10-1.95 SLOPE PROTECTION:

Slope protection shall be placed or constructed in conformance with the provisions in Section 72, "Slope Protection," of the Standard Specifications.

Rock slope protection fabric must be Type B.

PAYMENT

The contract price paid per cubic yard for rock slope protection (the class of rock and method of placement to be designated in the Engineer's Estimate) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the rock slope protection, complete in place, including excavation, and backfilling footing trenches, as shown on the plans, and as specified in the specifications and these special provisions, and as directed by the Engineer.

The contract price paid per square foot for rock slope protection fabric shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing rock slope protection fabric, complete in place, as shown on the plans, as specified in the specifications and these special provisions, and as directed by the Engineer.

10-1.96 CONCRETE (DITCH LINING):

Concrete (ditch lining) shall be placed or constructed in conformance with the provisions in Section 72-4, "Concrete Slope Protection, Gutter Lining, Ditch Lining, and Channel Lining" of the Standard Specifications.

10-1.97 SLOPE PAVING:

Slopes under the ends of bridges, where shown on the plans, shall be paved in conformance with the provisions in Section 72-6, "Slope Paving," of the Standard Specifications and these special provisions.

The contract price paid per cubic yard for slope paving (concrete) shall include full compensation for furnishing all labor, materials (including bar reinforcing steel, reinforcing steel anchors, welded wire fabric, timber spacers, downdrain, and underdrains), tools, equipment and incidentals, and for doing all the work involved in constructing the slope paving, complete in place (including excavation, backfill and installing timber spacers), as shown on the plans, as specified in these special provisions and the specifications, and as directed by the Engineer.

The location of construction joints shall be subject to the approval of the Engineer. Placement of slope paving shall be scheduled so that the work, including placement, finishing, and

application of curing, is completed in any section bounded by permissible construction joints on the same day that the work is started in that section.

Areas of slope paving shown on the plans to have a grooved finish shall be scored by dragging a finishing tool over the struck-off surface or by any other means which will result in a surface conforming to the details shown on the plans.

Prior to placing the permanent slope paving, the Contractor shall construct a test panel at least 4' x 6' at the site for approval by the Engineer. The test panel shall be constructed of the same materials as are proposed for the permanent work and shall be finished and cured as specified for the permanent work. Additional test panels shall be constructed as necessary until a panel is produced which conforms to the requirements herein, before constructing other slope paving.

10-1.98 SLOPE PAVING (AESTHETIC TREATMENT):

Slope paving for the Van Buren Boulevard Overcrossing (Replace) where shown on the plans shall have an aesthetic treatment in conformance with the details shown on the plans and these special provisions.

Areas of slope paving shown on the plans to have an exposed aggregate finish shall be constructed and finished in conformance with the following requirements.

A. Coarse aggregate shall conform to the provisions for one inch x No. 4 primary size coarse aggregate in Section 90-3.02, "Coarse Aggregate Grading," of the Standard Specifications.

B. Shotcrete shall not be used for the construction of exposed aggregate concrete.

C. Coarse aggregates shall be exposed to a depth of approximately 3/16 inch to 3/8 inch. Exposed aggregate surfaces shall be uniform in appearance.

D. At the option of the Contractor, a concrete set retarder may be applied to the surface of the concrete after placing, consolidating, and finishing of the concrete has been completed. The concrete set retarder shall be commercial quality, manufactured specifically for use on the top surface of concrete and shall be applied in accordance with the manufacturer's recommendations. The retarder shall effectively retard the setting time of the cement and fine aggregate matrix deep enough and long enough to permit exposing the aggregates.

E. Care shall be taken in placing and consolidating the concrete such that the coarse aggregate remains uniformly distributed throughout the concrete.

F. When the mass of concrete has set sufficiently to permit removing the matrix of cement and fine aggregate, the coarse aggregate shall be exposed with a water spray, coarse brooming, abrasive blasting, or a combination of these procedures. Removal methods shall not dislodge or loosen the coarse aggregate from embedment in the cement mortar.

G. Immediately after the cement mortar has hardened sufficiently to resist further removal, all cement film and other loose material shall be cleaned from the exposed aggregate and all other surfaces with stiff brooms and water.

H. Except when operations for exposing the aggregate are underway, concrete shall be cured by the water method or with curing compound (F) in conformance with the provisions in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. Areas of concrete where curing compounds are removed during the cure period shall be kept continuously wet until the end of the cure period or until the curing compound is replaced.

The location of construction joints shall be subject to the approval of the Engineer.

Prior to placing the permanent slope paving (aesthetic treatment), the Contractor shall construct a test panel at least 20' x 20' at the site for approval by the Engineer. The test panel shall be constructed of the same materials as are proposed for the permanent work and shall be finished and cured as specified for the permanent work. Additional test panels shall be constructed as necessary until a panel is produced which conforms to the requirements herein, before constructing other slope paving (aesthetic treatment) areas.

The Contractor shall submit a proposed plan for mixing, delivery, placement, finishing and curing of the slope paving (aesthetic treatment). This plan shall be submitted to the Engineer for approval at least 20 days prior to constructing the decorative test panels.

The contract price paid per square foot for slope paving (aesthetic treatment) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work in slope paving (aesthetic treatment), complete in place, including test panels, exposed aggregate, broom finish, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.99 MISCELLANEOUS CONCRETE CONSTRUCTION:

Minor concrete (curb & gutter), minor concrete (sidewalk), minor concrete (curb ramp), minor concrete (miscellaneous construction), and minor concrete (textured paving) shall conform to the provisions in Section 73, "Concrete Curbs and Sidewalks," of the Standard Specifications and these special provisions.

Curb ramp detectable warning surface shall consist of raised truncated domes constructed or installed on curb ramps in conformance with the details shown on the plans and these special provisions. At the option of the Contractor, the detectable warning surface shall be prefabricated, cast-in-place, or stamped into the surface of the curb ramp. The color of the detectable warning surface shall be yellow conforming to Federal Standard 595B, Color No. 33538.

Prefabricated detectable warning surface shall be in conformance with the requirements established by the Department of General Services, Division of State Architect and be attached in conformance with the manufacturer's recommendations.

Cast-in-place and stamped detectable warning surfaces shall be painted in conformance with the provisions in Section 59-6, "Painting Concrete," of the Standard Specifications.

The finished surfaces of the detectable warning surface shall be free from blemishes.

Prior to constructing the cast-in-place or stamping the detectable warning surface, the Contractor shall demonstrate the ability to produce a detectable warning surface conforming to the details shown on the plans and these special provisions by constructing a 24" x 24" test panel.

The manufacturer shall provide a written 5-year warranty for prefabricated detectable warning surfaces, guaranteeing replacement when there is defect in the dome shape, color fastness, sound-on-cane acoustic quality, resilience, or attachment. The warranty period shall begin upon acceptance of the contract.

Full compensation for constructing or furnishing and installing curb ramp detectable warning surfaces shall be considered as included in the contract price paid per cubic yard for minor concrete (curb ramp) and no separate payment will be made therefor.

Minor Concrete (Textured Paving)

Minor concrete (textured paving) is required at concrete surfaces shown on the plans.

Aggregate for minor concrete (textured paving) shall conform to the grading specified for fine aggregate in Section 90-3.03, "Fine Aggregate Grading," of the Standard Specifications. Aggregate for grout shall conform to the following grading:

Sieve Sizes	Percentage Passing
No. 4	100
No. 8	90 - 100
No. 16	60 - 100
No. 30	35 - 70
No. 50	15 - 35
No. 100	2 - 15

The color of textured pavement must be redish brown. Samples of the colors specified for textured paving are available for review by prospective bidders at the office of the Department of Transportation 464 W. Fourth Street, San Bernardino, CA. Portland cement concrete closely conforming to the colors specified for textured paving are available through commercial concrete sources.

A sample of sufficient size, of each type and color of the textured paving, to demonstrate the textured paving, including color hardener, curing and finishing compounds, for both grouted and ungrouted finishes, shall be submitted to the Engineer for written approval.

Textured paving shall not be placed on the project prior to approval by the Engineer of the samples prepared and submitted by the Contractor. In the event more than one sample of each type and color of textured paving to be placed is required by the Engineer, each additional sample will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Welded wire fabric, of the size and type shown on the plans and conforming to the provisions in Section 52, "Reinforcement," of the Standard Specifications, shall be placed in the textured paving areas as shown on the plans.

Aggregate base shall be Class 2 and shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications.

The respective pattern types and colors of concrete for textured paving shall be placed at the locations shown on the plans, struck off and compacted until a layer of mortar is brought to the surface. The concrete shall be screeded to the required grade and cross section and floated to a uniform surface.

Floor color hardener shall be applied to the plastic surface of the concrete by the "dry-shake" method using a minimum of 60 pounds of hardener per 100 square feet. Hardener shall be applied in 2 applications, shall be wood-floated after each application, and shall be trowelled only after the final floating. The resultant color of the floor hardener shall closely conform to the colors specified on the plans for the respective areas.

The forming tools for the textured paving shall be applied to form the patterned surfaces while the concrete is still in the plastic stage of set.

Textured paving areas shall be cured by the curing compound method. The curing compound shall be curing compound (6) conforming to the provisions in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

The textured paving shall be grouted in the sidewalk areas shown on the plans. The grout shall be placed after initial curing of that portion of the textured paving. The grout shall be spread over the textured concrete surface and consolidated by methods recommended by the grout manufacturer and approved by the Engineer. Surplus grout shall be removed by a squeegee and damp burlap rag or by other approved methods before the curing seal is applied to the grouted areas.

Curing seal and other deleterious substances shall be removed from the impressions in the textured areas, to receive the grout, before the grout is placed. Cleaning and removal methods shall not stain or discolor those portions of the textured paving to remain exposed after

grouting. Methods of cleaning the impressions in textured areas to be grouted shall be approved by the Engineer.

The textured pattern and grout of the textured paving in sidewalk areas shall continue through the curb ramps, except for the grooved areas and the detectable warning surface area, if any, of the curb ramps.

For payment purposes, the area in square feet of minor concrete (textured paving) will be determined from horizontal measurements of the finished textured paving.

The contract price paid per square foot for minor concrete (textured paving) shall include full compensation for furnishing all labor, materials (including welded wire fabric, where required, and aggregate base), tools, equipment, and incidentals, and for doing all the work involved in constructing textured paving, including grouted areas, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.100 MISCELLANEOUS IRON AND STEEL:

Miscellaneous iron and steel shall conform to the provisions in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

PAYMENT

The contract prices paid per pound, for miscellaneous iron and steel, and miscellaneous metal (bridge) of the types shown in the Engineer's Estimate, or the contract unit price paid for grate, for frame and grate, or for frame and cover shall include full compensation for furnishing all labor, materials (including non-metallic materials for restrainer units), tools, equipment and incidentals, and for doing all the work involved in furnishing and installing the miscellaneous metal, complete in place, as shown on the plans, and as specified in the specifications and these special provisions, and as directed by the Engineer.

If a portion or all of the miscellaneous iron and steel, and miscellaneous metal (bridge) are fabricated more than 300 air line miles from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impracticable and extremely difficult to ascertain and determine the actual increase in these expenses, it is agreed that payment to the Contractor for the miscellaneous metal items of work will be reduced $5,000 for each fabrication site located more than 300 air line miles from both Sacramento and Los Angeles and an additional $3,000 ($8,000 total) for each fabrication site located more than 3,000 air line miles from both Sacramento and Los Angeles.

10-1.101 BRIDGE DECK DRAINAGE SYSTEM:

Bridge deck drainage systems shall conform to the provisions for miscellaneous bridge metal in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Self-tapping screws used for sleeve connections shall be hex-head stainless steel, installed in holes drilled to fit the self-tapping screws, conforming to the requirements of ASTM Designation: A 276, Type 304.

At the Contractor's option, fiberglass pipes and fittings with the same diameter and minimum bend radius as those shown on the plans may be substituted for welded steel pipe in deck drain systems.

Fiberglass pipe and fittings shall conform to the requirements in ASTM Designation: D 2996, and shall have a minimum short-term rupture strength of 30,000 psi. The adhesive type recommended by the manufacturer shall be used for joining pipe and fittings. Fiberglass pipe not enclosed in a box girder cell or encased in concrete shall be manufactured from ultraviolet-resistant resin pigmented with concrete-gray color, or be coated with a concrete-gray resin-rich exterior coating. Paint shall not be used. Fiberglass pipe treated with ultraviolet protection shall withstand a minimum of 2,500 hours of accelerated weathering when tested in conformance with the requirements in ASTM Designation: G 154. Lamps shall be UV-B (313 nm wavelength). The resting cycle shall be 4 hours of ultraviolet exposure at 140° F, and then 4 hours of condensate exposure at 120° F. After testing, the surface of the pipe shall exhibit no fiber exposure, crazing, or checking, and only a slight chalking or color change.

Support spacing for fiberglass pipe shall be the same as shown on the plans for welded steel pipe. Pipe supports shall have a width of not less than 1.5 inches.

A Certificate of Compliance for fiberglass pipe and fittings shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall include all laboratory test results conforming to the provisions specified herein.

For drainage piping NPS 8 or smaller, the Contractor shall have the option of substituting polyvinyl chloride (PVC) plastic pipe and fittings with the same diameter and minimum bend radius as shown on the plans for welded steel pipe, which is:

A. Enclosed in a box girder cell and exposed for a length not greater than 20 feet within the cell, or
B. encased in concrete.

The PVC plastic pipe and fittings shall be Schedule 40 conforming to the requirements of ASTM Designations: D 1785. The maximum support spacing for PVC plastic pipe shall be 6 feet.

Couplings used to connect PVC plastic pipe or fiberglass pipe to steel shall be threaded or flanged. The sleeve connections shown on the plans shall not be used for either PVC plastic pipe or fiberglass pipe.

If PVC plastic pipe or fiberglass pipe is substituted for welded steel pipe, the quantity of drainage piping will be computed on the basis of the dimensions and details shown on the plans, and no change in the quantities to be paid for will be made because of the use of PVC plastic pipe or fiberglass pipe.

Bridge deck drainage systems will be measured and paid for by the pound in the same manner specified for miscellaneous metal (bridge) in Section 75-1.06, "Measurement," and Section 75-1.07, "Payment," of the Standard Specifications.

10-1.102 CHAIN LINK FENCE AND GATE:

Chain link fence shall be Type CL-6 and shall conform to the provisions in Section 80, "Fences," of the Standard Specifications.

PAYMENT

Items of work, measured as specified in Section 80-4.03, "Measurement," of the Standard Specifications, will be paid for at the contract price per linear foot, for chain link fence of the type designated in the Engineer's Estimate and the contract unit price per chain link gate. The size and type of gate is designated in the contract item.

Full compensation for clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground between posts, excavating holes, disposing of surplus excavated material, and furnishing and placing portland cement concrete footings, and connecting new fences to structures and existing cross fences, and constructing temporary fences for the protection of stock, shall be considered as included in the price paid for the fence and no additional compensation will be allowed therefor.

The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing chain link fences and gates, complete in place, as shown on the plans, and as specified in the specifications and these special provisions, and as directed by the Engineer.

10-1.103 MARKERS AND DELINEATORS:

Markers and delineators shall conform to the provisions in Section 82, "Markers and Delineators," of the Standard Specifications and these special provisions.

Markers and delineators on flexible posts shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Flexible posts shall be made from a flexible white plastic which shall be resistant to impact, ultraviolet light, ozone,

and hydrocarbons. Flexible posts shall resist stiffening with age and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability.

Retroreflective sheeting for metal and flexible target plates shall be the retroreflective sheeting designated for channelizers, markers, and delineators conforming to the requirements in ASTM Designation: D 4956-95 and in conformance with the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

PAYMENT

Items of work, measured as specified in Section 82-1.05, "Measurement," of the Standard Specifications, will be paid for at the contract unit price for highway post markers and object markers of the type designated in the contract item, or at the single contract unit price for object markers or markers; and the contract unit price for delineators of the class designated in the contract item.

The above prices and payments shall include full compensation for furnishing all labor, materials (except State-furnished marker panels), tools, equipment and incidentals, and for doing all the work involved in installing markers and delineators, complete in place, as shown on the plans, as specified in the specifications and these special provisions, and as directed by the Engineer.

10-1.104 METAL BEAM GUARD RAILING:

Metal beam guard railing shall be constructed in conformance with the provisions in Section 83-1, "Railings," of the Standard Specifications and these special provisions.

Attention is directed to "Order of Work" of these special provisions.

Line posts shall be wood, steel, or plastic. Blocks shall be wood or plastic.

ALTERNATIVE IN-LINE TERMINAL SYSTEM

Alternative in-line terminal system shall be furnished and installed as shown on the plans and in conformance with these special provisions.

The allowable alternatives for an in-line terminal system shall consist of one of the following or a Department approved equal.

A. TERMINAL SYSTEM (TYPE SKT) - Terminal system (Type SKT) shall be a SKT 350 Sequential Kinking Terminal manufactured by Road Systems, Inc., located in Big Spring, Texas, and shall include items detailed for terminal system (Type SKT) shown on the plans. The SKT 350 Sequential Kinking Terminal can be obtained from the distributor, Universal Industrial Sales, P.O. Box 699, Pleasant Grove, UT 84062, telephone (801) 785-0505 or from the distributor, Gregory Highway Products, 4100 13th Street, S.W., Canton, OH 44708, telephone (330) 477-4800.

B. TERMINAL SYSTEM (TYPE ET) - Terminal system (Type ET) shall be an ET-2000 PLUS (4-tube system) extruder terminal as manufactured by Trinity Industries, Inc., and shall include items detailed for terminal system (Type ET) shown on the plans. The ET-2000 PLUS (4-tube system) extruder terminal can be obtained from the manufacturer, Trinity Industries, Inc., P.O. Box 99, 950 West 400S, Centerville, UT 84014, telephone (800) 772-7976.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that the terminal systems furnished conform to the contract plans and specifications, conform to the prequalified design and material requirements, and were manufactured in conformance with the approved quality control program.

Terminal systems shall be installed in conformance with the manufacturer's installation instructions and these requirements. Each terminal system installed shall be identified by painting the type of terminal system in neat black letters and figures 2 inches high on the backside of the rail element between system posts numbers 4 and 5.

For terminal system (Type ET) the steel foundation tubes with soil plates attached shall be, at the Contractor's option, either driven, with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. The wood terminal posts shall be inserted into the steel foundation tubes by hand and shall not be driven. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 149° F or less. The edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

For terminal system (Type SKT) the soil tubes shall be, at the Contractor's option, driven with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. Wood posts shall be inserted into the steel foundation tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 149° F or less. The edges of the wood posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Surplus excavated material remaining after the terminal system has been installed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for alternative in-line terminal system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for

doing all the work involved in furnishing and installing alternative in-line terminal system, complete in place, including excavation, backfill and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

ALTERNATIVE FLARED TERMINAL SYSTEM

Alternative flared terminal system shall be furnished and installed as shown on the plans and in conformance with these special provisions.

The allowable alternatives for a flared terminal system shall consist of one of the following or a Department approved equal.

A. TERMINAL SYSTEM (TYPE FLEAT) - Terminal system (Type FLEAT) shall be a Flared Energy Absorbing Terminal 350 manufactured by Road Systems, Inc., located in Big Spring, Texas, and shall include items detailed for terminal system (Type FLEAT) shown on the plans. The Flared Energy Absorbing Terminal 350 can be obtained from the distributor, Universal Industrial Sales, P.O. Box 699, Pleasant Grove, UT 84062, telephone (801) 785-0505 or from the distributor, Gregory Highway Products, 4100 13th Street, S.W., Canton, OH 44708, telephone (330) 477-4800.

B. TERMINAL SYSTEM (TYPE SRT) - Terminal system (Type SRT) shall be an SRT-350 Slotted Rail Terminal (8-post system) as manufactured by Trinity Industries, Inc., and shall include items detailed for terminal system (Type SRT) shown on the plans. The SRT-350 Slotted Rail Terminal (8-post system) can be obtained from the manufacturer, Trinity Industries, Inc., P.O. Box 99, 950 West 400S, Centerville, UT 84014, telephone (800) 772-7976.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that the terminal systems furnished conform to the contract plans and specifications, conform to the prequalified design and material requirements, and were manufactured in conformance with the approved quality control program.

Terminal systems shall be installed in conformance with the manufacturer's installation instructions and these requirements. Each terminal system installed shall be identified by painting the type of terminal system in neat black letters and figures 2 inches high on the backside of the rail element between system posts numbers 4 and 5.

For terminal system (Type SRT), the steel foundation tubes with soil plates attached shall be, at the Contractor's option, either driven, with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. The wood terminal posts shall be inserted into the steel foundation tubes by hand and shall not be driven. Before the wood terminal posts are inserted, the inside

surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 149° F or less. The edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

For terminal system (Type FLEAT), the soil tubes shall be, at the Contractor's option, driven with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. Wood posts shall be inserted into the steel foundation tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 149° F or less. The edges of the wood posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Surplus excavated material remaining after the terminal system has been installed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for alternative flared terminal system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing alternative flared terminal system, complete in place, including excavation, backfill and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

LONG SPAN NESTED GUARDRAIL

Long span nested guardrail shall be furnished and installed as shown on the plans and in conformance with these special provisions.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that the guardrail and posts furnished conform to the contract plans and specifications, conform to the prequalified design and material requirements, and were manufactured in conformance with the approved quality control program.

Surplus excavated material remaining after the long span nested guardrail is installed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing long span nested guardrail, complete in place, including excavation, backfill and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer shall be paid under the metal beam guard railing item.

10-1.105 CHAIN LINK RAILING:

Chain link railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications and these special provisions.

The chain link fabric shall be 9-gage (0.148-inch diameter), Type IV, Class B, bonded vinyl coated fabric, conforming to the requirements in AASHTO Designation: M 181.

The strength of the bond between the coating material and steel of the bonded vinyl coated chain link fabric shall be equal to or greater than the cohesive strength of the polyvinyl chloride (PVC) coating material.

PAYMENT

The contract prices paid per linear foot for railings of the types shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the railings, complete in place, including, but not limited to, excavation, backfill and disposal of surplus material, concrete and reinforcing steel, as shown on the plans, as specified in the specifications and these special provisions, and as directed by the Engineer.

10-1.106 METAL BRIDGE RAILING:

Metal railing, steel bridge railing, steel bridge picket railing, metal tube bridge railing, handrailing, pipe handrailing, and tubular handrailing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

PAYMENT

The contract prices paid per linear foot for railings of the types shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the railings, complete in place, including, but not limited to, excavation, backfill and disposal of surplus material, concrete and reinforcing steel, as shown on the plans, as specified in the specifications and these special provisions, and as directed by the Engineer.

10-1.107 CABLE RAILING:

Cable railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

PAYMENT

The contract price paid per linear foot for cable railingshall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the railing, complete in place, including, but not limited to, excavation, backfill and disposal of surplus material, concrete and reinforcing steel, as shown on the plans, as specified in the specifications and these special provisions, and as directed by the Engineer.

10-1.108 PEDESTRIAN BARRICADE (TYPE 1):

Pedestrian barricade shall be type 1 and shall be constructed at the location shown on the plans and in conformance with the details shown on the plans, the provisions in Section 83-1, "Railings," of the Standard Specifications, and these special provisions.

Portland cement concrete shall be minor concrete or may be produced from commercial quality concrete containing not less than 590 poundsof cementitious material per cubic yard.

Excavated material from the barricade post holes shall be disposed of outside the highway right of way in conformance with the provision in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The quantity of pedestrian barricade (type 1) will be measured as units determined from actual count in place.

The contract unit price paid for pedestrian barricade (type 1) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing pedestrian barricade (type 1), complete in place, including excavation, concrete, removal and disposal of excavated material, furnishing and installing sign panels on pedestrian barricade (type 1), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.109 CONCRETE BARRIER:

Concrete barriers shall conform to the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

Concrete barrier (Type 26A modified) will be measured and paid for as concrete barrier (Type 26 modified).

PAYMENT

The contract price paid per linear foot for concrete barrier of the type or types listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the concrete barriers, complete in place, including bar reinforcing steel, steel dowels and drilling and bonding dowels in structures, hardware for steel plate barrier, miscellaneous metal, excavation, backfill (including concrete paving for, and granular material or concrete slab used as backfill in Type 50E, Type 60E, Type 60GE, and Type 60SE concrete barrier), and disposing of surplus material and for furnishing, placing, removing and disposing of the temporary railing for closing the gap between existing barrier and the concrete barrier being constructed, as shown on the plans, as specified in the specifications and these special provisions, and as directed by the Engineer.

Full compensation for construction of the electrolier pedestals shall be considered as included in the contract price paid per linear foot for concrete barrier of the type listed on the engineers estimate and no separate payment will be made therefor.

10-1.110 DOUBLE THRIE BEAM BARRIER:

Thrie beam barrier shall conform to the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.
Attention is directed to "Order of Work" of these special provisions.

PAYMENT

Double thrie beam barrier, measured as specified in Section 83-2.03, "Measurement," of the Standard Specifications, will be paid for at the contract price per linear foot for double thrie beam barrier, and the contract unit price or prices for end anchor assemblies, return caps, terminal connectors and the various types of terminal sections.

The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the barrier, complete in place, including drilling holes for wood posts, driving posts, backfilling the space around posts, excavating and backfilling end anchor assembly holes, connecting thrie beam barrier to concrete surfaces and disposing of surplus excavated material, and for furnishing, placing, removing and disposing of the temporary railing for closing the gap between existing barrier and the barrier being constructed as shown on the plans, and as specified in the specifications and these special provisions, and as directed by the Engineer.

10-1.111 TRANSITION RAILING (TYPE WB):

Transition railing (Type WB) shall be furnished and installed in conformance with details shown on the plans, the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

The 10-gage rail elements shall conform to the requirements of Class B, Type 1 thrie beam guard railing as shown in AASHTO Designation: M 180. End caps shall conform to the requirements of Class A, Type 1 thrie beam guard railing as shown in AASHTO Designation: M 180.

Surplus excavated material remaining after the transitional railing (Type WB) has been constructed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for transition railing (Type WB) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing transition railing (Type WB), complete in place, including drilling holes for wood posts, driving posts, backfill, and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.112 TRANSITION RAILING (TYPE DTB):

Transition railing (Type DTB) shall be furnished and installed in conformance with details shown on the plans, the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.
The 10-gage rail elements shall conform to the requirements of Class B, Type 1 thrie beam guard railing as shown in AASHTO Designation: M 180. End caps shall conform to the requirements of Class A, Type 1 thrie beam guard railing as shown in AASHTO Designation: M 180.

