

GENERAL INTERCHANGE NOTES LIGHTING

FED. NO. DIVISION	STATE	PROJECT	
2	OHIO		

271
384

LAKE COUNTY
LAK-2-1422

SPECIFICATIONS

THE OHIO STANDARD SPECIFICATIONS SHALL GOVERN WHERE APPLICABLE UNLESS SHOWN OR NOTED TO THE CONTRARY IN THESE CONTRACT PLANS.

GENERAL SCOPE OF CONTRACTOR'S RESPONSIBILITY

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL LIGHTING UNITS COMPLETE INCLUDING FOUNDATIONS, STANDARDS, BRACKETS, LUMINAIRES, LAMPS, PULL BOXES, BALLASTS AND GROUNDING TOGETHER WITH THE NECESSARY INNER POLE AND MAST ARM WIRING, CONNECTED BETWEEN BALLASTS AND LAMPS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL AND CONNECT TO THE BALLAST THE UNDERGROUND LIGHTING CABLES ARRANGED IN CIRCUITS AS DESIGNATED TOGETHER WITH ALL CONDUIT, TRENCH, COVERBOARD AND ALL MATERIALS AND LABOR NECESSARY TO COMPLETE THE UNDERGROUND LIGHTING CABLE INSTALLATIONS, AS SHOWN ON THE PLANS. THE CIRCUITS SHALL TERMINATE AT THE PULL BOX AS DETAILED ON THE DRAWINGS. SCHEDULE WORK TO AVOID INTERFERENCE WITH GENERAL ROADWAY CONSTRUCTION. THE CONTRACTOR SHALL INITIATE CONTACT WITH THE RESPONSIBLE OFFICIALS OF THE UTILITY COMPANY CHARGED WITH INSTALLING AND CONNECTING THE POWER SERVICE AND EQUIPMENT REQUISITE TO THE LIGHTING SYSTEM. SUCH CONTACT WITH THE UTILITY COMPANY SHALL BE EFFECTED AS EARLY AS PRACTICABLE IN THE INTEREST OF PROPERLY CORRELATING THE SEPARATE PORTIONS OF THE WORK NECESSARY FOR THE OVERALL COMPLETION OF THE LIGHTING SYSTEM.

THE CONTRACTOR SHALL ALSO COOPERATE CLOSELY WITH THE CONTRACTORS PRESENTLY ENGAGED IN ROADWAY WORK UNDER THE EXISTING CONTRACTS, INCLUDING SEWER RELOCATION CONTRACTOR, AND OTHER CONTRACTORS WHO MAY SUBSEQUENTLY BE ASSIGNED TO PERFORM WORK IN THE AREA OF THIS LIGHTING CONTRACT. THE ROADWAY LIGHTING INSTALLATION SHALL, EXCEPT AS MODIFIED HEREIN OR ON THE DRAWINGS, CONFORM TO THE REQUIREMENTS OF THE STATE OF OHIO, DEPARTMENT OF HIGHWAYS, CONSTRUCTION AND MATERIALS SPECIFICATIONS, JANUARY 1, 1961, ITEM S-25, ELECTRICAL EQUIPMENT.

LIGHTING UNITS

REFER TO SCHEDULE ON LIGHTING PLAN SHEET 273. LIGHTING UNITS SHALL BE ARRANGED IN THE DISTRIBUTION SYSTEM AS DETAILED AND ARE DESIGNATED BY A LETTER NUMBER SEQUENCE WHICH INDICATES ITS ENERGIZING CIRCUIT AND THE POSITION OF THE UNIT IN THE CIRCUIT.

LIGHTING UNIT LOCATIONS

REFER TO SCHEDULE ON LIGHTING PLAN SHEETS. EACH LIGHTING UNIT LOCATION IS REFERENCED BY A STATION ON ONE OR MORE OF THE SEVERAL ROADWAY SURVEY CENTER LINES TOGETHER WITH A RIGHT ANGLE OFFSET FROM THE ROADWAY PAVEMENT. FINAL POSITION IS SUBJECT TO ADJUSTMENT TO SUIT FIELD CONDITIONS.

