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Note: Addenda information is NOT included with the electronic documents available via electronic file transfer. Only bidder or non-bidder package holders listed with the Caltrans Plans and Bid Documents section as described above will receive addenda information.



**STATE OF CALIFORNIA**

**DEPARTMENT OF TRANSPORTATION**

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**NOTICE TO CONTRACTORS  
AND**

**SPECIAL PROVISIONS**

**FOR CONSTRUCTION ON STATE HIGHWAY IN**

**SAN BERNARDINO COUNTY IN AND NEAR FONTANA FROM 0.2 MILE EAST OF CITRUS AVENUE  
OVERCROSSING TO 0.7 MILE EAST OF SIERRA AVENUE OVERCROSSING**

**DISTRICT 08, ROUTE 10**

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**For Use in Connection with Standard Specifications Dated JULY 1992 and Labor Surcharge and Equipment Rental  
Rates.**

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**CONTRACT NO. 08-340804**

**08-SBd-10-15.4/16.9**

**Federal Aid Project**

**\*HP21STPL-5307(005)N**

**Bids Open: September 28, 2000**

**Dated: August 7, 2000**

**QCQA  
OSD**

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# IMPORTANT SPECIAL NOTICES

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The specifications for this project include Quality Control / Quality Assurance provisions for the contract item "Asphalt Concrete" in the Special Provisions. Asphalt concrete shall conform to the provisions in Section 11-1, "Quality Control / Quality Assurance," and the section entitled "Asphalt Concrete" in Section 10-1, "General," of the Special Provisions. Section 39, "Asphalt Concrete," of the Standard Specifications shall not apply to Type A and Type B asphalt concrete.

The bidder's attention is directed to Section 5, containing specifications for "Disputes Review Board," of the Special Provisions, regarding establishing a Disputes Review Board (DRB) for the project.

The Special Provisions for Federal-aid projects (with and without DBE goals) have been revised to incorporate changes made by new regulations governing the DBE Program (49 CFR Part 26).

Sections 2 and 5 incorporate the changes. Bidders should read these sections to become familiar with them. Attention is directed to the following significant changes:

Section 2, "Disadvantaged Business Enterprise (DBE)" revises the counting of participation by DBE primes, and the counting of trucking performed by DBE firms. The section also revises the information that must be submitted to the Department in order to receive credit for trucking.

Section 2, "Submission of DBE Information" revises the information required to be submitted to the Department to receive credit toward the DBE goal. It also revises the criteria to demonstrate good faith efforts.

Section 5, "Subcontractor and DBE Records" revises the information required to be reported at the end of the project, and information related to trucking that must be submitted throughout the project.

Section 5, "DBE Certification Status" adds new reporting requirements related to DBE certification.

Section 5, "Subcontracting" describes the efforts that must be made in the event a DBE subcontractor is terminated or fails to complete its work for any reason.

Section 5, "Prompt Progress Payment to Subcontractors" requires prompt payment to all subcontractors.

Section 5, "Prompt Payment of Withheld Funds to Subcontractors" requires the prompt payment of retention to all subcontractors.

**SURETY 2000**

Caltrans is conducting a pilot program in cooperation with Surety 2000, to test electronic bond verification systems. The purpose of the pilot program is to test the use of Surety 2000 for verifying a bidder's bond electronically.

Surety 2000 is an Internet-based surety verification and security system, developed in conjunction with the surety industry. Surety agents may contact Surety 2000 at 1-800-660-3263.

Bidders are encouraged to participate in the pilot program. To participate, the bidder is asked to provide the "Authorization Code" provided by Surety 2000, on a separate sheet, together with the standard bidder's bond required by the specifications. The bidder's surety agent may obtain the "Authorization Code" from Surety 2000.

The Department will use the "Authorization Code" to access the Surety 2000 database, and independently verify the actual bidder's bond and document the functioning of the Surety 2000 system.

"Authorization Codes" will be used only to verify bidder's bonds, and only as part of the pilot program. The use of "Authorization Codes" will not be accepted in lieu of the bidder's bond or other bidder's security required in the specifications during the pilot study.

The function of the Surety 2000 system is to provide an easier way for Contractors to protect their bid security, and to discourage fraud. This system is available to all California admitted sureties and surety agents.

The results of the pilot study will be tabulated, and at some time in the future, the Department may consider accepting electronic bidder's bond verification in lieu of the bidder's bond specified.

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DEPARTMENT OF TRANSPORTATION

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**NOTICE TO CONTRACTORS**

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**CONTRACT NO. 08-340804**

**08-SBd-10-15.4/16.9**

Sealed proposals for the work shown on the plans entitled:

**STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROJECT PLANS FOR CONSTRUCTION ON STATE HIGHWAY IN SAN BERNARDINO COUNTY IN AND NEAR FONTANA FROM 0.2 MILE EAST OF CITRUS AVENUE OVERCROSSING TO 0.7 MILE EAST OF SIERRA AVENUE OVERCROSSING**

will be received at the Department of Transportation, 3347 Michelson Drive, Suite 100, Irvine, CA 92612-1692, until 2 o'clock p.m. on September 28, 2000, at which time they will be publicly opened and read in Room C - 1116 at the same address.

Proposal forms for this work are included in a separate book entitled:

**STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROPOSAL AND CONTRACT FOR CONSTRUCTION ON STATE HIGHWAY IN SAN BERNARDINO COUNTY IN AND NEAR FONTANA FROM 0.2 MILE EAST OF CITRUS AVENUE OVERCROSSING TO 0.7 MILE EAST OF SIERRA AVENUE OVERCROSSING**

General work description: Existing interchange to be reconstructed, railroad overhead to be widened, auxiliary lanes to be constructed and landscaping to be installed.

This project has a goal of 14 percent disadvantaged business enterprise (DBE) participation.

No prebid meeting is scheduled for this project.

**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.

At the time this contract is awarded, the Contractor shall possess either a Class A license or a Class C-8, C-12 license.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Project plans, special provisions, and proposal forms for bidding this project can only be obtained at the Department of Transportation, Plans and Bid Documents, Room 0200, MS #26, Transportation Building, 1120 N Street, Sacramento, California 95814, FAX No. (916) 654-7028, Telephone No. (916) 654-4490. Use FAX orders to expedite orders for project plans, special provisions and proposal forms. FAX orders must include credit card charge number, card expiration date and authorizing signature. Project plans, special provisions, and proposal forms may be seen at the above Department of Transportation office and at the offices of the District Directors of Transportation at Irvine, Oakland, and the district in which the work is situated. Standard Specifications are available through the State of California, Department of Transportation, Publications Unit, 1900 Royal Oaks Drive, Sacramento, CA 95815, Telephone No. (916) 445-3520.

Cross sections for this project are not available.

The successful bidder shall furnish a payment bond and a performance bond.

The Department of Transportation hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation.

The U.S. Department of Transportation (DOT) provides a toll-free "hotline" service to report bid rigging activities. Bid rigging activities can be reported Mondays through Fridays, between 8:00 a.m. and 5:00 p.m., eastern time, Telephone No. 1-800-424-9071. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report these activities. The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated, and available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>. The Federal minimum wage rates for this project as predetermined by the United States Secretary of Labor are set forth in the books issued for bidding purposes entitled "Proposal and Contract," and in copies of this book that may be examined at the offices described above where project plans, special provisions, and proposal forms may be seen. Addenda to modify the Federal minimum wage rates, if necessary, will be issued to holders of "Proposal and Contract" books. Future effective general prevailing wage rates which have been predetermined and are on file with the California Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

Attention is directed to the Federal minimum wage rate requirements in the books entitled "Proposal and Contract." If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, the Contractor and subcontractors shall pay not less than the higher wage rate. The Department will not accept lower State wage rates not specifically included in the Federal minimum wage determinations. This includes "helper" (or other classifications based on hours of experience) or any other classification not appearing in the Federal wage determinations. Where Federal wage determinations do not contain the State wage rate determination otherwise available for use by the Contractor and subcontractors, the Contractor and subcontractors shall pay not less than the Federal minimum wage rate which most closely approximates the duties of the employees in question.

DEPARTMENT OF TRANSPORTATION

Deputy Director Transportation Engineering

Dated August 7, 2000

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**COPY OF ENGINEER'S ESTIMATE**  
**(NOT TO BE USED FOR BIDDING PURPOSES)**

**08-340804**

Item	Item Code	Item	Unit of Measure	Estimated Quantity
1	019363	LEAD COMPLIANCE PLAN	LS	LUMP SUM
2	070010	PROGRESS SCHEDULE (CRITICAL PATH)	LS	LUMP SUM
3	070018	TIME-RELATED OVERHEAD	WDAY	400
4	071321	TEMPORARY FENCE (TYPE CL-6)	LF	250
5 (S)	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM
6 (S)	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM
7	120116	TYPE II BARRICADE	EA	5
8	120120	TYPE III BARRICADE	EA	150
9	120149	TEMPORARY PAVEMENT MARKING (PAINT)	SQFT	5040
10	120159	TEMPORARY TRAFFIC STRIPE (PAINT)	LF	198 000
11	120165	CHANNELIZER (SURFACE MOUNTED)	EA	680
12	120182	PORTABLE DELINEATOR	EA	150
13	120200	FLASHING BEACON (PORTABLE)	EA	6
14	120300	TEMPORARY PAVEMENT MARKER	EA	2910
15 (S)	128601	TEMPORARY SIGNAL SYSTEM	LS	LUMP SUM
16	128650	PORTABLE CHANGEABLE MESSAGE SIGN	EA	4
17	129000	TEMPORARY RAILING (TYPE K)	LF	36 800
18	129100	TEMPORARY CRASH CUSHION MODULE	EA	550
19	129150	TEMPORARY TRAFFIC SCREEN	LF	5500
20	150608	REMOVE CHAIN LINK FENCE	LF	1560

Item	Item Code	Item	Unit of Measure	Estimated Quantity
21	150711	REMOVE PAINTED TRAFFIC STRIPE	LF	112 000
22	150712	REMOVE PAINTED PAVEMENT MARKING	SQFT	3810
23	150174	REMOVE THERMOPLASTIC TRAFFIC STRIPE	LF	15 900
24	150722	REMOVE PAVEMENT MARKER	EA	2120
25	150744	REMOVE ROADSIDE SIGN (WOOD POST)	EA	18
26	150760	REMOVE SIGN STRUCTURE	EA	4
27	150767	REMOVE BRIDGE MOUNTED SIGN	EA	2
28	150771	REMOVE ASPHALT CONCRETE DIKE	LF	970
29	150806	REMOVE PIPE	LF	240
30	150820	REMOVE INLET	EA	1
31	150829	REMOVE RETAINING WALL	LF	160
32	150860	REMOVE BASE AND SURFACING	CY	10 800
33	151540	RECONSTRUCT CHAIN LINK FENCE	LF	700
34	151568	RECONSTRUCT THRIE BEAM BARRIER	LF	450
35	151572	RECONSTRUCT METAL BEAM GUARD RAILING	LF	2150
36	152322	RESET ROADSIDE SIGN (WOOD POST)	EA	14
37	152392	RELOCATE ROADSIDE SIGN (WOOD POST)	EA	27
38	152604	MODIFY INLET	EA	1
39 (S)	153103	COLD PLANE ASPHALT CONCRETE PAVEMENT	SQYD	3250
40	153220	REMOVE CONCRETE (CHANNEL)	CY	670

Item	Item Code	Item	Unit of Measure	Estimated Quantity
41	153229	REMOVE CONCRETE BARRIER (TYPE K)	LF	78
42	153246	REMOVE CONCRETE (MISCELLANEOUS)	CY	1150
43	157551	BRIDGE REMOVAL, LOCATION A	LS	LUMP SUM
44	157562	BRIDGE REMOVAL (PORTION), LOCATION B	LS	LUMP SUM
45	160101	CLEARING AND GRUBBING	LS	LUMP SUM
46	190101	ROADWAY EXCAVATION	CY	26 000
47 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	12 610
48 (F)	192037	STRUCTURE EXCAVATION (RETAINING WALL)	CY	4810
49 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	11 340
50 (F)	193013	STRUCTURE BACKFILL (RETAINING WALL)	CY	7980
51	194001	DITCH EXCAVATION	CY	78
52	198001	IMPORTED BORROW	CY	59 000
53 (S)	200001	HIGHWAY PLANTING	LS	LUMP SUM
54 (S)	204053	WILD FLOWER SEEDING	ACRE	4.2
55 (S)	204098	MAINTAIN EXISTING PLANTS	LS	LUMP SUM
56 (S)	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM
57 (S)	206401	MAINTAIN EXISTING IRRIGATION FACILITIES	LS	LUMP SUM
58 (S)	208000	IRRIGATION SYSTEM	LS	LUMP SUM
59 (S)	208304	WATER METER	EA	1
60 (S)	019364	15" WELDED STEEL PIPE CONDUIT (.250" THICK)	LF	770

Item	Item Code	Item	Unit of Measure	Estimated Quantity
61 (S)	019365	24" WELDED STEEL PIPE CONDUIT (.250" THICK)	LF	410
62	220101	FINISHING ROADWAY	LS	LUMP SUM
63	260201	CLASS 2 AGGREGATE BASE	CY	12 100
64 (S)	019366	GRAVEL MULCH	CY	210
65	280000	LEAN CONCRETE BASE	CY	3040
66	290301	CEMENT TREATED PERMEABLE BASE	CY	2870
67	390152	ASPHALT CONCRETE	TON	25 500
68	394002	PLACE ASPHALT CONCRETE (MISCELLANEOUS AREA)	SQYD	2280
69	394040	PLACE ASPHALT CONCRETE DIKE (TYPE A)	LF	720
70	394044	PLACE ASPHALT CONCRETE DIKE (TYPE C)	LF	410
71	394048	PLACE ASPHALT CONCRETE DIKE (TYPE E)	LF	1550
72	397001	ASPHALTIC EMULSION (PAINT BINDER)	TON	32
73	401000	CONCRETE PAVEMENT	CY	5630
74	401066	CONCRETE PAVEMENT (RAMP TERMINI)	CY	690
75	490528	FURNISH STEEL PILING (HP 14 X 89)	LF	3882
76 (S)	490529	DRIVE STEEL PILE (HP 14 X 89)	EA	127
77	490538	FURNISH STEEL PILING (HP 14 X 117)	LF	1200
78 (S)	490539	DRIVE STEEL PILE (HP 14 X 117)	EA	25
79 (S)	500001	PRESTRESSING CAST-IN-PLACE CONCRETE	LS	LUMP SUM
80 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	2310

Item	Item Code	Item	Unit of Measure	Estimated Quantity
81 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	5285
82 (F)	048317	STRUCTURAL CONCRETE, BRIDGE (COLOR)	CY	1120
83 (F)	510060	STRUCTURAL CONCRETE, RETAINING WALL	CY	2977
84 (F)	510088	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N MODIFIED)	CY	78
85 (F)	048318	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N MODIFIED) (COLOR)	CY	485
86 (F)	510102	CLASS A CONCRETE (STRUCTURE)	CY	810
87 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	94
88	511106	DRILL AND BOND DOWEL	LF	67
89 (S)	512207	FURNISH PRECAST PRESTRESSED CONCRETE GIRDER (80'-90')	EA	18
90 (S)	512500	ERECT PRECAST PRESTRESSED CONCRETE GIRDER	EA	18
91	515020	REFINISH BRIDGE DECK	SQFT	1412
92 (S)	519087	JOINT SEAL (TYPE B-MR 2")	LF	542
93 (S)	519101	JOINT SEAL (TYPE A)	LF	190
94	520101	BAR REINFORCING STEEL	LB	176 000
95 (S-F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	1 351 000
96 (F)	520103	BAR REINFORCING STEEL (RETAINING WALL)	LB	294 547
97 (F)	560208	FURNISH SIGN STRUCTURE (TUBULAR)	LB	170 300
98 (S-F)	560209	INSTALL SIGN STRUCTURE (TUBULAR)	LB	170 300
99 (F)	560213	FURNISH SIGN STRUCTURE (LIGHTWEIGHT)	LB	5010
100 (S-F)	560214	INSTALL SIGN STRUCTURE (LIGHTWEIGHT)	LB	5010

Item	Item Code	Item	Unit of Measure	Estimated Quantity
101 (F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	47 000
102 (S-F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	47 000
103	561004	30" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	52
104	561005	36" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	150
105	561011	48" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	44
106	566011	ROADSIDE SIGN - ONE POST	EA	33
107	566012	ROADSIDE SIGN - TWO POST	EA	8
108	620100	18" ALTERNATIVE PIPE CULVERT	LF	230
109	620140	24" ALTERNATIVE PIPE CULVERT	LF	150
110	650014	18" REINFORCED CONCRETE PIPE	LF	1300
111	650018	24" REINFORCED CONCRETE PIPE	LF	240
112	650030	42" REINFORCED CONCRETE PIPE	LF	100
113	650034	48" REINFORCED CONCRETE PIPE	LF	110
114	650516	24" REINFORCED CONCRETE PIPE (CLASS V)	LF	1610
115	650520	30" REINFORCED CONCRETE PIPE (CLASS V)	LF	1670
116	681103	3" PLASTIC PIPE (EDGE DRAIN)	LF	6110
117	681107	3" PLASTIC PIPE (EDGE DRAIN OUTLET)	LF	370
118	681112	4" PLASTIC PIPE (EDGE DRAIN OUTLET)	LF	160
119	700837	36" BITUMINOUS COATED CORRUGATED STEEL PIPE INLET (.064" THICK)	LF	2.3
120	048319	10" WELDED STEEL PIPE CASING (BRIDGE)	LF	160