Surplus excavated material remaining after the transitional railing (Type DTB) has been constructed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for transition railing (Type DTB) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing transition railing (Type DTB), complete in place, including drilling holes for wood posts, driving posts, backfill, and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.113 CRASH CUSHION (TAU II):

Crash cushion (TAU II) shall be furnished and installed as shown on the plans and in conformance with these special provisions.

The Crash cushion shall be (TAU II) or an alternate product which performs in a similar manner as approved by the Engineer. The listed product is intended as a guideline, and products from alternate manufacturers will be accepted provided that the product and its performance are a close approximation of the specified product. The Contractor shall submit the proposed alternate product to the Engineer for evaluation and approval prior to placing an order with the vendor.

Although the Special Provisions and construction plans reference specific brands or products, the intent of these references is as a guideline only, and products from alternate manufacturers will be accepted, provided that the product and its performance are a close approximation of the specified product. The Contractor shall submit information and specifications of the proposed alternate product to the Engineer for evaluation and approval prior to placing an order with the vendor.

Crash cushion (TAU II) shall be the 4-bay (Test Level 2) model TAU II crash cushion manufactured by Barrier Systems, Inc., and shall include all items detailed for a 4-bay (Test Level 2) model TAU II crash cushion shown in the manufacturer's plans and installation instructions. The 4-bay (Test Level 2) model TAU II crash cushion supplied shall comply to NCHRP Report 350, Test Level 2. The 4-bay (Test Level 2) model TAU II crash cushion can be obtained from the distributor, Statewide Safety and Signs, at the following location:

13755 Blaisdell
Poway, CA 92064
Phone: (858) 679-7292
Toll Free: (800) 547-9683

Concrete anchorage devices used for attaching the crash cushion (TAU II) to the concrete pad shall be limited to those which have been satisfactory tested for such application by previous testing.

The concrete pad shall conform to the provisions in Section 51, "Concrete Structures," and Section 52, "Reinforcement," of the Standard Specifications and "Portland Cement Concrete" elsewhere in these special provisions.

The Contractor shall furnish the Engineer copies of the manufacturer's plan and parts list as requested.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that the crash cushion conforms to the contract plans and specifications, conforms to the prequalified design and material requirements, and was manufactured in conformance with the approved quality control program.

Crash cushion (TAU II) shall be installed in conformance with the manufacturer's installation instructions.

Surplus excavated material remaining after the crash cushion has been installed shall be disposed of as directed by the Engineer.

Crash cushion (TAU II) will be measured by the unit as determined from actual count in place in the completed work.

The contract unit price paid for crash cushion (TAU II) shall include full compensation for furnishing all labor, materials (including anchor bolts, nuts, washers, and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the crash cushion (TAU II), complete in place, including structure excavation, structure backfill, bar reinforcing steel and concrete for foundation, and disposing of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.114 THERMOPLASTIC PAVEMENT MARKING:

Thermoplastic pavement markings shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification PTH-02ALKYD.

Retroreflectivity of the thermoplastic pavement markings shall conform to the requirements in ASTM Designation: D 6359-99. White thermoplastic pavement markings shall have a minimum initial retroreflectivity of 250 mcd m^{-2} lx^{-1}. Yellow thermoplastic pavement markings shall have a minimum initial retroreflectivity of 150 mcd m^{-2} lx^{-1}.

Thermoplastic pavement markings shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

At the option of the Contractor, permanent pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the thermoplastic pavement markings specified herein. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications.

If permanent tape is placed instead of thermoplastic pavement markings, the tape will be measured and paid for by the square foot as thermoplastic pavement marking.

PAYMENT

The contract price paid per square foot for thermoplastic pavement markings shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying thermoplastic pavement markings, complete in place,

including the removal of conflicting pavement markings and establishing alignment for stripes and layout work, as shown on the plans, as specified in the specifications and these special provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

10-1.115 THERMOPLASTIC TRAFFIC STRIPE (SPRAYABLE):

Sprayable thermoplastic traffic stripes (traffic lines) shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Sprayable thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification No. PTH-02SPRAY.

Retroreflectivity of the sprayable traffic stripes shall conform to the requirements in ASTM Designation: D 6359-99. White sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of 250 mcd m^{-2} lx^{-1}. Yellow sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of 150 mcd m^{-2} lx^{-1}.

At the option of the Contractor, permanent traffic striping and pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the sprayable thermoplastic traffic stripes. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications.

Where striping joins existing striping, as shown on the plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Sprayable thermoplastic material shall be applied to the pavement at a minimum thickness of 0.039-inch and a minimum rate of 0.13-lb/ft. The minimum application rate is based on a solid stripe of 4 inches in width.

Sprayable thermoplastic material shall be applied to the pavement at a temperature between 351° F and 401° F, unless a different temperature is recommended by the manufacturer.

Sprayable thermoplastic traffic stripes shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

MEASUREMENT AND PAYMENT

If permanent tape is placed instead of sprayable thermoplastic traffic stripes, the tape will be measured and paid for by the linear foot as thermoplastic traffic stripe (sprayable).

Sprayable thermoplastic traffic stripes will be measured by the linear foot along the line of the traffic stripes, without deductions for gaps in broken traffic stripes. A double traffic stripe, consisting of two 4-inch wide yellow stripes, will be measured as one traffic stripe.

The contract price paid per linear foot for thermoplastic traffic stripe (sprayable) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in applying sprayable thermoplastic traffic stripes (regardless of the number, widths, and patterns of individual stripes involved in each traffic stripe) including establishing alignment for stripes, and layout work, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.116 PAVEMENT MARKERS:

Pavement markers shall be placed in conformance with the provisions in Section 85, "Pavement Markers," of the Standard Specifications and these special provisions.

Attention is directed to "Traffic Control System For Lane Closure" of these special provisions regarding the use of moving lane closures during placement of pavement markers with bituminous adhesive.

The Contractor shall furnish the Engineer certificates of compliance for the pavement markers in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Retroreflective pavement markers shall be marked as abrasion resistant on the body of the markers.

PAYMENT

The contract unit prices paid for pavement marker (retroreflective) and pavement marker (non-reflective) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and placing pavement markers, complete in place, including adhesives, and establishing alignment for pavement markers, as shown on the plans, as specified in the specifications and these special provisions, and as directed by the Engineer.

10-1.117 MOBILIZATION:

Mobilization shall conform to the provisions of the Standard Specifications.

Payment – Full compensation, except as otherwise provided herein, for conforming to the requirements of this article shall be paid for on a lump sum basis and no additional compensation will be allowed therefor.

10-1.118 DE-MOBILIZATION:

De-mobilization shall consist of completion of all final construction and administrative work required to secure the project for termination and acceptance by the Engineer, including, but not limited to the following:

1. Satisfactory completion of Finishing Roadway in accordance with these special provisions, and Section 22, "Finishing Roadway" of the Standard Specifications;
2. Removal of all temporary facilities, construction office, temporary utilities, plant, equipment, surplus material, construction debris and similar from project limits and adjacent property, as required and as directed by the Engineer;
3. Restoration of all temporary roads and haul routes and construction storage and office areas, etc. to original or better condition;
4. Completion of record of drawings (as-builts), to the satisfaction of the Engineer;
5. Submission of final Disadvantaged Business Enterprise report to the Engineer;
6. Submission of final certified payroll documents to the Engineer;
7. Submission of property owner releases, as required by the Engineer;
8. Completion of the requirements of permits issued by other agencies;
9. Satisfactory completion of all other contractually and legally required construction and administrative items of work.

De-Mobilization shall include the satisfactory completion of all items of work, but shall not be construed as being a separate payment for work that is paid under separate contract items. The contract item for De-Mobilization is intended for proper close-out activities.

Payment for De-Mobilization will be made on a lump sum basis in the amount of the fixed bid price after satisfactory completion of the above listed items. Payment for De-Mobilization will be included in the final pay estimate and payment. No partial payments will be made for De-Mobilization.

SECTION 10-2 HIGHWAY PLANTING AND IRRIGATION SYSTEMS

10-2.01 GENERAL:

The work performed in connection with highway planting and irrigation systems shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these special provisions.

COST BREAK-DOWN

The Contractor shall furnish the Engineer a cost break-down for the contract lump sum items of highway planting and irrigation system. Cost break-down tables shall be submitted to the Engineer for approval within 15 working days after the contract has been approved. Cost break-down tables will be approved, in writing, by the Engineer before any partial payment will be made for the applicable items of highway planting and irrigation system involved.

Cost break-downs shall be completed and furnished in the format shown in the samples of the cost break-downs included in this section. Line item descriptions of work shown in the samples are the minimum to be submitted. Additional line item descriptions of work may be designated by the Contractor. If the Contractor elects to designate additional line item descriptions of work, the quantity, value and amount for those line items shall be completed in the same manner as for the unit descriptions shown in the samples. The line items and quantities given in the samples are to show the manner of preparing the cost break-downs to be furnished by the Contractor.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and their values shall be included in the cost break-downs submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-downs submitted for approval.

The sum of the amounts for the line items of work listed in each cost break-down table for highway planting and for irrigation system work shall be equal to the contract lump sum price bid for Highway Planting and Irrigation System, respectively. Overhead and profit, , shall be included in each individual line item of work listed in a cost break-down table.

No adjustment in compensation will be made in the contract lump sum prices paid for highway planting and irrigation system due to differences between the quantities shown in the cost break-downs furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

Individual line item values in the approved cost break-down tables will be used to determine partial payments during the progress of the work and as the basis for calculating an adjustment in compensation for the contract lump sum items of highway planting and irrigation system due to changes in line items of work ordered by the Engineer. When the total of ordered

changes to line items of work increases or decreases the lump sum price bid for either Highway Planting or Irrigation System by more than 25 percent, the adjustment in compensation for the applicable lump sum item will be determined in the same manner specified for increases and decreases in the total pay quantity of an item of work in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

HIGHWAY PLANTING COST BREAK-DOWN

Contract No. 0E5201

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
Roadside Clearing	LS	LUMP SUM		
Mulch (4" deep)	CY	35		
Plant Group K (24" Box)	EA	13		
Commercial Fertilizer – granular (220 lbs / AC)	LB	4,620		
Commercial Fertilizer – Slow Release Tablets	EA	424		
Seed (Type 1Erosion Control)	SF	778,746		
Seed (Type 2 Bioswale)	SF	65,867		
Seed (Type 3 Vernal Pool Buffer)	SF	7,559		
Seed (Type 4 Channel)	SF	58,631		

TOTAL _____

IRRIGATION SYSTEM COST BREAK-DOWN

Contract No. 0E5201

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
2" Purple Plastic Pipe (PR 315) Pressure Line	LF	2,500		
3/4" Purple Plastic Pipe (Sch 40) Supply Line	LF	3,552		
1" Purple Plastic Pipe (Sch 40) Supply Line	LF	1,152		
1-1/2" Purple Plastic Pipe (Sch 40) Supply Line	LF	2,145		
2" Purple Plastic Pipe (Sch 40) Supply Line	LF	1,396		
Pull Box	EA	21		
2" Electric Remote Control Valve	EA	6		
2" Electric Control Valve Master (RCVM)	EA	1		
2" Ball Valve	EA	10		
2" Backflow Preventer Assembly (BFPA)	EA			
Backflow Preventer Assembly Enclosure	EA			
Flow Sensor	EA	1		
6 Station Irrigation Controller (wall mounted)	EA	1		
8 Station Irrigation Controller (wall mounted)	EA	1		
Irrigation Controller Cabinet (single)	EA	2		
Sprinkler Type B-4 4SST-PC	EA	178		
Sprinkler Type B-4 4 EST PC	EA	8		
Sprinkler Type C-2	EA	106		
Control and Neutral Conductors	LF	3,300		
Recycled Water Warning Signs	EA	4		

TOTAL _____

10-2.02 (BLANK)

10-2.03 (BLANK)

10-2.04 HIGHWAY PLANTING:

The work performed in connection with highway planting shall conform to the provisions in Section 20-4, "Highway Planting," of the Standard Specifications and these special provisions.

HIGHWAY PLANTING MATERIALS

Horticultural soil testing has not yet been completed. Fertilizer, soil amendment, topsoil, mulch, etc. specifications shown here are for plan check/base bid purposes only. Soil test results may change the specifications and bid quantities, and may include the need to import topsoil.

Commercial Fertilizer (Granular)

Commercial fertilizer (granular) shall be a pelleted or granular form and shall fall within 20 percent of the following guaranteed chemical analysis:

Ingredient	Percentage
Nitrogen	20
Phosphoric Acid	20
Water Soluble Potash	20

Commercial Fertilizer (Slow Release Tablets)

Commercial fertilizer (slow release) shall be tablets, shall be slow or controlled release with a nutrient release over an 8-month to 12-month period, and shall fall within the following guaranteed chemical analysis range:

Ingredient	Percentage
Nitrogen	20
Phosphoric Acid	10
Water Soluble Potash	5

ROADSIDE CLEARING

Before preparing planting areas, mulch areas, and seeding areas, or commencing irrigation trenching operations for planting areas, trash and debris shall be removed from the entire highway right of way within the project limits as required under Construction Site Management of these special provisions.

The project area shall be cleared as specified herein:

A. Existing plants, where shown on the plans to be removed, shall be removed.

B. At the option of the Contractor, removed trees and shrubs may be reduced to chips. Chipped material shall be spread within the project limits at locations designated by the Engineer. Chipped material shall not be substituted for mulch, nor shall the chipped material be placed within areas to receive mulch.

C. Weeds shall be killed and removed within the entire highway right of way, within the project limits, excluding median areas, new and existing pavement, curb, sidewalk and other surfaced areas.

D. Weeds shall be killed and removed within proposed mulch areas and within the area extending beyond the outer limits of the proposed mulch areas to the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, existing planting and fences. At those locations where proposed mulch areas are 12 feet or more from the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, and fences, the clearing limit shall be 6 feet beyond the outer limits of the proposed mulch areas.

E. Weeds shall be killed and removed within an area 2 feet in diameter centered at each liner or seedling plant location where the plants are planted more than 10 feet apart. At locations where liner or seedling plants are to be planted less than 10 feet apart, weeds shall be killed and removed within the entire area.

F. Weeds shall be killed and removed from within areas where rock blankets and graveled areas are to be placed, and from within unpaved gore areas between the edge of pavement and planting areas as shown on the highway planting plans.

G. Roadside clearing for seeding areas shall also consist of mowing weeds in the areas to be seeded until the start of the seeding operation.

H. No clearing activities shall occur within the designated Environmentally Sensitive Area(s) (ESA).

After the initial roadside clearing is complete, additional roadside clearing work shall be performed as necessary to maintain the areas, as specified above, in a neat appearance until the start of the plant establishment period. This work shall include the following:

A. Trash and debris shall be removed.

B. Rodents shall be controlled.

C. Weed growth shall be killed before the weeds reach the seed stage of growth or exceed 6 inches in length, whichever occurs first.

D. Existing ground cover shall be killed and removed from within the 6-foot diameter areas specified for each proposed plant location within the existing ground cover areas.

E. Weeds in plant basins, including basin walls, shall be removed by hand pulling, after the plants have been planted.

Weed Control

Weed control shall also conform to the following:

A. Stolon type weeds shall be killed with glyphosate.

B. Tumbleweeds shall be removed by hand pulling before the tumbleweeds reach a height of 6 inches.

C. Removed weeds and ground cover shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Roadside clearing work shall not include work required to be performed as clearing and grubbing as specified in Section 16, "Clearing and Grubbing," of the Standard Specifications.

PESTICIDES

Pesticides used to control weeds shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications. Except as otherwise provided in these special provisions, pesticide use shall be limited to the following materials:

Cacodylic Acid
Diquat
Fluazifop-butyl
Glyphosate
Isoxaben (Preemergent)
Sethoxydim
Oxadiazon - 50 percent WP (Preemergent)
Oryzalin (Preemergent)
Pendimethalin (Preemergent)
Prodiamine (Preemergent)
Trifluralin (Preemergent)
Ammonium Sulfate
Magnesium Chloride
Melfluidide (Growth regulator)
Napropamide (Preemergent)

Granular preemergents may be used when applied to areas that will be covered with mulch, excluding plant basins. Granular preemergents shall be limited to the following materials:

Dichlobenil (Preemergent)
Oxadiazon (Preemergent)

Granular preemergents shall be applied prior to the application of mulch. Mulch applications shall be completed in these areas on the same working day. Photosensitive dye will not be required.

Glyphosate shall be used to kill stolon type weeds.

Oxadiazon shall be of the emulsifiable concentration or wettable powder type, except when Oxadiazon is used under mulch in conformance with these special provisions.

Prior to the application of preemergents, ground cover plants shall have been planted a minimum of 3 days and shall have been thoroughly watered.

A minimum of 100 days shall elapse between applications of preemergents.

Except for ground cover plants, preemergents shall not be applied within 18 inches of plants or within seeding areas.

Growth regulators shall not be applied within 6 feet of trees, shrubs or vines.

Ammonium sulfate and magnesium chloride shall be used only in areas planted to Carpobrotus or Delosperma. Ammonium sulfate and magnesium chloride shall not be applied in a manner that allows the pesticides to come in contact with trees or shrubs.

If the Contractor elects to request the use of other pesticides on this project, the request shall be submitted, in writing, to the Engineer not less than 15 days prior to the intended use of the other pesticides. Except for the pesticides listed in these special provisions, no pesticides shall be used or applied without prior written approval of the Engineer.

Pesticides shall not be applied within the limits of the plant basins. Pesticides shall not be applied in a manner that allows the pesticides to come in contact with the foliage and woody parts of the plants.

PREPARING PLANTING AREAS

Plants adjacent to drainage ditches shall be located so that after construction of the basins, no portion of the basin walls shall be less than the minimum distance shown on the plans for each plant involved.

CULTIVATE

Areas to be planted with seed (type 1 erosion control), seed (type 2 bioswale), seed (type 3 vernal pool buffer), and seed (Type 4 channel) shall be cultivated.

Unless payment is made separately in these special provisions, full compensation for performing cultivation, weed germination, killing of weeds that germinate, and for furnishing and mixing soil amendment and fertilizer shall be considered as included in the contract unit prices paid for the plants involved and no separate payment will be made therefor.

PLANTING

Backfill material for plant holes must be a mixture of soil and soil amendment. The quantity of soil amendment shall be as shown on the Plant List. Thoroughly mix backfill material and uniformly distribute throughout the entire depth of the plant hole without clods and lumps.

Apply or place commercial fertilizer (granular and slow release tablets) and iron sulfate at the time of planting and at the rates shown on the Plant List.

Mulch placed in areas outside of plant basins shall be spread to a uniform depth of 4 inches.

Spread mulch from the outside of the proposed plant basin to the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, fences, and existing plantings. If the proposed plant material is 12 feet or more from the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, fences, and other existing plantings, the mulch must be spread 6 feet beyond the outside edge of the proposed plant basins.

Do not place mulch within 4 feet of the centerline of earthen drainage ditches, within 4 feet of the edge of paved ditches, and within 4 feet of the centerline of drainage flow lines.

Attention is directed to "Irrigation Systems Functional Test" of these special provisions regarding functional tests of the irrigation systems. Do not perform planting in an area until the functional test has been completed for the irrigation system serving that area.

CONSTRUCTION

Application

Plant between November and April and when the soil is moist to a minimum depth of 8 inches, unless otherwise approved in writing by the Engineer.

EROSION CONTROL, BIOSWALE, CHANNEL AND VERNAL POOL BUFFER SEEDING

GENERAL

Summary

This work includes scarifying the soil, furnishing and incorporating commercial fertilizer, and dry applying native seed to seeding areas shown on the plans.

Seeding materials must not be applied prior to September or after May. If seeding work cannot be performed prior to the start of plant establishment and within the above specified time limit, then the work must be performed during the plant establishment period when directed by the Engineer.

Pesticides must not be used on seeding areas after the seed has been applied.

MATERIALS

Seed

Seed not required to be labeled under the California Food and Agricultural Code must be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts or by a seed technologist certified by the Society of Commercial Seed Technologists. Measure and mix individual seed species in the presence of the Engineer.

Seed must contain at most 1.0 percent total weed seed by weight.

Seed must be free of the following specific weed species: *Pennisetum*, *Sisymbrium* and *Salsola*.

Deliver seed to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag attached are not accepted. The Engineer takes a sample of approximately one ounce or 0.25 cup of seed for each seed lot greater than 2 pounds.

Seed must consist of the following:

Seed (Type 1 Erosion Control)

Botanical Name (Common Name)	Percent Germination (Minimum)	Pounds Pure Live Seed Per Acre (Slope Measurement)
Anemopsis californica (Yerba Mansa)	50	2
Diplacus longiflorus (Monkey Flower)	2	2
Escscholzia californica (California Poppy)	85	2
Lupinus succulentus (Arroyo Lupine)	90	3
Muhlenbergia rigens (Deer Grass)	60	2
Oenothera californica (Evening primrose)	50	2
Nasella lepida (Foothill Needlegrass)	65	2
Nasella pulchra (Purple Needlegrass)	75	2
	Total	17

Seed (Type 2 Bioswale)

Botanical Name (Common Name)	Percent Germination (Minimum)	Pounds Pure Live Seed Per Acre (Slope Measurement)
Juncus mexicanus (Mexican Rush)	40	2
Nasella pulchra (Purple Needlegrass)	65	2
Scripus actus occidentalis (Bullrush)	60	2
Typha llatifolia (Common Cattail)	40	2
Vulpia myuros myruros (Rattail Fescue)	85	2
	Total	10

Seed (Type 3 Vernal Pool Buffer)

Botanical Name (Common Name)	Percent Germination (Minimum)	Pounds Pure Live Seed Per Acre (Slope Measurement)
Distichlis spicata (Saltgrass)	70	2
Eschscholzia californica (California Poppy)	85	2
Heliotropium currassavicum (Salt Heliotrope)	12	2
Lasthenia californica (Goldenfields)	50	3
Nasella pulchra (Purple Needlegrass)	65	2
Plantago erecta (Dot-seed Plantain)	85	2
	Total	13

Seed (Type 4 Channel)

Botanical Name (Common Name)	Percent Germination (Minimum)	Pounds Pure Live Seed Per Acre (Slope Measurement)
Ambrosia psilostachya (Western Ragweed)	50	2
Delinandra fasciculata (Common Tarplant)	65	2
Lasthenia (californica) gracilis (Goldfields)	50	2
Sisyrhinchium bellum (Blue-eyed grass)	50	2
Escscholzia californica (California Poppy)	85	2
Verbena lasiostachy (Vervain)	65	2
Solidago californica (Goldenrod)	65	2
Lupinus succulentus (Arroyo Lupine)	90	2
Lotus Scoparius (Deerweed)	65	2
Nasella pulchra (Purple Needlegrass)	65	2
Leymus triticoides (Creeping Wild Rye)	65	2
	Total	17

Seed Sampling Supplies

At the time of seed sampling, provide the Engineer a glassine lined bag and custody seal tag for each seed lot sample.

CONSTRUCTION

Site Preparation

Immediately prior to applying seed to seeding areas, trash and debris must be removed, and weeds must be mowed as close to the ground as possible.

After mowing and just prior to seed application, seeding areas must be scarified to a minimum depth of one inch.

Application

Seed for seeding must be applied at the rate of 17 pounds per acre (slope measurement). (Type 1 Erosion Control), 10 pounds per acre (slope measurement) (Type 2 Bioswale) and 13 pounds per acre (slope measurement) (Type 3 Vernal Pool Buffer).

Seed must be incorporated into the soil to a maximum depth of 1/4 inch by raking, dragging or drilling.

Watering of seeding areas will not be required unless directed by the Engineer. When directed by the Engineer, watering will be paid for as extra work as specified in Section 4-1.03D,"Extra Work," of the Standard Specifications.

PLANT ESTABLISHMENT WORK

The plant establishment period shall be Type 2 and shall not be less than 750 working days (three years).

If seeding cannot be performed within the time limits specified under " Seeding" of these special provisions and the Engineer determines that the work except seeding and plant establishment work has been completed, the Engineer will notify the Contractor in writing of the start of the plant establishment period.

Seeding not performed prior to the start of the plant establishment period shall be performed during the plant establishment period. The work involved in preparing areas to receive seeding and applying seed shall be in conformance with the provisions in "Seeding" of these special provisions.

After sowing seed, plant establishment work for the seeding areas will not be required except for removing trash and debris and mowing. Mowing shall be performed after the seeds have set and the plants have begun to die back.

Attention is directed to "Relief From Maintenance and Responsibility" in these special provisions regarding relief from maintenance and protection.

Commercial fertilizer (granular) shall be applied to trees, shrubs, vines and ground cover during the first week of April and October of each year. Commercial fertilizer shall be applied at the rates shown on the plans and shall be spread with a mechanical spreader wherever possible.

During the plant establishment period, the plants shall be watered utilizing the Remote Irrigation Control System (RICS) software program. A watering schedule shall be submitted to the Engineer for use during the plant establishment period.

Weeds within plant basins, including basin walls and ground cover, shall be controlled by hand pulling.

Weeds within mulched and ground cover areas and outside of plant basins shall be controlled by killing.

Weeds outside of mulched areas, plant basins, ground cover, the median, and paved areas shall be controlled by mowing. At locations where proposed planting areas are 12 feet or more from the edges of existing plantings to remain and from shoulders, dikes, curbs, sidewalks, fences, and walls, the mowing limit shall be 6 feet beyond the outer limits of the proposed planting area.

Weeds within median areas, pavement, curbs, sidewalk, and other surfaced areas shall be controlled by killing.

Except as specified in these special provisions, disposal of mowed material will not be required unless ordered by the Engineer. Disposal of mowed material, as directed by the Engineer, will be paid for as extra work as provided in Section 4-1.03D,"Extra Work," of the Standard Specifications.

At the option of the Contractor, a growth regulator may be applied to mowed areas, provided the growth regulator is approved in advance by the Engineer and the growth regulator is applied in conformance with these special provisions.

At the option of the Contractor, plants of a larger container size than those originally specified may be used for replacement plants during the first 125 working days of the plant establishment period.

After 125 working days of the plant establishment period have been completed, replacement of plants shall be the same size as originally specified.

When ordered by the Engineer, one application of a preemergent pesticide conforming to the provisions in "Pesticides" of these special provisions, shall be applied between 40 working days and 50 working days prior to completion of the plant establishment period. This work will be paid for as extra work as provided in Section 4-1.03D,"Extra Work," of the Standard Specifications.

Wye strainers shall be cleaned at least 15 days prior to the completion of the plant establishment period.

The final inspection shall be performed in conformance with the provisions in Section 5-1.13, "Final Inspection," of the Standard Specifications and shall be completed a minimum of 20 working days before the estimated completion of the contract.

