13) DEWATERING

a) PROVIDE PUMPING TO REMOVE, MAINTAIN AND DISPOSE OF ALL WATER ENTERING THE EXCAVATION DURING THE TIME THE EXCAVATION IS BEING PREPARED, FOR THE CONDUIT LAYING, DURING THE LAYING OF THE CONDUIT, AND UNTIL THE BACKFILL AT THE CONDUIT ZONE HAS BEEN COMPLETED. THESE PROVISIONS SHALL APPLY ON A CONTINUOUS BASIS. WATER SHALL BE DISPOSED OF IN A MANNER TO PREVENT DAMAGE TO ADJACENT PROPERTY. TRENCH WATER SHALL NOT BE DRAINED THROUGH THE CONSTRUCTION. GROUND WATER SHALL NOT BE ALLOWED TO RISE AROUND THE PIPE UNTIL JOINING COMPOUND HAS FIRMLY SET.

b) THE OWNER'S REPRESENTATIVE SHALL BE NOTIFIED 48 HOURS PRIOR TO COMMENCEMENT OF DEWATERING.

9) INSTALL UNDERGROUND CONDUIT NOT LESS THAN 24' BELOW FINISHED GRADE IN NON-TRAFFIC TRAFFIC AREAS AND 24' BELOW FINISHED GRADE IN TRAFFIC AREAS, INCLUDING ROADS AND PARKING AREAS. NOT LESS THAN 48' BELOW FINISHED GRADE UNDER TRANSIT SYSTEM RIGHT OF WAY AND RAILROAD RIGHT OF WAY. DIMENSIONS SHALL BE MEASURED TO THE TOP OF THE CONDUIT.

10) CONDUIT CROSSING EXISTING UNDERGROUND UTILITIES SHALL CROSS BELOW THE BOTTOM DEPTH OF THE EXISTING UTILITIES. IF THE TOP PORTION OF THE EXISTING UTILITY DEPTH BELOW FINISH GRADE EXCEEDS 72 INCHES AND THE SPECIFIED SEPARATION AND DEPTHS ARE MAINTAINED WHEN CROSSING OVER THE TOP OF THE EXISTING UNDERGROUND UTILITY, THE CONDUIT MAY CROSS ABOVE THE EXISTING UNDERGROUND UTILITY.

11) PROVIDE LONG RADIUS HORIZONTAL BENDS (MINIMUM RADIUS OF 36 TIMES THE CONDUIT DIAMETER) IN UNDERGROUND CONDUITS WHERE THE CONDUIT IS IN EXCESS OF 100 FEET LONG.

12) CONDUITS INSTALLED BELOW GRADE SHALL NOT BE SMALLER THAN 0.75 INCHES.

B. INSTALLATION OF CONDUCTORS

1) CONDUCTORS SHALL BE CONTINUOUS BETWEEN OUTLETS OR JUNCTION BOX AND NO SPLICES SHALL BE MADE EXCEPT IN PULL BOXES OR HANDHOLES.

2) ALL JOINTS, SPLICES AND TAPS #10 AND SMALLER (INCLUDING FIXTURE PIGTAILS) CONNECTED WITH 'IDEAL' WING NUTS OR SCOTCHLOK CONNECTORS, #8 AND LARGER CONNECTED WITH SOLDERLESS CONNECTOR OR 100% ELECTROLYTIC COPPER.

3) OIL OR GREASE SHALL NOT BE USED WHEN PULLING CONDUCTORS. APPROVED CABLE LUBRICANTS ONLY.

C. CONDUIT CONCRETE ENCASEMENT

1) CONDUITS WHICH ARE RUN UNDERGROUND EXTERIOR TO BUILDING SLAB SHALL BE CONTINUOUSLY CONCRETE ENCASED EXCEPT, 15 AND 20 AMPERE POWER BRANCH CIRCUIT CONDUITS UNDERGROUND DO NOT REQUIRE CONCRETE ENCASEMENT.

2) CONCRETE FOR ENCASEMENT OF UNDERGROUND CONDUITS SHALL BE 2000 PSI 28 DAYS CURE STRENGTH WITH A MAXIMUM OF 3/4' GRAVEL. CONCRETE ENCASEMENT OF CONDUITS SHALL BE CONTINUOUS WITHOUT VOIDS. THE ENCASEMENT SHALL EXTEND 3-INCHES PAST THE EDGES OF ALL CONDUITS ON ALL SIDES OF THE CIRCUIT. PROVIDE TEN POUNDS OF RED OXIDE CEMENT COLORING UNIFORMLY MIXED WITH EACH CUBIC YARD OF CONCRETE FOR CONDUIT ENCASEMENT.

3) CONDUITS OF ANY SIZE AND TYPE (INCLUDING 15 AMPERE AND 20 AMPERE POWER BRANCH CIRCUITS) LOCATED UNDER ROADS, PAVED AREAS AND 'TRANSIT-SYSTEM' RIGHT OF WAY SHALL BE CONCRETE ENCASED.

