STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	87 N-0275-01	2001	13	18

IV. TRAFFIC SIGNAL POLES AND PEDESTALS

A. GENERAL

1. LOAD: ALL TRAFFIC SIGNAL POLES SHALL CONFORM TO THE LATEST EDITION OF THE AMERICAN ASSOCIATION FOR STATE HIGHWAY AND TRANSPORTATION OFFICIALS' "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS" HANDBOOK WITH A WIND LOAD OF 80 MILES PER HOUR AND A 30 PERCENT GUST FACTOR. THE POLES SHALL ALSO ACCOMMODATE WIND LOADINGS WHICH MAY CAUSE DEFLECTIONS OF THE MAST ARM IN THE VERTICAL PLANE. THESE DEFLECTIONS SHALL NOT BE SUCH THAT THERE IS LESS THAN A 15 FOOT CLEARANCE BETWEEN THE ROADWAY AND THE LOWEST POINT OF THE SIGNAL ASSEMBLY.

2. SHOP DRAWINGS: ALL TRAFFIC SIGNAL POLES SHALL BE DETAILED ON SHOP DRAWINGS BY THE MANUFACTURER INDICATING POLE AND ARM DIMENSIONS AND ATTACHMENT METHOD ALONG WITH SIGNAL WEIGHT, PROJECTED AREAS, AND TYPE OF MOUNTING THAT IT IS DESIGNED TO ACCOMMODATE. ALL NEW TRAFFIC SIGNAL POLES OR POLES NOT PREVIOUSLY APPROVED WILL REQUIRE SUBMISSION OF DESIGN CALCULATIONS ALONG WITH THE SHOP DRAWINGS.

3. SHAFT: THE SHAFT SHALL INCLUDE HIGH STRENGTH ANCHOR BOLTS, WASHERS, AND NUTS, CONFORMING TO SECTION 1613, TYPE II OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS. ANCHOR BOLT WASHERS CONFORMING TO THE REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS, SPECIFICATION F436 WILL ALSO BE ACCEPTABLE. IT ALSO SHALL INCLUDE COVER LEAVES, A HANDHOLE AND COVER, CAST POLE TOP, A J-HOOK WIRE SUPPORT, AND A SUITABLE DEVICE FOR ATTACHING THE MAST ARM TO THE SHAFT. THE SHAFT SHALL INCLUDE 1 INCH RUBBER GROMMETS AT ALL OUTLETS FOR SIGNAL WIRING.

4. COMBINATION POLES: WHERE A COMBINATION LIGHTING/SIGNAL POLE IS SPECIFIED ON THE PLAN, THE ABOVE APPLIES WITH THE LUMINAIRE ARM TO BE MOUNTED 90 DEGREES TO THE VERTICAL PLANE OF THE SIGNAL ARM.

5. ARMS: ALL SIGNAL POLE ARMS SHALL INCLUDE 25 mm RUBBER GROMMETS AT OUTLETS FOR SIGNAL WIRING AND REMOVABLE END CAPS.

6. FOUNDATIONS: BASES FOR POLES AND CABINETS SHALL BE REINFORCED CONCRETE AS DETAILED ON THE PLANS. THE REINFORCING BARS SHALL BE FREE OF RUST AND DIRT AND SHALL BE OF THE SIZE, NUMBER AND DIMENSIONS SHOWN ON THE PLANS. THE TOP 150 mm OF POLE AND PEDESTAL BASES SHALL BE FORMED INTO A SQUARE AND SHALL BE LEVEL WITH THE TOP OF ADJACENT SIDEWALK OR APPROXIMATELY 50 mm ABOVE FINISHED GROUND LINE.

ANCHOR BOLTS SHALL EXTEND UNIFORMLY ABOVE THE FINISH GRADE OF THE CONCRETE BASE A HEIGHT EQUAL TO THE MANUFACTURER'S RECOMMENDATIONS (LEAVING AT LEAST THREE THREADS EXPOSED WHEN SECURED).

