

DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES

OFFICE ENGINEER

1727 30th Street MS-43

P.O. BOX 168041

SACRAMENTO, CA 95816-8041

FAX (916) 227-6214

www.dot.ca.gov/hq/esc/oe



*Serious Drought.
Help save water!*

August 13, 2015

04-Ala-580 & 680-I-580 (PM 19.4/46.0) & I-680 (PM 3.3/21.7)

04-2G5214

Project ID 0414000064

ACHSNHPIG-X001(593)E

Addendum No. 2

Dear Contractor:

This addendum is being issued to the contract for CONSTRUCTION ON STATE HIGHWAY IN ALAMEDA COUNTY AT VARIOUS LOCATIONS.

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, August 25, 2015.

This addendum is being issued to revise the project plans, the *Notice to Bidders and Special Provisions* and the *Bid book*.

Project plan sheets 1, 2, 3, 8, 9, 12, 13, 18, 21, 23, 24, 25, 26, 27, 39, 40 through 51, 68, 69, 78, 111, 131 and 140 are replaced and attached for substitution for the like-numbered sheets.

Project plan sheets 25A, 25B, 106A, 106B, 106C, 109A, 109B, 109C, 110A, 110B, 110C, 110D, 125A, 130A, 130B, 130C and 141A are added and attached for addition to the project plans.

In the *Notice to Bidders and Special Provisions*, in the Registered Persons signature and seal sheet, the signature and seal sheet is added as attached.

In the *Notice to Bidders and Special Provisions*, the "STANDARD PLANS LIST," is replaced as attached:

In the *Notice to Bidders*, the thirteenth paragraph is replaced as follows:

"The estimated cost of the project is 3,634,000."

In the *Special Provisions*, Section 1-1.01, is replaced as attached.

In the *Special Provisions*, Section 14-6.02, is replaced as attached.

In the *Special Provisions*, Section 86-1.06B, is replaced as attached.

Addendum No. 2
Page 2
August 13, 2015

04-Ala-580 & 680-I-580 (PM 19.4/46.0) & I-680 (PM 3.3/21.7)
04-2G5214
Project ID 0414000064
ACHSNHPIG-X001(593)E

In the Special Provisions, Section 86-2.08G, is replaced as attached.

In the Special Provisions, Section 86-2.22, "TRAFFIC OPERATIONS SYSTEM," is added as attached.

In the Special Provisions, Section 86-3.05, "GENERAL PACKET RADIO SYSTEM WIRELESS MODEM ASSEMBLY," is replaced as attached.

In the Special Provisions, Section 14-1.02A, is deleted.

In the *Bid* book, in the "Bid Item List," Items 5, 6, 9, 10, 11, 14, 15, 18, 21, 22, 30, 32, 33, 34, 38, 39, 40, 41, 42, 44, 45, 46, 48, 49, 52, 55 and 60 are replaced.

In the *Bid* book, in the "Bid Item List," Items 65, 66, 67, 68 and 69 are added.

In the *Bid* book, in the "Bid Item List," Items 16, 36, 37, 51, 56 and 64 are deleted.

To *Bid* book holders:

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*.

Submit the *Bid* book as described in the *Electronic Bidding Guide* at the Bidders' Exchange website.

http://www.dot.ca.gov/hq/esc/oe/electronic_bidding/electronic_bidding.html

Inform subcontractors and suppliers as necessary.

This addendum, EBS addendum file, 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/04/04-2G5214

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,



BIJAN SARTIPI
District Director
Attachments

CONTRACT NO. 04-2G5214

The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

LANDSCAPE ARCHITECTURE

Queen Williams 7-20-15

LICENSED LANDSCAPE ARCHITECT



STANDARD PLANS LIST

The standard plan sheets applicable to this Contract include those listed below. The applicable revised standard plans (RSPs) listed below are included in the project plans.

ABBREVIATIONS, LINES, SYMBOLS AND LEGEND

A10A	Abbreviations (Sheet 1 of 2)
RSP A10B	Abbreviations (Sheet 2 of 2)
A10C	Lines and Symbols (Sheet 1 of 3)
A10D	Lines and Symbols (Sheet 2 of 3)
A10E	Lines and Symbols (Sheet 3 of 3)
A62A	Excavation and Backfill - Miscellaneous Details
A62C	Limits of Payment for Excavation and Backfill - Bridge
A73A	Object Markers
A73B	Markers
A73C	Delineators, Channelizers and Barricades
RSP A77L1	Midwest Guardrail System Standard Railing Section (Wood Post with Wood Block)
RSP A77L3	Metal Beam Guard Railing Reconstruct Installation
RSP A77M1	Midwest Guardrail System Standard Hardware
RSP A77N1	Midwest Guardrail System Wood Post and Wood Block Details
RSP A77N3	Midwest Guardrail System Typical Line Post Embedment and Hinge Point Offset Details
RSP A77N4	Midwest Guardrail System Typical Railing Delineation and Dike Positioning Details
RSP A77N5	Midwest Guardrail System Typical Vegetation Control Standard Railing Section
RSP A77N6	Midwest Guardrail System Typical Vegetation Control for Terminal System End Treatments
RSP A77N7	Midwest Guardrail System Typical Vegetation Control at Structure Approach
RSP A77N8	Midwest Guardrail System Typical Vegetation Control at Fixed Object
RSP A77N9	Midwest Guardrail System Typical Vegetation Control at Fixed Object
RSP A77N10	Midwest Guardrail System Typical Vegetation Control at Fixed Object
RSP A77P1	Midwest Guardrail System Typical Layouts for Embankments

