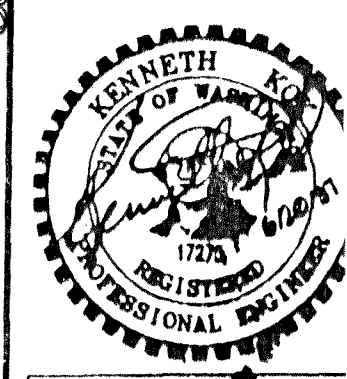


00248.001 2/23/98 KK

REVISIONS	



EXPIRES 2/23/98

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ELECTRICAL STREET LIGHTING PLAN

HOMESTEAD PIOVESAN SITE

DATE: 20 JUNE 91


SCALE: 1" = 60'-0"

DRAWN: KL

DESIGNED: KK

SHEET

OF X SHEETS



STREET LIGHTING SPECIFICATION

1. GENERAL

- THE REQUIREMENTS OF THIS SECTION APPLY TO ALL THE ELECTRICAL WORK FOR A COMPLETE STREET ILLUMINATION SYSTEM.
- COORDINATE ELECTRICAL/ILLUMINATION WORK WITH RELATED WORK SHOWN AND SPECIFIED ELSEWHERE.
- ALL ELECTRICAL MATERIALS SHALL BE "UL" (UNDERWRITERS LABORATORIES, INC.) LISTED, LABELED AND APPROVED FOR THE SERVICE INTENDED WHERE UL STANDARDS HAVE BEEN ESTABLISHED.
- THE ENTIRE INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, THE WASHINGTON STATE RULES AND REQUIREMENTS FOR INSTALLING ELECTRIC WIRES AND EQUIPMENT, AND THE REQUIREMENTS OF THE CITY OF BELLINGHAM.

2. WORK INCLUDED

- THE CONTRACTOR SHALL PERFORM ALL THE WORK REQUIRED (INCLUDING THE FURNISHING OF ALL SUPERVISION, LABOR, SERVICES, TOOLS, MATERIALS AND EQUIPMENT AND THE PERFORMANCE OF ALL OPERATIONS AND INCIDENTALS NECESSARY) FOR A COMPLETE, SAFE AND RELIABLE ELECTRICAL/ILLUMINATION INSTALLATION, ADJUSTED, TESTED AND READY FOR OPERATION. THE ELECTRICAL/ILLUMINATION WORK IS GENERALLY DESCRIBED AS FOLLOWS:

- STREET LIGHT STANDARDS, LUMINAIRES, LAMPS AND BASES.
- STREET LIGHTING SERVICE PREDESKALS AND SERVICES FROM POINT OF CONNECTION WITH PUGET SOUND ENERGY, INCLUDING ALL NECESSARY COORDINATION WITH THE UTILITY.
- GROUNDING.
- CONDUIT, WIRING, JUNCTION BOXES, ETC.
- TRENCHING AND BACKFILLING.
- TESTING AND COMPLETING.

- THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED LICENSES, PERMITS, INSPECTIONS, ETC.

3. SUBMITTALS

- SUBMIT FOUR COPIES OF SHOP DRAWINGS AND/OR PRODUCT DATA FOR ALL CONTRACTOR SUPPLIED EQUIPMENT AND MATERIALS TO THE ENGINEER FOR APPROVAL BEFORE ORDERING. ALL EQUIPMENT AND MATERIAL SHALL BE OBTAINED FROM A SOURCE APPROVED BY THE ENGINEER.
- SUBMITTALS SHALL PROVIDE SUFFICIENT DETAIL SO COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS CAN BE ASCERTAINED. IDENTIFY EACH ITEM BY MANUFACTURER, BRAND, TRADE NAME, NUMBER, SIZE, RATING, OR WHATEVER OTHER DATA IS NECESSARY TO PROPERLY IDENTIFY AND REVIEW MATERIALS AND EQUIPMENT.