Item	Item Code	Item	Unit of Measure	Estimated Quantity
121	019367	JACKED 42" WELDED STEEL PIPE (.500" THICK)	LF	48
122	705011	18" STEEL FLARED END SECTION	EA	1
123	019368	MEDIAN ISLAND	EA	1
124	721009	ROCK SLOPE PROTECTION (FACING, METHOD B)	CY	13
125	721430	CONCRETE (CHANNEL LINING)	CY	130
126 (F)	721810	SLOPE PAVING (CONCRETE)	CY	153
127	729010	ROCK SLOPE PROTECTION FABRIC	SQYD	9.3
128	731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	500
129 (S-F)	019369	ROCK COBBLE PAVING	SQFT	2100
130	731530	MINOR CONCRETE (TEXTURED PAVING)	SQFT	200
131 (F)	750001	MISCELLANEOUS IRON AND STEEL	LB	16 200
132	800360	CHAIN LINK FENCE (TYPE CL-6)	LF	540
133	820107	DELINEATOR (CLASS 1)	EA	100
134	820131	OBJECT MARKER (TYPE K)	EA	8
135	832003	METAL BEAM GUARD RAILING (WOOD POST)	LF	6310
136 (S-F)	833032	CHAIN LINK RAILING (TYPE 7)	LF	530
137	833126	CONCRETE BARRIER (TYPE 25A)	LF	1050
138 (F)	833128	CONCRETE BARRIER (TYPE 25 MODIFIED)	LF	204
139 (F)	833142	CONCRETE BARRIER (TYPE 26 MODIFIED)	LF	528
140 (F)	839521	CABLE RAILING	LF	1280

Item	Item Code	Item	Unit of Measure	Estimated Quantity
141	839532	CABLE ANCHOR ASSEMBLY (BREAKAWAY, TYPE B)	EA	7
142	839565	TERMINAL SYSTEM (TYPE SRT)	EA	8
143 (S)	840504	4" THERMOPLASTIC TRAFFIC STRIPE	LF	39 500
144 (S)	840506	8" THERMOPLASTIC TRAFFIC STRIPE	LF	11 300
145 (S)	840508	8" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 12-3)	LF	7900
146 (S)	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	2590
147 (S)	840525	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 36-12)	LF	900
148 (S)	840526	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 17-7)	LF	9520
149 (S)	850101	PAVEMENT MARKER (NON-REFLECTIVE)	EA	4130
150 (S)	850102	PAVEMENT MARKER (REFLECTIVE)	EA	2850
151 (S)	860251	SIGNAL AND LIGHTING (LOCATION 1)	LS	LUMP SUM
152 (S)	860460	LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM
153 (S)	860797	ELECTRIC SERVICE (IRRIGATION)	LS	LUMP SUM
154 (S)	861101	RAMP METERING SYSTEM (LOCATION 1)	LS	LUMP SUM
155 (S)	861102	RAMP METERING SYSTEM (LOCATION 2)	LS	LUMP SUM
156 (S)	867014	12 SINGLEMODE FIBER OPTIC CABLE	LF	2260
157 (S)	867015	24 SINGLEMODE FIBER OPTIC CABLE	LF	3300
158 (S)	867017	48 SINGLEMODE FIBER OPTIC CABLE	LF	3300
159 (S)	867019	60 SINGLEMODE FIBER OPTIC CABLE	LF	3300
160 (S)	019370	24 SINGLEMODE FIBER OPTIC CABLE SPLICE	EA	2

Item	Item Code	Item	Unit of Measure	Estimated Quantity
161 (S)	019371	60 SINGLEMODE FIBER OPTIC CABLE SPLICE	EA	2
162 (S)	019372	48 SINGLEMODE FIBER OPTIC CABLE SPLICE	EA	2
163 (S)	019373	SPLICE 12 SINGLEMODE FIBER OPTIC CABLE TO 48 SINGLEMODE FIBER OPTIC CABLE	EA	5
164 (S)	019374	2" TYPE 1 CONDUIT (TRENCHED)	LF	750
165 (S)	019375	3" TYPE 1 CONDUIT (TRENCHED)	LF	120
166 (S)	019376	3" TYPE 1 CONDUIT (BORED)	LF	230
167 (S)	019377	4" FIBER OPTIC CONDUIT (TRENCHED IN DIRT)	LF	1535
168 (S)	019378	4" FIBER OPTIC CONDUIT (TRENCHED IN ASPHALT)	LF	980
169 (S)	019379	4" AND 3" FIBER OPTIC CONDUIT (TRENCHED IN DIRT)	LF	200
170 (S)	019380	4" AND 2" FIBER OPTIC CONDUIT (TRENCHED IN ASPHALT)	LF	220
171 (S)	019381	1" INNERDUCT	LF	11 800
172 (S)	019382	NO. 6 FIBER OPTIC PULL BOX (TRAFFIC)	EA	9
173 (S)	019383	FIBER OPTIC SPLICE VAULT (TRAFFIC)	EA	5
174 (S)	019384	FLEXIBLE POST FIBER OPTIC DELINEATORS	EA	6
175 (S)	019385	RELOCATE CCTV CAMERA POLE	EA	1
176 (S)	019386	ADJUST FIBER OPTIC PULL BOX TO GRADE	EA	1
177 (S)	019387	RESET FIBER OPTIC SPLICE VAULT TO GRADE	EA	3
178 (S)	019388	REMOVE FIBER OPTIC CABLE	LF	2720
179 (S)	019389	REMOVE FIBER OPTIC PULL BOX	EA	1
180 (S)	019390	REMOVE FIBER OPTIC SPLICE VAULT	EA	3

Item	Item Code	Item	Unit of Measure	Estimated Quantity
181	999990	MOBILIZATION	LS	LUMP SUM

**STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION**

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**SPECIAL PROVISIONS**

**Annexed to Contract No. 08-340804**

**SECTION 1. SPECIFICATIONS AND PLANS**

The work embraced herein shall conform to the provisions in the Standard Specifications dated July 1992, and these special provisions.

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the indented text following said term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

In case of conflict between the Standard Specifications and these special provisions, the special provisions shall take precedence over and be used in lieu of the conflicting portions.

**SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS**

**2-1.01 GENERAL**

The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the Proposal form and the submission of the bid.

In addition to the subcontractors required to be listed in conformance with Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications, each proposal shall have listed therein the portion of work that will be performed by each subcontractor listed.

The Bidder's Bond form mentioned in the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications will be found following the signature page of the Proposal.

Submit request for substitution of an "or equal" item, and the data substantiating the request to the Department of Transportation, District 8 Construction, MS 1104, 464 West 4th Street, 6th Floor, San Bernardino, Ca 92401-1400, so that the request is received by the Department by close of business on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate. Each subcontract signed by the bidder must include this assurance.

**2-1.015 FEDERAL LOBBYING RESTRICTIONS**

Section 1352, Title 31, United States Code prohibits Federal funds from being expended by the recipient or any lower tier subrecipient of a Federal-aid contract to pay for any person for influencing or attempting to influence a Federal agency or Congress in connection with the awarding of any Federal-aid contract, the making of any Federal grant or loan, or the entering into of any cooperative agreement.

If any funds other than Federal funds have been paid for the same purposes in connection with this Federal-aid contract, the recipient shall submit an executed certification and, if required, submit a completed disclosure form as part of the bid documents.

A certification for Federal-aid contracts regarding payment of funds to lobby Congress or a Federal agency is included in the Proposal. Standard Form - LLL, "Disclosure of Lobbying Activities," with instructions for completion of the Standard Form is also included in the Proposal. Signing the Proposal shall constitute signature of the Certification.

The above-referenced certification and disclosure of lobbying activities shall be included in each subcontract and any lower-tier contracts exceeding \$100,000. All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the Engineer.

The Contractor, subcontractors and any lower-tier contractors shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by the Contractor, subcontractors and any lower-tier contractors. An event that materially affects the accuracy of the information reported includes:

- A. A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or
- B. A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or,
- C. A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

#### **2-1.02 DISADVANTAGED BUSINESS ENTERPRISE (DBE)**

This project is subject to Part 26, Title 49, Code of Federal Regulations entitled "Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs." The Regulations in their entirety are incorporated herein by this reference.

Bidders shall be fully informed respecting the requirements of the Regulations and the Department's Disadvantaged Business Enterprise (DBE) program developed pursuant to the Regulations; particular attention is directed to the following matters:

- A. A DBE must be a small business concern as defined pursuant to Section 3 of U.S. Small Business Act and relevant regulations promulgated pursuant thereto.
- B. A DBE may participate as a prime contractor, subcontractor, joint venture partner with a prime or subcontractor, vendor of material or supplies, or as a trucking company.
- C. A DBE bidder, not bidding as a joint venture with a non-DBE, will be required to document one or a combination of the following:
  - 1. The bidder will meet the goal by performing work with its own forces.
  - 2. The bidder will meet the goal through work performed by DBE subcontractors, suppliers or trucking companies.
  - 3. The bidder, prior to bidding, made adequate good faith efforts to meet the goal.
- D. A DBE joint venture partner must be responsible for specific contract items of work, or portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DBE joint venture partner must share in the capital contribution, control, management, risks and profits of the joint venture. The DBE joint venturer must submit the joint venture agreement with the proposal or the DBE Information form required in the Section entitled "Submission of DBE Information" of these special provisions.
- E. A DBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work.
- F. DBEs must be certified by either the California Department of Transportation, or by a participating State of California or local agency which certifies in conformance with Title 49, Code of Federal Regulations, Part 26, as of the date of bid opening. It is the Contractor's responsibility to verify that DBEs are certified. Listings of DBEs certified by the Department are available from the following sources:
  - 1. The Department's DBE Directory, which is published quarterly. This Directory may be obtained from the Department of Transportation, Materiel Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520.
  - 2. The Department's Electronic Information Bulletin Board Service, which is accessible by modem and is updated weekly. The Bulletin Board may be accessed by first contacting the Department's Business Enterprise Program at Telephone: (916) 227-8937 and obtaining a user identification and password.
  - 3. The Department's web site at <http://www.dot.ca.gov/hq/bep/index.htm>.
  - 4. The organizations listed in the Section entitled "DBE Goal for this Project" of these special provisions.

G. Credit for materials or supplies purchased from DBEs will be as follows:

1. If the materials or supplies are obtained from a DBE manufacturer, 100 percent of the cost of the materials or supplies will count toward the DBE goal. A DBE manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications.
2. If the materials or supplies are purchased from a DBE regular dealer, 60 percent of the cost of the materials or supplies will count toward the DBE goal. A DBE regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a DBE regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A person may be a DBE regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided in this paragraph G.2. if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not DBE regular dealers within the meaning of this paragraph G.2.
3. Credit for materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer will be limited to the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, provided the fees are reasonable and not excessive as compared with fees charged for similar services.

H. Credit for DBE trucking companies will be as follows:

1. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting the DBE goal.
  2. The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
  3. The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
  4. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
  5. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.
  6. For the purposes of this paragraph H, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.
- I. Noncompliance by the Contractor with the requirements of the regulations constitutes a breach of this contract and may result in termination of the contract or other appropriate remedy for a breach of this contract.
- J. Bidders are encouraged to use services offered by financial institutions owned and controlled by DBEs.

#### **2-1.02A DBE GOAL FOR THIS PROJECT**

The Department has established the following goal for Disadvantaged Business Enterprise (DBE) participation for this project:

Disadvantaged Business Enterprise (DBE): 14 percent

Bidders may use the services of the following firms to contact interested DBEs. These firms are available to assist DBEs in preparing bids for subcontracting or supplying materials.

The following firms may be contacted for projects in the following locations:

<p>Districts 04, 05 (except San Luis Obispo and Santa Barbara Counties), 06 (except Kern County) and 10:</p> <p>Triaxial Management Services, Inc. - Oakland</p> <p>1545 Willow Street, 1st Floor Oakland, CA 94607 Telephone - (510) 286-1313 FAX No. - (510) 286-6792</p>	<p>Districts 08, 11 and 12:</p> <p>Triaxial Management Services, Inc. - San Diego 2725 Congress Street, Suite 1-D San Diego, CA 92110 Telephone - (619) 543-5109 FAX No. - (619) 543-5108</p>
<p>Districts 07 and 08; in San Luis Obispo and Santa Barbara Counties in District 05; and in Kern County in District 06:</p> <p>Triaxial Management Services, Inc. - Los Angeles 2594 Industry Way, Suite 101 Lynwood, CA 90262 Telephone - (310) 537-6677 FAX No. - (310) 637-0128</p>	<p>Districts 01, 02, 03 and 09:</p> <p>Triaxial Management Services, Inc. - Sacramento 930 Alhambra Blvd., #205 Sacramento, CA 95816 Telephone - (916) 553-4172 FAX No. - (916) 553-4173</p>

**2-1.02B SUBMISSION OF DBE INFORMATION**

The required DBE information shall be submitted on the "CALTRANS BIDDER - DBE INFORMATION" form included in the Proposal. If the DBE information is not submitted with the bid, the DBE Information form shall be removed from the documents prior to submitting the bid.

It is the bidder's responsibility to make enough work available to DBEs and to select those portions of the work or material needs consistent with the available DBEs to meet the goal for DBE participation or to provide information to establish that, prior to bidding, the bidder made adequate good faith efforts to do so.

If DBE information is not submitted with the bid, the apparent successful bidder (low bidder), the second low bidder and the third low bidder shall submit DBE information to the Department of Transportation, 1120 N Street, Room 0200, MS #26, Sacramento, California 95814 so the information is received by the Department no later than 4:00 p.m. on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening. DBE information sent by U.S. Postal Service certified mail with return receipt and certificate of mailing and mailed on or before the third day, not including Saturdays, Sundays and legal holidays, following bid opening will be accepted even if it is received after the fourth day following bid opening. Failure to submit the required DBE information by the time specified will be grounds for finding the bid or proposal nonresponsive. Other bidders need not submit DBE information unless requested to do so by the Department.

The bidder's DBE information shall establish that good faith efforts to meet the DBE goal have been made. To establish good faith efforts, the bidder shall demonstrate that the goal will be met or that, prior to bidding, adequate good faith efforts to meet the goal were made.

Bidders are cautioned that even though their submittal indicates they will meet the stated DBE goal, their submittal should also include their adequate good faith efforts information along with their DBE goal information to protect their eligibility for award of the contract in the event the Department, in its review, finds that the goal has not been met.

The bidder's DBE information shall include the names, addresses and phone numbers of DBE firms that will participate, with a complete description of work or supplies to be provided by each, the dollar value of each DBE transaction, and a written confirmation from the DBE that it is participating in the contract. A copy of the DBE's quote will serve as written confirmation that the DBE is participating in the contract. When 100 percent of a contract item of work is not to be performed or furnished by a DBE, a description of the exact portion of that work to be performed or furnished by that DBE shall be included in the DBE information, including the planned location of that work. The work that a DBE prime contractor has committed to performing with its own forces as well as the work that it has committed to be performed by DBE subcontractors, suppliers and trucking companies will count toward the goal.

The information necessary to establish the bidder's adequate good faith efforts to meet the DBE goal should include:

- A. The names and dates of each publication in which a request for DBE participation for this project was placed by the bidder.

- B. The names and dates of written notices sent to certified DBEs soliciting bids for this project and the dates and methods used for following up initial solicitations to determine with certainty whether the DBEs were interested.
- C. The items of work which the bidder made available to DBE firms, including, where appropriate, any breaking down of the contract work items (including those items normally performed by the bidder with its own forces) into economically feasible units to facilitate DBE participation. It is the bidder's responsibility to demonstrate that sufficient work to meet the DBE goal was made available to DBE firms.
- D. The names, addresses and phone numbers of rejected DBE firms, the firms selected for that work, and the reasons for the bidder's choice.
- E. Efforts made to assist interested DBEs in obtaining bonding, lines of credit or insurance, and any technical assistance or information related to the plans, specifications and requirements for the work which was provided to DBEs.
- F. Efforts made to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, excluding supplies and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliate.
- G. The names of agencies contacted to provide assistance in contacting, recruiting and using DBE firms.
- H. Any additional data to support a demonstration of good faith efforts.

### **SECTION 3. AWARD AND EXECUTION OF CONTRACT**

The bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract," of the Standard Specifications and these special provisions for the requirements and conditions concerning award and execution of contract. Section 3-1.01, "Award of Contract," of the Standard Specifications is amended to read:

**3-1.01 Award of Contract**—The right is reserved to reject any and all proposals.

The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. Such award, if made, will be made within 30 days after the opening of the proposals. This period will be subject to extension for such further period as may be agreed upon in writing between the Department and the bidder concerned.

All bids will be compared on the basis of the Engineer's Estimate of the quantities of work to be done.

The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed and who has met the goal for DBE participation or has demonstrated, to the satisfaction of the Department, adequate good faith efforts to do so. Meeting the goal for DBE participation or demonstrating, to the satisfaction of the Department, adequate good faith efforts to do so is a condition for being eligible for award of contract.

A "Payee Data Record" form will be included in the contract documents to be executed by the successful bidder. The purpose of the form is to facilitate the collection of taxpayer identification data. The form shall be completed and returned to the Department by the successful bidder with the executed contract and contract bonds. For the purposes of the form, payee shall be deemed to mean the successful bidder. The form is not to be completed for subcontractors or suppliers. Failure to complete and return the "Payee Data Record" form to the Department as provided herein will result in the retention of 31 percent of payments due the contractor and penalties of up to \$20,000. This retention of payments for failure to complete the "Payee Data Record" form is in addition to any other retention of payments due the Contractor.

### **SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES**

Attention is directed to the provisions in Sections 8-1.03, "Beginning of Work," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," and 20-4.08, "Plant Establishment Work," of the Standard Specifications and these special provisions.

The Contractor shall begin work within 15 calendar days after the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department of Transportation.

Said work (except plant establishment work) shall be diligently prosecuted to completion before the expiration of

#### **400 WORKING DAYS**

beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of **\$1,400** per day, for each and every calendar day's delay in finishing the work (except plant establishment work) in excess of the number of working days prescribed above.

The Contractor shall diligently prosecute the plant establishment work to completion before the expiration of

### **1,400 WORKING DAYS**

beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of \$250 per day, for each and every calendar day's delay in completing the plant establishment work in excess of the number of working days prescribed above.

