

Engineering Department



Street and Safety Lighting
Standards and Guidelines

February 2016

INTRODUCTION

These specifications are a supplement to the latest edition of the Standard Specifications for Public Works Construction “Green Book” and the City of National City Standard Special Provision. In case of conflict with the Green Book or National City Standard Special Provisions, these specifications shall take precedence.

GENERAL

New or relocated streetlights located within City R/W or City easements are required to include light emitting diode (LED) luminaires and shall be constructed per City Standards, Per Plan, and field inspected and approved prior to requesting energizing or acceptance.

INDUSTRY STANDARDS:

LED streetlight luminaires shall meet the applicable requirements of the following industry standards:

1. ANSI/NEMA/ANSI C78.377-2011-Specifications for the Chromaticity of Solid-State Lighting (SSL) Products
2. IES LM-79-08 – Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products
3. IESNA LM-80-08 – Approved Method measuring Lumen Maintenance of LED chips / Fixture Manufacturer must provide extrapolation explanation for Lumen Maintenance derived from In-Situ testing upon request.
4. IEEE C62.41.2-2002-IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits
5. IESNA TM-15-11 & Addendum A (replaces TM-15-07 and TM-15-07 Addendum A) – Luminaire Classification System for Outdoor Luminaires; Backlight, Uplight, and Glare (BUG) Ratings
6. ANSI/UL 1598 – Poles & luminaires; UL
7. ANSI/UL 8750: Additional requirements for LED luminaires such as drivers and LED arrays

Test data that establishes compliance with the requirements of ANSI/UL 1598 and the other industry standards listed above shall be provided upon request.

REFERENCE:

1. Project Plans and Specifications – Location and project –specific details
2. California Electric Code – As applicable by the Building Department
3. SDGE Standards – As applicable
4. City Standard Drawings
5. Standard Specifications for Public Works Construction (Greenbook) (latest edition) – Subsections 700 and 701 and all included cross references.
6. Caltrans Standard Plans and Specifications (latest editions)

STREET LIGHT LOCATIONS:

As guided by illuminance levels in the latest edition of IESNA Roadway Lighting Manual or as directed by the City Engineer.

Street light poles shall be designed and placed in locations that provide ADA path compliance.

LUMINAIRES:

Fixtures shall be LED, dimmable, and one of the following or as approved by City Engineer:

CREE / BETA LEDway Series #: STR-LWY-2M-HT-04-E-UL-SV-525-DIM-R-UTL-40k (66 watts / residential)
 CREE / BETA LEDway Series #: STR-LWY-3M-HT-06-E-UL-SV-525-DIM-R-UTL-40k (100 watts / collector/arterial)
 CREE / BETA LEDway Series #: STR-LWY-3M-HT-08-E-UL-SV-525-DIM-R-UTL-40k (136 watts / signalized intersection)

General description of LED Streetlight – Standard fixture utilizes terminal block for power input suitable for #6 - #14 AWG wire operates at 700mA. Drive current is not field switchable. A three-pole terminal block capable of accepting #14 to #10 AWG shall be mounted to the housing inside the electrical compartment. Luminaire shall be provided with capability for optional backlight control. Complete assembly weight shall not exceed 45 lbs. Fixture is designed to mount on a schedule 40, 2” nominal pipe size (NPS) horizontal tenon (minimum 8” in length) and is adjustable +/- 5 degrees to allow for fixture leveling (includes two axis T-level to aid in this process). Fixture, including the LEDs, drivers and electrical components, shall carry a limited ten-year warranty and housing paint and finish shall carry a ten-year warranty.

Color temperature and CRI: 4000K color temperature for Safety Street Lighting, minimum 70 CRI

OPTICAL DISTRIBUTION METHOD & CONFIGURATIONS:

Optical configurations shall meet the following criteria:

1. No reflectors or single lensed fixture accepted. Close contact refractors to be employed for optical distribution.
2. Refractors are to be polymeric material rated 5VA, f1 rating
3. Lumen maintenance at 50,000 hours of life to be no less than 88% of initial lumen output
4. Shall have 95% survival rate at 50,000 hours
5. Integral 10K surge suppressor for diode and entire system protection

Fixture Application (@100 hours)	LED Fixture Wattage	Color Temp	Minimum Lumens	Distribution Type
Residential Streets	60 Watts	3000 K	4,500 Lumens	IESNA Type II distribution
Collector Streets	95 Watts	3000 K	8,600 Lumens	IESNA Type III distribution
Major Streets	130 Watts	3000 K	12,100 Lumens	IESNA Type III distribution
Signalized Intersections	130 Watts	4000 K	11,800 Lumens	IESNA Type III distribution

Note: The items in the table are recommended values and may be changed per direction of City.

LUMINAIRE HOUSING:

Luminaire housing shall be furnished with an optical assembly, be powder-coated silver, include a level bubble to facilitate installation, allow for tool-less entry and shall include an integral twistlock type receptacle for photoelectric cell control in accordance with the latest EEI-NEMA standards which is adjustable with respect to north and prewired to the terminal board. Photocell control shall be for a 7-pin receptacle per ANSI C136.41.

Luminaire external housing shall have a minimum rating of IP66 as specified in IEC 60529, with the ability to shed water from inside the housing (i.e. weep holes).

The LED luminaire shall be designed for horizontal mounting. The LED assembly shall have a slip-fitted mounting bracket capable of attaching to a two-inch (2") pipe without the need for special mounting parts. They shall be installed in a horizontal position with leveling and clamping to the mast arm pipe accomplished by tightening mounting bolts, which are externally or internally accessible. Bolts shall be minimum 5/8" x2" size and either stainless steel.

Luminaire circuitry shall include quick connect / disconnects to allow easy separation and removal of driver and power door. Grounding requirements: ANSI/UL Standards and NFPA 70.

The luminaire power unit assembly shall consist of an integral driver, capacitor, 10K surge suppressor, and heavy duty terminal block. The power unit assembly shall be mounted on a separate component of the luminaire to facilitate replacement.

The luminaire optical chamber shall have a minimum rating of IP66 as specified in IEC 60529.

The luminaire housing cooling system shall consist of a passive heat sink with no fans, pumps, or liquids and shall be designed and constructed to accept a standard plug type, locking, three-pole, three-wire, streetlight photocontrol. The fixture and finish endurance tested to withstand 5,000 hours of elevated ambient salt fog conditions as defined in ASTM Standard B 117.

All fasteners shall be stainless steel and all polycarbonate components shall be UV stabilized.

An easily-viewable nameplate shall be permanently affixed to the inside of each luminaire housing. The nameplate shall contain the following information: manufacturer's name, manufacturer's catalog number, date of manufacture (month and year), plant location, input power consumption, driver output current, IEC IP Rating, correlated color temperature (CCT), IES light distribution type, IESNA TM-15 BUG ratings, and serial number. Utility approved SDGE name plate with light source and wattage shall be permanently affixed on the exterior of the Luminaire to be visible from the ground.

The driver assembly shall be enclosed in a separate compartment from the optical assembly. The entire fixture shall be "wet listed" with the optical assembly compartment being rated at IP66. The LED Luminaire shall be constructed to provide the required light distribution with the lower edge of the Luminaire housing below the entire light source close contact refractors. **The Luminaire must be Dark Sky Compliant with U0 bug rating.** The light distribution pattern shall be per the FIXTURE table shown above.

DRIVERS:

Light Emitting Diode (LED) drivers shall be component-type consisting of precision wound coils and welded magnetic steel laminations assembled together and impregnated with baked-on, insulating, weatherproof varnish; and metal-cased, hermetically-sealed capacitor, suitable for use on multiple distribution circuits with 60Hz, 120 or 240 Volt rating. The operating sound pressure noise level shall not exceed the ambient noise level by more than five (5) decibels at a 30 feet when measured by a sound level meter conforming to the American Standards for Sound Level Meters. Where the ambient noise level is less, a minimum of 40 decibels shall be assumed.

Power supply / driver shall be field replaceable by means quick-disconnect connectors and easy access mounting hardware. Power supply / driver shall be wet-listed in the US and Canada, UL, ROHS compliant, meet Caltrans 611 vibration testing and GR-63-CORE section 4.4.1/5.4.2 earthquake zone 4.

DRIVER SPECIFICATIONS:

Electronic; voltage range = universal 120 – 277 v +/- 10%; frequency = 50/60 Hz; power factor > 90% @ full load; THD < 20% @ full load; output ripple < 10%; output shall be isolated; case temperature rated for -40 to 60C; fully encased and potted; overheat protection, self-limited short circuit protection, and overload protected – minimum integral 10k surge protection tested in accordance with IEEE C62.41 and ANSI standard 62.41.2; Driver Life Rating not less than 100,000 hours.

PHOTOELECTRIC CONTROL UNIT:

Fisher-Pierce # TRS-2 105-305 VAC LED control or approved equal.

The photoelectric unit shall consist of a photoelectric cell in a weatherproof housing which plugs into an EEl-NEMA twist-lock receptacle integral with the luminaire and shall be installed with the clear UV-stabilized photocell window facing north. The control unit shall contain a uniformly coated cadmium-sulfide photoelectric cell suitable for operation with 120 or 240 volt line supply with surge protection to prevent damage and made to fail in the “ON” position. The unit shall have a HID load rating of 1,800 VA with a Tungsten load rating of 1,000 watts.

The response level of the unit to changing light levels shall remain stable throughout the life of the unit (5,000 operations). The “turn-on” level shall be nominal 1 foot-candle and the “turn-on: turn-off” ratio shall be 1.5.

FUSES:

Fuses shall be slow blow 13/32” x 1 ½” in-line type in 10 amp size (unless specified otherwise by the City). The fuse shall be installed in the hot leg of the lighting conductor. The circuit shall be fused in the base of the pole – not in the pull box. 240-volt installations require each leg to be fused using a double fuse holder and two fuses of appropriate size. Heat shrink both crimp ends.

FUSEHOLDERS:

Fuseholders shall be completely waterproof, shall grip the fuse in the load side section when opened, and be able to take a 13/32” x 1 ½” fuse, with crimp-type tubular terminals of a proper size for the cable in the particular light.

MAST ARMS:

Mast arms shall be two inch (2”) I.P.S. galvanized steel or aluminum and shall be self-supporting without braces, scrolls or rods. Mounting shall be perpendicular to the street centerline unless otherwise directed by the City Engineer. They shall have a minimum of six inches (6”) of horizontal straight section at the end of the arm to mount a two inch (2”) I.P.S. slipfitter type luminaire mount.

Mast arms shall be eight feet (8’) long for all luminaires unless otherwise specified in the plans and shall be capable of handling the EPA and weight of the luminaire. Steel arms shall conform to ASTM A 120. Aluminum arms shall be corrosion resistant alloys such as Aluminum Association wrought alloys 6061 or 6062 or cast alloys 319 or 356.

All exposed hardware shall be stainless steel. All protected hardware not visible after installation shall be cast aluminum and / or stainless steel, hot-dipped galvanized. Anti-seize shall be used.

FOUNDATIONS:

Foundations shall be per Greenbook Standard Plans and Specifications.

CONCRETE POLES:

RESIDENTIAL STREETS: Ameron DWG. 1203-036 Rev. 4

COLLECTOR AND ARTERIAL STREETS: Ameron DWG 1203-037 Rev. 4

(Note: Use 8' arm poles located adjacent to the sidewalk on residential, collector and arterial streets)

Concrete poles shall be tapered, centrifugally cast and pre-stressed. Poles shall be round black and white marble aggregate or natural exposed aggregate. Pole shape and color shall be uniform for any one project. Replacement poles shall match existing.

