

DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES

OFFICE ENGINEER

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July 19, 2012

03-Sac,Sut-99-36.6/36.9, 0.0/1.6

03-406604

Project ID 0300000614

HP21L-6203(048)

Addendum No. 1

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN SACRAMENTO AND SUTTER COUNTIES NEAR SACRAMENTO FROM 1.3 MILES NORTH OF ELVERTA ROAD TO 0.6 MILE NORTH OF RIEGO ROAD.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on Tuesday, July 31, 2012.

This addendum is being issued to revise the Project Plans, the Notice to Bidders and Special Provisions, the Bid book, the Federal Minimum Wages with Modification Number 7 dated 07/13/2012, and provide additional cross sections and the dgn files of Cross Section.

Project Plan Sheets 2, 159, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 183, 188, 246, and 247 are revised. Copies of the revised sheets are attached for substitution for the like-numbered sheets.

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," the second paragraph is revised as follows:

"The first order of work, Phase 1, shall be to construct the roads, ditches, berms, drainage systems, agricultural irrigation pipes and valves, and related work as shown for "RD1," "RD2," "RD3," and "RD4" lines as shown on the typical cross sections, layouts, drainage plans, and the rest of the project plans to maintain continual access, drainage, and irrigation for adjacent agricultural operations. Reclamation District 1000 (RD-1000) and Natomas Mutual Water Company (NMWC) own, operate, and maintain the irrigation and drainage canals in all four quadrants of the intersection of State Route 99 and Riego Road. The Contractor shall coordinate and cooperate with RD-1000, NMWC, property owners, and farmers during construction of the project. The Contractor shall anticipate that irrigation canals and drainage ditches will be in use for agricultural purposes, and that will not impede agricultural operations, including flows in RD-1000 and NMWC canals, ditches, and related facilities. The Contractor shall provide for temporary diversions of agricultural irrigation and drainage flows as necessary to construct the Phase 1 improvements. Relocation of RD-1000 and NMWC ditches shall be as described beginning on page 70 of the project Information Handout, under "Project Description." Full compensation for all coordination efforts, flow diversions, and dewatering as necessary for construction of Phase 1 improvements shall be considered as included in the various items of work involved and no additional compensation will be allowed therefor."

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In the Special Provisions, Section 10-3.07, "TRAFFIC PULL BOXES," is revised as follows:

"10-3.07 TRAFFIC PULL BOXES

All traffic pull box covers must be welded to frame with 3 inches minimum weld on each long side."

In the Special Provisions, Section 10-3.08, "ELECTRONIC MARKERS," is replaced with Section 10-3.08, "PULL BOX," as attached.

In the Special Provisions, Section 10-3.10, "TELEPHONE CABLE," the fifth paragraph is revised as follows:

"All conductors shall be terminated inside the telephone demarcation cabinet and the controller cabinet as shown on the plans. All connections from the terminal block TBO to Surge Suppressors and RJ-14 modular jack shall be via a cable consisting of 2 pairs of No. 22 solid conductors and shall meet the same specifications as the TC cable."

In the Special Provisions, Section 10-3.10, "TELEPHONE CABLE," the last paragraph is deleted.

In the Special Provisions, Section 10-3.11, "SERVICE," the following paragraph is added after the last paragraph:

"The Contractor must arrange with the service utility to complete service connections for temporary and existing signal and lighting during the stage construction. The Contractor must pay all costs and fees for the energy, line extension, and service connections required by the service utility except existing signal and lighting service fees for the energy. Inform the Engineer 15 days before the service connections are required."

In the Special Provisions, Section 10-3.16, "LIGHT EMITTING DIODE PEDESTRIAN SIGNAL FACE MODULES," is replaced with Section 10-3.16, "LIGHT EMITTING DIODE COUNTDOWN PEDESTRIAN SIGNAL FACE MODULES," as attached.

In the Special Provisions, Section 10-3.20, "LUMINAIRES," is replaced with Section 10-3.20, "LIGHT EMITTING DIODE LUMINAIRES," as attached.

In the Special Provisions, Section 10-3.23, "INTELLIGENT TRANSPORTATION SYSTEM EQUIPMENT," is revised as attached.

In the Special Provisions, Section 10-3.25, "WIRELESS VEHICLE DETECTOR SYSTEM," the Table is revised as follows:

		Quantity					
Part Number	Description	1-99	100-499	500-999	1000-1499	1500-2999	3000+
VSN240-F	Flush-Mount Wireless Sensor	480	470	446	422	398	366
VSN240-EPX	Epoxy (sealant) tube for Installation	\$68	\$67	\$64	\$60	\$57	\$52

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In the Special Provisions, Section 10-3.25, "WIRELESS VEHICLE DETECTOR SYSTEM," the fifth paragraph after the Table is revised as follows:

"The above price will be firm for orders placed on or before May 31, 2013, provided delivery is accepted within 90 days after the order is placed."

In the Bid book, in the "Bid Item List," Item 120 is revised, as attached.

To Bid book holders:

Replace page 8 of the "Bid Item List" in the Bid book with the attached revised page 8 of the Bid Item List. The revised Bid Item List is to be used in the bid.

Attached are additional cross sections and a copy of the dgn files of Cross Section.

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the Notice to Bidders section of the Notice to Bidders and Special Provisions.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the Bid book.

Submit bids in the Bid book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

This addendum, attachments and the modified wage rates are available for the Contractors' download on the Web site:

http://www.dot.ca.gov/hq/esc/oe/project_ads_addenda/03/03-406604

If you are not a Bid book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,



REBECCA D. HARNAGEL
Chief, Office of Plans, Specifications & Estimates
Office Engineer
Division of Engineering Services

Attachments

10-3.08 PULL BOX

GENERAL

Summary

This work includes installing a non-traffic-rated pull box as shown on the plans and as specified in these special provisions. Comply with Section 86-2.06, "Pull Boxes," of the Standard Specifications.

