

TITLE SHEET

DEPARTMENT OF THE NAVY
NAVFAC SE
JACKSONVILLE FLORIDA

REPLACE SECURITY AND STREET LIGHTING

AT THE

MARINE CORPS AIR STATION

BEAUFORT SOUTH CAROLINA

DESIGNED BY:

PUBLIC WORKS ENGINEERING
MCAS BEAUFORT
BLDG 616
PO BOX 55019
BEAUFORT SOUTH CAROLINA 29904

DOCUMENT 00 01 15

LIST OF DRAWINGS
04/06

PART 1 GENERAL

1.1 SUMMARY

This document lists the drawings for the project pursuant to contract clause "DFARS 252.236-7001, Contract Drawings, Maps and Specifications."

1.2 CONTRACT DRAWINGS

Contract drawings are as follows:

MCAS PW DRAWING NO.	NAVFAC DWG NO.	SHEET NO.	TITLE
21058	N/A	1	STREET, PARKING, & SECURITY LIGHTING

1.3 SUPPLEMENTARY DRAWINGS

These supplementary drawings may not be a part of the contract but are included with the drawings for information.

1.3.1 Reference Drawings

Reference drawings are listed in Attachment "A". The reference drawings are intended only to show the original construction and major renovations and repairs that have occurred over the life of the facility. Not all past renovations are shown, but sufficient details are provided to allow the contractor to develop an understanding of the contract scope. Drawings are the property of the Government and shall not be used for any purpose other than that intended by the contract. The drawings are provided in electronic form only (PDFs).

-- End of Document --

SECTION 00 41 00

BID SCHEDULES
01/07

PART 1 GENERAL

1.1 BASIS OF BIDS

1.1.1 Options

This contract will be solicited with a base bid and one bid option item.

Options Form

(i) Item 0001: Base Amount

Basis of Bid for Item 0001 shall be the entire work complete in accordance with the contract drawings and specifications.

Item 0001 \$ _____

(ii) Item 0002: Bid Option 1 Item Amount

Basis of Bid for Bid Option 1 Item 0002 shall be the entire work complete in accordance with the contract drawings and specifications. Specific requirements are discribed in section 01 11 00 Summary of Work BID OPTION 1.

Item 0002 \$ _____

-- End of Document --

SECTION 01 11 00

SUMMARY OF WORK

07/06

PART 1 GENERAL

1.1 GENERIC SPECIFICATION SECTIONS

Section 01 14 00	"Work Restrictions", in full.
Section 01 20 00.00 20	"Price and Payment Procedures", in full.
Section 01 30 00	"Administrative Requirements", in full.
Section 01 32 17.00 20	"Network Analysis Schedules (NAS)", in full.
Section 01 33 00	"Submittal Procedures", in full.
Section 01 35 13	"Special Project Procedures", in full.
Section 01 35 29	"Safety and Occupational Health Requirements", in full.
Section 01 35 40.00 20	"Environmental Management", in full.
Section 01 45 00.00 20	"Construction Quality Control", in full.
Section 01 50 00.00 20	"Temporary Facilities and Controls", in full.
Section 01 57 19.00 20	"Temporary Environmental Controls", in full.
Section 01 62 35	"Recycled/Recovered Materials", in full.
Section 01 74 19	"Construction and Demolition Waste Management", in full.
Section 01 77 00.00 20	"Closeout Procedures", in full.
Section 01 78 23	"Operation and Maintenance Data", in full.
Section 02 41 00	"Demolition", in full.
Section 02 82 16.00 20	"Engineering Control of Asbestos Containing Materials", does not apply
Section 02 82 33.13 20	"Removal/Control and Disposal of Paint with Lead", does not apply
Section 03 30 00.00 20	"Cast-In-Place Concrete", does not apply
Section 04 20 00	"Masonry", does not apply
Section 05 40 00	"Cold-Formed Metal Framing", does not apply
Section 06 10 00	"Rough Carpentry", does not apply