Full compensation for mowing and trimming turf (sod) and disposing of mowed and trimmed material during the plant establishment period shall be considered as included in the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

10-2.05 IRRIGATION SYSTEMS:

Irrigation systems shall be furnished and installed in conformance with the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications, except materials containing asbestos fibers shall not be used.
Method A pressure testing shall conform to the provisions in Section 20-5.03H(1), "Method A", of the Standard Specifications, except leaks that develop in the tested portion of the system shall be located and repaired after each test period when a drop of more than 5 pounds per square inch is indicated by the pressure gage. After the leaks have been repaired, the one hour pressure test shall be repeated and additional repairs made until the drop in pressure is 5 pounds per square inch or less.

Pipe supply lines shall be pressure tested in conformance with the provisions in Section 20-5.03H, "Pressure Testing," of the Standard Specifications, except the pipe (supply line) on the discharge side of the control valve shall be tested by Method B as specified in Section 20-5.03H(2), "Method B," of the Standard Specifications.

Only pipeline trenches and excavation pits for supply lines being supplied from one water service point shall be open at one time. After pressure testing is complete, trenches and pits excavated for pipe supply lines, being supplied from one water service point, shall be

backfilled prior to commencing excavations for pipe supply lines being supplied from another water service point.

VALVE BOXES

Valve boxes shall conform to the provisions in Section 20-2.24, "Valve Boxes," of the Standard Specifications, except as otherwise provided herein.

Valve boxes shall be precast portland cement concrete.

Covers for concrete valve boxes shall be cast iron. Cast iron covers shall be hinged with brass hinge pins for valve boxes containing valves smaller than 2 inches.

Valve boxes shall be identified on the top surface of the covers by branding the appropriate abbreviations for the irrigation facilities contained in the valve boxes as shown on the plans. Valve boxes that contain remote control valves shall be identified by the appropriate letters and numbers (controller and station numbers). The letters and numbers shall be 2 inches in height.

Label material shall be plate plastic.

BALL VALVES

Ball valves shall be as shown on the plans and in conformance with the provisions in Section 20-2of the Standard Specifications and these special provisions.

Ball valves, smaller than 3 inches in size, shall be furnished with a cross-handle.

Ball valves shall be a solid brass.

ELECTRIC AUTOMATIC IRRIGATION COMPONENTS

Irrigation Controllers

Irrigation controllers shall be single, solid-state independent controllers conforming to the following:

A. Irrigation controllers shall be fully automatic and shall operate a complete 14-day or longer irrigation program.

B. A switch or switches shall be provided on the face of the control panel that will turn the irrigation controller "on" or "off" and provide for automatic or manual operation. Manual operation shall allow cycle start at the desired station and shall allow activation of a single station.

C. The watering time of each station shall be displayed on the face of the control panel.

D. The irrigation controller and the low voltage output source shall be protected by fuses or circuit breakers.

E. The irrigation controller mechanism, panel and circuit board shall be connected to the low voltage control and neutral conductors by means of plug and receptacle connectors located in the irrigation controller enclosure.

F. Each station shall have a variable or incremental timing adjustment with a range of 99 minutes to a minimum of one minute.

G. Irrigation controllers shall be capable of a minimum of 2 program schedules.

H. Irrigation controllers shall have an output that can energize a pump start circuit or a remote control valve (master).

I. When 2 or more irrigation controllers operate the same electric remote control valve (master), an isolation relay shall be provided and installed per the controller manufacturer's instructions.

J. Irrigation controllers shall be manufactured by the same company.

K. Where direct burial conductors are to be connected to the terminals strip, the conductors shall be connected with the proper size open-end crimp-on wire terminals. No exposed wire shall extend beyond the crimp of the terminal and the wires shall be parallel on the terminal strip.

Attention is directed to the provisions in "Electric Service (Irrigation)" of these special provisions regarding electrical power for irrigation controllers and irrigation controller enclosure cabinets.

Electric Remote Control Valves

Electric remote control valves shall conform to the provisions in Section 20-2.23, "Control Valves," of the Standard Specifications and the following:

A. Valves shall be brass construction.

B. Valves shall be straight pattern (side inlet) as shown on the plans.

C. Electric remote control valves shall be outfitted with adjustable pressure regulators as shown on the plans. Pressure regulators shall be compatible for use with the electric remote control valves and shall be of the same manufacturer as the electric remote control valves. Pressure regulators shall regulate and maintain the outlet pressure regardless of the incoming pressure. Pressure regulators shall withstand a cold water working pressure of 200 psi. The Contractor shall adjust the pressure regulators to provide proper operation of the irrigation system downstream of the electric remote control valves.

Pull Boxes

Pull box installations shall conform to the provisions in Section 20-5.027I, "Conductors, Electrical Conduits and Pull Boxes," of the Standard Specifications.

Conductors

Low voltage, as used in this section "Conductors," shall mean 36 V or less.

Markers for the control conductors shall be identified with the appropriate number or letter designations of irrigation controllers and station numbers. Markers for neutral conductors shall be identified with the appropriate number or letter designations of the irrigation controllers.

The color of low voltage neutral and control conductor insulation, except for the striped portions, shall be homogeneous throughout the entire thickness of the insulation.

Insulation for conductors may be UL listed polyethylene conforming to UL44 test standards with a minimum insulation thickness of 41 mils for wire sizes 10AWG and smaller.

ARMOR-CLAD CONDUCTORS

Armor-clad conductors shall be used in direct burial applications from pull boxes adjacent to irrigation controller to remote control valves and other irrigation facilities in conformance with the details shown on the plans and these special provisions.

Armor-clad conductors shall conform to the following:

A. Conductors shall be the proper size for the application, and shall be solid, uncoated copper with a conductor size not less than 90 percent of the AWG diameter required.

B. At the Contractor's option, conductor insulation coverings shall be either of the following:

   1. Polyvinyl chloride (PVC) conforming to UL style, Type UF 60°C, 600 V. Average thickness of insulation shall be not less than 60 mils, with a minimum thickness of 54 mils, or

   2. UL listed polyethylene conforming to UL44 test standards with a minimum insulation thickness of 41 mils for wire sizes 10AWG and smaller.

C. Armor shall be a minimum 0.005-inch thick by 0.50-inch wide Type 304 stainless steel tape that is helically wrapped over each conductor with a 33 percent minimum overlap.

D. Outer jacket for conductors shall be sunlight resistant PVC and shall conform to the Insulated Power Cable Engineer's Association (ICEA) S-61-402, NEMA Standard WC5, and UL Listing 1263. Nominal thickness of the outer jacket shall be 30 mils with a minimum thickness of 24 mils.

At the option of the Contractor, conductors conforming to the provisions in Section 20-2.31D, "Conductors," of the Standard Specifications may be used when the conductors are installed in an electrical conduit.

IRRIGATION CONTROLLER ENCLOSURE CABINET

Irrigation controller enclosure cabinets shall be constructed and equipment installed in the cabinets in conformance with the provisions of Section 86-3.04A, "Cabinet Construction," of the Standard Specifications, and these special provisions.

Electric service shall be installed in accordance with "Electric Service (Irrigation)" of these special provisions.

Irrigation controller enclosure cabinets shall be provided with cross ventilation, roof ventilation or a combination of both. The ventilation shall not compromise the weather resistance properties of the irrigation controller enclosure cabinets and shall be fabricated by the manufacturer.

The anchorage arrangement shall be inside the cabinet as shown on the plans. Dimensions of the cabinet shall be suitable for the equipment to be installed as shown on the plans and specified in these special provisions. Cabinet shall accommodate required controller communication system antennae.

Irrigation controller enclosure cabinet dimensions for a single irrigation controller shall be 60 inches (Height) x 36 inches (Width) x 12 inches (Depth).

Irrigation controller enclosure cabinets shall be fabricated in conformance with the provisions in Section 86-3.04A, "Cabinet Construction," of the Standard Specifications.

Irrigation controller enclosure cabinets shall be fabricated of stainless steel.

Irrigation controller enclosure cabinets fabricated of cold rolled steel or aluminum shall be cleaned and painted by the manufacturer in conformance with the provisions in Section 86-3.04A, "Cabinet Construction," of the Standard Specifications. The finish color of the irrigation controller enclosure cabinets shall be a tan to light brown closely matching Federal Standard 595B, Color No. 20450.

Irrigation controller enclosure cabinet doors shall not be furnished with integral door locks. Irrigation controller enclosure cabinet door handles shall have provisions for padlocking in the latched position. Padlocks will be State-furnished as provided under "State-Furnished Materials" of these special provisions.

Mounting panels shall be fabricated of stainless steel metal sheets with a minimum thickness of 4 mm.

Inside of the doors shall have provisions for storage of the irrigation plans.

Solid-state automatic shut-off rain sensor units shall be installed for the irrigation controller enclosure cabinets. Rain sensor units shall automatically interrupt the master remote control

valves when approximately 1/8 inch of rain has fallen. The irrigation system shall automatically be enabled again when the accumulated rainfall evaporates from the rain sensor unit collection cup. Rain sensor units shall be rated 24 V (ac) to 30 V (ac). Static charge protection shall be included to protect against lightning damage.

Equipment, except for field wiring, shall be installed in the cabinet in a shop by the equipment manufacturer's representative or distributor prior to field installation.

IRRIGATION SYSTEMS FUNCTIONAL TEST

Functional tests for the irrigation controllers and associated automatic irrigation systems shall conform to the provisions in Section 20-5.027J, "Testing," of the Standard Specifications and these special provisions.

Tests shall demonstrate to the Engineer, through one complete cycle of the irrigation controllers in the automatic mode, that the associated automatic components of the irrigation systems operate properly. If automatic components of the irrigation systems fail a functional test, these components shall be repaired at the Contractor's expense and the testing repeated until satisfactory operation is obtained.

Associated automatic components shall include, but not be limited to, remote control valve actuator systems, flow sensors, remote control valves, and rain sensors.

Upon completion of work on an irrigation system, including correction of deficiencies and satisfactory functional tests for the systems involved, the plants to be planted in the area watered by the irrigation system may be planted provided the planting areas have been prepared as specified in these special provisions.

PIPE

Plastic Pipe

Plastic pipe supply lines must be polyvinyl chloride (PVC) 1120 or 1220 pressure rated pipe with the minimum pressure rating (PR) shown on the plans.

Plastic pipe supply lines must have solvent cemented type joints. Primers must be used on the solvent cemented type joints.

Plastic pipe supply lines (main) must have a minimum cover of 1.5 feet.

Plastic pipe (irrigation lines) must be installed not less than 12 inches below the finished grade, measured to the top of the pipe.

Fittings for plastic pipe supply lines with a pressure rating (PR) of 315 must be Schedule 80.

Copper Pipe

Copper pipe must be Type "K" rigid conforming to ASTM Designation: B88. Use wrought copper or cast bronze fittings, soldered or threaded. Use 95% tin and 5% antimony solder.

Copper pipe supply lines installed between water meters and backflow preventer assemblies must be installed not less than 18 inches below finished grade, measured to the top of the pipe.

Recycled Water Supply Lines

New and exposed recycled water supply lines shall be marked with a permanently affixed purple warning tape bearing the continuous wording "CAUTION RECYCLED WATER." The tape shall be wrapped around the supply lines in a manner that produces a uniform and smooth fit, free of irregularities.

At the Contractor's option, purple colored polyvinyl chloride (PVC) supply lines may be used for recycled water supply lines in place of standard PVC supply line with affixed purple warning tape. Purple colored PVC supply lines shall conform to the following:

A. Pipe shall be made of PVC 1120 with the minimum pressure ratings (PR) shown on the plans.
B. Pipe shall conform to the requirements in one of the following Standards: ASTM Designation: D 1785, ASTM Designation: D 3139 and ASTM Designation: D 2241 or ASTM Designation: D 2672.
C. Pipe shall have permanent wording "CAUTION RECYCLED WATER" in 2 rows, approximately 180 degrees apart, in the longitudinal direction of the pipe. The warning message shall be repeated every 24 inches continuously along the pipe.

THRUST BLOCK

Thrust blocks shall be installed in accordance with the plans and these special provisions. Thrust blocks shall be installed on the main supply line at all changes in direction and terminus run.

WATER METER

Water meters for the irrigation systems will be furnished and installed by the serving utility at the locations shown on the plans.

The Contractor shall make the arrangements and pay the costs and fees required by the serving utility.

The Western Municipal Water District has established a fee of $25,000 for furnishing and installing a water meter. The Contractor shall furnish the Engineer with a copy of the invoice for the installation fee. If, at the time of installation, this fee has been changed, the County will take a credit for the reduction in the fee, or the County will pay the difference for the increase in the fee. The credit or payment will be taken or paid on the first monthly progress payment made after the meter is installed.

Attention is directed to Section 20-4.06, "Watering," of the Standard Specifications. The Contractor shall make the arrangements for furnishing and applying water until the water meters have been installed by the serving utility.

The quantity of water meters will be measured by the unit as determined from actual count in place.

Cost for coordination, furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing water meters, complete in place, as shown on the plans, shall be considered as included in the various items of work as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, shall be considered as included in the various items of work. No markup will be allowed.

BACKFLOW PREVENTER ASSEMBLIES

Backflow preventers shall conform to the provisions in Section 20-2.25, "Backflow Preventers," of the Standard Specifications and these special provisions.

Backflow preventers shall have current approval from the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC Foundation).

Before backflow preventer assembly installation, the Contractor shall provide the Engineer with the portion of the USC Foundation "List of Approved Backflow Prevention Assemblies" showing type of assembly, manufacturer's name, model number, edition of the manual under which the assembly was approved, approval date and the last renewal date.

The "List of Approved Backflow Prevention Assemblies" is available to Foundation Members. Membership information to join the USC Foundation is available at:

http://www.usc.edu/dept/fccchr/membership.html

Questions concerning the USC Foundation "List of Approved Backflow Prevention Assemblies" can be answered by calling the Foundation at toll free (866) 545-6340.

Pressure loss through the backflow preventers shall not exceed the following:

BACKFLOW PREVENTER SIZE (Inches)	FLOW RATE (Gallons Per Minute)	PRESSURE LOSS (PSI)
¾	30	8
1	50	8
1 ½	100	5
2	155	7

BACKFLOW PREVENTER ASSEMBLY ENCLOSURE

Enclosures shall be fabricated of structural steel angles and flattened expanded metal and shall be installed over backflow preventer assemblies on a portland cement concrete pad as shown on the plans and in conformance with these special provisions.

Expanded metal for sides, ends and top panels shall be fabricated from 9-gage minimum thickness, sheet steel. The flattened expanded metal openings shall be approximately 3/4-inch x 1-3/4-inch in size.

Expanded metal panels shall be attached to the 3/16-inch thick steel angle frames by a series of welds, not less than 1/4-inch in length and spaced not more than 4-inches on center, along the edges of the enclosure.

Lock-guard shall be made of a minimum thickness of 3/16-inch cold rolled steel.

Padlocks will be State-furnished in accordance with "State-furnished Materials" of these special provisions.

Enclosures shall be galvanized, after fabrication, in conformance with the provisions in Section 75-1.05, "Galvanizing," of the Standard Specifications.

Hold down bolt assemblies shall be galvanized and shall be installed when the portland cement concrete pad is still plastic. Nuts shall be hexagonal and washers shall be the lock type.

Enclosures shall be painted by the manufacturer with one application of a commercial quality pre-treatment, vinyl wash primer and a minimum of one application of a commercial quality, exterior enamel for metal. The finish color shall be a tan to light brown closely matching Federal Standard No. 595B, Color No. 20450.

All parts of the backflow preventer assembly enclosure, including hold down assemblies, may be constructed of stainless steel instead of standard steel materials specified above. Stainless steel enclosures shall conform to the provisions herein except galvanizing, priming and painting shall not be required. Stainless steel enclosures shall be powder coated a tan to light brown color closely matching Federal Standard 595B, Color No. 20450, by the manufacturer.

Lock-guard for stainless steel enclosures shall be 12-gage stainless steel, Type 304.

The quantity of backflow preventer assembly enclosures will be measured by the unit as determined from actual count in place.

The contract unit price paid for the backflow preventer assembly enclosure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing a backflow preventer assembly enclosure, complete in place, including constructing the portland cement concrete pad, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

TESTING NEW BACKFLOW PREVENTERS

New backflow preventers shall be tested for proper operation in conformance with the provisions in Section 20-5.03J, "Check and Test Backflow Preventers," of the Standard Specifications and these special provisions.

Tests for new backflow preventers shall be satisfactorily completed after installation and before operation of the irrigation systems.

New backflow preventers shall be retested one year after the satisfactory completion of the previous test, and each year thereafter until the plant establishment period is completed. An additional test shall be provided not more than 10 days prior to acceptance of the contract.

SPRINKLERS

Sprinklers shall conform to the type, pattern, material, and operating characteristics listed in the "Sprinkler Schedule" shown on the plans.

Sprinklers shall have purple recycled water caps.

Flow shutoff device on risers shall automatically and instantly stop the flow of water from a riser when the riser is broken on the downstream side of the device. The flow shutoff device shall be installed as recommended by the manufacturer of the device.

SPRINKLER (TYPE C-2 MOD)

Sprinkler (Type C-2 MOD) shall be furnished and installed as shown on the plans, in conformance with these special provisions and as directed by the Engineer.

Drainpipe shall be commercially available, rigid, perforated, polyvinyl chloride (PVC) pipe with holes spaced not more than 6 inches on center on one side of the pipe.

Drain grate shall be a commercially available, one-piece, injection molded drain grate manufactured from structural foam polyolefins, with ultraviolet light inhibitors. Color of drain grate shall be black.

Gravel for filling the drainpipe shall have 100 percent passing the 3/4 inch sieve and 100 percent retained on the 1/2 inch sieve. Gravel shall be clean, washed, dry and free from clay or organic material.

RECYCLED WATER WARNING SIGNS

Recycled water warning signs shall be furnished and installed at the locations shown on the plans, as specified in these special provisions, and as directed by the Engineer. Recycled water warning signs shall be affixed to the above ground irrigation facilities that use or are associated with recycled water.

Warning sign decals shall be commercially available, and shall include the following information: "Caution: Recycled Water, Do Not Drink" in English and Spanish, and the "Do Not Drink" drinking glass graphic symbol. Warning sign decals shall be UV fade resistant, purple in color (Pantone color #522C) with black text, manufactured from a flexible, vinyl based or flexible, vinyl based with mylar product. Warning sign decals shall be all-weather, self-adhesive with peel-off backs.

Aluminum sign plates shall be 1/16 inch aluminum.

Warning tags shall be purple, doubled sided, manufactured from polyurethane, incorporating an integral neck attachment and attachment hole. The attachment hole shall be capable of withstanding 178 pounds of pull out resistance. Tag lettering shall be hot-stamped in black

and capable of withstanding outdoor usage. Warning tags shall include the following information: "Recycled Water, Do Not Drink" and the "Do Not Drink" drinking glass graphic symbol.

Warning signs on above ground irrigation facilities shall be placed in visible locations.

Warning sign decals shall be applied directly to clean smooth surfaces. The smooth surfaces shall be cleaned with alcohol, or an equivalent cleaner, before applying the decals.

Warning sign decals shall be applied directly to irrigation facilities with smooth surfaces or affixed to aluminum sign plates, which shall be attached to the various above ground irrigation facilities.

Warning sign decals or warning sign decals on aluminum sign plates shall be permanently affixed to backflow preventers, valve boxes, nozzle lines, concrete sprinkler protectors, sprinkler risers, irrigation controller enclosure cabinets, flow sensors, irrigation controller enclosures not in cabinets, gates, fences, and other irrigation facilities in conformance with the details shown on the plans.

Warning sign decals approximately 2.5 inches x 3 inches shall be permanently affixed to sprinkler risers.

A 4 inch x 4 inch warning sign decal shall be permanently affixed to irrigation controller enclosure cabinet doors, irrigation controller enclosures not in cabinets, backflow preventer assemblies, backflow preventer assembly enclosures, and valve box covers. Decals for valve box covers shall be affixed to aluminum sign plates and the plates affixed to the valve box cover with a silicon base adhesive. Decals for cabinets may be affixed to aluminum sign plates and the plates attached with commercial quality, cadmium plated, non-removable, self-tapping screws or commercial quality, cadmium plated bolts, nuts and washers.

A 12 inch x 12 inch warning sign decal on aluminum sign plate shall be permanently affixed to gates, fences and walls 5 feet above finished grade. Sign plates for gates and fences shall be attached with "S" hooks and "C" clips or 14-gage galvanized steel wire as shown on the plans. Sign plates for concrete walls or other rough surfaces shall be affixed with a silicon base adhesive.

Warning tags approximately 2 inch x 2 inch shall be attached to the remote control valves, remote control valves (master), inside the valve box in accordance with the manufacturers recommendations.

Marking underground pipe for recycled water shall conform to the provisions in "Pipe" of these special provisions.

FINAL IRRIGATION SYSTEM CHECK

A final check of existing and new irrigation facilities shall be performed not more than 40 working days and not less than 30 working days prior to acceptance of the contract.

The length of watering cycles using potable water measured by water meters for the final check of irrigation facilities will be determined by the Engineer.

Remote control valves connected to existing and new irrigation controllers shall be checked for automatic performance when the controllers are in automatic mode.

Unsatisfactory performance of irrigation facilities installed or modified by the Contractor shall be repaired and rechecked at the Contractor's expense until satisfactory performance is obtained, as determined by the Engineer.

Repair or replacement of existing irrigation facilities due to unsatisfactory performance shall conform to the provisions in "Existing Highway Irrigation Facilities" of these special provisions.

Nothing in this section "Final Irrigation System Check" shall relieve the Contractor of full responsibility for making good or repairing defective work or materials found before the formal written acceptance of the entire contract by the Director.

Full compensation for checking the irrigation systems prior to the acceptance of the contract shall be considered as included in the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

SECTION 10-3. ELECTRICAL SYSTEMS

10-3.01 DESCRIPTION:

Traffic signals flashing beacons lighting closed circuit television systems changeable message sign systems highway advisory radio system sign illumination electric service (irrigation) ramp metering systems traffic monitoring stations communication conduit sprinkler control conduit maintaining existing traffic management system elements during construction shall conform to the provisions in Section 86, "Electrical Systems," of the Standard Specifications and these special provisions.

Locations of the changeable message signs system, traffic monitoring systems, and closed circuit television system installations are shown on the electrical plans and sign plans.

10-3.02 COST BREAK-DOWN:

Cost break-downs shall conform to the provisions in Section 86-1.03, "Cost Break-Down," of the Standard Specifications and these special provisions.

The Engineer shall be furnished a cost break-down for each contract lump sum item of work described in this Section 10-3.

The cost break-down shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The cost break-down shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

The cost break-down shall include the following items in addition to those listed in the Standard Specifications:

A. Architectural Lighting
B. Sign Lighting
C. Wiring – each type
D. Modems – each type
E. Video Detection System
F. Signs – each type

10-3.03 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS:

Traffic signal system shutdowns shall be limited to periods between the hours of 9 a.m. and 4 p.m.

10-3.04 MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION:

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, identified on the plans and located within the project limits shall 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 on the plans, the Contractor shall provide for temporary or portable TMS elements. The Contractor shall receive the Engineer's approval 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 shall 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 that are not shown on the plans 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 shall obtain written approval from the Engineer 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 shall 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, shall 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 on the plans, the Contractor shall provide provisions for temporary or portable detection operations.

The Contractor shall receive the Engineer's approval on the type of detection and installation before installing the temporary or portable detection.

If existing TMS elements shown on the plans 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 shall 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, shall be repaired or replaced, at the Contractor's expense, within 24 hours. For a structure-related elements, the Contractor shall install temporary or portable TMS elements within 24 hours. For nonstructure-related TMS elements, the Engineer may approve temporary or portable TMS elements for use during the construction activities.

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

A TMS element shall 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 shall 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 shall 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 shall be repaired at the Contractor's expense and as directed by the Engineer.

The Engineer will approve, in writing, 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 shall be new and of equal or better quality than the existing TMS elements.

PAYMENT

The contract lump sum price paid for maintaining existing traffic management system elements during construction shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in maintaining existing traffic management system elements as shown on the plans, specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

If no electrical work exists on the project and no TMS elements are identified within the project limits, the pre-construction operational status check will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Furnishing and installing temporary or portable TMS elements that are not shown on the plans, but are required when an existing TMS element becomes nonoperational or off line due to construction activities, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Furnishing and installing temporary or portable TMS elements and replacing TMS elements that are not shown on the plans nor identified during the pre-construction operational status check and were damaged by construction activities will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

If the Contractor is required to submit provisions for the replacement of TMS elements that were not identified, the provisions will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

10-3.05 CAST-IN-DRILLED-HOLE CONCRETE PILE FOUNDATIONS:

GENERAL

Summary

This work includes constructing cast-in-drilled-hole concrete pile foundations for traffic signal and lighting standards.

Comply with Section 86-2.03, "Foundations," of the Standard Specifications, and "Piling" of these special provisons.

MATERIALS

Concrete must contain not less than 590 pounds of cementitious material per cubic yard.

CONSTRUCTION

For standards located in sidewalk areas, the pile foundation must be:

1. Placed to final sidewalk grade before the sidewalk is placed
2. Square for the top 4 inches

Use sleeve nuts on Type 1-A standards. The bottom of the base plate must be flush with finished grade.

PAYMENT

Payment for cast-in-drilled-hole concrete pile foundations shall conform to the provisions in Section 86-8, "Payment," of the Standard Specifications.

10-3.06 STANDARDS, STEEL PEDESTALS, AND POSTS:

Standards, steel pedestals, and posts for traffic signal and lighting standards shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, "Steel Structures" of these special provisions, and the following requirements.

Steel bolts not designated on the plans as high-strength (HS) or stainless steel shall be for general applications and shall conform to the requirements in ASTM Designation: A 307.

Anchor bolts shall conform to the requirements in ASTM Designation: F 1554, Grade 36. High-strength (HS) anchor bolts shall conform to the requirements in ASTM Designation: F 1554, Grade 105.

The sign mounting hardware shall be installed at the locations shown on the plans.

Non-illuminated street name signs shall be installed on signal mast arms using a minimum 3/4" x 0.020" round edge stainless steel strap and saddle bracket. The strap shall be wrapped at least twice around the mast arm, tightened, and secured with a 3/4" stainless strap seal. The sign panel shall be leveled and hardware securely tightened.

Handhole reinforcement rings for standards, steel pedestals, and posts shall be continuous around the handholes.

Type 1 standards shall be assembled and set with the handhole on the downstream side of the pole in relation to traffic or as shown on the plans.

10-3.07 CONDUIT:

Conduit to be installed underground shall be Type 3 Schedule 80 unless otherwise specified. The conduit in a foundation and between a foundation and the nearest pull box shall be Type 3 Schedule 80.

After conductors have been installed, the ends of conduits terminating in pull boxes, service equipment enclosures, and controller cabinets shall be sealed with an approved type of sealing compound.

