLUDED IN THE COST OF THE PREEMPT CONFIRMATION LIGHT.

ITEM 633 - PREEMPTION RECEIVING UNIT, AS PER PLAN

RECEIVING UNITS SHALL CONSIST OF LIGHT WEIGHT, WEATHERPROOF AND DIRECTIONAL ASSEMBLY. EACH RECEIVING UNIT SHALL BE 360 DEGREE ADJUSTABLE. THE RECEIVING UNIT SHALL BE CAPABLE OF SENDING THE PROPER ELECTRICAL SIGNAL TO THE TRAFFIC SIGNAL CONTROLLER VIA THE PREEMPTION DETECTOR CABLE. RECEIVING UNITS SHALL BE SUPPLIED WITH MAST ARM MOUNTING HARDWARE AS SHOWN IN THE PLANS.

INSTALL THE DETECTORS AT THE LOCATIONS RECOMMENDED BY THE PREEMPT DETECTOR SUPPLIER. FOR MAST ARM MOUNTED LOCATIONS, MOUNT THE PREEMPT DETECTORS BY FIELD DRILLING A WIRE ENTRANCE HOLE IN THE MAST ARM. PROVIDE AND INSTALL A RUBBER GROMMET FOR THE WIRE ENTRANCE HOLE.

FURNISH PREEMPTION RECEIVING UNITS WITH 60-MONTH WARRANTIES OR FOR THE MANUFACTURER'S STANDARD WARRANTY WHICHEVER IS GREATER. ENSURE THE WARRANTY PERIOD BEGINS ON THE DATE OF SHIPMENT TO THE PROJECT. ENSURE THAT EACH UNIT HAS A PERMANENT LABEL OR STAMP INDICATING THE DATE OF SHIPMENT.

FURNISH SONEM MODEL PREEMPTION RECEIVING UNITS, AS MANUFACTURED BY TRAFFIC SYSTEMS, LLC, PHOENIX, ARIZONA.

PAYMENT FOR ACCEPTED QUANTITIES OF "ITEM 633 - PREEMPTION RECEIVING UNIT, AS PER PLAN" SHALL BE AT THE CONTRACT UNIT PRICE FOR EACH DETECTOR IN PLACE, COMPLETELY INSTALLED AT THE LOCATIONS SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED. FIELD DRILLING OF THE MAST ARM FOR THE WIRE ENTRANCE HOLE AND GROMMET SHALL BE CONSIDERED INCIDENTAL TO AND INCLUDED IN THE COST OF THE RECEIVING UNIT.

ITEM 633 - PREEMPT PHASE SELECTOR, AS PER PLAN

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT PHASE SELECTOR, INCLUDING WIRING INTERFACE PANELS N THE LOCAL CONTROLLER CABINET, AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE PREEMPT PHASE SELECTORS COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS. THIS ITEM SHALL INCLUDE THE EXTRA CABINET SPACE NECESSARY TO BE LOCATED IN THE LOCAL CONTROLLER CABINETS WHERE INDICATED IN THE PLANS.

THE PHASE SELECTORS SHALL CONSIST OF A MODULE OR MODULES THAT WILL PROVIDE THE NECESSARY INPUTS TO THE CONTROLLER. PHASE SELECTORS SHALL BE SUPPLIED WITH SUFFICIENT QUANTITIES OF CHANNELS TO PROVIDE PREEMPTION FOR ALL APPROACHES TO THE INTERSECTION SEPARATELY. POWER SHALL BE OBTAINED FROM THE PHASE SELECTOR OR PHASE SELECTOR POWER SUPPLY AND NOT FROM THE LOCAL CONTROLLER TIMER.

THE PHASE SELECTORS SHALL HAVE FRONT PANEL INDICATORS FOR ACTIVE PREEMPT CHANNEL STATUS. IT SHALL HAVE TEST SWITCHES TO ACTIVATE ALL PREEMPT CHANNELS.

FURNISH PREEMPT PHASE SELECTORS WITH 60-MONTH WARRANTIES OR FOR THE MANUFACTURER'S STANDARD WARRANTY WHICHEVER IS GREATER. ENSURE THE WARRANTY PERIOD BEGINS ON THE DATE OF SHIPMENT TO THE PROJECT. ENSURE THAT EACH UNIT HAS A PERMANENT LABEL OR STAMP INDICATING THE DATE OF SHIPMENT.

FURNISH SONEM MODEL PREEMPT PHASE SELECTORS, AS MANUFACTURED BY TRAFFIC SYSTEMS, LLC, PHOENIX, ARIZONA.

PAYMENT FOR "ITEM 633 - PREEMPT PHASE SELECTOR, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH PHASE SELECTOR IN PLACE, COMPLETELY INSTALLED IN THE LOCAL CONTROLLER SHOWN IN THE PLANS, WIRED, TESTED AND ACCEPTED.

ITEM 633 - PREEMPT DETECTOR CABLE, AS PER PLAN

THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT DETECTOR HOME RUN CABLE IN THE LOCATIONS SHOWN IN THE PLANS. IT SHALL CONNECT THE PREEMPT RECEIVING UNITS TO THE PHASE SELECTORS IN THE LOCAL CONTROLLER CABINET.

PREEMPT DETECTOR CABLE SHALL CONFORM TO ODOT SPECIFICATION 632. ONLY ONE EXTERNAL SPLICE SHALL BE PERMITTED BETWEEN PREEMPTION RECEIVER UNIT AND THE CONTROLLER CABINET. THIS SPLICE SHALL MEET THE REQUIREMENTS OF C&MS 632.23 USING A WATERPROOF EPOXY SPLICE KIT. THE CABLE SHALL BE APPROVED FOR BOTH OVERHEAD AND UNDERGROUND USE. THE JACKET SHALL WITHSTAND EXPOSURE TO SUNLIGHT AND ATMOSPHERIC TEMPERATURES AND STRESSES REASONABLY EXPECTED IN NORMAL INSTALLATIONS.

PAYMENT FOR QUANTITIES OF "ITEM 633 - PREEMPT DETECTOR CABLE, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER FOOT FOR THE CABLE FURNISHED, IN PLACE, ALL CONNECTIONS MADE AND WIRING COMPLETED, TESTED AND ACCEPTED.

THE MANUFACTURER'S REPRESENTATIVE SHALL PROVIDE A SIX (6) HOUR TRAINING COURSE ON THE SETUP, OPERATION AND MAINTENANCE OF THE SYSTEM.

CONSTRUCTION - - LOCATE AND MOUNT DETECTOR IN ACCORDANCE WITH MANUFACTURE SPECIFICATIONS.

PAYMENT FOR "ITEM 809 - UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED PROGRAMMING, CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONNECTIONS TESTED AND ACCEPTED.

ITEM 809 - STOP-BAR RADAR DETECTION, AS PER PLAN

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A STOP BAR DETECTION UNIT CAPABLE OF INTERSECTION DETECTION CONTROL UTILIZING ABOVE GROUND DIGITAL WAVE RADAR TECHNIQUES. THE UNIT SHALL BE NON-INTRUSIVE AND SHALL DETECT VEHICLES FROM 6 FEET UP TO 140 FEET FOR A 90 DEGREE FIELD OF VIEW FROM THE UNIT. THE UNIT SHALL PROVIDE REAL-TIME PRESENCE DATA FOR AT LEAST 10 LANES. THE UNIT SHALL PROVIDE AT LEAST 16 DETECTION ZONES SIMULTANEOUSLY FOR INTERSECTION CONTROL. ONE UNIT SHALL BE PROVIDED PER APPROACH, WHERE SPECIFIED IN THE PLANS, COVERING MULTIPLE LANES WHERE STOP BAR DETECTION IS REQUIRED.

THE UNIT SHALL BE USED TO PROVIDE STOP BAR DETECTION AND SYSTEM DETECTION AS SHOWN ON THE PLAN.

THE EQUIPMENT SUPPLIED SHALL BE WAVETRONIX MATRIX.

ALL REQUIRED INPUTS CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CALTRANS, NEMA TS1 AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.

THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ONSITE TRAINING ON THE SETUP, OPERATION, AND MAINTENANCE OF THE UNIT.

THE UNIT SHALL COME WITH A 2-YEAR MANUFACTURER SUPPLIED WARRANTY.

PAYMENT FOR "ITEM 809 - STOP BAR RADAR DETECTION, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE FULLY FUNCTIONING INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT AND CONNECTIONS TESTED AND ACCEPTED.

ITEM 809 - ADVANCE RADAR DETECTION, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF SUPPLEMENTAL SPECIFICATION 809, THE ADVANCE DETECTION UNITS SHALL BE WAVETRONIX ADVANCE.

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 FULLY FUNCTIONING INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT AND CONNECTIONS TESTED AND ACCEPTED.

ITEM 815 - SPREAD SPECTRUM RADIO, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF SUPPLEMENTAL SPECIFICATION 815, THE SPREAD SPECTRUM RADIO SUPPLIED SHALL BE FULLY COMPATIBLE WITH THE EXISTING AVON RADIO INTERCONNECT SYSTEM. THE RADIOS SUPPLIED SHALL BE MDS 9810 RADIOS AS MANUFACTURED BY GE MDS. THESE UNITS ARE NO LONGER MANUFACTURED, BUT REFURBISHED UNITS ARE AVAILABLE FROM GE MDS (585-241-5540).

PAYMENT FOR "ITEM 815 - SPREAD SPECTRUM RADIO, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE FULLY FUNCTIONING INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, ANTENNAS AND CONNECTIONS TESTED AND ACCEPTED.

CALCULATED JMD
CHECKED MJH

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

TRAFFIC SIGNAL NOTES

LOR-IR90-20.55

I02520CN006

SHEET NUMBER					ITEM	EXT.	GRAND TOTAL	UNIT	DESCRIPTION
10	15	20	25						
									MISCELLANEOUS
105					202	30000	105	SF	WALK REMOVED
105					608	10000	105	SF	4" CONCRETE WALK
160	140	180			611	00400	480	FT	4" CONDUIT, TYPE E
									LIGHTING
18	10	6			625	00450	34	EACH	CONNECTION, FUSED PULL APART
9	5	3			625	00460	17	EACH	CONNECTION, UNFUSED PULL APART
18	6	3	6		625	00480	33	EACH	CONNECTION, UNFUSED PERMANENT
1	1				625	18511	2	EACH	BRACKET ARM, 30', AS PER PLAN
4602	2334	1059			625	22990	7995	FT	NO. 6 AWG 600 VOLT DISTRIBUTION CABLE
			230		625	23200	230	FT	NO. 4 AWG 2400 VOLT DISTRIBUTION CABLE
830	360	190			625	23400	1380	FT	NO. 10 AWG POLE AND BRACKET CABLE
			860		625	24100	860	FT	1-1/2" DUCT CABLE WITH TWO NO. 4 AWG 2400 VOLT CABLES
			860		625	24400	860	FT	DUCT CABLE, MISC.: REMOVAL OF EXISTING DUCT CABLE
40	380	409			625	25400	829	FT	CONDUIT, 2", 725.04
98	154	39			625	25500	291	FT	CONDUIT, 3", 725.04
56	30	45			625	25600	131	FT	CONDUIT, 4", 725.04
759	417	469	105		625	25902	1750	FT	CONDUIT, JACKED OR DRILLED, 725.04, 4"
1	1				625	26253	2	EACH	LUMINAIRE, CONVENTIONAL, SOLID STATE (LED), AS PER PLAN
270	760	700	860		625	29002	2590	FT	TRENCH, 24" DEEP
6	5	7	1		625	30700	19	EACH	PULL BOX, 725.08, 18"
1	1	1			625	30706	3	EACH	PULL BOX, 725.08, 24"
1	1	1			625	30720	3	EACH	PULL BOX, 725.08, 36"
			1		625	31506	1	EACH	PULL BOX REMOVED
			2		625	31600	2	EACH	PULL BOX, MISC.: MODIFY EXISTING PULL BOX
6	3	2			625	32000	11	EACH	GROUND ROD
1	1	1			625	32001	3	EACH	GROUND ROD, AS PER PLAN
270	760	700	860		625	36000	2590	FT	PLASTIC CAUTION TAPE
	1				625	75400	1	EACH	LIGHT POLE REMOVED
	1				625	75500	1	EACH	LIGHT POLE FOUNDATION REMOVED
1	1				625	75506	2	EACH	LUMINAIRE REMOVED
1					625	75520	1	EACH	LUMINAIRE SUPPORT REMOVED
7	4	4			630	79200	15	EACH	SIGN ATTACHMENT ASSSEMBLY, MAST ARM
2	3	3			630	79500	8	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
13.25	33.5	33.5			630	80100	80.25	SF	SIGN FLAT SHEET
4	1	1			631	90501	6	EACH	INTERNALLY ILLUMINATED FIXED MESSAGE SIGN, BY SIZE, 1 FACE, LED EDGE LIT TYPE, AS PER PLAN
									SIGNALS
10	8	7			632	05007	25	EACH	VEHICULAR SIGNAL HEAD, (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, AS PER PLAN
3	1	1			632	05087	5	EACH	VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, AS PER PLAN
6					632	20731	6	EACH	PEDESTRIAN SIGNAL HEAD, (LED), TYPE D2, COUNTDOWN, AS PER PLAN
13	9	8			632	25001	30	EACH	COVERING OF VEHICULAR SIGNAL HEAD, AS PER PLAN
6					632	25010	6	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
6					632	26001	6	EACH	PEDESTRIAN PUSHBUTTON, AS PER PLAN
745					632	40300	745	FT	SIGNAL CABLE, 3 CONDUCTOR, NO. 14 AWG
765	470	410			632	40400	1645	FT	SIGNAL CABLE, 4 CONDUCTOR, NO. 14 AWG

CALCULATED JMD
CHECKED MJH

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

GENERAL · SUMMARY

LOR-IR90-20.55

I025200C001

SHEET NUMBER					ITEM	EXT.	GRAND TOTAL	UNIT	DESCRIPTION
10	15	20							
									SIGNALS (CONT'D)
1950	960	355			632	40500	3265	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
460	120	350			632	40700	930	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
715					632	65300	715	FT	LOOP DETECTOR LEAD-IN CABLE, 2 CONDUCTOR, NO. 14 AWG
4	3	2			632	64011	9	EACH	SIGNAL SUPPORT FOUNDATION, AS PER PLAN
2					632	64020	2	EACH	PEDESTAL FOUNDATION
85	520	520			632	68300	1125	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
1	1	1			632	70001	3	EACH	POWER SERVICE, AS PER PLAN
		1			632	75192	1	EACH	SIGNAL SUPPORT, TYPE TC-12.30 DESIGN 7 POLE, WITH MAST ARMS TC-81.21 DESIGN 12 AND DESIGN 12, AS PER PLAN
3					632	77231	3	EACH	SIGNAL SUPPORT, MECHANICAL DAMPER FOR TC-81.21 MAST ARM (GREATER THAN 59' IN LENGTH), AS PER PLAN
	1				632	80503	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 11, AS PER PLAN
1					632	80603	2	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 12, AS PER PLAN
	1	1			632	80621	2	EACH	SIGNAL SUPPORT, TYE TC-81.21, DESIGN 13, AS PER PLAN
2					632	80629	2	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 14, AS PER PLAN
	1				632	81091	1	EACH	COMBINATION SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 13, AS PER PLAN
1					632	81095	1	EACH	COMBINATION SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 14, AS PER PLAN
2					632	89900	2	EACH	PEDESTAL, 8', TRANSFORMER BASE
1	1	1			632	81095	3	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN
4					632	90400	4	EACH	SIGNALIZATION, MISC.: UNIVERSAL TRAFFIC MANAGEMENT RADAR VEHICLE DETECTION SYSTEM
1	1	1			633	01581	3	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET TYPE TS1, AS PER PLAN
1	1	1			633	67101	3	EACH	CABINET FOUNDATION, AS PER PLAN
1	1	1			633	67201	3	EACH	CONTROLLER WORK PAD, AS PER PLAN
1	1	1			633	67301	3	EACH	PREEMPTION, AS PER PLAN
4	3	3			633	67311	10	EACH	PREEMPTION RECEIVING UNIT, AS PER PLAN
765	470	410			633	67321	1645	FT	PREEMPT DETECTOR CABLE, AS PER PLAN
1	1	1			633	67351	3	EACH	PREEMPT PHASE SELECTOR, AS PER PLAN
4	3	3			633	67401	10	EACH	PREEMPT CONFIRMATION LIGHT, AS PER PLAN
1	1	1			633	74001	3	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), AS PER PLAN
	3	3			809	69001	6	EACH	ADVANCE RADAR DETECTION, AS PER PLAN
	3	3			809	69101	6	EACH	STOP-BAR RADAR DETECTION, AS PER PLAN
1	1	1			815	30001	3	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

CALCULATED JMD
CHECKED MJH

GENERAL SUMMARY

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

LOR-IR90-20.55

102520CC002

NOTES

1. POLE LOCATIONS HAVE BEEN INDICATED AS ACCURATELY AS POSSIBLE. IN NO CASE SHALL THE CLEARANCE FROM FACE OF CURB TO FACE OF POLE, SIGN OR OTHER PROPOSED ITEMS BE LESS THAN 4 FT. TOP OF POLE FOUNDATIONS SHALL BE FLUSH WITH ADJACENT WALK WAYS, IF APPLICABLE.