RSP A77Q1	Midwest Guardrail System Typical Layouts for Structure Approach
RSP A77Q2	Midwest Guardrail System Typical Layouts for Structure Approach and Between Structures
RSP A77Q3	Midwest Guardrail System Typical Layouts for Structure Approach
RSP A77R2	Midwest Guardrail System Typical Layouts for Fixed Objects Between Separate Roadbeds (One-Way Traffic)
RSP A77R3	Midwest Guardrail System Typical Layouts for Roadside Fixed Objects
RSP A77T1	Metal Railing End Anchor Assembly (Type CA)
RSP A77T2	Midwest Guardrail System Buried Post End Anchor
RSP A77U1	Midwest Guardrail System Connections to Bridge Railings without Sidewalks Details No. 1
RSP A77U2	Midwest Guardrail System Connections to Bridge Railings without Sidewalks Details No. 2
RSP A77U3	Midwest Guardrail System Connections to Abutments and Walls
RSP A77U4	Midwest Guardrail System Transition Railing (Type WB-31)
RSP A77U5	Midwest Guardrail System Transition to Metal Beam Guardrail
RSP A87B	Hot Mix Asphalt Dikes
RSP H1	Landscape and Erosion Control Abbreviations
RSP H5	Landscape Details
RSP H6	Landscape Details
RSP H9	Landscape Details
H51	Erosion Control Details - Fiber Roll and Compost Sock
H52	Rolled Erosion Control Product
T1A	Temporary Crash Cushion, Sand Filled (Unidirectional)
T1B	Temporary Crash Cushion, Sand Filled (Bidirectional)
T2	Temporary Crash Cushion, Sand Filled (Shoulder Installations)
T3A	Temporary Railing (Type K)
T3B	Temporary Railing (Type K)
RSP T9	Traffic Control System Tables for Lane and Ramp Closures
RSP T10	Traffic Control System for Lane Closure on Freeways and Expressways
RSP T14	Traffic Control System for Ramp Closure

T59	Temporary Water Pollution Control Details (Temporary Concrete Washout Facility)
T61	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
T62	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
T63	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
T64	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
B0-3	Bridge Details
RS1	Roadside Signs, Typical Installation Details No. 1
RS2	Roadside Signs - Wood Post, Typical Installation Details No. 2
RS4	Roadside Signs, Typical Installation Details No. 4
RSP ES-1A	Electrical Systems (Legend and Abbreviations)
RSP ES-1B	Electrical Systems (Legend and Abbreviations)
RSP ES-1C	Electrical Systems (Legend and Abbreviations)
ES-5A	Electrical Systems (Detectors)
RSP ES-5B	Electrical Systems (Detectors)
RSP ES-5D	Electrical Systems (Curb Termination and Handhole)
ES-6B	Electrical Systems (Electrolier Anchorage and Grouting for Types 15 and 21, Barrier Rail Mounted)
ES-6E	Electrical Systems (Lighting Standard, Types 30 and 31)
ES-6F	Electrical Systems (Lighting Standard, Slip Base Plate)
ES-7M	Electrical Systems (Signal and Lighting Standard - Detail No. 1)
ES-7N	Electrical Systems (Signal and Lighting Standard - Detail No. 2)
ES-7O	Electrical Systems (Signal and Lighting Standard - Detail No. 3)
RSP ES-8A	Electrical Systems (Non-Traffic Pull Box)
RSP ES-10A	Electrical Systems (Isofootcandle Diagrams)
RSP ES-10B	Electrical Systems (Isofootcandle Diagrams)
RSP ES-11	Electrical Systems (Foundation Installations)
ES-13A	Electrical Systems (Splicing Details)
ES-13B	Electrical Systems (Fuse Rating, Kinking and Banding Detail)

Add to section 1-1.01:

Bid Items and Applicable Sections		
Item code	Item description	Applicable section
029243	RELOCATE IRRIGATION VALVE	20
044932	CONCRETE BARRIER (TYPE 60SD MODIFIED)	83
044933	CONCRETE BARRIER (TRANSITION)	83
029245	TRAFFIC OPERATIONS SYSTEM	86
029560	TEMPORARY ALTERNATIVE CRASH CUSHION	12

CONTRACT NO. 04-2G5215
REPLACED PER ADDENDUM NO. 2 DATED AUGUST 13, 2015

Replace section 14-6.02 with:

14-6.02 SPECIES PROTECTION

14-6.02A General

Section 14-6.02 includes specifications for protecting regulated species or their habitat.