In no case will liquidated damages of more than **\$1,400** per day be assessed.

## **SECTION 5. GENERAL**

### **SECTION 5-1. MISCELLANEOUS**

#### **5-1.00 PLANS AND WORKING DRAWINGS**

When the specifications require working drawings to be submitted to the Division of Structure Design, the drawings shall be submitted to: Division of Structure Design, Documents Unit, Mail Station 9, 1801 30th Street, Sacramento, CA 95816, Telephone (916) 227-8252.

#### **5-1.002 LABORATORY**

When a reference is made in the specifications to the "Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations of the Department of Transportation, or established laboratories of the various Districts of the Department, or other laboratories authorized by the Department to test materials and work involved in the contract. When a reference is made in the specifications to the "Transportation Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations, located at 5900 Folsom Boulevard, Sacramento, CA 95819, Telephone (916) 227-7000.

#### **5-1.005 CONTRACT BONDS**

Attention is directed to Section 3-1.02, "Contract Bonds," of the Standard Specifications and these special provisions. The payment bond shall be in a sum not less than the following:

1. One hundred percent of the total amount payable by the terms of the contract when the total amount payable does not equal or exceed five million dollars (\$5,000,000).
2. Fifty percent of the total amount payable by the terms of the contract when the total amount payable is not less than five million dollars (\$5,000,000) and does not exceed ten million dollars (\$10,000,000).
3. Twenty-five percent of the total amount payable by the terms of the contract when the total amount payable exceeds ten million dollars (\$10,000,000).

#### **5-1.01 LABOR NONDISCRIMINATION**

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

### **NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOV. CODE, SECTION 12990)**

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination," of the Standard Specifications, which is applicable to all nonexempt state contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The Specifications are applicable to all nonexempt state construction contracts and subcontracts of \$5,000 or more.

#### **5-1.02 LABOR CODE REQUIREMENTS**

Section 7-1.01A(1), "Hours of Labor," of the Standard Specifications is amended to read:

**7-1.01A(1) Hours of Labor.**— Eight hours labor constitutes a legal day's work. The Contractor or any subcontractor under the Contractor shall forfeit, as a penalty to the State of California, \$25 for each worker employed in the execution of the contract by the respective Contractor or subcontractor for each calendar day during which that worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, thereof, inclusive,

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except that work performed by employees of Contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than one and one-half times the basic rate of pay, as provided in Section 1815 thereof.

Section 7-1.01A(2), "Prevailing Wage," of the Standard Specifications is amended to read:

**7-1.01A(2) Prevailing Wage.**— The Contractor and any subcontractor under the Contractor shall comply with Labor Code Sections 1774 and 1775. Pursuant to Section 1775, the Contractor and any subcontractor under the Contractor shall forfeit to the State or political subdivision on whose behalf the contract is made or awarded a penalty of not more than fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of Industrial Relations for the work or craft in which the worker is employed for any public work done under the contract by the Contractor or by any subcontractor under the Contractor in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. The amount of this forfeiture shall be determined by the Labor Commissioner and shall be based on consideration of the mistake, inadvertence, or neglect of the Contractor or subcontractor in failing to pay the correct rate of prevailing wages, or the previous record of the Contractor or subcontractor in meeting their respective prevailing wage obligations, or the willful failure by the Contractor or subcontractor to pay the correct rates of prevailing wages. A mistake, inadvertence, or neglect in failing to pay the correct rate of prevailing wages is not excusable if the Contractor or subcontractor had knowledge of the obligations under the Labor Code. In addition to the penalty and pursuant to Labor Code Section 1775, the difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor or subcontractor. If a worker employed by a subcontractor on a public works project is not paid the general prevailing per diem wages by the subcontractor, the prime contractor of the project is not liable for the penalties described above unless the prime contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime contractor fails to comply with all of the following requirements:

1. The contract executed between the contractor and the subcontractor for the performance of work on the public works project shall include a copy of the provisions of Sections 1771, 1775, 1776, 1777.5, 1813, and 1815 of the Labor Code.
2. The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.
3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.
4. Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to the subcontractor's employees on the public works project and any amounts due pursuant to Section 1813 of the Labor Code.

Pursuant to Section 1775 of the Labor Code, the Division of Labor Standards Enforcement shall notify the Contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages. If the Division of Labor Standards Enforcement determines that employees of a subcontractor were not paid the general prevailing rate of per diem wages and if the Department did not retain sufficient money under the contract to pay those employees the balance of wages owed under the general prevailing rate of per diem wages, the contractor shall withhold an amount of moneys due the subcontractor sufficient to pay those employees the general prevailing rate of per diem wages if requested by the Division of Labor Standards Enforcement. The Contractor shall pay any money retained from and owed to a subcontractor upon receipt of notification by the Division of Labor Standards Enforcement that the wage complaint has been resolved. If notice of the resolution of the wage complaint has not been received by the Contractor within 180 days of the filing of a valid notice of completion or acceptance of the public works project, whichever occurs later, the Contractor shall pay all moneys retained from the subcontractor to the Department. These moneys shall be retained by the Department pending the final decision of an enforcement action.

Pursuant to the provisions of Section 1773 of the Labor Code, the Department has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Section 1773.8 of the Labor Code, apprenticeship or other training programs authorized by Section 3093 of the Labor Code, and similar purposes) applicable to the work to be done, for straight time, overtime, Saturday, Sunday and holiday work. The holiday wage rate listed shall be applicable to all holidays

recognized in the collective bargaining agreement of the particular craft, classification or type of workmen concerned. The general prevailing wage rates and any applicable changes to these wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated. For work situated in District 9, the wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for District 6, located at Fresno. General prevailing wage rates are also available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>.

The wage rates determined by the Director of Industrial Relations for the project refer to expiration dates. Prevailing wage determinations with a single asterisk after the expiration date are in effect on the date of advertisement for bids and are good for the life of the contract. Prevailing wage determinations with double asterisks after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate shall be paid and incorporated in the contract. The Contractor shall contact the Department of Industrial Relations as indicated in the wage rate determinations to obtain predetermined wage changes.

Pursuant to Section 1773.2 of the Labor Code, general prevailing wage rates shall be posted by the Contractor at a prominent place at the site of the work.

Changes in general prevailing wage determinations which conform to Labor Code Section 1773.6 and Title 8 California Code of Regulations Section 16204 shall apply to the project when issued by the Director of Industrial Relations at least 10 days prior to the date of the Notice to Contractors for the project.

The State will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining the bid, and will not under any circumstances be considered as the basis of a claim against the State on the contract.

**7-1.01A(2)(a) Travel and Subsistence Payments.**— Attention is directed to the requirements of Section 1773.8 of the Labor Code. The Contractor shall make travel and subsistence payments to each workman, needed to execute the work, in accordance with the requirements in Labor Code Section 1773.8.

The first and second paragraphs of Section 7-1.01A(3), "Payroll Records," of the Standard Specifications are amended to read:

**7-1.01A(3) Payroll Records.**— Attention is directed to the provisions of Labor Code Section 1776, a portion of which is quoted below. Regulations implementing Labor Code Section 1776 are located in Sections 16016 through 16019 and Sections 16207.10 through 16207.19 of Title 8, California Code of Regulations.

"1776. (a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.

(2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

"(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the contractor on the following basis:

(1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.

(2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

"(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

"(d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

"(e) Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in a manner so as to prevent disclosure of an individual's name, address, and social security number. The name and address of the contractor awarded the contract or the subcontractor performing the contract shall not be marked or obliterated.

"(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

"(g) The contractor or subcontractor shall have 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section."

The penalties specified in subdivision (g) of Labor Code Section 1776 for noncompliance with the provisions of Section 1776 may be deducted from any moneys due or which may become due to the Contractor.

### **5-1.03 CONTRACTOR'S LICENSING LAWS**

The third paragraph of Section 7-1.01C, "Contractor's Licensing Laws," of the Standard Specifications is amended to read:

Attention is also directed to the requirements in Public Contract Code Section 10164. In all projects where Federal funds are involved, the Contractor shall be properly licensed at the time the contract is awarded.

### **5-1.035 INDEMNIFICATION AND INSURANCE**

Section 7-1.12, "Responsibility for Damage," of the Standard Specifications is deleted.

The Standard Specifications is amended by adding the following Section 7-1.121, "Indemnification," and Section 7-1.122, "Insurance," before Section 7-1.125, "Legal Action Against the Department."

**7-1.121 Indemnification.**—With the exception that this section shall in no event be construed to require indemnification by the Contractor to a greater extent than permitted by law, the Contractor shall defend, indemnify and save harmless the State, including its officers, directors, agents (excluding agents who are design professionals), and employees, and each of them (Indemnitees), from any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, losses or liabilities, in law or in equity, of every kind and nature whatsoever (Claims), arising out of or in connection with the Contractor's performance of this contract for:

- A. Bodily injury including, but not limited to, bodily injury, sickness or disease, emotional injury or death to persons, including, but not limited to, the public, any employees or agents of the Contractor, State, Department, or any other contractor and;
- B. Damage to property of anyone including loss of use thereof;

caused or alleged to be caused in whole or in part by any negligent or otherwise legally actionable act or omission of the Contractor or anyone directly or indirectly employed by the Contractor or anyone for whose acts the Contractor may be liable.

Except as otherwise provided by law, the indemnification provisions above shall apply regardless of the existence or degree of fault of Indemnitees. The Contractor, however, shall not be obligated to indemnify Indemnitees for Claims arising from conduct delineated in Civil Code section 2782. Further, the Contractor's indemnity obligation shall not extend to Claims to the extent they arise from any defective or substandard condition of the roadway which existed at or prior to the time the Contractor commenced work, unless this condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain. The Contractor's indemnity obligation shall extend to Claims arising after the work is completed and accepted only if these Claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work. No inspection by the Department, its employees or agents shall be deemed a waiver by the Department of full compliance with the requirements of this section.

The Contractor's obligation to defend and indemnify shall not be excused because of the Contractor's inability to evaluate liability or because the Contractor evaluates liability and determines that the Contractor is not liable to the claimant. The Contractor will respond within 30 days to the tender of any claim for defense and indemnity by the State, unless this time has been extended by the State. If the Contractor fails to accept or reject a tender of defense and indemnity within 30 days, in addition to any other remedy authorized by law, so much of the money due the Contractor under and by virtue of the contract as shall reasonably be considered necessary by the Department, may be retained by the State until disposition has been made of the claim or suit for damages, or until the Contractor accepts or rejects the tender of defense, whichever occurs first.

With respect to third party claims against the Contractor, the Contractor waives any and all rights of any type to express or implied indemnity against the State, its directors, officers, employees, or agents (excluding agents who are design professionals).

**7-1.122 Insurance.**—Insurance shall conform to the following requirements:

**7-1.122A Casualty Insurance.**—The Contractor shall, at the Contractor's expense, procure and maintain insurance on all of its operations with companies acceptable to the Department as follows. All insurance shall be kept in full force and effect from the beginning of the work through final acceptance by the State. In addition, the Contractor shall maintain completed operations coverage with a carrier acceptable to the Department through the expiration of the patent deficiency in construction statute of repose set forth in Section 337.1 of the Code of Civil Procedure.

**7-1.122A(1) Workers' Compensation and Employer's Liability Insurance.**—Workers' Compensation insurance shall be provided as specified in Section 7-1.01A(6), "Workers' Compensation." Employer's Liability Insurance shall be provided in amounts not less than:

- (a) \$1,000,000 for each accident for bodily injury by accident.
- (b) \$1,000,000 policy limit for bodily injury by disease.
- (c) \$1,000,000 for each employee for bodily injury by disease.

If there is an exposure of injury to the Contractors' employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act or under laws, regulations or statutes applicable to maritime employees, coverage shall be included for such injuries or claims.

**7-1.122A(2) Liability Insurance.**—The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability, and property damage liability for the limits of liability indicated below and including coverage for:

- (a) premises, operations and mobile equipment
- (b) products and completed operations
- (c) broad form property damage (including completed operations)
- (d) explosion, collapse and underground hazards
- (e) personal injury
- (f) contractual liability

**7-1.122A(3) Liability Limits/Additional Insureds.**—The limits of liability shall be at least:

- (a) \$1,000,000 for each occurrence (combined single limit for bodily injury and property damage).
- (b) \$2,000,000 aggregate for products-completed operations.
- (c) \$2,000,000 general aggregate. This general aggregate limit shall apply separately to the Contractor's work under this Agreement.
- (d) \$5,000,000 umbrella or excess liability. For projects over \$25,000,000 only, an additional \$10,000,000 umbrella or excess liability (for a total of \$15,000,000). Umbrella or excess policy shall include products liability completed operations coverage and may be subject to \$5,000,000 or \$15,000,000 aggregate limits. Further, the umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

The State and the Department, including their officers, directors, agents (excluding agents who are design professionals), and State employees, shall be named as additional insureds under the General Liability and Umbrella

Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this contract. Coverage for such additional insureds shall not extend to liability:

- (1) arising from any defective or substandard condition of the Roadway which existed at or prior to the time the Contractor commenced work, unless such condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain; or
- (2) for claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work; or
- (3) to the extent prohibited by Section 11580.04 of the Insurance Code.

The policy shall stipulate that the insurance afforded the additional insureds shall apply as primary insurance. Any other insurance or self insurance maintained by the Department or State will be excess only and shall not be called upon to contribute with this insurance. Such additional insured coverage shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured (Form B) endorsement form CG 2010, as published by the Insurance Services Office (ISO).

**7-1.122B Automobile Liability Insurance.**—The Contractor shall carry automobile liability insurance, including coverage for all owned, hired and non-owned automobiles. The primary limits of liability shall be not less than \$1,000,000 combined single limit each accident for bodily injury and property damage. The umbrella or excess liability coverage required under Section 7-1.122A(3), "Liability Limits/Additional Insureds," shall also apply to automobile liability.

**7-1.122C Policy Forms, Endorsements and Certificates.**—The Contractor's General Liability Insurance shall be provided under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.

Evidence of insurance in a form acceptable to the Department, including the required "additional insured" endorsements, shall be furnished by the Contractor to the Department at or prior to the pre-construction conference. The evidence of insurance shall provide that there will be no cancellation, lapse, or reduction of coverage without thirty (30) days' prior written notice to the Department. Certificates of Insurance, as evidence of required insurance, for the General Liability, Auto Liability and Umbrella-Excess Liability policies shall set forth deductible amounts applicable to each policy and all exclusions which are added by endorsement to each policy. The Department may expressly allow deductible clauses, which it does not consider excessive, overly broad, or harmful to the interests of the State. Standard ISO form CG 0001 or similar exclusions will be allowed provided they are not inconsistent with the requirements of this section. Allowance of any additional exclusions is at the discretion of the Department. Regardless of the allowance of exclusions or deductions by the Department, the Contractor shall be responsible for any deductible amount and shall warrant that the coverage provided to the Department is consistent with the requirements of this section.

**7-1.122D Enforcement.**—The Department may take any steps as are necessary to assure Contractor's compliance with its obligations. Should any insurance policy lapse or be canceled during the contract period the Contractor shall, within thirty (30) days prior to the effective expiration or cancellation date, furnish the Department with evidence of renewal or replacement of the policy. Failure to continuously maintain insurance coverage as herein provided is a material breach of contract. In the event the Contractor fails to maintain any insurance coverage required, the Department may, but is not required to, maintain this coverage and charge the expense to the Contractor or terminate this Agreement. The required insurance shall be subject to the approval of Department, but any acceptance of insurance certificates by the Department shall in no way limit or relieve the Contractor of the Contractor's duties and responsibilities under the Contract to indemnify, defend and hold harmless the State, its officers, agents, and employees. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve the Contractor for liability in excess of such coverage, nor shall it preclude the State from taking other actions as is available to it under any other provision of the contract or law. Failure of the Department to enforce in a timely manner any of the provisions of this section shall not act as a waiver to enforcement of any of these provisions at a later date.

**7-1.122E Self-Insurance.**—Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the State of evidence of the Contractor's financial capacity to respond. Additionally, self-insurance programs or retentions must provide the State with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

**7-1.122F Miscellaneous.**—Nothing contained in the Contract is intended to make the public or any member thereof a third party beneficiary of the Insurance or Indemnity provisions of these Standard Specifications, nor is any term,

condition or other provision of the Contract intended to establish a standard of care owed to the public or any member thereof.

#### **5-1.04 ARBITRATION**

The last paragraph in Section 9-1.10, "Arbitration," of the Standard Specifications is amended to read:

Arbitration shall be initiated by a Complaint in Arbitration made in compliance with the requirements of those regulations. A Complaint in Arbitration by the Contractor shall be made not later than 90 days after the date of service in person or by mail on the Contractor of the final written decision by the Department on the claim.

#### **5-1.05 NOTICE OF POTENTIAL CLAIM**

Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications is amended to read:

**9-1.04 Notice of Potential Claim.**--The Contractor shall not be entitled to the payment of any additional compensation for any act, or failure to act, by the Engineer, including failure or refusal to issue a change order, or for the happening of any event, thing, occurrence, or other cause, unless he shall have given the Engineer due written notice of potential claim as hereinafter specified. Compliance with this Section 9-1.04 shall not be a prerequisite as to matters within the scope of the protest provisions in Section 4-1.03, "Changes," or Section 8-1.06, "Time of Completion," or the notice provisions in Section 5-1.116, "Differing Site Conditions," or Section 8-1.07, "Liquidated Damages," or Section 8-1.10, "Utility and Non-Highway Facilities," nor to any claim which is based on differences in measurements or errors of computation as to contract quantities.

The written notice of potential claim shall be submitted to the Engineer prior to the time that the Contractor performs the work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within 15 days after the happening of the event, thing, occurrence, or other cause, giving rise to the potential claim.