THE ANCHOR BOLT SIZES FOR THE POLE BASES ARE TO BE STANDARDIZED AS FOLLOWS:

A. MAST ARM LENGTHS 5 m THROUGH 11 m 4 – 38 mm DIA. X 1371 mm LONG X 150 mm HOOK

BOLT CIRCLE = 400 mm DIAMETER

B. MAST ARM LENGTHS 12 m THROUGH 17 m 4 – 44 mm DIA. X 2133 mm LONG X 150 mm HOOK

BOLT CIRCLE = 500 mm DIAMETER

C. STREET LIGHT POLES (JOINT USE POLES WITH NO SIGNAL MAST ARM) – 4 – 25 mm DIA. X 914 mm LONG X 100 mm HOOK

BOLT CIRCLE = 280 mm DIAMETER

THE CONTRACTOR SHALL DESIGN AN ANCHOR BOLT ASSEMBLY WHICH SHALL BE WELDED TO THE REBAR CAGE AND THE RESULTING UNIT INSERTED IN THE FORM FOR THE CONCRETE BASE. THE UNIT SHALL BE DESIGNED AND CONSTRUCTED SUCH THAT, AFTER INSERTION IN THE FORM, IT CAN BE CHECKED FOR PROPER ORIENTATION, ELEVATION AND VERTICALITY. "STABBING" OF ANCHOR BOLTS OR GROUND RODS WILL NOT BE PERMITTED.

THE LOCATION OF THE BASES SHALL BE AS SHOWN ON THE PLANS. ANY VARIATION FROM THE PLAN LOCATION SHALL BE ONLY WITH THE APPROVAL OF THE ENGINEER.

STEEL TRAFFIC SIGNAL POLE BASES SHALL BE CONSTRUCTED IN TWO POURS. THE INITIAL CONCRETE PLACEMENT SHALL END 150 mm BELOW FINISH GRADE. A 150 mm THICK, 914 mm SQUARE CONCRETE CAP SHALL BE POURED WHEN THE POLE HAS BEEN ERECTED, PLUMBED, AND APPROVED BY THE ENGINEER. THE TOP OF THE BASE SHALL BE SLIGHTLY (6 mm TO 12 mm) HIGHER THAN THE ADJACENT CURB AND GUTTER, OR FINISH GRADE IF NO CURB AND GUTTER. ALUMINUM PEDESTAL BASES SHALL BE CONSTRUCTED IN ONE POUR AS DETAILED ON THE PLANS.

7. INSTALLATION: THE CONTRACTOR SHALL VISUALLY VERIFY THAT THE TRAFFIC SIGNAL POLES ARE PLUMB AFTER THE MAST ARM AND OTHER LOADS HAVE BEEN APPLIED. ADJUSTMENT SHALL BE MADE USING THE LEVELING NUTS ON THE ANCHOR BOLTS. THE FINAL DISTANCE BETWEEN THE TOP OF THE FOUNDATION AND THE BOTTOM OF THE LEVELING NUTS SHALL NOT EXCEED 25 mm. PRIOR TO INSTALLING THE POLE THE CONTRACTOR SHALL PROVIDE A SCREEN TO KEEP RODENTS FROM ENTERING THE POLE THROUGH THE GAP AT THE BASE. THE SCREEN MATERIAL SHALL BE A STIFF, WELDED STEEL WIRE MESH WITH 6 mm SQUARE OPENINGS. THE MESH WILL BE APPROVED BY THE ENGINEER ON THE BASIS OF COMPLIANCE WITH THE DIMENSIONAL REQUIREMENTS. THE HEIGHT OF THE SCREEN SHALL BE APPROXIMATELY 300 mm. THE LENGTH OF THE SCREEN SHALL BE APPROXIMATELY EQUAL TO THE INSIDE CIRCUMFERENCE OF THE POLE PLUS 300 mm. PRIOR TO INSTALLING THE TRAFFIC SIGNAL POLE ON THE FOUNDATION, THE CONTRACTOR SHALL ROLL THE SCREEN AND INSERT IT THROUGH THE OPENING AT THE BASE OF THE POLE. AFTER THE POLE HAS BEEN INSTALLED, ALL LOADS HAVE BEEN APPLIED AND THE POLE HAS BEEN PLUMBED THE CONTRACTOR SHALL PUSH THE SCREEN DOWN SO THE BOTTOM EDGE MAKES CONTACT WITH THE FOUNDATION.