Hand hole cover plates shall be aluminum and securing bolts shall be stainless steel tamper-proof bolts of the type installed with a pent-head wrench. Anti-seize shall be used.

All concrete poles shall be provided with a clear, factory applied Amershield Anti-Graffiti coating.

DECORATIVE POLES:

Per direction of the City Engineer, decorative poles may be chosen for street lighting on specific City corridors. See Attachment A and B for City preferred decorative street and pedestrian park lights.

Decorative pole colors shall be determined by the City Engineer during the design process.

PULL BOXES:

Pull boxes shall be concrete No. 5 Pull Boxes or approved equal. Pull boxes shall be installed per CALTRANS Standard Plan ES-8 as follows:

1. Located at the end of the conduit run and three feet (3') from SDGE service point
2. Located within five feet (5') of each street light.
3. Located at conduit interval runs of not more than 200 LF. Additional #5 pull boxes will be required for conduit runs over 200 LF long.

Pull boxes shall be installed behind sidewalk or five feet (5') behind the face of curb or dike and, where practical, shall be installed with the short side parallel to the curb. They shall not be installed in any part of a driveway or other traveled way, unless approved by the City Engineer and provided with a metal traffic cover. Pull box covers shall be inscribed "STREET LIGHTING" and shall be secured with bolts, cap screws or studs and nuts made of stainless steel. Pull boxes shall be tamper resistant and utilize a special key tool for opening. Anti-seize shall be used.

Pull boxes shall rest firmly on a 12" thick bed of ¾" crushed rock extending 6" beyond the outside edge of the pull box.

The approved pull box manufacturer is Christy and the approved models in Table 1 below. Use of other non-Christy pull boxes shall be approved by the City Engineer.

Table 1: Pull Box Product Numbers

Pull box	Christy Model #
#5 Box	N30 Box
#5 Lid	N30R Lid
#6 Box	N36 Box
#6 Lid	N36R Lid
#6 Box Fiberlyte Lid	N36 Box with FL36T Lid

CONDUIT AND TRENCH:

All conduit shall be two-inch (2") UL approved heavy wall polyvinyl chloride (PVC) Schedule 80. Conduit shall be encased in a minimum of three inches (3") of sand on all sides. The minimum sweep ratio shall be twenty-four inches (24"). Conduit shall enter pull boxes with a 90-degree sweep. The maximum length of a conduit run shall be two hundred feet (200'). The Contractor may, at his expense, use conduit or a larger size, provided the larger size is used for the entire length of the conduit runs between pull boxes (reducing couplings shall not be allowed).

Conduit shall be laid to a depth of not less than thirty inches (30") unless placed under sidewalk in which case only eighteen inches (18") shall be required. Conduit laid in open trench shall not be covered nor shall trench or inspection hole be backfilled until accepted by the City Engineer or his designated representative.

SPLICING:

Splices shall be permitted in pull boxes and lighting standard bases ONLY. All splices shall be waterproofed with penatrox with butt splice and heat shrink tubing.

CONDUCTORS AND SERVICE RUNS:

All conductors shall be stranded copper, XHHW-2, #8 AWG minimum. Neither aluminum nor direct-burial cable shall be accepted. All street light system shall be provided with 110-120V service.

Wire shall conform to the applicable portion of ASTM B3 and B8. Wire size shall be indicated on the "As-Built" plans. Wire connectors shall be approved by the City Engineer or his designated representative and shall bear the UL seal of approval. The installation procedure, connector size and crimping tools shall conform to the manufacturer's recommendations.

Wire from the base of the pole to the luminaire shall be #10. For the 120-volt installations, the wires shall be black and white, with black being the hot wire and fused. For 240-volt installations, one hot wire shall be black and the other shall be red. Both hot wires shall be fused. Any ground wires shall be green and connected to a clamp attached to an anchor bolt.

Service runs parallel to the street shall be installed under the sidewalk where new sidewalk is being constructed or directly behind the existing sidewalk. Voltage drop shall not exceed five percent (5%).

SERVICE CABINETS:

Section 86-2.11A (12th paragraph) is amended to read:

Except for false work lighting, the CONTRACTOR shall be responsible for applying for and arranging with the serving utility to complete service connections for both temporary and permanent installations and the CONTRACTOR shall pay all costs and fees required by the utility.

The City will provide the SDGE service address for the meters.

The electrical service cabinet shall:

- 1) Be fabricated with an anodized aluminum finish.
- 2) Provide Type III-C dual meter electrical service for all new installations. Deviations shall be approved by City Engineer.
- 3) Meet the SDGE Service Guide service requirements and the Caltrans Standard Plan Drawing ES-2C cabinet specifications.
- 4) Have separate main disconnect circuit breakers for metered and unmetered sections.
- 5) Have plug-in type circuit breakers. Cable bussing is not allowed.
- 6) Have 2 time delay photo controlled contactors.
- 7) Be caulked at the bottom.
- 8) Be a model, part, class or type number as approved by City.

CONNECTION TO SDGE SERVICE POINT:

Contact SDGE for a service point. SDGE will identify what service is available and where it is located. In rare cases, a new streetlight can be connected to an existing streetlight circuit, but not without written permission from the City Engineer. New voltage drop calculations shall be required to verify that existing circuit can handle additional load.

The service point shall be in the City's right-of-way; otherwise, the City will require an easement to the service point.

PRE-INSTALLATION:

1. Obtain a City R/W permit for any work performed within a City R/W or City easement. Attached to the R/W permit are the construction requirements applicable to all work performed within the City R/W.
2. Call underground Service Alert at 800-422-4133 at least 72 hours before excavating.

INSTALLATION AND INSPECTION:

1. Concrete and/or asphalt removal & replacement shall be per City of National City Standards or as directed by the City Engineer. A sidewalk extension maybe required to meet ADA access requirements.
2. Conduit depth shall be as described in the CONDUIT AND TRENCH section. All trenches shall be compacted per the City of National City Standards or as directed by the City Engineer.
3. Street Lights shall be located per City approved plan and shall not be relocated without prior City approval. Pole locations shall be potholed and locations approved by City Engineer prior to installation.
4. Minimum Engineering Department Inspections Required:
 - a. Schedule an Engineering Department Inspection 72 hours in advance.

- b. All work performed within a Public Right-Of-Way
 - c. All conduit placement
 - d. Prior to and during any concrete foundation placement
 - e. Pole installation
 - f. Construction "As-Built" drawings shall be submitted prior to final inspection
5. Public Works inspection is required for final wiring and splicing prior to energizing. Contact the Public Works Department for inspection 72 hours in advance.
 6. Pedestrian and vehicle traffic control and access shall be maintained per the Plans, Specifications, City Traffic Control Standards, CA MUTCD, and as otherwise required or directed by the City.

ACCEPTANCE AND ENERGIZING:

1. Upon completion of all street light construction, the Contractor (on public projects) or Developer (on private development projects) shall submit two (2) sets of professionally drafted streetlight "As-Built" plans on 11" x 17" size sheets to the Engineering Department, showing the following information:
 - a. Layout of curbs, gutter, sidewalks, driveways and other improvements, drawn to scale
 - b. Location of street lights, with dimensions from the nearest cross street intersection and between streetlights
 - c. Location of pull boxes dimensioned from the streetlights, curbs or other features
 - d. Location of service point (power source) and SDGE identification number
 - e. Location of conduit service runs dimensioned from face of curb, edge of pavement or back of sidewalk as applicable
 - f. Size and type of wire used
 - g. Size (wattage and voltage rating) and type (LED) of each lamp and number of lamps used
 - h. North arrow
 - i. Contractor's name, address and telephone number
 - j. Identifying project name and number
 - k. **INCOMPLETE SUBMITTALS WILL NOT BE ACCEPTED**
2. After "As-Built" plans have been accepted by the City, the Contractor or Developer shall anticipate a minimum of five (5) working days for the City to contact SDGE for streetlight energizing. Release of a Building Occupancy requires that streetlights be energized.

CONSTRUCTION AS-BUILT DRAWING REQUIREMENTS (STREETLIGHT INSTALLATIONS):

Two sets of "As-Built" drawings must be given to the Public Works Inspector before SDGE will energize a light. Maximum size of As-Built drawings shall be 11" x 17".

Please provide the following information in addition to As-Built Drawings:

POLE:

1. Manufacturer's name
2. Supplier's name and contact information
3. Material
4. Height
5. Mast Arm Length
6. Footing Type (AB)

FIXTURE:

1. Manufacture's name
2. Suppliers name and contact information
3. Wattage and Voltage
4. Fuse size and type
5. Photocell manufacturer

DISTRIBUTION:

1. Conduit type and size
2. Wire type and gauge
3. Pull box manufacturer
4. Service point I.D. number

STREET LIGHT DESIGN PLANS

(APPLIES TO CITY STANDARD STREET LIGHTS ONLY, NON-STANDARD STREET LIGHTS WILL BE REVIEWED ON A PROJECT-BY-PROJECT BASIS):

1. Check plans and make sure reference is made to City of National City on cover sheet. On plan show:
 1. Street light stationing.
 2. Street light size (watts).
 3. Street light installation detail.
 4. SDGE service point and stationing. Indicate serving voltage (120v or 240v).
 5. Street light service pull box and installation.
 6. Size of conduit (2" minimum) Schedule 80 PVC.
 7. Indicate trench depth.
 8. Size and numbers of wires.
 9. When laying conduits across a street, they shall be at right angles to the curb line.
 10. North arrow and scale.
 11. Vicinity map.
2. Voltage Drop calculations for wire sizing are required for every circuit run which has more than (2) street lights and whenever the service from the service point is more to the last (furthest) street light exceeds 500'.
3. The Engineer of record shall be responsible for providing final "As-Built" drawings once the lighting system is install and approved by the inspector. The construction "As-Built" drawings will be the basis for providing the final drawings. The final drawings are to be CAD drafted and shall be signed off by the engineer of record.
4. All non-standard City street lights shall be approved by Engineering Department.
5. Structural pole base calculations are required to be submitted as a supporting document when nonstandard streetlights are approved for installation. Calculations shall be prepared by licensed California registered engineer and shall be wet-stamped.

STREET LIGHT PLAN GENERAL NOTES

1. STREET LIGHT PLANS FOR CONSTRUCTION SHALL FOLLOW THE LATEST EDITION OF THE CITY OF NATIONAL CITY STREET AND SAFETY LIGHTING STANDARD GUIDELINES.
2. FURNISH ALL LABOR, MATERIALS, TOOLS, ACCESSORIES, ETC. REQUIRED FOR A COMPLETE WORKING ELECTRICAL SYSTEM.
3. ALL ELECTRICAL WORK SHALL COMPLY WITH ALL APPLICABLE STATE, COUNTY AND LOCAL CODES AND ORDINANCES, AS WELL AS ALL CURRENT STANDARDS, CODES AND PRACTICES AS REQUIRED BY NEC, NEMA, ANSI, NFPA, UBC, UL, IEEE, AND UTILITY COMPANY STANDARDS.
4. ALL EQUIPMENT, MATERIALS AND WORK SHOWN ARE NEW UNLESS SPECIFICALLY NOTED AS EXISTING OR NOTED OTHERWISE ON OTHER SHEETS. CONTRACTOR SHALL INSTALL ALL OWNER-

PROVIDED EQUIPMENT INCLUDING CHARGERS, COMMUNICATION POLE, TRANSFORMERS, METER/ELECTRICAL PEDESTAL, AND SHALL FURNISH AND INSTALL ALL OTHER MATERIALS REQUIRED TO COMPLETE THE WORK AND PROVIDE A FUNCTIONING SYSTEM.