At the option of the Contractor, the final 2 feet of conduit entering a pull box in a reinforced concrete structure may be Type 4.

10-3.08 CONDUCTORS, CABLES, AND WIRING:

Splices shall be insulated by "Method B".

Conductors shall be wrapped around projecting end of conduit in pull boxes, as shown on the plans. Cables shall be secured to the projecting end of conduit in pull boxes to prevent pulling of cables without removing the securing device.

Signal Interconnect Cable (SIC) shall be the 6-pair type.

10-3.09 SERVICE:

Continuous welding of exterior seams in service equipment enclosures is not required.

Service equipment enclosures shall be the aluminum type.

Circuit breakers shall not be the cable-in/cable-out type, mounted on non-energized clips. All circuit breakers shall be mounted vertically with the up position of the handle being the "ON" position.

Each service shall be provided with up to 2 main circuit breakers which shall disconnect ungrounded service entrance conductors. Where the "Main" circuit breaker consists of 2 circuit breakers as shown on the plans or required in the special provisions, each of the circuit breakers shall have a minimum interrupting capacity of 10,000 A, rms.

ELECTRIC SERVICE (IRRIGATION)

Electric service (irrigation) shall be from the service points to the irrigation controllers (IC) and to the spaces provided in the irrigation controller enclosure cabinets (CEC) for irrigation controllers as shown on the plans.

Irrigation Controller (IC): Electric service (irrigation) shall be a metered 120/240 V(ac), single-phase service in a Type III service equipment enclosure.

Nameplate inscriptions shall be as follows:

ITEMS	INSCRIPTION
Metering Equipment Enclosure	IC
Service Disconnect	IC

The inscription on other nameplates shall be the identifying letter designation used on the plans and in these special provisions, or shall be as directed by the Engineer.

Electric service (irrigation) will be paid for on a lump sum basis.

The contract lump sum price paid for electric service (irrigation) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for

doing all the work involved in installing electric service (irrigation) for irrigation controllers, complete in place, including conductors, conduit and pull boxes to the pull box adjacent to irrigation controller enclosure cabinets and irrigation controllers, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

10-3.10 NUMBERING ELECTRICAL EQUIPMENT:

The placement of numbers on electrical equipment will be done by others.

10-3.11 STATE-FURNISHED CONTROLLER ASSEMBLIES:

The Model 170 and 2070 controller assemblies, excluding anchor bolts, will be State-furnished as provided under "Materials" of these special provisions.

The Contractor shall construct each controller cabinet foundation as shown on the plans for Model 332A and 334 cabinets (including furnishing and installing anchor bolts), shall install the controller cabinet on the foundation, and shall make field wiring connections to the terminal blocks in the controller cabinet.

A listing of field conductor terminations, in each State-furnished controller cabinet, will be furnished free of charge to the Contractor at the site of the work.

State forces will maintain controller assemblies. The Contractor's responsibility for controller assemblies shall be limited to conforming to the provisions in Section 6-1.02, "State-Furnished Materials," of the Standard Specifications.

10-3.12 CODE DIVISION MULTIPLE ACCESS ASSEMBLY:

GENERAL

The Code Division Multiple Access (CDMA) assembly shall consist of the CDMA modem, a dipole antenna, , power supplyfor modem, interface cable between modem and 170E Controller, and modem mounting bracket. The CDMA assembly shall provide wireless data transmission between the signal controller in the field and the District 8 Transportation Management Center (TMC).

CDMA Modem

The modem shall be product certified by the cellular provider.

RF Specifications:

224 mW RF output (+23.5dBm)
Full duplex transceiver
Dual band support for both 800 MHz and 1.9 GHz bands
Adheres to CDMA authentication as specified in CDMA2000

External Antenna

The antenna shall meet the dual band requirements stated above.

Packet Mode Features:

The modem shall support data rates up to 150kbs and 75 kbps.

DC Power Specifications:

Advanced Power Management features
Low power consumption
Input Voltage: 10 VDC to 28 VDC
Input Current: 40 mA to 200 mA
Typical Receive: 200 mA at 12 VDC
Typical Transmit: Approximately 200 mA at 12 VDC
Dormant connection (idle for 10-20 seconds): 40 mA at 12 VDC

The above power requirements shall be provided by an AC power supply .

Environmental:

Operating ranges: -30°C to +70°C (10% duty cycle limit above 60°C)
Humidity: 5%-95% Non-condensing

Physical Characteristics:

Weight: Shall be less than 17 ounces
Size: Not greater than 3 inches wide x 1 inch high x 5 inches long
Status LED's: Power, Received Signal Strength Indication (RSSI) and data transmission error
RF Antenna Connector: 50 Ohm Terminal Node Controller (TNC)
Serial Interface: RS232 DB-9F
Modem Mounting Bracket: Shall attach and secure the modem in the proximity of the 170E Controller C2 port within the 332 Controller Cabinet

Interface Connection with 170E Controller:

Interface cable shall conform with C2P modem interconnect harness, "Model 170E Connectors", TSCES-2, of Traffic Control Equipment Specifications, January 1999, except that cable ends shall be C2P connector to the Model 170Econtroller and DB9 male connector to the external modem, with the following pin configurations as follow:

DB9M (to external modem)		**C2P (to Model 170E controller)**	
Function	Pin	Pin	Function
Transmit Data	3	K	Data In
Receive Data	2	L	Data Out
Signal Ground	5	N	Ground
Request to Send	7	J	Request to Send
Clear to Send	8	M	Clear to Send
Data Terminal Ready	4	H	Clear Detect

The Contractor shall provide the CDMA modem to the Engineer a minimum of 10 days before the Contractor will pick up the Type 332 cabinet.

Acceptance Testing

At the time of the signal turn-on, the CDMA assembly will be tested by State forces by performing a loop back test at the installation site . The test will be for a period of not less then 5 days of continuous, satisfactory operation.

WARRANTY

The Contractor shall provide a written warranty from the manufacturer against defects in materials and workmanship for wireless cellular data communication assembly for a period of 12 months after the acceptance test has been completed. Replacement of the CDMA assembly shall be provided within 5 days after receipt of failed CDMA assembly at no cost to the State, except the cost of shipping the failed parts. All warranty documentation shall be given to the Engineer at the time of delivering. Replacement parts of the CDMA assembly shall be delivered to Caltrans Electrical Maintenance Yard at 175 Cluster Street, San Bernardino, CA. 92408.

PAYMENT

Full compensation for Code Division Multiple Access assembly shall be considered as included in the contract lump sum price paid for signal and lighting and no separate payment will be made therefor.

10-3.13 ETHERNET GENERAL PACKET RADIO SYSTEM MODEM:

SUMMARY

The General Packet Radio Service (GPRS) assembly shall consist of a GPRS modem, GPRS antenna and antenna cable. The equipment shall be installed as shown in the plans. The Contractor shall secure all components and cables to the rack or cabinet as necessary. The installed wireless cellular data communication assembly shall be compatible with the existing AT&T GPRS/EDGE (Enhanced Data rates for Global system for mobile communications Evolution) system currently being used. The Contractor shall provide software, cabling and GPRS modem for connection to the existing wireless telecommunications provider's GPRS system. The Contractor shall be responsible for compatibility and demonstrating compatibility.

FUNCTIONAL REQUIREMENTS

The high speed Ethernet GPRS modem shall be capable of connecting to a general packet radio system wireless data network shall be furnished and installed as shown on the plans. The modem shall 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 District 8 Transportation Management Center.

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

The contractor shall 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 1900/850 MHz and 1800/900 MHz GSM HSDPA/UMTS
Transmit Frequency	From 1850 to 1910 MHz and from 824 to 849 MHz
Transmit Power Range At Antenna Port	1.0 W for 1900 MHz and 0.8 W for 850 MHz
Throughput	Up to 240 kbps, from 100 to 130 kbps typical
Receiver Frequency	From 1930 to 1990 MHz and from 869 to 894 MHz
Receiver Sensitivity	Typical –107 dBm
Network Protocols	UDP/TCP, DHCP,
Features	NAT, Port forwarding (minimum of 15 ports), 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, RJ-45 switch port, 10/100 Mbps (auto-sensing), Full or half duplex (auto-sensing)
Serial Interface	1 EIA-232 DB-9 F port, 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 TNC Male
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, link/activity
Input Voltage	From 9 V(dc) to 30 V(dc)
Input Current	From 40 mA to 200 mA
Operating Temperature	From -22°F to +140°F
Max Weight	2.0 lbs
Max Size	5.0" (W) x 1.50"(H) x 8.0"(L)

ACTIVATION

The Contractor shall 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 AND ANTENNA CABLE

The antenna shall be fixed mount design and use a waterproof acrylic foam adhesive to attach to the outside surface of the controller cabinet. The adhesive should be resistant to Jet Propellant Grade 4 (JP-4), acetone, methyl ethyl ketone, motor oil and gasoline. The antenna shall come with a separate coaxial cable with appropriate connectors at each end. Connect the antenna and the GPRS modem using the cable.

The antenna shall be compatible with the modem and the existing AT & T GPRS/EDGE system. The antenna shall not be more than 1 ⅛-inches high and 4 ⅜-inches in diameter and it shall operate in dual bands with frequency ranges from 824 MHz to 896 MHz and from 1850 MHz to1915 MHz.

Voltage Standing Wave Ratio (VSWR) at resonant point	1.5:1 or less
Nominal Impedance	50 Ω
Gain	3 dB
Horizontal Radiation Pattern	Omni Directional
Polarization	Vertical
Maximum Power Input	125 W

WARRANTY

The Ethernet modem shall have a 2-year warranty by the manufacturer. The warranty shall include hardware parts and labor needed for repair. The Contractor shall provide the Engineer with warranty documentation and the appropriate manufacturer contact information. The warranty period shall begin upon Contract Acceptance.

DELIVERY

The Contractor shall deliver the GPRS modem to the Engineer 10 days before the Contractor is scheduled to pick up the State-Furnished Model 334 cabinet.

TESTING

Proper operation of the GPRS modem shall be demonstrated by successfully performing a loop back test at the installation site by the Contractor. The loop back test shall involve transmitting data from the Model 170 controller to the TMC computer and monitoring the resulting return data. For success, the test shall transmit 5 minutes continuously, every hour, for one full day. The Contractor shall be responsible for developing the test procedures with documentation that include required equipment, prior to testing. The Engineer will approve the test procedures and documentation before the Contractor performs the testing. The testing shall be observed by the Engineer and the final recorded results approved by the Engineer.

PAYMENT

Full compensation for general packet radio service assembly shall be considered as included in the contract lump sum price for ramp metering system and no separate payment will be made therefor.

10-3.14 VEHICLE SIGNAL FACES AND SIGNAL HEADS:

Type SV-1-T mountings with 5 sections and SV-2-TD mountings shall be bolted to the standard through the upper pipe fitting in the same manner shown for bolting the terminal compartment.

10-3.15 LIGHT EMITTING DIODE SIGNAL MODULE:

GENERAL

Summary

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

Use LED signal module as the light source for the following traffic signal faces:

1. 12-inch section
2. 12-inch arrow section
3. 12-inch programmed visibility (PV) section

Submittals

Before shipping LED signal modules to job site, submit the following to the Transportation Laboratory:

1. Delivery form including district number, EA, and contact information
2. List containing all LED signal module serial numbers anticipated for use
3. LED signal modules

Quality Control and Assurance

Module must be one listed on the Pre-Qualified Products List for LED traffic signals at:

http://www.dot.ca.gov/hq/esc/approved_products_list

The State will test LED signal module shipments as specified in ANSI/ASQ Z1.4.. Testing will be completed within 30 days of delivery to the Transportation Laboratory. LED signal modules tested or submitted for testing must be representative of typical production units. LED and circular LED signal modules will be tested as specified in California Test 604. All parameters of the specification may be tested on the modules. LEDs must be spread evenly across the module. LED arrow indication must provide the minimum initial luminous intensity listed. Measurements will be performed at the rated operating voltage of 120 V(ac).

Delays resulting from submittal of non-compliant materials do not relieve you from executing the contract within the allotted time. Non-compliant materials will be rejected. You must resubmit new LED for retesting and pick up the failed units within 7 days of notification. You must provide new LED signal modules and allow a minimum of 30 days for the retest. You must pay for all shipping and handling costs related to testing and retesting. Delays resulting from resubmittal and retesting are your responsibility and no extra time will be allowed.

After testing, you must pick up the tested LED signal modules from the Transportation Laboratory and deliver to the job site.

Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED signal modules for a minimum period of 48 months after installation of LED signal modules. Replacement LED signal modules must be provided within 15 days after receipt of failed LED modules at your expense. The State pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED signal modules must be delivered to State Maintenance Electrical Shop at 175 Cluster St. San Bernardino, CA 92408.

MATERIALS

Minimum power consumption for LED signal module must be 5 W.

LED signal module must have an operational lifecycle rating of 48 months. During the operational lifecycle, LED signal module must meet all parameters of this specification.

LED signal module must be designed for installation in the door frame of standard traffic signal housing.

LED signal module must:

1. Be 4 pounds maximum weight
2. Be manufactured for 12-inch circular, and arrow
3. Be from the same manufacturer
4. Be the same model for each size
5. Be sealed units with:

    5.1. 2 color-coded conductors for power connection, except for lane control LED signal modules use 3 color-coded conductors.
    5.2. Printed circuit board and power supply contained inside and complying with Chapter 1, Section 6 of TEES published by the Department.
    5.3. Lens that is:

        5.3.1. Integral to the units
        5.3.2. Convex or flat with a smooth outer surface
        5.3.3. Made of UV stabilized plastic or glass, and withstands UV exposure from direct sunlight for 48 months without exhibiting evidence of deterioration

    5.4. 1-piece EPDM gasket

6. Include 3-foot long conductors with quick disconnect terminals attached
7. Be sealed in door frames
8. Fit into existing traffic signal section housing and comply with ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads"

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 signal module light output. Failure of an individual LED in a string must not result in loss of entire string or other indication.

No special tools for installation are allowed.

12-inch Arrow

Comply with Section 9.01 of ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads" for arrow indications.

LED signal module must:

1. Be weather tight and connect directly to electrical wiring.
2. Be capable of optical unit replacement.
3. Be a single, self-contained device, ready for installation into traffic signal housing.
4. Have manufacturer's name, trademark, model number, serial number, lot number, month and year of manufacture, and required operating characteristics, including rated voltage, power consumption, and volt-ampere, permanently marked on the back of the module.
5. Have a symbol of module type and color. Symbol must be an inch in diameter. Color must be written out in 0.50 inch high letters next to the symbol.
6. Be AlInGaP technology for red and yellow indications and gallium nitride technology for green indications.
7. Be ultra bright type rated for 100,000 hours of continuous operation from -40 °C to +74 °C.
8. Have a maximum power consumption as follows:

Power Consumption Requirements

LED Signal Module Type	Power Consumption (Watts)					
	Red		Yellow		Green	
	25 °C	74 °C	25 °C	74 °C	25 °C	74 °C
12-inch circular	11	17	22	25	15	15
12-inch arrow	9	12	10	12	11	11
Programmed Visibility	11	17	22	25	15	15

Lens may be tinted, or may use transparent film or materials with similar characteristics to enhance "ON/OFF" contrasts. Tinting or other materials to enhance "ON/OFF" contrast must not affect chromaticity and must be uniform across the face of the lens.

If polymeric lens is used, surface coating or chemical surface treatment must be applied for front surface abrasion resistance.

Power supply must be integral to the module.

Internal components must be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Lens and LED signal module material must comply with the ASTM specifications for that material.

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

If a specific mounting orientation is required, the LED signal module must have prominent and permanent vertical markings for accurate indexing and orientation within the signal housing. Markings must include an up arrow, or the word "UP" or "TOP."

LED signal module must meet or exceed the following values when operating at 25 °C:

Minimum Initial Intensities for Circular Indications (cd)

Angle (v,h)				12-inch		
				Red	Yellow	Green
2.5, ±2.5				399	798	798
2.5, ±7.5				295	589	589
2.5, ±12.5				166	333	333
2.5, ±17.5				90	181	181
7.5, ±2.5				266	532	532
7.5, ±7.5				238	475	475
7.5, ±12.5				171	342	342
7.5, ±17.5				105	209	209
7.5, ±22.5				45	90	90
7.5, ±27.5				19	38	38
12.5, ±2.5				59	119	119
12.5, ±7.5				57	114	114
12.5, ±12.5				52	105	105
12.5, ±17.5				40	81	81
12.5, ±22.5				26	52	52
12.5, ±27.5				19	38	38
17.5, ±2.5				26	52	52
17.5, ±7.5				26	52	52
17.5, ±12.5				26	52	52
17.5, ±17.5				26	52	52
17.5, ±22.5				24	48	48
17.5, ±27.5				19	38	38

Minimum Luminance for Arrows, and PV Indications (FL)

	Red	Yellow	Green
Arrow Indication	1,605	3,210	3,210
PV Indication (cd at 2.5°±2.5°)	91	91	91

LED signal module must meet or exceed the following illumination values for 48 months when operating over a temperature range of -40 °C to + 74 °C. Yellow LED signal module must meet or exceed the following illumination values for 48 months, when operating at 25 °C:

Minimum Maintained Intensities for Circular Indications (cd)

Angle (v,h)				12-inch		
				Red	Yellow	Green
2.5, ±2.5				339	678	678
2.5, ±7.5				251	501	501
2.5, ±12.5				141	283	283
2.5, ±17.5				77	154	154
7.5, ±2.5				226	452	452
7.5, ±7.5				202	404	404
7.5, ±12.5				145	291	291
7.5, ±17.5				89	178	178
7.5, ±22.5				38	77	77
7.5, ±27.5				16	32	32
12.5, ±2.5				50	101	101
12.5, ±7.5				48	97	97
12.5, ±12.5				44	89	89
12.5, ±17.5				34	69	69
12.5, ±22.5				22	44	44
12.5, ±27.5				16	32	32
17.5, ±2.5				22	44	44
17.5, ±7.5				22	44	44
17.5, ±12.5				22	44	44
17.5, ±17.5				22	44	44
17.5, ±22.5				20	41	41
17.5, ±27.5				16	32	32

Minimum Maintained Luminance for Arrow, and PV Indications (FL)

	Red	Yellow	Green
Arrow Indication	1,610	3,210	3,210
PV Indication (at 2.5°±2.5°)	91	91	91

LED signal module must comply with the following chromaticity requirements for 48 months when operating over a temperature range of -40 °C to +74 °C.

Chromaticity Standards (CIE Chart)

Red	Y: not greater than 0.308, or less than 0.998 -x
Yellow	Y: not less than 0.411, nor less than 0.995 - x, nor greater than 0.452
Green	Y: not less than 0.506 - 0.519x, nor less than 0.150 + 1.068x, nor more than 0.730 - x

LED signal module must operate:

1. At a frequency of 60 Hz ± 3 Hz, over a voltage range from 95 V(ac) 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 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.

Wiring and terminal block must comply with Section 13.02 of ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads." Electrical connection for each Type 1 LED signal module must be 2 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 signal 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 signal 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 signal module must not exceed 20 percent at an operating temperature of 25 °C.

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

Red and Yellow Flashing LED Signal Module

No external circuitry to flash the LED signal module is allowed. Use 12 V(dc) or 120 V(ac).

Flashing LED signal module circuitry must prevent perceptible light emission to the unaided eye when a voltage, 50 V(ac) or less for alternating current or 5 V(dc) for 12 V(dc) flasher units, is applied to the unit.

Electrical connection for each flashing LED signal module must be 4 secured, color-coded, 600 V(ac), 20 AWG minimum stranded jacketed copper wires. Wire must comply with NEC, rated for service at +105 °C. Conductors for flashing LED signal module must be 3 feet in length, with quick disconnect terminals attached. The color code is as follows:

Color Code Requirements

Function	Color
Neutral/DC common	white
Steady On	red
Flash On	brown
Flash Out	orange

Flashing LED signal module must include all necessary electronics to:

1. Operate in a "Steady On" mode
2. Perform, in "Flash On" mode, 50 to 60 flashes per minute with a 50 percent ± 5 duty cycle
3. Allow alternating flashing operation, wig-wag, if the "Steady On" input of another flashing LED signal module is connected

When power is applied to the "Flash On" control conductor, the control output must allow a 12 V(dc) or 120 V(ac) signal that is switched opposite of the flash state of the module. Output must be able to source a maximum of 2.5 A for 12 V(dc), or 0.3 A for 120 V(ac).

Do not use the power consumption from "Flash Out" output of the flashing LED signal module when determining maximum power consumption.

The flashing LED Signal module must be clearly marked on the back, as "DC FLASHER" or "AC FLASHER", in 0.50-inch letters.

10-3.16 PROGRAMMED VISIBILITY VEHICLE TRAFFIC SIGNAL HEADS:

A signal technician qualified to program the programmed visibility signal heads shall be present at the time the signal heads are placed in operation.

10-3.17 BATTERY BACKUP SYSTEM:

GENERAL

Summary

This work includes installing battery backup system (BBS). Comply with Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and TEES.

The State will furnish BBS components as listed in "Materials" of these special provisions.

You must furnish the external cabinet and batteries.

Submittals

Before shipping external cabinets to the jobsite, submit material list including contract number, cabinet serial numbers, and contact information to the Transportation Laboratory.

Submit a Certificate of Compliance for each external cabinet and batteries to the Engineer under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Quality Control and Assurance

The State may test the cabinets.

Functional Testing

After complete installation, BBS functional test must be performed. Test for 30 minutes of continuous, satisfactory operation with utility power turned off. Perform test in the presence of the Engineer.

Warranty

Batteries must be warranted by the manufacturer to operate within a temperature range of -25 °C to +60 °C for 2 years.

Batteries must have a written warranty against defects in materials and workmanship from the manufacturer prorated for a period of 60 months after installation. You must provide the Engineer with all warranty documentation before installation. Replacement batteries must be available within 5 business days after receipt of failed batteries at no cost to the State except the cost of shipping the failed batteries. Replacement batteries must be delivered to Caltrans Maintenance Electrical Shop at 175 Cluster St. San Bernardino, CA 92408.

MATERIALS

Batteries must:

1. Be deep cycle, sealed prismatic, lead-calcium-based, absorbed-glass mat and valve-regulated lead acid (AGM/VRLA) type
2. Have voltage rating of 12 V
3. Be group size 24
4. Be commercially available and stocked locally
5. Have a carrying handle
6. Be marked with date code, maximum recharge data, and recharge cycles
7. Have 2 top-mounted, threaded, stud posts that include all washers and nuts required for attaching 3/8-inch ring lugs of a State-furnished BBS battery harness
8. Include rubber insulating protective covers for protecting the lugs, posts, and wiring - red for positive terminal and black for negative terminal
9. Be new and fully-charged when furnished
10. Be free from damage or deformities

External cabinet must be one listed on the Pre-Qualified Products List at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

External cabinet must be capable of housing:

1. 8 batteries
2. Inverter/charger unit
3. Power transfer relay
4. Manually-operated bypass switch
5. Required control panels
6. Wiring and harnesses

Dimensions and details for the external cabinet, for attaching the external cabinet to the Model 332A cabinet, and for wiring the State-furnished equipment will be available in an information handout as described in "Project Information" of these special provisions.

The following details must comply with Section 86-3.04, "Controller Cabinets," of the Standard Specifications and TEES:

1. Door construction, including material, thickness, coating, and welds
2. Frame
3. Door seals

4. Continuous stainless steel piano hinge or 4 leaves with 2 bolts on each side of each leaf, used to connect the door to external cabinet
5. Padlock clasp or latch and lock mechanism

The external cabinet must be ventilated by using louvered vents, filter, and a thermostatically controlled fan. Fan must be AC-operated from the same line output as the Model 332A cabinet. A 2-position terminal block must be provided on the fan panel, along with 10 feet of connected hookup wire.

The external cabinet surface must be anodized aluminum. Anti-graffiti paint must not be used.

The external cabinet must include all bolts, washers, nuts, and cabinet-to-cabinet coupler fittings necessary for mounting it to the Model 332A cabinet.

Fasteners for the external cabinet must include:

1. 8 cabinet mounting bolts that are 18-8 stainless steel hex head, fully-threaded, and 3/8" – 16 x 1"
2. 2 washers per bolt designed for 3/8-inch bolt and are 18-8 stainless steel 1-inch OD round flat type
3. K-lock nut per bolt: K-lock washer that is 18-8 stainless steel and hex-nut

External cabinet to Model 332A cabinet couplings must include a conduit for power connections between the 2 cabinets. Couplings must include:

1. 2-inch nylon-insulated steel chase nipple, T & B 1947 or equivalent
2. 2-inch sealing, steel locknut, T & B 146SL or equivalent
3. 2-inch nylon-insulated steel bushing, T & B 1227 or equivalent

CONSTRUCTION

Mount external cabinet to either the left or right side of Model 332A cabinet. The typical side-mounting location of external cabinet is flush with the bottom of the Model 332A cabinet and approximately equidistant from the front and rear door edges.

MEASUREMENT AND PAYMENT

Full compensation for assembling and installing battery backup system is included in the contract lump sum price paid for "SIGNAL AND LIGHTING", and no separate payment will be made therefor.

10-3.18 LIGHT EMITTING DIODE PEDESTRIAN SIGNAL FACE MODULES:

GENERAL

Summary

This work includes installing LED pedestrian signal face (PSF) module into standard Type A pedestrian signal housing. Comply with Section 86, "Electrical Systems," of the Standard Specifications.

Submittals

Before shipping LED PSF modules to job site, submit the following to the Transportation Laboratory:

1. Delivery form including district number, EA, and contact information
2. List containing all LED PSF module serial numbers anticipated for use
3. LED PSF modules

Quality Control and Assurance

Module must be one listed on the Pre-Qualified Products List for LED traffic signals at:

http://www.dot.ca.gov/hq/esc/approved_products_list

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

Delays resulting from submittal of non-compliant materials do not relieve you from executing the contract within the allotted time. Non-compliant materials will be rejected. You must resubmit new LED for retesting and pick up the failed units within 7 days of notification. You must provide new LED PSF modules and allow a minimum of 30 days for the retest. You must pay for all shipping and handling costs related to testing and retesting. Delays resulting from resubmittal and retesting are your responsibility and no extra time will be allowed.

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

Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED PSF modules for a minimum period of 48 months after installation of LED PSF modules. Replacement LED PSF modules must be provided within 15 days after receipt of failed LED PSF modules at your expense. The State pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED PSF modules must be delivered to State Maintenance Electrical Shop at 175 Cluster St. San Bernardino, CA 92408.