B. STEEL TRAFFIC SIGNAL POLES

1. GENERAL: STEEL TRAFFIC SIGNAL POLES SHALL CONFORM TO SUBSECTIONS 1605 AND 1606 OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS AND THE REQUIREMENTS ON THE PLAN. THE POLES AND ARMS SHALL BE TAPERED MONOTUBE MADE ONLY OF ONE LENGTH OF STRUCTURAL STEEL SHEET OF NOT LESS THAN NO. 7 MANUFACTURING STANDARD GAUGE MEETING THE REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) SPECIFICATION A595 "SPECIFICATION FOR STEEL TUBES, LOW-CARBON, TAPERED FOR STRUCTURAL USE". AS AN ACCEPTABLE ALTERNATIVE, THE POLES AND ARMS SHALL HAVE A MINIMUM OF 12 SIDES MADE ONLY OF ONE LENGTH OF STRUCTURAL STEEL SHEET OF NOT LESS THAN NO. 7 MANUFACTURING STANDARD GAUGE MEETING THE REQUIREMENTS OF THE LATEST EDITION OF THE ASTM SPECIFICATION A570 "SPECIFICATION FOR STRUCTURAL QUALITY HOT-ROLLED CARBON STEEL SHEET AND STRIP" OR A572 "SPECIFICATION FOR HIGH-STRENGTH LOW-ALLOY COLUMBIUM-VANADIUM STEELS OF STRUCTURAL QUALITY" WITH A MINIMUM YIELD STRENGTH OF 55 KILOPOUNDS PER SQUARE INCH AND A MAXIMUM SILICONE CONTENT OF 0.06 PERCENT. ONLY ONE LONGITUDINAL WELD, AND NO TRANSVERSE WELDS, SHALL BE PERMITTED IN THE FABRICATION OF THE SHAFT OR ARM. (EXCEPTION: MULTIPLE GAUGE ARMS DESIGNED FOR LENGTHS OF 40 FEET OR GREATER MAY HAVE BOLTED TELESCOPIC FIELD JOINTS SO AS TO DEVELOP FULL STRENGTH OF THE ADJACENT SHAFT SECTIONS TO RESIST BENDING ACTION.)

2. POLE FINISH

SURFACE PREPARTATION – THE EXTERIOR STEEL SURFACE SHALL BE BLASTED CLEAN IN ACCORDANCE WITH THE REQUIREMENTS OUTLINED IN THE STEEL STRUCTURES PAINTING COUNCIL SURFACE PREPARATION SPECIFICATION, NUMBER 6, (SSPCSP60) UTILIZING A DRY ABRASIVE, CLOSED CYCLE, RECIRCULATING SYSTEM WITH CENTRIFUGAL WHEELS AND ABRASIVE. THE ABRASIVE USED SHALL BE STEEL SHOT CONFORMING TO THE SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) RECOMMENDED PRACTICE #J827 WITH PARTICLE SIZE MEETING SAE SHOT NUMBER S280.

ZINC COATING – THE POLE ASSEMBLY SHALL BE HOT-DIP GALVANIZED TO THE REQUIREMENTS OF, EITHER ASTM A123 (FABRICATED ITEMS), OR ASTM A153 (HARDWARE ITEMS) BY IMMERSION IN A MOLTEN BATH OF PRIME WESTERN GRADE ZINC, MAINTAINED BETWEEN 810 AND 850 DEGREES F. MAXIMUM ALUMINUM CONTENT OF THE BATH SHALL NOT EXCEED 0.01%.