D. UNDERGROUND CONDUITS

1) THREE OR MORE UNDERGROUND CONDUITS LARGER THAN 1' IN SIZE AND OCCUPYING THE SAME TRENCH SHALL BE SEPARATED AND SUPPORTED ON FACTORY FABRICATED, NON-METALLIC, DUCT/CONDUIT SUPPORT SPACERS. THE SPACERS SHALL BE MODULAR, KEYED INTERLOCKING TYPE, 'BUILT-UP' TO ACCOMMODATE *QUANTITY, SIZE ORIENTATION AND SPACING OF INSTALLED* CONDUITS. THE SPACERS SHALL MAINTAIN A CONSTANT DISTANCE BETWEEN ADJACENT CONDUIT SUPPORTS AND HOLD CONDUITS IN PLACE DURING TRENCH BACKFILL OPERATIONS. MINIMUM SUPPORT SPACER INSTALLATION INTERVAL ALONG WITH LENGTH OF THE CONDUITS SHALL BE AS FOLLOWS:

a) CONCRETE ENCASED CONDUITS, NOT LESS THAN 8 FT. ON CENTER.

b) NON-CONCRETE ENCASED CONDUITS, NOT LESS THAN 5 FT. ON CENTER.

2) PROVIDE TRENCHING, EXCAVATION, SHORING AND BACKFILLING REQUIRED FOR THE PROPER INSTALLATION OF UNDERGROUND CONDUITS. TOPS OF BACKFILL SHALL MATCH FINISH GRADE.

3) BOTTOMS OF TRENCHES SHALL BE CUT PARALLEL TO 'FINISH GRADE' ELEVATION. MAKE TRENCHES 12 INCHES WIDER THAN THE GREATEST DIAMETER OF THE CONDUIT.

4) BACKFILLING TRENCHES FOR CONDUITS WITHOUT CONCRETE ENCASEMENT REQUIREMENTS.

a) CONDUITS WHICH ARE NOT REQUIRED BY THE CONTRACT DOCUMENTS TO BE CONCRETE ENCASED SHALL BE SET ON A 3 INCH BED OF DAMP CLEAN SAND. CONDUIT TRENCHES SHALL BE BACKFILLED TO WITHIN 12 INCHES OF FINISHED GRADE WITH DAMP SAND AFTER INSTALLATION OF CONDUIT AND CONCRETE IS COMPLETED. REMAINDER OF BACKFILL SHALL BE NATIVE SOIL.

b) PROVIDE A CONTINUOUS YELLOW 12 INCH WIDE FLAT PLASTIC TRACER TAPE, LOCATED 6 INCHES ABOVE THE CONDUITS IN THE TRENCH. THE TRACER TAPE SHALL BE IMPRINTED WITH 'WARNING--ELECTRIC CIRCUITS' A MINIMUM OF 24 INCHES ON CENTER.

5) BACKFILLING TRENCHES FOR CONDUITS UNDER PAVED AREAS

a) IN ADDITION TO THE REQUIREMENTS OF CONDUIT CONCRETE ENCASEMENT, CONDUITS UNDER WALKWAYS, ROADS, PARKING LOTS, DRIVEWAYS, AND BUILDINGS SHALL BE CAST IN PLACE CONCRETE 'SLURRY MIX' BACKFILL THE SLURRY MIX SHALL COVER EACH SIDE AND TOP OF CONDUITS AND CONDUIT CONCRETE ENCASEMENT. THE SLURRY MIX SHALL BE CONTINUOUS TO THE UNDERSIDE OF THE FINISH SUBGRADE SURFACE.

6) BACKFILLING TRENCHES FOR CONDUITS WITH CONCRETE ENCASEMENT REQUIREMENTS BY THE CONTRACT DOCUMENTS.

a) TRENCHES WITH ALL CONDUITS CONCRETE ENCASED AND NOT LOCATED UNDER A BUILDING PAD AND NOT LOCATED UNDER PAVED AREAS, SHALL BE BACKFILLED WITH CLEAN DAMP SAND OR NATIVE SOIL.

7) BACKFILL MATERIAL

a) SAND AND NATIVE SOIL BACKFILL OF TRENCHES SHALL BE MACHINE VIBRATED IN 6-INCH LIFTS TO PROVIDE NOT LESS THAN 90 PERCENT COMPACTION OF BACKFILL.

b) CONCRETE AND SLURRY MIX SHALL BE MACHINE VIBRATED DURING INSTALLATION TO REMOVE 'AIR-VOIDS'.

c) SOIL SHALL HAVE NO STONES, ORGANIC MATTER OR AGGREGATE GREATER THAN 3 INCHES.

d) THE SLURRY MIX SHALL CONSIST OF CONCRETE, CLEAN SAND AND CLEAN WATER MIXTURE. MAXIMUM SHRINKING OF SLURRY MIX SHALL NOT EXCEED 5 PERCENT WET TO DRY.

8) DO NOT BACKFILL UNTIL INSTALLATION HAS BEEN APPROVED

OWNER'S REPRESENTATIVE AND AS-BUILT DRAWINGS ARE UP TO DATE. PROMPTLY INSTALL CONDUITS AFTER EXCAVATION HAS BEEN DONE, SO AS TO KEEP THE EXCAVATIONS OPEN AS SHORT A TIME AS POSSIBLE. EXCESS SOIL FROM TRENCHING SHALL BE REMOVED FROM THE SITE.