4. STREET LIGHTING SERVICES

- SERVICES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF PUGET SOUND ENERGY.
- SERVICE PREDESKALS SHALL BE DIRECT BURIED TYPE, NEMA 3R, 250/240 VOLT, 1 PHASE, 3 WIRE, 100 AMP, SUITABLE FOR USE AS SERVICE ENTRANCE EQUIPMENT, COMPLETE WITH 3 # 20 AMP, 2 POLE CIRCUIT BREAKERS & A MINIMUM OF 1 DOUBLE POLE CIRCUIT BREAKER SPACE. ENCLOSURE SHALL BE HEAVY DUTY ZINC COATED STEEL WITH CORROSION RESISTANT FINISH.

5. CONDUIT

- PVC CONDUIT SHALL BE FURNISHED AND INSTALLED AS INDICATED ON THE PLANS, DIRECT BURIED A MINIMUM DEPTH OF 18 INCHES BELOW FINISHED GRADE.
- CONDUIT SHALL BE HEAVY-WALL (SCHEDULE 40) PVC, FLAME RETARDANT, SUITABLE FOR USE WITH 90C CABLE, SHALL NOT DISTORT FROM THE HEAT IT WILL NORMALLY ENCOUNTER, AND SHALL BE RESISTANT TO LOW TEMPERATURE AND SUNLIGHT EFFECTS, IMPACT AND CRUSHING. CONDUIT FITTINGS, COUPLINGS, ETC. SHALL BE OF THE SAME TYPE AND MANUFACTURER AS THE CONDUIT.
- NO CONDUIT SHALL BEND MORE THAN 180 DEGREES BEFORE THE END OF ITS RUN. BENDS IN CONDUITS SHALL BE MADE WITHOUT FLATTENING, KINKING OR REDUCING THE CROSS-SECTIONAL AREA OF THE CONDUIT. CONDUIT CUTS SHALL BE MADE SQUARE WITH A PROPER CUTTING TOOL. THE INSIDE AND OUTSIDE OF ALL CONDUIT ENDS SHALL BE REAMED TO ELIMINATE BURRS AND ROUGH EDGES, THEN WIPED CLEAN.
- JOINTS IN UNDERGROUND CONDUIT SYSTEM SHALL BE SOLVENT WELDED TO PREVENT THE ENTRANCE OF MOISTURE. FOR ALL EMBEDDED (DIRECT BURIED) LIGHT STANDARDS, PROVIDE CONDUIT FROM THE ADJACENT STREET LIGHTING JUNCTION BOX TO WITHIN 2 INCHES OF THE POLE & SEAL AT THAT POINT WITH A SEALANT THAT CAN BE REMOVED FOR REPAIRS.
- SUITABLE BUSHINGS AND ENDBELLS SHALL BE USED ON ALL CONDUIT TERMINATIONS.
- CONDUIT SYSTEMS SHALL BE COMPLETE, SNAKED AND CLEANED BEFORE PULLING ANY CABLE.

6. JUNCTION BOXES

- JUNCTION BOXES CONFORMING TO STANDARD PLAN J-1A (WITH THE EXCEPTION THAT THE LIDS SHALL BEAR THE LEGEND "LIGHTING") SHALL BE FURNISHED AND INSTALLED AT LOCATIONS SHOWN ON THE PLANS OR AS DESIGNATED BY THE ENGINEER. ALL LIDS, COVER PLATES AND OTHER METAL SURFACES SHALL BE HOT-DIPPED GALVANIZED.
- JUNCTION BOXES SHALL BE PLACED ON A 6-INCH CRUSHED SURFACING TOP COURSE CUSHION. JUNCTION BOXES SHALL BE INSTALLED PLUMB AND TRUE, AND SHALL BE SQUARE WITH ADJACENT ROADWAYS, SIDEWALKS, PROPERTY LINES, ETC.

- CONDUIT INTO JUNCTION BOXES SHALL BE NO MORE THAN 5 INCHES AND NO LESS THAN 3 INCHES FROM THE BOTTOM OF THE BOX SURFACE. CONDUIT ENTERING THE BOTTOM OF A JUNCTION BOX SHALL BE LOCATED NEAR THE END WALLS TO LEAVE THE MAJOR PORTION OF THE BOX CLEAR. AT ALL OUTLETS, CONDUIT SHALL ENTER FROM THE DIRECTION OF THE RUN TERMINATING WITHIN 3 INCHES OF THE BOX WALL NEAREST ITS ENTRY LOCATION AND HAVE SELL BEND. CARE SHALL BE TAKEN TO INSURE A NEAT AND CONVENIENT ARRANGEMENT OF CONDUIT, CABLES AND SPLICES/TAPS/TERMINATIONS.