Section 07 24 00	"Exterior Insulation and Finish Systems", does not apply.
Section 07 60 00	"Flashing and Sheet Metal", does not apply
Section 07 61 14.00 20	"Steel Standing Seam Roofing", does not apply.
Section 07 84 00	"Firestopping", does not apply
Section 07 92 00	"Joint Sealants", does not apply
Section 08 11 13	"Steel Doors and Frames", does not apply
Section 08 14 00	"Wood Doors", does not apply.
Section 08 51 13.00 20	"Aluminum Windows", does not apply.
Section 08 71 00	"Door Hardware", does not apply
Section 08 81 00	"Glazing", does not apply.
Section 08 91 00	"Metal Louvers", does not apply.
Section 09 22 00	"Metal Support Assemblies", does not apply
Section 09 24 23	"Stucco", does not apply.
Section 09 29 00	"Gypsum Board", does not apply
Section 09 30 00	"Ceramic Tile, Quarry Tile, and Paver Tile", does not apply
Section 09 51 00	"Acoustical Ceilings", does not apply
Section 09 65 00	"Resilient Floorings", does not apply
Section 09 67 00.00 40	"Fluid-Applied Flooring", does not apply
Section 09 68 00	"Carpet", does not apply
Section 09 90 00	"Paints and Coatings", does not apply
Section 10 21 13	"Toilet Compartments", does not apply.
Section 10 28 13	"Toilet Accessories", does not apply.
Section 10 44 16	"Fire Extinguishers", does not apply.
Section 22 00 00	"Plumbing, General Purpose", does not apply
Section 22 05 48.00 20	"Mechanical Sound, Vibration, and Seismic control", does not apply
Section 23 03 00.00 20	"Basic Mechanical Materials and Methods", does not apply
Section 23 07 00	"Thermal Insulation for Mechanical

Systems", does not apply

Section 23 08 00.00 20 "HVAC Testing/Adjusting/Balancing", does not apply

Section 23 09 54.00 20 "Direct Digital Control Systems", does not apply

Section 23 30 13.00 20 "Ductwork and Ductwork Accessories", does not apply

Section 26 00 00.00 20 "Basic Electrical Materials and Methods", in full

Section 26 20 00 "Interior Distribution System", does not apply

Section 26 51 00 "Interior Lighting", does not apply

Section 26 56 00 "Exterior Lighting", See attached

Section 27 10 00 "Building Telecommunications Cabling System", does not apply

Section 28 31 74.00 20 "Interior Fire Detection and Alarm System", does not apply

Section 31 00 00 "Earthwork", does not apply.

Section 31 31 16 "Soil Treatment for Subterranean Termite Control", does not apply.

Section 32 10 00 "Bituminous Concrete Pavement", does not apply.

Section 32 92 19 "Seeding", does not apply.

1.2 TECHNICAL

Refer to the "PROJECT TABLE OF CONTENTS" for listing of the technical sections.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

1.3.1 Project Description

BASE BID:

Replace approximately 530 street lighting cobra-head fixtures on MCAS Beaufort, SC. Provide a new LED cobra-head fixture and 6 foot mounting arm for each fixture.

Replace 18 pole mounted transformers with oil-filled pole mounted 15 KVA 7200:277 volt single-phase transformers.

Replace 18 existing lighting contactors with new NEMA 3R, 277 volt lighting contactors including photocell controls.

Replace the conductors from the overhead street lighting circuit to each new cobra-head fixture with #12 copper conductor, make final connection and check proper operation.

STREET LIGHTING CONTROL LOCATIONS

1. FRONT OF BUILDING 702 POLE #2060.
2. BUILDING 612, CORNER OF DRAYTON AND ITAMI AVE. POLE #3336.
3. BUILDING 555, ELROD ST. AND KIMES, POLE #2120.
4. BUILDING 629, CORNER OF GORDON ST. & HOFFECKER ST. POLE #3016.
5. CORNER OF GEIGER BLVD. & GORDON ST. POLE #3050.
6. BUILDING 601, DRYTON ST. POLE #3268.
7. BUILDING 566 CHAPEL, POLE #3242.
8. BUILDING 932 BARRACKS, POLE #3080.
9. ACROSS FROM BARACKS 1244, CORNER OF GEIGER BLVD. & KAVIENG ST.
10. BUILDING 660 CORPORALS SCHOOL PARKING LOT.
11. BUILDING 554 O-CLUB, POLE #1128.
12. QUILALI RD. POLE #1098.
13. DITCH LINE BEHIND BUILDING 616, POLE # 1422.
14. POLE #3275 PAD MOUNT BY BUILDING 2077.
15. POLE #3277 POLE MOUNT TYPE BY BUILDING 2077.
16. POLE #2156 BY THE OLD TEST-CELL. HAVE THE OVERHEAD WIRE BURIED.
17. POLE #4046 ACROSS THE STREET FROM BUILDING 404.
18. PAD MOUNT ON THE BACKSIDE OF MACS-TWO FIELD.