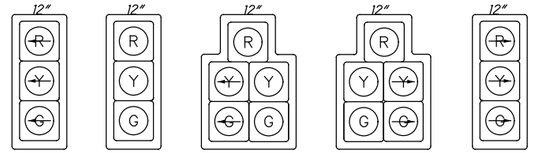
2. LOCATION OF CONDUIT RUNS SHOWN ON THE DRAWING ARE APPROXIMATE. MAINTAIN 36" HORIZONTAL AND 12" VERTICAL CLEARANCE FROM WATER AND GAS LINES. FIELD ADJUST AS NEEDED.

3. SIGNAL HEADS SHALL BE RIGID-MOUNTED TO MAST ARMS.

4. ALL CONDUIT SHALL BE INSTALLED IN OPEN-CUT TRENCH, EXCEPT WHERE OTHERWISE NOTED. ALL CONDUIT UNDER ROADWAYS SHALL BE 4" RMC, JACKED OR DRILLED.

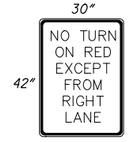
5. IN ADDITION TO THE STOP BAR AND ADVANCE DETECTION, SYSTEM DETECTION ZONES SHALL BE SETUP FOR EACH DEPARTURE LANE. GENERAL LOCATION AND SIZE SHOWN IN THE PLANS.

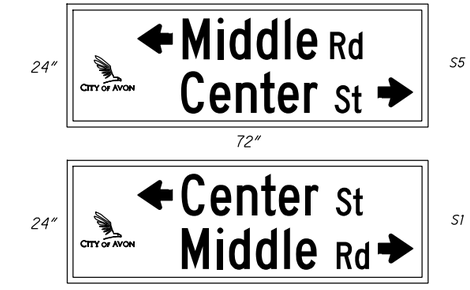
PROPOSED SIGNAL HEADS*



* - VEHICLE SIGNAL HEADS INCLUDE BACKPLATES

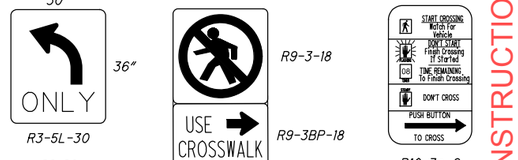
PROPOSED SIGNS

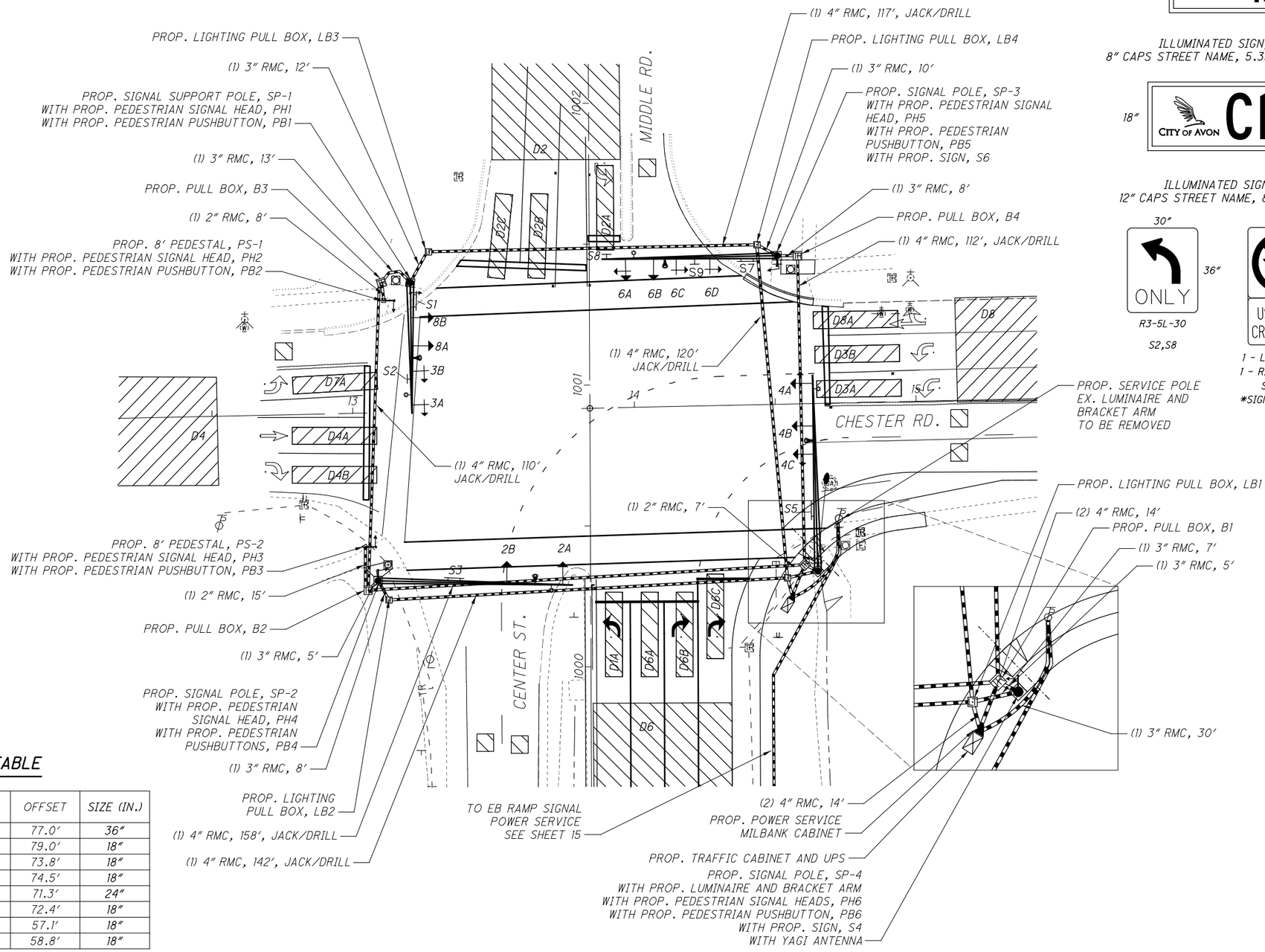




ILLUMINATED SIGN, SINGLE FACE, WHITE ON BLUE
8" CAPS STREET NAME, 5.33" CAPS STREET SUFFIX, FHWA SERIES C

ILLUMINATED SIGN, SINGLE FACE, WHITE ON BLUE
12" CAPS STREET NAME, 8" CAPS STREET SUFFIX, FHWA SERIES C





PULLBOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
B1	1000+33.9	RT.	77.0'	36"
B2	1000+27.5	LT.	79.0'	18"
B3	1001+36.7	LT.	73.8'	18"
B4	1001+45.8	RT.	74.5'	18"
LB1	1000+31.3	RT.	71.3'	24"
LB2	1000+24.8	LT.	72.4'	18"
LB3	1001+47.5	LT.	57.1'	18"
LB4	1001+49.6	RT.	58.8'	18"

LEGEND

	PROP	EXIST
TRAFFIC SIGNAL, 3 UNIT HEAD, 12"		
TRAFFIC SIGNAL, 3 UNIT HEAD, 12" WITH ARROWS		
TRAFFIC SIGNAL, 4 OR 5 UNIT HEAD, 12"		
SIGNAL SUPPORT POLE		
PEDESTRIAN SIGNAL		
PEDESTRIAN PUSH BUTTON		
PEDESTAL SUPPORT		
LUMINAIRE, CONVENTIONAL		
SIGN		
CONTROLLER CABINET		
TRAFFIC PULL BOX		
ADVANCE RADAR DETECTION UNIT		
STOP BAR RADAR DETECTION UNIT		
DETECTION ZONE		
PREEMPTION RECEIVING UNIT & LIGHT		
POWER SERVICE		
PROP. CONDUIT		

HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED JMD CHECKED MJH

TRAFFIC SIGNAL PLAN
CENTER ST./ MIDDLE RD. & CHESTER RD.

LOR-IR90-20.55

10 25

BU3 - APPROVED FOR CONSTRUCTION - 4/26/16

102520CP001

INTERSECTION: CENTER ST./MIDDLE RD. & CHESTER RD. MAINTAINING AGENCY: CITY OF AVON									
START UP		DUAL ENTRY: YES		PHASES:			2,4,6,8		
		REST IN RED:		RING 1 -			RING 2 -		
START IN: Y/R FLASH Ø ; ALL RED O		OVERLAP			A	B	C	D	
TIME FOR FLASH OR ALL RED: 7 SEC.									
FIRST PHASE(S): 2+6		PHASES			3+6	1	-	-	
COLOR DISPLAYED: GREEN Ø ; YELLOW O									
INTERVAL OR FEATURE		CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)		1	2	3	4	5	6	7	8
DIRECTION		NBL	SB	WBL	EB	-	NB	EBL	WB
MINIMUM GREEN (INITIAL)	(SEC.)	7	20	7	10	-	20	7	10
ADDED INITIAL	*(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL	(SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP)	(SEC.)	2.5	5.0	2.5	4.0	-	5.0	2.5	4.0
TIME BEFORE REDUCTION	*(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP	*(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE	*(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I	(SEC.)	14	43	14	27	-	43	14	27
MAXIMUM GREEN II	(SEC.)	14	43	14	27	-	43	14	27
YELLOW CHANGE	(SEC.)	3	4	3	3.5	-	4	3	3.5
ALL RED CLEARANCE	(SEC.)	4	2	4	3.5	-	2	4	3.5
WALK	(SEC.)	-	12	-	14	-	-	-	14
PEDESTRIAN CLEARANCE	(SEC.)	-	21	-	36	-	-	-	33
RECALL	MAXIMUM (ON/OFF)	OFF	OFF	OFF	OFF	-	OFF	OFF	OFF
	MINIMUM (ON/OFF)	OFF	ON	OFF	OFF	-	ON	OFF	OFF
	PEDESTRIAN (ON/OFF)	OFF	OFF	OFF	OFF	-	OFF	OFF	OFF
MEMORY	(ON/OFF)	OFF	ON	ON	OFF	-	ON	OFF	OFF

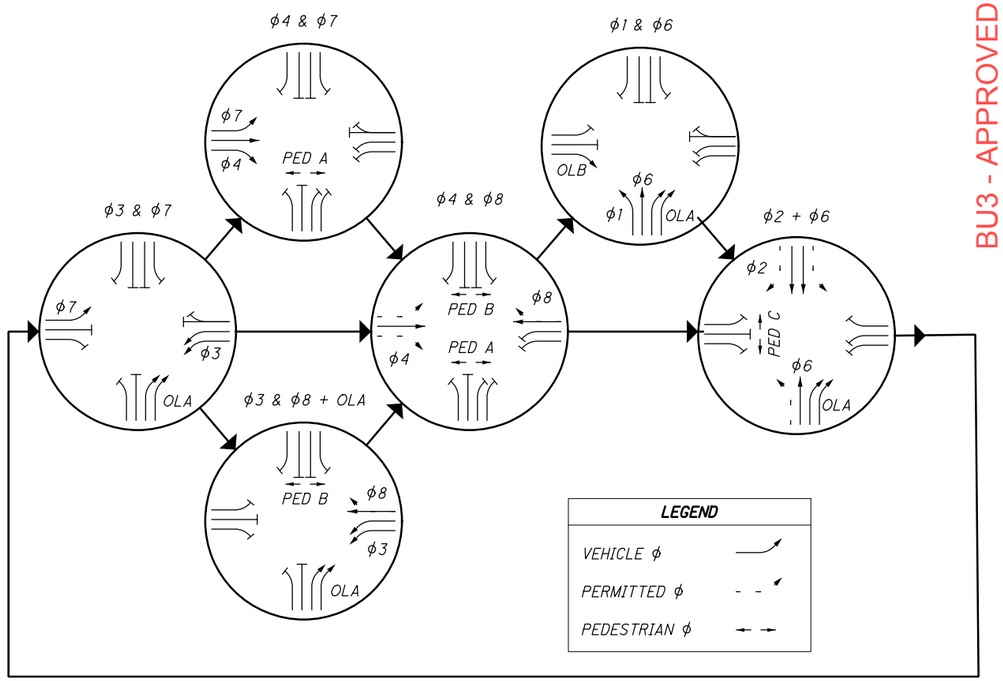
*VOLUME DENSITY CONTROLS

	SPLITS (G+Y+AR) IN SECONDS								CYCLE LENGTH (SEC)	OFFSET (SEC)
PHASE	1	2	3	4	5	6	7	8		
DIRECTION	NBL	SB	WBL	EB	-	NB	EBL	WB		
PLAN NO.	CENTER (SR 83) & CHESTER (WEST)									
709	35	28	24	23	-	63	14	33	110	59
710	20	28	34	28	-	48	18	44	110	77
711	24	28	18	20	-	52	14	24	90	27
712	26	29	31	24	-	55	15	32	110	38