2) LOCATE, BY WAY OF VERTICAL AND HORIZONTAL CONTROL DIMENSIONS, EXISTING SUBGRADE PETROLEUM PRODUCT PIPES, PROCESS PIPING, CONDUITS, SEWER, WATER, GAS, STORM DRAIN, ELECTRICAL, TELEPHONE AND IRRIGATION LINES IN THE AFFECTED AREAS OF CONTRACT CONSTRUCTION WORK.

3) ARRANGE AND MEET WITH THE OWNER'S REPRESENTATIVE TO REVIEW EXISTING UNDERGROUND CONDITIONS.

4) THE PROPOSED ROUTE OF EACH EXCAVATION SHALL BE CONTINUOUSLY SURVEYED ALONG THE ENTIRE EXCAVATION PATH USING GROUND PENETRATING RADAR (GPR) OPERATING FROM THE SURFACE GRADE. THE GPR SHALL DETECT AND MAP EXISTING UNDERGROUND METAL AND NON METAL PRIVATE AND PUBLIC UTILITY LINES, PIPES, CONDUITS, CONDUCTORS, ETC. THE GPR SHALL IDENTIFY THE HORIZONTAL AND VERTICAL LOCATION OF EXISTING UNDERGROUND CONDITIONS LOCATED AT A DEPTH OF NOT LESS THAN 3 METERS BELOW FINISH GRADE AND LOCATED WITH A VERTICAL AND HORIZONTAL ACCURACY WITHIN < 12 INCHES OF ACTUAL CONDITION.

C. EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID EXISTING UNDERGROUND UTILITIES, AND TO PREVENT HAZARD TO PERSONNEL AND/OR DAMAGE TO EXISTING UNDERGROUND UTILITIES OR STRUCTURES. THESE DRAWINGS AND SPECIFICATIONS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH IS THE RESPONSIBILITY OF THE CONTRACTOR.

D. REPAIR/REPLACE, WITHOUT ADDITIONAL COST TO THE CONTRACT, AND TO THE SATISFACTION OF THE OWNER ANY EXISTING WORK DAMAGED THAT WAS IDENTIFIED IN THE RECORD DRAWINGS PROVIDED; IDENTIFIED BY THE OWNER'S REPRESENTATIVE; IDENTIFIED BY THE UNDERGROUND DETECTION SERVICES PERFORMED; OR ANY EXISTING WORK DAMAGED AS A RESULT OF FAILURE TO COMPLY WITH ALL THE REFERENCED REQUIREMENTS.

E. THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT (USA) OF SOUTHERN CALIFORNIA, AT LEAST 48 HOURS PRIOR TO EXCAVATION, AND SHALL NOT EXCAVATE UNTIL VERIFICATION HAS BEEN RECEIVED FROM THE USA AND THAT PUBLIC UTILITIES SERVING THE SITE HAVE BEEN LOCATED AND MARKED.

F. *THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES, WHERE* SHOWN ON DRAWINGS, ARE SHOWN DIAGRAMMATICALLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER, THE OWNER'S REPRESENTATIVE. THE OWNER, THE OWNER'S REPRESENTATIVE, AND THE OWNER'S CONSULTING ENGINEER'S ARE NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES, WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED UNDER THIS OR ANY OTHER CONTRACTS. THE CONTRACTOR SHALL IDENTIFY EACH EXISTING UTILITY LINE PRIOR TO EXCAVATION AND MARK THE LOCATIONS ON THE GROUND OF EACH EXISTING UTILITY LINE.

9. CONDUIT

SCHEDULE 40 PVC CONDUIT SHALL BE USED FOR ALL CONDUIT BELOW GRADE. PROVIDE CODE SIZED GROUND CONDUCTOR.

10. PULL BOXES

A. SIZES AS INDICATED ON THE DRAWINGS AND IN NO CASE OF LESS SIZE OR MATERIAL THICKNESS THAN REQUIRED BY THE GOVERNING CODE. EXERCISE CARE IN LOCATING UNDERGROUND PULL BOXES TO AVOID INSTALLATION IN DRAW-IN WATER FLOW AREAS.

1) CONCRETE PULL BOXES: FURNISH COMPLETE WITH PULLING IRONS, HOT-DIP GALVANIZED TRAFFIC COVER WITH HOT-DIP GALVANIZED FRAME AND 4 GALVANZIED CABLE RACKS WITH PORCELAIN BLOCKS. THE BOX TO BE SET ON A PEA GRAVEL BASE 12' THICK AND AS LARGE AS THE BOTTOM. INSTALL A 3/4' BY 10' COPPER CLAD GROUND ROD FOR GROUNDING ALL METAL PARTS. AFTER CABLES HAVE BEEN PULLED AND INSPECTED, SEAL BOX BETWEEN COVER AND FRAME WITH A MASTIC COMPOUND SIMILAR TO PARMAGUM OR DUKSEAL. CONSTRUCTION EQUAL TO PREFABRICATED PULL BOXES AS MANUFACTURED BY QUIKSET OR BROOKS SERVICES WITHIN PULL BOX (I.E., '240/120 VOLT, 1-PHASE, 3-WIRE STREET LIGHTING').