- IF MORE THAN 1 POLE IS ON A CIRCUIT, IF ANY POLE IS MORE THAN 50 FEET FROM THE SERVICE, OR IF ANY POLE IS BURIED IN A SIDEWALK, A TYPE I JUNCTION BOX SHALL BE FURNISHED AND INSTALLED WITHIN 5 FEET OF THE BASE OF THAT POLE.

- RINGS SHALL BE FURNISHED AND INSTALLED IN ALL JUNCTION BOXES. RING HOLDERS SHALL BE BUSHMAN #10B-BU-ROCA OR PRIOR APPROVED EQUAL.

7. STREET LIGHTING STANDARDS

- STREET LIGHTING STANDARDS (POLES) SHALL BE FURNISHED AND INSTALLED ON LIGHT STANDARD BASES, SHALL BE SET PLUMB AND TRUE, AND SHALL BE SQUARE WITH THE ADJACENT STREETS, SIDEWALKS, AND PROPERTY LINE. THE BASE SHALL BE GROUTED TO COVER LEVELING NITS AND TO FILL THE VOID UNDER THE BASE PLAT WITH A NON-SHINKING GROUT. TOP OF CONCRETE SHALL BE FLUSH WITH ADJACENT SIDEWALKS, CURBS, ETC.

- TYPE 'A' STREET LIGHTING STANDARDS (POLES) SHALL BE PROVIDED AND INSTALLED WHERE SHOWN ON THE PLANS AND/OR AS DESIGNATED BY THE ENGINEER. STANDARDS SHALL BE OCTAGONAL, TAPERED PRE-STRESSED CONCRETE, EMBEDDED (DIRECT BURIED) TYPE SPUN HOLLOW STANDARDS MACHINE MADE IN STEEL, MOLDS BY THE CENTRIFUGAL PROCESS. PRE-STRESSING WIRE, CAGINS AND OTHER REINFORCEMENT SHALL BE PLACED IN A MANNER THAT ASSURES NO CRACKING DURING NORMAL HANDLING. THE POLES SHALL HAVE CAST-IN INSERTS ON THE SIDE FOR A HANDHOLE (ABOVE GRADE) & A CABLE INSERT (BELOW GRADE). THE POLES SHALL BE AMERON MEO-1 METER POLES OR PRIOR APPROVED EQUAL, WITH EXPOSED NATURAL AGGREGATE FINISH AND HAVE AN 23 FOOT, 8 INCH POLE HEIGHT ABOVE GROUND.

- TYPE 'B' STREET LIGHTING STANDARDS (POLES) SHALL BE PROVIDED AND INSTALLED WHERE SHOWN ON THE PLANS AND/OR AS DESIGNATED BY THE ENGINEER. THE STANDARDS SHALL BE OCTAGONAL, TAPERED PRE-STRESSED CONCRETE, ANCHOR BASE TYPE SPUN HOLLOW STANDARDS MACHINE MADE IN STEEL, MOLDS BY THE CENTRIFUGAL PROCESS. PRE-STRESSING WIRE, CAGINS AND OTHER REINFORCEMENT SHALL BE PLACED IN A MANNER THAT ASSURES NO CRACKING DURING NORMAL HANDLING. POLES SHALL HAVE AN INSERT ON THE SIDE FOR A HANDHOLE. THE POLES SHALL BE AMERON TYPE MEO-85 METER POLES OR PRIOR APPROVED EQUAL, WITH EXPOSED NATURAL AGGREGATE FINISH AND HAVE A 21 FOOT, 8 INCH POLE HEIGHT ABOVE GROUND.