CONTROL CENTER DATA											
CONTROL CENTER	LINE VOLTAGE	CONNECTED LOAD AMPS.	ENCLOSURE RATING AMPS.	SERVICE ENTRANCE CONDUCTOR SIZE	CIRCUIT NUMBER	DESCRIPTION	CIRCUIT VOLTAGE	CIRCUIT LOAD AMPS.	CIRCUIT FUSE SIZE AMPS.	CIRCUIT CABLE SIZE	MAINTAINING AGENCY
MILBANK A	120V SINGLE PHASE	93.5 AMPS	200 AMPS	2/0 AWG	A1	SP-1 RECEPTACLE	120	16 AMPS	20 AMPS	#6	AVON
					A2	SP-2 RECEPTACLE	120	16 AMPS	20 AMPS	#6	
					A3	SP-3 RECEPTACLE	120	16 AMPS	20 AMPS	#6	
					A4	SP-4 RECEPTACLE	120	16 AMPS	20 AMPS	#6	
					A5	SP-1 ILLUMINATED STREET SIGN	120	1.2 AMPS	20 AMPS	#6	
					A6	SP-2 ILLUMINATED STREET SIGN	120	1.2 AMPS	15 AMPS	#6	
					A7	SP-3 ILLUMINATED STREET SIGN	120	1.2 AMPS	15 AMPS	#6	
					A8	SP-4 ILLUMINATED STREET SIGN	120	1.2 AMPS	15 AMPS	#6	
					A9	SP-4 LUMINAIRE	120	0.7 AMPS	15 AMPS	#6	
					A10	CENTER & CHESTER CONTROLLER	120	24 AMPS	30 AMPS	#6	

DETECTION ZONE	MOVEMENT	PULSE OR PRESENCE	ASSOCIATED PHASE	DELAY IN CONTROLLER (SEC)	DELAY INHIBIT PHASE	PURPOSE	DETECTION ZONE LENGTH (FT)
D2A	SBL	PRESENCE	2	0	2	CALL PHASE 2	30
D2B	SBT	PRESENCE	2	0	2	CALL PHASE 2	30
D2C	SBR	PRESENCE	2	8	2	CALL PHASE 2	30
D3A	WBL	PRESENCE	3	3	3	CALL/EXTEND PHASE 3	30
D3B	WBL	PRESENCE	3	0	3	CALL/EXTEND PHASE 3	30
D7A	EBL	PRESENCE	7	3	7	CALL/EXTEND PHASE 7	30
D4A	EBT	PRESENCE	4	0	4	CALL PHASE 4	30
D4B	EBT/R	PRESENCE	4	8	4	CALL PHASE 4	30
D1A	NBL	PRESENCE	1	0	1	CALL/EXTEND PHASE 1	30
D6A	NBT	PRESENCE	6	0	6	CALL PHASE 6	30
D6B	NBR	PRESENCE	6	0	6	CALL PHASE 6	30
D6C	NBR	PRESENCE	6	8	6	CALL PHASE 6	30
D8A	WBT/R	PRESENCE	8	8	8	CALL PHASE 8	30
D2	SB	-	2	-	2	EXTEND PHASE 2	-
D4	EB	-	4	-	4	EXTEND PHASE 4	-
D6	NB	-	6	-	6	EXTEND PHASE 6	-
D8	WB	-	8	-	8	EXTEND PHASE 8	-

PHASING DIAGRAM (TYPICAL)



BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

CALCULATED JMD
CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS
CENTER ST./MIDDLE RD. & CHESTER RD.

LOR-IR90-20.55

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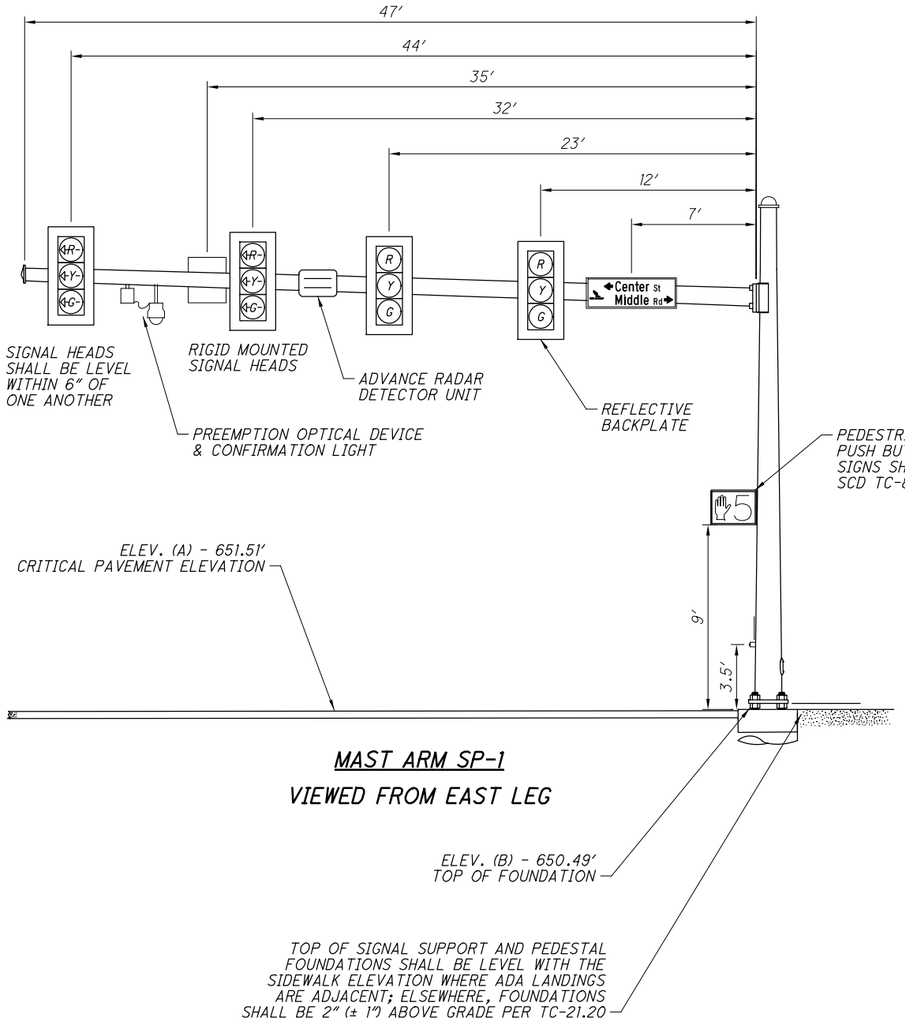
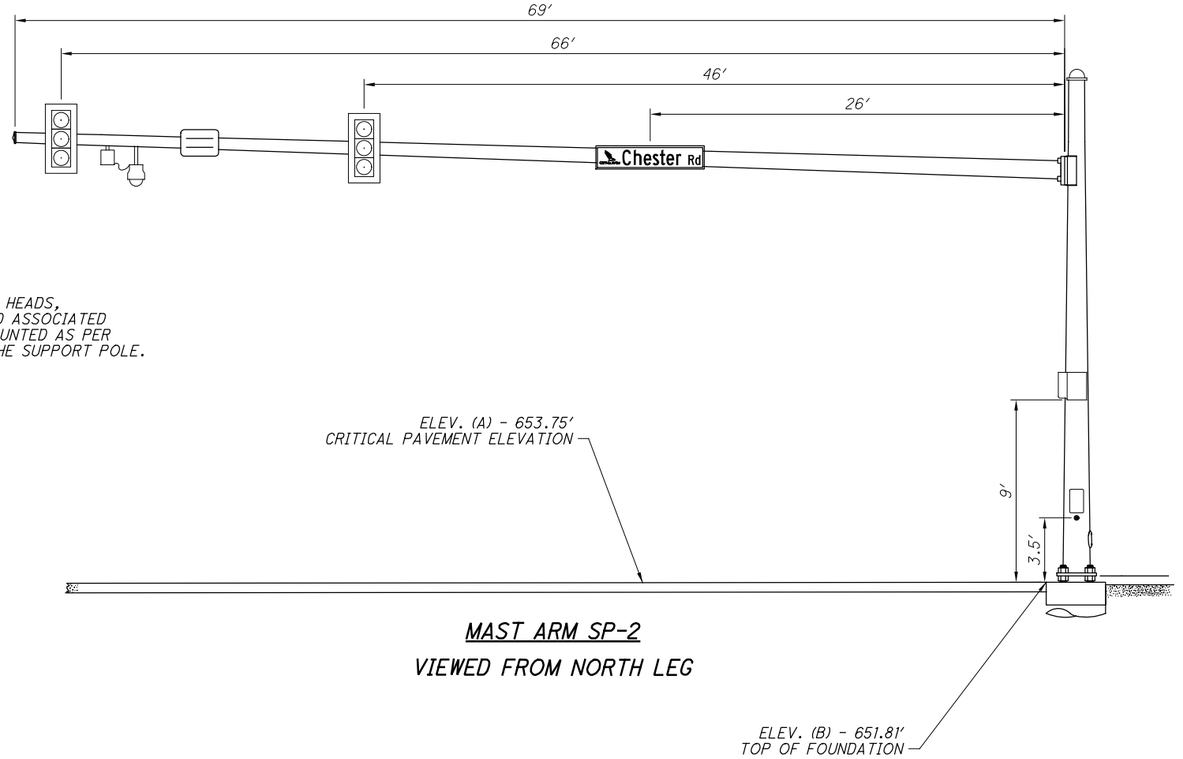
I02520CP002



MAST ARM SP-1

VIEWED FROM EAST LEG



MAST ARM SP-2

VIEWED FROM NORTH LEG

SUPPORT NO.	STATION	OFFSET	ELEVATION A	ELEVATION B	SIGNAL SUPPORT DETAILS: DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	L3	L4	L5	L6	D1	MAST ARM A ANGLE	ORIENTATION ANGLES FROM MAST ARM: PEDESTRIAN SIGNAL	PEDESTRIAN BUTTON	BRACKET ARM	HANDHOLE
							FT	FT	FT	FT	FT	FT	FT	FT	FT	FT	DEG	DEG	DEG	DEG	DEG
SP-1	1001+36.8	63.5′ LT.	651.51′	650.49′	TC-81.21	12	22.5′	21′	47′	44′	35′	32′	23′	12′	7′	-	90°	0°	0°	-	180°
SP-2	1000+39.9	75.5′ LT.	653.75′	651.81′	TC-81.21	14	23.5′	22′	69′	66′	46′	26′	-	-	-	-	0°	270°	270°	-	180°
SP-3	1001+45.6	66.7′ RT.	651.39′	651.22′	TC-81.21	14	22.5′	21′	62′	61′	54′	44′	36′	30′	24′	11′	0°	270°	270°	-	180°
SP-4	1000+33.5	80.7′ RT.	651.98′	652.04′	TC-81.21	14	30′	21′	69.5′	66.5′	52′	42′	22′	-	-	-	90°	0°	0°	0°	180°
PS-1	1001+30.4	73.0′ LT.	-	650.38′	8 FT PEDESTAL		-	-	-	-	-	-	-	-	-	-	90°**	270°	270°	-	-
PS-2	1000+42.9	79.9′ LT.	-	650.88′	8 FT PEDESTAL		-	-	-	-	-	-	-	-	-	-	270°**	90°	90°	-	-

** - TRANSFORMER BASE HANDHOLE

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

CALCULATED JMD | CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS
CENTER ST./MIDDLE RD. & CHESTER RD.

LOR-IR90-20.55

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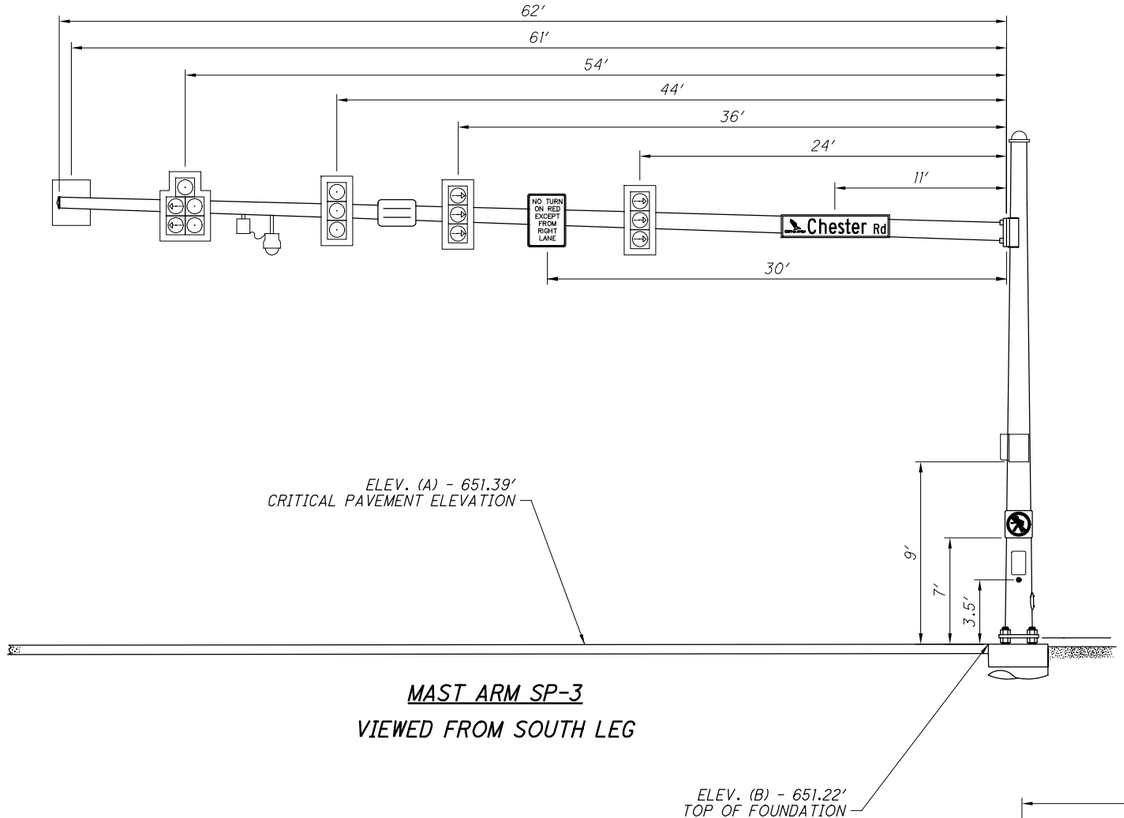
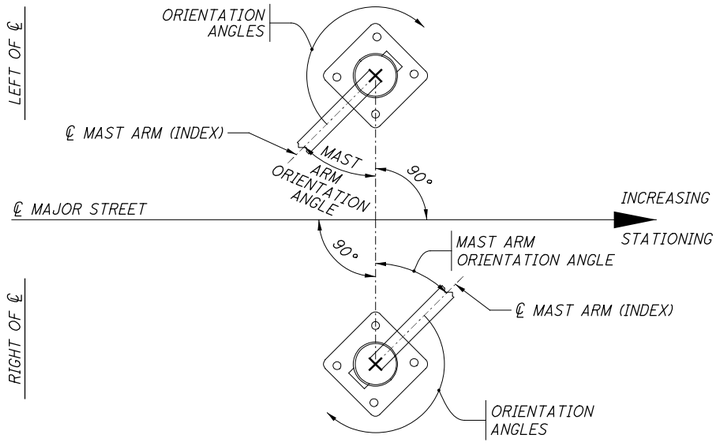
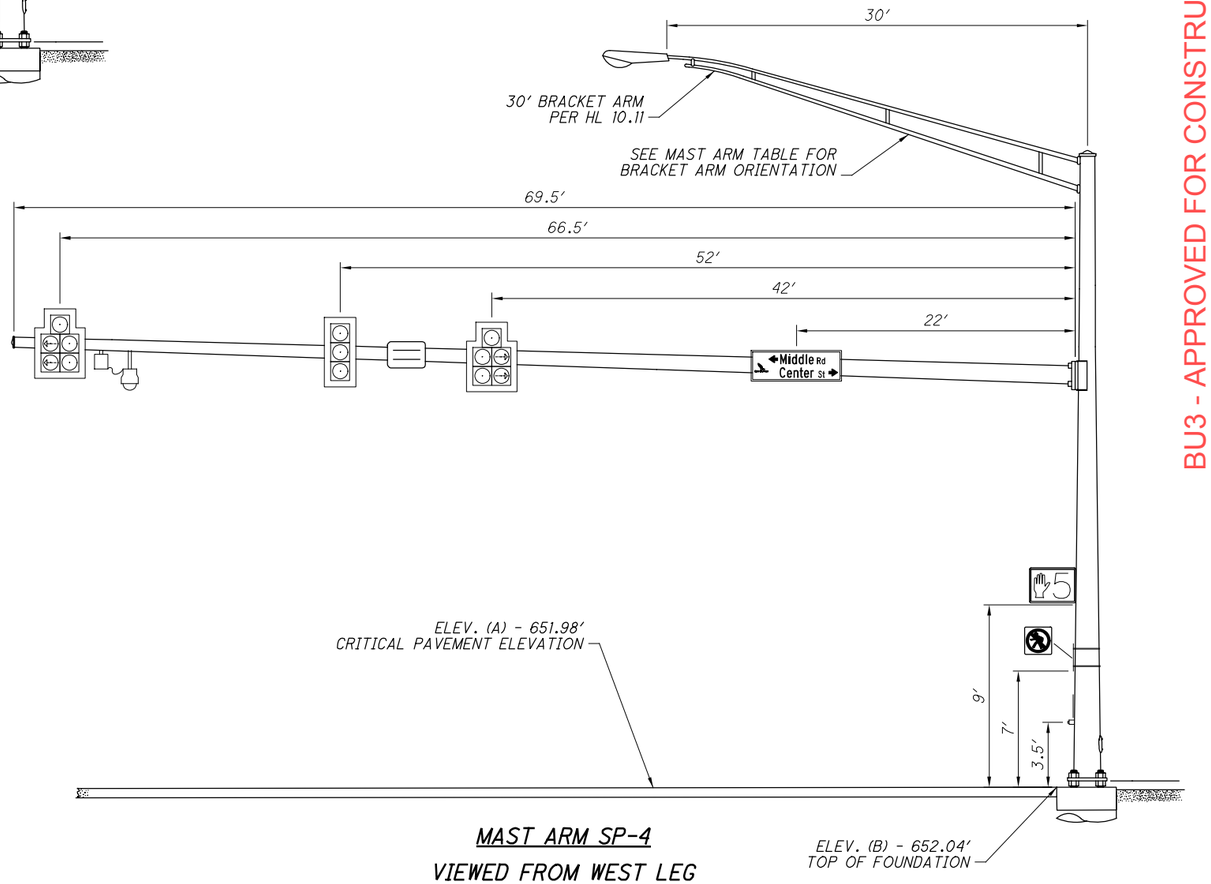