11. WIRE AND CABLE

A. CONDUCTORS SHALL BE COPPER #12 AWG MINIMUM UNLESS SPECIFICALLY NOTED OTHERWISE ON DRAWINGS.

B. CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID AND #8 AWG AND LARGER SHALL BE STRANDED.

C. CONDUCTORS SHALL HAVE TYPE THHN/THWN INSULATION.

12. TRENCHING, FOOTINGS AND SLEEVES

PROVIDE TRENCHING, CONCRETE ENCASEMENT OF CONDUITS, BACKFILLING, AND COMPACTION FOR THE UNDERGROUND ELECTRICAL WORK, IN ACCORDANCE WITH APPLICABLE SECTIONS OF THIS SPECIFICATION.

13. LIGHTING FIXTURES

SHALL BE TYPE AS INDICATED ON FIXTURE SCHEDULE AND SHALL BE U.L. APPROVED.

14. LAMPS

SHALL BE TYPE AS SHOWN ON FIXTURE SCHEDULE.

15. GENERAL EXECUTION

A. CONDUIT:

1) PROVIDE PULL BOXES WHERE REQUIRED FOR PULLING CONDUCTORS DUE TO EXCESSIVE NUMBER OF BENDS OR LENGTH OF CONDUIT RUNS.

2) RUN EXPOSED CONDUITS AT RIGHT ANGLES OR PARALLEL TO STRUCTURAL MEMBERS, WALLS, FLOOR OR CEILING.

3) SEPARATION OF CONDUITS ENTERING TERMINATION POINTS OR CROSSING OTHER CONDUITS MAY BE REDUCED AS REQUIRED WITHIN 60 INCHES OF THE TERMINATION OR CROSSING POINTS.

4) CONDUITS CONTAINING UTILITY COMPANY SERVICE CIRCUITS (I.E. ELECTRICAL POWER) SHALL BE SEPARATED A MINIMUM OF 12 INCHES FROM ALL OTHER UTILITIES AND CONDUITS, WITH OR WITHOUT CONCRETE ENCASEMENT; METALLIC OR NON-METALLIC CONDUIT, ABOVE GRADE OR UNDERGROUND CONDUIT LOCATIONS.

1. THE 'GENERAL CONDITIONS' ARE HEREBY MADE A PART OF THIS SECTION. THE WORDS 'SHALL BE' ARE ASSUMED INTO EACH PARAGRAPH. THE WORK 'PROVIDE' AS NOTED HEREIN AND ON THE DRAWINGS SHALL MEAN 'FURNISH, INSTALL AND CONNECT'.

2. SCOPE

UNDER THIS HEADING IS INCLUDED LABOR, MATERIALS, EQUIPMENT AND APPLIANCES REQUIRED TO COMPLETE THE ELECTRICAL WORK.

3. SPECIAL REQUIREMENTS

A. WORK AND MATERIALS IN FULL ACCORDANCE WITH THE LATEST RULES AND REGULATIONS OF THE NATIONAL ELECTRICAL CODE, CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 3 AND OTHER APPLICABLE STATE AND LOCAL LAWS AND REGULATIONS. KEEP A COPY OF ALL APPLICABLE CODES AVAILABLE AT THE JOB SITE AT ALL TIMES WHILE PERFORMING WORK UNDER THIS SECTION. NOTHING IN PLANS OR SPECIFICATIONS SHALL BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE MOST STRINGENT OF CODES. SHOULD ANY CHANGES BE NECESSARY IN THE DRAWINGS OR SPECIFICATIONS TO MAKE THE WORK COMPLY WITH THESE REQUIREMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO BID.

B. INTENT OF PLANS AND SPECIFICATIONS

1) THIS SPECIFICATION AND ATTENDANT DRAWINGS ARE INTENDED TO COVER A COMPLETE INSTALLATION OF THE STREET LIGHTING SYSTEM. THE OMISSION OF EXPRESSED REFERENCE TO ANY ITEM OF LABOR OR MATERIAL FOR THE PROPER EXECUTION OF THE WORK IN ACCORDANCE WITH PRESENT PRACTICE OF THE TRADE SHALL NOT RELIEVE THE CONTRACTOR FROM PROVIDING SUCH ADDITIONAL LABOR AND MATERIALS.

2) REFER TO THE DRAWINGS AND SHOP DRAWINGS OF OTHER TRADES FOR ADDITIONAL DETAILS WHICH AFFECT THE PROPER INSTALLATION OF THIS WORK. DIAGRAMS AND SYMBOLS SHOWING ELECTRICAL CONNECTIONS ARE DIAGRAMMATIC ONLY. WIRING DIAGRAMS DO NOT NECESSARILY SHOW THE EXACT PHYSICAL ARRANGEMENT OF THE EQUIPMENT.

3) BEFORE SUBMITTING A BID, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL FEATURES OF THE SITE WHICH MAY AFFECT THE *EXECUTION OF THE WORK. NO EXTRA PAYMENT WILL BE ALLOWED FOR* FAILURE TO OBTAIN THIS INFORMATION.

4) IF THERE ARE OMISSIONS OR CONFLICTS BETWEEN THE WITH THE ENGINEER BEFORE SUBMITTING A BID.