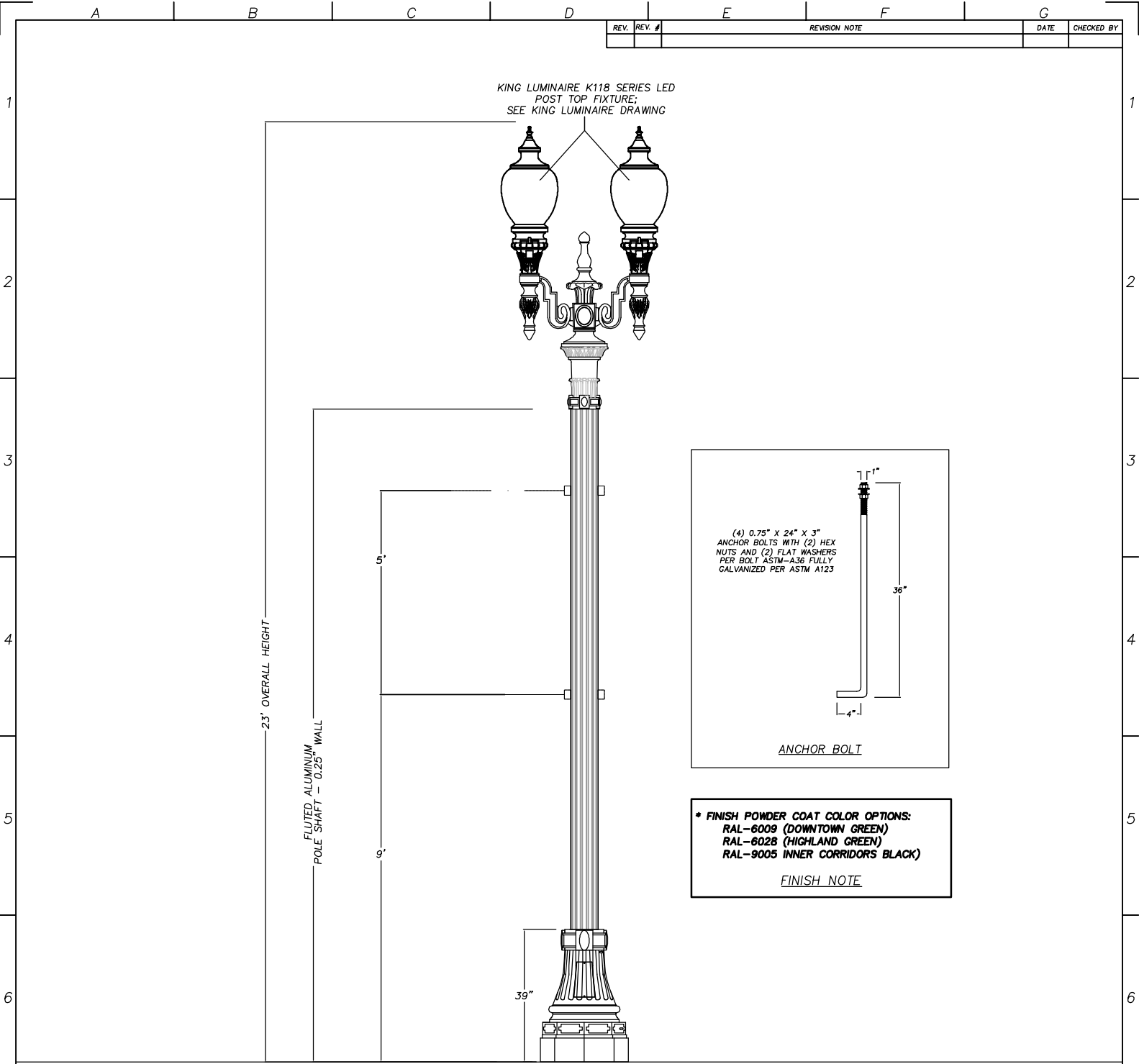
5. PRIOR TO PURCHASE OF ANY PANEL, PROTECTIVE DEVICES, SWITCH, STARTER, CONDUIT, WIRE, ETC., TO FEED ANY PIECE OF MECHANICAL OR ELECTRICAL EQUIPMENT VERIFY THE VOLTAGE, PHASE, AND LOAD OF THAT ITEM IN THE FIELD AND/OR WITH THE PARTICULAR ENTITY INVOLVED IN FURNISHING THE ITEM SUCH THAT THE PROPER SIZE & RATING OF THE MATERIALS ARE PURCHASED. NO EXTRAS WILL BE ALLOWED FOR FAILURE TO COMPLY. THIS APPLIES TO ALL EQUIPMENT UNDER OTHER SECTIONS & BY THE OWNER.
6. PULL ROPES: PROVIDE 300 POUND PULL WIRE OR NYLON EQUIVALENT IN ALL INTERIOR CONDUIT RUNS. PROVIDE 1800 POUND PULL WIRE IN EACH EXTERIOR CONDUIT OR DUCT.
7. APPEARANCE AND WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY AND STANDARDS.
8. VERIFY THE EXACT LOCATION AND ELEVATION OF ALL ELECTRICAL EQUIPMENT PRIOR TO ROUGH-IN. FINAL CONNECTIONS OF EQUIPMENT SHALL BE PER MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS AND INSTRUCTIONS. THE ELECTRICAL CONTRACTOR SHALL PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
9. TYPE MC OR TYPE AC CABLE SHALL ONLY BE USED WITH THE SPECIFIED WRITTEN PERMISSION OF THE PROGRAM/PROJECT MANAGER. ENT TYPE CONDUIT IS NOT ALLOWED.
10. CONDUIT/ CONDUCTOR RUNS SHOWN ARE DIAGRAMMATICAL ONLY. THE BEST FINAL CONDUIT ROUTING SHALL BE AS DETERMINED BY THE ELECTRICAL CONTRACTOR AT THE TIME OF CONSTRUCTION. ALL CONDUIT SHALL BE CONCEALED UNLESS OTHERWISE APPROVED BY THE ENGINEER.
11. ALL WIRING SHALL BE COPPER XHHW-2 (UNLESS OTHERWISE NOTED) AND RATED AT 600V.
12. ALL UNDERGROUND CONDUIT SHALL BE MINIMUM 2" CONDUIT PVC SCHEDULE 80. ALL ELBOWS AND EXPOSED RISERS SHALL BE RIGID STEEL CONDUIT WITH THREADED COUPLINGS AND CONNECTORS. ANY DAMAGE TO EXISTING PAVEMENT, WALKING SURFACES, GROUND, OR EXISTING LANDSCAPE SHALL BE RESTORED TO ITS ORIGINAL CONDITION.
13. FOR GROUNDING, CONTRACTOR SHALL PROVIDE AND INSTALL (1) 10' X 5/8" COPPER CLAD GROUND ROD OR 15' OF NO. 4 BARE STRANDED WIRE COILED AND SECURELY FASTENED TO ANCHOR BOLD (UFER GROUND) WITH EACH NEW LIGHT POLE FOUNDATION.
14. ALL WORK SHALL CONFORM TO CURRENT CITY CODES AND CITY STANDARDS.
15. CONDUIT FOR COMMUNICATIONS AND FIBER OPTIC SHALL BE ROUTED SUCH THAT NO BENDS EXCEED 45 DEGREES.
16. ALL MATERIALS AND EQUIPMENT SHALL BE SUBMITTED TO THE CITY ENGINEER FOR APPROVAL PRIOR TO PROCUREMENT.

17. ALL PULL BOXES SHALL BE MINIMUM SIZE #5 PER CALTRANS STANDARD PLANS AND FITTED WITH AN ANTI THEFT INSERT.
18. ALL PULL BOXES SHALL CONTAIN A DIELECTRIC BARRIER WHEN POWER AND COMMUNICATION WIRES SHARE THE SAME PULL BOX.

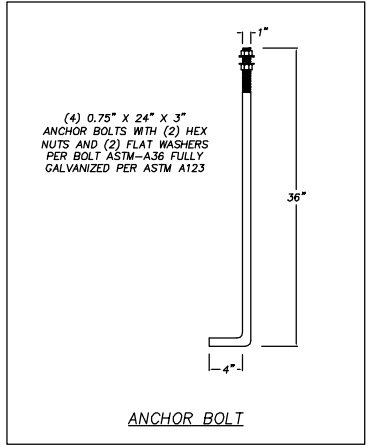
Attachment A

NATIONAL CITY - DECO





KING LUMINAIRE K118 SERIES LED
POST TOP FIXTURE;
SEE KING LUMINAIRE DRAWING

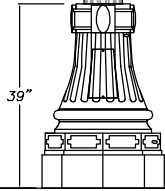


(4) 0.75" x 24" x 3"
ANCHOR BOLTS WITH (2) HEX
NUTS AND (2) FLAT WASHERS
PER BOLT ASTM-A36 FULLY
GALVANIZED PER ASTM A123

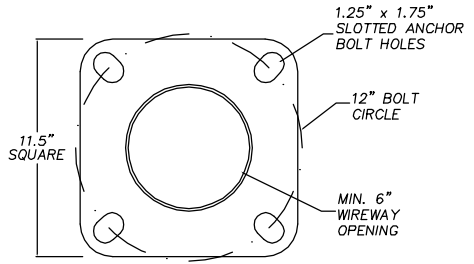
ANCHOR BOLT

* FINISH POWDER COAT COLOR OPTIONS:
RAL-6009 (DOWNTOWN GREEN)
RAL-6028 (HIGHLAND GREEN)
RAL-9005 INNER CORRIDORS BLACK

FINISH NOTE



26" P TO P
24" F TO F



NATIONAL CITY
TYPE A

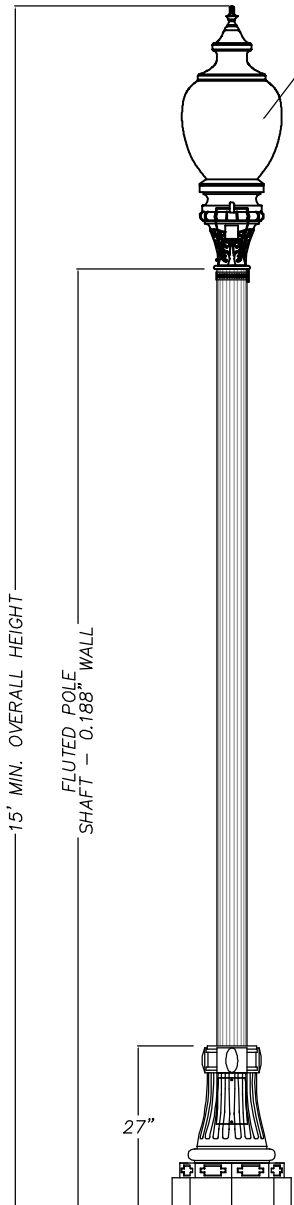


SOUTH COAST LIGHTING & DESIGN
1391 CALLE AVANZADO, SAN CLEMENTE, CA. 92673
VOICE - 805-441-0070 / FAX - 949-276-8855
SEANCO@SOUTHCOASTLIGHTING.COM / WWW.SOUTHCOASTLIGHTING.COM
DUE TO CONTINUING IMPROVEMENTS, SOUTH COAST LIGHTING & DESIGN, INC RESERVES THE RIGHT TO
CHANGE DIMENSIONS, DESIGNS, AND CONSTRUCTION FROM THAT WHICH IS SHOWN IN THIS BROCHURE.
CONTACT FACTORY FOR DETAILED ENGINEERING DRAWINGS