MAST ARM SP-3

VIEWED FROM SOUTH LEG



POLE ORIENTATION



MAST ARM SP-4

VIEWED FROM WEST LEG

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

CALCULATED JMD
CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS

CENTER ST./MIDDLE RD. & CHESTER RD.

LOR-IR90-20.55

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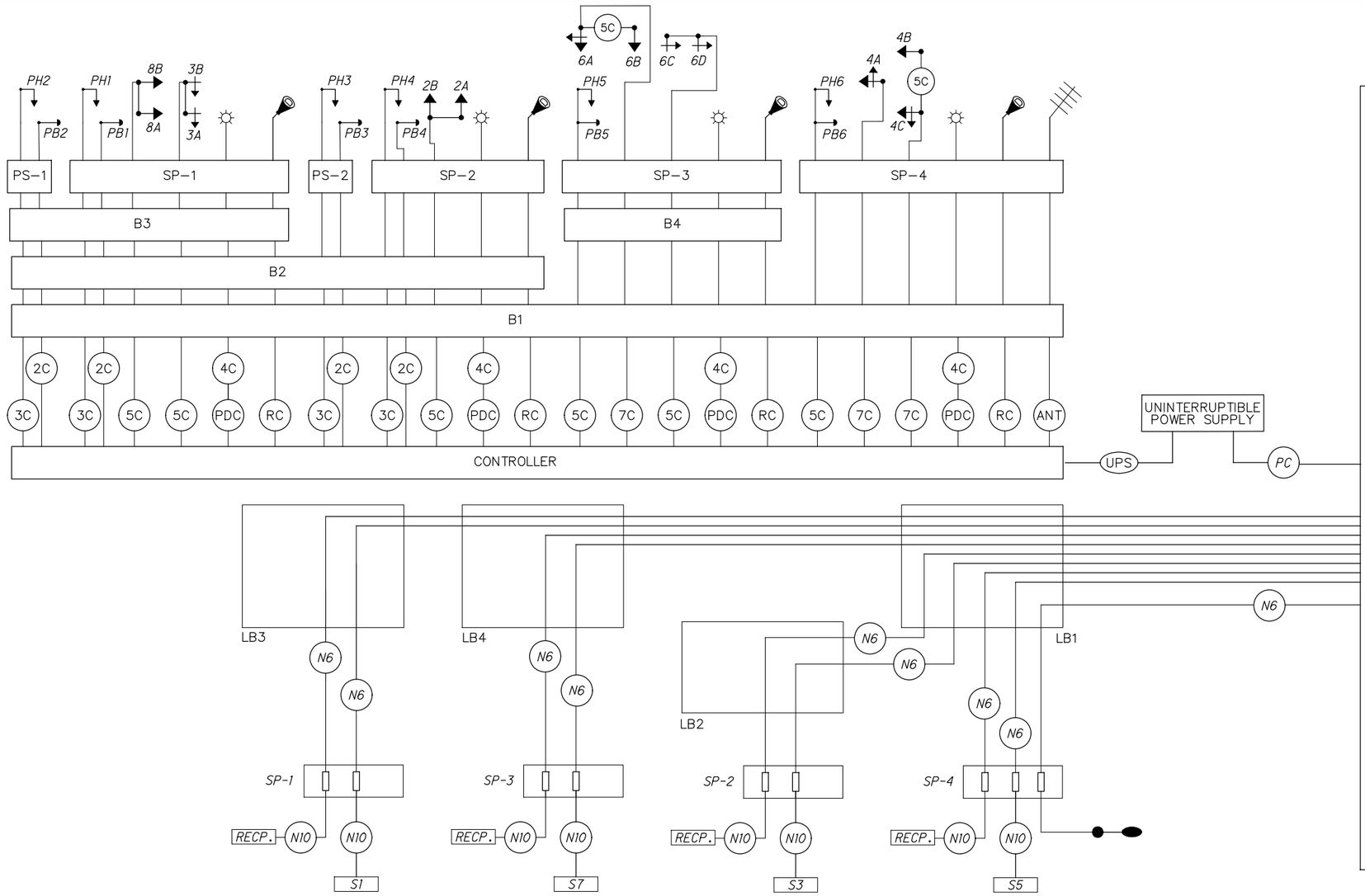
FIELD WIRING HOOK–UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A,2B (SB)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
3A,3B (WBL)	---R-->	Φ3 R	R
	---Y-->	Φ3 Y	
	---G-->	Φ3 G	
4A (EBL)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
	<--Y---	Φ7 Y	
	<--G---	Φ7 G	
4B (EBT)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
4C (EBT/R)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
	---Y-->	OLB Y	
	---G-->	OLB G	
6A (NB LT)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	
	<--Y---	Φ1 Y	
	<--G---	Φ1 G	
6B (NB)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	
6C,6D (NBR)	---R-->	OLA R	R
	---Y-->	OLA Y	
	---G-->	OLA G	
8A,8B (WB)	R	Φ8 R	R
	Y	Φ8 Y	
	G	Φ8 G	
PEDESTRIAN MOVEMENTS			
PED A (PH4, PH6)	W	Φ4 PED	OUT
	DW	Φ4 PED	
PED B (PH1, PH5)	W	Φ8 PED	OUT
	DW	Φ8 PED	
PED C (PH2, PH3)	W	Φ2 PED	OUT
	DW	Φ2 PED	



LEGEND

- 5 SECTION VEHICULAR SIGNAL HEAD, 1-WAY
- 3 SECTION VEHICULAR SIGNAL HEAD, 1-WAY
- 3 SECTION VEHICULAR SIGNAL HEAD, TURN ARROWS 1-WAY
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- STOP BAR RADAR DETECTION UNIT
- ADVANCE RADAR DETECTION UNIT
- LUMINAIRE, CONVENTIONAL
- CONNECTION
- CONNECTION
- #C — SIGNAL CABLE, # CONDUCTOR, NO. XX AWG
- RC — RADAR DETECTION CABLE
- PDC — PREEMPTION DETECTOR CABLE*
- POWER SOURCE
- PC — POWER CABLE, 2 CONDUCTOR, NO. X AWG
- UPS — UNINTERRUPTIBLE POWER SUPPLY CABLE
- SP-1 — SIGNAL SUPPORT POLE NO. __
- NX — NO. X AWG DISTRIBUTION CABLE
- NXX — NO. XX AWG POLE & BRACKET CABLE
- SX — INTERNALLY ILLUMINATED SIGN
- PREEMPTION SYSTEM (WITH CONFIRMATION LIGHT)

*PREEMPTION DETECTOR CABLE AS QUANTIFIED INCLUDES A SEPARATE 5C CABLE TO POWER THE ADJACENT CONFIRMATION LIGHT.

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

CALCULATED JMD | CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS
CENTER ST./MIDDLE RD. & CHESTER RD.

LOR-IR90-20.55

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NOTES

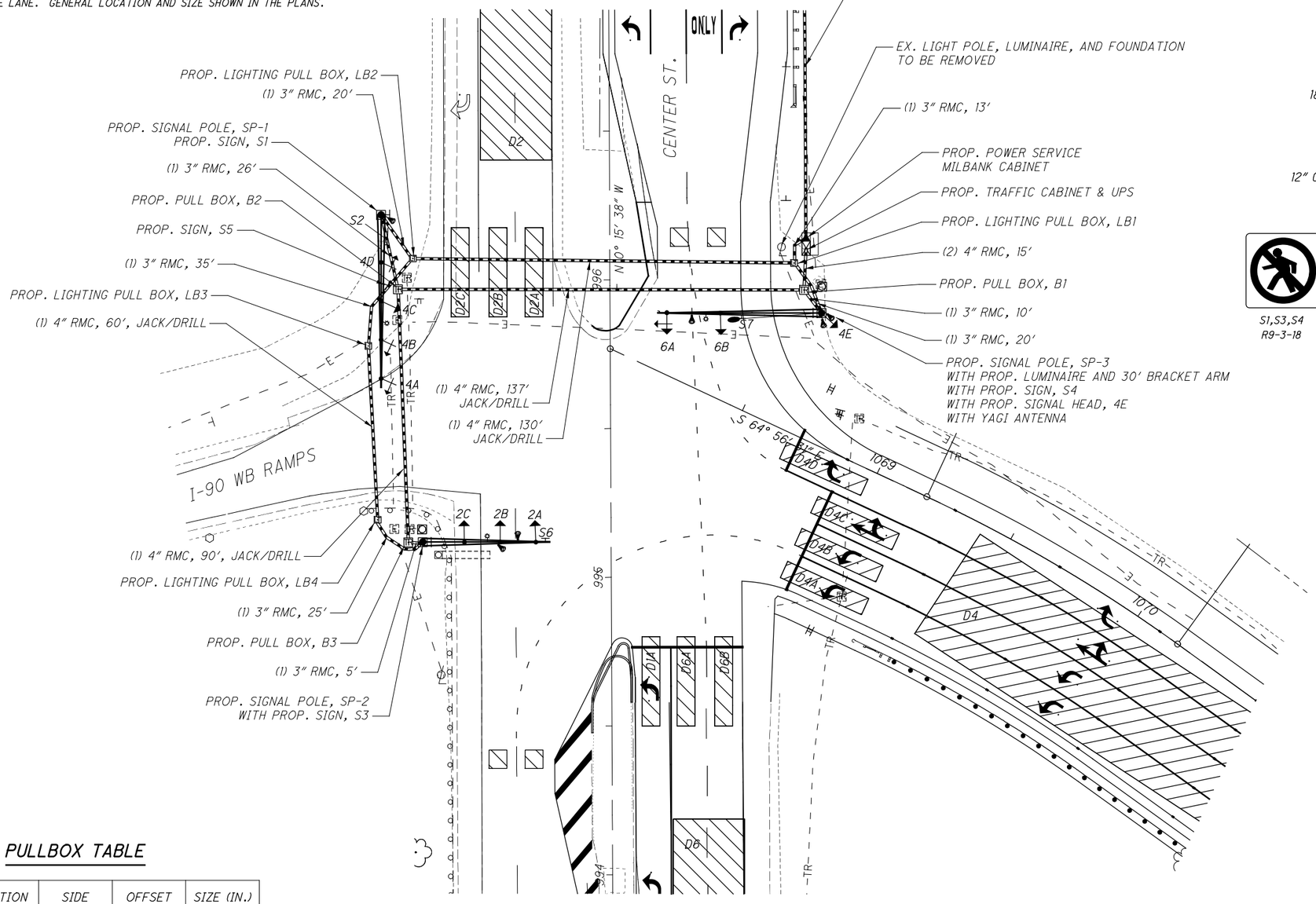
1. POLE LOCATIONS HAVE BEEN INDICATED AS ACCURATELY AS POSSIBLE. IN NO CASE SHALL THE CLEARANCE FROM FACE OF CURB TO FACE OF POLE, SIGN OR OTHER PROPOSED ITEMS BE LESS THAN 4 FT. TOP OF POLE FOUNDATIONS SHALL BE FLUSH WITH ADJACENT WALK WAYS, IF APPLICABLE.

2. LOCATION OF CONDUIT RUNS SHOWN ON THE DRAWING ARE APPROXIMATE. MAINTAIN 36" HORIZONTAL AND 12" VERTICAL CLEARANCE FROM WATER AND GAS LINES. FIELD ADJUST AS NEEDED.

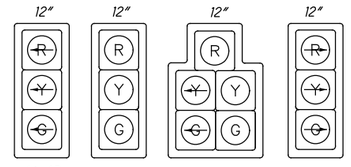
3. SIGNAL HEADS SHALL BE RIGID-MOUNTED TO MAST ARMS.