Submittals

Before shipping pull boxes to the jobsite, submit a list of materials, Contract number, pull box manufacturer, manufacturer's instructions for pull box installation, and your contact information to the Transportation Laboratory.

Submit reports for pull box from an NRTL-accredited lab to the Engineer.

Quality Control and Assurance

Pull boxes may be tested by the Department. Deliver pull boxes and covers to the Transportation Laboratory and allow 30 days for testing. When testing is complete, you will be notified. You must pick up the boxes and covers from the test site and deliver it to the job site.

Any failure of the pull box or the cover that renders the unit noncompliant with these specifications will be a cause for rejection. If the unit is rejected, you must allow 30 days for retesting. Retesting period starts when the replacement pull box is delivered to the test site. You must pay for all retesting costs. Delays resulting from submittal of noncompliant materials does not relieve you from executing the contract within the allotted time.

If the pull box submitted for testing does not comply with the specifications, remove the unit from the test site within 5 business days after notification that it is rejected. If the unit is not removed within that period, it may be shipped to you at your expense.

You must pay for all shipping, handling, and transportation costs related to the testing and retesting.

Functional Testing

The pull box and cover must be tested under ANSI/SCTE 77, "Specifications for Underground Enclosure Integrity."

Warranty

Provide a 2-year manufacturer replacement warranty for pull box and cover from the date of installation of the pull box and cover. All warranty documentation must be submitted to the Engineer before installation.

Replacement parts must be provided within 5 business days after receipt of failed pull box, cover, or both at no cost to the Department and must be delivered to the Department's Maintenance Electrical Shop at 11325 Sanders Drive, Rancho Cordova, CA 95742.

MATERIALS

The pull box and cover must comply with ANSI/SCTE 77, "Specifications for Underground Enclosure Integrity," for Tier 22 load rating and must be gray or brown in color.

Each pull box cover must have an electronic marker cast inside.

Extension for the pull box must be of the same material as the pull box and attached to the pull box to maintain the minimum combined depths as shown.

Include recesses for a hanger if a transformer or other device must be placed in a pull box.

The bolts, nuts, and washers must be a captive bolt design.

The captive bolt design must be capable of withstanding a torque range of 55 to 60 ft-lb and a minimum pull out strength of 750 lb. Perform the test with the cover in place and the bolts torqued. The pull box and cover must not be damaged while performing the test to the minimum pull out strength.

Stainless steel hardware must have an 18 percent chromium content and an 8 percent nickel content.

Galvanize ferrous metal parts under Section 75-1.05, "Galvanizing."
Manufacturer's instructions must provide guidance on:

1. Quantity and size of entries that can be made without degrading the strength of the pull box below Tier 22 load rating
2. Where side entries cannot be made
3. Acceptable method to be used to create the entry

Tier 22 load rating must be labeled or stenciled by the manufacturer on the inside and outside of the pull box and on the underside of the cover.

CONSTRUCTION

Do not install pull box in curb ramps or driveways.

A pull box for a post or a pole standard must be located within 5 feet of the standard. Place a pull box adjacent to the back of the curb or edge of the shoulder. If this is impractical, place the pull box in a suitable, protected, and accessible location.

10-3.16 LIGHT EMITTING DIODE COUNTDOWN PEDESTRIAN SIGNAL FACE MODULES

GENERAL

Summary

This work includes installing Light Emitting Diode (LED) countdown pedestrian signal face (PSF) module into standard Type A pedestrian signal housing. Comply with Section 86, "Electrical Systems," of the Standard Specifications, TEES and the California MUTCD.

Submittals

Before shipping to job site, submit the LED countdown PSF module and the following to the Transportation Laboratory:

1. Delivery form including district number, EA, and contact information
2. List containing serial numbers of all LED countdown PSF module anticipated for use
3. Installation manuals and schematic wiring diagram.
4. Manufacturer's name, trademark, model number, lot number, month and year of manufacture

Submit documentation of manufacturer's production quality assurance testing performed on LED countdown PSF module. The documentation must include test data that conforms to the specified requirements and the following:

1. Luminous intensity as specified in "Photometric Requirements" of these special provisions.
2. Power factor after burn-in.
3. Test current flow measurements in amperes after burn-in. Measured values must conform with design qualification figures and with this specification. The measured ampere values with rated voltage must be recorded on the product labels.

Failure to submit manufacturer test documentation will be cause for rejection.

Quality Control and Assurance

If the Engineer determines by visual inspection that there is exterior physical damage, assembly anomalies, scratches, abrasions, cracks, chips, discoloration, or other defects to surface of the lens, modules will be rejected.

The State will test LED countdown PSF module shipments as specified in ANSI/ASQ Z1.4. Testing will be completed within 30 days of delivery to the Transportation Laboratory. LED countdown PSF module submitted for testing must be representative of typical production units. LED countdown PSF module will be tested as specified in California Test 606. All parameters of the specification may be tested on the module.

Non-compliant materials will be rejected. You must resubmit new LED countdown PSF module or retesting and pick up the failed units within 7 days of written notification. If the failed materials are not removed within that period, it may be shipped to you at your expense. You must allow 30 days for retesting.

After successful testing, you must pick up the tested LED countdown PSF module from the Transportation Laboratory and deliver to the job site.

Warranty

You must provide a manufacturer's written warranty against defects in materials and workmanship for LED countdown PSF module for a minimum period of 60 months from the date of successful completion of acceptance testing. Replacement LED countdown PSF module must be provided within 15 days after receipt of failed module at no cost to the State, except for the cost of shipping. All warranty documentation must be submitted to the Engineer before installation. Replacement LED countdown PSF modules must be delivered to Department's Maintenance Electrical Shop at 11325 Sanders Drive, Rancho Cordova, California 95742.