4. GENERAL REQUIREMENTS

A. PROVIDE ALL MOUNTING FACILITIES REQUIRED FOR PROPERLY SECURING EQUIPMENT AND OUTLETS.

B. COORDINATE ELECTRICAL INSTALLATION WITH OTHER TRADES.

C. GUARANTEE ALL MATERIALS AND EQUIPMENT FOR ONE YEAR FROM THE DATE OF ACCEPTANCE BY OWNER.

D. GROUND ALL EQUIPMENT AND SERVICES IN ACCORDANCE WITH APPLICABLE CODES AND AS INDICATED ON DRAWINGS.

E. PROVIDE AS-BUILT DRAWINGS WITH ALL CHANGES INDICATED IN RED INK. PROVIDE DIMENSIONS OF THE LOCATION OF UNDERGROUND RUNS AND STUB OUTS.

5. GENERAL

ALL NEW MATERIAL SHALL CONFORM WITH A.N.S.I., I.E.E.E., N.E.M.A. AND SHALL BE U.L. LABELED.

6. PERMITS

TAKE OUT AND PAY FOR ALL REQUIRED PERMITS, INSPECTIONS AND EXAMINATIONS WITHOUT ADDITIONAL COST TO THE OWNER.

7. POWER SERVICE

A. STREET LIGHTING POWER SERVICE AND METERING FACILITIES SHALL CONFORM TO THE REQUIREMENTS OF THE SERVING UTILITY COMPANY. CONTRACTOR SHALL VERIFY SERVICE LOCATIONS AND REQUIREMENTS, AND SHALL PAY ALL COSTS LEVIED BY THE SERVING UTILITY COMPANY FOR RENDERING UTILITY SERVICES TO THE CONTRACT WITHOUT ADDITIONAL COST TO THE OWNER. SERVICE INFORMATION WILL BE FURNISHED BY THE SERVING UTILITY.

B. CONFORM TO ALL REQUIREMENTS OF THE SERVING UTILITY COMPANY. LOCATION OF METER PEDESTAL PAD AND PULL BOXES AND ROUTING OF SERVICE CONDUITS INDICATED ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE VERIFIED WITH THE SERVING UTILITY COMPANY PRIOR TO INSTALLATION. INSTALLATION OF SERVICE SHALL NOT BEGIN UNTIL APPROVED DRAWINGS HAVE BEEN RECEIVED FROM THE SERVING UTILITY COMPANY.

C. WITHIN 30 CALENDAR DAYS OF RECEIPT OF NOTICE THAT THE CONTRACT AWARD HAS BEEN MADE, THE CONTRACTOR SHALL NOTIFY THE NEW BUSINESS DEPARTMENT OF THE DISTRICT OFFICE OF THE SERVING UTILITY COMPANY CONCERNING THE PROJECT CONTRACT AND SHALL PROVIDE INFORMATION AS TO THE TOTAL STREET LIGHTING REQUIREMENTS OF THE CONTRACT. THE CONTRACTOR SHALL FURNISH AT THE SAME TIME INFORMATION AS TO THE ESTIMATED COMPLETION DATE OF JOB OR THE DATE WHEN THE RESPECTIVE UTILITY COMPANY CIRCUITS WILL BE READY FOR INSTALLATION, ENERGIZING AND ACTIVATION OF THE RESPECTIVE SERVICE.

D. IN ADDITION TO THE REQUIREMENTS OF THE SERVING UTILITY COMPANY, ALL POWER SERVICE CONDUITS FOR UTILITY COMPANY CIRCUITS SHALL BE COMPLETELY ENCASED IN CONCRETE ON ALL SIDES, TOP AND BOTTOM. THE CONCRETE SHALL BE RED MIX COLOR AND EXTEND A MINIMUM OF THREE INCHES PAST THE CONDUIT.

8. UNDERGROUND DETECTION SERVICES EXISTING UTILITY STRUCTURES

A. SERVICES SHALL BE PROVIDED UTILIZING THE LATEST DETECTION EQUIPMENT AVAILABLE. SERVICES SHALL BE PERFORMED BY A COMPANY REGULARLY ENGAGED IN THE BUSINESS OF EXISTING UNDERGROUND UTILITY STRUCTURE DETECTION FOR THE PAST FIVE YEARS.

B. PRIOR TO EXCAVATION THE FOLLOWING WORK SHALL BE PERFORMED:

1) CONTRACTOR TO MARK TRENCHING LOCATIONS AND INDICATE WIDTH AND DEPTH.

CITY OF SAN BERNARDINO STREET LIGHTING POLICIES AND PROCEDURES

A. GENERAL

1. STREET LIGHTING SYSTEMS SHALL CONFORM TO THESE SPECIFICATIONS AND CITY STANDARD DRAWINGS DESIGNATED SL SERIES.

2. ALL MATERIAL SHALL BE NEW, AND SHALL BEAR THE LABEL OF THE UNDERWRITER'S LABORATORIES, WHERE APPLICABLE.

3. ALL WORK SHALL BE DONE IN COMPLIANCE WITH THE LATEST EDITION OF STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, THE NATIONAL ELECTRICAL CODE, THE CALIFORNIA STATE SAFETY ORDERS AND ALL OTHER CODES, RULES AND REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION. PARTICULAR ATTENTION IS DIRECTED TO SECTION 2 AND 307 STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

a. IN CASE OF CONFLICT BETWEEN ANY STANDARD SPECIFICATIONS AND THESE POLICIES AND PROCEDURES, THESE POLICIES AND PROCEDURES SHALL TAKE PRECEDENCE OVER AND BE USED IN LIEU OF SUCH CONFLICTING PORTIONS EXCEPT FOR WORK ON STATE HIGHWAYS.