4. ALL CONDUIT SHALL BE INSTALLED IN OPEN-CUT TRENCH, EXCEPT WHERE OTHERWISE NOTED. ALL CONDUIT UNDER ROADWAYS SHALL BE 4" RMC, JACKED OR DRILLED.

5. IN ADDITION TO THE STOP BAR AND ADVANCE DETECTION, SYSTEM DETECTION ZONES SHALL BE SETUP FOR EACH DEPARTURE LANE. GENERAL LOCATION AND SIZE SHOWN IN THE PLANS.



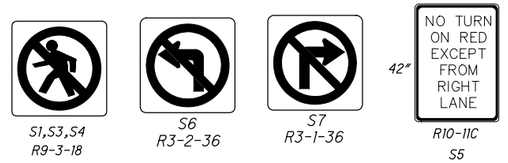
PROPOSED SIGNAL HEADS*



* - VEHICLE SIGNAL HEADS INCLUDE BACKPLATES

PROPOSED SIGNS

ILLUMINATED SIGN, SINGLE FACE, WHITE ON BLUE
12" CAPS STREET NAME, 8" CAPS STREET SUFFIX, FHWA SERIES



PULLBOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
B1	995+96.7	RT.	65.2'	36"
B2	995+96.7	LT.	71.2'	18"
B3	995+12.1	LT.	67.3'	18"
LB1	996+04.6	RT.	62.3'	24"
LB2	996+06.7	LT.	67.0'	18"
LB3	995+78.9	LT.	80.9'	18"
LB4	995+19.8	LT.	79.3'	18"

LEGEND

	PROP	EXIST
TRAFFIC SIGNAL, 3 UNIT HEAD, 12"		
TRAFFIC SIGNAL, 3 UNIT HEAD, 12" WITH ARROWS		
TRAFFIC SIGNAL, 4 OR 5 UNIT HEAD, 12"		
SIGNAL SUPPORT POLE		
PEDESTRIAN SIGNAL		
PEDESTRIAN PUSH BUTTON		
PEDESTAL SUPPORT		
LUMINAIRE, CONVENTIONAL		
SIGN		
CONTROLLER CABINET		
TRAFFIC PULL BOX		
ADVANCE RADAR DETECTION UNIT		
STOP BAR RADAR DETECTION UNIT		
DETECTION ZONE		
PREEMPTION RECEIVING UNIT & LIGHT		
POWER SERVICE		
PROP. CONDUIT		

HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED JMD
CHECKED MJH

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

TRAFFIC SIGNAL PLAN
CENTER ST. & I-90 WB RAMPS

LOR-IR90-20.55

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102520CP006

INTERSECTION: CENTER ST. & IR-90 WB MAINTAINING AGENCY: ODOT									
START UP START IN: Y/R FLASH Ø ; ALL RED O TIME FOR FLASH OR ALL RED: 7 SEC. FIRST PHASE(S): 2+6 COLOR DISPLAYED: GREEN Ø ; YELLOW O			DUAL ENTRY: YES REST IN RED:		PHASES: RING 1 -			2,6 RING 2 -	
			OVERLAP			A	B	C	D
			PHASES			-	-	-	-
INTERVAL OR FEATURE			CONTROLLER MOVEMENT NO.						
INTERSECTION MOVEMENT (PHASE)			1	2	3	4	5	6	7	8
DIRECTION			NBL	SB	-	WB	-	NB	-	-
MINIMUM GREEN (INITIAL)		(SEC.)	7	20	-	10	-	20	-	-
ADDED INITIAL		*(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL		(SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP)		(SEC.)	2.1	3	-	1.2	-	3	-	-
TIME BEFORE REDUCTION		*(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP		*(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE		*(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I		(SEC.)	12	39	-	24	-	39	-	-
MAXIMUM GREEN II		(SEC.)	12	39	-	24	-	39	-	-
YELLOW CHANGE		(SEC.)	3	4.5	-	4.5	-	4.5	-	-
ALL RED CLEARANCE		(SEC.)	3.5	1.5	-	2.5	-	1.5	-	-
WALK		(SEC.)	-	-	-	-	-	-	-	-
PEDESTRIAN CLEARANCE		(SEC.)	-	-	-	-	-	-	-	-
RECALL	MAXIMUM	(ON/OFF)	OFF	OFF	-	OFF	-	OFF	-	-
	MINIMUM	(ON/OFF)	OFF	ON	-	OFF	-	ON	-	-
	PEDESTRIAN	(ON/OFF)	OFF	OFF	-	OFF	-	OFF	-	-
MEMORY		(ON/OFF)	OFF	ON	-	OFF	-	ON	-	-

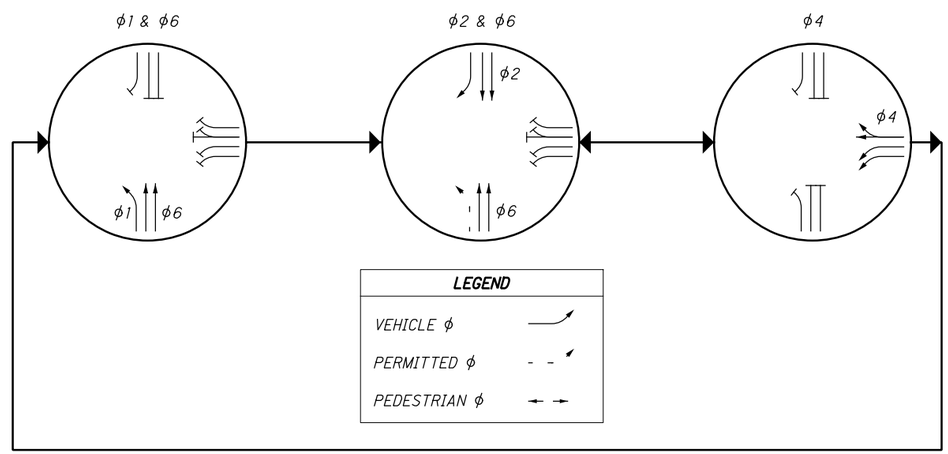
*VOLUME DENSITY CONTROLS

	SPLITS (G+Y+AR) IN SECONDS								CYCLE LENGTH (SEC)	OFFSET (SEC)
PHASE	1	2	3	4	5	6	7	8		
DIRECTION	NBL	SB	-	WB	-	NB	-	-		
PLAN NO.	CENTER (SR 83) & IR-90 WB									
709	18	57	-	35	-	75	-	-	110	3
710	20	50	-	40	-	70	-	-	110	15
711	18	42	-	30	-	60	-	-	90	57
712	30	48	-	32	-	78	-	-	110	87

DETECTION ZONE	MOVEMENT	PULSE OR PRESENCE	ASSOCIATED PHASE	DELAY IN CONTROLLER (SEC)	DELAY INHIBIT PHASE	PURPOSE	DETECTION ZONE LENGTH (FT)
D2A	SBT	PRESENCE	2	-	2	CALL PHASE 2	30
D2B	SBT	PRESENCE	2	-	2	CALL PHASE 2	30
D2C	SBR	PRESENCE	2	8	2	CALL PHASE 2	30
D4A	WBL	PRESENCE	4	-	4	CALL PHASE 4	30
D4B	WBL	PRESENCE	4	-	4	CALL PHASE 4	30
D4C	WBT/R	PRESENCE	4	-	4	CALL PHASE 4	30
D4D	WBR	PRESENCE	4	8	4	CALL PHASE 4	30
D1A	NBL	PRESENCE	1	-	1	CALL/EXTEND PHASE 1	30
D6A	NBT	PRESENCE	6	-	6	CALL PHASE 6	30
D6B	NBT	PRESENCE	6	-	6	CALL PHASE 6	30
D2	SB	-	2	-	2	EXTEND PHASE 2	-
D4	WB	-	4	-	4	EXTEND PHASE 4	-
D6	NB	-	6	-	6	EXTEND PHASE 6	-

CONTROL CENTER DATA											
CONTROL CENTER	LINE VOLTAGE	CONNECTED LOAD AMPS.	ENCLOSURE RATING AMPS.	SERVICE ENTRANCE CONDUCTOR SIZE	CIRCUIT NUMBER	DESCRIPTION	CIRCUIT VOLTAGE	CIRCUIT LOAD AMPS.	CIRCUIT FUSE SIZE AMPS.	CIRCUIT CABLE SIZE	MAINTAINING AGENCY
MILBANK B	120V SINGLE PHASE	93.5 AMPS	150 AMPS	2/0 AWG	B1	SP-1 RECEPTACLE	120	16 AMPS	20 AMPS	#6	AVON
					B2	SP-2 RECEPTACLE	120	16 AMPS	20 AMPS	#6	
					B3	SP-3 RECEPTACLE	120	16 AMPS	20 AMPS	#6	
					B4	SP-1 ILLUMINATED STREET SIGN	120	1.2 AMPS	15 AMPS	#6	
					B5	SP-3 LUMINAIRE	120	0.7 AMPS	15 AMPS	#6	
					B6	CENTER & IR-90 WB CONTROLLER	120	24 AMPS	30 AMPS	#6	

PHASING DIAGRAM (TYPICAL)



BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

CALCULATED JMD | CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS
CENTER ST. & I-90 WB RAMPS

LOR-IR90-20.55

16
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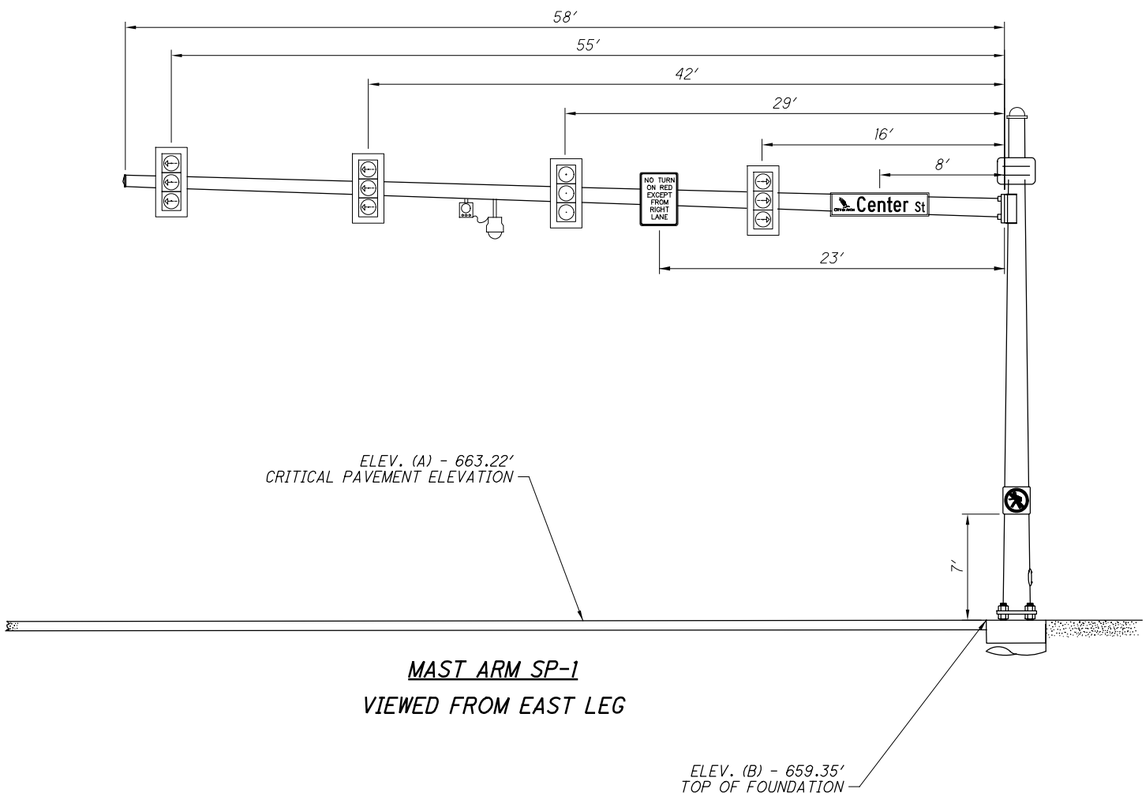
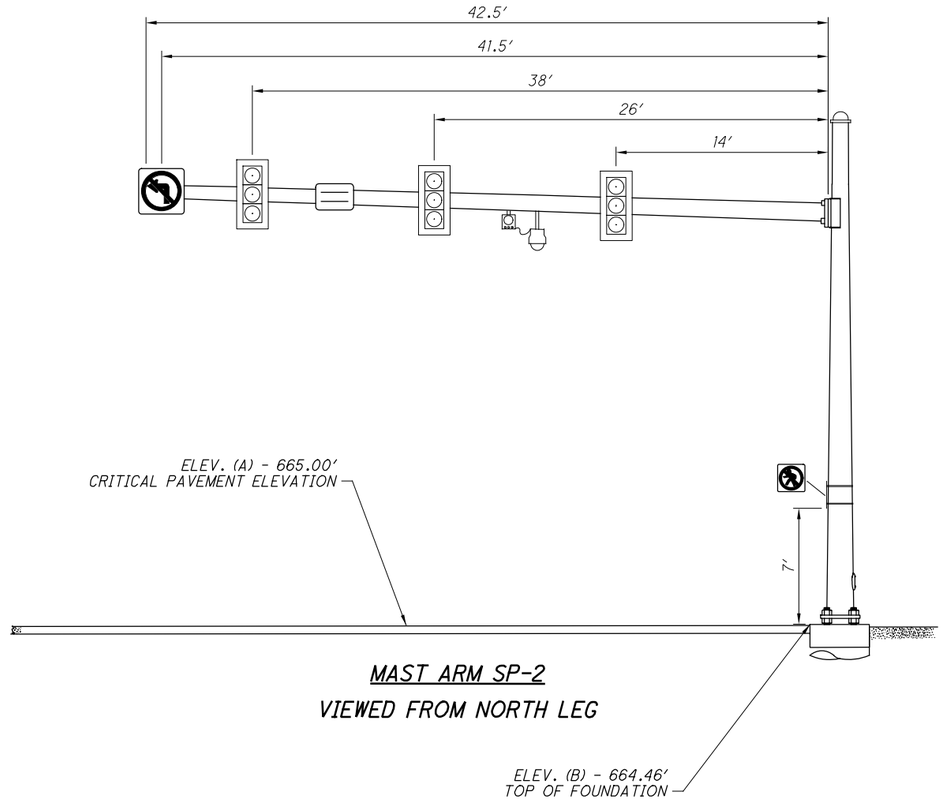
102520CP007