MATERIALS

LED PSF module must:

1. Be from the same manufacturer.
2. Be installed in standard Type A pedestrian signal housing, "UPRAISED HAND" and "WALKING PERSON." Do not include reflectors.
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.
6. Use required color and be ultra bright type rated for 100,000 hours of continuous operation from -40 °C to +74 °C.
7. Be able to replace signal lamp optical units and pedestrian signal faces with both LED and incandescent light sources.
8. Fit into pedestrian signal section housings without modifications to the housing. The housing must comply with ITE publication, Equipment and Materials Standards, Chapter 3, "Pedestrian Traffic Control Signal Heads."
9. Be a single, self-contained device, not requiring on-site assembly for installation into standard Type A housing.
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 PSF modules. Circuit board must comply with Chapter 1, Section 6 of TEES published by the Department.

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 other indication.

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

No special tools for installation are allowed.

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

Power supply for LED PSF module must be integral to the module. Power supply for each symbol must be isolated to avoid turn-on conflict.

Assembly and manufacturing processes for LED 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 PSF module must comply with ASTM D 3935.

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

Color of "UPRAISED HAND" symbol must be portland orange.

Color of "WALKING PERSON" symbol must be lunar white.

Each symbol must not be less than 10 inches high and 6.5 inches wide. Uniformity ratio of illuminated symbols must not exceed 4 to 1 between highest and lowest luminance areas. Symbols must comply with ITE publication, Equipment and Material Standards, Chapter 3, "Pedestrian Traffic Control Signal Indications," and the "California MUTCD."

LED PSF module must maintain an average luminance value over 48 months of continuous use in signal operation for a temperature range of -40 °C to +74 °C. In addition, LED PSF modules must meet or exceed the following luminance values upon initial testing at 25 °C.

Luminance Values

PSF module	Luminance
UPRAISED HAND	1,094 FL
WALKING PERSON	1,547 FL

Color output of LED 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 PSF module must comply with the following chromaticity requirements for 48 months when operating over a temperature range of -40 °C to +74 °C.

Chromaticity Standards (CIE Chart)

UPRAISED HAND (portland orange)	Not greater then 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 PSF module maximum power consumption must not exceed the following values:

Power Consumption Requirements

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

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 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 PSF module must operate:

1. At a frequency of 60 Hz ± 3 Hz over a voltage range from 95 V(ac) 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.

LED 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 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 PSF module must not exceed 20 percent at an operating temperature of 25 °C.

The LED 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 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 2 indications is not allowed.

10-3.19 DETECTORS:

Loop detector sensor units will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Loop wire shall be Type 1 .

Loop detector lead-in cable shall be Type B .

Slots shall be filled with hot-melt rubberized asphalt sealant.

For Type E detector loops, sides of the slot shall be vertical and the minimum radius of the slot entering and leaving the circular part of the loop shall be 1-1/2 inches. Slot width shall be a maximum of 5/8 inch. Loop wire for circular loops shall be Type 2. Slots of circular loops shall be filled with hot melt rubberized asphalt sealant.

10-3.20 VIDEO IMAGE VEHICLE DETECTION SYSTEM:

GENERAL

Summary

This work includes installing video image vehicle detection system (VIVDS) for traffic signals.

Definitions

Video Detection Unit (VDU): Processor unit that converts the video image from the camera and provides vehicle detection in defined zones. Unit includes an image processor, extension module, and communication card.

Video Image Sensor Assembly (VIS): An enclosed and environmentally-protected camera assembly used to collect the video image.

Video Image Vehicle Detection System (VIVDS): A system that detects video images of vehicles in defined zones and provides video output.

Submittals

Submit proposed list of materials before starting work:

Submittals

Item	Description
Certificate of compliance	For VIVDS as specified in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.
Site analysis report	Written analysis for each detection site, recommending the optimum video sensor placement approved by the manufacturer.
Lane configuration	Shop drawing showing detection zone setback, detection zone size, camera elevation, selected lens viewing angle, illustration of detection zone mapping to reporting contact output, and illustration of output connector pin or wire terminal for lane assignment.
Configuration record	Windows XP PC compatible CD containing the final zone designs and calibration settings to allow reinstallation.
Mounting and wiring information	Approved wiring and service connection diagrams wrapped in clear self-adhesive plastic, placed in a heavy duty plastic envelope, and secured to the inside of the cabinet door.
Communication protocol	Industry standard available in public domain. Document defining message structure organization, data packet length, message usability, and necessary information to operate a system from a remote Windows based personal computer.
Programming software	CD containing set up and calibration software that observes and detects the vehicular traffic, including bicycles, motorcycles, and sub-compact cars, with overlay of detection zones and allows adjustment of the detection sensitivity for a traffic signal application.
Detector performance DVD recordings and analysis	Performance analysis based on 24-hour DVD recording of contiguous activity for each approach. Include 2 contiguous hours of sunny condition, with visible shadows projected a minimum of 6 feet into the adjacent lanes, and two 1-hour night periods with vehicle headlights present.
Preventative maintenance parts documentation	Documentation containing equipment replacement parts list for preventative maintenance, including electrical parts, mechanical parts, and assemblies.
Acceptance testing schedule	Submit schedule for approval 15 days before acceptance testing of VIVDS. Acceptance testing is separate from detector performance and analysis.
Training	Submit training material for approval 30 days before training.
Warranty	Manufacturer's written warranty against defects in material and workmanship for VIS assemblies and VDU, for 24-month period after VIVDS installation.

Warranty

After final acceptance of VIVDS, replacement VIS and VDU must be provided within 10 days of receipt of a failed unit at no cost to the State, except the cost of shipping failed VIS and VDU. Deliver replacement VIS and VDU to: 175 Cluster Street, San Bernardino, CA 92402.

MATERIALS

VIVDS must include:

1. VIS and mounting hardware. Use a clamping device as mounting hardware on a pole or mast-arm.
2. VDU
3. Power supply
4. Surge suppression
5. Cables
6. Connectors
7. Wiring for connecting to the State-furnished Model 332A traffic controller cabinet.
8. Communication card

VIVDS must include necessary firmware, hardware, and software for designing the detection patterns or zones at the intersection or approach. Detection zones must be created with a graphic user interface designed to allow to anyone trained in VIVDS system setup to configure and calibrate a lane in less than 15 minutes.

Functional Requirements

VIVDS must support normal operation of existing detection zones while a zone is being added or modified. Zone must flash or change color on a viewing monitor when vehicular traffic is detected. Length and width of each detection zone for each lane must be approved by the Engineer.

Software and firmware must detect vehicular traffic presence, provide vehicle counts, set up detection zones, test VIVDS performance, and allow video scene and system operation viewing from the local traffic management center/office. VIVDS must support a minimum of 2 separate detection patterns or zones that can be enacted by a remote operator at the signal controller cabinet.

VIVDS detection zone must detect vehicles by providing an output for presence and pulse. At least one detection output must be provided for each detection zone. One spare detection output must be provided for each approach. Detection performance must be achieved for each detection zone with a maximum of 8 user-defined zones for every camera's field of view.

VIVDS must detect the presence of vehicles under all types of adverse weather and environmental conditions, including snow, hail, fog, dirt, dust or contaminant buildup on the lens or faceplate, minor camera motion due to winds, and vibration. Under low visibility conditions, the VIVDS must respond by selecting a fail-safe default pattern, placing a constant call mode for all approaches. VIVDS outputs must assume a fail-safe "on" or "call" pattern for presence detection if video signal or power is not available and must recover from a power failure by restoring normal operations within 3 minutes without manual intervention. If powered off for more than 90 days, system must maintain the configuration and calibration information in memory.

Detection algorithm must be designed to accommodate naturally occurring lighting and environment changes, specifically the slow moving shadows cast by buildings, trees, and other objects. These changes must not result in a false detection or mask a true detection. VIVDS must not require manual interventions for day-night transition or for reflections from poles, vehicles or pavement during rain and weather changes. VIVDS must suppress blooming effects from vehicle headlights and bright objects at night.

Vehicle detection must call service to a phase only if a demand exists and extend green service to the phase until the demand is taken care of or until the flow rates have reduced to levels for phase termination. VIVDS must detect the presence of vehicular traffic at the detection zone positions and provide the call contact outputs to the Model 170E or Model 2070 controller assembly with the following performance:

Detector Performance

Requirements	Performance during AMBER and RED interval	Performance during GREEN interval
Average response time after vehicle enters 3 feetinto detection zone or after 3 feet past detection zone	≤ 1 s	≤ 100 ms
Maximum number of MISSED CALLS in 24-hour duration, where MISSED CALLS are greater than 5 s during AMBER and RED intervals and greater than 1 s during GREEN intervals (upon entering 3 feet of detection zone or after departing 3 feetpast detection zone).	0	10
Maximum number of FALSE CALLS in 24-hour duration (calls greater than 500ms without a vehicle present)	20	20

VIVDS must be able to locally store, for each lane, vehicle count data in 5, 15, 30, and 60 minute intervals for a minimum period of 7 days and be remotely retrievable. VIVDS must count vehicular traffic in detection zone with a 95 percent accuracy or better for every hour counted over a morning or an evening peak hour. VIVDS detection zone tested must have a minimum range of 50 feet behind the limit line for each approach. Testing period will be pre-approved by the Engineer 48 hours in advance.

Technical Requirements

System elements must comply with the manufacturer's recommendations and be designed to operate continuously in an outdoor environment.

All equipment, cables, and hardware must be part of an engineered system that is designed by the manufacturer to fully interoperate with all other system components. Mounting assemblies must be corrosion resistant. Connectors installed outside the cabinets and enclosures must be corrosion resistant, weather proof, and watertight. Exposed cables must be sunlight and weather resistant. Label cables with permanent cable labels at each end.

Camera and zoom lens assembly must be housed in an environmentally sealed enclosure that complies with NEMA 4 standards. Enclosure must be watertight and protected from dust. Enclosure must include a thermostat controlled heater to prevent condensation and to ensure proper lens operation at low temperatures. Adjustable sun shield that diverts water from the camera's field of view must be included. Connectors, cables and wiring must be enclosed and protected from weather.

Each camera and its mounting hardware must be less than 10 pounds-and less than 1 square foot equivalent pressure area. Only one camera must be mounted on a traffic signal or luminaire arm. Top of camera must not be more than 12 inches above top of luminaire arm or 30 inches above top of traffic signal arm.

VIS must use a charge-coupled device (CCD) element, support National Television Standards Committee (NTSC) and RS170 video output formats, and have a horizontal resolution of at least 360 lines. VIS must include an auto gain control (AGC) circuit, have a minimum

sensitivity to scene luminance from 0.1 lux to 10,000 lux, and produce a usable video image of vehicular traffic under all roadway lighting conditions regardless of the time of day. VIS must have a motorized lens with variable focus and zoom control with an aperture of f/1.4 or better. Focal length must allow ± 50 percent adjustment of the viewed detection scene.

A flat panel video display with a minimum 8-inch screen and that supports NTSC video output must be enclosed in the Model 332A cabinet for viewing video detector images and for performing diagnostic testing. Display must be viewable in direct sunlight. Each VIVDS must have video system connections that support the NTSC video output format, can be seen in each camera's field of view, and has a program to allow the user to switch to any video signal at an intersection. A metal shelf or pull-out document tray with metal top capable of supporting the VDU and monitor must be furnished and placed on an EIA 19 inch rack with 10-32 "Universal Spacing" threaded holes in the Model 332A cabinet. System must allow independent viewing of a scene while video recording other scenes without interfering with the operation of the system's output.

Mounting hardware must be powder-coated aluminum, stainless steel, or treated to withstand 250 hours of salt fog exposure as specified in ASTM B 117 without any visible corrosion damage.

VDU must operate between –37 to +74 °C and 0 to 95 percent relative humidity.

VDU front panel must have indicators for power, communication, presence of video input for each VIS, and a real time detector output operation. Hardware or software test switch must be included to allow the user to place either a constant or momentary call for each approach. Indicators must be visible in daylight from 5 feet away.

VDU must have a serial communication port, EIA 232/USB 2.0 that supports sensor unit setup, diagnostics, and operation from a local PC compatible laptop with Windows XP or later version operating system. VIVDS must have an Ethernet communication environment, including Ethernet communication card. VIVDS must include central and field software to support remote real-time viewing and diagnostics for operational capabilities through wide area network (WAN) or wireless. Wireless networking standard must be IEEE 802.11g/n.

VDU, image processors, extension modules, and video output assemblies must be inserted into the controller input file slots using the edge connector to obtain limited 24 V(dc) power and to provide contact closure outputs. Cabling the output file to a "D" connector on the front of the VDU is acceptable. No rewiring to the standard Model 332A cabinet is allowed. Controller cabinet resident modules must comply with the requirements in Chapter 1 and Sections 5.2.8, 5.2.8.1, 5.2.8.2, 5.4.1, 5.4.5, 5.5.1, 5.5.5, and 5.5.6 of TEES.

VIVDS must operate between 90 to 135 V(ac) service as specified in NEMA TS-1. VIS, excluding the heater circuit, must draw less than 10 W of power. Power supply or transformer for the VIVDS must meet the following minimum requirements:

Minimum Requirements for Power Supply and Transformers

Item	Power Supply	Transformer
Power Cord	Standard 120 V(ac), 3 prong cord, 3 feet minimum length (may be added by Contractor)	Standard 120 V(ac), 3 prong cord, 3 feet minimum length (may be added by Contractor)
Type	Switching mode type	Class 2
Rated Power	Two times (2x) full system load	Two times (2x) full system load
Operating Temperature	-37 to 74 °C	-37 to 74 °C
Operating Humidity Range	From 5 percent to 95 percent	From 5 percent to 95 percent
Input Voltage	From 90 to 135 V(ac)	From 90 to 135 V(ac)
Input Frequency	60 Hz ± 3 Hz	60 Hz ± 3 Hz
Inrush Current	Cold start, 25 A max. at 115 V	N/A
Output Voltage	As required by VIVDS	As required by VIVDS
Overload Protection	From 105 percent to 150 percent in output pulsing mode	Power limited at >150 percent
Over Voltage Protection	From 115 percent to 135 percent of rated output voltage	N/A
Setup, Rise, Hold Up	800ms, 50ms,15ms at 115 V(ac)	N/A
Withstand Voltage	I/P-0/P:3kV, I/P-FG:1.5kV, for 60 sec.	I/P-0/P:3kV, I/P-FG:1.5kV, for 60 sec
Working Temperature	Not to exceed 70°C@30 percent load	Not to exceed 70 °C@ 30 percent load
Safety Standards	UL 1012, TUV EN60950	UL 1585
EMC Standards	EN55022 Class B, EN61000-4-2, 3, 4, 5	N/A

Field terminated circuits must include transient protection as specified in IEEE Standard 587-1980, Category C. Video connections must be isolated from ground.

Wiring must be routed through end caps or existing holes. New holes for mounting or wiring must be shop-drilled.

VIVDS and support equipment required for acceptance testing must be new and as specified in the manufacturer's recommendations. Date of manufacture, as shown by date codes or serial numbers of electronic circuit assemblies, must not be older than 12 months from the scheduled installation start date. Material substitutions must not deviate from the material list approved by the Engineer.

CONSTRUCTION

Install VDU in a State-furnished Model 170E or Model 2070 controller assembly. Install VIS power supply or transformer on a standard DIN rail using standard mounting hardware and power conductors wired to DIN rail mounted terminal blocks in the controller cabinet.

Wire each VIS to the controller cabinet with a wiring harness that includes all power, control wiring, and coaxial video cable. Attach harness with standard MIL type and rated plugs. Cable type and wire characteristics must comply with manufacturer's recommendations for the VIS to cabinet distance. Wiring and cables must be continuous, without splices, between the VIS and controller cabinet. Coil a minimum of 7 feet of slack in the bottom of the controller cabinet. For setup and diagnostic access, terminate serial data communication output conductors at TB-0 and continue for a minimum of 10 feet to a DB9F connector. Tape ends of unused and spare conductors to prevent accidental contact to other circuits. Label conductors inside the cabinet for the functions depicted the approved detailed diagrams.

Adjust the lens to view 110 percent of the largest detection area dimension. Zones or elements must be logically combined into reporting contact outputs that are equivalent to the detection loops and with the detection accuracy required.

Verify the performance of each unit, individually, and submit the recorded average and necessary material at the conclusion of the performance test. Determine and document the accuracy of each unit, individually, so that each unit may be approved or rejected separately. Failure to submit necessary material at the conclusion of testing invalidates the test. The recorded media serves as acceptance evidence and must not be used for calibration. Calibration must have been completed before testing and verification.

Verify the detection accuracy by observing the VIVDS performance and recorded video images for a contiguous 24-hour period. The recorded video images must show the viewed detection scene, the detector call operation, the signal phase status for each approach, the vehicular traffic count, and time-stamp to 1/100 of a second, all overlaid on the recorded video. Transfer the 24-hour analysis to DVD.

VIVDS must meet the detection acceptance criterion specified in table titled "Detector Performance."

Calculate the VIVDS's vehicular traffic count accuracy as 100[1-(|TC-DC|/TC)], where DC is the detector's vehicular traffic count and TC is the observed media-recorded vehicular traffic count and where the resulting fraction is expressed as an absolute value.

The Engineer will review the data findings and accept or reject the results within 7 days. Vehicle anomalies or unusual occurrences will be decided by the Engineer. Data or counts not agreed by the Engineer will be considered errors and count against the unit's calibration. If the Engineer determines that the VIVDS does not meet the performance requirements, you must re-calibrate and retest the unit, and resubmit new test data within 7 days. After 3 failed attempts, you must replace the VIVDS with a new unit.

Notify the Engineer 20 days before the unit is ready for acceptance testing. Acceptance testing must be scheduled to be completed before the end of a normal work shift. You must demonstrate that all VIS and VDUs satisfy the functional requirements.

Repair, replacement, and retesting of VIVDS components due to failure or rejection are the Contractor's expense.

PAYMENT

Full compensation for video image vehicle detection system shall be considered as included in the contract lump price paid for signal and lighting (location 2) and no separate payment will be made therefor.

10-3.21 PEDESTRIAN PUSH BUTTONS:

Pedestrian push button housings shall be the metallic type not the plastic type.

10-3.22 LUMINAIRES:

Ballasts shall be the lag regulator type.

10-3.23 SIGN LIGHTING FIXTURES-INDUCTION:

Induction sign lighting fixtures shall conform to the provisions for mercury sign lighting fixtures in Section 86-6.05, "Sign Lighting Fixtures-Mercury", of the Standard Specifications and these special provisions.

Each fixture shall consist of a housing with door, a reflector, refractor or a lens, a lamp, a power coupler, a high frequency generator and a fuse block.

Fixtures shall have a minimum average rating of 60,000 hours. Fixtures shall be for a wattage of 87 W, 120/240 V(ac). The power factor of the fixtures shall be greater than 90 percent and the total harmonic distortion shall be less than 10 percent. Fixtures shall be Underwriter's Laboratories (UL) approved for wet locations and be Federal Communications Commission (FCC) Class A listed.

The mass of the fixture shall not exceed 20 kg. The manufacturer's brand name, trademark, model number, serial number and date of manufacture shall be located on the packaged assembly and permanently marked on the outside and inside of the housing.

MATERIALS

Mounting Assembly

The mounting assembly may be either cast aluminum, hot-dip galvanized steel plate or steel plate that has been galvanized and finished with a polymeric coating system or the same finish that is used for the housing.

Housing

Housings shall have a door designed to hold a refractor or lens. Housing doors shall be designed to be opened without the use of tools. Housings and doors shall have a powder coat or polyester paint finish of a gray color resembling unfinished fabricated aluminum.

Reflector

Reflectors shall be designed to be removed as a unit that includes the lamp and power coupler.

Refractor

Refractors or lenses shall have smooth exteriors. Lenses shall be flat or convex. Convex lenses shall be made from heat resistant, high-impact resistant, tempered glass.

Convex lenses shall be designed or shielded so that no fixture luminance is visible when the fixture is approached directly from the rear and the viewing level is the bottom of the fixture. When a shield is used it shall be an integral part of the door casting.

Lamp

Each fixture shall be furnished with a 85-W induction lamp. Interior lamp walls shall be fluorescent phosphor coated. Lamp light output shall be at least 70 percent at 60 000 hours. Lamps shall have a minimum color-rendering index of 80. Lamps shall be rated at a color temperature of 4000 K. Lamps shall be removable without the use of tools.

Power Coupler

Power couplers shall consist of a construction base with antenna, heat sink and electrical connection cable. The power coupler shall be designed so that it can be removed with common hand tools.

High Frequency Generator

High frequency generators shall start and operate lamps at an ambient temperature of -25 °C or greater for the rated life of the lamp.

Generator output frequency shall be 2.65 MHz ± 10 percent. The generator radio frequency interference shall meet the requirements of the Federal Communications Commision Title 47, Part 18, regulations concerning harmful interference.

High frequency generators shall operate continuously at ambient air temperatures from -25 to +25 °C without reduction in generator life. High frequency generators shall have a design life of at least 100 000 hours at 55 °C.

High frequency generators shall be capable of being replaced with common hand tools. Conductor terminals shall be identified as to the component terminal to which they connect.

High frequency generators shall be mounted to use the fixture upon which they are mounted as a heat sink.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and a copy of the high frequency generator test methods and results shall be submitted by the manufacturer with each lot of fixtures. The certificate shall state that the high frequency generators meet the requirements of this section and the generator specifications of the lamp manufacturer.

Full compensation for conforming to these requirements shall be considered as included in the contract price paid for Lighting and Sign Illumination and no additional compensation will be allowed therefore.

10-3.24 INTERNALLY ILLUMINATED SIGNS:

The "METER ON" sign shall be a Type A pedestrian signal modified so that the reflector shall be a single chamber with 2 incandescent lamps.

The message shall be white "METER ON" as shown on the plans. White color shall be in conformance with the provisions in Section 86-4.06, "Pedestrian Signal Faces," of the Standard Specifications.

Lenses shall be 3/16 inch, minimum thickness, clear acrylic or polycarbonate plastic or 1/8 inch nominal thickness glass fiber reinforced plastic, with molded, one piece, neoprene gasket. Message lettering for "METER" shall be "Series C," 4-1/2 inches high, with uniform 1/2 inch stroke, and for "ON" shall be "Series C," 6 inches high, with uniform one inch stroke. Letters shall be clear, transparent or translucent, with black opaque background silk screened on to the second surface of the lens.

10-3.25 ARCHITECTURAL LIGHTING:

Architectural Lighting Fixtures shall be King Luminaire K118 Washington Series Model No. K118R-CAR-III-85(IND)-120-K14-PR-HSS or approved equal. The architectural fixture shall include a cutoff reflector Model No. 202D0759 (02-03420) or approved equal with a house side shield.

The architectural Lighting Fixture shall included a K14 cast aluminum capital and it shall be mounted on top of a Caltrans Standard Plans ES-7B Type 1-A pole. The K14 cast aluminum capital shall be color "Standard Black".

Type 1-A pole shall be tapered at 0.14 inches per foot with a 3.5 inch outside diameter tenon on top. The tenon shall be 3.5" long. The architectural lighting fixture shall be secured to the 1-A pole top tenon using three (3) stainless steel set screws at 120 degrees. The Type 1-A poles for the Architectural Lighting Fixture shall be colored to match the K-14 cast aluminum capitals.

PAYMENT

The cost for the furnishing and installing the architectural lighting on the project shall be considered as included in the contract lump sum price paid for lighting and sign illumination.

10-3.26 PHOTOELECTRIC CONTROLS:

Contactors shall be the mechanical armature type.

10-3.27 REMOVING, REINSTALLING OR SALVAGING ELECTRICAL EQUIPMENT:

Salvaged electrical materials shall be hauled to 175 Cluster St., San Bernardino, CA, 92408 and stockpiled.

The Contractor shall provide the equipment, as necessary, to safely unload and stockpile the material. A minimum notice of 2 business days shall be given prior to delivery.

10-3.28 DISPOSING OF ELECTRICAL EQUIPMENT:

Fluorescent light ballasts which contain polychlorinated biphenyls (PCBs) shall be disposed of in conformance with the California Department of Toxic Substances Control (DTSC) Regulations set forth in Title 22, Division 4.5, Chapter 42, of the California Code of Regulations.

Ballasts and transformers that contain polychlorinated biphenyl (PCB) are designated as extremely hazardous wastes and fluorescent tubing and mercury lamps are designated as hazardous wastes under Title 22, Division 4.5, Chapter 11, Article 4.1 and Article 5, of the California Code of Regulations.

The State assumes generator responsibility for these wastes. The Engineer will prepare the Hazardous Waste Manifest for Shipment. Ballasts shall be packaged and transported to a hazardous waste disposal facility. The Contractor shall package and transport fluorescent lights to an appropriately permitted facility.

PAYMENT

Full compensation for hauling, stockpiling, and disposing of transformers, fluorescent tubing and mercury lamps and non-leaking fluorescent light ballasts shall be considered as included in the contract price paid for the various items of work and no additional compensation will be allowed therefor.

10-3.29 PAYMENT:

The contract lump sum price or prices paid for signal and lighting shall include highway lighting at intersections in connection with signals only.

Other roadway lighting on the project, including the architectural lighting, shall be considered as included in the contract lump sum price paid for lighting and sign illumination.

Full compensation for hauling and stockpiling electrical materials shall be considered as included in the contract price paid for the item requiring the material to be salvaged and no additional compensation will be allowed therefor.

If any of the fabrication sites for the materials listed are located more than 300 air line miles from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impractical and difficult to determine the actual increase in these expenses, it is agreed that payment to the Contractor for furnishing these listed materials from each fabrication site located more than 300 air line miles from both Sacramento and Los Angeles will be reduced $2,000:

1. Extinguishable message signs
2. Service equipment enclosures
3. Telephone demarcation cabinets

SECTION 10-4. RELOCATION OF WATER FACILITIES

10-4.01 GENERAL:

Relocating the water facilities shall consist of modifying the existing water facilities and constructing or installing new water facilities in accordance with the details shown on the plans, the provisions of section 6.00 Technical Provisions and 9.0 Western Municipal Water District (WMWD) Standard Drawings located in The Western Municipal Water District's Developer Handbook & Standard Drawings for Water & Sewer Facilities, February 2, 2009, herein known as the "WMWD Standards"; Sections 1 through 9, Section 15, "Existing Highway Facilities," and Section 70, "Miscellaneous Facilities," of the Standard Specifications; and these special provisions.

WMWD Developer Handbook & Standard Drawings for Water & Sewer Facilities may be downloaded, printed and viewed on WMWD's website:

(http://wmwd.com/devservices/standardspec.htm)

Except for Sections 15 and 70, Sections 10 through 95 of the Standard Specifications shall not apply to the work in this Section 10-4 except when specific reference is made thereto.