This project is within or near habitat for regulated species shown in the following table:

Species Name
Alameda whipsnake
California tiger salamander
California red-legged frog
California clapper rail (Ridgeway's rail)
Valley elderberry longhorn beetle
Burrowing owl
Tricolored blackbird
Migratory birds
Raptors and owls

14-6.02B Material

Not Used

14-6.02C Construction

14-6.02C(1) General

Not Used

14-6.02C(2) Protective Radius

Upon discovery of a regulated species, stop construction activities within a 150 ft radius of the discovery or as defined in the table below. Immediately notify the Engineer. Do not resume activities until receiving notification from the Engineer.

Regulated species name	Protective radius
Alameda whipsnake	100 ft
California tiger salamander	50 ft
California red-legged frog	50 ft
California clapper rail (Ridgeway's rail)	100 ft
Valley elderberry longhorn beetle	100 ft
Tricolor blackbird	50 ft
Raptors and owls	500 ft

14-6.02C(3) Protocols

Not Used

14-6.02C(4) Biological Resource Information

Not Used

14-6.02C(5) Protection Measures

Within species protection area 1, implement the following protection measures:

1. All Job site work will occur between September 2 and February 14.
2. Before performing any work at the job site, all construction personnel must complete a 2 hour training provided by the Department's Biologist. The training will cover requirements of laws and regulations, and protection measures related to regulated species. On completing the training, the construction personnel must sign a form stating that they completed the training. Submit this form as an informational submittal. Request training 15 days before starting work to coordinate initial training.
3. Before initial soil or ground disturbing activity, Department's Biologist surveys the job site for regulated species. Notify the Engineer at least 10 working days before the start of construction to allow the preconstruction surveys to be conducted.
4. Vegetated or non-paved staging, storage, and parking areas must be authorized. Submit requests 10 working days before use.
5. Notify the Engineer 10 days before start of construction to request that a preconstruction bird survey be performed. Department's Biologist performs the survey of the job site to determine the presence of nesting birds. If the survey determines the absence of nesting birds, pruning, vegetation removal, and ground disturbing work may be performed within 72 hours of the survey, upon authorization. After 72 hours, Department's Biologist performs another bird survey before any additional pruning, vegetation and ground disturbing work can occur. After the initial survey has been completed, notify the Engineer at least 7 days before starting any pruning, vegetation and ground disturbing work during the nesting season to request that another bird survey be performed.
6. When authorized, pruning, vegetation removal, and ground disturbing work may be performed season from February 15 to September 1.
7. Do not use plastic monofilament.
8. All excavated, steep-walled holes or trenches more than 1-foot deep must be covered, with plywood, filled, or have a ramp constructed of earth fill or wooden planks at the close of each working day.
9. Direct lights away from ESA.
10. You are responsible for obtaining PLACs for and complying with environmental laws and regulations that apply to the use of existing unpaved or ungraveled property outside the project limits as shown, for the sole use of the project, including:
 - 10.1. Field office sites
 - 10.2. Vehicle parking
 - 10.3. Staging areas
 - 10.4. Storage yards
 - 10.5. Access roads
 - 10.6. Material procurement sites
 - 10.7. Material disposal sites
11. Submit all PLACS obtained by you before the start of the affected work.

14-6.02C(6) Monitoring Schedule

Not Used

14-6.02D Payment

Not Used

Replace "Reserved" in section 86-1.06B with:

Traffic Management System (TMS) elements include, but are not limited to ramp metering (RM) system, communication system, traffic monitoring stations, video image vehicle detection system (VIVDS), microwave vehicle detection system (MVDS), loop detection system, changeable message sign (CMS) system, extinguishable message sign (EMS) system, highway advisory radio (HAR) system, closed circuit television (CCTV) camera system, roadway weather information system (RWIS), visibility sensor, and fiber optic system.

Existing TMS elements, including detection systems, shown and located within the project limits must remain in place and be protected from damage. If the construction activities require existing TMS elements to be nonoperational or off line, and if temporary or portable TMS elements are not shown, the Contractor must provide for temporary or portable TMS elements. The Contractor must receive authorization on the type of temporary or portable TMS elements and installation method.

Before work is performed, the Engineer, the Contractor, and the Department's Traffic Operations Electrical representatives must jointly conduct a pre-construction operational status check of all existing TMS elements and each element's communication status with the Traffic Management Center (TMC), including existing TMS elements not shown and elements that may not be impacted by the Contractor's activities. The Department's Traffic Operations Electrical representatives will certify the TMS elements' location and status, and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components.