MAST ARM SP-1

VIEWED FROM EAST LEG



MAST ARM SP-2

VIEWED FROM NORTH LEG

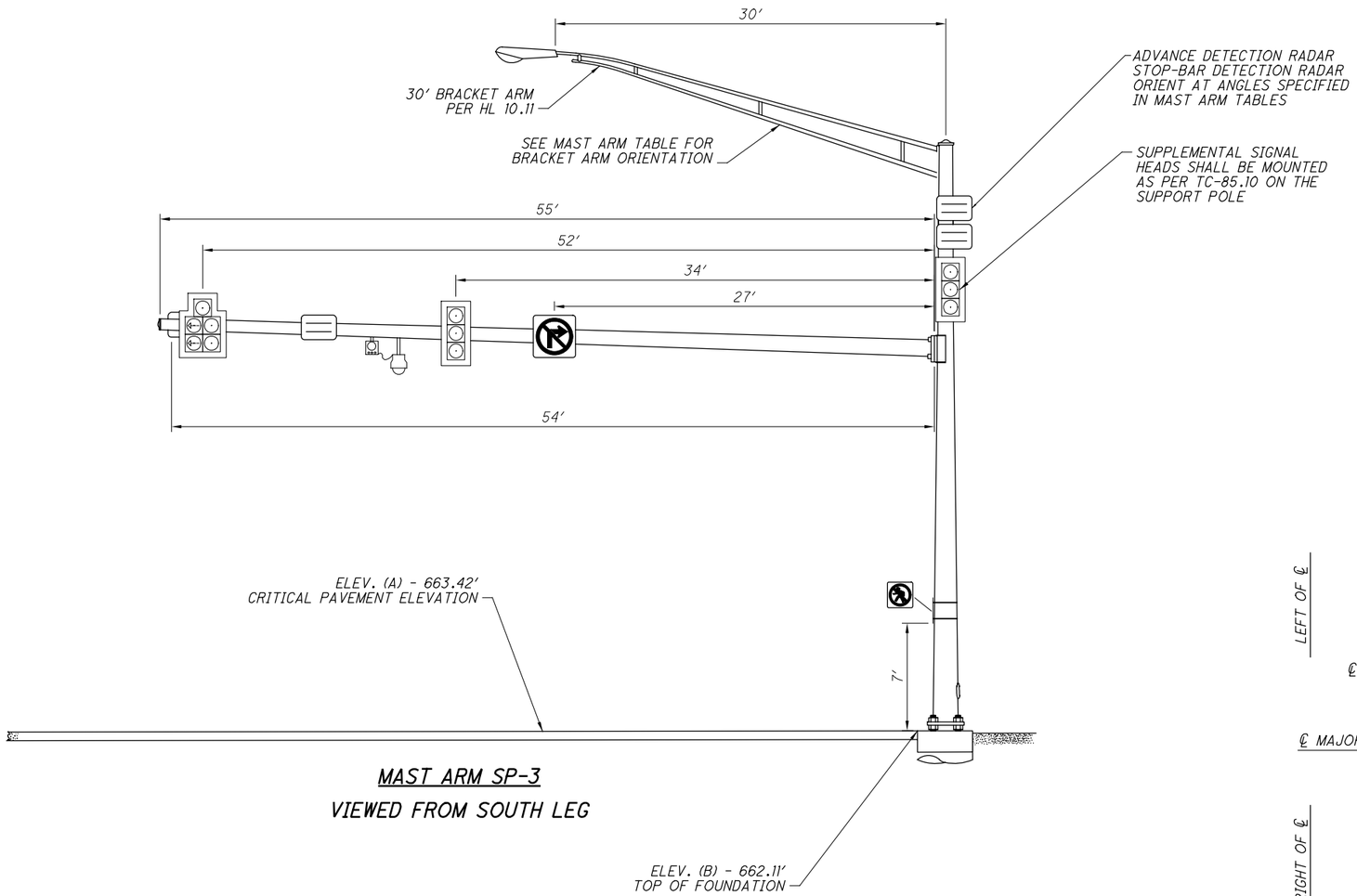
SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS											ORIENTATION ANGLES FROM MAST ARM		
			A	B	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	L3	L4	L5	D1	MAST ARM A ANGLE	BRACKET ARM	HANDHOLE	RADAR DETECTOR ANGLES
							FT	FT	FT	FT	FT	FT	FT	FT	FT	DEG	DEG	DEG	DEG
SP-1	996+22.2	76.8′ LT.	663.22′	659.35′	TC-81.21	13	25.5′	24′	58′	55′	42′	29′	23′	16′	8′	90°	-	180°	34°
SP-2	995+12.1	63.3′ LT.	665.00′	664.46′	TC-81.21	11	22.5′	21′	42.5′	41.5′	38′	26′	14′	-	-	0°	-	180°	-
SP-3	995+88.6	71.1′ RT.	663.42′	662.11′	TC-81.21	13	30′	21′	55′	52′	34′	27′	-	-	-	0°	0°	180°	221°/270°

CALCULATED JMD
CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS
CENTER ST. & I-90 WB RAMPS

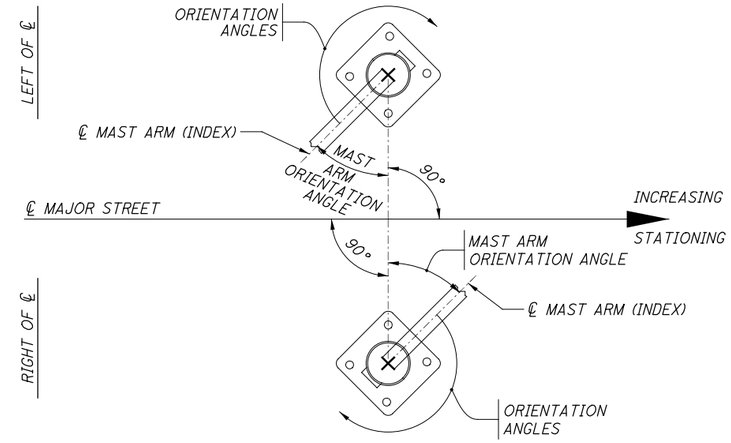
LOR-IR90-20.55

17
25



MAST ARM SP-3

VIEWED FROM SOUTH LEG



POLE ORIENTATION

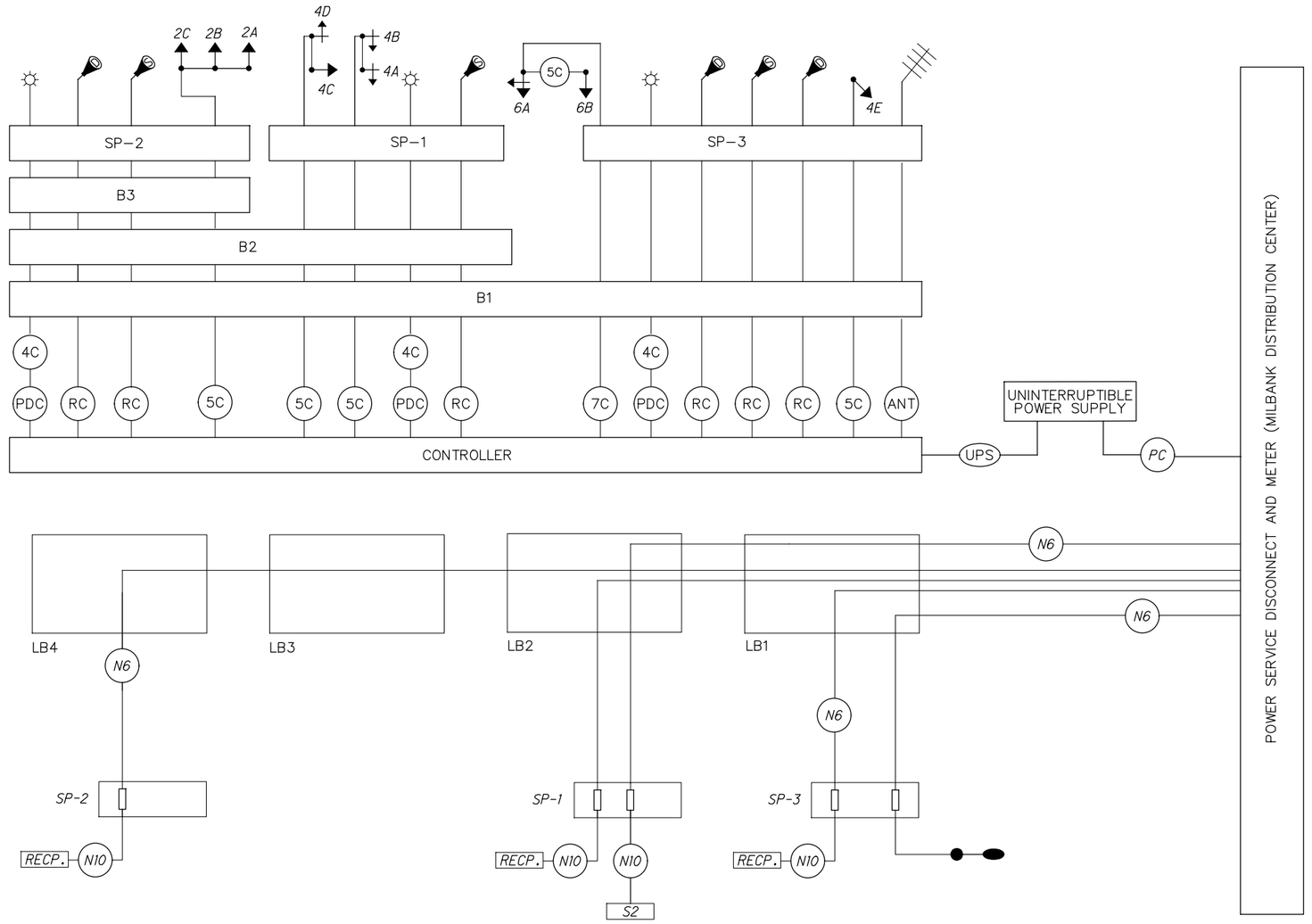
CALCULATED JMD
CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS
CENTER · ST. & I-90 WB RAMPS

LOR-IR90-20.55

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A,2B,2C (SB)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
4A,4B (WBL)	<--R---	Φ4 R	R
	<--Y---	Φ4 Y	
	<--G---	Φ4 G	
4C (WBT/R)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
4D (WBR)	---R-->	Φ4 R	R
	---Y-->	Φ4 Y	
	---G-->	Φ4 G	
4E (WB)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
6A (NB LT)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	
	<--Y---	Φ1 Y	
	<--G---	Φ1 G	
6B (NB)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	



LEGEND

- 5 SECTION VEHICULAR SIGNAL HEAD, 1-WAY
- 3 SECTION VEHICULAR SIGNAL HEAD, 1-WAY
- 3 SECTION VEHICULAR SIGNAL HEAD, TURN ARROWS 1-WAY
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- STOP BAR RADAR DETECTION UNIT (S)
- ADVANCE RADAR DETECTION UNIT (D)
- LUMINAIRE, CONVENTIONAL
- CONNECTION
- CONNECTION
- #C — SIGNAL CABLE, # CONDUCTOR, NO. XX AWG
- RC — RADAR DETECTION CABLE
- PDC — PREEMPTION DETECTOR CABLE*
- POWER SOURCE
- PC — POWER CABLE, 2 CONDUCTOR, NO. X AWG
- UPS — UNINTERRUPTIBLE POWER SUPPLY CABLE
- SP-1 — SIGNAL SUPPORT POLE NO. __
- NX — NO. X AWG DISTRIBUTION CABLE
- NXX — NO. XX AWG POLE & BRACKET CABLE
- SX — INTERNALLY ILLUMINATED SIGN
- PREEMPTION SYSTEM (WITH CONFIRMATION LIGHT)

*PREEMPTION DETECTOR CABLE AS QUANTIFIED INCLUDES A SEPARATE 5C CABLE TO POWER THE ADJACENT CONFIRMATION LIGHT.

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

CALCULATED JMD | CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS
CENTER · ST. & I-90 WB RAMPS

LOR-IR90-20.55

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NOTES

1. POLE LOCATIONS HAVE BEEN INDICATED AS ACCURATELY AS POSSIBLE. IN NO CASE SHALL THE CLEARANCE FROM FACE OF CURB TO FACE OF POLE, SIGN OR OTHER PROPOSED ITEMS BE LESS THAN 4 FT. TOP OF POLE FOUNDATIONS SHALL BE FLUSH WITH ADJACENT WALK WAYS, IF APPLICABLE.

2. LOCATION OF CONDUIT RUNS SHOWN ON THE DRAWING ARE APPROXIMATE. MAINTAIN 36" HORIZONTAL AND 12" VERTICAL CLEARANCE FROM WATER AND GAS LINES. FIELD ADJUST AS NEEDED.

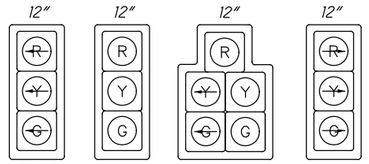
3. SIGNAL HEADS SHALL BE RIGID-MOUNTED TO MAST ARMS.

4. ALL CONDUIT SHALL BE INSTALLED IN OPEN-CUT TRENCH, EXCEPT WHERE OTHERWISE NOTED. ALL CONDUIT UNDER ROADWAYS SHALL BE 4" RMC, JACKED OR DRILLED.

5. IN ADDITION TO THE STOP BAR AND ADVANCE DETECTION, SYSTEM DETECTION ZONES SHALL BE SETUP FOR EACH DEPARTURE LANE. GENERAL LOCATION AND SIZE SHOWN IN THE PLANS.

6. LIGHTING WORK ALONG OFF-RAMP IS SHOWN IN FURTHER DETAIL ON SHEET 25.

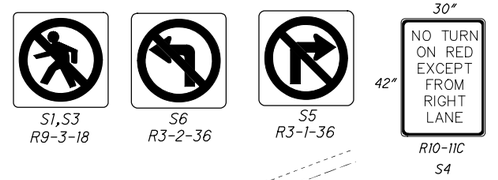
PROPOSED SIGNAL HEADS*



* - VEHICLE SIGNAL HEADS INCLUDE BACKPLATES

PROPOSED SIGNS

ILLUMINATED SIGN, SINGLE FACE, WHITE ON BLUE
12" CAPS STREET NAME, 8" CAPS STREET SUFFIX, FHWA SERIES C



PULLBOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
B1	988+43.6	RT.	65.1'	36"
B2	987+63.9	RT.	67.0'	18"
B3	987+55.9	LT.	65.8'	18"
B4	1069+40.6	LT.	26.8'	18"
B5	1069+47.3	RT.	16.1'	18"
B6	1072+95.8	RT.	6.3'	18"
LB1	988+37.5	RT.	73.4'	24"
LB2	987+68.7	RT.	68.5'	18"
LB3	987+59.4	LT.	65.4'	18"

LEGEND

	PROP	EXIST
TRAFFIC SIGNAL, 3 UNIT HEAD, 12"	●	○
TRAFFIC SIGNAL, 3 UNIT HEAD, 12" WITH ARROWS	●	○
TRAFFIC SIGNAL, 4 OR 5 UNIT HEAD, 12"	●	○
SIGNAL SUPPORT POLE	■	▣
PEDESTRIAN SIGNAL	┐	┐
PEDESTRIAN PUSH BUTTON	→	→
PEDESTAL SUPPORT	▪	▫
LUMINAIRE, CONVENTIONAL	●—	○—
SIGN	⊢	⊢
CONTROLLER CABINET	⊠	⊠
TRAFFIC PULL BOX	▥	▥
ADVANCE RADAR DETECTION UNIT	◗	◗
STOP BAR RADAR DETECTION UNIT	◗	◗
DETECTION ZONE	▨	
PREEMPTION RECEIVING UNIT & LIGHT	☼	
POWER SERVICE	▲	
PROP. CONDUIT	———	

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HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED JMD
CHECKED MJH