LIGHT UNIT FOUNDATIONS

REFER TO LIGHTING DETAIL SHEET 272. LIGHT UNIT FOUNDATIONS SHALL BE SO PLACED THAT THEIR FINISHED TOPS WILL EXTEND ABOVE THE FINISHED GROUND LINE AS SHOWN IN THE DETAILS. THE CONTRACTOR SHALL CONFIRM THE OFFSET DISTANCE IN THE FIELD WHICH ARE NOTED IN THE SCHEDULES TO PREVENT ANY IMPROPER PLACEMENTS THAT COULD RESULT DUE TO CHANGES IN THE ROADWAY DESIGN. THE UNIT PRICE BID FOR EACH LIGHT STANDARD FOUNDATION SHALL INCLUDE FURNISHING AND PLACING CONCRETE, ANCHOR BOLTS, CONDUIT ELLS, ETC., AND THE COST OF ALL EXCAVATION, BACKFILLING, AND DISPOSAL OF SURPLUS EXCAVATION AND DISCARDED MATERIAL IN ACCORDANCE WITH THE PROVISIONS OF SECTION E-1.06.

LUMINAIRES

LUMINAIRES SHALL BE PROPERLY DESIGNED TO FURNISH LIGHT DISTRIBUTION PATTERNS EQUIVALENT TO A.S.A.I.E.S. TYPE II, TYPE III, AND SHALL BE EQUAL TO GENERAL ELECTRIC CO., M-400 OR WESTINGHOUSE TYPE QV-25 OR LINE MATERIAL 2A2 WITH 2" SLIP FITTER CONNECTION FOR INSTALLATION ON LIGHTING UNIT BRACKET. TYPE II TO BE USED ON ALL RAMPS, TYPE III ON S.R. 2.

LIGHT STANDARDS AND MAST ARMS

REFER TO SCHEDULE ON LIGHTING PLAN AND DETAIL SHEETS. STANDARDS SHALL BE THE UNION METAL MFG. CO. DESIGN 440A OR (440A MODIFIED) OR APPROVED EQUAL SHOWN ON THE PLANS, MODIFIED WHERE REQUIRED SO AS TO PROVIDE A NOMINAL LUMINAIRE MOUNTING HEIGHT OF THIRTY FEET WHEN MEASURED BETWEEN BASE OF THE STANDARD AND CENTER OF MAST ARM WHERE THE LUMINAIRE IS ATTACHED, AS SHOWN ON THE DETAILS. THE BRACKET LENGTHS SHALL BE OF A LENGTH AS LISTED ON THE SCHEDULE IN THE LIGHTING PLANS TO PROVIDE A SUITABLE OVERHANG OVER THE ROADWAY PAVEMENT. STANDARD AND BRACKET ASSEMBLY SHALL BE EQUIVALENT TO MANUFACTURER'S SPECIFIED TYPE.

LAMPS

ALL LAMPS SHALL BE 400 WATT, 21,000 INITIAL LUMEN, MERCURY VAPOR TYPE, TYPE ASA CODE H1LS NON-COLOR CORRECTED WITH AVERAGE RATED LIFE OF 6,000 HOURS AT FIVE TO TEN HOURS BURN PER START. LAMP AS SPECIFIED SHALL BE FURNISHED AND INSTALLED IN EACH LUMINAIRE. LAMPS WHICH DO NOT START PROPERLY SHALL BE REPLACED AS DIRECTED BY THE ENGINEER.

CABLE SPLICE KIT

SPLICES IN SYSTEM DISTRIBUTION CABLE SHALL BE PERFORMED BY USE OF MINNESOTA MINING & MFG. CO. SCOTCHCAST SPLICING KIT NO. 82A FOR INLINE AND NO. 82-B1 FOR WYE SPLICE.

POLE AND BRACKET WIRE

ALL WIRING BETWEEN LAMPS AND BALLASTS SHALL CONSIST OF TWO SINGLE CONDUCTOR A.W.G. #10 RUBBER INSULATED, NEOPRENE SHEATHED CABLES RATED 600 VOLT, EQUIVALENT TO GENERAL ELECTRIC CO. TYPE S 1-58021-RHW-USE.