TOP COAT – ALL VISUALLY-EXPOSED EXTERIOR SURFACES SHALL BE COATED WITH A URETHANE OR TRIGLYCIDYL ISOYANURATE (TGIC) POLYESTER POWDER TO A MINIMUM DRY FILM THICKNESS (DFT) OF 0.05 mm (2.0 MILS.) PRIOR TO APPLICATION OF THE TOP COAT, THE SURFACE SHALL BE MECHANICALLY ETCHED AND PRE-HEATED TO 450 DEGREES F FOR A MINIMUM OF ONE HOUR. THE COATING SHALL BE ELECTROSTATICALLY APPLIED AND CURED AT A MINIMUM TEMPERATURE OF 400 DEGREES F, AND THE COLOR SHALL BE BLACK.

3. MATERIAL CERTIFICATIONS

ALL MATERIALS AND PRODUCTS SHALL BE PRODUCED IN THE UNITED STATES OF AMERICA. THEY SHALL BE OF THE ASTM TYPE AS CALLED FORTH IN THIS SPECIFICATION. MILL CERTIFICATIONS (TWO COPIES EACH) SHALL BE SUPPLIED TO THE CITY FOR PROOF OF COMPLIANCE TO THIS SPECIFICATION.

V. CONDUIT

A. GENERAL: CONDUIT RUNS ARE TYPICAL ONLY AND MAY BE ADJUSTED DURING INSTALLATION TO CLEAR OBSTRUCTIONS AND FACILITATE WIRING AS APPROVED BY THE ENGINEER.

ALL CONDUCTORS SHALL BE RUN BETWEEN BASES, JUNCTION BOXES PULL BOXES, AND SERVICES BOXES IN CONDUIT CONFORMING TO THE PROVISIONS LISTED BELOW. THE SIZE OF THE CONDUIT USED SHALL BE OF THE SIZE AS SHOWN ON THE PLANS.

THE ENDS OF ALL CONDUIT SHALL BE WELL REAMED TO REMOVES BURRS AND ROUGH EDGES. FIELD CUTS SHALL BE MADE SQUARE AND TRUE SO THAT THE ENDS WILL BUTT OR COME TOGETHER FOR THE FULL DIAMETER THEREOF. SLIP JOINTS OR RUNNING THREADS WILL NOT BE PERMITTED FOR COUPLING CONDUIT. WHEN A STANDARD COUPLING CANNOT BE USED, AN APPROVED THREADED UNION SHALL BE USED. THE THREADS ON ALL CONDUIT SHALL BE PAINTED WITH A GOOD QUALITY OF LEAD OR RUST PREVENTATIVE PAINT BEFORE COUPLINGS ARE MADE. ALL COUPLINGS SHALL BE FITTED AND TIGHTENED UNTIL THE END OF THE CONDUITS ARE BROUGHT TOGETHER. WHERE COATING ON CONDUIT HAS BEEN INJURED IN HANDLING, OR INSTALLING, SUCH INJURED PLACES SHALL BE THOROUGHLY PAINTED WITH RUST PREVENTATIVE PAINT.

ALL CONDUIT ENDS SHALL BE THREADED AND CAPPED WITH STANDARD PIPE CAPS UNTIL WIRING IS STARTED. WHEN CAPS ARE REMOVED, THE THREADED ENDS SHALL BE PROVIDED WITH APPROVED CONDUIT BUSHINGS.

CONDUIT BENDS, EXCEPT FACTORY BENDS, SHALL HAVE A RADIUS OF NOT LESS THAN SIX (6) TIMES THE INSIDE DIAMETER OF THE CONDUIT. WHERE FACTORY BENDS ARE NOT USED, CONDUIT BENDS SHALL BE MADE WITHOUT CRIMPING OR FLATTENING, USING THE LONGEST RADIUS PRACTICABLE.