BID OPTION 1:

Replace 45 cobra-head fixtures in the Pine Grove area with 240 volt LED cobra-head units and integral photo-cell controls. Provide new 6' mounting arm for each fixture. Connect to existing 240 volt circuit with new #12 copper wire. Make final connection and check proper operation.

1.3.2 Location

The work shall be located at MCAS Beaufort South Carolina. The exact location will be shown by the Contracting Officer.

1.4 EXISTING WORK

In addition to "FAR 52.236-9, Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements":

- a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.
- b. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Contracting Officer. At the completion of operations, existing work shall be in a condition equal to or better than that which existed before new work started.

1.5 LOCATION OF UNDERGROUND FACILITIES

Obtain digging permits prior to start of excavation. Verify the elevations of existing piping, utilities, and any type of underground obstruction. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.5.1 Notification Prior to Excavation

Notify the Contracting Officer at least 15 days prior to starting excavation work.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 26 56 00

EXTERIOR LIGHTING

07/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- ANSI C62.41.2 Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.
- ANSI C78.377 (2008) Specifications for the Chromaticity of Solid State Lighting Products
- ANSI C136.31 (2001) American National Standard for Roadway Lighting Equipment -Luminaire Vibration

ASTM INTERNATIONAL (ASTM)

- ASTM B 117 (2009) Standing Practice for Operating Salt Spray (Fog) Apparatus
- ASTM G 154 (2006) Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

- IESNA HB-9 (2000) Lighting Handbook
- IESNA LM-79 (2008) Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
- IESNA LM-80 80 (2008) Approved Method for Measuring Lumen Maintenance of LED Light Sources
- IESNA TM-15 (2007; Addendum 2009) Luminaire Classification System for Outdoor Luminaires
- IESNA RP-8 (2000; Errata 2004; R 2005) Roadway Lighting

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

- IEEE C62.41.2 (2002) Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

IEEE C136.13	(1992) Roadway Lighting Equipment, Metal Brackets for Wood Poles
IEEE C136.21	(1987) Roadway Lighting Equipment - Vertical Tenons Used with Post-Top-Mounted Luminaires
IEEE C136.3	(2005) Roadway and Area Lighting Equipment Luminaire Attachments
IEEE C2	(2002) National Electrical Safety Code
IEEE Std 100	(2000) The Authoritative Dictionary of IEEE Standards Terms

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

IEC 60068-2-30	(2009) Environmental Testing - Part 2- Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)
IEC 60068-2-14	(2009) Environmental Testing - Part 2-14: Tests - Test N: Change of Temperature

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2003) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA 60529	(2004) Degrees of Protection provided by enclosures (IPCode) (IEC 60529) NEMA C136.3 (2005) Roadway and Area Lighting Equipment Luminaire Attachments
NEMA C136.10	2006) American National Standard for Roadway Lighting Equipment-Locking- Type Photocontrol Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing
NEMA C136.3	(2005) Roadway and Area Lighting Equipment Luminaire Attachments
NEMA ICS 2	(2000; R 2004) Industrial Controls and Systems: Controllers, Contactors, and Overload Relays Rated Not More than 2000 Volts AC or 750 Volts DC
NEMA ICS 6	(1993; R 2001) Industrial Control and Systems: Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2005) National Electrical Code
NFPA 72	(2010; TIA 10-4) National Fire Alarm and Signaling Code

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

Energy Star (1992; R 2006) Energy Star Energy Efficiency Labeling System

UNDERWRITERS LABORATORIES (UL)

UL 1598 2008; Rev thru Jan 2010) Luminaires

UL 8750 (2009) UL Standard for Safety for Light Emitting Diode (LED) Equipment for Use in Lighting Products,

UL 773 (1995; Rev thru Mar 2002) Plug-In Locking Type Photocontrols for Use with Area Lighting

1.2 DEFINITIONS

- a. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, shall be as defined in IEEE Std 100.
- b. Average life is the time after which 50 percent will have failed and 50 percent will have survived under normal conditions.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Photometric Plan; G,

Submit computer generated photometric analysis of the designed to values for the "end of useful life" of the lighting installation, using an LLD value of 0.7. Submittal shall include the following:

- Horizontal illuminance measurements at finished grade.
- Spacing between computer calculation points must be 10'
- Vertical illuminance measurements at 5 foot above finished grad
- Minimum footcandle level
- Maximum footcandle level
- Average maintained footcandle level
- Maximum and minimum ratio (Horizontal)