MULTIPLE STREET LIGHTING CABLE INSTALLATION

ALL CABLE FORMING THE TWO LIGHTING CIRCUITS, DESIGNATED ALPHABETICALLY ON THE LIGHTING PLANS, SHALL BE SINGLE CONDUCTOR A.W.G. NO. 4 STRANDED COPPER CABLE, UNSHIELDED, 600 VOLT RATING WITH RUBBER INSULATION AND HEAVY DUTY NEOPRENE SHEATH SUITABLE FOR DIRECT BURIAL UNDERGROUND AND SHALL BE EQUIVALENT TO GENERAL ELECTRIC COMPANY VERSATOL GEOPRENE, TYPE S1-58006. THE ENDS OF THE 600 VOLT CABLE SHALL BE FINISHED ACCORDING TO THE RECOMMENDATIONS OF THE CABLE MANUFACTURER WHERE EXPOSED TO THE WEATHER, AS ON THE RISERS AT THE SERVICE POLES OR THE SERVICE EQUIPMENT CENTERS. THE ENDS SHOULD BE FINISHED AFTER THE EXACT LENGTH OF THE RISER BEYOND THE END OF THE CONDUIT HAS BEEN DETERMINED IN THE FIELD BY THE CIRCUIT CONDITIONS ON THE POLE OR CENTER. PROVIDE THREE FEET OF SLACK IN EACH PULL BOX ADJACENT TO THE LIGHTING STANDARD FOUNDATION.

CABLE TRENCHES

IN CROSS SECTION THE CABLE TRENCHES SHALL BE AS SHOWN IN THE DETAILS AND SO ALIGNED AS TO CARRY THE LIGHTING CABLE FROM POINT TO POINT, IN THE MOST DIRECT MANNER COMPATIBLE WITH THE FEATURES OF THE GROUND AND PAVEMENT AREAS INVOLVED.

THE UNIT PRICE BID PER LINEAR FOOT OF FINISHED CABLE TRENCH SHALL INCLUDE FURNISHING AND PLACING OF SAND, ETC., AND THE COST OF ALL EXCAVATION, BACKFILLING, AND DISPOSAL OF ALL SURPLUS EXCAVATION AND DISCARDED MATERIAL IN ACCORDANCE WITH THE PROVISIONS OF SECTION E-1.06.

ALL TRENCH SHALL BE RESTORED TO THE ORIGINAL CONDITION PRIOR TO EXCAVATION WHERE FINISH ROADWAY GRADING HAS BEEN COMPLETED.

SHIELDS

WHERE LIGHTING LUMINAIRES ARE LOCATED WITHIN 75 FEET OF AN OVERHEAD BRIDGE STRUCTURE, SUCH LUMINAIRES SHALL BE EQUIPPED WITH SUITABLE SHIELDS, DESIGNED TO FIT LUMINAIRE FURNISHED, TO ELIMINATE GLARE ON THE BRIDGE.

CONCRETE ENCASED ROADWAY CONDUIT

CONCRETE ENCASED ROADWAY DUCTS SHALL BE EITHER SINGLE OR DOUBLE CONDUITS, CONCRETE ENCASED, LOCATED AT THE POSITIONS INDICATED ON THE LIGHTING PLAN. IN CROSS SECTION THE DUCTS SHALL BE AS SHOWN IN THE DETAILS, CROSSING UNDER THE ROADWAYS AS NEARLY AT RIGHT ANGLES AS CONDITIONS WILL PERMIT, FOLLOWING THE CONTOUR OF THE ROADWAY CROSS SECTION AT A CONSTANT DEPTH AS DETAILED AND EXTENDING AT LEAST TWO FEET BEYOND THE PAVED SHOULDER.