The written notice of potential claim shall be submitted on Form CEM-6201 furnished by the Department and shall be certified with reference to the California False Claims Act, Government Code Sections 12650 - 12655. The notice shall set forth the reasons for which the Contractor believes additional compensation will or may be due and the nature of the costs involved. Unless the amount of the potential claim has been stated in the written notice, the Contractor shall, within 15 days of submitting said notice, furnish an estimate of the cost of the affected work and impacts, if any, on project completion. Said estimate of costs may be changed or updated by the Contractor when conditions have changed. When the affected work is completed, the Contractor shall submit substantiation of his actual costs. Failure to do so shall be sufficient cause for denial of any claim subsequently filed on the basis of said notice of potential claim.

It is the intention of this Section 9-1.04 that differences between the parties arising under and by virtue of the contract be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken. The Contractor hereby agrees that he shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was filed.

Should the Contractor, in connection with or subsequent to the assertion of a potential claim, request inspection and copying of documents or records in the possession of the Department that pertain to the potential claim, Contractor shall make its records of the project, as deemed by the Department to be pertinent to the potential claim, available to the Department for inspection and copying.

#### **5-1.06 PARTIAL PAYMENTS**

The last paragraph of Section 9-1.06, "Partial Payments," of the Standard Specifications is amended to read:

Attention is directed to the prohibitions and penalties pertaining to unlicensed contractors as provided in Business and Professions Code Sections 7028.15(a) and 7031.

#### **5-1.07 PAYMENT OF WITHHELD FUNDS**

Section 9-1.065, "Payment of Withheld Funds," of the Standard Specifications, is amended by adding the following after the third paragraph:

Alternatively, and subject to the approval of the Department, the payment of retentions earned may be deposited directly with a person licensed under Division 6 (commencing with Section 17000) of the Financial Code as the escrow agent. Upon written request of an escrow agent that has not been approved by the Department under subdivision (c) of Section 10263 of the Public Contract Code, the Department will provide written notice to that escrow agent within 10 business days of receipt of the request indicating the reason or reasons for not approving that escrow agent. The

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payments will be deposited in a trust account with a Federally chartered bank or savings association within 24 hours of receipt by the escrow agent. The Contractor shall not place any retentions with the escrow agent in excess of the coverage provided to that escrow agent pursuant to subdivision (b) of Section 17314 of the Financial Code. In all respects not inconsistent with subdivision (c) of Section 10263 of the Public Contract Code, the remaining provisions of Section 10263 of the Public Contract Code shall apply to escrow agents acting pursuant to subdivision (c) of Section 10263 of the Public Contract Code.

#### **5-1.08 FINAL PAYMENT AND CLAIMS**

Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications is amended to read:

**9-1.07B Final Payment and Claims.**--After acceptance by the Director, the Engineer will make a proposed final estimate in writing of the total amount payable to the Contractor, including therein an itemization of said amount, segregated as to contract item quantities, extra work and any other basis for payment, and shall also show therein all deductions made or to be made for prior payments and amounts to be kept or retained under the provisions of the contract. All prior estimates and payments shall be subject to correction in the proposed final estimate. The Contractor shall submit written approval of the proposed final estimate or a written statement of all claims arising under or by virtue of the contract so that the Engineer receives such written approval or statement of claims no later than close of business of the thirtieth day after receiving the proposed final estimate. If the thirtieth day falls on a Saturday, Sunday or legal holiday, then receipt of such written approval or statement of claims by the Engineer shall not be later than close of business of the next business day. No claim will be considered that was not included in the written statement of claims, nor will any claim be allowed as to which a notice or protest is required under the provisions in Sections 4-1.03, "Changes," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," 5-1.116, "Differing Site Conditions," 8-1.10, "Utility and Non-Highway Facilities," and 9-1.04, "Notice of Potential Claim," unless the Contractor has complied with the notice or protest requirements in said sections.

On the Contractor's approval, or if he files no claim within said period of 30 days, the Engineer will issue a final estimate in writing in accordance with the proposed final estimate submitted to the Contractor and within 30 days thereafter the State will pay the entire sum so found to be due. Such final estimate and payment thereon shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

If the Contractor within said period of 30 days files claims, the Engineer will issue a semifinal estimate in accordance with the proposed final estimate submitted to the Contractor and within 30 days thereafter the State will pay the sum so found to be due. Such semifinal estimate and payment thereon shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except insofar as affected by the claims filed within the time and in the manner required hereunder and except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

Claims filed by the Contractor shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of said claims. If additional information or details are required by the Engineer to determine the basis and amount of said claims, the Contractor shall furnish such further information or details so that the information or details are received by the Engineer no later than the fifteenth day after receipt of the written request from the Engineer. If the fifteenth day falls on a Saturday, Sunday or legal holiday, then receipt of such information or details by the Engineer shall not be later than close of business of the next business day. Failure to submit such information and details to the Engineer within the time specified will be sufficient cause for denying the claim.

The Contractor shall keep full and complete records of the costs and additional time incurred for any work for which a claim for additional compensation is made. The Engineer or any designated claim investigator or auditor shall have access to those records and any other records as may be required by the Engineer to determine the facts or contentions involved in the claims. Failure to permit access to such records shall be sufficient cause for denying the claims.

Claims submitted by the Contractor shall be accompanied by a notarized certificate containing the following language:

Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code Section 12650 et. seq., the undersigned,

\_\_\_\_\_  
(name) \_\_\_\_\_ of  
(title) \_\_\_\_\_  
\_\_\_\_\_  
(company)

hereby certifies that the claim for the additional compensation and time, if any, made herein for the work on this contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the contract between parties.

Dated \_\_\_\_\_

/s/ \_\_\_\_\_

Subscribed and sworn before me this \_\_\_\_\_ day

of \_\_\_\_\_

\_\_\_\_\_  
Notary Public  
My Commission Expires \_\_\_\_\_

Failure to submit the notarized certificate will be sufficient cause for denying the claim.

Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant. Any such overhead claim shall also be subject to audit by the State at its discretion.

Any costs or expenses incurred by the State in reviewing or auditing any claims that are not supported by the Contractor's cost accounting or other records shall be deemed to be damages incurred by the State within the meaning of the California False Claims Act.

The District Director of the District which administers the contract will make the final determination of any claims which remain in dispute after completion of claim review by the Engineer. A board or person designated by said District Director will review such claims and make a written recommendation thereon to the District Director. The Contractor may meet with the review board or person to make a presentation in support of such claims.

Upon final determination of the claims, the Engineer will then make and issue his final estimate in writing and within 30 days thereafter the State will pay the entire sum, if any, found due thereon. Such final estimate shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

#### 5-1.09 INTEREST ON PAYMENTS

Interest shall be payable on progress payments, payments after acceptance, final payments, extra work payments and claim payments as follows:

1. Unpaid progress payments, payment after acceptance and final payments shall begin to accrue interest 30 days after the Engineer prepares the payment estimate.
2. Unpaid extra work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following the receipt of a properly submitted and undisputed extra work bill. To be properly submitted, the bill must be submitted within 7 days of the performance of the extra work and in accordance with the requirements of Section 9-1.03C, "Records," and Section 9-1.06, "Partial Payments," of the Standard Specifications. An undisputed extra work bill not submitted within 7 days of performance of the extra work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.
3. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments and extra work payments shall be 10 percent per annum.
4. The rate of interest payable on a claim, protest or dispute ultimately allowed under this contract shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to ascertain the basis and amount of said claim, protest or dispute.

The rate of interest payable on any award in arbitration shall be 6 percent per annum if allowed under the provisions of Civil Code Section 3289.

#### **5-1.10 PUBLIC SAFETY**

The Contractor shall provide for the safety of traffic and the public in accordance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these special provisions.

The Contractor shall install temporary railing (Type K) between any lane carrying public traffic and any excavation, obstacle, or storage area when the following conditions exist:

- (1) Excavations.--Any excavation, the near edge of which is 12 feet or less from the edge of the lane, except:
  - (a) Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
  - (b) Excavations less than one foot deep.
  - (c) Trenches less than one foot wide for irrigation pipe or electrical conduit, or excavations less than one foot in diameter.
  - (d) Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
  - (e) Excavations in side slopes, where the slope is steeper than 4:1.
  - (f) Excavations protected by existing barrier or railing.

(2) Temporarily Unprotected Permanent Obstacles.--Whenever the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or whenever the Contractor, for his convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.

(3) Storage Areas.--Whenever material or equipment is stored within 12 feet of the lane and such storage is not otherwise prohibited by the specifications.

The approach end of temporary railing (Type K), installed in accordance with the requirements in this section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications shall be offset a minimum of 15 feet from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than one foot transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15-foot minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications. Temporary railing (Type K), conforming to the details shown on 1995 Standard Plan T3 or 1997 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance.

The fourteenth paragraph of Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications is amended to read:

Each rail unit placed within 10 feet of a traffic lane shall have a reflector installed on top of the rail as directed by the Engineer. A Type P marker panel shall also be installed at each end of railing installed adjacent to a two-lane, two-way highway and at the end facing traffic of railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, the marker shall be installed at the end of the skew nearest the traveled way. Type P marker panels shall conform to the provisions in Section 82, "Markers and Delineators," except that the Contractor shall furnish the marker panels.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" elsewhere in these special provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas the Contractor shall close the adjacent traffic lane unless otherwise provided in the specifications:

Approach speed of public traffic (Posted Limit) (Miles Per Hour)	Work Areas
Over 45	Within 6 feet of a traffic lane but not on a traffic lane.
35 to 45	Within 3 feet of a traffic lane but not on a traffic lane.

The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators shall be considered to be the edge of traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 10 feet without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

Full compensation for conforming to the requirements in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

#### **5-1.11 SURFACE MINING AND RECLAMATION ACT**

Attention is directed to the Surface Mining and Reclamation Act of 1975, commencing in Public Resources Code, Mining and Geology, Section 2710, which establishes regulations pertinent to surface mining operations.

Material from mining operations furnished for this project shall only come from permitted sites in compliance with the Surface Mining and Reclamation Act of 1975.

The requirements of this section shall apply to all materials furnished for the project, except for acquisition of materials in conformance with Section 4-1.05, "Use of Materials Found on the Work," of the Standard Specifications.

#### **5-1.12 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES**

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe, and shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In accordance with Section 25914.1 of the Health and Safety Code, all such removal of asbestos or hazardous substances including any exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

#### **5-1.13 FINAL PAY QUANTITIES**

Section 9-1.015, "Final Pay Quantities," of the Standard Specifications is amended to read:

**9-1.015 Final Pay Items.**—When an item of work is designated as (F) or (S-F) in the Engineer's Estimate, the estimated quantity for that item of work shall be the final pay quantity, unless the dimensions of any portion of that item are revised by the Engineer, or the item or any portion of the item is eliminated. If the dimensions of any portion of the item are revised, and the revisions result in an increase or decrease in the estimated quantity of that item of work, the final pay quantity for the item will be revised in the amount represented by the changes in the dimensions, except as otherwise provided for minor structures in Section 51-1.22, "Measurement." If a final pay item is eliminated, the estimated quantity for the item will be eliminated. If a portion of a final pay item is eliminated, the final pay quantity will be revised in the amount represented by the eliminated portion of the item of work.

The estimated quantity for each item of work designated as (F) or (S-F) in the Engineer's Estimate shall be considered as approximate only, and no guarantee is made that the quantity which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantity. No allowance will be made in the event that the quantity based on computations does not equal the estimated quantity.

In case of discrepancy between the quantity shown in the Engineer's Estimate for a final pay item and the quantity or summation of quantities for the same item shown on the plans, payment will be based on the quantity shown in the Engineer's Estimate.

#### **5-1.14 YEAR 2000 COMPLIANCE**

This contract is subject to Year 2000 Compliance for automated devices in the State of California. Year 2000 compliance is defined as follows:

Year 2000 compliance for automated devices in the State of California is achieved when embedded functions have or create no logical or mathematical inconsistencies when dealing with dates prior to and beyond 1999. The year 2000 is recognized and processed as a leap year. The product must also operate accurately in the manner in which it was intended for date operation without requiring manual intervention.

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for all automated devices furnished for the project.

#### **5-1.145 BUY AMERICA REQUIREMENTS**

Attention is directed to the "Buy America" requirements of the Surface Transportation Assistance Act of 1982 (Section 165) and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) Sections 1041(a) and 1048(a), and the regulations adopted pursuant thereto. In accordance with the law and regulations, all manufacturing processes for steel and iron materials furnished for incorporation into the work on this project shall occur in the United States; with the exception that pig iron and processed, pelletized and reduced iron ore manufactured outside of the United States may be used in the domestic manufacturing process for such steel and iron materials. The application of coatings, such as epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of steel or iron materials shall be considered a manufacturing process subject to the "Buy America" requirements.

A Certificate of Compliance, conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, shall be furnished for steel and iron materials. The certificates, in addition to certifying that the materials comply with the specifications, shall also specifically certify that all manufacturing processes for the materials occurred in the United States, except for the above exceptions.

The requirements imposed by the law and regulations do not prevent a minimal use of foreign steel and iron materials if the total combined cost of the materials used does not exceed one-tenth of one percent (0.1%) of the total contract cost or \$2,500, whichever is greater. The Contractor shall furnish the Engineer acceptable documentation of the quantity and value of any foreign steel and iron prior to incorporating the materials into the work.

#### **5-1.15 SUBCONTRACTOR AND DBE RECORDS**

The Contractor shall maintain records showing the name and business address of each first-tier subcontractor. The records shall also show the name and business address of every DBE subcontractor, DBE vendor of materials and DBE trucking company, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all of these firms. DBE prime contractors shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

Upon completion of the contract, a summary of these records shall be prepared on Form CEM-2402 (F) and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer. The form shall be furnished to the Engineer within 90 days from the date of contract acceptance. \$10,000 will be withheld from payment until the Form CEM-2402 (F) is submitted. The amount will be returned to the Contractor when a satisfactory Form CEM-2402 (F) is submitted.

Prior to the fifteenth of each month, the Contractor shall submit documentation to the Engineer showing the amount paid to DBE trucking companies listed in the Contractor's DBE information. This monthly documentation shall indicate the portion of the revenue paid to DBE trucking companies which is claimed toward DBE participation. The Contractor shall also obtain and submit documentation to the Engineer showing the amount paid by DBE trucking companies to all firms, including owner-operators, for the leasing of trucks. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The records must confirm that the amount of credit claimed toward DBE participation conforms with Section 2-1.02, "Disadvantaged Business Enterprise," of these special provisions.

The Contractor shall also obtain and submit documentation to the Engineer showing the truck number, owner's name, California Highway Patrol CA number, and if applicable, the DBE certification number of the owner of the truck for all trucks used during that month for which DBE participation will be claimed. This documentation shall be submitted on Form CEM-2404 (F).

### **5-1.152 DBE CERTIFICATION STATUS**

If a DBE subcontractor is decertified during the life of the project, the decertified subcontractor shall notify the Contractor in writing with the date of decertification. If a subcontractor becomes a certified DBE during the life of the project, the subcontractor shall notify the Contractor in writing with the date of certification. The Contractor shall furnish the written documentation to the Engineer.

Upon completion of the contract, Form CEM-2403 (F) indicating the DBE's existing certification status shall be signed and certified correct by the Contractor. The certified form shall be furnished to the Engineer within 90 days from the date of contract acceptance.

### **5-1.155 PERFORMANCE OF DBE SUBCONTRACTORS AND SUPPLIERS**

The DBEs listed by the Contractor in response to the provisions in Section 2-1.02B, "Submission of DBE Information," and Section 3, "Award and Execution of Contract," of these special provisions, which are determined by the Department to be certified DBEs, shall perform the work and supply the materials for which they are listed, unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources.

Authorization to use other forces or sources of materials may be requested for the following reasons:

- A. The listed DBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when such written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of such subcontractor's or supplier's written bid, is presented by the Contractor.
- B. The listed DBE becomes bankrupt or insolvent.
- C. The listed DBE fails or refuses to perform the subcontract or furnish the listed materials.
- D. The Contractor stipulated that a bond was a condition of executing a subcontract and the listed DBE subcontractor fails or refuses to meet the bond requirements of the Contractor.
- E. The work performed by the listed subcontractor is substantially unsatisfactory and is not in substantial conformance with the plans and specifications, or the subcontractor is substantially delaying or disrupting the progress of the work.
- F. It would be in the best interest of the State.

The Contractor shall not be entitled to any payment for such work or material unless it is performed or supplied by the listed DBE or by other forces (including those of the Contractor) pursuant to prior written authorization of the Engineer.

### **5-1.16 SUBCONTRACTING**

Attention is directed to the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, and Section 2, "Proposal Requirements and Conditions," and Section 3, "Award and Execution of Contract," of these special provisions.

The second sentence of the third paragraph in said Section 8-1.01 is amended to read:

When items of work in the Engineer's Estimate are preceded by the letters (S) or (S-F), said items are designated as "Specialty Items."

Section 8-1.01 of the Standard Specifications is amended by adding the following before the sixth paragraph:

Pursuant to the provisions of Section 6109 of the Public Contract Code, the Contractor shall not perform work on a public works project with a subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.

Pursuant to the provisions of Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations web site at:

<http://www.dir.ca.gov/DLSE/Debar.html>.

The provisions in the third paragraph of Section 8-1.01, "Subcontracting," of the Standard Specifications, that the Contractor shall perform with the Contractor's own organization contract work amounting to not less than 50 percent of the original contract price, is not changed by the Federal Aid requirement specified under "Required Contract Provisions Federal-Aid Construction Contracts" in Section 14 of these special provisions that the Contractor perform not less than 30 percent of the original contract work with the Contractor's own organization.

Each subcontract and any lower tier subcontract that may in turn be made shall include the "Required Contract Provisions Federal-Aid Construction Contracts" in Section 14 of these special provisions. This requirement shall be enforced as follows:

- A. Noncompliance shall be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or to become due, until correction is made. Failure to comply may result in termination of the contract.