MATERIALS

LED countdown PSF module must:

1. Be from the same manufacturer.
2. Be installed in standard Type A pedestrian signal housing.
3. Use LED as the light source.
4. Be designed to mount behind or replace face plates of standard Type A housing as specified in ITE publication, Equipment and Material Standards, Chapter 3, "Pedestrian Traffic Control Signal Indications" and the "California MUTCD."
5. Have a minimum power consumption of 10 W for the UPRASIED HAND.
6. Use required color and be ultra bright type rated for 100,000 hours of continuous operation for a temperature range of -40 to +74 °C.
7. Be able to replace signal lamp optical units.
8. Fit into pedestrian signal section housings without modifications.
9. Be a single, self-contained device, not requiring on-site assembly for installation.
10. Have the following information permanently marked on the back of module:
 - 10.1. Manufacturer's name
 - 10.2. Trademark
 - 10.3. Model number
 - 10.4. Serial number
 - 10.5. Lot number
 - 10.6. Month and year of manufacture
 - 10.7. Required operating characteristics, as follows:
 - 10.7.1. Rated voltage
 - 10.7.2. Power consumption
 - 10.7.3. Volt-ampere (VA)
 - 10.7.4. Power factor
11. Have prominent and permanent vertical markings for accurate indexing and orientation within the signal housing if a specific mounting orientation is required. Markings must include an up arrow, or the word "UP" or "TOP." Marking must be a minimum of 1-inch diameter.

Circuit board and power supply must be contained inside the LED countdown PSF module. Circuit board must comply with Chapter 1, Section 6 of TEES.

Individual LEDs must be wired so catastrophic loss or failure of 1 LED will not result in loss of more than 5 percent of the PSF module light output. Failure of an individual LED in a string must not result in the loss of entire string. or the indication.

LEDs must be evenly distributed in each indication. Do not use outline shape.

No special tools for installation are allowed.

Installation of the LED countdown PSF module into pedestrian signal face must require only removal of lenses, reflectors, lamps, and existing LED modules.

Assembly and manufacturing processes for LED countdown PSF module must assure that all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Material used for LED countdown PSF module must comply with ASTM D 3935.

Enclosures containing the power supply or electronic components of LED countdown PSF module, except lenses, must be made of UL94VO flame-retardant material.

Each symbol must not be less than 9 inches high and 5.25 inches wide. The uniformity of the signal output across the emitting section of the module lens for the WALKING PERSON and UPRASIED HAND symbol and the countdown display must not exceed a ratio of 5 to 1 between highest and lowest luminance values. Symbols must comply with ITE publication, Equipment and Material Standards, Chapter 3, "Pedestrian Traffic Control Signal Indications," and the "California MUTCD."

LED countdown PSF module must be designed to operate over the specified ambient temperature and voltage range, and be readable (both day and night) at all distances from 10 feet to the full width of the area to be crossed.

LED countdown PSF module must maintain an average luminance value over 60 months of continuous use in signal operation for a temperature range of -40 to +74 °C. In addition, LED countdown PSF module must meet or exceed the following luminance values upon initial testing at 25 °C.

PSF module	Luminance
UPRAISED HAND and two digit Countdown	1,094 FL
WALKING PERSON	1,547 FL

Color output of LED countdown PSF module must comply with chromaticity requirements in Section 5.3 of ITE publication, Equipment and Material Standards, Chapter 3, "Pedestrian Traffic Control Signal Indications."

Measured chromaticity coordinates of LED countdown PSF module must comply with the following chromaticity requirements for 60 months when operating over a temperature range of -40 to +74 °C.

UPRAISED HAND and COUNTDOWN TIMER (portland orange)	Not greater than 0.390, nor less than 0.331, nor less than 0.997-X
WALKING PERSON (lunar white)	X: not less than 0.280, nor greater than 0.320 Y: not less than 1.055*X - 0.0128, nor greater than 1.055*X + 0.0072

LED countdown PSF module maximum power consumption must not exceed the following values:

PSF module	Power Consumption @ 24 °C	Power Consumption @ 74 °C
UPRAISED HAND	10.0 W	12.0 W
WALKING PERSON	9.0 W	12.0 W
Two digit COUNTDOWN TIMER	6.0 W	8.0 W

Wiring and terminal block must comply with Section 13.02 of ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads." The LED countdown PSF module must be supplied with spade lugs and 3 secured, color-coded, 3-foot long, 600 V(ac), 20 AWG minimum stranded jacketed copper wires. Wires must comply with NEC, rated for service at +105 °C.

LED countdown PSF module must operate:

1. At a frequency of 60 ± 3 Hz over a voltage range from 95 to 135 V(ac) without perceptible flicker to the unaided eye. Fluctuations of line voltage must have no visible effect on luminous intensity of the indications. Rated voltage for measurements must be 120 V(ac).
2. Compatible with currently used State controller assemblies including solid state load switches, flashers, and conflict monitors. Comply with TEES Chapters 3 and 6. If a 20 ma alternating current or less is applied to the unit, the voltage read across the 2 leads must be 15 V(ac) or less.
3. Where the control and regulation module must be "smart" to exhibit countdown displays automatically adjusted with the traffic controller programmed intervals.
4. The mode of operation of the countdown PSF module must be during the pedestrian change interval. The module will begin counting down when the flashing "Upraised Hand" interval turns on counting down to "0" and turn off when the steady "Upraised Hand interval" turns on.

LED countdown PSF module on-board circuitry must:

1. Include voltage surge protection to withstand high-repetition noise transients. The voltage surge protection must comply with NEMA Standard TS2, Section 2.1.6.
2. Comply with FCC, Title 47, SubPart B, Section 15 regulations for Class A emission limits for electronic noise.

LED countdown PSF module must provide a power factor of 0.90 or greater.