TRAFFIC SIGNAL PLAN
CENTER ST. & I-90 EB RAMPS

LOR-IR90-20.55

10252OCP011

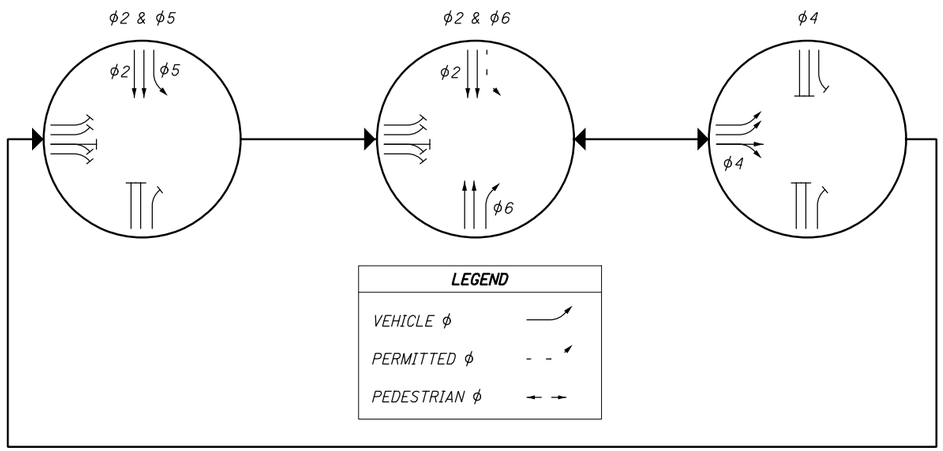
INTERSECTION: CENTER ST. & IR-90 EB MAINTAINING AGENCY: ODOT									
START UP START IN: Y/R FLASH Ø ; ALL RED O TIME FOR FLASH OR ALL RED: 7 SEC. FIRST PHASE(S): 2+6 COLOR DISPLAYED: GREEN Ø ; YELLOW O			DUAL ENTRY: YES REST IN RED:		PHASES: RING 1 -			2,6 RING 2 -	
			OVERLAP		A	B	C	D	
			PHASES		-	-	-	-	
INTERVAL OR FEATURE			CONTROLLER MOVEMENT NO.						
INTERSECTION MOVEMENT (PHASE)			1	2	3	4	5	6	7	8
DIRECTION			-	SB	-	EB	SBL	NB	-	-
MINIMUM GREEN (INITIAL)		(SEC.)	-	20	-	10	7	20	-	-
ADDED INITIAL		*(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL		(SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP)		(SEC.)	-	3	-	3.1	3.5	3	-	-
TIME BEFORE REDUCTION		*(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP		*(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE		*(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I		(SEC.)	-	39	-	24	12	39	-	-
MAXIMUM GREEN II		(SEC.)	-	39	-	24	12	39	-	-
YELLOW CHANGE		(SEC.)	-	4.5	-	4.5	3	4.5	-	-
ALL RED CLEARANCE		(SEC.)	-	1.5	-	2.0	3.5	1.5	-	-
WALK		(SEC.)	-	-	-	-	-	-	-	-
PEDESTRIAN CLEARANCE		(SEC.)	-	-	-	-	-	-	-	-
RECALL	MAXIMUM	(ON/OFF)	-	OFF	-	OFF	OFF	OFF	-	-
	MINIMUM	(ON/OFF)	-	ON	-	OFF	OFF	ON	-	-
	PEDESTRIAN	(ON/OFF)	-	OFF	-	OFF	OFF	OFF	-	-
MEMORY		(ON/OFF)	-	ON	-	OFF	OFF	ON	-	-

*VOLUME DENSITY CONTROLS

	SPLITS (G+Y+AR) IN SECONDS								CYCLE LENGTH (SEC)	OFFSET (SEC)
PHASE	1	2	3	4	5	6	7	8		
DIRECTION	-	SB	-	EB	SBL	NB	-	-		
PLAN NO.	CENTER (SR 83) & IR-90 EB									
709	-	85	-	25	36	49	-	-	110	6
710	-	80	-	30	30	50	-	-	110	0
711	-	66	-	24	30	36	-	-	90	8
712	-	82	-	28	40	42	-	-	110	40

DETECTION ZONE	MOVEMENT	PULSE OR PRESENCE	ASSOCIATED PHASE	DELAY IN CONTROLLER (SEC)	DELAY INHIBIT PHASE	PURPOSE	DETECTION ZONE LENGTH (FT)
D5A	SBL	PRESENCE	5	0	5	CALL/EXTEND PHASE 5	30
D2A	SBT	PRESENCE	2	0	2	CALL PHASE 2	30
D2B	SBT	PRESENCE	2	0	2	CALL PHASE 2	30
D4A	EBL	PRESENCE	4	0	4	CALL PHASE 4	30
D4B	EBL	PRESENCE	4	0	4	CALL PHASE 4	30
D4C	EBT/R	PRESENCE	4	0	4	CALL PHASE 4	30
D4D	EBR	PRESENCE	4	8	4	CALL PHASE 4	30
D6A	NBT	PRESENCE	6	0	6	CALL PHASE 6	30
D6B	NBT	PRESENCE	6	0	6	CALL PHASE 6	30
D6C	NBR	PRESENCE	6	8	6	CALL PHASE 6	30
D2	SB	-	2	-	2	EXTEND PHASE 2	-
D4	EB	-	4	-	4	EXTEND PHASE 4	-
D6	NB	-	6	-	6	EXTEND PHASE 6	-

PHASING DIAGRAM (TYPICAL)



CONTROL CENTER DATA

CONTROL CENTER	LINE VOLTAGE	CONNECTED LOAD AMPS.	ENCLOSURE RATING AMPS.	SERVICE ENTRANCE CONDUCTOR SIZE	CIRCUIT NUMBER	DESCRIPTION	CIRCUIT VOLTAGE	CIRCUIT LOAD AMPS.	CIRCUIT FUSE SIZE AMPS.	CIRCUIT CABLE SIZE	MAINTAINING AGENCY
MILBANK C	120V SINGLE PHASE	57.2 AMPS	100 AMPS	2/0 AWG	C1	SP-1 RECEPTACLE	120	16 AMPS	20 AMPS	#6	AVON
					C2	SP-2 RECEPTACLE	120	16 AMPS	20 AMPS	#6	
					C3	SP-2 ILLUMINATED STREET SIGN	120	1.2 AMPS	15 AMPS	#6	
					C4	CENTER & IR-90 EB CONTROLLER	120	24 AMPS	30 AMPS	#6	

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CALCULATED JMD | CHECKED MJH

TRAFFIC SIGNAL PLAN DETAILS
CENTER ST. & I-90 EB RAMPS

LOR-IR90-20.55

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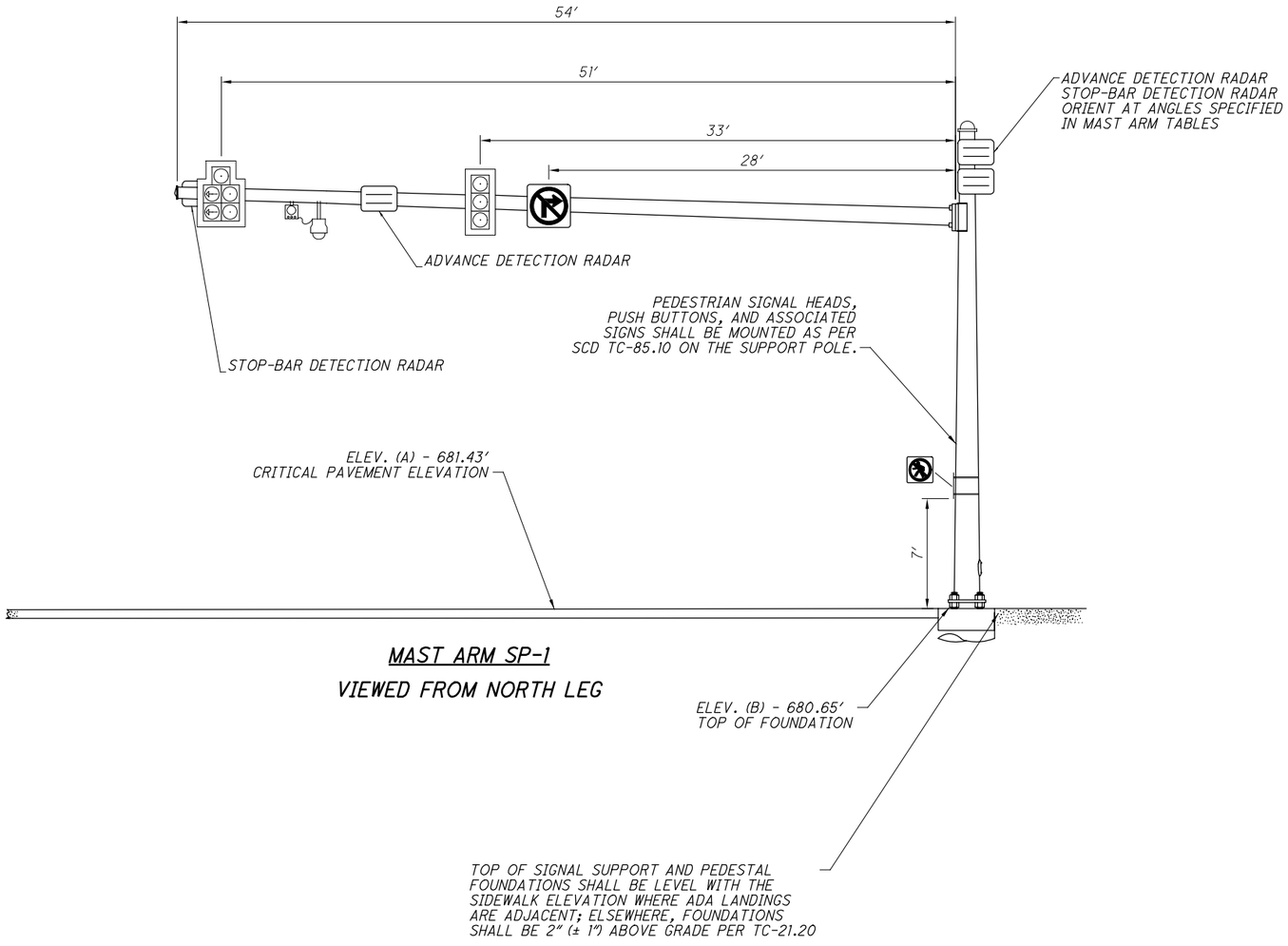


SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS											MAST ARM ANGLE A	ORIENTATION ANGLES FROM MAST ARM		
			A	B	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	L3	L4	L5	D1		MAST ARM ANGLE B	HANDHOLE	RADAR DETECTOR ANGLES
							FT	FT	FT	FT	FT	FT	FT	FT	FT	DEG	DEG	DEG	DEG
SP-1	987+68.0	71.1' LT.	681.43'	680.65'	TC-81.21	13	22.5'	21'	54'	51'	33'	28'	-	-	-	0°	-	180°	190°/260°
SP-2	988+39.5	67.4' RT.	679.82'	679.02'	TC-12.30	12	22.5'	21'	48'	47'	42'	25'	-	-	-	0°	-	180°	-
			680.06'		DES 7	12	22.5'	21'	48'	45'	39'	33'	21'	9'	6'	-	270°		