- BOTH FIXTURE TYPE 'A' AND TYPE 'B' STREET LIGHTING LUMINAIRES SHALL BE THE CUTOFF TYPE, SUITABLE FOR WET LOCATIONS, WITH DIECAST ALUMINUM COBRA-HEAD STYLE HOUSING & FLAT TEMPERED & IMPACT RESISTANT GLASS LENS. REFLECTORS SHALL BE PROVIDED AND THE LAMP POSITION SELECTED SUCH THAT THE FIXTURE PRODUCES AN EVEN/SHORT TYPE II DISTRIBUTION PATTERN WITH ESSENTIALLY COMPLETE LIGHT CUTOFF ABOVE 75 DEGREES FROM NAZIR. LUMINAIRE HOUSINGS SHALL BE SLIP-THRU MOUNTED TO AN EXTENSION ARM. BALLASTS SHALL BE AUTOREGULATOR TYPE, CLASS H INSULATED, RATED FOR OPERATION AT 240 VOLT AC AND DOWN TO -20F. LAMPS FOR TYPE 'A' LUMINAIRES SHALL BE 100 WATT HIGH PRESSURE SODIUM. LAMPS FOR TYPE 'B' LUMINAIRES SHALL BE 250 WATT HIGH PRESSURE SODIUM. LUMINAIRES SHALL HUBBELL H-1-B-80 SERIES, G.E. PDS-64G POLYBUDOR, OR PRIOR APPROVED EQUAL.

- LUMINAIRE EXTENSION ARMS SHALL BE SPUN ALUMINUM, ELIPTICAL TAPERED TYPE, LENGTH AS INDICATED, COMPLETE WITH SUITABLE POLE CAP, AMERON MO-AB TYPE, OR PRIOR APPROVED EQUAL.

- PHOTO-ELECTRIC CONTROLS, TURN-LOCK TYPE WITH RECEPTACLE, SHALL BE FURNISHED AT THE TOP OF EACH TYPE 'B' FIXTURE LIGHT STANDARD.

- TYPE 'A' LIGHTING STANDARDS (POLES) SHALL BE EMBEDDED (DIRECT BURIED) WITH THE TYPE OF EMBEDMENT AS RECOMMENDED BY THE POLE MANUFACTURER FOR THE TYPE AND SIZE OF POLE AND LUMINAIRE PROVIDED, AND THE SOIL CONDITIONS AT THE SITE, EXCEPT MINIMUM AS INDICATED.

- POLE BASES FOR TYPE 'B' LIGHTING STANDARDS (POLES) SHALL BE POURED-IN-PLACE CONCRETE, OF THE SIZE & SHAPE AS RECOMMENDED BY THE POLE MANUFACTURER FOR THE SOIL CONDITIONS AT THE SITE (EXCEPT MINIMUM AS INDICATED).

- STANDARDS AND LUMINAIRES SHALL BE INSTALLED PLUMB AND TRUE, AND SHALL BE SQUARE WITH ADJACENT ROADWAYS, SIDEWALKS, PROPERTY LINES, ETC.

- IF AN EMBEDDED (DIRECT BURIED) TYPE POLE IS PLACED IN CONCRETE, AN 18 INCH BREAKOUT SHALL SURROUND THE POLE TO FACILITATE REPLACEMENT.

8. WIRING

- WIRING SHALL BE FURNISHED AND INSTALLED BETWEEN TRANSFORMER AND SERVICE PREDESKALS AND JUNCTION BOXES AND LUMINAIRES AS INDICATED ON THE PLANS. ALL WIRING SHALL CON- FORM TO WADOT SPECIFICATIONS.

- POWER CABLES SHALL BE SINGLE CONDUCTOR STRANDED COPPER WITH 600 VOLT TYPE USE/RN/RN-11 INSULATION. THE MINIMUM CONDUCTOR SIZE BETWEEN JUNCTION BOXES SHALL BE #6 AWG. THE MINIMUM CONDUCTOR SIZE FROM JUNCTION BOXES TO INDIVIDUAL STANDARDS SHALL BE #10 AWG.

- ALL SPLICES IN UNDERGROUND ILLUMINATION CIRCUITS SHALL BE INSTALLED AT JUNCTION BOXES, AND SHALL BE WATER-TIGHT. SPLICES SHALL EMPLOY COPPER CRIMPED CONNECTORS INSTALLED WITH AN APPROVED TOOL DESIGNED FOR THE PURPOSE. CONNECTORS SHALL THEN BE CENTERED IN CLEAR RIGID MOLDS, OR PRIOR APPROVED EQUAL, AND ENCAPSULATED IN EPOXY.