Total harmonic distortion from current and voltage induced into an alternating current power line by LED countdown PSF module must not exceed 20 percent at an operating temperature of 25 °C.

The LED countdown PSF module circuitry must prevent perceptible light emission to the unaided eye when a voltage, 50 V(ac) or less is applied to the unit.

When power is applied to LED countdown PSF module, light emission must occur within 90 ms.

The "UPRAISED HAND" and "WALKING PERSON" symbol indications must be electrically isolated from each other. Sharing a power supply or interconnect circuitry between the 3 indications is not allowed.

MEASUREMENT AND PAYMENT

Full Compensation for installing light emitting diode countdown pedestrian signal face module is included in the contract lump sum price paid for signal and lighting, and no additional compensation will be allowed therefor.

10-3.20 LIGHT EMITTING DIODE LUMINAIRES

GENERAL

Summary

This work includes installing LED luminaires. Comply with Section 86, "Electrical Systems," of the Standard Specifications.

Definitions

CALiPER: Commercially Available LED Product Evaluation and Reporting. A U.S. DOE program that individually tests and provides unbiased information on the performance of commercially available LED luminaires and lights.

correlated color temperature: Absolute temperature in kelvin of a blackbody whose chromaticity most nearly resembles that of the light source.

house side lumens: Lumens from a luminaire directed to light up areas between the fixture and the pole (e.g., sidewalks at intersection or areas off of the shoulders on freeways).

International Electrotechnical Commission (IEC): Organization that prepares and publishes international standards for all electrical, electronic and related technologies.

junction temperature: Temperature of the electronic junction of the LED device. The junction temperature is critical in determining photometric performance, estimating operational life, and preventing catastrophic failure of the LED.

L70: Extrapolated life in hours of the luminaire when the luminous output depreciates 30 percent from initial values.

LM-79: Test method from the Illumination Engineering Society of North America (IESNA) specifying test conditions, measurements, and report format for testing solid state lighting devices, including LED luminaires.

LM-80: Test method from the IESNA specifying test conditions, measurements, and report format for testing and estimating the long term performance of LEDs for general lighting purposes.

National Voluntary Laboratory Accreditation Program (NVLAP): U.S. DOE program that accredits independent testing laboratories to qualify.

power factor: Ratio of the real power component to the complex power component.

street side lumens: Lumens from a luminaire directed to light up areas between the fixture and the roadway (e.g., traveled ways, freeway lanes).

surge protection device (SPD): Subsystem or component that can protect the unit against short duration voltage and current surges.

total harmonic distortion: Ratio of the rms value of the sum of the squared individual harmonic amplitudes to the rms value of the fundamental frequency of a complex waveform.

Submittals

Submit a sample luminaire to the Transportation Laboratory for testing after the manufacturer's testing is completed. Include the manufacturer's testing data.

Product submittals must include:

1. LED luminaire checklist.
2. Product specification sheets, including:
 - 2.1. Maximum power in watts.
 - 2.2. Maximum designed junction temperature.
 - 2.3. Heat sink area in square inches.
 - 2.4. Designed junction to ambient thermal resistance calculation with thermal resistance components clearly defined.
 - 2.5. L70 in hours when extrapolated for the average nighttime operating temperature.
3. IES LM-79 and IES LM-80 compliant test reports from a CALiPER-qualified or NVLAP-approved testing laboratory for the specific model submitted.
4. Photometric file based on LM-79 test report.
5. Initial and depreciated isofootcandle diagrams showing the specified minimum illuminance for the particular application. The diagrams must be calibrated to feet and show a 40' x 40' grid. The diagrams must be calibrated to the mounting height specified for that particular application. The depreciated isofootcandle diagrams must be calculated at the minimum operational life.

6. Test report showing SPD performance as tested under ANSI/IEEE C62.41.2 and ANSI/IEEE C62.45.
7. Test report showing mechanical vibration test results as tested under California Test 611 or equal.
8. Data sheets from the LED manufacturer that include information on life expectancy based on junction temperature.
9. Data sheets from power supply manufacturer that include life expectancy information.

Submit documentation of a production QA performed by the luminaire manufacturer that ensures the minimum performance levels of the modules comply with these specifications and includes a documented process for resolving problems.

Submit warranty documentation before installing LED luminaires.

Quality Control and Assurance

General

The Department may perform random sample testing on the shipments. The Department completes testing within 30 days after delivery to Transportation Laboratory. Luminaires are tested under California Test 678. All parameters specified in these specifications may be tested on the shipment sample. When testing is complete, the Department notifies you. Pick up the equipment from the test site and deliver to the job site.

One sample luminaire must be fitted with a thermistor or thermo-couple temperature sensor. A temperature sensor must be mounted on the LED solder pad as close to the LED as possible. A temperature sensor must be mounted on the power supply case. Light bar or modular systems must have 1 sensor for each module mounted as close to the center of the module as possible. Other configurations must have at least 5 sensors per luminaire. Contact the Transportation Laboratory for advice on sensor location. Thermocouples must be either Type K or C. Thermistors must be a negative temperature coefficient type with a nominal resistance of 20 k Ω . The appropriate thermocouple wire must be used. The leads must be a minimum of 6 feet. Documentation must accompany the test unit that details the type of sensor used.

The sample luminaires must be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at a temperature of +70 °F before performing any testing.

The luminaire lighting performance must be depreciated for the minimum operating life by using the LED manufacturer's data or the data from the LM-80 test report, whichever results in a higher lumen depreciation.

Failure of the luminaire that renders the unit noncompliant with these specifications is cause for rejection. If a unit is rejected, allow 30 days for retesting. The retesting period starts when the replacement luminaire is delivered to the test site.

If a luminaire submitted for testing does not comply with these specifications, remove the unit from the Transportation Laboratory within 5 business days after notification that it is rejected. If the unit is not removed within that period, the Department may ship the unit to you and deduct the cost.