The Contractor must obtain authorization at least 72 hours before interrupting existing TMS elements' communication with the TMC that will result in the elements being nonoperational or off line. The Contractor must notify the Engineer at least 72 hours before starting excavation activities.

Traffic monitoring stations and their associated communication systems, which were verified to be operational during the pre-construction operational status check, must remain operational on freeway/highway mainline at all times, except:

1. For a duration of up to 15 days on any continuous segment of the freeway/highway longer than 3 miles
2. For a duration of up to 60 days on any continuous segment of the freeway/highway shorter than 3 miles

If the construction activities require existing detection systems to be nonoperational or off line for a longer time period or the spacing between traffic monitoring stations is more than the specified criteria above, and temporary or portable detection operations are not shown, the Contractor must provide provisions for temporary or portable detection operations. The Contractor must receive authorization on the type of detection and installation before installing the temporary or portable detection.

If existing TMS elements shown or identified during the pre-construction operational status check, except traffic monitoring stations, are damaged or fail due to the Contractor's activity, where the elements are not fully functional, the Engineer must be notified immediately. If the Contractor is notified by the Engineer that existing TMS elements have been damaged, have failed or are not fully functional due to the Contractor's activity, the damaged or failed TMS elements, excluding structure-related elements, must be repaired or replaced, at the Contractor's expense, within 24 hours. For a structure-related elements, the Contractor must install temporary or portable TMS elements within 24 hours. For nonstructure-related TMS elements, the Engineer may authorize temporary or portable TMS elements for use during the construction activities.

If fiber optic cables are damaged due to the Contractor's activities, the Contractor must install new fiber optic cables from an original splice point or termination to an original splice point or termination, unless otherwise authorized. Fiber optic cable must be spliced at the splice vaults if available. The amount of new fiber optic cable slack in splice vaults and the number of new fiber optic cable splices must be equivalent to the amount of slack and number of splices existing before the damage or as directed by the Engineer. Fusion splicing will be required.

The Contractor must demonstrate that repaired or replaced elements operate in a manner equal to or better than the replaced equipment. If the Contractor fails to perform required repairs or replacement work, the Department may perform the repair or replacement work and the cost will be deducted from monies due to the Contractor.

A TMS element must be considered nonoperational or off line for the duration of time that active communications with the TMC is disrupted, resulting in messages and commands not transmitted from or to the TMS element.

The Contractor must provide provisions for replacing existing TMS elements within the project limits, including detection systems, that were not identified on the plans or during the pre-construction operational status check that became damaged due to the Contractor's activities.

If the pre-construction operational status check identified existing TMS elements, then the Contractor, the Engineer, and the Department's Traffic Operations Electrical representatives must jointly conduct a post construction operational status check of all existing TMS elements and each element's communication status with the TMC. The Department's Traffic Operations Electrical representatives will certify the TMS elements' status and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components. TMS elements that cease to be functional between pre and post construction status checks must be repaired at the Contractor's expense.

The Engineer will authorize the schedule for final replacement, the replacement methods and the replacement elements, including element types and installation methods before repair or replacement work is performed. The final TMS elements must be new and of equal or better quality than the existing TMS elements.

If no electrical work exists on the project and no TMS elements are identified within the project limits, the pre-construction operational status check is change order work.

Furnishing and installing temporary or portable TMS elements that are not shown, but are required when an existing TMS element becomes nonoperational or off line due to construction activities, is change order work.

Furnishing and installing temporary or portable TMS elements and replacing TMS elements that are not shown nor identified during the pre-construction operational status check and were damaged by construction activities is change order work.

If the Contractor is required to submit provisions for the replacement of TMS elements that were not identified, submitting the provisions is change order work.

Add to section 86-2.08:

86-2.08F Hybrid Camera Cable

86-2.08F(1) General

86-2.08F(1)(a) Summary

Section 86-2.08G includes specifications for installing hybrid camera cable for CCTV system.

86-2.08F(1)(b) Definitions

APA: Aluminum polyolefin and aluminum with adhesive.

CCTV: Closed circuit television.

CCU: Camera control unit.

HCC: Hybrid camera cable.

OD: Outside diameter.

TDR: Time-domain reflectometer is an electronic instrument used to characterize and locate faults in metallic cables and connectors.

VEU: Video encoder unit is a device enabling or decompression of .

VW-1: Standard for Vertical Flame Test of the flammability of insulating materials.

86-2.08F(1)(c) Submittals

Submit certificates of compliance from the manufacturers for HCC and cable connectors. Include test results for attenuation and faults.