The DBE information furnished under Section 2-1.02B, "Submission of DBE Information," of these special provisions is in addition to the subcontractor information required to be furnished under Section 8-1.01, "Subcontracting," and Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications.

In conformance with the Federal DBE regulations Sections 26.53(f)(1) and 26.53(f)(2) Part 26, Title 49 CFR:

- A. The Contractor shall not terminate for convenience a DBE subcontractor listed in response to Section 2-1.02B, "Submission of DBE Information," and then perform that work with its own forces, or those of an affiliate without the written consent of the Department, and
- B. If a DBE subcontractor is terminated or fails to complete its work for any reason, the Contractor will be required to make good faith efforts to substitute another DBE subcontractor for the original DBE subcontractor, to the extent needed to meet the contract goal.

The requirement in Section 2-1.02, "Disadvantaged Business Enterprise (DBE)," of these special provisions that DBEs must be certified on the date bids are opened does not apply to DBE substitutions after award of the contract.

#### **5-1.162 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS**

Attention is directed to the provisions in Sections 10262 and 10262.5 of the Public Contract Code and Section 7108.5 of the Business and Professions Code concerning prompt payment to subcontractors.

#### **5-1.164 PROMPT PAYMENT OF WITHHELD FUNDS TO SUBCONTRACTORS**

The Contractor shall return all moneys withheld in retention from the subcontractor within 30 days after receiving payment for work satisfactorily completed, even if the other contract work is not completed and has not been accepted in conformance with Section 7-1.17, "Acceptance of Contract," of the Standard Specifications. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor or deficient subcontract performance or noncompliance by a subcontractor.

#### **5-1.17 PARTNERING**

The State will promote the formation of a "Partnering" relationship with the Contractor in order to effectively complete the contract to the benefit of both parties. The purpose of this relationship will be to maintain cooperative communication and mutually resolve conflicts at the lowest possible management level.

The Contractor may request the formation of such a "Partnering" relationship by submitting a request in writing to the Engineer after approval of the contract. If the Contractor's request for "Partnering" is approved by the Engineer, scheduling of a "Partnering" workshop, selecting the "Partnering" facilitator and workshop site, and other administrative details shall be as agreed to by both parties.

The costs involved in providing a facilitator and a workshop site will be borne equally by the State and the Contractor. The Contractor shall pay all compensation for the wages and expenses of the facilitator, and of the expenses for obtaining the workshop site. The State's share of such costs will be reimbursed to the Contractor in a change order written by the Engineer. Markups will not be added. All other costs associated with the "Partnering" relationship will be borne separately by the party incurring the costs.

The establishment of a "Partnering" relationship will not change or modify the terms and conditions of the contract and will not relieve either party of the legal requirements of the contract.

#### **5-1.18 DISPUTES REVIEW BOARD**

To assist in the resolution of disputes or potential claims arising out of the work of this project, a Disputes Review Board, hereinafter referred to as the "DRB", shall be established by the Engineer and Contractor cooperatively upon approval of the contract. The DRB is intended to assist the contract administrative claims resolution process as set forth in the provisions of Section 9-1.04, "Notice of Potential Claim," and Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. The DRB shall not be considered to serve as a substitute for any requirements in the specifications in regard

to filing of potential claims. The requirements and procedures established in this special provision shall be considered as an essential prerequisite to filing a claim, for arbitration or for litigation prior or subsequent to project completion.

The DRB shall be utilized when dispute or potential claim resolution at the job level is unsuccessful. The DRB shall function until the day of acceptance of the contract, at which time the work of the DRB will cease except for completion of unfinished dispute hearings and reports. After acceptance of the contract any disputes or potential claims that the Contractor wants to pursue that have not been settled, shall be stated or restated, by the Contractor, in response to the Proposed Final Estimate within the time limits provided in Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. The State will review those claims in accordance with Section 9-1.07B, of the Standard Specifications. Following the completion of the State's administrative claims procedure, the Contractor may resort to arbitration as provided in Section 9-1.10, "Arbitration," of the Standard Specifications.

Disputes, as used in this section, shall include all differences of opinion, properly noticed as provided hereinafter, between the State and Contractor on matters related to the work and other subjects considered by the State or Contractor, or by both, to be of concern to the DRB on this project, except matters relating to Contractor, subcontractor or supplier claims not actionable against the State as specified in these special provisions. Whenever the term "dispute" or "disputes" is used herein, it shall be deemed to include potential claims as well as disputes.

The DRB shall serve as an advisory body to assist in the resolution of disputes between the State and the Contractor, hereinafter referred to as the "parties". The DRB shall consider disputes referred to it, and furnish written reports containing findings and recommendations pertaining to those disputes, to the parties to aid in resolution of the differences between them. DRB findings and recommendations are not binding on the parties.

The DRB shall consist of one member selected by the State, one member selected by the Contractor, and a third member selected by the first two members and approved by both the State and the Contractor. The third member shall act as DRB Chairperson.

The first two DRB members shall select a third DRB member subject to the mutual approval of the parties, or may mutually concur on a list of potentially acceptable third DRB members and submit the list to the parties for final selection and approval of the third member. The goal in selection of the third member is to complement the professional experience of the first two members, and to provide leadership for the DRB's activities.

No DRB member shall have prior direct involvement in this contract, and no member shall have a financial interest in this contract or the parties thereto, within a period of 6 months prior to award of this contract, or during the contract, except as follows:

1. Compensation for services on this DRB.
2. Ownership interest in a party or parties, documented by the prospective DRB member, that has been reviewed and determined in writing by the State to be sufficiently insignificant to render the prospective member acceptable to the State.
3. Service as a member of other Disputes Review Boards on other contracts.
4. Retirement payments or pensions received from a party that are not tied to, dependent on or affected by the net worth of the party.
5. The above provisions apply to any party having a financial interest in this contract; including but not limited to contractors, subcontractors, suppliers, consultants, and legal and business services.

DRB members shall be especially knowledgeable in the type of construction and contract documents potentially anticipated by the contract, and shall discharge their responsibilities impartially and as an independent body considering the facts and circumstances related to the matters under consideration, applicable laws and regulations, and the pertinent provisions of the contract.

The State and the Contractor shall select their respective DRB members, in accordance with the terms and conditions of the Disputes Review Board Agreement and these provisions, within 45 days of the approval of the contract. Each party shall provide written notification to the other of the name of their selected DRB member along with the prospective member's written disclosure statement.

Before their appointments are final, the first two prospective DRB members shall submit complete disclosure statements to both the State and the Contractor. The statement shall include a resume of the prospective member's experience, together with a declaration describing all past, present and anticipated or planned future relationships, including indirect relationships through the prospective member's primary or full-time employer, to this project and with all parties involved in this construction contract; including, but not limited to, any relevant subcontractors or suppliers to the parties, the parties' principals or the parties' counsel. The DRB members shall also include a full disclosure of close professional or personal relationships with all key members of all parties to the contract. Either the Contractor or the State may object to the others nominee and that person will not be selected for the DRB. No reason need be given for the first objection. Objections to subsequent nominees must be based on a specific breach or violation of nominee responsibilities under this specification. A different person shall then be nominated within 14 Days. The third DRB member shall supply a full disclosure statement to the first two DRB members and to the parties prior to appointment. Either party may reject any of the three prospective DRB

members who fail to fully comply with all required employment and financial disclosure conditions of DRB membership as described in the Disputes Review Board Agreement and elsewhere herein. A copy of the Disputes Review Board Agreement is included in this special provision.

The first duty of the State and Contractor selected members of the DRB is to select and recommend prospective third member(s) to the parties for final selection and approval. The first two DRB members shall proceed with the selection of the third DRB member immediately upon receiving written notification from the State of their selection, and shall provide their recommendation simultaneously to the parties within 21 days of the notification.

An impasse shall be considered to have been reached if the parties are unable to approve a third member within 14 days of receipt of the recommendation of the first two DRB members, or if the first two members are unable to agree upon a recommendation within the 14 day time limit allowed in the preceding paragraph. In the event of an impasse in selection of the third DRB member, the State and the Contractor shall each propose three candidates for the third position. The parties shall select all candidates proposed under this paragraph from the current list of arbitrators certified by the Public Works Contract Arbitration Committee created by Article 7.2 (commencing with Section 10245) of the State Contract Act. The first two DRB members shall then select one of the 6 proposed candidates in a blind draw.

The Contractor, the State, and all three members of the DRB shall complete and adhere to the Disputes Review Board Agreement in administration of this DRB within 14 days of the parties' concurrence in the selection of the third member. The State authorizes the Engineer to execute and administer the terms of the Agreement. The person(s) designated by the Contractor as authorized to execute Contract Change Orders shall be authorized to execute and administer the terms of this agreement, or to delegate the authority in writing. The operation of the DRB shall be in conformance with the terms of the Disputes Review Board Agreement.

The State and the Contractor shall bear the costs and expenses of the DRB equally. Each DRB board member shall be compensated at an agreed rate of \$1,000.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is greater than four hours. Each DRB board member shall be compensated at an agreed rate of \$600.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is less than or equal to four hours. The agreed rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof, that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time, (such as time spent evaluating and preparing recommendations on specific issues presented to the DRB), has been specifically agreed to in advance by the State and Contractor. Time away from the project, that has been specifically agreed to in advance by the parties, will be compensated at an agreed rate of \$100.00 per hour. The agreed amount of \$100.00 per hour shall include all incidentals including any expenses for telephone, fax and computer services. Members serving on more than one DRB, regardless of the number of meetings per day, shall not be paid more than the all inclusive rate per day or rate per hour for an individual project. The State will provide, at no cost to the Contractor, administrative services such as conference facilities and secretarial services to the DRB. These special provisions and the Disputes Review Board Agreement state provisions for compensation and expenses of the DRB. All DRB members shall be compensated at the same daily and hourly rate. The Contractor shall make direct payments to each DRB member for their participation in authorized meetings and approved hourly rate charges from invoices submitted by each DRB member. The State will reimburse the Contractor for its share of the costs. There will be no markups applied to any expenses connected with the DRB, either by the DRB members or by the Contractor when requesting payment of the State's share of DRB expenses.

Service of a DRB member may be terminated at any time with not less than 14 days notice as follows:

1. The State may terminate service of the State appointed member.
2. The Contractor may terminate service of the Contractor appointed member.
3. Upon the written recommendation of the State and Contractor members for the removal of the third member.
4. Upon resignation of a member.

When a member of the DRB is replaced, the replacement member shall be appointed in the same manner as the replaced member was appointed. The appointment of a replacement DRB member will begin promptly upon determination of the need for replacement and shall be completed within 14 days. Changes in either of the DRB members chosen by the two parties will not require re-selection of the third member, unless both parties agree to such re-selection in writing. The Disputes Review Board Agreement shall be amended to reflect the change of a DRB member.

The following procedure shall be used for dispute resolution:

1. If the Contractor objects to any decision, act or order of the Engineer, the Contractor shall give written notice of potential claim as specified in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications, including provision of applicable cost documentation; or file written protests or notices pursuant to Sections 4-1.03A, "Procedure and Protest", 8-1.06, "Time of Completion", 8-1.07, "Liquidated Damages", or 8-1.10, "Utility and Non-Highway Facilities" of the Standard Specifications.

2. The Engineer will respond, in writing, to the Contractor's written protest or notice within 14 days of receipt of the written protest or notice.
3. Within 14 days after receipt of the Engineer's written response, the Contractor shall, if the Contractor still objects, file a written reply with the Engineer, stating clearly and in detail the basis of the objection.
4. Following the Contractor's objection to the Engineer's decision, the Contractor shall refer the dispute to the DRB if the Contractor wishes to further pursue the objection to the Engineer's decision. The Contractor shall make the referral in writing to the DRB, simultaneously copied to the State, within 21 days after receipt of the written reply from the Engineer. The written dispute referral shall describe the disputed matter in individual discrete segments so that it will be clear to both parties and the DRB what discrete elements of the dispute have been resolved, and which remain unresolved.
5. The Contractor, by failing to submit the written notice of referral of the matter to the DRB within 21 days after receipt of the State's written reply, waives any future claims on the matter in contention.
6. The Contractor and the State shall each be afforded an opportunity to be present and to be heard by the DRB, and to offer evidence. Either party furnishing any written evidence or documentation to the DRB must furnish copies of such information to the other party a minimum of 14 days prior to the date the DRB is scheduled to convene the hearing for the dispute. Either party shall produce such additional evidence as the DRB may deem necessary to reach an understanding and determination of the dispute. The party furnishing additional evidence shall furnish copies of such additional evidence to the other party at the same time the evidence is provided to the DRB. The DRB will not consider any evidence not furnished in accordance with the terms specified herein.
7. The DRB shall furnish a report, containing findings and recommendations as described in the Disputes Review Board Agreement, in writing to both the State and the Contractor. The DRB shall complete its reports, including minority opinion if any, and submit them to the parties within 30 days of the DRB hearing, except that time extensions may be granted at the request of the DRB with the written concurrence of both parties. The report shall include the facts and circumstances related to the matters under consideration, applicable laws and regulations, the pertinent provisions of the Contract and the actual costs and time incurred as shown on the Contractor's cost accounting records.
8. Within 30 days after receiving the DRB's report, both the State and the Contractor shall respond to the DRB in writing signifying that the dispute is either resolved or remains unresolved. Failure to provide the written response within the time specified, or a written rejection of the DRB's recommendation presented in the report by either party, shall conclusively indicate that the party(s) failing to respond accepts the DRB recommendation. Immediately after responses have been received by both parties, the DRB will provide copies of both responses to the parties simultaneously. Either party may request clarification of elements of the DRB's report from the DRB prior to responding to the report. The DRB will consider any clarification request only if submitted within 10 days of receipt of the DRB's report, and if submitted simultaneously in writing to both the DRB and the other party. Each party may submit only one request for clarification for any individual DRB report. The DRB shall respond, in writing, to requests for clarification within 10 days of receipt of such requests.
9. The DRB's recommendations, stated in the DRB's reports, are not binding on either party. Either party may seek a reconsideration of a recommendation of the DRB. The DRB shall only grant a reconsideration based upon submission of new evidence and if the request is submitted within the 30 day time limit specified for response to the DRB's written report. Each party may submit only one request for reconsideration regarding any individual DRB recommendation.
10. If the State and the Contractor are able to resolve their dispute with the aid of the DRB's report, the State and Contractor shall promptly accept and implement the recommendations of the DRB.
11. The State or the Contractor shall not call members who served on the DRB for this contract as witnesses in arbitration proceedings which may arise from this contract, and all documents created by the DRB shall be inadmissible as evidence in subsequent arbitration proceedings, except the DRB's final written reports on each issue brought before it.
12. The State and Contractor shall jointly indemnify and hold harmless the DRB members from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of and resulting from the findings and recommendations of the DRB.
13. The DRB members shall have no claim against the State or the Contractor, or both, from any claimed harm arising out of the parties' evaluations of the DRB's report.

**Disputes Involving Subcontractor Claims.**—For purposes of this section, a "subcontractor claim" shall include any claim by a subcontractor (including also any pass through claims by a lower tier subcontractor or supplier) against the Contractor that is actionable by the Contractor against the Department which arises from the work, services, or materials provided or to be provided in connection with the contract. If the Contractor determines to pursue a dispute against the Department that includes a subcontractor claim, the dispute shall be processed and resolved in accordance with these special provisions and in accordance with the following:

Contract No. <Dist>-<Contract\_No>

1. The Contractor shall identify clearly in all submissions pursuant to this section, that portion of the dispute that involves a subcontractor claim or claims.
2. The Contractor shall include, as part of its submission pursuant to Step 4 above, a certification (False Claims Act Certification) by the subcontractor's or supplier's officer, partner, or authorized representative with authority to bind the subcontractor and with direct knowledge of the facts underlying the subcontractor claim. The Contractor also shall submit a certification that the subcontractor claim is acknowledged and forwarded by the Contractor. The form for these certifications are available from the Engineer.
3. At any DRB meeting on a dispute that includes one or more subcontractor claims, the Contractor shall require that each subcontractor that is involved in the dispute have present an authorized representative with actual knowledge of the facts underlying the subcontractor claim to assist in presenting the subcontractor claim and to answer questions raised by the DRB members or the Department's representatives.
4. Failure by the Contractor to declare a subcontractor claim on behalf of its subcontractor (including lower tier subcontractors' and suppliers' pass through claims) at the time of submission of the Contractor's claims, as provided hereunder, shall constitute a release of the Department by the Contractor on account of such subcontractor claim.
5. The Contractor shall include in all subcontracts under this contract that subcontractors and suppliers of any tier (a) agree to submit subcontractor claims to the Contractor in a proper form and in sufficient time to allow processing by the Contractor in accordance with the Dispute Review Board resolution specifications; (b) agree to be bound by the terms of the Dispute Review Board provisions to the extent applicable to subcontractor claims; (c) agree that, to the extent a subcontractor claim is involved, completion of all steps required under these Dispute Review Board special provisions shall be a condition precedent to pursuit by the subcontractor of any other remedies permitted by law, including without limitation of a lawsuit against the Contractor; and (d) agree that the existence of a dispute resolution process for disputes involving subcontractor claims shall not be deemed to create any claim, right, or cause of action by any subcontractor or supplier against the Department.

Notwithstanding the foregoing, this Dispute Review Board special provision shall not apply to, and the DRB shall not have the authority to consider, any subcontractor claim between the subcontractor(s) or supplier(s) and the Contractor that is not actionable by the Contractor against the Department.