Warranty

Furnish a 7-year replacement warranty from the manufacturer of the luminaires against any defects or failures. The effective date of the warranty is the date of installation. Furnish replacement luminaires within 10 days after receipt of the failed luminaire. The Department does not pay for the replacement. Deliver replacement luminaires to the following Department Maintenance Electrical Shop at 11325 Sanders Drive, Rancho Cordova, California 95742.

MATERIALS

General

The luminaire must include an assembly that uses LEDs as the light source. The assembly must include a housing, an LED array, and an electronic driver. The luminaire must:

1. Be UL listed under UL 1598 for luminaires in wet locations or an equivalent standard from a recognized testing laboratory
2. Have a minimum operational life of 63,000 hours
3. Operate at an average operating time of 11.5 hours per night
4. Be designed to operate at an average nighttime operating temperature of 70 °F
5. Have an operating temperature range from -40 to +130 °F
6. Be defined by the following application:

Application	Replaces
Roadway 1	200 Watt HPS mounted at 34 ft
Roadway 2	310 Watt HPS mounted at 40 ft
Roadway 3	310 Watt HPS mounted at 40 ft with back side control
Roadway 4	400 Watt HPS mounted at 40 ft

The individual LEDs must be connected such that a catastrophic loss or a failure of 1 LED does not result in the loss of more than 20 percent of the luminous output of the luminaire.

Luminaire Identification

Each luminaire must have the following identification permanently marked inside the unit and outside of its packaging box:

1. Manufacturer's name
2. Trademark
3. Model no.
4. Serial no.
5. Date of manufacture (month-year)
6. Lot number
7. Contract number
8. Rated voltage
9. Rated wattage
10. Rated power in VA

Electrical

The luminaire must operate from a 60 ± 3 Hz AC power source. The fluctuations of line voltage must have no visible effect on the luminous output. The operating voltage must range from 120 to 480 V(ac). The luminaire must operate over the entire voltage range or the voltage range may be selected from either of the following options:

1. Luminaire must operate over a voltage range of 95 to 277 V(ac). The operating voltages for this option are 120 V(ac) and 240 V(ac).
2. Luminaire must operate over a voltage range of 347 to 480 V(ac). The operating voltage for this option is 480 V(ac).

The power factor of the luminaire must be 0.90 or greater. Total harmonic distortion, current and voltage, induced into an AC power line by a luminaire must not exceed 20 percent. The maximum power consumption allowed for the luminaire must be as shown in the following table:

Application	Maximum Consumption (Watts)
Roadway 1	165
Roadway 2	235
Roadway 3	235
Roadway 4	300

Surge Suppression and Electromagnetic Interference

The luminaire on-board circuitry must include an SPD to withstand high repetition noise transients caused by utility line switching, nearby lightning strikes, and other interferences. The SPD must protect the luminaire from damage and failure due to transient voltages and currents as defined in Tables 1 and 4 of ANSI/IEEE C64.41.2 for location category C-High. The SPD must comply with UL 1449. The SPD performance must be tested under ANSI/IEEE C62.45 based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High.

The luminaires and associated on-board circuitry must comply with the Class A emission limits provided in 47 CFR 15, subpart B concerning the emission of electronic noise.

Compatibility

The luminaire must be operationally compatible with currently used lighting control systems and photoelectric controls.

Photometric Requirements

The luminaire must maintain a minimum illuminance level throughout the minimum operating life. The L70 of the luminaire must be the minimum operating life or greater. The measurements must be calibrated to standard photopic calibrations. The minimum maintained illuminance values, measured at a point, must be as shown in the following table:

Application	Mounting Height (ft)	Minimum Maintained Illuminance (fc)	Light Pattern Figure (isofootcandle curve)
Roadway 1	34	0.15	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(82)^2} + \frac{(y - 20)^2}{(52)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.</p>
Roadway 2	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(82)^2} + \frac{(y - 20)^2}{(52)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 20 feet to the house side of the pattern.</p>
Roadway 3	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(92)^2} + \frac{(y - 23)^2}{(55)^2} = 1$ <p>for $y \geq 0$ (street side)</p> <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 23 feet to the house side of the pattern.</p>
Roadway 4	40	0.2	<p>Pattern defined by an ellipse with the equation:</p> $\frac{x^2}{(92)^2} + \frac{(y - 23)^2}{(55)^2} = 1$ <p>where: x = direction longitudinal to the roadway y = direction transverse to the roadway and the luminaire is offset from the center of the pattern by 23 feet to the house side of the pattern.</p>

The luminaire must have a correlated color temperature range from 3,500 to 6,500 K. The color rendering index must be 65 or greater.

The luminaire must not allow more than:

1. 10 percent of the rated lumens to project above 80 degrees from vertical
2. 2.5 percent of the rated lumens to project above 90 degrees from vertical

Thermal Management

The passive thermal management of the heat generated by the LEDs must have enough capacity to ensure proper operation of the luminaire over the minimum operation life. The LED maximum junction temperature for the minimum operation life must not exceed 221 °F.

The junction-to-ambient thermal resistance must be 95 °F per watt or less. The use of fans or other mechanical devices is not allowed. The heat sink material must be aluminum or other material of equal or lower thermal resistance.

The luminaire must contain circuitry that automatically reduces the power to the LEDs to a level that ensures the maximum junction temperature is not exceeded when the ambient outside air temperature is 100 °F or greater.

Physical and Mechanical Requirements

The luminaire must be a single, self-contained device, not requiring job site assembly for installation. The power supply for the luminaire is integral to the unit. The weight of the luminaire must not exceed 35 lb. The maximum effective projected area when viewed from either side or either end must be 1.4 sq ft. The housing color must match a color no. from 26152 to 26440 or from 36231 to 36375, or color no. 36440 of FED-STD-595.