Design Data For Luminaires; G,

Warranty; G,

SD-02 Shop Drawings

Luminaire drawings; G,

SD-03 Product Data

Energy Efficiency; G,

Luminaries; G,

Lighting contactor; G,

Photocell switch; G,

ARS/Brackets; G,

SD-05 Design Data

Design Data for Luminaries; G,

SD-06 Test Reports

IESNA LM-79 Report; G,

Submit report on manufacturer's standard production model luminaire. LM-79 submittal shall include:

- Testing agency, report number, date, manufacturer's name, catalog number, LED driver, drive current, ambient temperature
- Luminaire Efficacy (Lumens/watt)
- Color Qualities (CCT and CRI)
- Electrical Measurements (input voltage, input current, input power (watts))
- Spectral Distribution over visible wavelengths (mW/nm)

In addition, submittal shall include the following based on the LM-79 testing:

- Picture of sample
- Isocandela Plot
- Luminance Summary table
- Illuminance - Point to Point
- Illuminance - Isofootcandle Plot
- Absolute Intensity Candlepower (cd) Summary table
- Photometric File including B.U.G rating in IES Format

IESNA LM-80 Report;G,

Submit report on manufacturer's standard production LED package, array, or module. Submittal shall include:

- Testing agency, report number, date, type of equipment, and LED light source being tested.
- All data required by IESNA LM-80

Operating Test; G,

Test laboratories for the IESNA LM-79 and IESNA LM-80 reports shall be one of the following:

National Voluntary Laboratory Accreditation Program (NVLAP) accredited for solidstate lighting testing as part of the Energy-Efficient Lighting Products laboratory accreditation program.

One of the qualified labs listed on the DOE SSL web site (http://www1.eere.energy.gov/buildings/ssl/test_labs.html).

A manufacturer's in-house lab that meets the following criteria:

- a) Manufacturer has been regularly engaged in the design and production of high intensity discharge roadway and area luminaires and the manufacturer's lab has been successfully certifying these fixtures for a minimum of 15 years.
- b) Annual equipment calibration including photometer calibration in accordance with National Institute of Standards and Technology.

SD-07 Certificates

Fixture Useful Life Certificate; G,

Submit certification from the manufacturer indicating the expected useful life of the luminaires provided. The useful life shall be directly correlated to the IESNA LM-80 test data, adjusted for the thermal properties of manufacturer's luminaire, and adjusted for local average ambient operating conditions.

1.4 QUALITY ASSURANCE

1.4.1 Drawing Requirements

1.4.1.1 Luminaire Drawings

Include dimensions, effective projected area (EPA), accessories, and installation and construction details.

1.4.2 Design Data for Luminaires

- a. Distribution data according to IESNA classification type as defined in IESNA HB-9.
- b. Shielding as defined by IESNA RP-8 or B.U.G. rating for the installed position as defined by IESNA TM-15
- c. Provide safety certification and file number for the luminaire family. Include listing, labeling and identification per NFPA 70 (NEC). Applicable testing bodies are determined by the US Occupational Safety Health Administration (OSHA) as Nationally Recognized Testing Laboratories (NRTL) and include: CSA (Canadian Standards Association), ETL (Edison Testing Laboratory), and UL (Underwriters Laboratory).

1.4.3 Standard Products

Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer. Component parts of the item shall be the products of the same manufacturer, unless stated otherwise in this section.

1.4.4 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable

if the manufacturer has been regularly engaged in the design and production of high intensity discharge roadway and area luminaires for a minimum of 15 years. Products shall have been in satisfactory commercial or industrial use for 15 years prior to bid opening. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 15-year period.

1.4.5 Alternative Qualifications

Products having less than a 2-year field service record will be acceptable if the manufacturer has been regularly engaged in the design and production of high intensity discharge roadway and area luminaires for a minimum of 15 years. Products shall have been in satisfactory commercial or industrial use for 15 years prior to bid opening. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 15-year period.

1.4.6 Material and Equipment Manufacturing Date

Products manufactured more than 1 year prior to date of delivery to site shall not be used, unless specified otherwise.

1.4.7 Energy Efficiency

Comply with National Energy Policy Act. Comply with Energy Star requirements for the following lighting products: LED Cobra head fixtures.

1.4.8 Warranty

Life of exterior LED lighting (primarily the luminaire) is not yet well understood given the relative newness of the technology for this application. Projected life of LED luminaires is a key component to payback scenarios in project evaluations, therefore it is very important that products perform as anticipated. Since life claims provided by suppliers is typically 50,000 hours or greater and the first cost of exterior LED luminaires may be significant, site Warranty shall assure that the product will perform as claimed in terms of useful life. The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

Provide a written five year on-site replacement warranty for material, fixture finish, and workmanship. On-site replacement includes transportation, removal, and installation of new products.