A copy of the "Disputes Review Board Agreement" to be executed by the Contractor, State and the three DRB members after approval of the contract follows:

**DISPUTES REVIEW BOARD AGREEMENT**

\_\_\_\_\_  
(Contract Identification)

Contract No. \_\_\_\_\_

**THIS DISPUTES REVIEW BOARD AGREEMENT, hereinafter called "AGREEMENT"**, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, between the State of California, acting through the California Department of Transportation and the Director of Transportation, hereinafter called the "STATE"; \_\_\_\_\_ hereinafter called the "CONTRACTOR"; and the Disputes Review Board, hereinafter called the "DRB" consisting of the following members:

\_\_\_\_\_,  
(Contractor Appointee)

\_\_\_\_\_,  
(State Appointee)

and \_\_\_\_\_  
(Third Person)

WITNESSETH, that

WHEREAS, the STATE and the CONTRACTOR, hereinafter called the "parties", are now engaged in the construction on the State Highway project referenced above; and

WHEREAS the special provisions for the above referenced contract provides for the establishment and operation of the DRB to assist in resolving disputes; and

WHEREAS, the DRB is composed of three members, one selected by the STATE, one selected by the CONTRACTOR, and the third member selected by the other two members and approved by the parties;

NOW THEREFORE, in consideration of the terms, conditions, covenants, and performance contained herein, or attached and incorporated and made a part hereof, the STATE, the CONTRACTOR, and the DRB members hereto agree as follows:

**I  
DESCRIPTION OF WORK**

To assist in the resolution of disputes between the parties, the contract provides for the establishment and the operation of the DRB. The intent of the DRB is to fairly and impartially consider disputes placed before it and provide written recommendations for resolution of these disputes to both parties. The members of this DRB shall perform the services necessary to participate in the DRB's actions as designated in Section II, Scope of Work.

**II  
SCOPE OF WORK**

The scope of work of the DRB includes, but is not limited to, the following:

**A. Objective**

The principal objective of the DRB is to assist in the timely resolution of disputes between the parties arising from performance of this contract. It is not intended for either party to default on their normal responsibility to amicably and fairly settle their differences by indiscriminately assigning them to the DRB. It is intended that the mere existence of the DRB will encourage the parties to resolve disputes without resorting to this review procedure. But when a dispute which is serious enough to warrant the DRB's review does develop, the process for prompt and efficient action will be in place.

**B. Procedures**

The DRB shall render written reports on disputes between the parties arising from the construction contract. Prior to consideration of a dispute, the DRB shall establish rules and regulations that will govern the conduct of its business and reporting procedures in accordance with the requirements of the contract and the terms of this AGREEMENT. DRB recommendations, resulting from its consideration of a dispute, shall be furnished in writing to both parties. The recommendations shall be based on the pertinent contract provisions, and the facts and circumstances involved in the dispute. The recommendations shall find one responsible party in a dispute; shared or "jury" determinations shall not be rendered.

The DRB shall refrain from officially giving any advice or consulting services to anyone involved in the contract. The individual members shall act in a completely independent manner and while serving as members of the DRB shall have no consulting business connections with either party or its principals or attorneys or any other affiliates (subcontractors, suppliers, etc.) who have a beneficial interest in the contract.

During scheduled meetings of the DRB as well as during dispute hearings, DRB members shall refrain from expressing opinions on the merits of statements on matters under dispute or potential dispute. Opinions of DRB members expressed in private sessions shall be kept strictly confidential. Individual DRB members shall not meet with, or discuss contract issues with individual parties, except as directed by the DRB Chairperson. Any such discussions or meetings shall be disclosed to both parties. Any other discussions regarding the project between the DRB members and the parties shall be in the presence of all three members and both parties. Individual DRB members shall not undertake independent investigations of any kind pertaining to disputes or potential disputes, except with the knowledge of both parties and as expressly directed by the DRB Chairperson.

**C. Construction Site Visits, Progress Meetings and Field Inspections**

The DRB members shall visit the project site and meet with representatives of the parties to keep abreast of construction activities and to develop familiarity with the work in progress. All scheduled progress meetings shall be held at or near the job site. The DRB shall meet at least once at the start of the project, and at least once every six months thereafter. The frequency, exact time, and duration of additional site visits and progress meetings shall be as recommended by the DRB and approved by the parties consistent with the construction activities or matters under consideration and dispute. Each meeting

shall consist of a round table discussion and a field inspection of the work being performed on the contract, if necessary. Each meeting shall be attended by representatives of both parties. The agenda shall generally be as follows:

1. Meeting opened by the DRB Chairperson.
2. Remarks by the STATE's representative.
3. A description by the CONTRACTOR's representative of work accomplished since the last meeting; the current schedule status of the work; and a forecast for the coming period.
4. An outline by the CONTRACTOR's representative of potential problems and a description of proposed solutions.
5. An outline by the STATE's representative of the status of the work as the STATE views it.
6. A brief description by the CONTRACTOR's or STATE's representative of potential claims or disputes which have surfaced since the last meeting.
7. A summary by the STATE's representative, the CONTRACTOR's representative, or the DRB of the status of past disputes and claims.

The STATE's representative will prepare minutes of all regular meetings and circulate them for revision and approval by all concerned.

The field inspection shall cover all active segments of the work, the DRB being accompanied by both parties' representatives. The field inspection may be waived upon mutual agreement of the parties.

#### **D. DRB Consideration and Handling of Disputes**

Upon receipt by the DRB of a written referral of a dispute, the DRB shall convene to review and consider the dispute. The DRB shall determine the time and location of DRB hearings, with due consideration for the needs and preferences of the parties while recognizing the paramount importance of speedy resolution of issues. If the matter is not urgent, it may be scheduled for the time of the next scheduled DRB visit to the project. For an urgent matter, and upon the request of either party, the DRB shall meet at its earliest convenience.

Normally, hearings shall be conducted at or near the project site. However, any location which would be more convenient and still provide all required facilities and access to necessary documentation shall be satisfactory.

Both parties shall be given the opportunity to present their evidence at these hearings. It is expressly understood that the DRB members are to act impartially and independently in the consideration of the contract provisions, and the facts and conditions surrounding any dispute presented by either party, and that the recommendations concerning any such dispute are advisory and nonbinding on the parties.

The DRB may request that written documentation and arguments from both parties be sent to each DRB member, through the DRB Chairperson, for review before the hearing begins. A party furnishing any written documentation to the DRB shall furnish copies of such information to the other party at the same time that such information is supplied to the DRB.

DRB hearings shall be informal. There shall be no testimony under oath or cross-examination. There shall be no reporting of the procedures by a shorthand reporter or by any electronic means. Documents and verbal statements shall be received by the DRB in accordance with acceptance standards established by the DRB. Said standards need not comply with prescribed legal laws of evidence.

The third DRB member shall act as Chairperson for dispute hearings and all other DRB activities. The parties shall have a representative at all hearings. Failure to attend a duly noticed meeting by either of the parties shall be conclusively considered by the DRB as indication that the non-attending party considers any written submittals as their entire and complete argument. The claimant shall discuss the dispute, followed by the other party. Each party shall then be allowed one or more rebuttals until all aspects of the dispute are thoroughly covered. DRB members may ask questions, seek clarification, or request further data from either of the parties. The DRB may request from either party documents or information that would assist the DRB in making its findings and recommendations including, but not limited to, documents used by the CONTRACTOR in preparing the bid for the project. A refusal by a party to provide information requested by the DRB may be considered by the DRB as an indication that the requested material would tend to disprove that party's position. Claims shall not necessarily be computed by merely subtracting bid price from the total cost of the affected work. However, if any claims are based on the "total cost method", then, to be considered by the DRB, they shall be supported by evidence furnished by the CONTRACTOR that (1) the nature of the dispute(s) makes it impossible or impracticable to determine cost impacts with a reasonable degree of accuracy, (2) the CONTRACTOR's bid estimate was realistic, (3) the CONTRACTOR's actual costs were reasonable, and (4) the CONTRACTOR was not responsible for the added expenses. As to any claims based on the CONTRACTOR's field or home office accounting records, those claims shall be supported by an audit report of an independent Certified Public Accountant unless the contract includes special provisions that provide for an alternative method to calculate unabsorbed home office overhead. Any of those claims shall also be subject to audit by the DRB with the concurrence of the parties. In large or complex cases, additional hearings may be necessary in order to

consider all the evidence presented by both parties. All involved parties shall maintain the confidentiality of all documents and information, as provided in this AGREEMENT.

During dispute hearings, no DRB member shall express an opinion concerning the merit of any facet of the case. All DRB deliberations shall be conducted in private, with all interim individual views kept strictly confidential.

After hearings are concluded, the DRB shall meet in private and reach a conclusion supported by two or more members. Private sessions of the DRB may be held at a location other than the job site or by electronic conferencing as deemed appropriate, in order to expedite the process.

The DRB's findings and recommendations, along with discussion of reasons therefor, shall then be submitted as a written report to both parties. Recommendations shall be based on the pertinent contract provisions, applicable laws and regulations, and facts and circumstances related to the dispute. The report shall be thorough in discussing the facts considered, the contract language, law or regulation viewed by the DRB as pertinent to the issues, and the DRB's interpretation and philosophy in arriving at its conclusions and recommendations. The DRB's report shall stand on its own, without attachments or appendices. The DRB chairman shall complete and furnish a summary report to the DRB Program Manager, Construction Program, M.S. 44, P.O. Box 942874, Sacramento, CA 94274.

With prior written approval of both parties, the DRB may obtain technical services necessary to adequately review the disputes presented; including audit, geotechnical, schedule analysis and other services. The parties' technical staff may supply those services as appropriate. The cost of any technical services, as agreed to by the parties, shall be borne equally by the two parties as specified in an approved contract change order. The CONTRACTOR will not be entitled to markups for the payments made for these services.

The DRB shall resist submittal of incremental portions of information by either party, in the interest of making a fully-informed decision and recommendation.

The DRB shall make every effort to reach a unanimous decision. If this proves impossible, the dissenting member shall prepare a minority opinion, which shall be included in the DRB's report.

Although both parties should place weight upon the DRB's recommendations, they are not binding. Either party may appeal a recommendation to the DRB for reconsideration. However, reconsideration shall only be allowed when there is new evidence to present, and the DRB shall accept only one appeal from each party pertaining to any individual DRB recommendation. The DRB shall hear appeals in accordance with the terms described in the Section entitled "Disputes Review Board" in the special provisions.

#### **E. DRB Member Replacement**

Should the need arise to appoint a replacement DRB member, the replacement DRB member shall be appointed in the same manner as the original DRB members were appointed. The selection of a replacement DRB member shall begin promptly upon notification of the necessity for a replacement and shall be completed within 14 days. This AGREEMENT will be amended to indicate change in DRB membership.

### **III CONTRACTOR RESPONSIBILITIES**

The CONTRACTOR shall furnish to each DRB member one copy of all pertinent documents which are or may become necessary for the DRB to perform their function. Pertinent documents are any drawings or sketches, calculations, procedures, schedules, estimates, or other documents which are used in the performance of the work or in justifying or substantiating the CONTRACTOR's position. The CONTRACTOR shall also furnish a copy of such pertinent documents to the STATE, in accordance with the terms outlined in the special provisions.

### **IV STATE RESPONSIBILITIES**

The STATE will furnish the following services and items:

#### **A. Contract Related Documents**

The STATE will furnish to each DRB member one copy of Notice to Contractors and Special Provisions, Proposal and Contract, Plans, Standard Specifications, and Standard Plans, change orders, written instructions issued by the STATE to the CONTRACTOR, or other documents pertinent to any dispute that has been referred to the DRB and necessary for the DRB to perform its function.

## **B. Coordination and Services**

The STATE, through the Engineer, will, in cooperation with the CONTRACTOR, coordinate the operations of the DRB. The Engineer will arrange or provide conference facilities at or near the project site and provide secretarial and copying services to the DRB without charge to the CONTRACTOR.

## **V TIME FOR BEGINNING AND COMPLETION**

Once established, the DRB shall be in operation until the day of acceptance of the contract. The DRB members shall not begin any work under the terms of this AGREEMENT until authorized in writing by the STATE.

## **VI PAYMENT**

### **A. All Inclusive Rate Payment**

The STATE and the CONTRACTOR shall bear the costs and expenses of the DRB equally. Each DRB board member shall be compensated at an agreed rate of \$1,000.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is greater than four hours. Each DRB board member shall be compensated at an agreed rate of \$600.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is less than or equal to four hours. The agreed rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof, that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time has been specifically agreed to in advance by the STATE and CONTRACTOR. Time away from the project, that has been specifically agreed to in advance by the parties, will be compensated at an agreed rate of \$100.00 per hour. The agreed amount of \$100.00 per hour shall include all incidentals including any expenses for telephone, fax and computer services. Members serving on more than one DRB, regardless of the number of meetings per day, shall not be paid more than the all inclusive rate per day or rate per hour for an individual project. The STATE will provide, at no cost to the CONTRACTOR, administrative services such as conference facilities and secretarial services to the DRB.

### **B. Payments**

All DRB members shall be compensated at the same rate. The CONTRACTOR shall make direct payments to each DRB member for their participation in authorized meetings and approved hourly rate charges from invoices submitted by each DRB member. The STATE will reimburse the CONTRACTOR for its share of the costs of the DRB.

The DRB members may submit invoices to the CONTRACTOR for partial payment for work performed and services rendered for their participation in authorized meetings not more often than once per month during the progress of the work. The invoices shall be in a format approved by the parties and accompanied by a general description of activities performed during that billing period. Payment for any hourly fees, at the agreed rate, shall not be paid to a DRB member until the amount and extent of those fees are approved by the STATE and CONTRACTOR.

Invoices shall be accompanied by original supporting documents, which the CONTRACTOR shall include with the extra work billing when submitting for reimbursement of the STATE's share of cost from the STATE. The CONTRACTOR will be reimbursed for one-half of approved costs of the DRB. No markups will be added to the CONTRACTOR's payment.

### **C. Inspection of Costs Records**

The DRB members and the CONTRACTOR shall keep available for inspection by representatives of the STATE and the United States, for a period of three years after final payment, the cost records and accounts pertaining to this AGREEMENT. If any litigation, claim, or audit arising out of, in connection with, or related to this contract is initiated before the expiration of the three-year period, the cost records and accounts shall be retained until such litigation, claim, or audit involving the records is completed.

## **VII ASSIGNMENT OF TASKS OF WORK**

The DRB members shall not assign any of the work of this AGREEMENT.

**VIII**  
**TERMINATION OF AGREEMENT, THE DRB, AND DRB MEMBERS**

DRB members may resign from the DRB by providing not less than 14 days written notice of the resignation to the STATE and CONTRACTOR. DRB members may be terminated by their original appointing power, in accordance with the terms of the contract.

**IX**  
**LEGAL RELATIONS**

The parties hereto mutually understand and agree that the DRB member in the performance of duties on the DRB, is acting in the capacity of an independent agent and not as an employee of either party.

No party to this AGREEMENT shall bear a greater responsibility for damages or personal injury than is normally provided by Federal or State of California Law.

Notwithstanding the provisions of this contract that require the CONTRACTOR to indemnify and hold harmless the STATE, the parties shall jointly indemnify and hold harmless the DRB members from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of and resulting from the findings and recommendations of the DRB.

**X**  
**CONFIDENTIALITY**

The parties hereto mutually understand and agree that all documents and records provided by the parties in reference to issues brought before the DRB, which documents and records are marked "Confidential - for use by the DRB only", shall be kept in confidence and used only for the purpose of resolution of subject disputes, and for assisting in development of DRB findings and recommendations; that such documents and records will not be utilized or revealed to others, except to officials of the parties who are authorized to act on the subject disputes, for any purposes, during the life of the DRB. Upon termination of this AGREEMENT, said confidential documents and records, and all copies thereof, shall be returned to the parties who furnished them to the DRB. However, the parties understand that such documents shall be subsequently discoverable and admissible in court or arbitration proceedings unless a protective order has been obtained by the party seeking further confidentiality.

**XI**  
**DISPUTES**

Any dispute between the parties hereto, including disputes between the DRB members and either party or both parties, arising out of the work or other terms of this AGREEMENT, which cannot be resolved by negotiation and mutual concurrence between the parties, or through the administrative process provided in the contract, shall be resolved by arbitration as provided in Section 9-1.10, "Arbitration," of the Standard Specifications.

**XII**  
**VENUE, APPLICABLE LAW, AND PERSONAL JURISDICTION**

In the event that any party, including an individual member of the DRB, deems it necessary to institute arbitration proceedings to enforce any right or obligation under this AGREEMENT, the parties hereto agree that any such action shall be initiated in the Office of Administrative Hearings of the State of California. The parties hereto agree that all questions shall be resolved by arbitration by application of California law and that the parties to such arbitration shall have the right of appeal from such decisions to the Superior Court in accordance with the laws of the State of California. Venue for the arbitration shall be Sacramento or any other location as agreed to by the parties.

**XIII**  
**FEDERAL REVIEW AND REQUIREMENTS**

On Federal-Aid contracts, the Federal Highway Administration shall have the right to review the work of the DRB in progress, except for any private meetings or deliberations of the DRB.

All other Federal requirements in this agreement shall only apply to Federal-Aid contracts.

**XIV  
CERTIFICATION OF THE CONTRACTOR,  
THE DRB MEMBERS, AND THE STATE**

IN WITNESS WHEREOF, the parties hereto have executed this AGREEMENT as of the day and year first above written.

DRB MEMBER

DRB MEMBER

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title : \_\_\_\_\_

DRB MEMBER

By : \_\_\_\_\_

Title : \_\_\_\_\_

CONTRACTOR

CALIFORNIA STATE DEPARTMENT  
OF TRANSPORTATION

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

**5-1.19 FORCE ACCOUNT PAYMENT**

The second, third and fourth paragraphs of Section 9-1.03A, "Work Performed by Contractor," in the Standard Specifications, shall not apply.

Attention is directed to "Overhead" of these special provisions.

To the total of the direct costs for work performed on a force account basis, computed as provided in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental," of the Standard Specifications, there will be added the following markups:

Cost	Percent Markup
Labor	28
Materials	10
Equipment Rental	10

The above markups shall be applied to all work performed on a force account basis, regardless of whether the work revises the current contract completion date.