DRAWN BY: R.R.	CHECKED BY: --	APPROVED BY: --	CATALOG #: NC-POLE TYPE A	DATE: 12.6.15
CUSTOMER: NATIONAL CITY			PROJECT NAME: CITY STANDARDS	
			DRAWING NUMBER: R-120615-1S	SHEET NUMBER: 1 OF 1

REV.	REV. #	REVISION NOTE	DATE	CHECKED BY

KING LUMINAIRE K118 SERIES LED
POST TOP FIXTURE;
SEE KING LUMINAIRE DRAWING

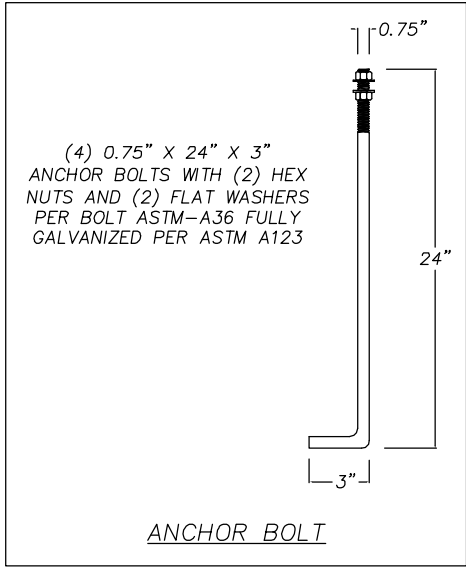


15' MIN. OVERALL HEIGHT

FLUTED POLE
SHAFT - 0.188" WALL

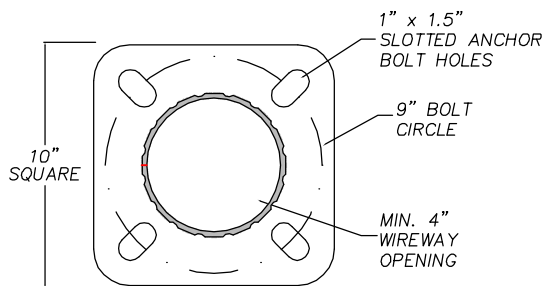
27"

19.5" P TO P
18.25" F TO F



* FINISH POWDER COAT COLOR OPTIONS:
RAL-6009 (DOWNTOWN GREEN)
RAL-6028 (HIGHLAND GREEN)
RAL-9005 INNER CORRIDORS BLACK

FINISH NOTE



NATIONAL CITY
TYPE B

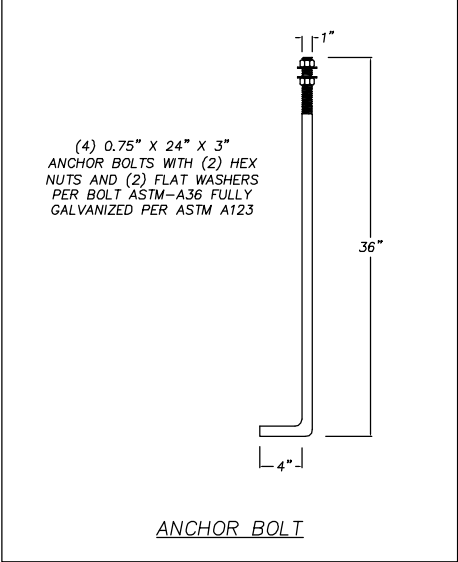
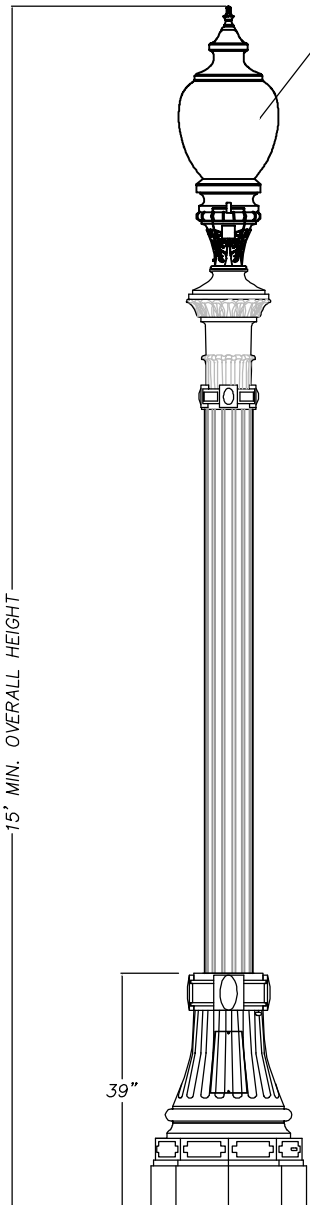


SOUTH COAST LIGHTING & DESIGN
1391 CALLE AVANZADO, SAN CLEMENTE, CA. 92673
VOICE - 805-441-0070 / FAX - 949.276.8855
SEANCO@SOUTHCOASTLIGHTING.COM / WWW.SOUTHCOASTLIGHTING.COM
DUE TO CONTINUING IMPROVEMENTS, SOUTH COAST LIGHTING & DESIGN, INC RESERVES THE RIGHT TO
CHANGE DIMENSIONS, DESIGNS, AND CONSTRUCTION FROM THAT WHICH IS SHOWN IN THIS BROCHURE.
CONTACT FACTORY FOR DETAILED ENGINEERING DRAWINGS

DRAWN BY: R.R.	CHECKED BY: --	APPROVED BY: --	CATALOG #: NC-POLE TYPE B	DATE: 12.6.15
CUSTOMER: NATIONAL CITY			PROJECT NAME: CITY STANDARDS	
			DRAWING NUMBER: R-120615-2S	SHEET NUMBER: 1 OF 1

REV.	REV. #	REVISION NOTE	DATE	CHECKED BY

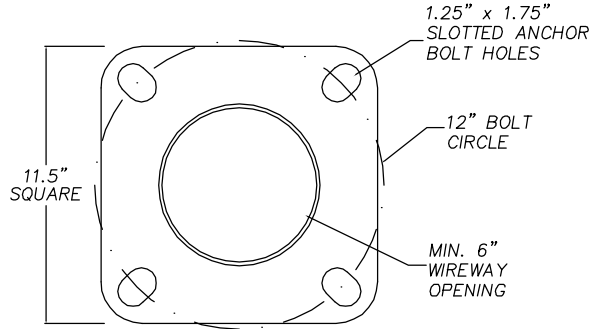
KING LUMINAIRE K118 SERIES LED
POST TOP FIXTURE;
SEE KING LUMINAIRE DRAWING



* FINISH POWDER COAT COLOR OPTIONS:
RAL-6009 (DOWNTOWN GREEN)
RAL-6028 (HIGHLAND GREEN)
RAL-9005 INNER CORRIDORS BLACK)

FINISH NOTE

26" P TO P
24" F TO F



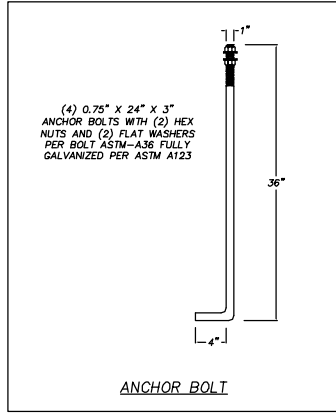
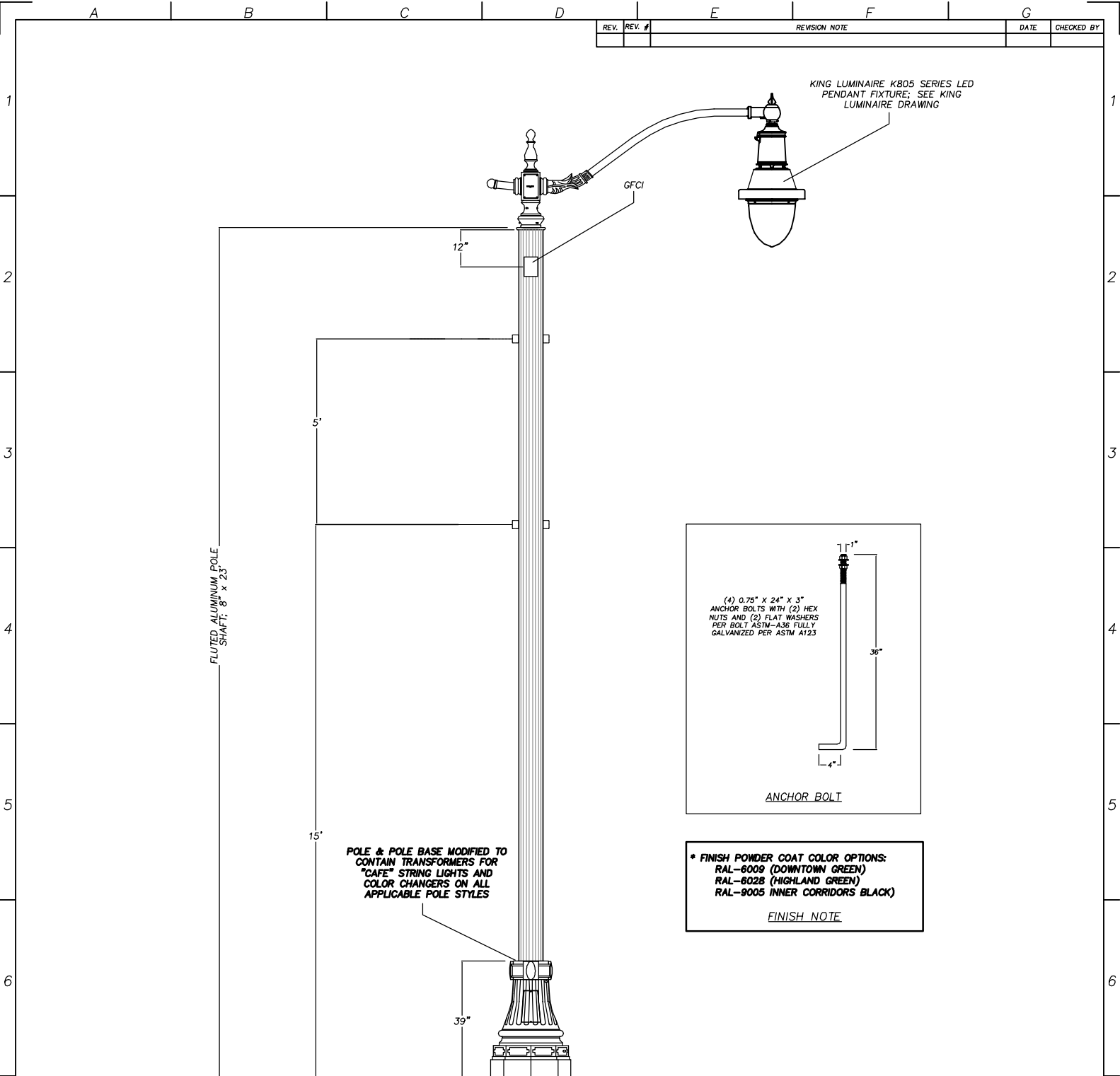
NATIONAL CITY
TYPE C