The Contractor shall notify Western Municipal Water District (Telephone number: 951-789-5000) 72 hours prior to starting work. Only WMWD personnel will operate valves on the existing water pipeline and any shut down of water supply to the March Air Museum will be limited to a maximum of 6 hours. WMWD will assist with the necessary coordination with the local fire agencies (March Air Reserve Base & Riverside County) of all pipeline shutdowns and such shut downs will be subject to any stipulations made by those agencies.

Construction inspection will be by Caltrans personnel with notification to, access for, and consultation with being provided to WMWD inspector(s) during the installation and the testing of the constructed pipeline. Acceptance of the constructed pipeline will be subject to review and approval by WMWD.

The County shall provide WMWD a copy of the original construction schedule and any subsequent updates to confirm the time and date when the County will commence work. The County will give WMWD notice of the anticipated date that the relocation work will be commenced. Said notice shall be provided at a minimum as follows:

(1) a minimum of 30 and maximum 90 calendar days prior to the anticipated commencement date for the work.

(2) a minimum of 7 and a maximum of 21 calendar days prior to the anticipated commencement date for the work, and

(3) a minimum of 72 and a maximum of 168 hours prior to the anticipated commencement date for the work.

10-4.02 RELOCATE WATER FACILITY:

12" POLYVINYL CHLORIDE WATER MAIN

The length of 12" polyvinyl chloride water main to be paid for will be determined by the foot from actual measurements along the centerline of the pipe in place in the completed work. Pipe placed in excess of the length designated by the Engineer will not be paid for. When pipes are cut to fit a structure, the quantity to be paid for will be the length of pipe placed before cutting, measured in one foot increments.

Fittings, including double ball joints and flexible couplings, which increase the length of the 12" polyvinyl chloride water main and for which no separate contract item is provided, will be measured by the foot. Fittings will be measured along centerlines to the point of intersections.

The contract price paid per foot for 12" polyvinyl chloride water main as shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in 12" polyvinyl chloride water main, complete in place, including blow off assemblies, air release valves, fittings, including double ball joints and flexible couplings, pressure testing, bacteriological testing, tracer wire and warning tape, corrosion control, and thrust blocks, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

ABANDON WATER FACILITY

Existing water facilities where shown on the plans to be abandoned, shall be abandoned as specified in these special provisions.

The contract price paid per foot for abandon water facility shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in abandon water facility, complete in place, including valves, laterals, backfill, and disposal of friable and non-friable material, except for pressure reducing station, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

SECTION 10-5. RELOCATION OF COMMUNICATION LINE

10-5.01 GENERAL

Relocating the communication line shall consist of modifying the existing communication line, constructing or installing new communication lines, and removal of existing communication line in accordance with the details shown on the plans, the provisions of Sections 1 through 9, Section 15, "Existing Highway Facilities," and Section 70, "Miscellaneous Facilities," of the Standard Specifications; and these special provisions.

The Contractor shall notify March Air Reserve Base (Don Combs, DAFC at 951-447-2931) 72 hours prior to starting work.

Construction inspection will be by Caltrans personnel with notification to, access for, and consultation with being provided to March Air Reserve Base inspector(s) during the installation and the testing of the constructed communication line. Acceptance of the constructed communication line will be subject to review and approval by March Air Reserve Base. The contractor shall provide March Air Reserve Base a copy of the original construction schedule and any subsequent updates to confirm the time and date when the Contractor will commence work. The contractor will give March Air Reserve Base notice of the anticipated date that the relocation work will be commenced. Said notice shall be provided at a minimum as follows:

(1) a minimum of 30 and maximum 90 calendar days prior to the anticipated commencement date for the work.

(2) a minimum of 7 and a maximum of 21 calendar days prior to the anticipated commencement date for the work, and

(3) a minimum of 72 and a maximum of 168 hours prior to the anticipated commencement date for the work.

10-5.02 RELOCATE COMMUNICATION LINE:

4" POLYVINYL CHLORIDE CONDUIT

The 4" polyvinyl chloride conduit shall be schedule 40 PVC. Installation of the conduits shall be stacked 2 by 2 with 1 ¼" vertical and horizontal separation. The minimum depth of from top of pipe to finished surface shall be 36" inches. The length of 4" polyvinyl chloride conduit to be paid for will be determined by the foot from actual measurements along the centerline of the pipe in place in the completed work. Pipe placed in excess of the length designated by the Engineer will not be paid for. When pipes are cut to fit a structure, the quantity to be paid for will be the length of pipe placed before cutting, measured in one foot increments.

Fittings, including double ball joints and flexible couplings, which increase the length of the 4" polyvinyl chloride conduit and for which no separate contract item is provided, will be measured by the foot. Fittings will be measured along centerlines to the point of intersections.

The contract price paid per foot for 4" polyvinyl chloride conduit as shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in 4" polyvinyl chloride conduit, complete in place, including pullboxes, fittings, flexible couplings, tracer wire and warning tape, corrosion control, pull rope, as-built footage, and ties as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

ANAW 300 CABLE (COMMUNICATION)

The length of ANAW 300 cable to be paid for will be determined by the foot from actual measurements of the completed work.

Intercept pullboxes are to be placed in the locations shown on the plans over the existing conduit. At each pullbox, #6 ground wire is to be placed around the intercept pullbox and tied to a 5' long, 5/8" in diameter UFER ground rod.

The contract price paid per foot for ANAW 300 cable as shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in ANAW 300 cable, complete in place, including, splices, solid copper ground wire, and UFER ground requirement

REMOVE CABLE (COMMUNICATION)

Existing communication cable where shown on the plans to be removed, shall be removed and must be delivered to March Air Reserve Base Recycling Yard. Contact Don Combs, DAFC at 951-447-2931 for base access and coordination.

The contract price paid per foot for remove cable shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in remove cable and delivery of removed cable to March Air Reserve Base.

SECTION 10-6. ELECTRICAL LINE EXTENSION

10-6.01 GENERAL

The work of installing the necessary electrical line extension shall be performed in accordance with the Southern California Edison Company line extension plans, the current edition of the National Electric Code, these special provisions, and as directed by the Engineer.

The line extension work shall be performed at as follows:

Along Van Buren Blvd, from west of the railroad through the railroad overhead structure, Van Buren overcrossing structure and the interchange to the designated service point, as shown on the Edison Company's plans.

The Contractor's work shall include, but is not be limited to furnishing, installing and constructing the following, as generally shown on the Edison Company's line extension plans as 'work to be performed by the customer':

Pad-mount transformer foundations, trenching, backfill, compaction, conduit, conduit sweeps, conduit risers to 10 feet above grade, pull rope, pull boxes, vaults, vault pads, pull boxes, and other required equipment.

The contractor shall provide necessary coordination with SCE for all work associated with the electrical line extension.

All work shall be in accordance with the requirements, plans and specifications of the Edison Company.

Unless otherwise required on the Edison plans, pole riser conduit and sweeps shall be Schedule 80, and underground conduit, bends, etc. shall be Schedule 40. All other facilities shown on the Edison Company's plans shall be installed, if and as shown to be installed by the 'customer' or the County of Riverside. The Contractor shall coordinate with the Edison Company's inspector in all matters pertaining to the installation of the line extension, including inspection.

The Edison Company will inspect all work performed by the Contractor, provide and install transformers, provide and install conductors, provide and install conduit above Contractor installed risers (above the 10 foot level), and make final connections.

The Edison Company will be allowed a construction window of 30 working days, or as otherwise specified in the Special Provision entitled "liquidated damages" for their work.

Bidding Contractors are advised to carefully review the Edison Company's plans prior to bidding to ensure that the bidding contractor and specialty sub-contractor, if utilized, understands the Contractor's responsibilities.

The Edison Company's line extension plan is available at the County of Riverside office 3525 14th Street Transportation Annex, Riverside CA, 92501

Estimated line extension length: 2,400 feet.

The County of Riverside will pay all fees required by the Edison Company.

It shall be the Contractor's full responsibility to maintain electrical service to all existing traffic signals, lighting, signing and other electrical systems within the project limits. Designs for temporary electrical systems to serve the existing electrical systems shall be prepared by the Contractor and shall be approved by the Engineer prior to implementation.

The contract price paid per lump Sum for Edison line extension shall include full compensation, including all labor, equipment, materials and incidentals, including all required materials and services as shown on the Edison Company's line extension plans, as described in the specifications and special provisions, and as directed by the Engineer, and no additional compensation will be allowed.for Communication line in accordance with the details shown on the plans, the provisions of Sections 1 through 9, Section 15, "Existing Highway Facilities," and Section 70, "Miscellaneous Facilities," of the Standard Specifications; and these special provisions.

SECTION 10-7. WATER CONSERVATION

10-7.01 WATER CONSERVATION:

Attention is directed to the various sections of the Standard Specifications and these special provisions which require the use of water for the construction of this project. Attention is directed to Section 7, "Legal Relations and Responsibility," of the Standard Specifications with regards to the Contractor's responsibilities for public convenience, public safety, preservation of property, indemnification, and insurance.

Nothing in this section "Water Conservation" shall relieve the Contractor from furnishing an adequate supply of water required for the proper construction of this project in conformance with the provisions in the Standard Specifications or these special provisions or relieve the Contractor from the legal responsibilities defined in Section 7.

The Contractor shall, whenever possible and not in conflict with the above requirements, minimize the use of water during construction of the project. Watering equipment shall be kept in good working order; water leaks shall be repaired promptly; and washing of equipment, except when necessary for safety or for the protection of equipment, shall be discouraged.

Concrete slope protection, concreted-rock slope protection, minor structures, and miscellaneous concrete construction shall not be cured by using water. The water cure for bridge decks shall be accomplished with the use of a moisture retaining medium in conformance with the provisions in Section 90-7.01A, "Water Method," of the Standard Specifications.

10-7.02 SURFACE MINING AND RECLAMATION ACT:

Imported borrow or aggregate material must come from a surface mine permitted under the Surface Mining and Reclamation Act of 1975 (SMARA), Pub Res Code § 2710, et seq., or from an exempt site.

The Department of Conservation, Office of Mine Reclamation maintains a list of permitted mine sites. For the list of permitted sites, go to:

http://www.conservation.ca.gov/omr/ab_3098_list

If you import borrow or aggregate material from a surface mine not on this list, submit proof the mine is exempt from SMARA.

10-7.03 SPECIES PROTECTION:

GENERAL

Summary

This work includes protecting regulated species or their habitat.

This project is within or near habitat for regulated species:

Burrowing owl (*Athene cunicularia)*

CONSTRUCTION

Protective Radius

Upon discovery of a regulated species, stop construction activities within a 300' radius of the discovery or as defined in the table below. Immediately notify the Engineer. Do not resume activities until receiving written notification from the Engineer.

Regulated Species Name	Protective Radius
Burrowing Owl (Athene cunicularia)	300'

MEASUREMENT AND PAYMENT

Full compensation for Species Protection is included in the various contract items of work and no additional compensation will be allowed.

10-7.04 RELATIONS WITH CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD:

This project lies within the boundaries of the Santa Ana Regional Water Quality Control Board (RWQCB).

The State Water Resources Control Board (SWRCB) has issued to the Department a permit that governs storm water and non-storm water discharges from the Department's properties, facilities, and activities. The Department's permit is entitled "Order No. 99 - 06 - DWQ, NPDES No. CAS000003, National Pollutant Discharge Elimination System (NPDES) Permit, Statewide Storm Water Permit and Waste Discharge Requirements (WDRs) for the State of California, Department of Transportation (Caltrans)." Copies of the Department's permit are available for review from the SWRCB, Division of Water Quality, 1001 "I" Street, P.O. Box 100, Sacramento, California 95812-0100, Telephone fax: (916) 341-5463 and may also be obtained at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/caltrans.shtml

The Department's permit references and incorporates by reference the current statewide general permit issued by the SWRCB entitled "Order No. 2009-0009-DWQ, National

Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities" that regulates discharges of storm water and non-storm water from construction activities disturbing one acre or more of soil in a common plan of development. Copies of the statewide permit and modifications thereto are available for review from the SWRCB, Division of Water Quality, 1001 "I" Street, P.O. Box 100, Sacramento, California 95812-0100, Telephone fax: (916) 341-5463 and may also be obtained at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/

The Santa Ana RWQCB has issued a permit which governs storm water and non-storm water discharges resulting from construction activities in the project area. The RWQCB permit is entitled "National Pollutant Discharge Elimination System (NPDES) Permit Order No. R8-2010-0033-DWQ, Permit No. CAS618033 and the Santa Ana De Minimus Permit (Order No. R8-2009-0003, NPDES No. CAG998001)." Copies of the RWQCB permit are available for review from
http://www.waterboards.ca.gov/santaana/water_issues/programs/stormwater/index.shtml

The NPDES permits that regulate this project, as referenced above, are collectively referred to in this section as the "permits."

The Contractor shall know and comply with provisions of Federal, State, and local regulations and requirements that govern the Contractor's operations and storm water and non-storm water discharges from the project site and areas of disturbance outside the project limits during construction. Attention is directed to Sections 7-1.01, "Laws to be Observed," 5-1.18, "Property and Facility Preservation," 7-1.12, "Indemnification and Insurance," and 9-1.07E(5), "Penalty Withholds," of the Standard Specifications.

The Contractor shall notify the Engineer immediately upon request from the regulatory agencies to enter, inspect, sample, monitor, or otherwise access the project site or the Contractor's records pertaining to water pollution control work. The Contractor and the Department shall provide copies of correspondence, notices of violation, enforcement actions, or proposed fines by regulatory agencies to the requesting regulatory agency.

10-7.05 PALEONTOLOGY:

Attention is directed to the California Public Resources Code Section 5097.5, which protects vertebrate paleontological sites or other paleontological features situated on public lands. In compliance with the California Environmental Quality Act (CEQA) requirements a Paleontologist provided by the County of Riverside will monitor the excavation within the project limits to salvage fossil specimens as necessary during construction.

The Contractor shall provide the Engineer with a schedule of excavation operations within the project limits in writing at least 15 working days prior to construction and update the schedule as needed. The Contractor shall notify the Engineer 15 days in advance of the start of excavation operations.

All employees, subcontractors, and Contractor's representatives on the project site involved in excavation activities shall receive a one-hour paleontological resource awareness training program provided by the Paleontologist prior to performing on-site work. The Contractor shall submit a written request to the Engineer 10 days prior to the performance of any work requesting the paleontological resource awareness training.

If fossils are discovered, the Engineer may temporarily divert or suspend the excavation operations until the Paleontologist completes the salvage and removal of the fossil specimens.

All fossil specimens salvaged from within the State Right of Way shall remain the property of the State.

A delay due to paleontological monitoring or the salvage and removal of fossil specimens, when ordered by the Engineer, will be considered a temporary suspension of work, in accordance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications.

Full compensation for conforming to these requirements shall be considered as included in the contract price paid for various contract items of work involved and no additional compensation will be allowed therefore.

Any additional excavation required due to the discovery of paleontological remains, when ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

10-7.06 REMOVAL OF ASBESTOS CONTAINING MATERIALS:

Asbestos containing materials (ACM), as defined in section 1529, "Asbestos," of the Construction Safety Orders, Title 8, of the California Code of Regulations suspected to be present in the structure proposed for demolition or renovation.

In compliance with Standard Specifications Section 14-9.01, the Contractor must notify the US EPA, the California Air Resources Board, and the South Coast Air Quality Management District (SCAQMD) as required by the National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61, Subpart M, California Health and Safety Code section 39658(b)(1), and the California Air Resources Board regulations. Provide a copy of the notification form and attachments to the Engineer prior to submittal. Notification must take place a minimum of 10 days prior to starting demolition or renovation activities. Contractor

must contact the AQMD for confirmation. Notify other local permitting agencies and utility companies prior to demolition or alteration.

Mail Original Notification To:

Mr. Bob Trotter
U.S. EPA - Region IX
Asbestos NESHAP Notification (Air 5)
75 Hawthorne Street
San Francisco, California 94105

Send Copy or Fax To:

California Air Resources Board
Enforcement Division
Asbestos NESHAP Notification
Attn: Ahmad Najjar
Post Office Box 2815
Sacramento, California 95812
Fax: (916) 445-7986

Send Copy to:

South Coast Air Quality Management District, 21865 Copley Drive, Diamond Bar, CA 91765

Friable ACM is defined under the Asbestos Hazard Emergency Response Act (AHERA) as "any material containing more than 1 percent (%) asbestos by area that hand pressure can crumble, pulverize or reduce to powder when dry". The term non- friable implies that the asbestos fibers are tightly bound into the matrix of the material and should not become an airborne hazard as long as the material remains intact and undamaged, and is not sawed, sanded, drilled or otherwise abraded during removal.

Codes, which govern removal and disposal of materials containing asbestos include, but are not limited to, the following:

1. California Health and Safety Code, Division 20, Chapter 6.5, Hazardous Waste Control.
2. California Code of Regulations, Title 8, General Industry Safety Order 5208 Asbestos.
3. California Code of Regulations, Title 8, Sections 1529 and 341
4. California Code of Regulations, Title 22, Division 4.5
5. Occupational Safety and Health Administration, Part 26 (amended), of Title 29 of the Code of Federal Regulations.
6. Code of Federal Regulations (CFR), Title 40, Part 61, subpart M.

ASBESTOS SURVEY

ASBESTOS SAMPLING AND ANALYSIS WORKPLAN

At least fifteen (15) days prior to beginning any sampling for suspected ACM, submit a written, project specific Asbestos Sampling and Analysis Workplan that establishes the procedures used to comply with requirements for asbestos abatement, including sampling and testing of suspected ACM, containment, transportation and disposal of ACM. No sampling and analysis work will proceed until the plan is authorized by the Engineer. If the plan is unacceptable, it will be returned within ten (10) days of the submittal to the Contractor for revision. The Engineer must have five (5) days to review and authorize or reject the revised plan from the date the revised plan is received from the Contractor. The Contractor, must be a Certified Asbestos Consultant (CAC) and AHERA (Asbestos Hazard Emergency Response Act) -trained to perform an asbestos survey prior to any removal activity. The plan must be prepared, signed and stamped by a CAC.

ACM sampling methods must meet USEPA, SW-846, "Test Methods for Evaluating Solid Waste," Volume II: Field Manual, Physical/Chemical, Chapter Nine Section 9.1. Use a laboratory certified by the California Department of Public Health, Environmental Laboratory Accreditation Program for analysis of ACM samples. Samples must be analyzed for asbestos according to Analytical Method 600/R-93-116 specified in 40 Code of Federal Regulations (CFR) Part 763 Subpart F, Appendix A (Polarized Light Microscopy).

A minimum of one sample must be taken per suspected ACM location. For pipes and other linear components of suspected ACM, collect one sample per 5 feet of exposed material. Sample any exposed ACM on the existing structure. ACM encased in concrete will be sampled when exposed during demolition.

Transport samples under the chain of custody to the laboratory within 24 hours of collection. Run analytical laboratory tests on a 48-hour turn-around. Send by facsimile, or hand deliver to the Engineer, laboratory results as soon as they are available. Supply a summary report of sampling protocols, photographs of the structures and of the locations where samples were taken, chain of custody, analysis and laboratory data sheets, to the Engineer within 15 days of completion of sampling.

SUBMITTALS

Submit a draft sampling and analysis report to the Engineer within 15 days of completion of sampling and analysis. The Engineer will review the survey report and provide comments to the Contractor within 7 days. If, in the opinion of the Engineer, completion of work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted in accordance with Section 8-1.09, "Right of Ways Delays" of the Standard Specifications. Make any requested edits and submit four copies of the final report to the Engineer within five (5) days.

Submit an Asbestos Compliance Plan (ACP). ACP must comply with section 7-1.01A, "Labor Code Requirements," of the Standard Specifications.

ASBESTOS COMPLIANCE PLAN

Prepare an Asbestos Compliance Plan (ACP) to prevent or minimize exposure to asbestos. Attention is directed to Title 8, California Code of Regulations, Construction Safety Orders, section 5192 (b) and section 1529, "Asbestos", Occupational Safety and Health Guidance Manual published by the National Institute of Occupational Safety and Health (NIOSH) and the USEPA for elements of the ACP. The ACP must contain as a minimum but not be limited to: identification of key personnel for the project, job hazard analysis for work assignments, summary of risk assessment, personal protective equipment, delineation of work zones on-site, decontamination procedures, general safe work practices, security measures, emergency response plans and worker training. The ACP must be authorized in writing by an industrial hygienist certified in the practice of industrial hygiene by the American Board of Industrial Hygiene before submission to the Engineer for review and acceptance. Submit the ACP to the Engineer at least 15 days prior to beginning work in areas containing or suspected to contain asbestos.

TRAINING

Prior to performing work in areas containing or suspected to contain asbestos, personnel who have no prior training or are not current in their training status, including State personnel, must complete a safety training program provided by the Contractor, which meets the requirement of Title 8, California Code of Regulations, Section 1529. Provide a written certification of completion of safety training to the Engineer for trained personnel prior to performing work in areas containing or suspected to contain asbestos.

EQUIPMENT AND MEDICAL SURVEILLANCE

Provide personnel protective equipment, training, and medical surveillance required by the Contractor's Asbestos Compliance Plan to State personnel. The number of State personnel will be 3.

REMOVAL

Prepare a work plan for the removal, storage, transportation and disposal of ACM. Removal and management of ACM will be performed by a contractor registered pursuant to Section 6501.5 of the Labor Code and certified pursuant to Section 7058.6 of the Business and Professions Code. Asbestos removal must conform to Cal/OSHA requirements in Title 8 Sections 1529 and 341. For bridges built before 1980, where ACM is suspected, but cannot be sampled before demolition, a CAC must be present during demolition in case unforeseen ACM is encountered. Remove all friable material in a manner that conforms to OSHA work practice requirements. Remove and handle all non-friable ACM to prevent breakage. Non-friable ACM such as asbestos cement pipe must be disposed of to a landfill facility permitted to take ACM. The removal of ACM encased in concrete or other similar structural material is not required prior to demolition, but such material must be adequately wetted whenever exposed during demolition. Packaging, storage, transporting, and disposing of ACM, must conform to Title 22, Division 4.5, Chapters 11, 12 and 13 of the California Code of

Regulations. No visible dust must be generated when handling, removing, transporting, and disposing of ACM.

Asbestos removal procedures include, but are not limited to:

1. Installing asbestos warning signs at perimeters of abatement work areas.
2. Wetting asbestos materials with sprayers.
3. Containing large volumes of asbestos materials in disposal bins for temporary storage until removed from the site.
4. Providing manifests for the Engineer to sign for disposal of friable ACM waste or a waste shipment record for disposal of non-friable ACM waste.
5. Providing transporters registered to transport hazardous waste in the State of California in accordance with the provisions of Chapter 6.5, Division 20 of the Health and Safety Code and Title 22 of the California Code of Regulations, Division 4.5.
6. Disposing of asbestos materials at a permitted disposal facility, which accepts such materials.
7. Working in accordance with Federal, State, and Local requirements for asbestos work.

Mark all vehicles used to transport ACM as specified below, or an equivalent warning:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

Handling

Comply with CCR Title 22, Division 4.5, Chapter 12, Article 3 requirements for the packaging and labeling of removed ACM, and place such removed material in approved plastic containers (double ply plastic bags) with caution labels affixed to bags. Such caution labels must have conspicuous, legible lettering, which spells out the following, or equivalent warning:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

At the option of the Contractor, the removed materials containing asbestos may be placed directly into a covered roll off or drop box, which must have the same caution label, affixed on all sides.

Transporting

Haulers of friable asbestos containing material will have current registration with the State Department of Toxic Substances Control (DTSC), and must have a U.S. Environmental Protection Agency Identification Number (U.S. EPA I.D. Number). A valid registration

issued by DTSC is required for all vehicles used to transport hazardous waste material. Non-friable ACM is not hazardous waste and can be transported with a waste shipment record (WSR) or comparable shipping document.

Disposal

The Engineer will obtain the required EPA generator identification numbers, and will sign the hazardous waste manifests for disposal of friable asbestos containing material. The Contractor must dispose of friable and non-friable waste containing asbestos at a disposal facility permitted to accept such material and that meets all the requirements specified by Federal, State, and Local regulations. Notify the proper authorities at the disposal site in advance of delivery of asbestos containing material to the disposal site. Conduct additional sampling deemed necessary by the owner of the disposal facility for acceptance of the material at your expense.

MEASUREMENT AND PAYMENT

Preparation of the Asbestos Compliance Plan, including paying the Certified Industrial Hygienist, and for providing personal protective equipment, training, medical surveillance, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer will be paid as extra work in accordance with section 4-1.03D of the Standard Specifications.

Preparation of a Sampling and Analysis Work Plan, and an Asbestos Removal Work Plan, identifying and determining the extent of asbestos prior to and during demolition or alteration work, including sampling and testing, removal, transportation and disposal of this material will be paid as extra work in accordance with section 4-1.03D of the Standard Specifications.

10-7.07 ENVIRONMENTALLY SENSITIVE AREA:

An ESA exists on this project.

Before start of work, protect the ESA by installing temporary fence (Type ESA).

10-7.08 NONHIGHWAY FACILITIES (INCLUDING UTILITIES):

Installation of the utilities shown in the following table requires coordination with your activities. Make the necessary arrangements with the utility company through the Engineer and submit a schedule:

1. Verified by a representative of the utility company
2. Allowing at least the time shown for the utility owner to complete its work

Utility Relocation and Contractor-Arranged Time for the Relocation

Utility	Utility Address	Location	Days
Southern California Edison	26100 Menifee Road Romoland, CA 92585	Southwest of the railroad overhead	10
The Gas Company	1981 Lugonia Avenue Redlands, CA 92374-9796	Southeast side of the freeway	45
Metropolitan Water District	450 Alessandro Blvd Riverside, CA 92508	Southeast side of the freeway	
March Air Reserve Base	452nd MSG/Civil Engineering 610 Meyer Dr. Bldg 2403 March AFB, CA 92518-2166	Southeast side of the freeway	5

Utility work that requires coordination between the contractor and utility owners includes, but not limited to, the description below:

- Southern California Edison to relocate poles overhead electrical west of railroad, over Van Buren Boulevard.
- Southern California Edison to relocate overhead electrical and guy wire extension east of I-215.
- Southern California Edison electrical line extension from west of railroad to east of I-215, along the new Van Buren Boulevard. This requires, but not limited to, contractors installation of concrete platforms and conduits from west of the interchange, through the new bridge structures, to the point of connection shown on plans to allow SCE to extend electrical line.Electrical service required from Southern California Edison.
- The gas company to relocate 6" HP gas line along and under the new Van Buren Boulvard east of I-215.
- Western Munincipal Water District water line to be installed though the new Van Buren bridge structures. This work is to be performed by the contractor. Inspection to be performed by owner.
- Western Municipal Water District water line to be relocated east of the new Van Buren Boulevard and I-215. This work is to be performed by the contractor. Inspection to be performed by owner.
- Establishment of water meter and water service for landscaping
- Relocation of March Air Reserve Base communication line east of new Van Buren Blvd and I-215. This work is to be performed by the contractor. Inspection to be performed by owner.