4. STREET LIGHTING SYSTEMS SHALL BE INSTALLED IN CONFORMITY WITH THE FOLLOWING SPECIFICATIONS:

a. ALL STREET LIGHTING SYSTEMS SHALL BE METERED SYSTEMS AND SHALL BECOME, UPON ACCEPTANCE, THE SOLE PROPERTY OF THE CITY OF SAN BERNARDINO.

b. INSTALLATIONS SHALL MEAN THE EXCAVATION AND BACKFILL OF TRENCHES, INSTALLING CONDUIT AND CONDUCTORS, LIGHTING STANDARDS, FOUNDATIONS, LUMINARIES AND LAMPS, SERVICE PANEL, AND ALL OTHER REGULATED DEVICES AND FITTINGS NECESSARY FOR A COMPLETE AND OPERABLE STREET LIGHTING SYSTEM.

c. CONTRACTORS SHALL OBSERVE ALL SECTIONS OF THE MUNICIPAL CODE, CITY OF SAN BERNARDINO, IN RELATION TO OBSTRUCTION OF PASSAGEWAYS FOR VEHICLE AND/OR PEDESTRIANS, THE PROVIDING OF BARRICADES, WARNING LIGHTS, ETC., SAFETY AT OR NEAR THE CONSTRUCTION SITE. ATTENTION IS DIRECTED TO SECTION 6 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION).

d. ALL STREET PAVEMENT, CONCRETE CURB AND SIDEWALK REMOVED OR DAMAGED OR ANY CONDUIT, WATER LINE, SEWER, ETC., DAMAGED SHALL BE REPAIRED OR REPLACED IN ACCORDANCE WITH TITLE 12, MUNICIPAL CODE OF THE CITY OF SAN BERNARDINO; AND ANY AMENDMENTS THERETO, PARTICULARLY WITH RESPECT TO THE METHODS OF CUTTING PAVEMENTS, BACKFILLING, TEMPORARY RESURFACING AND STREET CUT PERMITS.

B. CONDUIT AND CONDUCTORS

1. CONDUIT

a. RIGID METAL GALVANIZED CONDUIT SHALL CONFORM TO UNDERWRITER'S LABORATORY, INC., STANDARDS FOR RIGID STEEL CONDUIT.

b. MATERIALS SHALL BE RECOGNIZED BY THE UNDERWRITER'S LABORATORIES, INC. AS HAVING SUITABLE CHARACTERISTICS WHEN PROPERLY FORMED AND TREATED, INCLUDING RIGID POLYVINYL CHLORIDE (SCHEDULE 40) FOR UNDERGROUND USE, AND RIGID POLYVINYL CHLORIDE (SCHEDULE 80) FOR USE ABOVE GROUND AND PASSING UNDER ROADWAYS. PVC CONDUIT SHALL BE GREY IN COLOR.

c. CONDUIT OR DUCT PASSING UNDER ROADWAYS SHALL BE INSTALLED PRIOR TO PAVING, OTHERWISE JACKING OR DRILLING METHODS SHALL BE EMPLOYED, UTILIZING ONLY GALVANIZED STEEL CONDUIT. CONDUIT SHALL BE 2" DIAMETER MINIMUM.

d. CONDUIT OR DUCT SHALL BE PLACED AT THE FOLLOWING DEPTHS BELOW GRADE:

e. 18" WITHIN PARKWAYS AND MEDIANS, BACK OF CURBS, AND UNDER CONCRETE SIDEWALKS. 24" DEEP WHEN CROSSING STREETS AND/OR ALLEYS.

f. EXISTING CONDUIT IN AREAS WHERE STREET IMPROVEMENTS ARE BEING MADE, SHALL BE RELOCATED TO DEPTHS BELOW GRADE PER SECTION D ABOVE.

g. CONDUITS SHALL BE 1-1/4" DIAMETER MINIMUM. DETERMINATION OF CONDUIT SIZE (BASED ON NUMBER AND SIZE OF WIRES) SHALL BE ACCORDING TO CONDUIT AND WIRE TABLES OF THE NATIONAL ELECTRIC CODE AND CALIFORNIA STATE SAFETY ORDERS.

h. GALVANIZED RIGID CONDUIT SHALL ME REAMED WHEN CUT AND SHALL BE CAPPED TO PREVENT FOREIGN OBJECTS FROM FALLING INTO PIPE OPENINGS. THE CONDUIT SHALL REMAIN CAPPE?D UNTIL WIRE IS PULLED.

i. ALL CONDUIT IN THE BASE OF THE POLES SHALL LEAN TOWARDS THE HAND HOLE AND THE ENDS SHALL NOT EXTEND MORE THAN 3/4" ABOVE THE BOTTOM OF THE HAND HOLE NOR BE TERMINATED MORE THAN 2" BELOW THE BOTTOM OF THE HAND HOLE.

j. CONDUIT SHALL BE BENT WITHOUT CRIMPING OR FLATTENING AND SHALL HAVE A RADIUS OF AT LEAST 6 TIMES THE DIAMETER OF THE CONDUIT.