SOUTH COAST LIGHTING & DESIGN
1391 CALLE AVANZADO, SAN CLEMENTE, CA. 92673
VOICE - 805-441-0070 / FAX - 949-276-8855
SEAN@SOUTHCOASTLIGHTING.COM / WWW.SOUTHCOASTLIGHTING.COM
DUE TO CONTINUING IMPROVEMENTS, SOUTH COAST LIGHTING & DESIGN, INC RESERVES THE RIGHT TO
CHANGE DIMENSIONS, DESIGNS, AND CONSTRUCTION FROM THAT WHICH IS SHOWN IN THIS BROCHURE.
CONTACT FACTORY FOR DETAILED ENGINEERING DRAWINGS

DRAWN BY: R.R.	CHECKED BY: --	APPROVED BY: --	CATALOG #: NC-POLE TYPE C	DATE: 12.6.15
CUSTOMER: NATIONAL CITY			PROJECT NAME: CITY STANDARDS	
			DRAWING NUMBER: R-120615-7S	SHEET NUMBER: 1 OF 1

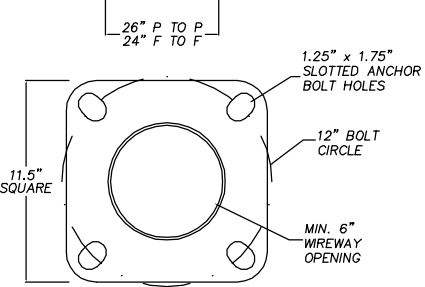
REV.	REV. #	REVISION NOTE	DATE	CHECKED BY



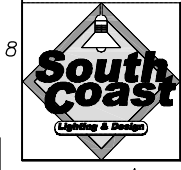
*** FINISH POWDER COAT COLOR OPTIONS:**
 RAL-6009 (DOWNTOWN GREEN)
 RAL-6028 (HIGHLAND GREEN)
 RAL-9005 INNER CORRIDORS BLACK)

FINISH NOTE

POLE & POLE BASE MODIFIED TO CONTAIN TRANSFORMERS FOR "CAFE" STRING LIGHTS AND COLOR CHANGERS ON ALL APPLICABLE POLE STYLES



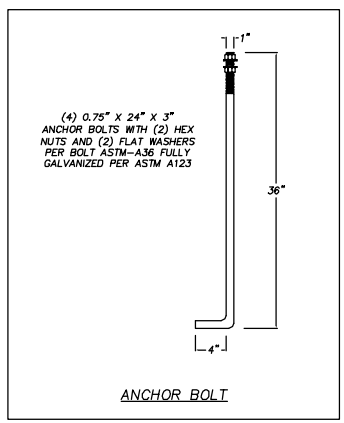
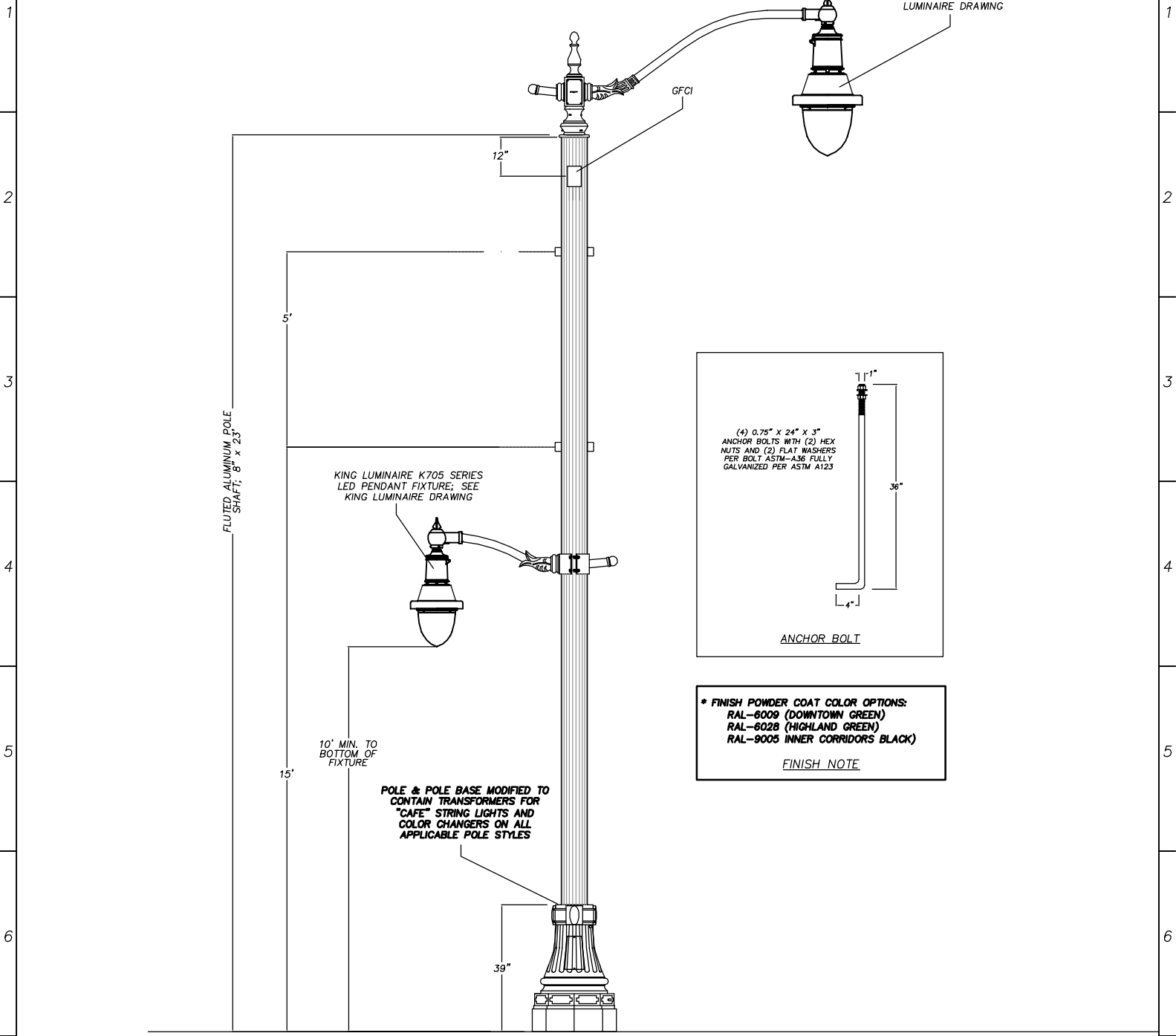
**NATIONAL CITY
TYPE D**



SOUTH COAST LIGHTING & DESIGN
 1391 CALLE AVANZADO, SAN CLEMENTE, CA. 92673
 VOICE - 805-441-0070 / FAX - 949.276.8855
 SEANCO@SOUTHCOASTLIGHTING.COM / WWW.SOUTHCOASTLIGHTING.COM
 DUE TO CONTINUING IMPROVEMENTS, SOUTH COAST LIGHTING & DESIGN, INC RESERVES THE RIGHT TO CHANGE DIMENSIONS, DESIGNS, AND CONSTRUCTION FROM THAT WHICH IS SHOWN IN THIS BROCHURE. CONTACT FACTORY FOR DETAILED ENGINEERING DRAWINGS

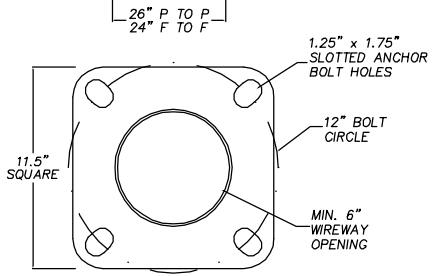
DRAWN BY: R.R.	CHECKED BY: --	APPROVED BY: --	CATALOG #: NC-POLE TYPE D	DATE: 12.6.15
CUSTOMER: NATIONAL CITY			PROJECT NAME: CITY STANDARDS	
			DRAWING NUMBER: R-120615-6S	SHEET NUMBER: 1 OF 1

REV.	REV. #	REVISION NOTE	DATE	CHECKED BY

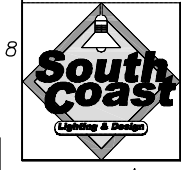


*** FINISH POWDER COAT COLOR OPTIONS:**
 RAL-6009 (DOWNTOWN GREEN)
 RAL-6028 (HIGHLAND GREEN)
 RAL-9005 (INNER CORRIDORS BLACK)

FINISH NOTE

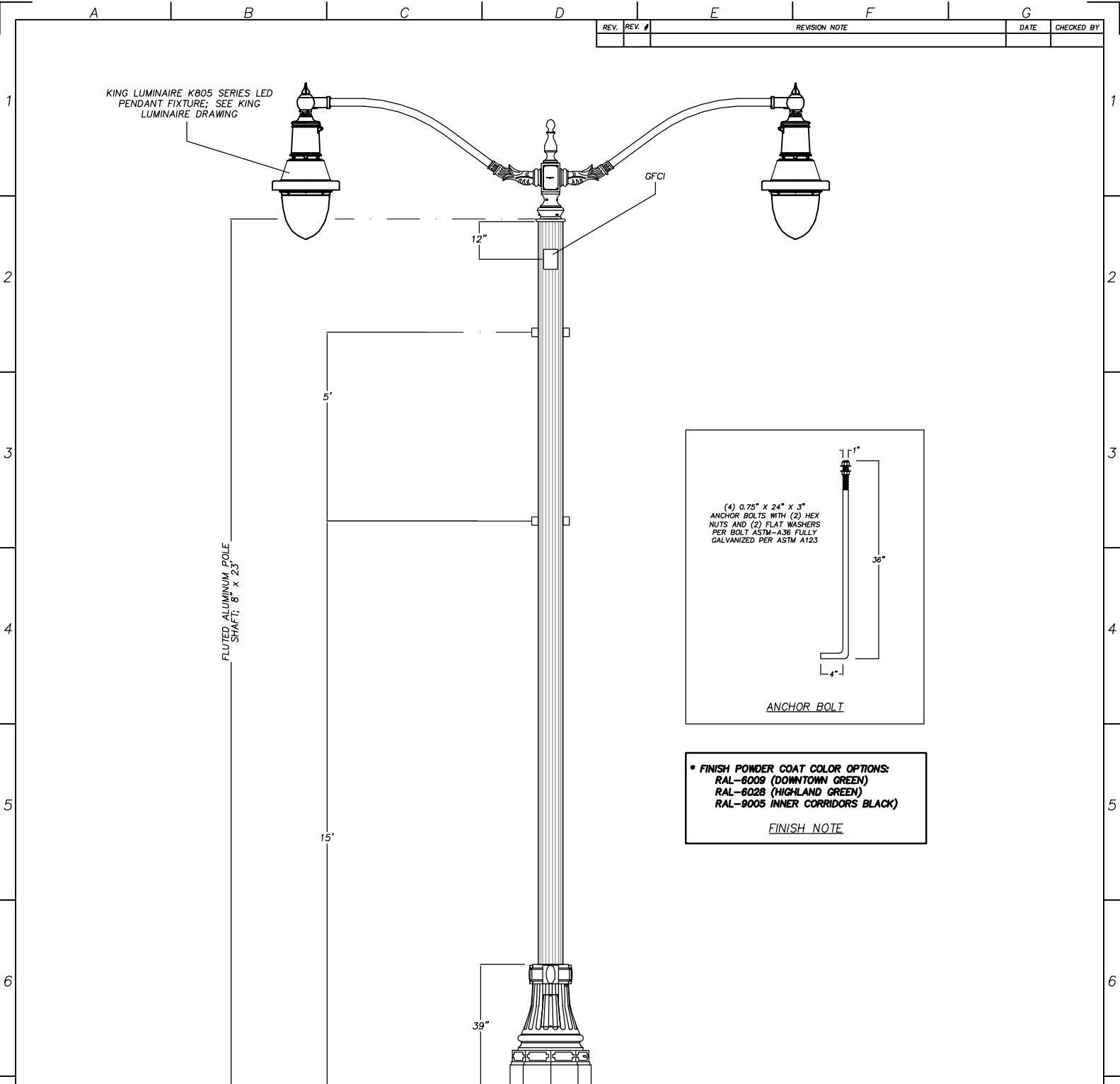


**NATIONAL CITY
TYPE E**



SOUTH COAST LIGHTING & DESIGN
 1391 CALLE AVANZADO, SAN CLEMENTE, CA. 92673
 VOICE - 805-441-0070 / FAX - 949.276.8855
 SEANCO@SOUTHCOASTLIGHTING.COM / WWW.SOUTHCOASTLIGHTING.COM
 DUE TO CONTINUING IMPROVEMENTS, SOUTH COAST LIGHTING & DESIGN, INC RESERVES THE RIGHT TO CHANGE DIMENSIONS, DESIGNS, AND CONSTRUCTION FROM THAT WHICH IS SHOWN IN THIS BROCHURE. CONTACT FACTORY FOR DETAILED ENGINEERING DRAWINGS