The utilities shown in the following table may interfere with pile driving, drilling activities, or subsurface construction, but the utility owner will not rearrange them. If you want any of them rearranged or temporarily deactivated, make arrangements with the utility owner.

Utilities Not Rearranged for Pile Driving, Drilling Activities, or Subsurface Construction

Utility	Location
The Gas Company-4" HP Gas	100-200 ft north of Van Buren Structures

10-7.09 DAMAGE REPAIR:

Attention is directed to Section 7-1.16, "Contractor's Responsibility for the Work and Materials," of the Standard Specifications and these special provisions.

When as a result of freezing conditions (as defined herein) during the plant establishment period, plants have died or, in the opinion of the Engineer, have deteriorated to a point beyond which the plants will not mature as typical examples of their species, the Engineer may direct replacement of the affected plants. The total cost of ordered plant replacement work will be paid for as extra work as provided in Section 4-1.03D,"Extra Work," of the Standard Specifications. A freezing condition, for the purpose of this specification, occurs when the temperature at or near the affected area has been officially recorded below 32° F and plants have been killed or damaged to the degree described above.

When, as a result of drought conditions (as defined herein) during the plant establishment period, plants have died or, in the opinion of the Engineer, have deteriorated to a point beyond which the plants will not mature as typical examples of their species, the Engineer may direct replacement of the affected plants. The total cost of ordered plant replacements, after water has been restricted or stopped, will be paid for as extra work as provided in Section 4-1.03D,"Extra Work," of the Standard Specifications. Restriction or shutoff of available water shall not relieve the Contractor from performing other contract work. A drought condition occurs when the Department, or its supplier, restricts or stops delivery of water to the Contractor to the degree that plants have died or deteriorated as described above.

10-7.10 RELIEF FROM MAINTENANCE AND RESPONSIBILITY:

The Contractor may be relieved of the duty of maintenance and protection for those items not directly connected with plant establishment work in conformance with the provisions in Section 7-1.15, "Relief From Maintenance and Responsibility," of the Standard Specifications. Water pollution control, maintain existing planted areas, maintain existing irrigation facilities, transplant trees, and transplant palm trees shall not be relieved of maintenance.

SECTION 11. (BLANK)

SECTION 12. (BLANK)

SECTION 13. RAILROAD RELATIONS AND INSURANCE

13-1 RELATIONS WITH RAILROAD COMPANY

13-1.01 GENERAL:

The term "Commission" shall mean the Riverside County Transportation Commission. The term "County" shall mean the County of Riverside.

The Commission is the owner in fee of the property commonly referred to as the San Jacinto Branch Line ("Rail Corridor"). Burlington Northern and Santa Fe Railway Company ("BNSF") has a freight easement for use of the Rail Corridor and is currently responsible for maintenance. Maintenance responsibility for the Rail Corridor may shift to the Southern California Regional Rail Authority ("SCRRA") following commencement of the Project.

A non-exclusive license has been granted by the Commission permiting the Contractor in, on, over, and across Commission property for the purposes of constructing the Project, including the erection and removal of falsework, as may be applicable, and the construction of a drainage facility, and for no other purpose.

If falsework is required for the Project, Contractor shall provide plans and specifications for the falsework to the Commission, BNSF and SCRRA for review and approval prior to commencement of any work on Commission property. The Project shall be constructed in accordance with the approved plans and specifications for the Project, and any approved plans and specifications for falsework (collectively, "Plans and Specifications").

13-1.02 RAILROAD REQUIREMENTS:

Contractor shall be responsible to coordinate and arrange for flagging services for the Project work and/or any required maintenance work from BNSF and/or SCRRA, as applicable.

Contractor shall provide for and maintain minimum vertical and horizontal clearances as shown in the Plans and Specifications for the Project, and in accordance with the Contractor Requirements set forth in Section 13-1.03 Exhibit "B" and the Bridge/Falsework Clearance Requirements as provided in Section 13-1.04 Exhibit "E".

Contractor shall construct the Project in a good and workmanlike manner and as shown on the Plans and Specifications. The principal elements of the Project work ("Work") are as follows:

1. Construction of the Project
2. All necessary grading and paving, including backfill of excavations and restoration of disturbed vegetation on the Rail Corridor
3. Provision of suitable drainage, both temporary and permanent
4. Maintenance of the job site at all times so that it will not present any source of danger to any person or property.
5. Removal of all trash and debris associated with the construction of the Project.

6. Job site cleanup to the pre-construction condition and to the Commission's satisfaction.

Contractor shall perform the Work in a manner that will not endanger or interfere with the safe and timely operations of the Commission, BNSF or SCRRA facilities.

The Work, including shoring, false work or cribbing used by Contractor, shall comply with the SCRRA and BNSF Bridge Requirements, which are included in the Information Handout, and all applicable requirements promulgated by state and federal agencies, departments, commissions and other legislative bodies.

Prior to commencing any construction of falsework, if applicable, contractor shall provide plans and specifications for the falsework to BNSF and SCRRA and the Commission for review and approval.

The Commission shall have the right to review and approve the Contractor's proposed construction schedule for the Work. Contractor shall reasonably adhere to the approved construction schedule for all Work that impacts the Rail Corridor or the Property. Construction activities for the Project shall not interfere with BNSF's or SCRRA's operation of trains on the Rail Corridor. The Contractor shall coordinate all Work with Commission to avoid conflict with the Commission's potential construction of the Perris Valley Line project, or any other project of Commission.

Emergency work will be permitted only upon prior notification to BNSF's Network Operations Center (telephone number (800) 832-5452) until such date that SCRRA assumes operations and maintenance responsibility for the corridor. At such time, the required notification for emergency work shall be provided to SCRRA ((909) 593-0661 or (888) 446-9715). In addition, the Commission's Assets and Property Manager shall be notified prior to any emergency work (telephone number: 951-787-7141).

Contractor understands that trains cannot be subject to delay once SCRRA Metrolink Commuter Rail Service commences.

Any changes or modifications during Project construction that affect safety or operation or the Rail Corridor shall be subject to the Commission's and BNSF's or SCRRA's, as applicable, written approval prior to the commencement of any such changes or modifications.

Any changes or modifications during Project construction that may affect the construction schedule of any Commission project within the Rail Corridor or the Property shall be subject to the Commission's prior written approval.

Contractor performing work on the Commission's property, or any part thereof, shall comply with the insurance requirements specified in Section 13-2.

Contractor is placed on notice that fiber optic, communication and other cable lines, gas, electric, and/or other utilities, and systems (collectively, the "Lines") owned by various telecommunications, electrical, gas, or other companies may be buried on the Commission's property. As applicable, the locations of those known Lines have been included on the Plans and Specifications based on available information from the utility companies but not all utility locations may be shown or known by the Commission. Contractor shall be responsible for

contacting the Commission and the utility companies and notifying them of any work that may damage Lines or facilities and/or interfere with their service. As applicable, Contractor must also mark all Lines shown on the Plans and Specifications or marked in the field in order to verify their locations. Contractor must also use all reasonable methods when working on or adjacent to the Commission's property to determine if any other Lines (fiber optic, cable, communication, gas, electric, or otherwise) may exist.

Contractor shall be responsible for coordinating the rearrangement of any facilities or Lines determined to interfere with construction. Contractor shall cooperate fully with any impacted utility company(ies) in performing such rearrangements.

Failure to mark or identify these Lines is sufficient cause for the Commission to stop construction of the Project on Commission property, at no cost to the Commission until identification work is completed.

Contractor shall conform with and meet the Contractor Requirements set forth in Section 13-1.03 Exhibit "B".

As may be required by BNSF, prior to performing any work, Contractor shall obtain copies of and execute BNSF's most-current standard "Exhibit 'C' – Contractor Requirements" and BNSF's most-current standard "Exhibit 'C-1' – Contractor Insurance Requirements". Contractor shall provide evidence to the Commission of compliance with this requirement.
As may be required by SCRRA once SCRRA commences maintenance of the Rail Corridor, Contractor shall obtain copies of and execute SCRRA's most-current standard "Temporary Right-of-Entry Agreement" and shall comply with all SCRRA insurance requirements related to such agreement. Contractor shall provide evidence to the Commission of compliance with this requirement.

Neither the Commission nor the County shall be responsible to Contractor for any changes in BNSF or SCRRA operations over the Rail Corridor.

County shall observe and inspect the operations of Contractor completing the Work to assure compliance with the Plans and Specifications, the terms of this Section 13 and all safety requirements specified herein.

Contractor shall include the Commission as an indemnified party under County's standard contractual indemnification, hold harmless and defense requirements.

The Commission shall have the right, in its reasonable discretion, to request any employee or contractor who enters the Rail Corridor and because of their incompetence, neglect of duty, unsafe conduct or misconduct and/or because they adversely affected operations on the Rail Corridor, be removed from the Rail Corridor. In the event Contractor elects not to honor such request, the Commission may stop work within the Rail Corridor until the matter has been fully resolved to the Commission's satisfaction.

The Commission shall have the right to stop construction work on the Project if any of the following events take place: (i) the Work is performed in a manner contrary to the Plans and Specifications; (ii) the Work is performed in a manner which is hazardous to the Rail Corridor, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance

described in Section 13-2 is canceled during the course of the Project; or (iv) the Work is not being completed in accordance with the approved construction schedule and/or the Contractor fails to coordinate the Work with the Commission to avoid conflicts with Commission work.. The work stoppage shall continue until all necessary actions are taken to rectify the situation to the reasonable satisfaction of the Commission. Any such work stoppage under this provision shall not give rise to any liability on the part of the Commission. The Commission's right to stop the work is in addition to any other rights the Commission may have.

Any approval of the Plans and Specifications by BNSF, SCRRA and/or the Commission shall in no way obligate BNSF, SCRRA or the Commission in any manner with respect to the finished product design and/or construction. Any approval by BNSF, SCRRA and/or the Commission shall mean only that the Plans and Specifications meet the subjective standards of BNSF, SCRRA and/or the Commission, and such approval by BNSF, SCRRA and/or the Commission shall not be deemed to mean that the Plans and Specifications or construction is structurally sound, appropriate or that the Plans and Specifications meet applicable regulations, laws, statutes or local ordinances and/or building codes.

Contractor shall comply with all federal, state and local laws, statutes, orders, ordinances, rules, regulations, plans, policies and decrees. Without limiting the generality of the foregoing, Contractor, at its sole cost and expense, shall obtain any and all permits which may be required by any law, regulation or ordinance for any activities Contractor desires to conduct or have conducted pursuant to this Agreement.

The Commission and its representatives, employees, agents or independent contractors may enter and inspect the Commission's property or any portion thereof or any improvements thereon at any time and from time to time at reasonable times to verify Contractor's compliance with the terms and conditions of this Section 13.

13-1.03 EXHIBIT B – CONTRACTOR REQUIREMENTS:

1. General Provisions

For any falsework above any tracks or any excavations located within twenty-five (25) feet of the nearest track or intersecting a slope from the plane of the top of rail on a 1 horizontal to 1 vertical slope beginning at eleven (11) feet from centerline of the nearest track, whichever is greater, both measured perpendicular to center line of track, Contractor shall furnish COMMISSION five (5) sets of working drawings showing details of construction affecting COMMISSION's Property. The working drawings shall include the proposed method of installation and removal of falsework, shoring or cribbing, not included in the contract plans, and two (2) sets of structural calculations of any falsework, shoring or cribbing. All calculations shall take into consideration railway surcharge loading and shall be designed to meet American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and calculations shall be stamped by a registered professional engineer licensed to practice in California. Contractor shall not begin work until notified by COMMISSION that plans have been approved. Contractor shall be required to use lifting devices such as cranes and/or winches to place or to remove any falsework over COMMISSION's tracks. In no case shall Contractor be relieved of responsibility for results obtained by the implementation of said approved plans.

2. Contractor Requirements

(a) Contractor shall take protective measures as are necessary to keep railway facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from his operations.

(b) Contractor shall notify COMMISSION, as required herein, and provide blasting plans to COMMISSION for review seven (7) calendar days prior to conducting any blasting operations adjacent to or on COMMISSION's Property.

(c) In addition to any the vertical and horizontal clearance requirements contained in Exhibit "E", COUNTY and its contractors or agents shall abide by the following clearances during construction:

- 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts

- 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts

- 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts

- 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts

(d) The details of construction affecting COMMISSION's Property not included in the contract plans shall be submitted to COMMISSION for approval before work is undertaken and this work shall not be undertaken until approved by COMMISSION.

(e) At other than public road crossings, Contractor shall not move any equipment or materials across COMMISSION's tracks until permission has been obtained from COMMISSION. The Contractor shall obtain a "Temporary Private Crossing Agreement" from COMMISSION prior to moving his equipment or materials across COMMISSION's tracks. The temporary crossing shall be gated and locked at all times when not required for use by Contractor. The temporary crossing for use of Contractor shall be at the expense of Contractor.

(f) Discharge, release or spill on COMMISSION's Property of any hazardous substances in excess of a reportable quantity or any hazardous waste is prohibited and Contractor shall immediately notify COMMISSION of any discharge, release or spills. Contractor shall not allow COMMISSION's Property to become a treatment, storage facility as those terms are defined in the applicable federal and state law.

(g) Upon completion of the work covered by the Agreement, Contractor shall promptly remove from COMMISSION's Property all of Contractor's tools, equipment, implements anti other materials, whether brought upon said property by said Contractor or any subcontractor, employee or agent of Contractor or of any subcontractor, and shall cause COMMISSION's Property to be left in a condition acceptable to COMMISSION.

3. Contractor Safety Action Plan

Contractor shall develop and implement a safety action plan which shall be made available to COMMISSION prior to commencement of any work on COMMISSION's Property. During performance of work, Contractor shall audit it's compliance with the Safety Action Plan. Contractor shall designate an on-site representative who shall serve as the contact person for COMMISSION and who shall maintain a copy of the safety action plan and subsequent audits at the job site for inspection and review by COMMISSION at any time during performance of the work.

All persons working within the Rail Corridor shall complete Roadway Worker Safety Training in accordance with BNSF and/or SCRRA requirements, as applicable.

4. Protection of COMMISSION Facilities and Activities Performed on COMMISSION's Property

Contractor shall give a minimum of fifteen (15) working days notice to COMMISSION and to SCRRA Maintenance of Way office at (909) 392-4506 in advance of when flagging services will be required.

5. Contractor General Safety Requirements

(a) Work in the proximity of railway track(s) is potentially hazardous where movement of trains and equipment can occur at any time and in any direction. All work

performed by contractors within 25 feet of any track shall be in compliance with FRA Roadway Worker Protection Regulations.

(b) Before beginning any task on COMMISSION's Property, a thorough job safety briefing shall be conducted with all personnel involved with the task and repeated when the personnel or task changes. If the task is within 25 feet of any track, the job briefing must include the SCRRA's flagger and include the procedures the Contractor will use to protect its employees, subcontractors, agents or invitees from moving any equipment adjacent to or across any COMMISSION track(s).

(c) Workers shall not work nearer than 25 feet to the centerline of any track without proper flag/work protection, unless the track is protected by track bulletin and work has been authorized by COMMISSION. If flag/work protection is provided, every contractor employee must know: (1) who the flagger is, and how to contact the flagger, (2) limits of the flag/work protection, (3) the method of communication to stop and resume work, and (4) entry into flag/work limits when designated. Men or equipment entering flag/work limits that were not previously job briefed, must notify the flagger immediately, and be given a job briefing if working at less than 25 feet from center line of track.

(d) When Contractor's employees are required to work on COMMISSION's Property after normal working hours or on weekends, COMMISSION must be notified. A minimum of two employees shall be present during such times.

(e) Any Contractor employee, its subcontractor's employee, agents or invitees under suspicion of being under the influence of drugs or alcohol, or in the possession of same, may be removed from COMMISSION's Property and subsequently released to the custody of a representative of Contractor management. Future access to COMMISSION's Property by that employee will be denied.

(f) Any damage to COMMISSION's Property, or any hazard noticed on passing trains, shall be reported immediately to COMMISSION. Any vehicle or machine which may come in contact with a track, signal equipment, or structure (bridge) that could result in a train derailment shall be reported by the quickest means possible to COMMISSION.

(g) All persons are prohibited from having a pocket knife with blade in excess of three (3) inches, firearms or other deadly weapons in their possession while working on COMMISSION's Property. All personnel protective equipment used on COMMISSION's Property shall meet applicable OSHA and ANSI specifications.

(h) Contractor shall not pile or store any materials, machinery or equipment closer than 25'-0" to the center line of the nearest COMMISSION track. At highway/rail at-grade crossings materials, machinery or equipment shall not be stored or left temporarily which interferes with the sight distances of motorists approaching the crossing. Prior to beginning work, Contractor will establish any storage area with concurrence of COMMISSION.

(i) Machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set and if equipped with blade, pan or bucket, they must be lowered to the ground. All machinery and equipment left unattended on COMMISSION's Property must be inoperable and secured against movement.

(j) Workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water shall meet all Federal, State and Local regulations.

(k) All power line wires must be considered dangerous and of high voltage unless informed to the contrary by proper authority. For all power lines the minimum clearance between the lines and any part of the equipment or load shall be; 200 KV or below - 15 feet, 200 to 350 KV - 20 feet, 350 to 500 KV - 25 feet, 500 to 750 KV - 35 feet, 750 to 1000 KV - 45 feet and if capacity of the line is not known, minimum clearance of 45 feet must be maintained. A person shall be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an operator to maintain the desired clearance by visual means.

6. Excavation

(a) Before excavating, it must be ascertained by Contractor if there are any underground pipe lines, electric wires, or cables, including fiber optic cable systems that either cross or run parallel with the track which are located within the work area. Excavating on COMMISSION's Property could result in damage to buried cables resulting in delay to traffic, including disruption of service to users resulting in business interruptions involving loss of revenue and profits. Before any excavation commences, Contractor must contact COMMISSION. All underground and overhead wires must be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of the line. It is also Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.

(b) Contractor must cease all work and COMMISSION must be notified immediately before continuing excavation in the area if obstructions are encountered that do not appear on drawings. If the obstruction is a utility, and the owner of the utility can be identified, then the owner should also be notified immediately, if there is any doubt about the location of underground cables or lines of any kind, no work will be performed until the exact location has been determined. There will be no exceptions to these instructions.

(c) All excavations shall be conducted in compliance with applicable OSHA regulations and regardless of depth shall be shored where there is any danger to tracks, structures or personnel.

(d) Any excavations, holes or trenches on COMMISSION's Property must be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that COMMISSION employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations must he back filled as soon as possible.

7. Hazardous Waste, Substances and Material Reporting

If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to COMMISSION's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor shall

immediately: (a) notify COMMISSION of such discovery; (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties; and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

8. Personal Injury Reporting

Any personal injury sustained by an employee of the Contractor, subcontractor or Contractor's invitees while on COMMISSION's Property must be reported immediately (by phone mail if unable to contact in person) to COMMISSION no later than the close of shift on the date of the injury.

13-1.04 EXHIBIT E – BRIDGE/FALSEWORK CLEARANCE REQUIREMENTS:

The term "Structure", as used herein, shall refer to the completed Van Buren Overhead Bridge, and all portions thereof, as widened pursuant to the Project Plans and Specifications.

Temporary construction clearances must be no less than 15 feet measured horizontally from the centerline of the nearest track and 22 feet-6 inches measured vertically from the top of rail of the most elevated track to the bottom of lowest temporary falsework member. Prior to commencement of work, California Public Utilities Commission (CPUC) approval shall be obtained for all work less than the CPUC's minimum requirement of 22 feet, 6 inches vertically from the top of the most elevated rail to the bottom of the lowest falsework for temporary structures.

For the completed Structure, COUNTY has submitted plans showing the least horizontal distance from the centerline of existing and future tracks to the face of the nearest member of the proposed Structure. The location of the least horizontal distance has been accurately described such that BNSF and/or SCRRA was able to determine where it will occur in both the horizontal and vertical plane. If the permanent Structure is within 25 feet of the nearest track (or future track), collision walls shall be incorporated into the permanent Structure design according to American Railway Engineering and Maintenance Association Manual of Recommended Practice - Chapter 8 - Article 2.1.5.

For the permanent Structure, COUNTY has submitted plans showing the least vertical clearance from top of the most elevated rail of existing and future tracks to the lowest point of the proposed Structure. A profile of the existing top of rail elevation shall be plotted on the bridge plans. The profile shall extend for 500 feet in each direction of the proposed overpass and a separate profile shall be plotted for each track. If the existing top of rail profile(s) is not uniform such that a sag exists in the vicinity of the proposed Structure, the permanent Structure vertical clearance shall be increased sufficiently to accommodate a raise in the track profile to remove the sag. Prior to beginning construction of the permanent Structure, the top of rail elevations should be checked and verified that they have not changed from the assumed elevations utilized for the design of the bridge.

During construction, the COMMISSION may require an independent engineering inspector to be present during certain critical activities of the Project, including but not limited to: driving foundation piles, erecting falsework, construction of shoring and retaining walls, placing concrete, placing soil backfill and compaction processes. COUNTY shall reimburse the COMMISSION for any costs of supplemental inspection services, provided that such costs shall be agreed upon in advance. Nothing in the foregoing shall obligate the COMMISSION to provide such inspector, and the COMMISSION shall have no liability for the work completed by or on behalf of COUNTY, regardless of any inspection or lack thereof provided by or on behalf of the COMMISSION.

13-1.05 PAYMENT:

Full compensation for coordination, compliance, flagging and all other aspects of working within the Rail Corridor shall be considered as included in the contract lump sum price paid for Relations with Railroad and no additional compensation will be allowed therefor.

Attention is directed to Section 10-1.04, " Obtain Encroachment Permits".

13-2 ADDITIONAL RAILROAD INSURANCE REQUIREMENTS

In addition to the insurance requirements set forth in General Condition Section 3-1.01B, of these Special Provisions "Insurance – Hold Harmless," the following additional insurance requirements are applicable to this project:

A. Railroad Protective Liability. CONTRACTOR shall, in connection with any construction activities undertaken with respect to the construction and/or repair of the Van Buren Overhead Bridge either directly by CONTRACTOR or by its contractors, acquire and keep in force during the period of such construction, railroad protective liability insurance with a combined single limit of **$2,000,000** and a general aggregate of **$6,000,000**. The COMMISSION, COUNTY, BNSF and SCRRA shall be named insureds under such policy, and their officials, officers, employees, agents, and consultants shall be named as additional insureds.

B. Pollution Liability Insurance. If the Project work involves any hazardous materials, CONTRACTOR shall maintain pollution liability insurance in the amount of no less than one million dollars **($1,000,000.00).** Such insurance, if required, shall include the COMMISSION, COUNTY and, if required by the COMMISSION, the SCRRA and their officials, officers, employees, agents, and consultants as insureds with respect to the construction of the Van Buren Overhead Bridge and the Property and shall contain no special limitations on the scope of coverage or the protection afforded to these insureds.

Standard Plans List

The Standard Plan sheets applicable to this contract include, but are not limited to those indicated below. Applicable Revised Standard Plans (RSP) and New Standard Plans (NSP) indicated below are included in the project plans as Standard Plan sheets.