The housing must be fabricated from materials designed to withstand a 3,000-hour salt spray test under ASTM B 117. All aluminum used in housings and brackets must be of a marine grade alloy with less than 0.2 percent copper. All exposed aluminum must be anodized.

Each refractor or lens must be made from UV-inhibited high impact plastic such as acrylic or polycarbonate or heat- and impact-resistant glass, and be resistant to scratching. Polymeric materials except lenses of enclosures containing either the power supply or electronic components of the luminaire must be made of UL94VO flame retardant materials. Paint or powder coating of the housing must comply with Section 86-2.16. A chromate conversion undercoating must be used underneath a thermoplastic polyester powder coat.

Each housing must be provided with a slip fitter capable of mounting on a 2-inch pipe tenon. This slip fitter must fit on mast arms with outside diameters from 1-5/8 to 2-3/8 inches. The slip fitter must be capable of being adjusted a minimum of ±5 degrees from the axis of the tenon in a minimum of five steps: +5, +2.5, 0, -2.5, -5. The clamping brackets of the slip fitter must not bottom out on the housing bosses when adjusted within the designed angular range. No part of the slip fitter mounting brackets on the luminaires must develop a permanent set in excess of 1/32 inch when the two or four 3/8-inch diameter cap screws used for mounting are tightened to 10 ft-lb. Two sets of cap screws may be furnished to allow the slip fitter to be mounted on the pipe tenon in the acceptable range without the cap screws bottoming out in the threaded holes. The cap screws and the clamping brackets must be made of corrosion resistant materials or treated to prevent galvanic reactions, and be compatible with the luminaire housing and the mast arm.

The assembly and manufacturing process for the LED luminaire must be designed to ensure internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources. When tested under California Test 611, the luminaire to be mounted horizontally on the mast arm must be capable of withstanding the following cyclic loading for a minimum of 2 million cycles without failure of any luminaire part:

Cyclic Loading

Plane	Power Supply	Minimum Peak Acceleration Level
Vertical	Installed	3.0 g peak-to-peak sinusoidal loading (same as 1.5 g peak)
Horizontal ^a	Installed	1.5 g peak-to-peak sinusoidal loading (same as 0.75 g peak)

^aPerpendicular to direction of mast arm

The housing must be designed to prevent the buildup of water on top of the housing. Exposed heat sink fins must be oriented to allow the water to freely run off of the luminaire and carry dust and other accumulated debris away from the unit. The optical assembly of the luminaire must be protected against dust and moisture intrusion to at least an ANSI/IEC rating of IP66. The power supply enclosure must be protected to at least an ANSI/IEC rating of IP43.

Each mounted luminaire must be furnished with an ANSI C136.10-compliant, locking type photocontrol receptacle and a rain tight shorting cap. The receptacle must comply with Section 86-6.08A, "Types," of the Standard Specifications.

Each mounted luminaire must be furnished with an ANSI C136.41-compliant, locking type photocontrol receptacle with dimming connections and a rain tight shorting cap. The receptacle must comply with Section 86-6.08A, "Types," of the Standard Specifications.

When the components are mounted on a down-opening door, the door must be hinged and secured to the luminaire housing separately from the refractor or flat lens frame. The door must be secured to the housing such that accidental opening is prevented. A safety cable must mechanically connect the door to the housing.

Field wires connected to the luminaire must terminate on a barrier type terminal block secured to the housing. The terminal screws must be captive and equipped with wire grips for conductors up to No. 6. Each terminal position must be clearly identified.

The power supply must be rated for outdoor operation and have at least an ANSI/IEC rating of IP65.

The power supply must be rated for a minimum operational life equal to the minimum operational life of the luminaire, or greater.

The power supply case temperature must have a self rise of 77 °F or less above ambient temperature in free air with no additional heat sinks.

The power supply must have 2 leads to accept standard 0-10 V(dc). Dimming control must be compatible with IEC 60929. If the control leads are open or the analog control signal is lost, the circuit must default to 100-percent power.

Conductors and terminals must be identified.

10-3.23 INTELLIGENT TRANSPORTATION SYSTEM EQUIPMENT

ETHERNET POWER CONTROLLER

The Ethernet power controller shall provide remote power management and control using two methods for accessing configuration and switching functions. The Command Line Interface shall be an ASCII menu system, which allows configuration and operation of the Ethernet power controller via telnet over TCP/IP network, via modem connection or via local PC using a terminal program such as Hyperterminal or TeraTerm.

The Ethernet power controller shall meet the following minimum technical requirements:

Features:

- A. Web Browser Access for Easy Setup and Operation
- B. Encrypted Password Security
- C. Expandable to Five Individual Outlets
- D. Each Outlet can Switch a 15 A Load
- E. On / Off / Reboot Switching
- F. IP Addressed, 10Base-T Interface
- G. EIA-232 Modem / Console Port
- H. Network Security Features
- I. Manual Power Control Button

Power Input/Output:

- A. AC Inputs: 15 Ampere (maximum)
- B. Voltage: 105 - 120 V(ac), 60 Hz
- C. Connectors: IEC-320 Inlet, Line Cord (supplied)
- D. AC Outputs: One , Expandable to Five
- E. Connector: NEMA 5-15 Outlet
- F. Load: 15 Amperes (total)

Console / Modem Port Interface:

- A. Connector: DE-9M, EIA-232, DTE (9-to-9 Pin provided)
- B. Coding: Serial ASCII, 8 Bits, No Parity

Physical / Environmental:

Size:

- A. Width: 19"
- B. Height: 3.5"
- C. Depth: 7.00"

Operation Temperature:

-40 to 165 °F

Humidity:

10 to 90 percent (relative humidity)

8-PORT ETHERNET SWITCH/EXTENDER

The ethernet switch/extender must be outdoor rated, managed network switch. The ethernet switch/extender must have a minimum capacity of eight network connections. The ethernet switch/extender must provide a minimum of two ethernet extender ports.