CONDUIT SET IN BASES SHALL EXTEND 50 mm TO 75 mm VERTICALLY FROM THE TOP OF THE BASE. A PLASTIC OR METAL CONDUIT BUSHING SHALL BE INSTALLED ON THE END OF ALL CONDUIT TERMINATING WITHIN A BASE. CONDUIT SHALL ENTER THROUGH THE SIDES OF A PULL BOX AND SHALL LEAVE THE MAJOR PORTION OF THE BOX CLEAR. CONDUIT ENTERING CONCRETE SERVICE AND JUNCTION BOXES SHALL NOT EXTEND MORE THAN 100 mm INSIDE OF SERVICE OR JUNCTION BOX AS MEASURED ALONG THE LONGITUDINAL AXIS OF THE CONDUIT. CONDUIT ENTERING SERVICE BOXES SHALL BE AT LEAST 150 mm ABOVE THE CRUSHED ROCK BOTTOM OF THE SERVICE HOLE. CONDUIT SHOULD BE SLOPED TO DRAIN AS DIRECTED BY THE ENGINEER. AT ALL OUTLETS, CONDUITS SHALL ENTER FROM THE DIRECTION OF THE RUN.

WHEREVER POSSIBLE, THE CONDUIT SHALL BE INSTALLED BY TRENCHING. TRENCHES SHALL RUN IN STRAIGHT LINES BETWEEN PULL BOXES AND BASES. THE LOCATION OF THE CONDUIT SHALL BE AS SHOWN ON THE PLANS, EXCEPT THAT WHERE PHYSICAL OBSTRUCTIONS DICTATE, THE LOCATION SHALL BE DETERMINED BY THE ENGINEER. CONDUIT SHALL BE INSTALLED TO A DEPTH OF AT LEAST 800 mm BELOW FINISH GRADE. THIS REQUIREMENT MAY BE WAIVED BY THE ENGINEER WHERE PHYSICAL CONDITIONS OR OBSTRUCTIONS WARRANT.

TRENCHES SHALL BE BACKFILLED WITH MATERIAL FREE OF ROCK AND COMPACTED IN LIFTS BY HAND TAMPING OR WITH MECHANICAL TAMPERS TO THE DENSITY NOTED ON THE PLANS. IF A DENSITY IS NOT SPECIFIED ON THE PLANS, TRENCH BACKFILL SHALL BE COMPACTED UNTIL, IN THE OPINION OF THE ENGINEER, NO SIGNIFICANT FUTURE SETTLEMENT WILL OCCUR.

EXISTING UNDERGROUND CONDUIT TO BE INCORPORATED INTO A NEW SYSTEM SHALL BE CLEANED WITH A MANDREL AND BLOWN OUT WITH COMPRESSOR AIR.

CONDUIT RUNS SHOWN ON THE PLANS ARE FOR BIDDING PURPOSES ONLY, AND MAY BE CHANGED WITH PERMISSION OF THE ENGINEER TO AVOID UNDERGROUND OBSTRUCTIONS.

B. METALLIC CONDUIT AND FITTINGS

1. CONDUIT: METALLIC CONDUIT SHALL BE RIGID STEEL CONDUIT MEETING THE REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN NATIONAL STANDARDS INSTITUTE SPECIFICATION C80.1 "SPECIFICATIONS FOR ZINC-COATED RIGID STEEL CONDUIT".

2. FITTINGS: METALLIC CONDUIT FITTINGS SHALL BE ZINC COATED AND SHALL MEET THE REQUIREMENTS OF THE LATEST EDITION OF THE AMERICAN NATIONAL STANDARDS INSTITUTE SPECIFICATION C80.4 "SPECIFICATIONS FOR FITTINGS FOR RIGID METAL CONDUIT AND ELECTRICAL METALLIC TUBING".

TRAFFIC SIGNAL SPECIFICATIONS

PROJECT NUMBER

DRAWN BY: TM	APPROVED BY	REVISED:
DATE: FEB. 96		DATE:

CITY OF WICHITA

DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING DIVISION — SCALE

WM. G. McKINLEY, TRAFFIC ENGINEER