ACRONYMS, ABBREVIATIONS AND SYMBOLS

A10A	**Acronyms and Abbreviations (Sheet 1 of 2)**
A10B	**Acronyms and Abbreviations (Sheet 2 of 2)**
A10C	**Symbols (Sheet 1 of 2)**
A10D	**Symbols (Sheet 2 of 2)**

PAVEMENT MARKERS, TRAFFIC LINES, AND PAVEMENT MARKINGS

A20A	**Pavement Markers and Traffic Lines, Typical Details**
A20B	**Pavement Markers and Traffic Lines, Typical Details**
A20C	**Pavement Markers and Traffic Lines, Typical Details**
A20D	**Pavement Markers and Traffic Lines, Typical Details**
A24A	**Pavement Markings – Arrows**
A24B	**Pavement Markings – Arrows**
RSP A24C	**Pavement Markings – Symbols and Numerals**
A24D	**Pavement Markings – Words**
A24E	**Pavement Markings – Words and Crosswalks**

EXCAVATION AND BACKFILL

A62A	**Excavation and Backfill – Miscellaneous Details**
A62B	**Limits of Payment for Excavation and Backfill – Bridge Surcharge and Wall**
A62C	**Limits of Payment for Excavation and Backfill – Bridge**
A62D	**Excavation and Backfill – Concrete Pipe Culverts**
RSP A62DA	**Excavation and Backfill – Concrete Pipe Culverts**
A62F	**Excavation and Backfill – Metal and Plastic Culverts**

OBJECT MARKERS, DELINEATORS, CHANNELIZERS AND BARRICADES

A73A	Object Markers
A73B	Markers
A73C	Delineators, Channelizers and Barricades

CONCRETE BARRIER TYPE 60 SERIES

RSP A76A	Concrete Barrier Type 60
A76B	Concrete Barrier Type 60
A76C	Concrete Barrier Type 60E

METAL BEAM GUARD RAILING – STANDARD RAILING SECTIONS

A77A1	Metal Beam Guard Railing – Standard Railing Section (Wood Post with Wood Block)
A77A2	Metal Beam Guard Railing – Standard Railing Section (Steel Post with Notched Wood or Notched Recycled Plastic Block)
A77B1	Metal Beam Guard Railing – Standard Hardware
A77C1	Metal Beam Guard Railing – Wood Post and Wood Block Details
A77C2	Metal Beam Guard Railing Steel Post, Notched Wood Block and Notched Recycled Plastic Block Details
A77C3	Metal Beam Guard Railing – Typical Line Post Embedment and Hinge Point Offset Details
RSP A77C4	Metal Beam Guard Railing – Typical Railing Delineation and Dike Positioning Details
NSP A77C5	Metal Beam Guard Railing – Typical Vegetation Control Standard Railing Section
NSP A77C6	Metal Beam Guard Railing – Typical Vegetation Control for Terminal System End Treatments
NSP A77C7	Metal Beam Guard Railing – Typical Vegetation Control at Structure Approach and Departure
NSP A77C8	Metal Beam Guard Railing – Typical Vegetation Control at Fixed Object
NSP A77C9	Metal Beam Guard Railing – Typical Vegetation Control at Fixed Object
NSP A77C10	Metal Beam Guard Railing – Typical Vegetation Control at Fixed Object

METAL BEAM GUARD RAILING – TYPICAL LAYOUTS FOR EMBANKMENTS

RSP A77E1	Metal Beam Guard Railing – Typical Layouts for Embankments
RSP A77E2	Metal Beam Guard Railing – Typical Layouts for Embankments
RSP A77E3	Metal Beam Guard Railing – Typical Layouts for Embankments
RSP A77E4	Metal Beam Guard Railing – Typical Layouts for Embankments
RSP A77E5	Metal Beam Guard Railing – Typical Layouts for Embankments
RSP A77E6	Metal Beam Guard Railing – Typical Layouts for Embankments

	METAL BEAM GUARD RAILING – TYPICAL LAYOUTS FOR STRUCTURES
RSP A77F1	Metal Beam Guard Railing – Typical Layouts for Structure Approach
RSP A77F4	Metal Beam Guard Railing – Typical Layouts for Structure Departure
	METAL BEAM GUARD RAILING – TYPICAL LAYOUTS FOR FIXED OBJECTS
RSP A77G3	Metal Beam Guard Railing – Typical Layouts for Roadside Fixed Objects
	METAL BEAM GUARD RAILING – END ANCHORAGE AND RAIL TENSIONING ASSEMBLY
A77H1	Metal Railing – End Anchor Assembly (Type SFT)
A77H3	Metal Railing – Anchor Cable and Anchor Plate Details
	METAL BEAM GUARD RAILING – CONNECTIONS DETAILS AND TRANSITION RAILING TO BRIDGE RAILINGS, ABUTMENTS AND WALLS
RSP A77J1	Metal Beam Guard Railing – Connections to Bridge Railings without Sidewalks Details No. 1
RSP A77J2	Metal Beam Guard Railing – Connections to Bridge Railings without Sidewalks Details No. 2
A77J3	Metal Beam Guard Railing – Connections to Abutments and Walls
RSP A77J4	Metal Beam Guard Railing – Transition Railing (Type WB)
A77K1	Metal Beam Guard Railing – Connections to Bridge Railings with Sidewalks Details No. 1
A77K2	Metal Beam Guard Railing – Connections to Bridge Railings with Sidewalks Details No. 2
	METAL BEAM GUARD RAILING – TERMINAL SYSTEM END TREATMENT
A77L1	Metal Beam Railing – Terminal System (Type SRT)
A77L2	Metal Beam Railing – Terminal System (Type SKT)
A77L3	Metal Beam Railing – Terminal System (Type ET)
A77L5	Metal Beam Railing – Terminal System (Type FLEAT)
	THRIE BEAM BARRIER – STANDARD BARRIER SECTIONS
A78A	Thrie Beam Barrier – Standard Barrier Railing Section (Wood Post with Wood Block)
RSP A78B	Thrie Beam Barrier – Standard Barrier Railing Section (Steel Post with Notched Wood Block or Notched Recycled Plastic Block)
RSP A78C1	Thrie Beam Barrier – Standard Hardware Details
A78C2	Thrie Beam Barrier – Post and Block Details
NSP A78C4	Double Thrie Beam Barrier – Typical Vegetation Control Standard Barrier Railing Section
NSP A78C5	Thrie Beam Barrier – Typical Vegetation Control at Fixed Objects in Median

NSP A78C6	Thrie Beam Barrier – Typical Vegetation Control at Structure Approach

THRIE BEAM BARRIER – CONNECTIONS TO BRIDGE RAILINGS, ABUTMENTS, WALLS AND BARRIER

RSP A78I	Double Thrie Beam Barrier – Connection to Concrete Barrier

THRIE BEAM BARRIER – TRANSITION RAILING

A78K	Double Thrie Beam Barrier – Transition Railing (Type DTB)

CRASH CUSHIONS

RSP A81A	Crash Cushion, Sand Filled (Unidirectional)
RSP A81B	Crash Cushion, Sand Filled (Unidirectional)
RSP A81C	Crash Cushion, Sand Filled (Bidirectional)

FENCES

RSP A85	Chain Link Fence
NSP A85A	Chain Link Fence Details
NSP A85B	Chain Link Fence Details

CURBS, DRIVEWAYS, DIKES, CURB RAMPS AND ACCESSIBLE PARKING

RSP A87A	Curbs and Driveways
A87B	Asphalt Concrete Dikes
RSP A88A	Curb Ramp Details
A88B	Curb Ramp and Island Passageway Details

PAVEMENTS

RSP P1	Jointed Plain Concrete Pavement
RSP P10	Concrete Pavement – Dowel Bar Details
RSP P12	Concrete Pavement – Dowel Bar Basket Details
RSP P17	Concrete Pavement – Tie Bar Basket Details
RSP P18	Concrete Pavement – Lane Schematics and Isolation Joint Detail
RSP P20	Concrete Pavement – Joint Details
RSP P30	Jointed Plain Concrete Pavement – End Panel Pavement Transitions
RSP P35	Concrete Pavement – Ramp Gore Area Paving Details
P70	Asphalt Concrete Paving (Longitudinal Tapered Notched Wedge Joint)

DRAINAGE INLETS, PIPE INLETS AND GRATES

NSP D71	Drainage Inlet Markers
D72	Drainage Inlets
D73	Drainage Inlets
NSP D73A	Drainage Inlets (Precast)
D74A	Drainage Inlets
RSP D74B	Drainage Inlets
D74C	Drainage Inlets Details

RSP D77A	Grate Details
D77B	Bicycle Proof Grate Details
	GUTTER AND INLET DEPRESSIONS
D78A	Gutter Depressions
D78C	Inlet Depressions – Asphalt Concrete Shoulders
	CONCRETE PIPE – DIRECT DESIGN METHOD
D79	Precast Reinforced Concrete Pipe – Direct Design Method
	PIPE AND ARCH CULVERT – ENDWALLS AND WARPED WINGWALLS
D86B	Pipe Culvert Headwalls, Endwalls and Warped Wingwalls
	PIPE DOWNDRAINS, ANCHORAGE SYSTEMS AND OVERSIDE DRAINS
D87D	Overside Drains
	CONSTRUCTION LOADS ON CULVERTS AND STRUT DETAILS
D88	Construction Loads on Culverts
	PIPE HEADWALLS, ENDWALLS AND WINGWALLS
D89	Pipe Culver Headwalls – Straight and "L"
D90	Pipe Culvert Headwalls, Endwalls and Wingwalls – Types A, B and C
	FLARED END SECTIONS
D94B	Concrete Flared End Sections
	PIPE COUPLING AND JOINT DETAILS
D97H	Reinforced Concrete Pipe or Non-Reinforced Concrete Pipe – Standard and Positive Joints
	PLANTING AND IRRIGATION
H9	Planting and Irrigation Details
	TEMPORARY CRASH CUSHIONS, RAILING AND TRAFFIC SCREEN
RSP T1A	Temporary Crash Cushion, Sand Filled (Unidirectional)
RSP T1B	Temporary Crash Cushion, Sand Filled (Bidirectional)
RSP T2	Temporary Crash Cushion, Sand Filled (Shoulder Installations)
T3	Temporary Railing (Type K)
	PROJECT FUNDING SIGNS
RSP T7	Construction Project Funding Identification Signs
	TEMPORARY TRAFFIC CONTROL SYSTEMS
T10	Traffic Control System for Lane Closure On Freeways and Expressways
T10A	Traffic Control System for Lane and Complete Closures on Freeways and Expressways
T11	Traffic Control System for Lane Closure on Multilane Conventional Highways
T12	Traffic Control System for Lane Closure on Multilane Conventional Highways
T14	Traffic Control System for Ramp Closure
T15	Traffic Control System for Moving Lane Closure on Multilane Highways

T16	Traffic Control System for Moving Lane Closure on Multilane Highways
	TEMPORARY WATER POLLUTION CONTROL
RSP T56	Temporary Water Pollution Control Details (Temporary Fiber Roll)
T57	Temporary Water Pollution Control Details (Temporary Check Dam)
T58	Temporary Water Pollution Control Details (Temporary Construction Entrance)
T59	Temporary Water Pollution Control Details (Temporary Concrete Washout Facility)
NSP T61	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
NSP T62	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
NSP T63	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
NSP T64	Temporary Water Pollution Control Details (Temporary Drainage Inlet Protection)
NSP T65	Temporary Water Pollution Control Details [Temporary Fence (Type ESA)]
	RETAINING WALLS
B3-1	Retaining Wall Type 1 – H = 4' through 30'
B3-2	Retaining Wall Type 1 – H = 32' through 36'
B3-8	Retaining Wall Details No. 1
B3-9	Retaining Wall Details No. 2
	CHAIN LINK RAILING, CABLE RAILING AND TUBULAR HAND RAILING
B11-7	Chain Link Railing
B11-51	Tubular Hand Railing
B11-52	Chain Link Railing Type 7
	BRIDGE CONCRETE BARRIERS
B11-54	Concrete Barrier Type 26
B11-55	Concrete Barrier Type 732
B11-56	Concrete Barrier Type 736
B11-57	Concrete Barrier Type 742
	ROADSIDE SIGNS
RS1	Roadside Signs, Typical Installation Details No. 1
RS2	Roadside Signs – Wood Post, Typical Installation Details No. 2
	Roadside Signs – Laminated Wood Box Post Typical Installation Details No. 3
RS4	Roadside Signs, Typical Installation Details No. 4
	OVERHEAD SIGNS (TRUSS)
S1	Overhead Signs – Truss, Instructions and Examples
S2	Overhead Signs – Truss, Single Post Type – Post Type II thru IX

S3	Overhead Signs – Truss, Single Post Type – Base Plate and Anchorage Details
S4	Overhead Signs – Truss, Single Post Type – Structural Frame Members Details No. 1
S5	Overhead Signs – Truss, Single Post Type – Structural Frame Members Details No. 2
S6	Overhead Signs – Truss, Gusset Plate Details
S8	Overhead Signs – Truss, Single Post Type – Round Pedestal Pile Foundation
S16	Overhead Signs – Walkway Details No. 1
S17	Overhead Signs – Walkway Details No. 2
S17A	Overhead Signs – Walkway Details No. 3
S18	Overhead Signs – Walkway Safety Railing Details
	OVERHEAD SIGNS (LIGHTWEIGHT)
S41	Overhead Signs – Lightweight Balanced – Single Steel Post Connection and Mounting Details
S42	Overhead Signs – Lightweight Balanced – Single Steel Post Details
S46	Overhead Signs – Lightweight, Sign Panel Mounting Details, Laminated Panel – Type A
S47	Overhead Signs – Lightweight, Light Fixture Mounting Details
S48	Overhead Signs – Lightweight Post Details
S49	Overhead Signs – Lightweight Foundation Details
	OVERHEAD AND ROADSIDE SIGNS PANELS
S81	Overhead Laminated Sign – Single or Multiple Panel, Type A (1" Thick)
S82	Roadside Laminated Sign – Single or Multiple Panel, Type B (1" Thick)
S86	Laminated Panel Details – Extrusions for Type A, B and H Panels
S87	Type A-1 Mounting Hardware – Overhead Laminated Type A Panel, Truss and Lightweight Sign Structures
S88	Type A-2 Mounting Hardware – Overhead Laminated Type A Panel, Bridge Mounted and Tubular Sign Structures
S89	Roadside Sign – Formed Single Sheet Aluminum Panel
S93	Framing Details for Framed Single Sheet Aluminum Signs, Rectangular Shape
S94	Roadside Framed Single Sheet Aluminum Signs, Rectangular Shape
S95	Roadside Single Sheet Aluminum Signs, Diamond Shape
	ELECTRICAL SYSTEMS – SYMBOLS AND ABBREVIATIONS
RSP ES-1A	Electrical Systems (Symbols and Abbreviations)
RSP ES-1B	Electrical Systems (Symbols and Abbreviations)
RSP ES-1C	Electrical Systems (Symbols and Abbreviations)
	ELECTRICAL SYSTEMS – SERVICE EQUIPMENT AND WIRING DIAGRAMS
ES-2A	Electrical Systems (Service Equipment)
	Electrical Systems (Service Equipment Notes, Type III Series)

RSP ES-2F	Electrical Systems (Service Equipment and Typical Wiring Diagram Type III – C Series)
	ELECTRICAL SYSTEMS – CONTROLLER CABINETS
ES-3A	Electrical Systems (Controller Cabinet Details)
ES-3C	Electrical Systems (Controller Cabinet Details)
RSP ES-3E	Electrical Systems (Telephone Demarcation Cabinet, Type B)
	ELECTRICAL SYSTEMS – IRRIGATION CONTROLLER ENCLOSURE CABINET
ES-3H	Electrical Systems (Electric Service Irrigation)
	ELECTRICAL SYSTEMS – SIGNAL HEADS, SIGNAL FACES AND MOUNTINGS
ES-4A	Electrical Systems (Signal Heads and Mountings)
ES-4B	Electrical Systems (Signal Heads and Mountings)
RSP ES-4C	Electrical Systems (Signal Heads and Mountings)
RSP ES-4D	Electrical Systems (Signal Heads and Mountings)
ES-4E	Electrical Systems (Signal Faces and Mountings)
	ELECTRICAL SYSTEMS – DETECTORS
RSP ES-5A	Electrical Systems (Detectors)
ES-5B	Electrical Systems (Detectors)
ES-5C	Electrical Systems (Detectors)
	ELECTRICAL SYSTEMS – LIGHTING STANDARDS
RSP ES-6A	Electrical Systems (Lighting Standard, Types 15 and 21)
RSP ES-6E	Electrical Systems (Lighting Standard, Types 30 and 31)
ES-6F	Electrical Systems (Lighting Standard, Types 30 and 31, Slip Base Plate Details)
	ELECTRICAL SYSTEMS – SIGNAL AND LIGHTING STANDARD, PUSH BUTTON POSTS AND TYPE 15TS STANDARD
ES-7A	Electrical Systems (Signal and Lighting Standards, Push Button Posts and Type 15TS Standard)
	ELECTRICAL SYSTEMS – SIGNAL AND LIGHTING STANDARDS
RSP ES-7B	Electrical Systems (Signal and Lighting Standard – Type 1 Standards and Equipment Numbering)
RSP ES-7E	Electrical Systems (Signal and Lighting Standard – Case 3 Arm Loading, Wind Velocity = 100 mph, Arm Lengths 15' to 45')
RSP ES-7F	Electrical Systems (Signal and Lighting Standard – Case 4 Arm Loading, Wind Velocity = 100 mph, Arm Lengths 25' to 45')
RSP ES-7G	Electrical Systems (Signal And Lighting Standard – Case 5 Arm Loading, Wind Velocity = 100 mph, Arm Lengths 50' to 55')
	ELECTRICAL SYSTEMS – FLASHING BEACONS
ES-7J	Electrical Systems (Signal and Lighting Standard – Advance Flashing Beacons)
	ELECTRICAL SYSTEMS – SIGNAL AND LIGHTING STANDARD DETAILS
ES-7M	Electrical Systems (Signal and Lighting Standards – Details No. 1)

ES-7N	Electrical Systems (Signal and Lighting Standards – Details No. 2)
	ELECTRICAL SYSTEMS – PEDESTRIAN BARRICADES
ES-7P	Electrical Systems (Pedestrian Barricades)
	ELECTRICAL SYSTEMS – PULL BOX DETAILS
ES-8	Electrical Systems (Pull Box Details)
	ELECTRICAL SYSTEMS – ELECTRICAL DETAILS, STRUCTURE INSTALLATIONS
RSP ES-9A	Electrical Systems (Electrical Details, Structure Installations)
ES-9B	Electrical Systems (Electrical Details, Structure Installations)
RSP ES-9C	Electrical Systems (Electrical Details, Structure Installations)
ES-9D	Electrical Systems (Electrical Details, Structure Installations)
	ELECTRICAL SYSTEMS – ISOFOOTCANDLE DIAGRAMS AND FOUNDATION DETAILS
ES-10	Electrical Systems (Isofootcandle Diagrams)
ES-11	Electrical Systems (Foundation Installations)
	ELECTRICAL SYSTEMS – SPLICING, WIRING DETAILS AND FUSE RATINGS
ES-13A	Electrical Systems (Splicing Details)
ES-13B	Electrical Systems (Wiring Details and Fuse Ratings)
	ELECTRICAL SYSTEMS – SIGN ILLUMINATION EQUIPMENT AND CONTROLS
ES-15A	Electrical Systems (Sign Illumination Equipment)
ES-15C	Electrical Systems (Sign Illumination Equipment)

OFFICE OF
CLERK OF THE BOARD OF SUPERVISORS
1st FLOOR, COUNTY ADMINISTRATIVE CENTER
P.O. BOX 1147, 4080 LEMON STREET
RIVERSIDE, CA 92502-1147
PHONE: (951) 955-1060
FAX: (951) 955-1071

KECIA HARPER-IHEM
Clerk of the Board of Supervisors

KIMBERLY A. RECTOR
Assistant Clerk of the Board

December 27, 2011

THE PRESS ENTERPRISE
ATTN: LEGALS
PO BOX 792
RIVERSIDE, CA 92501

FAX (951) 368-9018
E-MAIL: legals@pe.com

RE: NOTICE INVITING BIDS: I-215 AT VAN BUREN BLVD. INTERCHANGE PROJ. B7-0798

To Whom It May Concern:

Attached is a copy for publication in your newspaper for **TEN (10) TIMES:**

Sunday	- January 1, 2012	Friday	- January 6, 2012
Monday	- January 2, 2012	Saturday	- January 7, 2012
Tuesday	- January 3, 2012	Sunday	- January 8, 2012
Wednesday	- January 4, 2012	Monday	- January 9, 2012
Thursday	- January 5, 2012	Tuesday	- January 10, 2012

We require your affidavit of publication immediately upon completion of the last publication.

Your invoice must be submitted to this office in duplicate, WITH TWO CLIPPINGS OF THE PUBLICATION.

NOTE: PLEASE COMPOSE THIS PUBLICATION INTO A SINGLE COLUMN FORMAT.

Thank you in advance for your assistance and expertise.

Sincerely,

Mcgil
Cecilia Gil, Board Assistant to
KECIA HARPER-IHEM, CLERK OF THE BOARD

3.26 OF 12-20-11

Gil, Cecilia

From: PE Legals <legals@pe.com>
Sent: Tuesday, December 27, 2011 8:23 AM
To: Gil, Cecilia
Subject: RE: FOR PUBLICATION: I-215 at Van Buren Blvd. B7-0798

Received for publication from Jan. 1 to 10

PLEASE NOTE: The Press-Enterprise offices will be closed on Monday, December 26th in observance of Christmas Holiday and on Monday, January 2nd in observance of the New Year Holiday. Below are our Holiday Deadlines.

Christmas & New Year Holiday Deadlines	
Publication Date	Deadline to Press-Enterprise
Dec. 24 thru Dec. 27	Thurs., Dec. 22nd at 10:30 AM
Dec. 28	Fri., Dec. 23rd at 10:30 AM
Dec. 29	Tues., Dec. 27th at 10:30 AM
Dec. 30	Wed., Dec. 28th at 10:30 AM
Dec. 31 thru Jan. 3	Thurs., Dec. 29th at 10:30 AM
Jan. 4	Fri., Dec. 30th at 10:30 AM
Jan. 5	Tues., Jan. 3rd at 10:30 AM

From: Gil, Cecilia [mailto:CCGIL@rcbos.org]
Sent: Tuesday, December 27, 2011 8:22 AM
To: PE Legals
Subject: FOR PUBLICATION: I-215 at Van Buren Blvd. B7-0798

Hello again! Attached is a Notice Inviting Bids, for publication from January 1, 2012 to January 10, 2012. Please confirm. THANK YOU!

Cecilia Gil

Board Assistant to the
Clerk of the Board of Supervisors
951-955-8464

THE COUNTY ADMINISTRATIVE CENTER IS CLOSED EVERY FRIDAY UNTIL FURTHER NOTICE.
PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING.

NOTICE INVITING BIDS

Sealed proposals will be received at the Riverside County Transportation Department, 14th Street Transportation Annex, 3525 14th Street, Riverside, California 92501, telephone (951) 955-6780 until 2:00 pm on **Wednesday, February 1, 2012** at which time they will be publicly opened at said address, for construction in accordance with the specifications therefore, to which special reference is made, as follows: County of Riverside,

INTERSTATE 215 (I-215) AT VAN BUREN BOULEVARD INTERCHANGE IMPROVEMENT

PROJECT No. B7-0798
FEDERAL AID NO. STPLN-5956(201)

The UDBE Contract goal is 1.2%.

A pre-bid meeting is scheduled for 2:00 pm on **Wednesday, January 18, 2012,** at the County of Riverside Transportation Department, 3525 14th Street, Riverside, California 92501. This meeting is to inform bidders of project requirements and subcontractors of subcontracting and material supply opportunities. Bidder's attendance at this meeting is not mandatory.

THIS PROJECT IS SUBJECT TO THE "BUY AMERICA" PROVISIONS OF THE SURFACE TRANSPORTATION ASSISTANCE ACT OF 1982 AS AMENDED BY THE INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991.

Bids are required for the entire work described herein. The Contractor shall possess a current and active State of California Class "A" Contractor's license at the time this contract is awarded. The successful bidder shall furnish a payment bond and a performance bond.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Inquiries or questions based on alleged patent ambiguity of the plans, specifications or estimate must be communicated as a bidder inquiry, in writing, prior to bid opening. Any such inquiries or questions, submitted after bid opening, will not be treated as a bid protest. Technical questions should be directed to the office of the County of Riverside Transportation Department, 3525 14th Street, Riverside, CA 92501, telephone (951) 955-6780, electronic mail: jrjimenez@rctlma.org.

Plans and specifications may be obtained for a NONREFUNDABLE FEE OF $230 per full size plan set (or $115 per half size plan set [11"x17"], plus mailing, and are available at 3525 14th Street, Riverside, CA 92501.

Engineering Estimate	$37,000,000 - $44,000,000
Bid Bond	10%
Performance Bond	100%
Payment Bond	100%
Working Days	400 (Construction Period)
Working Days	750 (Plant Establishment Period after construction period)

http://www.rctlma.org/trans/bidadvertisements.html

Dated: December 27, 2011

Kecia Harper-Ihem, Clerk of the Board
By: Cecilia Gil, Board Assistant

FOR BILLING INQUIRIES:
CALL (951) 368-9710
EMAIL billinginquiry@pe.com

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10 DATE	11 REFERENCE NUMBER	12 14 DESCRIPTION - OTHER COMMENTS/CHARGES	13 PRODUCT/ZONE	15 SIZE	16 BILLED UNITS	17 TIMES RUN	18 RATE	19 GROSS AMOUNT	20 NET AMOUNT
01/01/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.29	191.10	191.10
01/02/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
01/03/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
01/04/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
01/05/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
01/06/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
01/07/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
01/08/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
01/09/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
01/10/2012	I00703180-01012012	PO# NIB Proj B7-0798, NOTICE INVITIN	Press-Enterprise	2 x 74 LI	148	1	1.19	176.40	176.40
		Order Placed by: Cecilia Gil							

Transp:
3.26 of 12/20/11

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1 BILLING PERIOD	6 BILLED ACCOUNT NUMBER	7 ADVERTISER/CLIENT NUMBER
01/10/2012 - 01/10/2012	100141323	100141323
23 BALANCE	24 INVOICE NUMBER	3 TERMS OF PAYMENT
$1,778.70	I00703180-01012012	DUE UPON RECEIPT

8 BILLING ACCOUNT NAME AND ADDRESS

BOARD OF SUPERVISORS
P.O. BOX 1147
COUNTY OF RIVERSIDE
RIVERSIDE, CA 92502

9 REMITTANCE ADDRESS

Enterprise Media
POST OFFICE BOX 12009
RIVERSIDE, CA 92502-2209

THE PRESS-ENTERPRISE

3450 Fourteenth Street
Riverside, CA 92501-3878
951-684-1200
951-368-9018 FAX

PROOF OF PUBLICATION
(2010, 2015.5 C.C.P)

Publication(s): Press-Enterprise

PROOF OF PUBLICATION OF

Ad Desc.: / NIB Proj B7-0798

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper in general circulation, printed and published daily in the County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673, and under date of August 25, 1995, Case Number 267864; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

01/01, 01/02, 01/03, 01/04, 01/05, 01/06, 01/07, 01/08, 01/09, 01/10/2012

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: January 10, 2012
At: Riverside, California

BOARD OF SUPERVISORS
P.O. BOX 1147
COUNTY OF RIVERSIDE
RIVERSIDE, CA 92502

Ad Number: 0000703180-01

P.O. Number: NIB Proj B7-0798

Ad Copy:

NOTICE INVITING BIDS

Sealed proposals will be received at the Riverside County Transportation Department, 14th Street Transportation Annex, 3525 14th Street, Riverside, California 92501, telephone (951) 955-6780 until 2:00 pm on **Wednesday, February 1, 2012** at which time they will be publicly opened at said address, for construction in accordance with the specifications therefore, to which special reference is made, as follows:

County of Riverside,

INTERSTATE 215 (I-215) AT VAN BUREN BOULEVARD INTERCHANGE IMPROVEMENT PROJECT No. B7-0798 FEDERAL AID NO. STPLN-5956(201)

The UDBE Contract goal is 1.2%.

A pre-bid meeting is scheduled for 2:00 pm on **Wednesday, January 18, 2012**, at the County of Riverside Transportation Department, 3525 14th Street, Riverside, California 92501. This meeting is to inform bidders of project requirements and subcontractors of subcontracting and material supply opportunities. Bidder's attendance at this meeting is not mandatory.

THIS PROJECT IS SUBJECT TO THE "BUY AMERICA" PROVISIONS OF THE SURFACE TRANSPORTATION ASSISTANCE ACT OF 1982 AS AMENDED BY THE INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991.

Bids are required for the entire work described herein. The Contractor shall possess a current and active State of California Class "A" Contractor's license at the time this contract is awarded. The successful bidder shall furnish a payment bond and a performance bond.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Inquiries or questions based on alleged patent ambiguity of the plans, specifications or estimate must be communicated as a bidder inquiry, in writing, prior to bid opening. Any such inquiries or questions, submitted after bid opening, will not be treated as a bid protest.

Technical questions should be directed to the office of the County of Riverside Transportation Department, 3525 14th Street, Riverside, CA 92501, telephone (951) 955-6780, electronic mail: jrjimenez@rctlma.org.

Plans and specifications may be obtained for a NONREFUNDABLE FEE OF $230 per full size plan set (or $115 per half size plan set [11"x17"], plus mailing, and are available at 3525 14th Street, Riverside, CA 92501.

Engineering Estimate	$37,000,000 - $44,000,000
Bid Bond	10%
Performance Bond	100%
Payment Bond	100%
Working Days	400 (Construction Period)
Working Days	750 (Plant Establishment Period after construction period)

http://www.rctlma.org/trans/bidadvertisements.html

Dated: December 27, 2011
Kecia Harper-Ihem, Clerk of the Board
By: Cecilia Gil, Board Assistant 1/1-1/10