Finish warranty shall include warranty against failure and against substantial deterioration such as blistering, cracking, peeling, chalking, or fading. Material warranty shall include:

- All power supply units (PSUs), including drivers.
- Replacement when more than 10% of LED sources in any lightbar or subassembly(s) are defective or non-starting.
- Warranty period must begin on date of beneficial occupancy. Contractor shall provide the Contracting Officer signed warranty certificates prior to final payment

PART 2 PRODUCTS

2.1 LUMINARIES

UL 1598 and UL 8750. Provide luminaires as indicated. Provide luminaires complete with LED light source and power supply unit. Details, shapes, and dimensions are indicative of the general type desired, but are not intended to restrict selection to luminaires of a particular manufacturer. Luminaires of similar designs, light distribution and brightness characteristics, and of equal finish and quality will be acceptable as approved.

2.1.1 GENERAL REQUIREMENTS

All hardware to be stainless steel.

All wiring to have modular connectors for ease of removal.

EPA - .52 sq. ft. and max weight 17 lbs.

Luminaire operation to be circuit controlled at installation site.

The assembly and manufacturing process for the LED luminaire shall be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

IES files (per L-79) must be submitted for application approval by USMC personnel.

Measurements based on photopic calculations.

Certification submitted by manufacturer to meet Buy America requirements

Warranty: to be free from defects in material and workmanship for a period of five (5) years for metal parts, a period of ten (10) years for paint finishes, and a period of six (6) years or 20,000 operating hours (whichever comes first) for LED Light Engines and LED power components, from the date of sale.

a. Luminaire shall be UL-listed for wet locations and wiring cavity must be field accessible for service or repair needs.

b. Luminaire shall be full cutoff or fully shielded as defined by IESNA RP-8. Alternatively, the full cutoff can be validated by meeting the following IESNA TM-15 B-U-G Ratings (backlight, uplight, and glare):

- maximum uplight (U) rating of U0 for all areas.
- maximum glare (G) rating equal to G2 for all areas.

c. Optical system for roadway and area luminaires shall be sealed and rated for IP 66 as defined in NEMA 60529.

d. Luminaire shall be fully assembled and electrically tested prior to shipment from factory.

e. For all mast arm mounted luminaires, a wildlife shield shall be included in the fixture to prevent wildlife access to the fixture.

f. The coating must be capable of surviving ASTM B 117 Salt Fog environment for 1000 hrs minimum without blistering or peeling.

- g. The coating shall demonstrate gloss retention of greater than or equal to 90% for 1000 hrs exposure QUV test per ASTM G 154 UVB-313 Lamps, 4 hr Condensation 50 °C.
- h. Luminaire shall be tested according to IEC 60068-2-14 for thermal shock. Luminaire shall be fully functional after completion of testing.
- i. Luminaire shall be tested according to IEC 60068-2-30, damp heat, steady state, for high humidity and high temperatures. Luminaire shall be fully functional after testing.
- j. Luminaire arm bolts shall be 304 stainless steel or zinc plated steel.
- k. If a lens not integral to the LED is used, construct the luminaire optical enclosure (lens/window) of clear and UV-resistant acrylic or tempered glass.
- l. 80% of the luminaire material by weight should be recyclable at end of life.
- m. Produce a minimum efficacy of 60 lumens per Watt driven at 350mA or a minimum of 50 lumens per Watt driven at 525mA tested per IESNA LM-79. Theoretical models of initial raw LED lumens per watt are not acceptable.
- n. Incorporate modular electrical connections and construct luminaire to allow replacement of all or any part of the optics, heat sinks, power supply units, and electrical components using only a simple tool, such as a screwdriver.
- o. Luminaire shall have a nameplate bearing the manufacturer's name, address, model number, date of manufacture, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.
- p. Fixture weight and effective projected area (EPA) shall not exceed the pole requirements for wind loading. Provide wind-loading calculations.
- q. Roadway and area luminaires shall have an integral tilt adjustment of +/- 5° to allow the unit to be leveled, in accordance with NEMA C136.3.
- r. Luminaire must pass 3G vibration testing in accordance with ANSI C136.31.

2.1.2 Housing

Top housing is one-piece die-cast with no exposed heat sink components.

Low copper (<0.6% Cu) A360 aluminum alloy used for all die castings.

Integral cooling ribs over the electrical compartment to transfer heat away from components.