DRAWN BY: R.R.	CHECKED BY: --	APPROVED BY: --	CATALOG #: NC-POLE TYPE E	DATE: 12.6.15
CUSTOMER: NATIONAL CITY			PROJECT NAME: CITY STANDARDS	
			DRAWING NUMBER: R-120615-4S	SHEET NUMBER: 1 OF 1



REV.	REV. #	REVISION NOTE	DATE	CHECKED BY

KING LUMINAIRE KB05 SERIES LED PENDANT FIXTURE; SEE KING LUMINAIRE DRAWING

GFCI

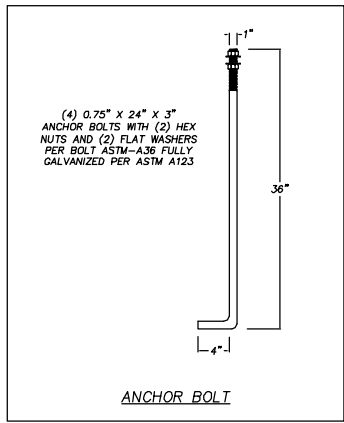
12"

5'

FLUTED ALUMINUM POLE
SHAFT: 8" x 23"

15'

39"



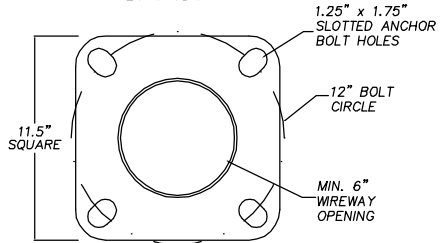
(4) 0.75" x 24" x 3"
ANCHOR BOLTS WITH (2) HEX
NUTS AND (2) FLAT WASHERS
PER BOLT ASTM-A36 FULLY
GALVANIZED PER ASTM A123

ANCHOR BOLT

* FINISH POWDER COAT COLOR OPTIONS:
RAL-6009 (DOWNTOWN GREEN)
RAL-6028 (HIGHLAND GREEN)
RAL-9005 INNER CORRIDORS BLACK

FINISH NOTE

26" P TO P
24" F TO F



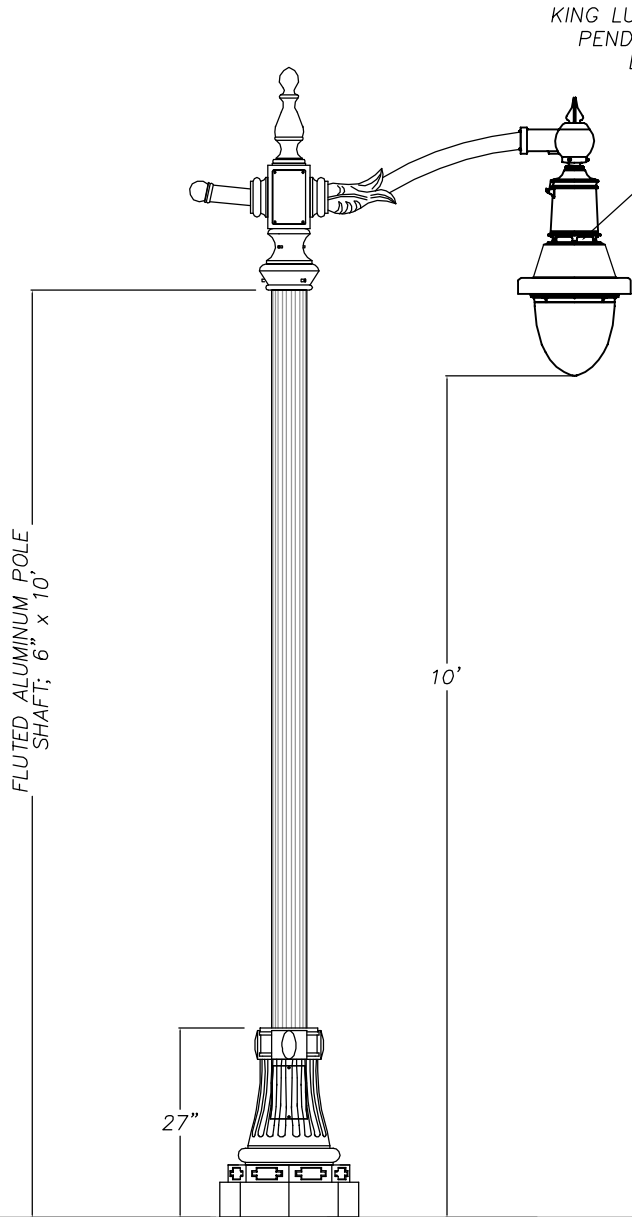
NATIONAL CITY
TYPE F



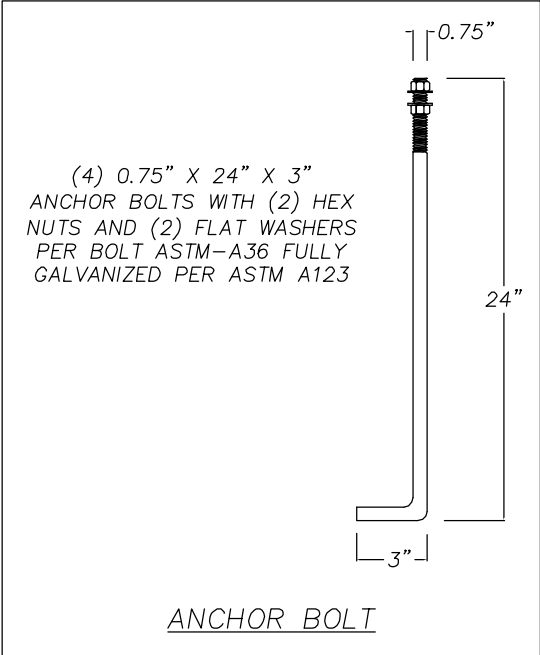
SOUTH COAST LIGHTING & DESIGN
1391 CALLE AVANZADO, SAN CLEMENTE, CA. 92673
VOICE - 805-441-0070 / FAX - 949.276.8855
SEANCO@SOUTHCOASTLIGHTING.COM / WWW.SOUTHCOASTLIGHTING.COM
DUE TO CONTINUING IMPROVEMENTS, SOUTH COAST LIGHTING & DESIGN, INC RESERVES THE RIGHT TO CHANGE DIMENSIONS, DESIGNS, AND CONSTRUCTION FROM THAT WHICH IS SHOWN IN THIS BROCHURE. CONTACT FACTORY FOR DETAILED ENGINEERING DRAWINGS

DRAWN BY: R.R.	CHECKED BY: --	APPROVED BY: --	CATALOG #: NC-POLE TYPE F	DATE: 12.6.15
CUSTOMER: NATIONAL CITY			PROJECT NAME: CITY STANDARDS	
			DRAWING NUMBER: R-120615-5S	SHEET NUMBER: 1 OF 1

REV.	REV. #	REVISION NOTE	DATE	CHECKED BY



KING LUMINAIRE K705 SERIES LED
PENDANT FIXTURE; SEE KING
LUMINAIRE DRAWING



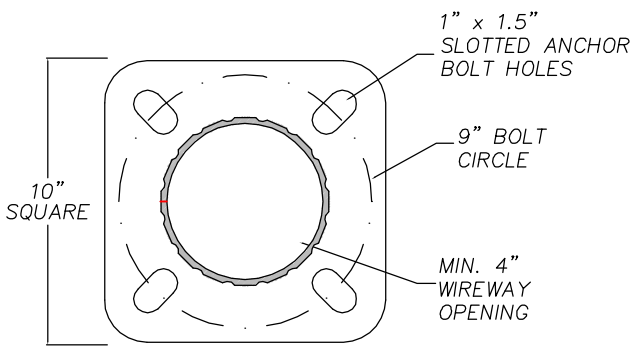
(4) 0.75" X 24" X 3"
ANCHOR BOLTS WITH (2) HEX
NUTS AND (2) FLAT WASHERS
PER BOLT ASTM-A36 FULLY
GALVANIZED PER ASTM A123

ANCHOR BOLT

* FINISH POWDER COAT COLOR OPTIONS:
RAL-6009 (DOWNTOWN GREEN)
RAL-6028 (HIGHLAND GREEN)
RAL-9005 INNER CORRIDORS BLACK)