The ethernet switch/extender must meet FCC Part 15 emissions for Class A devices and be UL listed.

At the Contractor's option multiple devices may be provided to meet the requirements of these specifications.

The switching function portion of the 8-port ethernet switch/extender must meet or exceed the following:

8-Port Ethernet Switch

Description	Specifications
Ethernet Interface	10/100BaseT, IEEE 802.3 Ethernet compliant, Auto-sense, MDIX
Ports	EIA-568, STP and UTP, Ethernet Extender (minimum two ports)
Switching	Non-Blocking
Memory	128K packet buffer
Input Voltage	24 V(dc)
Operating Temp	-40 to +165 °F
Mounting	DIN Rail

The ethernet extender portion of the ethernet switch/extender must provide a point-to-point ethernet connection over the existing Caltrans telephone cable or any new network grade twisted pair cable installations. The ethernet extenders must come in pairs, ready to plug and play.

When two ethernet extenders are connected to the power source, the link must be established automatically on power up. The ethernet extender portion of the ethernet switch/extender must meet the following or better requirements:

Standards:

- A. 802.3 Ethernet (10Base-T)
- B. 802.3u Fast Ethernet(100Base-TX)
- C. 802.3x Flow Control
- D. ITU G.993.1 VDSL standard covering very high bit-rate digital line subscriber

Additional Ethernet Port Features:

- A. Supports back pressure for half-duplex operation.
- B. Supports EIA-232 console, Telnet, SNMP V1, V2c & V3, RMON, Web Browser, TFTP management, command line interface in EIA-232 console, 802.1x security, bandwidth rate control, port mirroring, full wire-speed forwarding rate, MAC address locking (per port programmable), static secure MAC addresses per port (up to 24)

Ethernet Extender Ports:

- A. Two RJ-14 and terminal block ports
- B. Speed and distance: 1 Mbps at 6232 ft; 50 Mbps at 984 ft

LED Indicators:

- A. Per Unit: Power Status (Power 1, Power 2, Power 3)
- B. Per Port: 10/100Tx, Link/Activity, Speed Extender Port, Link

Switching Features:

- A. Switching Method: Store-and-Forward
- B. MAC Address Table: minimum 8K addresses
- C. Dual auto-sensing 10/100 Mbps Ethernet ports with Auto MDIX

Power Requirements:

- A. Input: 12-48 V (dc)
- B. Terminal block

Operating Temperature:

-40 to +165 °F

Humidity:

5 to 95 percent Non-Condensing

DATA SURGE SUPPRESSOR

A data surge suppressor shall be furnished and installed between the data/power cable and the network equipment in the cabinet. The data surge suppressor shall have an integral mounting bracket for easy installation in the cabinet. It shall have a weather sealed stainless steel case. Connector weather proofing shall be included and provided. All eight data wires in the cable shall be individually protected.

The data surge suppressor shall meet as a minimum the following requirements:

RF Power: 30 W minimum;
Data Clamping Voltage: 15 V on pins 1, 2, 3 and 6;
Power Clamping Voltage, when used: 58 V on pins 4, 5, 7 and 8;
Energy Rating: 400 J;
Response time (maximum): 1 ns.

MULTIPLE AC OUTLET STRIP

A Multiple AC Outlet Strip shall be furnished and installed as shown on the project plans. The multiple outlet strip shall have operating transient and surge protection (OTSP). The OTSP can be integrated and part of the multiple outlet strip or it can be a separate standalone unit.

Description	Specifications
Mounting	19" rack or wall mountable
Outlet quantity	6 minimum
Electrical Rating	15 A, 125 V(ac)
Circuit Breaker	12 A, 125 V
Max Surge Current	36 kVA
Surge Protection	Hot-to-Neutral
Turn on Voltage	400 L-N, 400 L-G Volts
UL 1449 Rating	400 V minimum

CABLES AND CONDUCTORS

The Contractor must furnish cabled conductors to power Ethernet Switch and Ethernet Extenders.

The cabled conductors must be 2 Pair, 22 AWG, stranded, and tinned copper wires with PVC jacket type insulation.

All cables must be neatly secured by blue self-gripping cable tie wraps such as hook and loop fasteners to eliminate potentials of cable or conductor damage.

All cables and conductors must be installed with appropriate length and must be free from twisting, nicking and over-stretching.

UNIVERSAL TERMINAL BLOCKS

The Contractor must install 12 position screw connection type, 26 AWG to 12 AWG wire size, din rail mount type terminal blocks with a gray partition plate and gray snap-on end brackets.

Each terminal block must be numbered and the entire block must be labeled with permanent labels as shown on the plans.

The din rail must be perforated and be of height 0.30 inch, and length of at least 29.70 inch.

MODULAR SURFACE MOUNT JACKS

The Contractor must furnish surface mounted, 6 position RJ-11 modular telephone jacks for 4-wire telephone patch cables as shown on the plans.

The Contractor must use screws to install the surface mounted modular jacks.

STANDARD HALF SHELVES

The Contractor shall provide shelves that will fit the EIA 19" rack inside the controller cabinets as shown on the plans.

The shelves shall be:

- A. Gray, 15"(D) x 5"(H), half-shelf single-sided rack mountable for communication equipment
- B. Made of sturdy 0.090-in thick aluminum with airflow vents
- C. Capable of holding at least 50.0 lb
- D. Capable of holding equipment up to 1.70 in. wide

CATEGORY 5E CABLE

Category 5E cable shall be the unshielded, outdoor rated, non-gel filled type, and shall meet the requirements of TIA/EIA-568B.2, Category 5E Cable, and the following:

- A. The jacket shall be black, gray, or blue. The jacket shall be marked as required by NEMA. The jacket shall be marked at intervals of not more than 3 feet with the cable identification: manufacturer's name, product identification, number of conductors and conductor size, and voltage and temperature ratings. Cable length markings may be sequentially alternated with the cable identification markings at not more than every other interval.
- B. The finished outside diameter of the cable shall not exceed 1/2-inch.
- C. The cable run between components shall be continuous without splices. A minimum of 3 feet of slack shall be provided at each pull box, junction box or vault, and a minimum of 9 feet at each cabinet.