The above markups, together with payments made for time-related overhead pursuant to "Overhead" of these special provisions, shall constitute full compensation for all overhead costs for work performed on a force account basis. These overhead costs shall be deemed to include all items of expense not specifically designated as cost or equipment rental in conformance with the provisions in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental," of the Standard Specifications. The total payment made as provided above and in the first paragraph of Section 9-1.03A, "Work Performed by Contractor," of the Standard Specifications shall be deemed to be the actual cost of the work performed on a force account basis, and shall constitute full compensation therefor. Full compensation for all overhead costs for work performed on a force account basis, and for which no adjustment is made to the quantity of time-related overhead pursuant to "Overhead" of these special provisions, shall be considered as included in the markups specified above, and no additional compensation will be allowed therefor.

When extra work to be paid for on a force account basis is performed by a subcontractor, approved in conformance with the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, an additional markup of 7 percent will be added to the total cost of that extra work including all markups specified in this section "Force Account Payment". The additional 7 percent markup shall reimburse the Contractor for additional administrative costs, and no other additional payment will be made by reason of performance of the extra work by a subcontractor.

**5-1.20 COMPENSATION ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS**

The provisions of this section shall apply only to the following contract item:

ITEM    ITEM  
CODE

390152    ASPHALT CONCRETE

The compensation payable for said asphalt concrete will be subject to being increased or decreased in accordance with the provisions of this section for paving asphalt price fluctuations exceeding 5 percent (Iu/Ib is greater than 1.05 or less than 0.95) which occur during performance of the work.

The adjustment in compensation will be determined in accordance with the following formulae when the item of asphalt concrete is included in a monthly estimate:

Total monthly adjustment = AQ

For an increase in paving asphalt price index exceeding 5 percent

A = 0.90 (Iu/Ib - 1.05) Ib

For a decrease in paving asphalt price index exceeding 5 percent

A = 0.90 (Iu/Ib - 0.95) Ib

Where A = Adjustment in dollars per ton of paving asphalt used to produce asphalt concrete rounded to the nearest \$0.01.

Iu = The California Statewide Paving Asphalt Price Index which is in effect on the first business day of the month within the pay period in which the quantity subject to adjustment was included in the estimate.

Ib = The California Statewide Paving Asphalt Price Index for the month in which the bid opening for the project occurred.

Q = Quantity in tons of paving asphalt that was used in producing the quantity of asphalt concrete shown under "This Estimate" on the monthly estimate using the amount of asphalt determined by the Engineer.

The adjustment in compensation will also be subject to the following:

1. The compensation adjustments provided herein, will be shown separately on payment estimates. The Contractor shall be liable to the State for decreased compensation adjustments and the Department may deduct the amount thereof from any moneys due or that may become due the Contractor.
2. Compensation adjustments made under this section will be taken into account in making adjustments under Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

3. The total price adjustment for price index increases of paving asphalt on this project shall not exceed \$137,000
4. In the event of an overrun of contract time, adjustment in compensation for paving asphalt included in estimates during the overrun period will be determined using the California Statewide Paving Asphalt Price Index in effect on the first business day of the month within the pay period in which the overrun began.

The California Statewide Paving Asphalt Price Index is determined each month on the first business day of the month by the Department using the median of posted prices in effect as posted by Chevron, Mobil and Unocal for the Buena Vista, Huntington Beach, Kern River, Long Beach, Midway Sunset and Wilmington fields.

In the event that any of the companies discontinue posting their prices for any field, the Department will determine an index from the remaining posted prices. The Department reserves the right to include in the index determination the posted prices of additional fields.

**5-1.21 AREAS FOR CONTRACTOR'S USE**

Attention is directed to the requirements specified in Section 7-1.19, "Rights in Land and Improvements," of the Standard Specifications and these special provisions.

The highway right of way shall be used only for purposes that are necessary to perform the required work. The Contractor shall not occupy the right of way, or allow others to occupy the right of way, for purposes which are not necessary to perform the required work.

There are no State-owned parcels adjacent to the right of way for the exclusive use of the Contractor within the contract limits. The Contractor shall secure at his own expense any area required for plant sites, storage of equipment or materials, or for other purposes.

No area is available within the contract limits for the exclusive use of the Contractor. However, temporary storage of equipment and materials on State property may be arranged with the Engineer, subject to the prior demands of State maintenance forces and to all other contract requirements. Use of the Contractor's work areas and other State-owned property shall be at the Contractor's own risk, and the State shall not be held liable for any damage to or loss of materials or equipment located within such areas.

The Contractor shall remove all equipment, materials, and rubbish from the work areas and other State-owned property which he occupies and shall leave the areas in a presentable condition, in accordance with the provisions in Section 4-1.02, "Final Cleaning Up," of the Standard Specifications.

The Contractor shall secure at his own expense any area required for plant sites, storage of equipment or materials, or for other purposes if sufficient area is not available to him within the contract limits, or at the sites designated on the plans outside the contract limits.

**5-1.22 PAYMENTS**

Attention is directed to Section 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these special provisions.

For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of said contract item of work which will be recognized for progress payment purposes.

Clearing and Grubbing	\$ 127,800
Bridge Removal, Location A	\$ 133,650
Bridge Removal (Portion), Location B	\$ 27,000

After acceptance of the contract pursuant to Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes herein above listed for said item, will be included for payment in the first estimate made after acceptance of the contract.

In determining the partial payments to be made to the Contractor, only the following listed materials will be considered for inclusion in said payment as materials furnished but not incorporated in the work:

- Bar reinforcing steel
- Culvert pipes and appurtenances
- Edge drain pipe
- Welded steel pipe
- Metal sign structures
- Signal and lighting standards
- Signal heads and mounting brackets
- Prestressing steel for cast-in-place members (sealed packages only)

Prestress anchorages and ducts  
Type B Joint Seals  
Miscellaneous iron and steel  
Railings  
Pavement markers  
Splice vaults  
Fiber optic cable

### **5-1.23 SOUND CONTROL REQUIREMENTS**

Sound control shall conform to the provisions in Section 7-1.01I, "Sound Control Requirements," of the Standard Specifications and these special provisions.

The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dbA at a distance of 50 feet. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise level.

Said noise level requirement shall apply to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

### **5-1.24 STRUCTURE DEMOLITION ASBESTOS REPORTING REQUIREMENTS**

Asbestos-containing material (ACM), as defined in Section 1529, "Asbestos," of the Construction Safety Orders, Title 8, of the California Code of Regulations, is present within the structure. The South Coast Air Quality Management District (SCAQMD) has determined that all bridge demolition work must comply with Federal asbestos regulations. Permits- The contractor shall notify the SCAQMD as required by NESHAP, 40CFR Part 61, and California Air Resources Control Board rules. The AQMD submittal form will be supplied to the Contractor. A copy of the notification form and attachments shall be provided to the Engineer prior to submittal to the Air District. Notification of SCAQMD shall take place a minimum of 10 days prior to demolition. The SCAQMD is located at 21865 Cooley Drive, Diamond Bar, CA 91785-4182. They may be reached via telephone at (909) 396-2336 if there are any questions regarding notification procedures.

Fees- The Contractor shall submit a fee of \$26.20 with the notification forms to SCAQMD. This fee must accompany the notification forms, or they will not be processed

Safety- Attention is directed to Section 7-1.06, "Safety and Health Provisions," of the Standard Specifications. Work practices and worker health and safety during any work that results in disturbance of ACM shall conform to Section 1529, "Asbestos," of the Construction Safety Orders, Title 8, of the California Code of Regulations. Written notification of exposure monitoring results shall be submitted to the Engineer upon its completion. Any required written certification of the adequacy of alternative work practices shall be submitted to the Engineer before performing any work. The Contractor shall certify in writing that the personnel performing the work have completed a training program appropriate for the work involved.

The requirements of subsection (d), "Multi-Employer Worksites," of Section 1529, "Asbestos," of the Construction Safety Orders, Title 8, of the California Code of Regulations shall be observed during performance of the work. This shall not be construed as relieving the Contractor from the Contractor's responsibilities as provided in Section 8-1.01, "Subcontracting," of the Standard Specifications.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for various contract items of work involved and no additional compensation will be allowed therefor.

### **5-1.25 AERIALY DEPOSITED LEAD**

Aerially deposited lead is present within the project limits. Aerially deposited lead is lead deposited within unpaved areas, primarily due to vehicle emissions.

Portions of the Site Investigation Report are included in the "Material Information Handout." The complete report, entitled " Site Investigation Report " is available for inspection at the Department of Transportation, District 8, 464 West Fourth Street, San Bernardino, California 92401-1400 at the Environmental Engineering Section located on the eighth floor, phone (909) 383-6385.

The Department has received from the California Department of Toxic Substances Control (DTSC) a variance regarding the use of aerially deposited lead. This project is subject to the conditions of the variance, as amended. The Variance is available for inspection at the Department of Transportation, District 8, 464 West Fourth Street, San Bernardino, California 92401-1400 at the Environmental Engineering Section located on the eighth floor, phone (909) 383-6385.

Once the Contractor has completed the placement of material containing aerially deposited lead in conformance with these special provisions and as directed by the Engineer, the Contractor shall have no responsibility for such materials in

place. The Department will not consider the Contractor a generator of such contaminated soils. Further cleanup, removal or remedial actions for such materials will not be required if handled or disposed of as specified herein.

Attention is directed to "Material Containing Aerially Deposited Lead" of these special provisions.

Excavation, reuse, and disposal of material with aerially deposited lead shall be in conformance with all rules and regulations including, but not limited to, those of the following agencies:

United States Department of Transportation (USDOT)  
United States Environmental Protection Agency (USEPA)  
California Environmental Protection Agency (Cal-EPA)  
California Department of Health Services  
Department of Toxic Substances Control (DTSC), Region 9  
California Division of Occupational Safety and Health Administration (Cal-OSHA)  
Integrated Waste Management Board  
Regional Water Quality Control Board (RWQCB), Region 9  
State Air Resources Control Board  
South Coast Air Quality Management District (SCAQMD)

Materials containing hazardous levels of lead shall be transported and disposed of in conformance with Federal and State laws and regulations, as amended, and county and municipal ordinances and regulations, as amended. Laws and regulations that govern this work include, but are not limited to:

Health and Safety Code, Division 20, Chapter 6.5 (California Hazardous Waste Control Act)  
Title 22, California Code of Regulations, Chapter 30 (Minimum Standard for Management of Hazardous and Extremely Hazardous Materials)  
Title 8, California Code of Regulations

**SECTION 6. (BLANK)**

**SECTION 7. (BLANK)**

**SECTION 8. MATERIALS**

**SECTION 8-1. MISCELLANEOUS**

**8-1.01 APPROVED TRAFFIC PRODUCTS**

The Department maintains the following list of Approved Traffic Products. The Engineer shall not be precluded from sampling and testing products on the list of Approved Traffic Products.

The manufacturer of products on the list of Approved Traffic Products shall furnish the Engineer a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each type of traffic product supplied.

Signing and delineation materials and products shall not be used in the work unless the material or product is on the list of Approved Traffic Products.

Materials and products may be added to the list of Approved Traffic Products if the manufacturer submits a New Product Information Form to the New Product Coordinator at the Transportation Laboratory. Upon a Departmental request for samples, sufficient samples shall be submitted to permit performance of required tests. Approval of materials or products will depend upon compliance with the specifications and tests the Department may elect to perform.

**PAVEMENT MARKERS, PERMANENT TYPE**

**Retroreflective**

- A. Apex, Model 921 (4" x4")
- B. Ray-O-Lite, Models SS (4"x4"), RS (4" x4") and AA (4"x4")
- C. Stimsonite, Models 88 (4"x4"), 911 (4"x4"), 953 (2.75"x4.5")
- D. 3M Series 290 (3.5" x4")

**Retroreflective With Abrasion Resistant Surface (ARS)**

- A. Ray-O-Lite "AA" ARS (4" x4")
- B. Stimsonite, Models 911 (4"x4"), 953 (2.75"x4.5")
- C. 3M Series 290 (3.5"x4")

### **Retroreflective With Abrasion Resistant Surface (ARS)**

(Used for recessed applications)

- A. Stimsonite, Model 948 (2.3"x4.7")
- B. Ray-O-Lite, Model 2002 (2.2"x4.7")
- C. Stimsonite, Model 944SB (2"x4")\*
- D. Ray-O-Lite, Model 2004 ARS (2"x4")\*

\*For use only in 4.5"wide (older) recessed slots

### **Non-Reflective For Use With Epoxy Adhesive, 4" Round**

- A. Apex Universal (Ceramic)
- B. Highway Ceramics, Inc. (Ceramic)

### **Non-Reflective For Use With Bitumen Adhesive, 4" Round**

- A. Apex Universal (Ceramic)
- B. Apex Universal, Model 929 (ABS)
- C. Elgin Molded Plastics, "Empco-Lite" Model 900 (ABS)
- D. Highway Ceramics, Inc. (Ceramic)
- E. Hi-Way Safety, Inc., Models P20-2000W and 2001Y (ABS)
- F. Interstate Sales, "Diamond Back" (ABS) and (Polypropylene)
- G. Alpine Products, D-Dot (ABS)
- H. Road Creations, Model RCB4NR (Acrylic)

## **PAVEMENT MARKERS, TEMPORARY TYPE**

### **Temporary Markers For Long Term Day/Night Use (6 months or less)**

- A. Apex Universal, Model 924 (4"x4")
- B. Davidson Plastics Corp., Model 3.0 (4"x4")
- C. Elgin Molded Plastics, "Empco-Lite" Model 901 (4"x4")
- D. Road Creations, Model R41C (4"x4")
- E. Vega Molded Products "Temporary Road Marker" (3"x4")

### **Temporary Markers For Short Term Day/Night Use (14 days or less)**

(For seal coat or chip seal applications, clear protective covers are required)

- A. Apex Universal, Model 932
- B. Davidson Plastics, Models T.O.M., T.R.P.M., and "HH" (High Heat)
- C. Hi-Way Safety, Inc., Model 1280/1281

## **STRIPING AND PAVEMENT MARKING MATERIALS**

### **Permanent Traffic Striping and Pavement Marking Tape**

- A. Advanced Traffic Marking, Series 300 and 400
- B. Brite-Line, Series 1000
- C. Swarco Industries, "Director 35" (For transverse application only)
- D. Swarco Industries, "Director 60"
- E. 3M, "Stamark" Series 380 and 5730
- F. 3M, "Stamark" Series 420 (For transverse application only)

### **Temporary (Removable) Striping and Pavement Marking Tape (6 months or less)**

- A. Brite-Line, Series 100
- B. P.B. Laminations, Aztec, Grade 102
- C. Swarco Industries, "Director-2"
- D. 3M, "Stamark," Series 620
- E. 3M Series A145 Removable Black Line Mask  
(Black Tape: For use only on Asphalt Concrete Surfaces)
- F. Advanced Traffic Marking Black "Hide-A-Line"  
(Black Tape: For use only on Asphalt Concrete Surfaces)

**Preformed Thermoplastic (Heated in place)**

- A. Flint Trading, "Premark" and "Premark 20/20 Flex"
- B. Pavemark, "Hotape"

**Removable Traffic Paint**

- A. Belpro, Series 250/252 and No. 93 Remover

**CLASS 1 DELINEATORS**

**One Piece Driveable Flexible Type, 66"**

- A. Carsonite, Curve-Flex CFRM-400
- B. Carsonite, Roadmarker CRM-375
- C. Davidson Plastics, "Flexi-Guide Models 400 and 566"
- D. FlexStake, Model 654TM
- E. GreenLine Models HWD1-66 and CGD1-66
- F. J. Miller Industries, Model JMI-375 (with soil anchor)

**Special Use Flexible Type, 66"**

- A. Carsonite, "Survivor" (with 18" U-Channel base)
- B. FlexStake, Model 604
- C. GreenLine Models HWD and CGD (with 18" U-Channel base)
- D. Safe-Hit with 8" pavement anchor (SH248-GP1)
- E. Safe-Hit with 15" soil anchor (SH248-GP2) and with 18" soil anchor (SH248-GP3)

**Surface Mount Flexible Type, 48"**

- A. Bent Manufacturing Company, "Masterflex" Model MF-180EX-48
- B. Carsonite, "Super Duck II"
- C. FlexStake, Surface Mount, Models 704 and 754TM

**CHANNELIZERS**

**Surface Mount Type, 36"**

- A. Bent Manufacturing Company, "Masterflex" Models MF-360-36 (Round) and MF-180-36 (Flat)
- B. Carsonite, "Super Duck" (Flat SDF-436, Round SDR-336)
- C. Carsonite, "Super Duck II" Model SDCF203601MB "The Channelizer"
- D. Davidson Plastics, Flex-Guide Models FG300LD and FG300UR
- E. FlexStake, Surface Mount, Models 703 and 753TM
- F. GreenLine, Model SMD-36
- G. Hi-Way Safety, Inc. "Channel Guide Channelizer" Model CGC36
- H. The Line Connection, "Dura-Post" Model DP36-3 (Permanent)
- I. The Line Connection, "Dura-Post" Model DP36-3C (Temporary)
- J. Repo, Models 300 and 400
- K. Safe-Hit, Guide Post, Model SH236SMA

**CONICAL DELINEATORS, 42"**

(For 28" Traffic Cones, see Standard Specifications)

- A. Bent Manufacturing Company "T-Top"
- B. Plastic Safety Systems "Navigator-42"
- C. Roadmaker Company "Stacker"
- D. Traffix Devices "Grabber"

**OBJECT MARKERS**

**Type "K", 18"**

- A. Carsonite, Model SMD-615
- B. FlexStake, Model 701KM
- C. Repo, Models 300 and 400
- D. Safe-Hit, Model SH718SMA
- E. The Line Connection, Model DP21-4K

**Type "K-4" / "Q", 24"**

(Shown as Type "Q" in the Traffic Manual)

- A. Bent Manufacturing "Masterflex" Model MF-360-24
- B. Carsonite, Super Duck II
- C. FlexStake, Model 701KM
- D. Repo, Models 300 and 400
- E. Safe-Hit, Models SH8 24SMA\_WA and SH8 24GP3\_WA
- F. The Line Connection, Model DP21-4Q