Solid barrier wall separating optical and electrical compartments.

Toolless entry for both electrical compartment and optical compartment.

One-piece extruded and vulcanized silicone gasket seals the housing against the lens surface to provide IP66 rated optical compartment.

2.1.3 Electronic Driver Module

Integral hinges for door attachment and toolless slide latch constructed with stainless steel hardware.

All electronic components are UL and CSA recognized.

Components mounted directly to the ballast tray for maximum heat dissipation.

All wiring terminated with toolless disconnect plugs.

2.1.4 Lens

Clear 3/16" thick tempered glass lens retained by a stainless steel piano hinge and a single die-cast aluminum cam-latch.

Edges camouflaged to conceal the outer portion of the housing and glare reduction.

2.1.5 Optical Module (Lamps)

Max system watts 73W

Precision injection molded, high specular reflectors positioned to achieve directional control toward desired task.

Secondary high specular reflector 95% panels surround the module to redirect light downward to optimize stray light into main beam efficiency.

For glare reduction, no more than 50% of the diodes are viewable at any viewing angle.

No fasteners are placed on the reflective surfaces.

Optical assembly fastens to the housing as a one-piece module.

Light Emitting Diode CCT (correlated color temperature) 4000°-4800° K or as approved by USMC.

Conformal coating on PC board assembly to provide additional water vapor barrier beyond IP66 cavity rating

LED optical modules assembled with integral heat sink

IDA approved to meet reduced uplight requirements;

Photometric testing per IESNA LM-79 procedure.

LEDs tested and confirmed per IESNA LM-80 procedures.

Submittals require LM-79 and LM-80 reports from an independent test lab for confirmation.

Veiling luminance ratio less than or equal to a flat glass 150W HPS cobrahead (.23 typical)

LED light engine assembly contains heat sink, LED PC board configuration and parallel wiring for ease of removal. Light engine must be field upgradeable with minimal effort and modular wiring connections to provide flexibility and incorporation of technology advances.

Thermal junction temperature module to monitor and control thermal operation of LED components. Integral thermal protection is standard with sensors at PC board level to monitor ambient temperatures every 30 seconds and moderate LED performance via dimming to extend life and performance.

In the loss of an LED, the system will not increase the current draw of the remaining LEDs and the LED component can be field replaced without the removal of the entire light engine.

Transient voltage surge suppression as standard equipment to meet ANSI C62.41.2 guidelines

2.1.6 Wiring

All factory electrical connections shall be made using crimp, locking, or latching style connectors. Twist style wire nuts are not acceptable.

2.1.7 Power Supply Units

UL 1310. Power Supply Unit (PSU) including drivers shall meet the following requirements:

- a. Minimum efficiency of 85%
- b. Drive current per LED shall not exceed 525mA \pm 10%
- c. Rated to operate between ambient temperatures of -30°C and +50°C
- d. Designed to operate on voltage system to which they are connected ranging from 120 V to 277 V nominal.
- e. Operating frequency: 50/60 Hz
- f. Power Factor (PF): \geq 0.90
- g. Total Harmonic Distortion (THD) current: \leq 20%
- h. FCC Title 47 Section 15, Class B
- i. Reduction of Hazardous Substances (RoHS) compliant.

2.1.8 LED Light Source

- a. Luminaires must be rated for operation in ambient temperatures of -30°C to +50°C.
- b. Correlated Color Temperature (CCT) shall be in accordance with ANSI C78.377.
Nominal CCT: 4000 K: (3985 \pm 275 K) to 4500 K: 4503 \pm 243 K
- c. Color Rendering Index (CRI) shall be: \geq 70 for 4000 K - 4800 K

2.1.9 Mounting Arm

Heavy cast, low copper aluminum (<0.6% Cu) alloy with stainless steel mounting bolts.

Arm designed to fit 1-1/2' mast arm bracket (1.625" OD).

Mounting bolts arranged to accommodate leveling of luminaire during installation.

Painted to match luminaire housing.

2.1.10 Paint

Super TGIC thermoset polyester powder coat paint, 2.5 mil nominal thickness, applied over a titanated zirconium conversion coating.

Meet ASTM B 117 2500 hour salt spray test endurance rating.

2.1.11 Ratings

UL 1598

IP66 rated optical compartment for water and dust protection

25° C operating ambient

IDA approved

2.2 ELECTRICAL SYSTEM

2.2.1 Surge Protection

Provide surge protection integral to luminaire to meet "C Low" waveforms as defined in IEEE C62.41.2, Scenario 1 Location Category C.