THE CONDUIT SHALL BE FOUR INCH SIZE ASBESTOS CEMENT TYPE CONFORMING TO FEDERAL SPECIFICATION W-C-571 TYPE I (CONDUIT FOR INSTALLATION WITH CONCRETE ENCASEMENT). THE CONDUIT SHALL BE TERMINATED WITH AN END BELL AND EXTENDED INTO PULL BOXES IN MANNER AS DETAILED. WHERE SHARP BENDS ARE REQUIRED THE CONDUIT SHALL TERMINATE WITH A SUITABLE SWEEPING BAND, AND END BELL. THE COST OF FURNISHING AND PLACING THE CONDUIT, CONCRETE, EXCAVATION, BACKFILLING, AND DISPOSAL OF SURPLUS EXCAVATION IN ACCORDANCE WITH THE PROVISIONS OF SEC. E-1.06 SHALL BE INCLUDED IN THE UNIT PRICE BID PER LINEAR FOOT FOR CONDUIT - CONCRETE ENCASED (SIZE AND NUMBER AS DETAILED).

COMPLETION, INSPECTION AND PERFORMANCE TEST

EXCLUSIVE OF THE POWER SUPPLY, THE LIGHTING SYSTEM UNDER THIS CONTRACT SHALL BE COMPLETE IN EVERY DETAIL AND FREE FROM ALL GROUNDS, SHORT CIRCUITS, IMPROPER CONNECTIONS, INFERIOR WORKMANSHIP, DAMAGED OR INFERIOR MATERIALS.

PRIOR TO COMPLETING THE SERVICE CONNECTION, THE LIGHTING SYSTEM INSTALLATION SHALL BE SUBJECT TO SUCH INSPECTION AS MAY BE PRESCRIBED BY THE RESPONSIBLE STATE AND/OR LOCAL INSPECTION AUTHORITIES AND ALL SYSTEM DEFICIENCIES SHALL BE IMMEDIATELY CORRECTED.

AFTER THE SERVICE CONNECTIONS HAVE BEEN MADE BY THE UTILITY COMPANY, THE COMPLETED LIGHTING SYSTEM SHALL BE OPERATED FROM SUNSET TO SUNRISE EACH NIGHT FOR A PERIOD OF ONE WEEK PRIOR TO ACCEPTANCE. DURING THIS TOTAL BURNING TEST OPERATION THE CONTRACTOR SHALL, AT NO EXTRA COST TO THE STATE, CORRECT ANY DEFECTS WHICH MAY DEVELOP. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ELECTRIC ENERGY COSTS FOR OPERATION OF THE LIGHTING SYSTEM DURING THE ABOVE SPECIFIED TEST PERIOD.

TESTING

CONTRACTOR SHALL FURNISH ALL NECESSARY EQUIPMENT AND APPLIANCES FOR TESTING THE UNDERGROUND CABLE CIRCUITS AFTER INSTALLATION AND BEFORE INITIAL ENERGIZATION. THE CONTRACTOR SHALL TEST AND DEMONSTRATE TO THE ENGINEER THE FOLLOWING:

- ALL LIGHTING CIRCUITS ARE FREE FROM OPEN CIRCUITS AND UNSPECIFIED GROUNDS.
- THAT THE RESISTANCE TO GROUND OF ALL NON-GROUNDED CABLES IS NOT LESS THAN 10 MEGOHMS AND ALL CIRCUITS ARE PROPERLY CONNECTED.

RESISTANCE MEASUREMENTS SHALL BE MADE WITH BALLASTS CONNECTED IN THE CIRCUIT. TESTS SHALL BE MADE WITH A 500 VOLT MEGGER.

SPLICES

SPLICES SHALL NOT BE PERMITTED IN UNDERGROUND CABLE LENGTHS LESS THAN 500 FEET. NO SPLICES SHALL BE PERMITTED BETWEEN LIGHTING UNITS. SPLICES WHERE PERMITTED SHALL BE PERFORMED IN PULL BOX ADJACENT TO THE STANDARD FOUNDATION. ALL SPLICES SHALL BE PERFORMED BY USE OF SPECIFIED SPLICE KIT INSTALLED PER MANUFACTURER'S INSTRUCTIONS, A COPY OF WHICH SHALL BE FURNISHED TO THE ENGINEER.

GROUNDING

ALL STANDARDS SHALL BE GROUNDED IN ACCORDANCE WITH THE PROVISIONS OF ITEM S-25.10 AND AS DETAILED ON THE DRAWINGS.