86-2.08F(1)(d) Quality Control and Assurance

HCC manufacturer must test the entire length of HCC for attenuation and faults using a TDR. A fault may include any of the following:

1. Return loss measurements indicating:
 - 1.1. Attenuation exceeding 3 dB in the band from 5 MHz to 30 MHz in a portion of cable less than 10 feet long
 - 1.2. Short in the cable
 - 1.3. Cut or open circuit in the cable
2. Exposure of or damage to the cable jacket revealed by a visual inspection

86-2.08F(1)(d)(i) Warranty

Furnish 1 year replacement written warranty from the manufacturer of the HCC against any defects or failures. The effective date of the warranty is the date of installation. HCC must be replaced within 10 days after receipt of the failed HCC. The Department does not pay for the replacement. Deliver replacement to:

CALTRANS MAINTENANCE ELECTRICAL SHOP
30 RICKARD STREET
SAN FRANCISCO, CA 94134-1224
(415) 330-6500

86-2.08F(2) Materials

86-2.08F(2)(a) Hybrid Camera Cable

86-2.08F(2)(a)(i) General

HCC must include:

1. Analog video cable
2. 6 - No. 22 AWG conductors
3. 8 - No. 26 AWG conductors
4. 4 - No. 26 AWG conductors in 2 twisted pairs
5. Outer jacket

Use polypropylene filler as required to form a uniform round cable.

HCC dimensions must not exceed:

1. Outside diameter of 0.425 inch
2. Length of 750 feet

86-2.08F(2)(a)(ii) Components

The analog video cable must be type RG-59/U coaxial cable and must comply with the following requirements:

Electrical Properties

Property	Value
Capacitance (picofarads/ft, nominal)	17.3
Impedance (ohms, nominal)	75
Velocity of propagation (percent, nominal)	78
Nominal OD (inch)	0.242
Insulation Rating (volt)	300

Cable Attenuation at 20 degrees C

Frequency (MHz)	Nominal dB/ 100 ft
1	0.30
10	0.90
50	2.10

Size Requirements for Video Cable Components

Component	Nominal OD (inches)
Copper center conductor	0.040
Foam polyethylene dielectric	0.180
Sealed APA tape with 0.06-inch overlap	0.216
Woven aluminum braid	0.241
PVC outer jacket	0.297

Conductors must comply with the following requirements:

Conductor quantity and type	Wire material	Minimum PVC insulation thickness (mils)	Nominal OD with insulation (mils)	Color-coding
6 - No. 22 AWG	Stranded (7x30), tinned copper	9	48	black, red, green, white, blue, yellow
8 - No. 26 AWG	Stranded (7x34), tinned copper		37	brown, blue, orange, yellow, purple, gray, white/black stripe, red/green stripe
4 - No. 26 AWG in 2 twisted pairs	Stranded (7x34), tinned copper		37	Pair No.1: black, white Pair No.2: red, green

The outer jacket must have an insulation rating of 300 volts and must include:

1. 1 mil thick polyester sheet wrapped with 25 percent overlap
2. 36 AWG tinned copper braid shield with 90 percent coverage
3. 32 mils thick UV-resistant PVC insulation passing VW-1 test
4. Manufacturer's identification surface-printed in white ink every foot along the length

Color of the outer jacket must be dark-gray matching color no. 24091 of FED-STD-595.

86-2.08F(2)(b) Cable Connectors

Cable connector for each HCC end must include strain relief back shelf and full-set crimp contacts of one of the following types:

1. Pin
2. Socket

Contacts must be size 16 and must consist of:

1. Brass contact body, sub-plated with 0.00050-inch nickel under MIL-C-26074B, grade B, and plated with 0.00030-inch gold under MIL-G-45204B, class 4
2. Stainless steel spring

86-2.08F(3) Construction

HCC must be continuous from the camera unit to CCU in the controller cabinet without splicing, unless shown.

Terminate HCC with cable connectors using the following contact types:

1. Socket at the camera unit end
2. Pin at the CCU end

Use appropriate contact crimping tools. If you do not, the Department will reject HCC termination. Secure HCC to the pole as shown for strain relief after connecting to camera pigtail cable.

Test HCC and connectors under section 86-2.14B. Replace faulty cable and retest. Dispose of the faulty cable.

86-2.08F(4) Payment

Not Used

Add to section 86-2:

86-2.22 TRAFFIC OPERATIONS SYSTEM

86-2.22A General

86-2.22A(1) Summary

Section 86-2.22 includes specifications for installing traffic operations system.

86-2.22A(2) Submittals

Not Used

86-2.22A(3) Quality Control and Assurance

Not Used

86-2.22B Materials

86-2.22B(1) General

Traffic operations system includes conduit, pull boxes, conductors and cables, hybrid camera cable (HCC), conduit sealing plugs, colored concrete backfill, cable marker, warning tape, general packet radio system (GPRS), and inductive loop detectors.

86-2.22B(2) Conduit

Comply with section 86-2.05.

86-2.22B(3) Pull Boxes

Comply with section 86-2.06.

86-2.22B(4) Conductors and Cables

Comply with section 86-2.08.