2.2.2 Photocell Switch

UL 773 or UL 773A, hermetically sealed cadmium-sulfide or silicon diode type cell, rated 277 volts ac, 60 Hz, with single-throw contacts for mechanically held contactors rated 1800 watts designed to fail to the ON position. Switch shall turn on at or below 32 lux (3 footcandles) and off at 43 to 107 lux (4 to 10 footcandles). A time delay shall prevent accidental switching from transient light sources. Provide a directional lens in front of the cell to prevent fixed light sources from creating a turnoff condition. Provide switch:

- a. Compliant with Reduction of Hazardous Substances (RoHS).
- b. Utilizing an ambient light sensing technology which inherently minimizes the contribution of typical high power LED light sources to the sensed light level.
- c. With a rated life expectancy of 90,000 hours continuous operation
- d. In a high-impact-resistant, noncorroding and nonconductive molded plastic housing with a locking-type receptacle conforming to NEMA C136.10 and rated 1800 VA, minimum.
- e. In a cast weatherproof aluminum housing with adjustable window slide, rated 1800 VA, minimum.
- f. In a U.V. stabilized polycarbonate housing with swivel arm and adjustable window slide, rated 1800 VA, minimum.
- g. Integral to the luminaire, rated 1000 VA, minimum.

2.3 LIGHTING CONTACTOR

NEMA ICS 2, electrically held contactor. Rate contactor as indicated. Provide in NEMA enclosure conforming to NEMA ICS 6. Contactor shall have silver alloy double-break contacts and shall require no arcing contacts. Provide contactor with hand-off-automatic selector switch.

2.4 BRACKETS AND SUPPORTS

IEEE C136.3, IEEE C136.13, and IEEE C136.21, as applicable. Slip-fitter or pipe-threaded brackets may be used, but brackets shall be coordinated to

luminaires provided, and brackets for use with one type of luminaire shall be identical. Brackets for pole-mounted street lights shall correctly position luminaire no lower than mounting height indicated. Mount brackets not less than 24 feet above street. Special mountings or brackets shall be as indicated and shall be of metal which will not promote galvanic reaction with luminaire head.

2.5 EQUIPMENT IDENTIFICATION

2.5.1 Manufacturer's Nameplate

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

2.6 FACTORY APPLIED FINISH

Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA 250 corrosion-resistance test. Provide factory applied baked enamel finish in color as indicated on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to IEEE C2, NFPA 70, and to the requirements specified herein.

3.1.1 On Wood Poles

Remove overhead street lights, mounted arms, wiring and transformers and controls for the new lights.

(Note the new street lights are supplied 277 volts).

Provide and install new LED street lights, new mounting arms, wiring, 15KVA transformer(HIGH VOLTAGE TO BE 7200) (LOW VOLTAGE TO BE 277), WIRING TO BE AT LEAST # 12 THHN, controls to be replaced for 277 volts output.

3.1.2 Steel or Aluminum Poles

Remove overhead street lights, wiring and transformers and controls that don't feed the right voltage to the new lights.

Provide and install new LED street lights, wiring, transformer(HIGH VOLTAGE TO BE 7200) (LOW VOLTAGE TO BE 277), WIRING TO BE AT LEAST # 12 THHN, controls to be replaced for 277 volts output.

3.1.3 Photocell Switch Aiming

Aim switch according to manufacturer's recommendations.

3.1.4 GROUNDING

Ground noncurrent-carrying parts of equipment including metal poles, luminaires, mounting arms, brackets, and metallic enclosures in accordance to NFPA 72 . Where copper grounding conductor is connected to a metal

other than copper, provide specially treated or lined connectors suitable for this purpose.

3.1.5 FIELD APPLIED PAINTING

Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria. Painting shall be as specified in Section 09 90 00 PAINTS AND COATINGS.

3.2 FIELD QUALITY CONTROL

Upon completion of installation, verify that equipment is properly installed, connected, and adjusted. Conduct an [operating test](#) to show that the equipment operates in accordance with the requirements of this section.