- SPLICES ABOVE GRADE ILLUMINATION CIRCUITS SHALL BE WITH SOLDERLESS PRESSURE TYPE CONNECTORS AND BE TAPED.

- BEFORE SPLICES AND CONNECTIONS ARE MADE, CONTACT SURFACES SHALL BE THOROUGHLY CLEANED. CONNECTIONS SHALL BE BOTH MECHANICALLY AND ELECTRICALLY SECURE. TAKE CARE NOT TO NICK CONDUCTORS DURING INSULATION REMOVAL.

- RINGS SHALL BE FURNISHED AND INSTALLED AT TAP TO THE STANDARDS/LUMINAIRES IN THE JUNCTION BOXES ADJACENT TO THE STANDARDS. RING HOLDERS SHALL BE WATERPROOF, IN-LINE RING HOLDERS WITH RUBER, BUSHMAN #10B-BU-ROCA, OR PRIOR APPROVED EQUAL.

- WIRE AND CABLE SHALL NOT BE EXPOSED TO WEATHER OR MECHANICAL DAMAGE LONGER THAN NECESSARY. CUT ENDS OF CABLE SHALL IMMEDIATELY BE SEALED.

- CABLE SHALL BE UNROLLED FROM REELS, OR REMOVED FROM CARTONS, AND INSTALLED IN A MANNER WHICH WILL PREVENT KINKING, CRUSHING OR EXCESSIVE TENSION ON CONDUCTORS AND INSULATION. CABLE PULLING LUBRICANTS OF A TYPE HAVING NO DAMAGING EFFECT ON THE INSULATION SHALL BE USED TO MINIMIZE PULLING STRESSES ON THE CABLE.

- CABLE SHALL BE INSTALLED OR DRAWN INTO THE CONDUIT SYSTEM ONLY AFTER ALL WORK OF ANY NATURE THAT COULD CAUSE INJURY TO THE CABLE IS COMPLETED. THE CONDUIT SYSTEM SHALL BE COMPLETE, SNAKED AND CLEANED BEFORE PULLING ANY CABLE.

10. GROUNDING

- ALL ELECTRICAL EQUIPMENT, DEVICES, ETC. SHALL BE SUITABLY GROUNDED AND PROVIDED WITH A LOW RESISTANCE GROUND FAULT RETURN PATH.