2. CONDUCTORS

a. SHALL BE COPPER AND INSTALLED IN CONDUIT.

b. SHALL BE MINIMUM NO. 10 AWG, EXCEPT CAN BE NO. 12 AWG WITHIN POLES.

c. CONDUCTORS SHALL MAINTAIN A VOLTAGE DROP NO GREATER THAN 5% OF THE SERVING VOLTAGE FOR HIGH PRESSURE SODIUM VAPOR (NEW INSTALLATION) AND 7% FOR MERCURY VAPOR (EXISTING INSTALLATIONS). SPLICES SHALL BE MADE ONLY IN PULLBOXES, POLE BASES OR SERVICE PANELS, AND SHALL BE COVERED WITH ACCEPTABLE INSULATING MATERIAL EQUAL IN VALUE TO THAT OF THE CONDUCTORS AND PAINTED WITH P AND B PAINT OR AN APPROVED EQUAL.

C. BONDING AND GROUNDING

1. STREET LIGHTING SYSTEMS SHALL PROVIDE FOR ELECTRICAL GROUND CONTINUITY.

2. SYSTEMS UTILIZING METALLIC CONDUIT SHALL HAVE ALL CONDUIT, ELECTROLIERS, AND ALL METALLIC COMPONENTS OF THE SYSTEM BONDED TO EACH OTHER.

3. SYSTEMS UTILIZING NON METALLIC CONDUIT SHALL HAVE A CONTINUOUS CONDUCTOR BONDING TOGETHER ALL STREET LIGHTS, AND ALL METALLIC COMPONENTS OF THE SYSTEM.

4. BONDING CONDUCTORS SHALL BE SOLID COPPER WIRE WITH A MINIMUM CROSS-SECTIONAL AREA EQUAL TO NO. 8 AWG, OR LARGER. ALL CONNECTIONS SHALL UTILIZE UL APPROVED GROUND CLAMPS AND BRASS NUTS AND BOLTS. ONE BONDING CONDUCTOR IN EACH CONCRETE STREET LIGHT BASE SHALL BE LOOPED UP TO A POINT TO 2 INCHES ABOVE THE BOTTOM OF THE HAND HOLE OPENING.

5. SYSTEMS SHALL BE BONDED TO A GROUND ELECTRODE AT THE SERVICE NEUTRAL, AND AT SUCH ADDITIONAL LOCATIONS AS MAY BE SPECIFIED BY THE CITY ENGINEER.

6. BONDING AT STREET LIGHTING STANDARDS AND SERVICE PEDESTALS SHALL BE BY MEANS OF A BONDING WIRE CONNECTING THE CONDUIT (OR CONDUIT GROUND WIRE) TO THE ANCHOR BOLTS OR GROUND ELECTRODE AS THE CASE MAY BE.

7. GROUNDING OF METAL CONDUIT, SERVICE EQUIPMENT, AND THE GROUNDED CONDUCTOR AT SERVICE POINT SHALL BE ACCOMPLISHED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE AND SERVING UTILITY.

8. FOR BONDING PURPOSES IN ALL NON-METALLIC TYPE CONDUIT, A BARE OR GREEN INSULATED NO. 8 COPPER WIRE SHALL BE RAN CONTINUOUSLY. INSULATION MUST BE STRIPPED BACK A MINIMUM OF 10 INCHES AT TERMINATION.

9. BONDING OF METALLIC CONDUIT IN CONCRETE PULLBOXES SHALL BE BY MEANS OF GALVANIZED GROUNDING BUSHINGS AND BONDING JUMPERS.

D. SERVICE AND FEED POINTS

1. ELECTRICAL SERVICE SHALL BE PROVIDED AT LOCATIONS DESIGNATED JOINTLY BY THE CITY ENGINEER AND SERVING UTILITY. SERVICE SHALL BE 120/240 VOLT, SINGLE PHASE, CITY OWNED, AND METERED.

E. INSPECTION

1. ALL STREET LIGHTING SYSTEMS SHALL BE INSPECTED BY THE CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVE AT THE FOLLOWING SPECIFIED TIMES:

a. WHEN SERVICE IS INSTALLED, SERVICES MUST BE INSPECTED AND CLEARED THROUGH THE SERVING UTILITY.

b. AFTER CONDUIT IS INSTALLED, WITH ALL DITCHES OPEN AND FOUNDATIONS READY FOR POURING OR BACKFILLING.

c. AT THE COMPLETION OF WIRING, FINAL ROUGH INSPECTION, AT WHICH TIME CONTRACTOR SHALL HAVE ALL PULLBOXES AND CONNECTION POINTS OPEN FOR INSPECTION.

d. ALL STREET LIGHTING INSTALLATION AND ELECTRICAL MATERIALS ARE SUBJECT TO INSPECTION AND APPROVAL OF THE CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVE DURING AL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AT LEAST 24 HOURS BEFORE ANY INSPECTION IS REQUIRED, AND 24 HOURS BEFORE ANY SCHEDULED PLAN TO PLACE CONCRETE. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR NOTIFYING THE CITY ENGINEER WHERE AND WHEN SUCH WORK IS IN READINESS FOR INSPECTION. SHOULD SUCH WORK BE COVERED UP WITHOUT INSPECTION AND APPROVAL, IT SHALL BE UNCOVERED, INSPECTED AND APPROVED, OR REDONE AT THE CONTRACTOR'S EXPENSE, AS THE CASE MAY BE.