86-2.22B(5) Hybrid Camera Cable

Comply with section 86-2.08F.

86-2.22B(6) Conduit Sealing Plugs

Comply with section 86-2.17.

86-2.22B(7) Colored Concrete Backfill

Comply with section 86-2.19.

86-2.22B(8) Cable Marker

Comply with section 86-2.20.

86-2.22B(9) Warning Tape

Comply with section 86-2.21.

86-2.22B(10) General Packet Radio System

Comply with section 86-3.05.

86-2.22B(11) Inductive Loop Detectors

Comply with section 86-5.01A.

86-2.22C Construction

86-2.22C(1) General

Install conduit, pull boxes, conductors, and cables complying with section 86-2 and as shown.

86-2.22C(2) Hybrid Camera Cable

Comply with section 86-2.08F.

86-2.22C(3) Conduit Sealing Plugs

Comply with section 86-2.17.

86-2.22C(4) Colored Concrete Backfill

Comply with section 86-2.19 and as shown.

86-2.22C(5) Cable Marker

Comply with section 86-2.20 and as shown.

86-2.22C(6) Warning Tape

Comply with section 86-2.21 and as shown.

86-2.22C(7) General Packet Radio System

Comply with section 86-3.05 and as shown.

86-2.22C(8) Inductive Loop Detectors

Comply with section 86-5.01A and as shown.

86-2.22D Payment

Not Used

Add to section 86-3:

86-3.05 GENERAL PACKET RADIO SYSTEM WIRELESS MODEM ASSEMBLY

86-3.05A General

86-3.05A(1) Summary

Section 86-3.05 includes specifications for installing the general packet radio system (GPRS) wireless modem assembly at the controller cabinet.

86-3.05A(2) Submittals

Submit warranty documentation before installation.

86-3.05A(3) Warranty

Furnish a 1-year replacement warranty from the manufacturer of the modems and power supplies against any defects or failures. The effective date of the warranty is the date of installation. Furnish replacement modems and power supplies within 5 days after receipt of the failed parts. The Department does not pay for the replacement parts. Deliver replacement modems and power supplies to:

CALTRANS MAINTENANCE ELECTRICAL SHOP
30 RICKARD STREET
SAN FRANCISCO, CA 94134-1224
(415) 330-6500

86-3.05B Materials

86-3.05B(1) General

The GPRS wireless modem assembly consists of a modem, power supply, mounting bracket and hardware, serial communication cable, or RJ-45 ethernet cable, and antenna.

86-3.05B(2) Modem

The modem must:

1. Be configurable remotely through the wireless network and through multiple communication ports including serial, Ethernet and USB ports.
2. Be configured before acceptance.
3. Have a minimum 53.6 Kbps raw data transfer rate.
4. Have a full duplex transceiver.
5. Have 1900/850 MHz dual band networking.
6. Have an integrated transmission control/internet protocol (TCP/IP) stack with user datagram protocol (UDP).
7. Have a user-settable password to prevent unauthorized access.
8. Include a DC power cable at least 3 feet long with a connector compatible with the modem power connector.
9. Have a packet buffering and forwarding feature that provides discipline to the output of the serial port. The packet forwarding time interval must be configurable from a rate of 0 (undisciplined) to 400 ms in increments of 100 ms or less.
10. Have a choice of "Friends Only" access mode.
11. Comply with TIA-678.
12. Have an operating temperature range from -30 to +70 degrees C with humidity from 5 to 95 percent (non-condensing) and have transmissions at 10 percent duty cycle above 60 degrees C.

13. Weigh less than 1 pound and have overall dimensions of 3.0 by 3.5 by 1.0 inches.
14. Have the following status indicators:
 - 14.1. Network
 - 14.2. Signal
 - 14.3. Activity
 - 14.4. Power
15. Operate in a static IP addressing environment of GPRS networks and meet the operational parameters shown in the following table:

Operational parameter	Requirements
Transmit power at antenna port	1.0 W for 1900 MHz 0.8 W for 850 MHz
Receiver sensitivity	-107 dBm (2.439 % bit error rate)
Input voltage	3.3 to 30 V(dc)
Input current	200 mA @ 30 V(dc)

16. Have the following standard interfaces:
 - 16.1. Host communicates with modem using either UDP or TCP packet modes.
 - 16.2. Computer terminal platform using dial-up networking communicates with the modem using point to point protocol (PPP).

Provide the Engineer with the modem serial number, and international mobile equipment identification (IMEI) number 30 days before requiring the packet data protocol (PDP) context. The Engineer will program the PDP context.

The modem and associated firmware, software, hardware, protocol, and other features must be fully compatible with the existing GPRS network. The existing GPRS network utilizes the AT&T Wireless cellular system (3G and later) and the AirLink Gateway. Demonstrate the compatibility to the Engineer by actual installation or by other authorized means.