FINISH NOTE

19.5" P TO P
18.25" F TO F



NATIONAL CITY
TYPE G



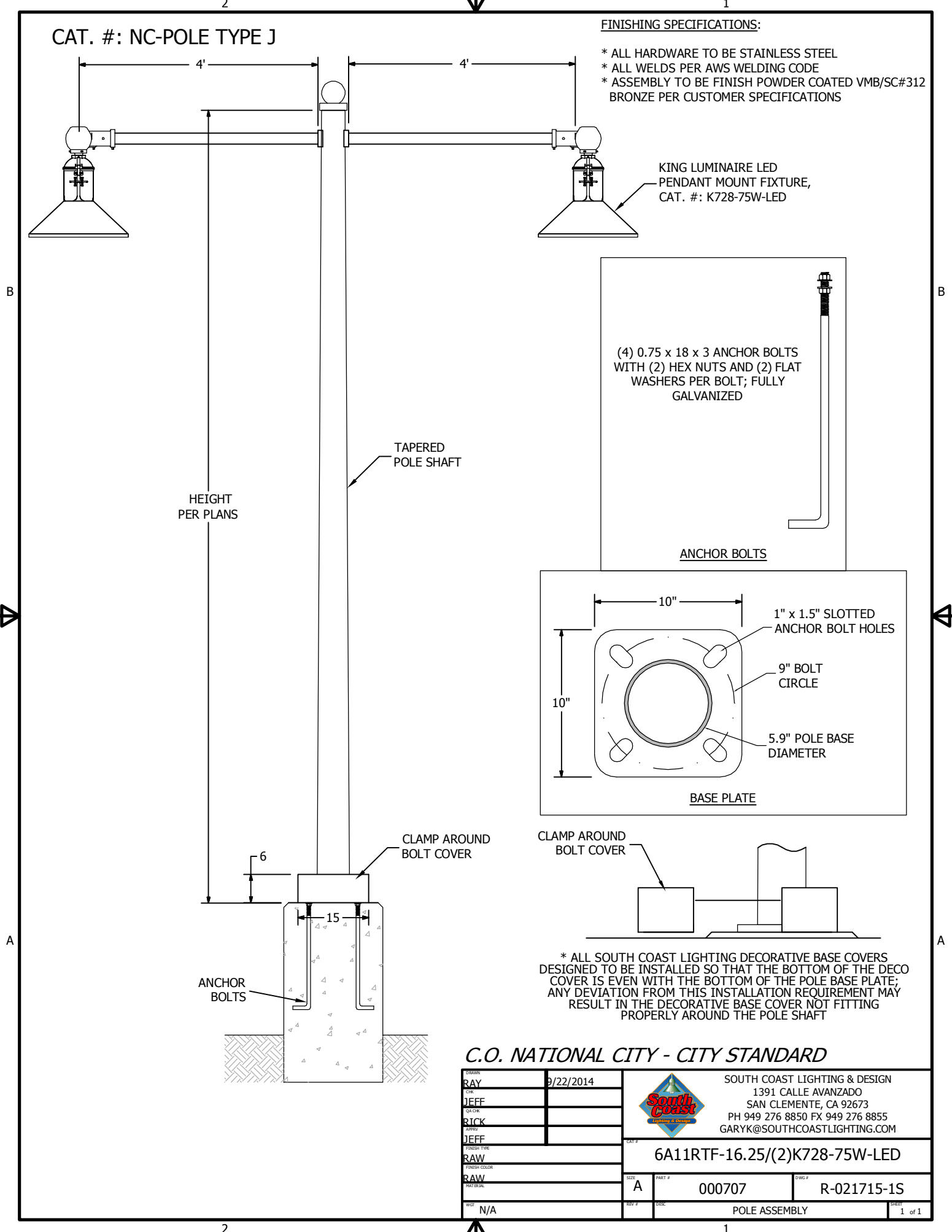
SOUTH COAST LIGHTING & DESIGN
1391 CALLE AVANZADO, SAN CLEMENTE, CA. 92673
VOICE - 805-441-0070 / FAX - 949-276-8855
SEANCO@SOUTHCOASTLIGHTING.COM / WWW.SOUTHCOASTLIGHTING.COM
DUE TO CONTINUING IMPROVEMENTS, SOUTH COAST LIGHTING & DESIGN, INC RESERVES THE RIGHT TO
CHANGE DIMENSIONS, DESIGNS, AND CONSTRUCTION FROM THAT WHICH IS SHOWN IN THIS BROCHURE.
CONTACT FACTORY FOR DETAILED ENGINEERING DRAWINGS

DRAWN BY: R.R.	CHECKED BY: --	APPROVED BY: --	CATALOG #: NC-POLE TYPE G	DATE: 12.6.15
CUSTOMER: NATIONAL CITY			PROJECT NAME: CITY STANDARDS	
			DRAWING NUMBER: R-120615-3S	SHEET NUMBER: 1 OF 1

CAT. #: NC-POLE TYPE J

FINISHING SPECIFICATIONS:

- * ALL HARDWARE TO BE STAINLESS STEEL
- * ALL WELDS PER AWS WELDING CODE
- * ASSEMBLY TO BE FINISH POWDER COATED VMB/SC#312 BRONZE PER CUSTOMER SPECIFICATIONS



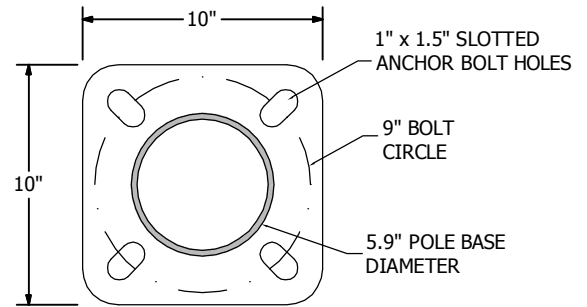
KING LUMINAIRE LED
PENDANT MOUNT FIXTURE,
CAT. #: K728-75W-LED

(4) 0.75 x 18 x 3 ANCHOR BOLTS
WITH (2) HEX NUTS AND (2) FLAT
WASHERS PER BOLT; FULLY
GALVANIZED

ANCHOR BOLTS

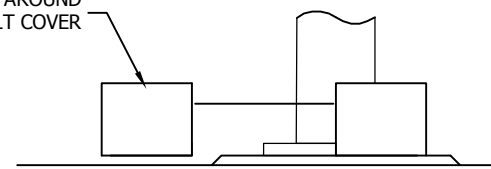
TAPERED
POLE SHAFT

HEIGHT
PER PLANS



BASE PLATE

CLAMP AROUND
BOLT COVER




CLAMP AROUND
BOLT COVER

ANCHOR
BOLTS

* ALL SOUTH COAST LIGHTING DECORATIVE BASE COVERS
DESIGNED TO BE INSTALLED SO THAT THE BOTTOM OF THE DECO
COVER IS EVEN WITH THE BOTTOM OF THE POLE BASE PLATE;
ANY DEVIATION FROM THIS INSTALLATION REQUIREMENT MAY
RESULT IN THE DECORATIVE BASE COVER NOT FITTING
PROPERLY AROUND THE POLE SHAFT

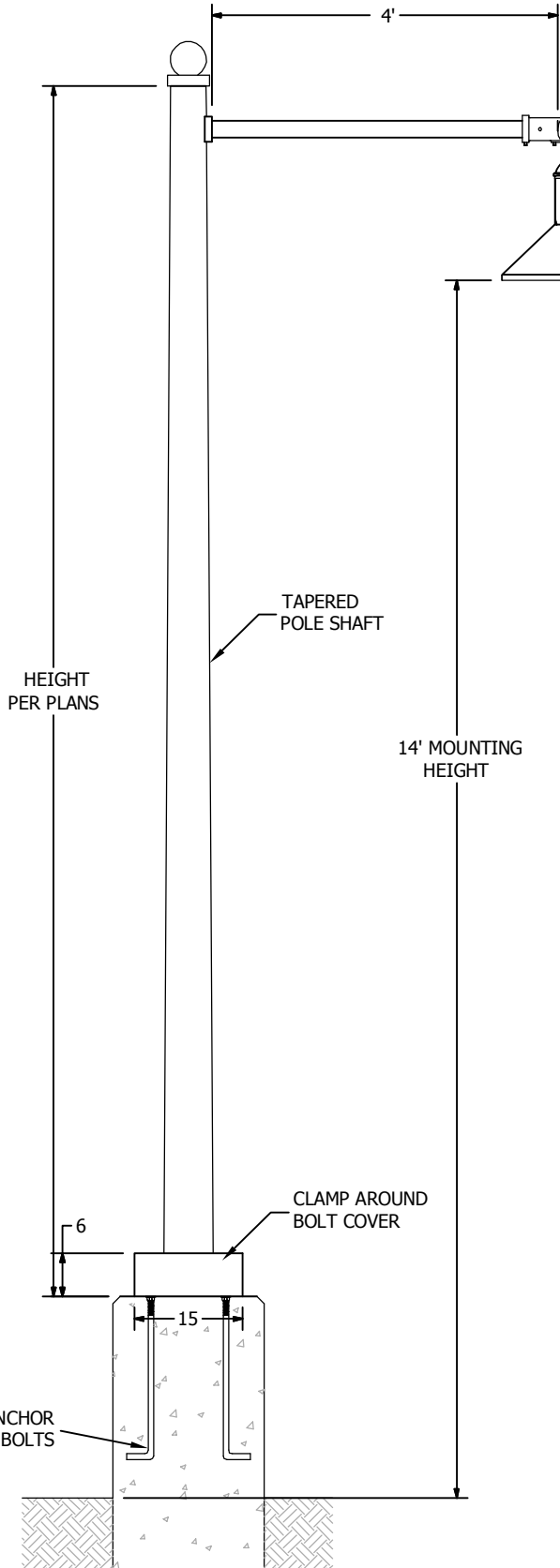
C.O. NATIONAL CITY - CITY STANDARD

DESIGN	RAY	DATE	9/22/2014	 <p>SOUTH COAST LIGHTING & DESIGN 1391 CALLE AVANZADO SAN CLEMENTE, CA 92673 PH 949 276 8850 FX 949 276 8855 GARYK@SOUTHCOASTLIGHTING.COM</p>				
CHK	JEFF							
QA CHK	RICK							
APPROV	JEFF							
FINISH TYPE	RAW	CAT #		6A11RTF-16.25/(2)K728-75W-LED				
FINISH COLOR	RAW	SIZE	A	PART #	000707	DWG #	R-021715-1S	
REV	N/A	REV #		DESC	POLE ASSEMBLY		SHEET	1 of 1

CAT. #: NC-POLE TYPE K

FINISHING SPECIFICATIONS:

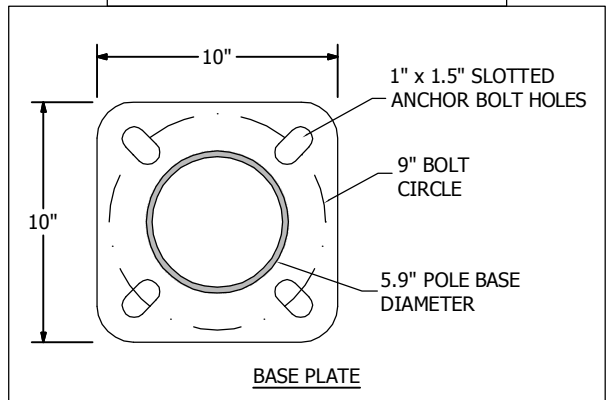
- * ALL HARDWARE TO BE STAINLESS STEEL
- * ALL WELDS PER AWS WELDING CODE
- * ASSEMBLY TO BE FINISH POWDER COATED VMB/SC#312 BRONZE PER CUSTOMER SPECIFICATIONS



KING LUMINAIRE LED
PENDANT MOUNT FIXTURE,
CAT. #: K728-100W-LED

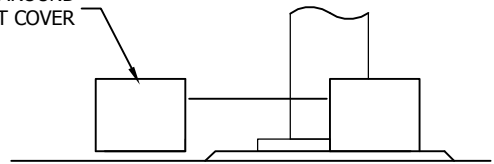
(4) 0.75 x 18 x 3 ANCHOR BOLTS
WITH (2) HEX NUTS AND (2) FLAT
WASHERS PER BOLT; FULLY
GALVANIZED

ANCHOR BOLTS




BASE PLATE

CLAMP AROUND
BOLT COVER



* ALL SOUTH COAST LIGHTING DECORATIVE BASE COVERS
DESIGNED TO BE INSTALLED SO THAT THE BOTTOM OF THE DECO
COVER IS EVEN WITH THE BOTTOM OF THE POLE BASE PLATE;
ANY DEVIATION FROM THIS INSTALLATION REQUIREMENT MAY
RESULT IN THE DECORATIVE BASE COVER NOT FITTING
PROPERLY AROUND THE POLE SHAFT

C.O. NATIONAL CITY - CITY STANDARD

DESIGN	RAY	9/22/2014	 <p>SOUTH COAST LIGHTING & DESIGN 1391 CALLE AVANZADO SAN CLEMENTE, CA 92673 PH 949 276 8850 FX 949 276 8855 GARYK@SOUTHCOASTLIGHTING.COM</p>
CHK	JEFF		
QA CHK	RICK		
SUPPLY	JEFF		
FINISH TYPE	RAW		<p>6A11RTF-16.25/K728-100W-LED</p>
FINISH COLOR	RAW		<p>SIZE: A PART #: 000707 DWG #: R-021715-1S</p>
REV	N/A		<p>REV # _____ DESC: POLE ASSEMBLY SHEET: 1 of 1</p>