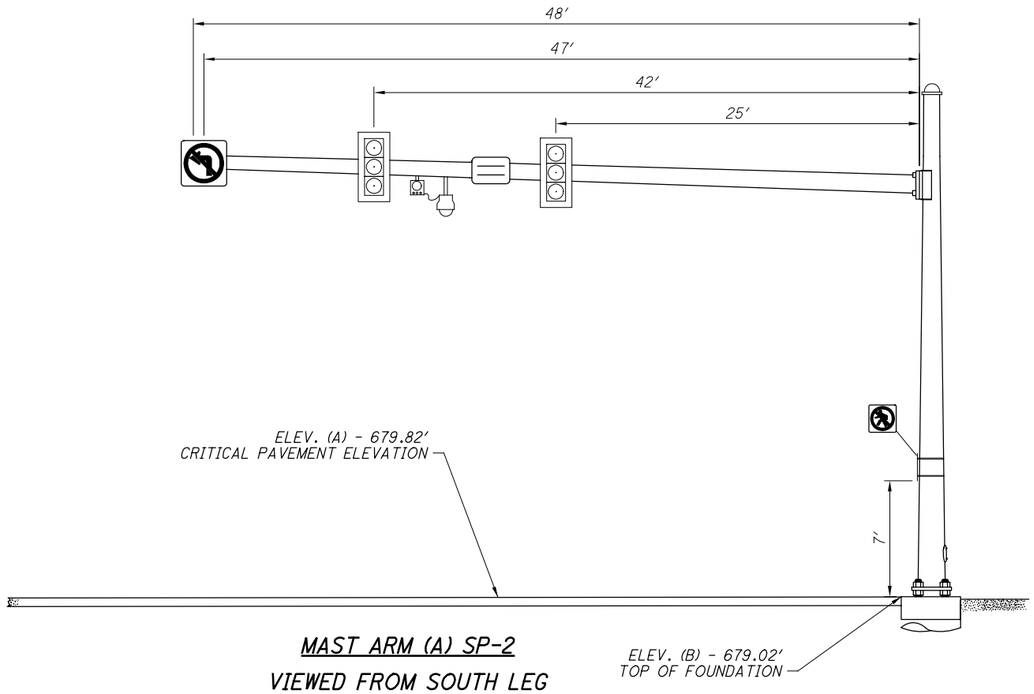
102520CP013

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

CALCULATED JMD
CHECKED MJH

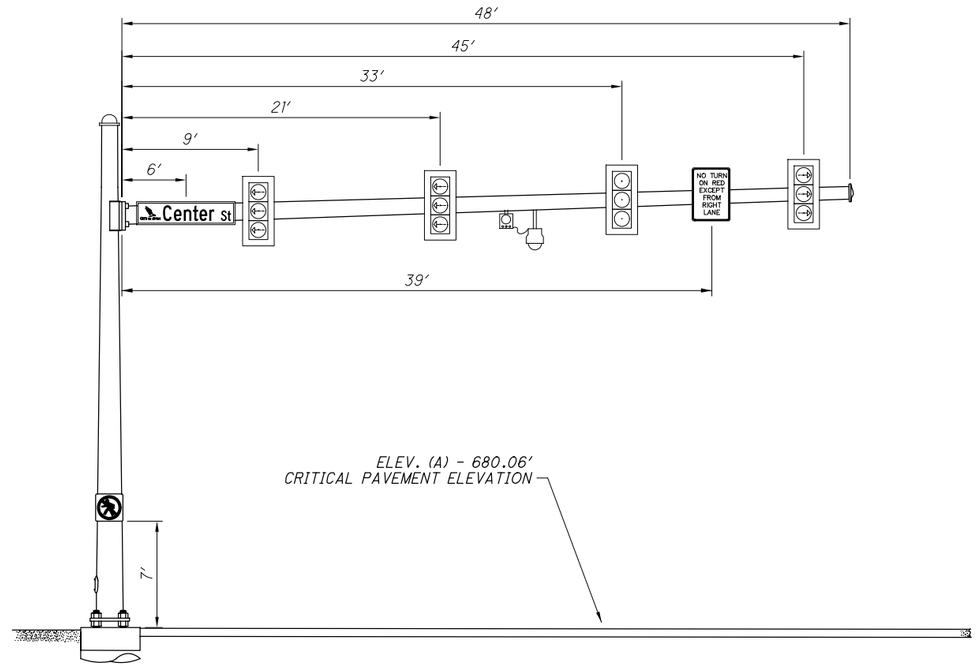
TRAFFIC SIGNAL PLAN DETAILS
CENTER ST. & I-90 EB RAMPS

LOR-IR90-20.55



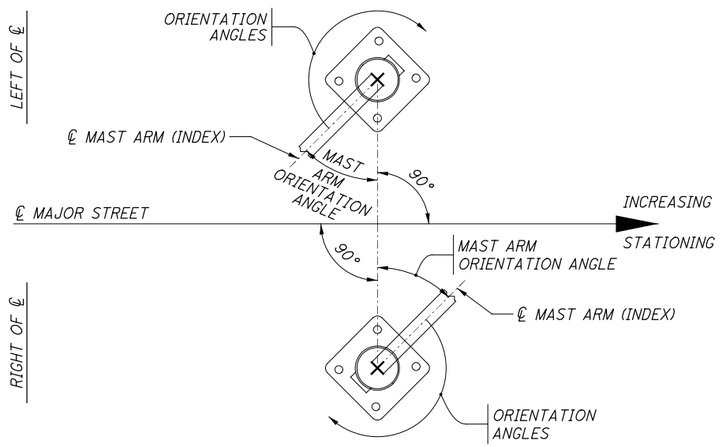
MAST ARM (A) SP-2

VIEWED FROM SOUTH LEG



MAST ARM (B) SP-2

VIEWED FROM WEST LEG



POLE ORIENTATION

CALCULATED JMD
CHECKED MJH

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

TRAFFIC SIGNAL PLAN DETAILS
CENTER ST. & I-90 EB RAMPS

LOR-IR90-20.55

23
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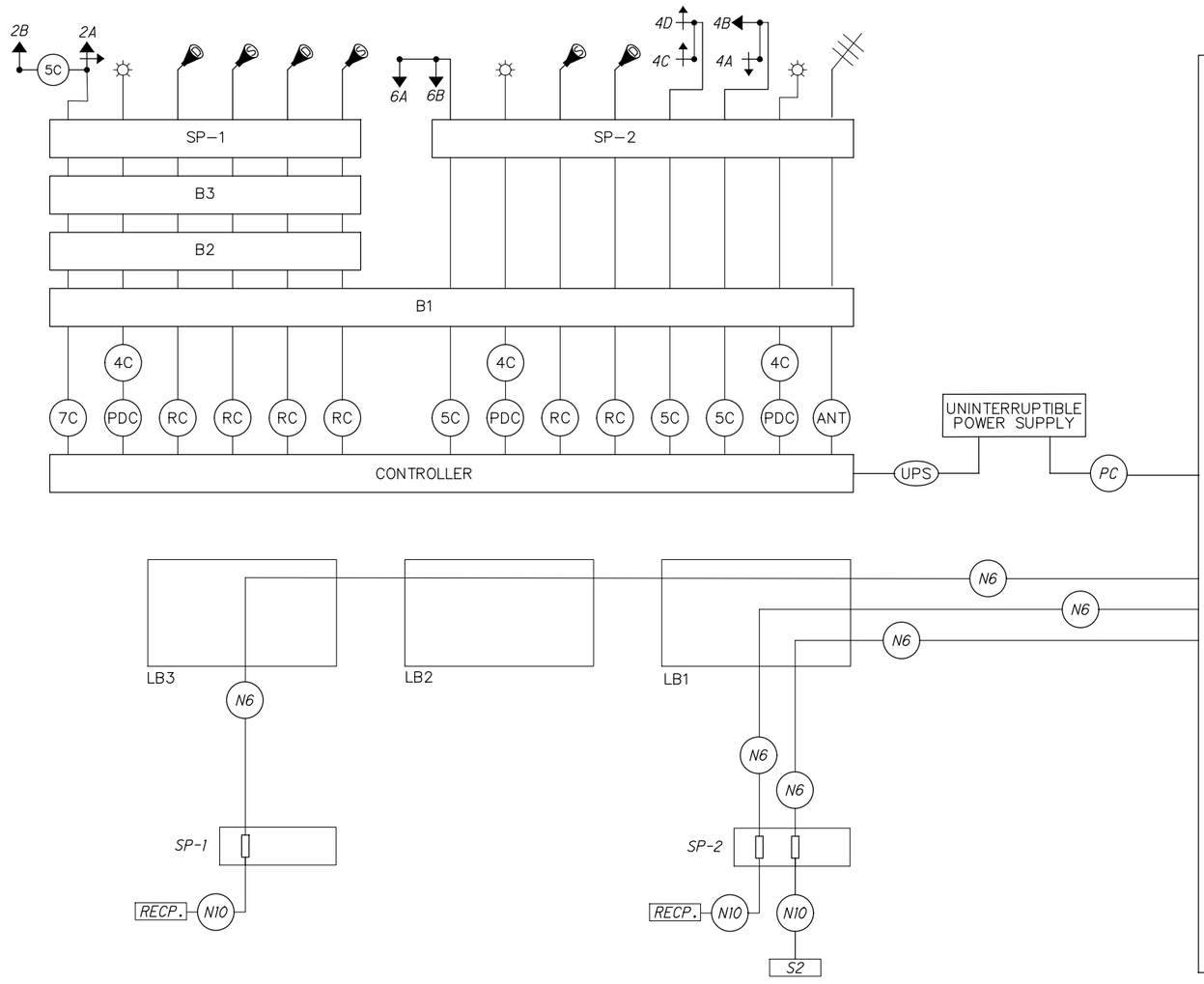
I02520CP014

FIELD WIRING HOOK–UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A (SB LT)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
	<--Y---	Φ5 Y	
	<--G---	Φ5 G	
2B (SB)	R	Φ2 R	R
	Y	Φ2 Y	
	G	Φ2 G	
4A (EBR)	---R-->	Φ4 R	R
	---Y-->	Φ4 Y	
	---G-->	Φ4 G	
4B (EBT/R)	R	Φ4 R	R
	Y	Φ4 Y	
	G	Φ4 G	
4C,4D (EBL)	<--R---	Φ4 R	R
	<--Y---	Φ4 Y	
	<--G---	Φ4 G	
6A,6B (NB)	R	Φ6 R	R
	Y	Φ6 Y	
	G	Φ6 G	



LEGEND

- 5 SECTION VEHICULAR SIGNAL HEAD, 1-WAY
- 3 SECTION VEHICULAR SIGNAL HEAD, 1-WAY
- 3 SECTION VEHICULAR SIGNAL HEAD, TURN ARROWS 1-WAY
- PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- STOP BAR RADAR DETECTION UNIT
- ADVANCE RADAR DETECTION UNIT
- LUMINAIRE, CONVENTIONAL
- CONNECTION
- CONNECTION
- #C — SIGNAL CABLE, # CONDUCTOR, NO. XX AWG
- RC — RADAR DETECTION CABLE
- PDC — PREEMPTION DETECTOR CABLE*
- POWER SOURCE
- PC — POWER CABLE, 2 CONDUCTOR, NO. X AWG
- UPS — UNINTERRUPTIBLE POWER SUPPLY CABLE
- SP-1 — SIGNAL SUPPORT POLE NO. __
- NX — NO. X AWG DISTRIBUTION CABLE
- NXX — NO. XX AWG POLE & BRACKET CABLE
- SX — INTERNALLY ILLUMINATED SIGN
- PREEMPTION SYSTEM (WITH CONFIRMATION LIGHT)

*PREEMPTION DETECTOR CABLE AS QUANTIFIED INCLUDES A SEPARATE 5C CABLE TO POWER THE ADJACENT CONFIRMATION LIGHT.

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

CALCULATED JMD
CHECKED MJH

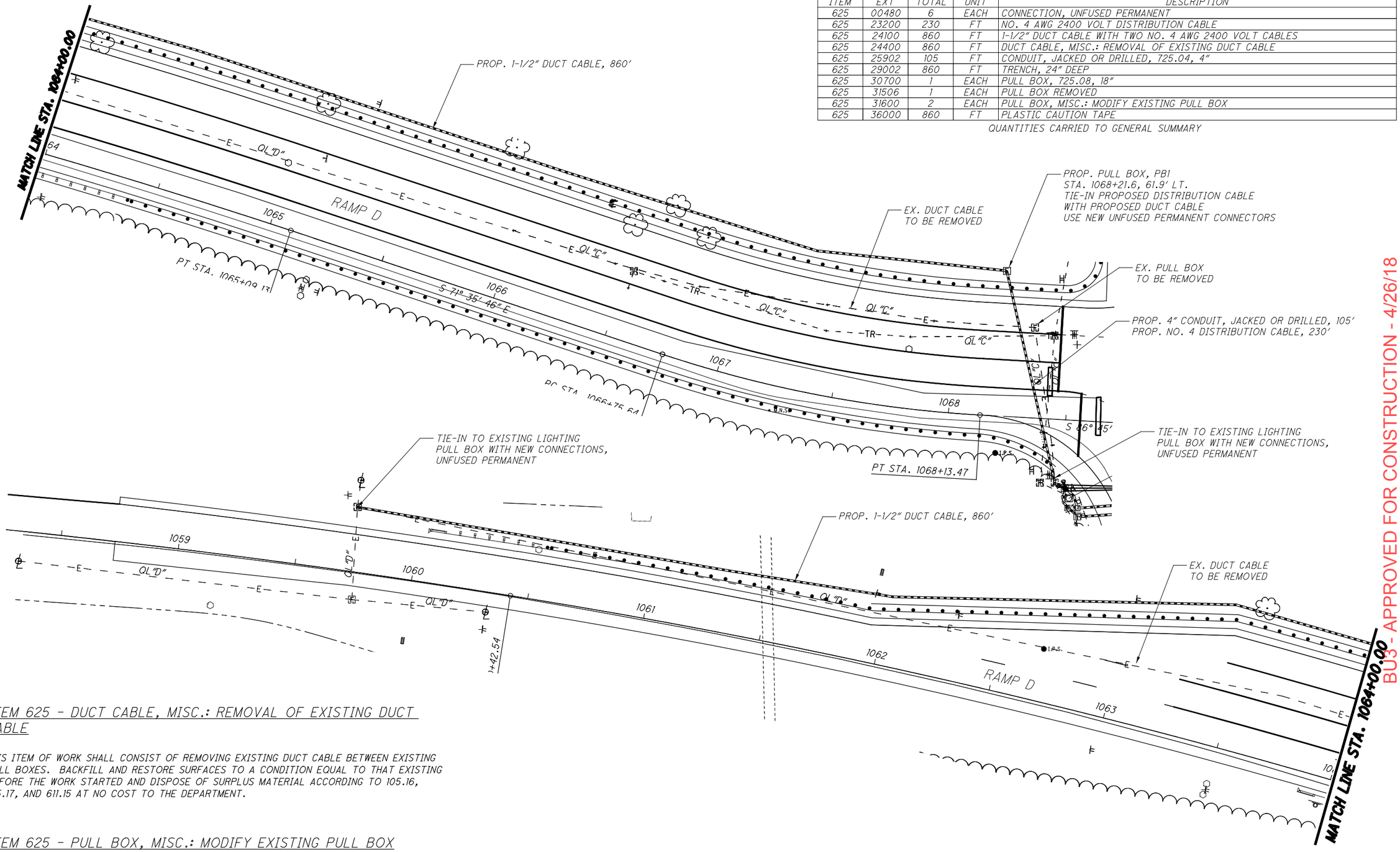
TRAFFIC SIGNAL PLAN DETAILS
CENTER ST. & I-90 EB RAMPS

LOR-IR90-20.55

I0252OCP015

SUMMARY				
ITEM	EXT	TOTAL	UNIT	DESCRIPTION
625	00480	6	EACH	CONNECTION, UNFUSED PERMANENT
625	23200	230	FT	NO. 4 AWG 2400 VOLT DISTRIBUTION CABLE
625	24100	860	FT	1-1/2" DUCT CABLE WITH TWO NO. 4 AWG 2400 VOLT CABLES
625	24400	860	FT	DUCT CABLE, MISC.: REMOVAL OF EXISTING DUCT CABLE
625	25902	105	FT	CONDUIT, JACKED OR DRILLED, 725.04, 4"
625	29002	860	FT	TRENCH, 24" DEEP
625	30700	1	EACH	PULL BOX, 725.08, 18"
625	31506	1	EACH	PULL BOX REMOVED
625	31600	2	EACH	PULL BOX, MISC.: MODIFY EXISTING PULL BOX
625	36000	860	FT	PLASTIC CAUTION TAPE

QUANTITIES CARRIED TO GENERAL SUMMARY



ITEM 625 - DUCT CABLE, MISC.: REMOVAL OF EXISTING DUCT CABLE

THIS ITEM OF WORK SHALL CONSIST OF REMOVING EXISTING DUCT CABLE BETWEEN EXISTING PULL BOXES. BACKFILL AND RESTORE SURFACES TO A CONDITION EQUAL TO THAT EXISTING BEFORE THE WORK STARTED AND DISPOSE OF SURPLUS MATERIAL ACCORDING TO 105.16, 105.17, AND 611.15 AT NO COST TO THE DEPARTMENT.

ITEM 625 - PULL BOX, MISC.: MODIFY EXISTING PULL BOX

IN ADDITION TO THE REQUIREMENTS OF THE C&MS, THIS ITEM SHALL INCLUDE CLEARING THE PULL BOX OF DEBRIS, REMOVING ANY EXISTING CABLES NOT BEING RECONNECTED, CUTTING INTO THE SIDES OF THE PULL BOX FOR NEW CONDUIT ENTRIES AND CEMENT PATCHING AND REPAIRING THE BOX TO SATISFACTORY CONDITION APPROVED BY THE ENGINEER. DISTURBED AREAS NEAR THE PULL BOX SHALL BE CLEARED OF WEEDS OR DEBRIS AND SHALL BE FULLY RESTORED. MATERIAL REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY DISPOSED OF OFF OF THE PROJECT SITE.

NOTES

1. LOCATION OF CONDUIT RUNS SHOWN ON THE DRAWING ARE APPROXIMATE. MAINTAIN 36" HORIZONTAL CLEARANCE FROM WATER AND GAS LINES. FIELD ADJUST AS NEEDED.
2. ALL TRENCH SHALL BE 24" DEEP (MIN.)
3. ANY EXISTING CONDUIT THAT IS NOT IN USE SHOULD BE ABANDONED IN PLACE AND CABLES REMOVED.

LEGEND

EX. LUMINAIRE
PROP. CONDUIT
PROP. PULL BOX
EX. PULL BOX

N

HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED JMD
CHECKED MJH

BU3 - APPROVED FOR CONSTRUCTION - 4/26/18

LIGHTING PLAN
SR 83 & I-90 INTERCHANGE RAMP D
LOR-IR90-20.55

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