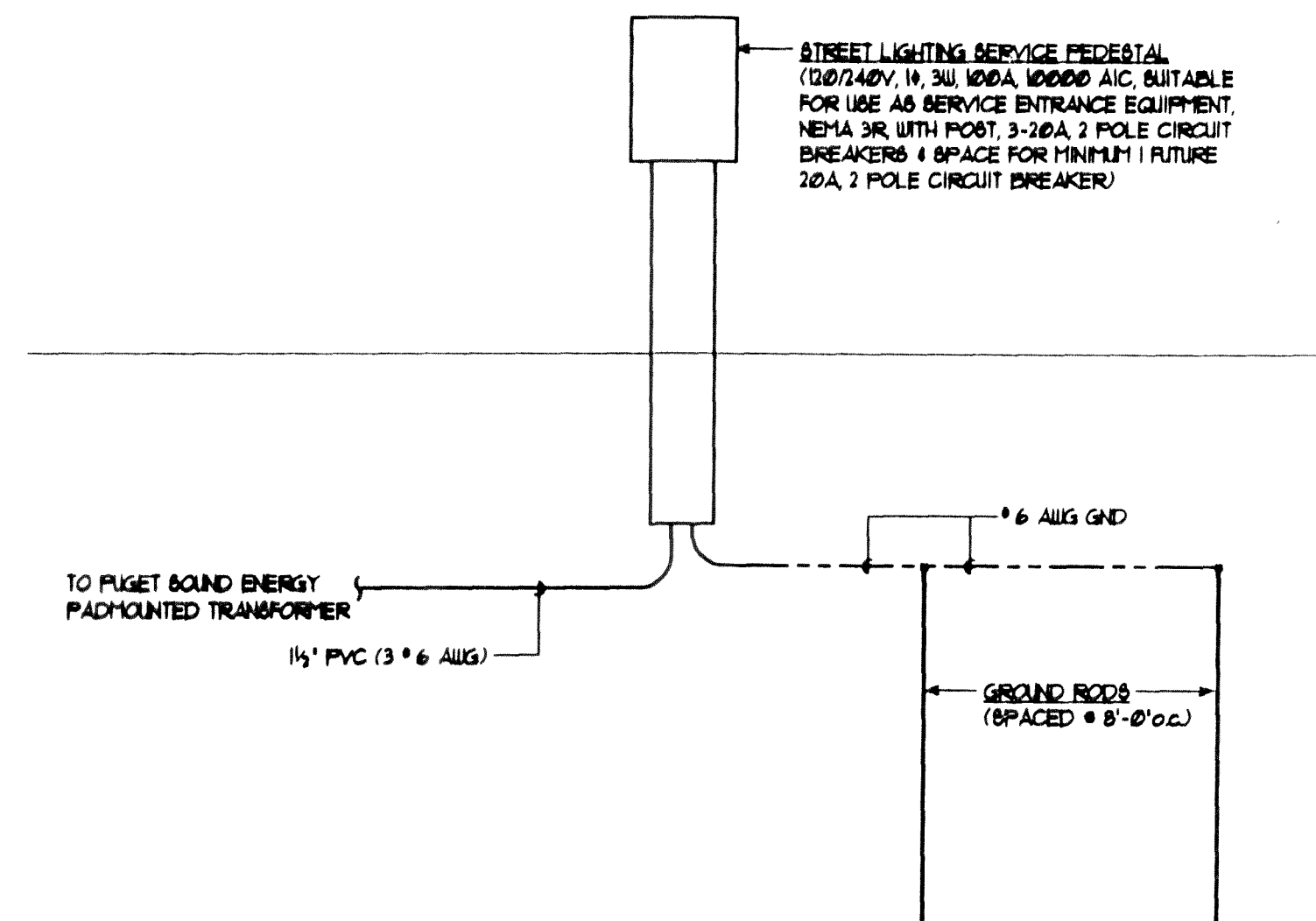
- A GROUND ROD PROVIDING 5 OHMS MAXIMUM RESISTANCE, OR 2 GROUND RODS SPACED AT MINIMUM 8 FEET APART, SHALL BE DRIVEN AT EACH SERVICE JUNCTION BOX. GROUND RODS SHALL BE CORRENCLAD STEEL, MINIMUM 5/8 INCH DIAMETER BY 8 FEET LONG.

- GROUND CABLES SHALL BE SINGLE CONDUCTOR STRANDED COPPER WITH 600 VOLT TYPE USE/RN/RN-11 INSULATION. THE MINIMUM CONDUCTOR SIZE BETWEEN JUNCTION BOXES SHALL BE #10 AWG. THE MINIMUM CONDUCTOR SIZE FROM JUNCTION BOXES TO INDIVIDUAL STANDARDS SHALL BE #10 AWG.