Attachment B

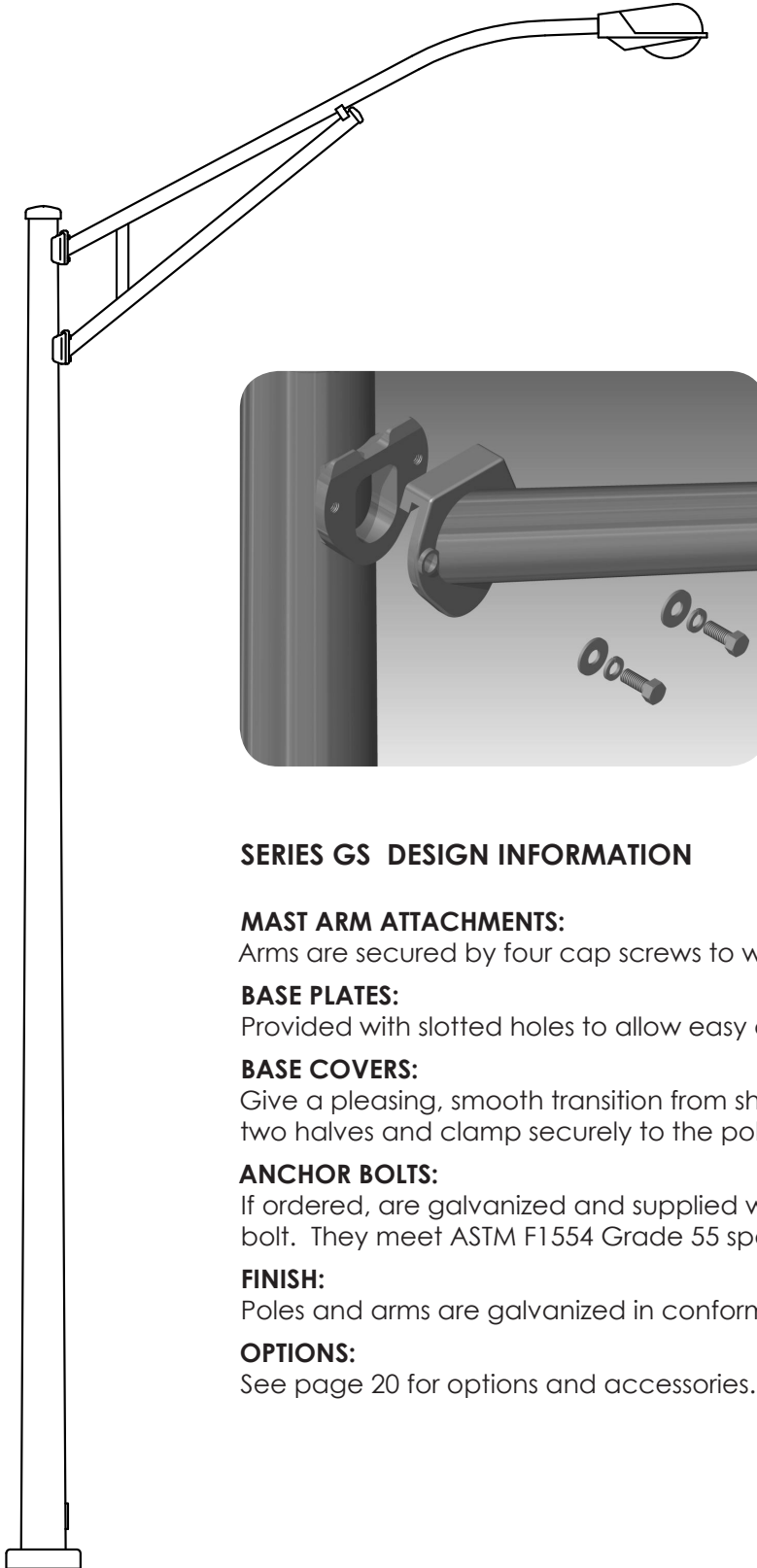


Ameron Pole Products

STEEL LIGHTING POLES

Quick Guide to Ameron Steel Pole Standards and Options

Series GS Pipe Truss Luminaire Arm



SERIES GS DESIGN INFORMATION

MAST ARM ATTACHMENTS:

Arms are secured by four cap screws to weather-resistant fitting.

BASE PLATES:

Provided with slotted holes to allow easy anchor bolt installation.

BASE COVERS:

Give a pleasing, smooth transition from shaft to base. They are supplied in two halves and clamp securely to the pole.

ANCHOR BOLTS:

If ordered, are galvanized and supplied with two nuts and two washers per bolt. They meet ASTM F1554 Grade 55 specification.

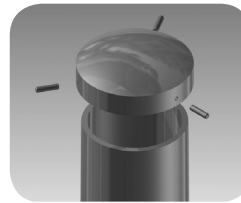
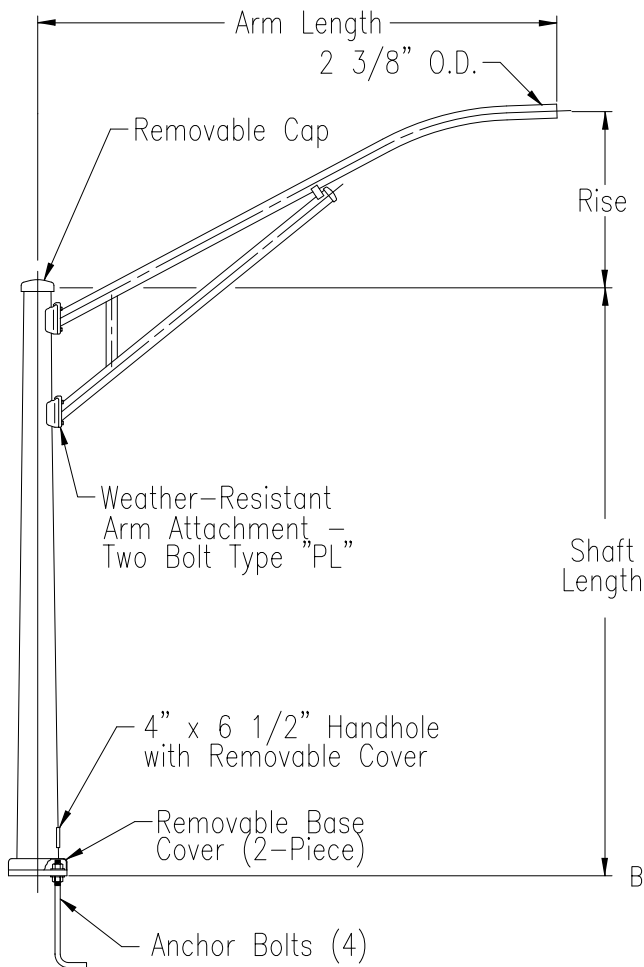
FINISH:

Poles and arms are galvanized in conformance to ASTM A123.

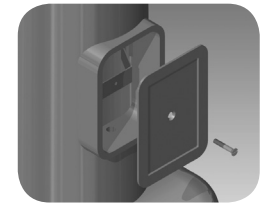
OPTIONS:

See page 20 for options and accessories.

Series GS Pipe Truss Luminaire Arm



POLE CAP DETAIL
Removable pole cup cap.

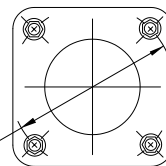


HANDHOLE DETAIL
Standard handhole assembly 4" x 6-1/2"

1. Pole Design is in accordance to the 2009 AASHTO Specifications for Structural Supports of Highway Signs, Luminaires, and Traffic Signals.

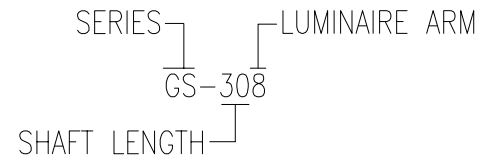
2. Weights are exclusive of anchor bolts.

3. For twin arms consult Ameron.



Anchor Base (4 Bolts)

ORDERING NOMENCLATURE



AASHTO 2009 Max EPA

Catalog Number	Shaft Length (FT)	Bolt Dia (IN)	Base OD (IN)	BC Min (IN)	BC Max (IN)	Base Square (IN)	Arm Length (FT)	Rise	Weight (LBS)	90 MPH	100 MPH	110 MPH	120 MPH
GS208	20	1	6.625	9.25	11.5	11.5	8	1' - 6"	239	17.1	13.7	11.1	9.2
GS2010	20	1	6.625	9.25	11.5	11.5	10	1' - 9"	255	13.3	10.5	8.5	7.0
GS2012	20	1	6.625	9.25	11.5	11.5	12	2' - 0"	263	11.0	8.7	6.9	5.6
GS2015	20	1	6.625	9.25	11.5	11.5	15	3' - 3"	290	7.7	5.9	4.6	3.6
GS258	25	1	7.313	10	11.5	11.5	8	1' - 6"	282	16.4	13.1	10.6	8.8
GS2510	25	1	7.313	10	11.5	11.5	10	1' - 9"	298	12.7	10.1	8.1	6.6
GS2512	25	1	7.313	10	11.5	11.5	12	2' - 0"	306	10.5	8.3	6.6	5.3
GS2515	25	1	7.313	10	11.5	11.5	15	3' - 3"	333	7.4	5.7	4.4	3.4
GS288	28	1	7.75	10.25	11.5	11.5	8	1' - 6"	322	16.0	12.8	10.4	8.6
GS2810	28	1	7.75	10.25	11.5	11.5	10	1' - 9"	338	12.4	9.8	7.9	6.5
GS2812	28	1	7.75	10.25	11.5	11.5	12	2' - 0"	346	10.3	8.1	6.4	5.2
GS2815	28	1	7.75	10.25	11.5	11.5	15	3' - 3"	373	7.2	5.5	4.3	3.3
GS308	30	1	8	10.5	11.5	11.5	8	1' - 6"	337	15.8	12.6	10.2	8.4
GS3010	30	1	8	10.5	11.5	11.5	10	1' - 9"	353	12.3	9.7	7.8	6.4
GS3012	30	1	8	10.5	11.5	11.5	12	2' - 0"	360	10.1	8.0	6.3	5.1
GS3015	30	1	8	10.5	11.5	11.5	15	3' - 3"	387	7.1	5.4	4.2	3.2
GS358	35	1	8.688	11.25	11.5	11.5	8	1' - 6"	392	15.3	12.2	9.9	7.9
GS3510	35	1	8.688	11.25	11.5	11.5	10	1' - 9"	408	11.9	9.4	7.5	6.1
GS3512	35	1	8.688	11.25	11.5	11.5	12	2' - 0"	416	9.8	7.7	6.1	4.9
GS3515	35	1	8.688	11.25	11.5	11.5	15	3' - 3"	443	6.9	5.2	4.0	3.1
GS408	40	1	9.375	12	12.5	12.5	8	1' - 6"	480	14.9	11.2	8.3	6.3
GS4010	40	1	9.375	12	12.5	12.5	10	1' - 9"	496	11.5	9.1	7.3	5.6
GS4012	40	1	9.375	12	12.5	12.5	12	2' - 0"	504	9.5	7.5	5.9	4.8
GS4015	40	1.25	9.375	12.5	12.5	12.5	15	3' - 3"	531	6.7	5.1	3.9	3.0