F. TESTING

1. PRIOR TO THE COMPLETION OF THE WORK, THE CONTRACTOR SHALL CASE THE FOLLOWING TESTS TO BE MADE IN THE PRESENCE OF THE CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVE ON ALL LIGHTING CIRCUITS:

2. TESTS FOR CONTINUITY OF EACH CIRCUIT.

3. TESTS FOR GROUND IN EACH CIRCUIT.

4. A MEGGER TEST AT 500 VOLTS DC SHALL BE MADE ON EACH CIRCUIT BETWEEN THE CIRCUIT AND A GROUND. THE INSULATION RESISTANCE SHALL NOT BE LESS THAN 10 MEGOHMS ON ALL CIRCUITS.

5. A FUNCTIONAL TEST IN WHICH IT IS DEMONSTRATED THAT EACH AND EVERY PART OF THE SYSTEM FUNCTIONS AS SPECIFIED OR INTENDED.

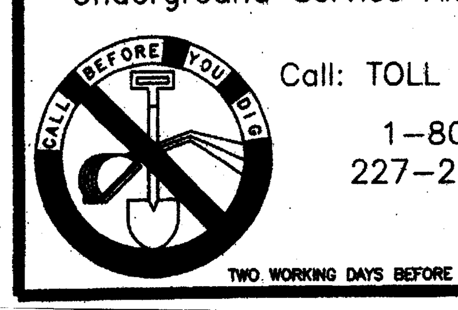
6. ALL LIGHTING EQUIPMENT SHALL BE ENERGIZED UNDER AS NEAR ACTUAL SERVICE CONDITIONS AS POSSIBLE FOR THREE SUCCESSIVE NIGHTS. DURING THE THIRD NIGHT OF THE TEST, ALL CIRCUITS SHALL BE PATROLLED AT LEAST ONCE BY THE CONTRACTOR, AND ANY INOPERATIVE EQUIPMENT REPLACE OR REPAIRED.

7. ANY FAULT IN ANY MATERIAL OR IN ANY PART OF THE INSTALLATION, WHICH MAY BE REVEALED BY THESE TESTS SHALL BE CORRECTED BY THE CONTRACTOR IN A MANNER APPROVED BY THE CITY ENGINEER AND THE SAME TESTS SHALL BE RELATED.

E0901570

E0701319

Underground Service Alert



Call: TOLL FREE
1-800
227-2600

TWO WORKING DAYS BEFORE YOU DIG

RECOMMENDED FOR APPROVAL BY PLAN CHECKER

PLAN CHECK FIRM :

PLAN CHECKER NAME: ______
PLAN CHECKER SIGNATURE: ______
PLAN CHECKER RCE NO.: ______
EXP. DATE: ______

REGISTERED PROFESSIONAL ENGINEER — STEPHEN R. ZAJICEK — No. E 10372 — Exp. 09-30-10 — ELECTRICAL — STATE OF CALIFORNIA

FBA ENGINEERING
Consulting Engineers
3420 Irvine Avenue
Newport Beach, California 92660-3189
T: 949 852 9995 F: 949 852 1657
FBAengr.com
FBA # 270.032.10

MARK	REVISIONS	BY	APPR.	DATE

BENCH MARK:
CITY OF SAN BERNARDINO BM# G1-41. ELEVATION 1158.763 FT. BRASS DISK CSB G1-41. 41.25 FT. EAST & 30.0 FT SOUTH OF THE CENTERLINE P.I. OF MT. VERNON & 14TH ST. ;9.75 FT. SOUTH OF THE SOUTH CURB LINE OF 14TH ST. ; 9.25 FT. EAST OF THE EAST CURB LINE OF MT.VERNON AVE. ' 2.0 FT EAST OF THE NORTH/SOUTH SIDEWALK ABOUT 0.2 FEET LOWER THEN THE PAVEMENT.

APPROVED NOV. 23, 2010

CITY ENGINEER ROBERT G. EISENBEISZ
REGISTERED CIVIL ENGINEER NO. 59931 EXP. 6/30/12
DRAWN BY: FBA
CHECKED BY: R.R.
RECOMMENDED BY:

CITY OF SAN BERNARDINO
DEVELOPMENT SERVICES~PUBLIC WORKS/ENGINEERING

STREET LIGHTING SPECIFICATIONS
ROOSEVELT II ELEMENTARY SCHOOL
1261 W. 16TH STREET

FOR CITY USE ONLY: FILE NO. W.O. NO.

DRAWING NO. 12343

SHEET 10 OF 10 SHEETS

RE-BID #F09-02 ROOSEVELT II (HENRY) E.S. NEW CONSTRUCTION BID ISSUANCE SET