86-3.05B(3) Power Supply

The power supply must:

1. Be vertically mountable on a 19-inch standard rack rail using 2 machine screws and 2 wing nuts.
2. Have provisions to attach the modem power cable securely without the modifying the cable.
3. Meet the requirements shown in the following table:

Characteristics	Requirements
Power cord	Standard 120 V(ac), 3 prong cord, at least 3 feet long (may be added by Contractor)
Type	Switching type
Power rated	40 W minimum with no minimum load required
Input voltage	From 85 to 264 V(ac) or 120 to 370 V(dc)
Input frequency	From 47 to 63 Hz
Inrush current	Cold start, 25 A at 115 V
Output voltage	12 V(dc), adjustable over a ± 10 percent range
Overload protection	From 105 to 150 percent in output pulsing mode
Over voltage protection	From 115 to 135 percent of output voltage
Setup, rise, hold up time	800 ms, 50 ms, 15 ms at 115 V(ac)
Withstand voltage	I/P-O/P: 3 kV, I/P-FG: 1.5 kV, for 60 seconds
Safety standards	UL 1012, UL 60950

86-3.05B(4) Mounting Bracket and Hardware

The mounting bracket must:

1. Be stainless steel
2. Securely hold the modem in a vertical position with all cables and conductors installed
3. Contain the modem using a method that allows the removal of the modem without tools or without removing the bracket from its attachment to the cabinet frame

86-3.05B(5) Serial Communication Cable

If the modem is designed to interface with a Department-furnished Model 170E controller, provide a C2 cable. The C2 cable interfaces the controller C2 connector and the GPRS modem and includes all conductors and connectors required for that purpose. The GPRS modem connector must comply with TIA-232 standard using a 9-pin D shell miniature connector. The Department-furnished controller end connector must comply with AMP 201360-2 or equivalent. All pins in both connectors must be gold plated. The cable must have 4 no. 20 AWG conductors with (UL) Type CM shielded or AWM 2464 80C 300 Volts. The cable must be at least 3 feet long. The cable wiring must comply with the following:

1. AMP 201360-2-ND -L to DE9-P - 2
2. AMP 201360-2-ND -K to DE9-P - 3
3. AMP 201360-2-ND -N to DB9-P - 5
4. AMP 201360-2-ND -D to AMP 201360-2-ND - H
5. AMP 201360-2-ND -J to AMP 201360-2-ND - M

86-3.05B(6) RJ-45 Ethernet Cable

If the modem is designed to interface with a Department-furnished Model 2070E controller, provide a 10/100 Base-T, RJ-45 Ethernet cable. The cable must be at least 3 feet long.

86-3.05B(7) Antenna

The antenna must:

1. Be the low profile disc type, and adhere to the cabinet using a factory installed double-sided waterproof acrylic foam adhesive. The coax cable must be at least 3 feet long and have a 50 Ω SMA connector on the modem end.
2. Meet the requirements shown in the following table:

Parameter	Requirements
VSWR (at resonant point)	2:1 or less
Frequency	1850-1990 MHz and 824-894 MHz
Nominal impedance	50 Ω
Gain	2 dB
Radiation pattern	Omni-directional
Polarization	Vertical
Ground plane	Required ^a

^aThe antenna requires a reflective ground plane to function properly. The required ground plane must extend beyond the antenna at least 8 inches in all directions.

86-3.05C Construction

Install the modem under the manufacturer's instructions.

You may adjust the modem Installation for field conditions if authorized.

86-3.05D Payment

Not Used

**BID ITEM LIST
04-2G5214**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
1	070030	LEAD COMPLIANCE PLAN	LS	LUMP SUM	LUMP SUM	
2	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM	LUMP SUM	
3	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM	LUMP SUM	
4	128652	PORTABLE CHANGEABLE MESSAGE SIGN (LS)	LS	LUMP SUM	LUMP SUM	
5	129000	TEMPORARY RAILING (TYPE K)	LF	5,900		
6	129100	TEMPORARY CRASH CUSHION MODULE	EA	690		
7	130100	JOB SITE MANAGEMENT	LS	LUMP SUM	LUMP SUM	
8	130200	PREPARE WATER POLLUTION CONTROL PROGRAM	LS	LUMP SUM	LUMP SUM	
9	130520	TEMPORARY HYDRAULIC MULCH	SQYD	1,600		
10	130620	TEMPORARY DRAINAGE INLET PROTECTION	EA	25		
11	130640	TEMPORARY FIBER ROLL	LF	2,800		
12	130730	STREET SWEEPING	LS	LUMP SUM	LUMP SUM	
13	130900	TEMPORARY CONCRETE WASHOUT	LS	LUMP SUM	LUMP SUM	
14	141120	TREATED WOOD WASTE	LB	75,500		
15	150661	REMOVE GUARDRAIL	LF	6,300		
16	BLANK					
17	150685	REMOVE IRRIGATION FACILITY	LS	LUMP SUM	LUMP SUM	
18	150771	REMOVE ASPHALT CONCRETE DIKE	LF	1,760		
19	150812	REMOVE PIPE (LF)	LF	48		
20	152316	RESET ROADSIDE SIGN (ONE POST)	EA	6		