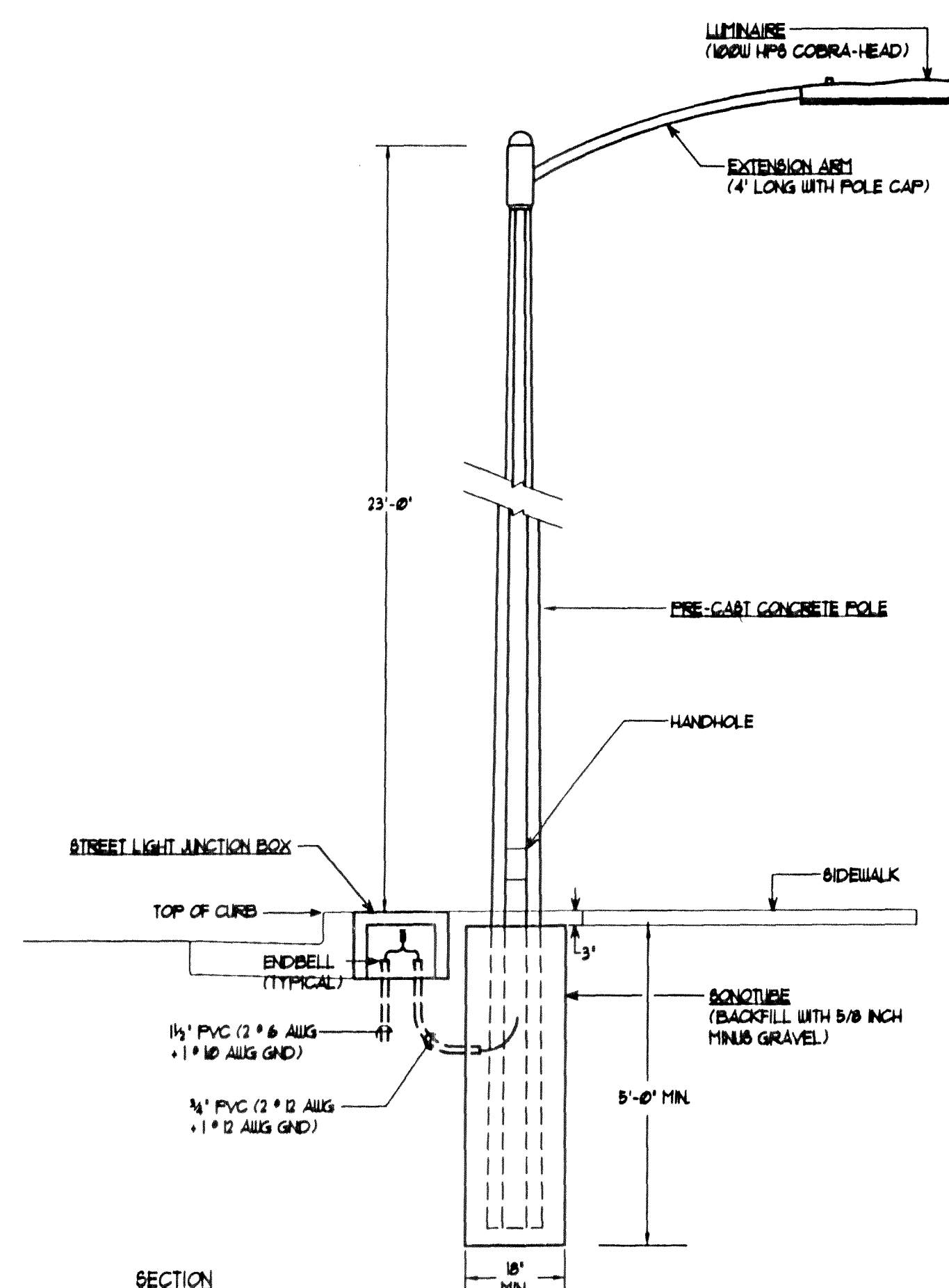
11. TESTING AND COMPLETING

- THE ILLUMINATION SYSTEM SHALL BE DEMONSTRATED TO THE ENGINEER AND AT AN AGREED UPON TIME AFTER COMPLETION AND PRIOR TO FINAL APPROVAL. THE CONTRACTOR SHALL PROVIDE MANPOWER AND EQUIPMENT FOR ANY NECESSARY FINAL ADJUSTMENTS AND/OR CORRECTIONS.