-- End of Section --

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						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 30 00	SD-01 Preconstruction Submittals														
			List of contact personnel	1.3.1	G												
		01 32 17.00 20	SD-01 Preconstruction Submittals														
			Qualifications		G												
			Standard Activity ID Dictionary	1.5.2.3	G												
			Construction Network Analysis	1.6.2	G												
			Schedule														
			Baseline Network Analysis	1.6.4	G												
			Schedule														
		01 33 00	SD-01 Preconstruction Submittals														
			Submittal register	1.3.1	G												
		01 35 29	SD-01 Preconstruction Submittals														
			Accident Prevention Plan (APP)	1.7	G A												
			Activity Hazard Analysis (AHA)	1.8	G A												
			Crane Critical Lift Plan	1.7.1	G A												
			Crane Operators	1.6.1.3	G A												
			SD-06 Test Reports														
			Reports	1.12													
			Accident Reports	1.12.1													
			Monthly Exposure Reports	1.12.3													
			Crane Reports	1.12.4													
			Regulatory Citations and Violations														
			SD-07 Certificates														
			Confined Space Entry Permit	1.9													
			Hot work permit	1.9													

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																		(g)
		01 35 29	Contractor Safety Self-Evaluation Checklist	1.4	G A													
		01 35 40.00 20	SD-01 Preconstruction Submittals															
			Environmental Protection Plan	1.8	G													
			Instructor Qualifications	1.9.1														
			SD-03 Product Data															
			Life Cycle Assessments	1.7.2														
			Packaging	2.1.2														
			SD-06 Test Reports															
			Field Quality Control Reports	3.2														
			SD-07 Certificates															
			Environmental Regulatory Requirements	1.6														
			SD-08 Manufacturer's Instructions															
			Material Safety Data Sheets	1.7.1														
			SD-11 Closeout Submittals															
			Training Program	1.9.3														
			Protection of Natural Resources	3.1														
		01 45 00.00 20	SD-01 Preconstruction Submittals															
			Construction Quality Control (QC) Plan	1.6.1	G													
			Indoor Air Quality (IAQ) Management Plan	1.18	G													
			SD-11 Closeout Submittals															
			Training Outline	1.15.3	G													
			Video Recording	1.15.4	G													

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		01 45 00.00 20	Validation of Training Completion	1.15.6	G												
		01 50 00.00 20	SD-01 Preconstruction Submittals														
			Traffic control plan	1.7.2.1	G												
			SD-03 Product Data														
			Backflow preventers	1.3													
			SD-06 Test Reports														
			Backflow Preventer Tests	3.4	G												
			SD-07 Certificates														
			Backflow Tester	1.5	G												
			Backflow Preventers	1.3													
		01 57 19.00 20	SD-01 Preconstruction Submittals														
			Preconstruction Survey	1.5.1	G												
			Solid Waste Management Plan and Permit		G												
			Regulatory Notification	1.5.2	G												
			Environmental Protection Plan	3.1	G												
			Contractor Hazardous Material Inventory Log	3.5.1	G												
			Contractor Hazardous Material Inventory Log	3.6	G												
			Dirt and Dust Control Plan	3.14.1	G												
			SD-06 Test Reports														
			Laboratory Analysis Disposal Requirements														
			Erosion and Sediment Control Inspection Reports														

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		01 57 19.00 20	Storm Water Inspection Reports for General Permit														
			SD-11 Closeout Submittals														
			Waste Determination Documentation	3.5													
			Disposal Documentation for Hazardous and Regulated Waste	3.6.1													
			Contractor 40 CFR Employee Training Records														
			Solid Waste Management Report														
			Contractor Hazardous Material Inventory Log	3.5.1	G												
			Contractor Hazardous Material Inventory Log	3.6	G												
			Hazardous Waste/Debris Management	3.13.1													
		01 74 19	SD-01 Preconstruction Submittals														
			Waste Management Plan; G														
			SD-11 Closeout Submittals														
			Records	1.7													
		01 77 00.00 20	SD-10 Operation and Maintenance														
			Data														
			Equipment/Product Warranty List	1.4.1	G												
			SD-11 Closeout Submittals														
			As-Built Drawings	1.3.1	G												
			Record Of Materials	1.3.2	G												

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		26 56 00	SD-01 Preconstruction Submittals														
			Photometric Plan		G												
			Design Data For Luminaires	1.4.2	G												
			Warranty		G												
			SD-02 Shop Drawings														
			Luminaire drawings	1.4.1.1	G												
			SD-03 Product Data														
			Energy Efficiency		G												
			Luminaires	2.1	G												
			Lighting contactor	2.3	G												
			Photocell switch		G												
			ARS/Brackets		G												
			SD-05 Design Data														
			Design Data for Luminaires		G												
			SD-06 Test Reports														
			IESNA LM-79 Report		G												
			IESNA LM-80 Report		G												
			Operating Test	3.2	G												
			SD-07 Certificates														
			Fixture Useful Life Certificate		G												