Ethernet GPRS Modem

The High Speed Ethernet GPRS modem capable of connecting to a General Packet Radio Service (GPRS) wireless data network must be furnished and installed as shown on the plans. The modem must be capable of providing high-speed connectivity as well as backup network connectivity including physical Serial and Ethernet connectivity for transmitting and receiving data from field controllers to the Transportation Management Center in Rancho Cordova via a frame relay connection.

The Contractor must provide SMA-M / TNC-F adaptor for SMA-F modem and TNC-M antenna connection.

The contractor must provide necessary power supplies, mounting hardware and wiring. The High Speed Ethernet GPRS modem shall meet or exceed the following requirements:

Description	Specifications
Network	Quad band 1900/850MHz and 1800/900 MHz GSM HSDPA/UMTS
Transmit Frequency	1850-1910 MHz and 824-849 MHz
Transmit Power Range At Antenna Port	1.0W for 1900 MHz and 0.8W for 850 MHz
Throughput	Up to 240 kbps, 100 to 130 kbps typical
Receiver Frequency	1930-1990 MHz and 869-894 MHz
Receiver Sensitivity	-107 dBm
Network Protocols	UDP/IP, TCP/IP, DHCP, HTTP
Features	NAT, Port forwarding, VPN pass-through, DES, 3DES and up to 256-bit AES Encryption, IPsec with IKE/ISAKMP, Multiple tunnel support, SCEP for X.509 certificates, IP filtering, HTTP, Web management
Security	SSL, SSH v2, FIPS 197
Ethernet Interface	IEEE 802.3, 10/100Base-T, 4 RJ45 switch ports, 10/100 Mbps (auto-sensing), Full or half duplex (auto-sensing)
Serial Interface	2 EIA RS232 DB-9M ports, Up to 230 kbps, hardware and software flow control, Full signal support for TX, RX, RTS, CTS, DTR, DSR and DCD, Hardware and software flow control
RF Antenna Connector	50 Ω SMA-F
Regulatory Approvals / Certifications	UL 60950, CE, CSA 22.2 No. 60950, EN60950, FCC Part 15, Class A, AS/NZS CISPR 22, EN55024, EN55022, Class A, PTCRB, NAPRD.03, GCF-CC, R&TTE, EN 301 511, GSM GPRS/EDGE, HSDPA/UMTS
LED Indicators	Ethernet, Power On, RSSI, Network, Link Status
Input Voltage	9 to 30 V(dc)
Input Current	40 to 200 mA
Operating Temperature	-40 to 165 °F
Max Weight	2.0lb
Max Size	4.0" (W) x 1.50"(H) x 8.0"(L)

Activation

Contractor must send all necessary activation information from the manufacturer to the Engineer in an electronic text format. With the information provided, the State will activate the modems after installation.

GPRS ANTENNA

The Contractor must furnish and install a GPRS Antenna at each location where a GPRS Modem will be-used. The GPRS antenna must have the following features or better:

Description	Specifications
Bandwidth	824 – 896 MHz and 1850 – 1990 MHz (Dual Band)
Polarization	Vertical
Nominal Impedance	50 ohms
Gain	3 dB
Radiation pattern	Omni-Directional
VSWR at resonant point	1.5:1 or Less
Maximum Power Input	125 Watts
Connector	TNC Male crimp type
Cable	50 ohms – 7 feet in length
Environmental	-40 to +165 °F

The antenna must be securely installed to prevent entry of water into cabinet penetration.

PAYMENT

Full compensation for intelligent transportation system equipment shall be considered as included in the contract lump sum prices paid for wireless vehicle detection system, closed circuit television system, and ramp metering system, and no separate payment will be made therefor.

CONTRACT NO. 03-406604
REVISED PER ADDENDUM NO. 1 DATED JULY 19, 2012

BID ITEM LIST**03-406604**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
101	023074	48" FLASH BOARD RISER	EA	3		
102 (F)	703450	WELDED STEEL PIPE CASING (BRIDGE)	LF	150		
103	705204	18" CONCRETE FLARED END SECTION	EA	9		
104	705206	24" CONCRETE FLARED END SECTION	EA	9		
105	705208	30" CONCRETE FLARED END SECTION	EA	4		
106	705307	12" ALTERNATIVE FLARED END SECTION	EA	1		
107	705311	18" ALTERNATIVE FLARED END SECTION	EA	3		
108	705315	24" ALTERNATIVE FLARED END SECTION	EA	7		
109	705319	30" ALTERNATIVE FLARED END SECTION	EA	3		
110	705323	42" ALTERNATIVE FLARED END SECTION	EA	2		
111	705325	48" ALTERNATIVE FLARED END SECTION	EA	1		
112	705525	30" AUTOMATIC DRAINAGE GATE	EA	1		
113	023075	24" AUTOMATIC DRAINAGE GATE	EA	4		
114	023076	24" GATE VALVE	EA	2		
115	707125	48" PRECAST CONCRETE PIPE INLET	LF	13		
116	721010	ROCK SLOPE PROTECTION (NO. 1, METHOD B)	CY	53		
117	721011	ROCK SLOPE PROTECTION (NO. 2, METHOD B)	CY	170		
118 (F)	721810	SLOPE PAVING (CONCRETE)	CY	128		
119	729010	ROCK SLOPE PROTECTION FABRIC	SQYD	440		
120	731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	34		