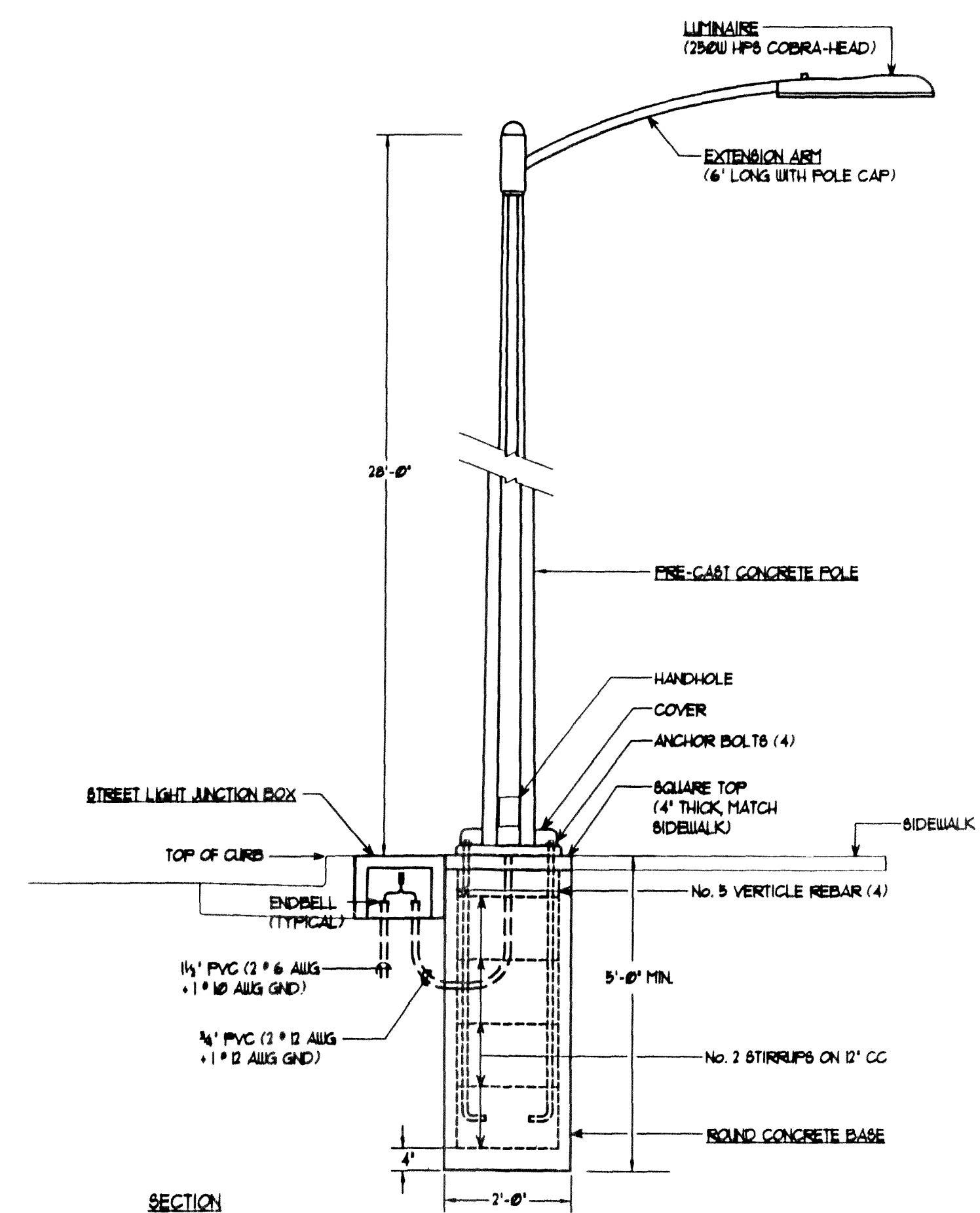
- ALL SYSTEMS SHALL TEST FREE FROM SHORTS AND GROUNDS AND SHALL BE FREE FROM MECHANICAL AND ELECTRICAL DEFECTS.



TYPICAL POWER SYSTEM RISER DIAGRAM
NO SCALE

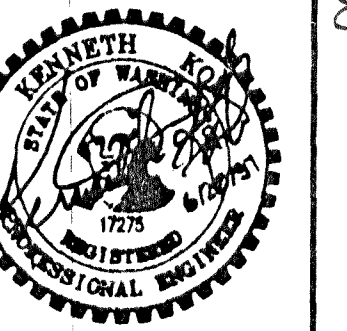


DETAIL - TYPICAL STREET LIGHT TYPE A
NO SCALE



DETAIL - TYPICAL STREET LIGHT TYPE B
NO SCALE

REVISIONS BY



EXPRES 2/23/98

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HOMESTEAD
PIOVESAN SITE

ELECTRICAL
DETAILS, NOTES &
RISER DIAGRAM

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