**BID ITEM LIST
04-2G5214**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
21	153141	REMOVE CONCRETE ISLAND (PORTIONS) (SQYD)	SQYD	170		
22	156590	REMOVE CRASH CUSHION (SAND FILLED)	EA	6		
23	160102	CLEARING AND GRUBBING (LS)	LS	LUMP SUM	LUMP SUM	
24	200052	PRUNE EXISTING PLANTS	LS	LUMP SUM	LUMP SUM	
25	029243	RELOCATE IRRIGATION VALVE	EA	18		
26	204096	MAINTAIN EXISTING PLANTED AREAS	LS	LUMP SUM	LUMP SUM	
27	206400	CHECK AND TEST EXISTING IRRIGATION FACILITIES	LS	LUMP SUM	LUMP SUM	
28	206402	OPERATE EXISTING IRRIGATION FACILITIES	LS	LUMP SUM	LUMP SUM	
29	206559	CONTROL AND NEUTRAL CONDUCTORS (ARMOR-CLAD)	LS	LUMP SUM	LUMP SUM	
30	208448	RISER SPRINKLER ASSEMBLY	EA	91		
31	208449	POP-UP SPRINKLER ASSEMBLY	EA	4		
32	208594	3/4" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	480		
33	208595	1" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	940		
34	208596	1 1/4" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	120		
35	208597	1 1/2" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	40		
36	BLANK					
37	BLANK					
38	210350	FIBER ROLLS	LF	10,600		
39	210600	COMPOST	SQFT	49,600		
40	390132	HOT MIX ASPHALT (TYPE A)	TON	17		

**BID ITEM LIST
04-2G5214**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
41	394074	PLACE HOT MIX ASPHALT DIKE (TYPE C)	LF	790		
42	394077	PLACE HOT MIX ASPHALT DIKE (TYPE F)	LF	970		
43	665011	12" CORRUGATED STEEL PIPE (.064" THICK)	LF	48		
44	731511	MINOR CONCRETE (ISLAND PAVING)	CY	12		
45	820118	GUARD RAILING DELINEATOR	EA	230		
46	820134	OBJECT MARKER (TYPE P)	EA	191		
47	820135	OBJECT MARKER (TYPE R)	EA	8		
48	820151	OBJECT MARKER (TYPE L-1)	EA	67		
49	832007	MIDWEST GUARDRAIL SYSTEM (WOOD POST)	LF	1,940		
50	832070	VEGETATION CONTROL (MINOR CONCRETE)	SQYD	5,260		
51	BLANK					
52	839543	TRANSITION RAILING (TYPE WB-31)	EA	96		
53	839573	RETURN CAP (TYPE A)	EA	4		
54	839584	ALTERNATIVE IN-LINE TERMINAL SYSTEM	EA	1		
55	839585	ALTERNATIVE FLARED TERMINAL SYSTEM	EA	61		
56	BLANK					
57	839591	CRASH CUSHION, SAND FILLED	EA	56		
58	839601	CRASH CUSHION (TYPE CAT)	EA	2		
59	044932	CONCRETE BARRIER (TYPE 60SD MODIFIED)	LF	69		
60	044933	CONCRETE BARRIER (TRANSITION)	LF	513		

**BID ITEM LIST
04-2G5214**

Item No.	Item Code	Item Description	Unit of Measure	Estimated Quantity	Unit Price	Item Total
61	860090	MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION	LS	LUMP SUM	LUMP SUM	
62	860401	LIGHTING	LS	LUMP SUM	LUMP SUM	
63	029245	TRAFFIC OPERATIONS SYSTEM	LS	LUMP SUM	LUMP SUM	
64	BLANK					
65	120165	CHANNELIZER (SURFACE MOUNTED)	EA	950		
66	029560	TEMPORARY ALTERNATIVE CRASH CUSHION	EA	49		
67	150857	REMOVE ASPHALT CONCRETE SURFACING	SQFT	800		
68	731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	13		
69	999990	MOBILIZATION	LS	LUMP SUM	LUMP SUM	

TOTAL BID

FOR BID ITEMS:

\$

TOTAL BID

FOR TIME:

$$\begin{array}{r}
 \text{WORKING DAYS BID} \\
 \text{(Do not bid less than 120 days and} \\
 \text{not more than 200 Days)}
 \end{array}
 \times
 \frac{\$4,200.00}{\text{COST PER DAY}}
 =
 \$$$

TOTAL BID FOR COMPARISON (COST PLUS TIME):

\$