PAINTING

ALL STANDARDS AND MAST ARMS SHALL BE PAINTED IN ACCORDANCE WITH THE PROVISIONS OF ITEM S-25.10 WITH THE EXCEPTION THAT THE PAINT FOR FIELD APPLICATION OVER THE FACTORY PRIME COATS SHALL BE DuPONT NO. 1166-220 ALUMINUM PAINT OR EQUAL. PAINT SHALL CONSIST OF ALUMINUM PASTE CONFORMING TO FEDERAL SPECIFICATION TT-A-468, TYPE II, CLASS A, AND A MIXING VEHICLE OF THE GLYCERAL PHTHALATE. THE ALUMINUM PASTE AND VEHICLE SHALL BE SEPARATELY PACKAGED AND SHALL BE MIXED IN THE FIELD IN THE PROPORTIONS OF TWO POUNDS OF PASTE TO ONE GALLON OF THE VEHICLE.

PAYMENT FOR PAINTING SHALL BE INCLUDED IN PRICE BID FOR LIGHTING STANDARDS WITH MAST ARMS.

DUCT, CABLE AND SPLICE MARKERS

CONCRETE MARKERS IN ACCORDANCE WITH THE DETAILS SHOWN ON THE PLANS SHALL BE PLACED OVER ENDS OF UNDERGROUND DUCTS, ALONG STRAIGHT UNDERGROUND CABLE RUNS AT 250 FOOT INTERVALS AT EACH CHANGE OF DIRECTION OF CABLE RUN AND ABOVE EACH CABLE SPLICE. MARKERS SHALL BE PLACED FLAT ON THE GROUND WITH ONE INCH PROJECTING ABOVE FINISHED GRADE.

PAYMENT FOR DUCT MARKERS SHALL BE INCLUDED IN PRICE BID FOR DUCT. PAYMENT FOR CABLE MARKERS SHALL BE INCLUDED IN PRICE BID FOR CABLE.

PULL BOXES

PULL BOXES SHALL BE FURNISHED AND INSTALLED AT ALL STANDARD FOUNDATIONS AND OTHER LOCATIONS INDICATED ON THE DRAWINGS AND IN ACCORDANCE TO THE DETAILS SHOWN ON THE LIGHTING DETAILS SHEET.

BOX MAY BE PRECAST OR CAST IN PLACE. CONCRETE AND BACKFILL SHALL BE IN ACCORDANCE TO THE REQUIREMENTS FOR STANDARD FOUNDATIONS SPECIFIED UNDER ITEM S-25.11.

FRAME AND COVER SHALL BE CAST IRON CONSTRUCTED AS DETAILED.

SEPARATE PAYMENT SHALL BE MADE FOR PULL BOXES.

BALLASTS

BALLASTS SHALL BE POLE TOP MOUNTING TYPE FURNISHED COMPLETE WITH MOUNTING ADAPTER. BALLAST SHALL BE REGULATOR TYPE RATED 400 WATTS, 460 VOLTS FOR 21,000 LUMEN LAMP. BALLAST SHALL PROVIDE +2% REGULATION IN LAMP WATTS WITH +13% VARIATION IN PRIMARY VOLTS FROM THE BALLAST DESIGN CENTER.

ADAPTER SHALL BE DESIGNED TO FIT DIAMETER OF TOP OF POLE FURNISHED. BALLAST AND ADAPTER ASSEMBLY SHALL BE INSTALLED AND WIRED IN ACCORDANCE TO THE MANUFACTURER'S INSTRUCTIONS.

BALLAST AND ADAPTER SHALL BE EQUIVALENT TO LINE MATERIAL INDUSTRIES CAT. NO. LU 11 A 14

LIGHTING DESIGN

THE INTERCHANGE LIGHTING LAYOUT HAS BEEN DESIGNED ON A BASIS OF 0.8 TO 1.0 FOOT CANDLE INTENSITY ON S.R. 2 AND 0.6 TO 0.8 FOOT CANDLE INTENSITY ON RAMPS.