**TEMPORARY RAILING (TYPE K) REFLECTORS AND CONCRETE BARRIER MARKERS**

**Impactable Type**

- A. ARTUK, "FB"
- B. Davidson Plastics, Model PCBM-12
- C. Duraflex Corp., "Flexx 2020" and "Electriflexx"
- D. Hi-Way Safety, Inc., Model GMKRM100

**Non-Impactable Type**

- A. ARTUK, JD Series
- B. Stimsonite, Model 967 (with 3 1/4" Acrylic cube corner reflector)
- C. Stimsonite, Model 967LS
- D. Vega Molded Products, Models GBM and JD

**THREE BEAM BARRIER MARKERS**

(For use to the left of traffic)

- A. Duraflex Corp., "Railrider"
- B. Davidson Plastics, "Mini" (3"x10")

**CONCRETE BARRIER DELINEATORS, 16"**

(For use to the right of traffic. When mounted on top of barrier, places top of reflective element at 48")

- A. Davidson Plastics, Model PCBM T-16
- B. Safe-Hit, Model SH216RBM

**CONCRETE BARRIER-MOUNTED MINI-DRUM (10 1/2" x14 1/4" x22 3/4")**

- A. Stinson Equipment Company "SaddleMarker"

**SOUND WALL DELINEATOR**

(Applied to a vertical surface. Top of reflective element at 48")

- A. Davidson Plastics, PCBM S-36

**GUARD RAILING DELINEATOR**

(Top of reflective element at 48" above plane of roadway)

**Wood Post Type, 686 mm**

- A. Carsonite, Model 427
- B. Davidson Plastics FG 427 and FG 527
- C. FlexStake, Model 102 GR
- D. GreenLine GRD 27
- E. J.Miller Model JMI-375G
- F. Safe-Hit, Model SH227GRD

**Steel Post Type**

- A. Carsonite, Model CFGR-327 with CFGRBK300 Mounting Bracket

## **RETROREFLECTIVE SHEETING**

### **Channelizers, Barrier Markers, and Delineators**

- A. 3M, High Intensity
- B. Reflexite, PC-1000 Metalized Polycarbonate
- C. Reflexite, AC-1000 Acrylic
- D. Reflexite, AP-1000 Metalized Polyester
- E. Reflexite, AR-1000 Abrasion Resistant Coating
- F. Stimsonite, Series 6200 (For rigid substrate devices only)

### **Traffic Cones, 13" Sleeves**

- A. Reflexite SB (Polyester), Vinyl or "TR" (Semi-transparent)

### **Traffic Cones, 4" and 6" Sleeves**

- A. 3M Series 3840
- B. Reflexite Vinyl, "TR" (Semi-transparent) or "Conformalite"

### **Barrels and Drums**

- A. Reflexite, "Super High Intensity" or "High Impact Drum Sheeting"
- B. 3M Series 3810

### **Barricades: Type I, Engineer Grade**

- A. American Decal, Adcolite
- B. Avery Dennison, 1500 and 1600
- C. 3M, Scotchlite, Series CW

### **Barricades: Type II, Super Engineer Grade**

- A. Avery Dennison, "Fasign" 2500 Series
- B. Kiwalite Type II
- C. Nikkalite 1800 Series

### **Signs: Type II, Super Engineer Grade**

- A. Avery Dennison, "Fasign" 2500 Series
- B. Kiwalite, Type II
- C. Nikkalite 1800 Series

### **Signs: Type III, High-Intensity Grade**

- A. 3M Series 3800
- B. Nippon Carbide, Nikkalite Brand Ultralite Grade II

### **Signs: Type IV, High-Intensity Prismatic Grade**

- A. Stimsonite Series 6200

### **Signs: Type VII, High-Intensity Prismatic Grade**

- A. 3M Series 3900

### **Signs: Type VI, Roll-Up Signs**

- A. Reflexite, Vinyl (Orange), Reflexite "SuperBright" (Fluorescent orange)
- B. 3M Series RS34 (Orange) and RS20 (Fluorescent orange)

## **SIGN SUBSTRATE FOR CONSTRUCTION AREA SIGNS**

### **Aluminum**

### **Fiberglass Reinforced Plastic (FRP)**

- A. Sequentia, "Polyplate"
- B. Fiber-Brite

### 8-1.02 STATE-FURNISHED MATERIALS

Attention is directed to Section 6-1.02, "State-Furnished Materials," of the Standard Specifications and these special provisions.

The following materials will be furnished to the Contractor:

Markers for placement on concrete barrier.  
Sign panels for roadside signs and overhead sign structures.  
Mast arm sign hanger assemblies.

Hardware for mounting sign panels as follows:

1. Blind rivets for mounting overlapping legend at sign panel joints.
2. Closure inserts.
3. Aluminum bolts and nuts and steel beveled washers for mounting laminated sign panels on overhead sign structures.

Padlocks for backflow preventer assembly enclosures, walk gates, and irrigation controller enclosure cabinets.

Lamps for vehicular traffic signal units and for Type A pedestrian signal units.

Loop detector unit sensors.

Model 170 controller assemblies, including controller unit, completely wired controller cabinet, and inductive loop detector sensor units.

Self-adhesive reflective numbers and edge sealer for numbering lighting equipment.

Said materials will be furnished to the Contractor at the Department of Transportation's Redistribution Warehouse, 175 West Cluster Street, San Bernardino, California, phone (909) 383-4630.

### 8-1.03 SLAG AGGREGATE

Air-cooled iron blast furnace slag shall not be used to produce aggregate for:

1. Structure backfill material.
2. Pervious backfill material.
3. Permeable material.
4. Any reinforced or prestressed portland cement concrete component or structure.

Aggregate produced from slag resulting from any steel-making process shall not be used for any highway construction except for the following items:

1. Class 2 Aggregate Base.
2. Asphalt Concrete.

Steel slag to be used to produce aggregate for Class 2 aggregate base shall be crushed so that 100 percent of the material will pass a 3/4 inch sieve and then shall be control aged for a period of at least 3 months under conditions that will maintain all portions of the stockpiled material at a moisture content in excess of 6 percent of the dry weight of the aggregate.

Any supplier of steel slag aggregate shall provide separate stockpiles for controlled aging of the slag. An individual stockpile shall contain not less than 10,000 nor more than 50,000 tons of slag. The material in each individual stockpile shall be assigned a unique lot number and each stockpile shall be identified with a permanent system of signs. The supplier shall maintain a permanent record of the dates on which stockpiles are completed and controlled aging begun, of the dates when controlled aging was completed, and of the dates tests were made and the results of these tests. Moisture tests shall be made at least once per week. No credit for aging will be given for the time period covered by any tests which show a moisture content of 6 percent or less. Such stockpiles and records shall be available to the Engineer during normal working hours for inspection, check testing and review.

The supplier shall notify the Transportation Laboratory, 5900 Folsom Boulevard, Sacramento, California 95819, when each stockpile is completed and controlled aging begun. No more aggregate shall be added to the stockpile unless a new aging period is initiated. A further notification shall be sent when controlled aging is completed.

The supplier shall provide a Certificate of Compliance in conformance with the requirements in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. Each stockpile or portion of a stockpile that is used in the work will be considered a lot. Said Certificates of Compliance shall state that the steel slag aggregate has been aged in a stockpile for at least 3 months at a moisture content in excess of 6 percent of the dry weight of the aggregate.

Each delivery of aggregate containing steel slag for use as Class 2 aggregate base shall be accompanied by a delivery tag for each load which will identify the lot of material by stockpile number, where the slag was aged, and the date that the stockpile was completed and controlled aging begun.

Air-cooled iron blast furnace slag or natural aggregate may be blended in proper combinations with steel slag aggregate to produce the specified gradings, for those items for which steel slag aggregate is permitted, unless otherwise provided.

Aggregate containing slag shall meet all of the applicable quality requirements for the items in which the aggregate is used.

The combined slag aggregate shall conform to the specified grading for the item in which it is used. The grading will be determined by California Test 202, modified by California Test 105 when there is a difference in specific gravity of 0.2 or more between the coarse and fine portion of the aggregate or between blends of different aggregates.

No aggregate produced from slag shall be placed within one foot, measured in any direction, of any non-cathodically protected pipe or structure unless the aggregate is incorporated in asphalt concrete.

When slag is used as aggregate in asphalt concrete, the  $K_C$  factor requirements, as determined by California Test 303, will not apply.

If steel slag aggregates are used to make asphalt concrete, there shall be no other aggregates used in the mixture, except that up to 50 percent of the material passing the No. 4 sieve may consist of iron blast furnace slag aggregates or natural aggregates, or a combination thereof. If iron blast furnace aggregates or natural aggregates or a combination thereof are used in the mix, each type of aggregate shall be fed to the drier at a uniform rate. The rate of feed of each type of aggregate shall be maintained within 10 percent of the amount set. Adequate means shall be provided for controlling and checking the accuracy of the feeder.

In addition to the requirements of Section 39-3.01, "Storage," of the Standard Specifications, steel slag aggregate shall be stored separately from iron blast furnace slag aggregate and each type of slag aggregate shall also be stored separately from natural aggregate.

Asphalt concrete produced from more than one of the following shall not be placed in the same layer: steel slag aggregates; iron blast furnace slag aggregates; natural aggregates; or any combination thereof. Once a type of aggregate or aggregates is selected, it shall not be changed without prior approval by the Engineer.

If steel slag aggregates are used to produce asphalt concrete, and if the specific gravity of a compacted stabilometer test specimen is in excess of 2.40, the quantity of asphalt concrete to be paid for will be reduced. The stabilometer test specimen will be fabricated in conformance with the procedures in California Test 304 and the specific gravity of the specimen will be determined in conformance with Method C of California Test 308. The pay quantity of asphalt concrete will be determined by multiplying the quantity of asphalt concrete placed in the work by 2.40 and dividing the result by the specific gravity of the compacted stabilometer test specimen. Such reduction in quantity will be determined and applied as often as is necessary to insure accurate results as determined by the Engineer.

#### **8-1.04 ENGINEERING FABRICS**

Engineering fabrics shall conform to the requirements in Section 88, "Engineering Fabrics," of the Standard Specifications and these special provisions.

Filter fabric for this project shall be ultraviolet ray (UV) protected.

### **SECTION 8-2. CONCRETE**

#### **8-2.01 PORTLAND CEMENT CONCRETE**

Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

Unless the use of mineral admixture is prohibited, whenever the word "cement" is used in the Standard Specifications or the special provisions, it shall be understood to mean "cementitious material" when both of the following conditions are met:

- A. The cement content of portland cement concrete is specified, andB. Section 90, "Portland Cement Concrete," of the Standard Specifications is referenced.
- B. Section 90, "Portland Cement Concrete" of the Standard Specifications is referenced.

Unless otherwise specified, a Type C accelerating chemical admixture conforming to the requirements in ASTM Designation: C 494, may be used in portland cement concrete for precast steam cured concrete members.

Unless otherwise specified, mineral admixture will not be required in portland cement concrete used for precast girders.

Section 90-1.01, "Description," of the Standard Specifications is amended to read:

**90-1.01 Description.**—Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

Unless otherwise specified, cementitious material to be used in portland cement concrete shall conform to the requirements for cement and mineral admixtures in Section 90-2, "Materials" and shall be either: 1) "Type IP (MS Modified) cement; or 2) a combination of "Type II Modified" portland cement and mineral admixture.

Concrete for each portion of the work shall comply with the provisions for the Class, cementitious material content in pounds per cubic yard, 28-day compressive strength, minor concrete, or commercial quality concrete, as shown on the plans or specified in these specifications or the special provisions.

Class A concrete shall contain not less than 564 pounds of cementitious material per cubic yard.

Class B concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

Class C concrete shall contain not less than 376 pounds of cementitious material per cubic yard.

Class D concrete shall contain not less than 658 pounds of cementitious material per cubic yard.

Minor concrete shall contain not less than 564 pounds of cementitious material per cubic yard unless otherwise specified in these specifications or the special provisions.

Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic yard of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content in pounds
Concrete which is designated by compressive strength:	
Deck slabs and slab spans of bridges	658 min., 800 max.
Roof sections of exposed top box culverts	658 min., 800 max.
Other portions of structures	564 min., 800 max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	658 min.
Roof sections of exposed top box culverts	658 min.
Prestressed members	658 min.
Seal courses	658 min.
Other portions of structures	564 min.
Concrete for precast members	564 min., 940 max.

Whenever the 28-day compressive strength shown on the plans is greater than 3,500 pounds per square inch, the concrete shall be considered to be designated by compressive strength. If the plans show a 28-day compressive strength which is 4,500 pounds per square inch or greater, an additional 7 days will be allowed to obtain the specified strength. The 28-day compressive strengths shown on the plans which are 3,500 pounds per square inch or less, are shown for design information only and are not to be considered a requirement for acceptance of the concrete.

Concrete designated by compressive strength shall be proportioned such that the concrete will conform to the strength shown on the plans or specified in the special provisions.

The Contractor shall determine the mix proportions for all concrete except pavement concrete. The Engineer will determine the mix proportions for pavement concrete.

Before using concrete for which the mix proportions have been determined by the Contractor, or in advance of revising those mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.

Compliance with cementitious material content requirements will be verified in conformance with procedures described in California Test 518 for cement content. For testing purposes, mineral admixture shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.

If any concrete used in the work has a cementitious material content, consisting of cement, mineral admixture, or cement plus mineral admixture, which is less than the minimum required for the work, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to the State \$0.25 for each pound of cement, mineral admixture, or cement plus mineral admixture which is less than the minimum required for the work. The Department may deduct the amount from moneys due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions for cementitious material content will be made based on the results of California Test 518.

The requirements of the preceding paragraph shall not apply to minor concrete nor commercial quality concrete.

Concrete for which the mix proportions are determined either by the Contractor or the Engineer shall conform to the requirements of this Section 90.

The first paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is amended to read:

**90-2.01 Portland Cement.**—Unless otherwise specified, portland cement shall be either "Type IP (MS) Modified" cement or "Type II Modified" portland cement.

"Type IP (MS) Modified" cement shall conform to the specifications for Type IP (MS) cement in ASTM Designation: C 595, and shall be comprised of an intimate mixture of Type II cement and not more than 25 percent of a mineral admixture. The type and minimum amount of mineral admixture used in the manufacture of "Type IP (MS) Modified" cement shall be in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

"Type II Modified" portland cement shall conform to the requirements for Type II portland cement in ASTM Designation: C 150.

In addition, "Type IP (MS) Modified" cement and "Type II Modified" portland cement shall conform to the following requirements:

- A. The cement shall not contain more than 0.60 percent by weight of alkalis, calculated as the percentage of Na<sub>2</sub>O plus 0.658 times the percentage of K<sub>2</sub>O, when determined by either direct intensity flame photometry or by the atomic absorption method. The instrument and procedure used shall be qualified as to precision and accuracy in conformance with the requirements in ASTM Designation: C 114.
- B. The autoclave expansion shall not exceed 0.50 percent.
- C. Mortar, containing the cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not expand in water more than 0.010 percent and shall not contract in air more than 0.048 percent except that when cement is to be used for precast prestressed concrete piling, precast prestressed concrete members or steam cured concrete products, the mortar shall not contract in air more than 0.053 percent.

The second paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is amended to read:

Type III and Type V portland cements shall conform to the requirements in ASTM Designation: C 150, and the additional requirements listed above for Type II Modified portland cement, except that when tested in conformance with California Test 527, mortar containing Type III portland cement shall not contract in air more than 0.075 percent.

The third paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is deleted.

The twelfth paragraph in Section 90-2.02, "Aggregates," of the Standard Specifications is deleted.

The first paragraph in Section 90-2.03, "Water," of the Standard Specifications is amended to read:

**90-2.03 Water.**—In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1,000 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO<sub>4</sub>. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO<sub>4</sub>. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with the requirements in ASTM Designation: C 191 or ASTM Designation: C 266; or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in conformance with the requirements in ASTM Designation: C 109, when compared to the results obtained with distilled water, tested in conformance with the requirements in ASTM Designation: C 109.

The following section is added to Section 90-2, "Materials," of the Standard Specifications:

**90-2.04 Admixture Materials.**—Admixture materials shall conform to the requirements in the following ASTM Designations:

Chemical Admixtures—ASTM Designation: C 494.

Air-entraining Admixtures—ASTM Designation: C 260.

Calcium Chloride—ASTM Designation: D 98.

Mineral Admixtures—Coal fly ash, raw or calcined natural pozzolan as specified in ASTM Designation: C 618. Silica fume conforming to the requirements in ASTM Designation C1240, with reduction of mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.

Mineral admixtures shall be used in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

Section 90-4.02, "Materials," of the Standard Specifications is amended to read:

**90-4.02 Materials.**—Admixture materials shall conform to the provisions in Section 90-2.04, "Admixture Materials."

Section 90-4.05, "Optional Use of Chemical Admixtures," of the Standard Specifications is amended to read:

**90-4.05 Optional Use of Chemical Admixtures.**—The Contractor will be permitted to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM Designation: C 494 to conserve cementitious material or to facilitate concrete construction application subject to the following conditions:

When a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by weight except that the resultant cementitious material content shall be not less than 470 pounds per cubic yard.

When a reduction in cementitious material content is made, the dosage of admixture used shall be the dosage used in determining approval of the admixture.

Section 90-4.07, "Optional Use of Air-entraining Admixtures," of the Standard Specifications is amended to read:

**90-4.07 Optional Use of Air-entraining Admixtures.**—When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate as provided in Section 40-1.015, "Cement Content."

Section 90-4.08, "Required Use of Mineral Admixtures," of the Standard Specifications is amended to read:

**90-4.08 Required Use of Mineral Admixtures.**—Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material for use in portland cement concrete.

The calcium oxide content of mineral admixtures shall not exceed 10 percent and the available alkali, as sodium oxide equivalent, shall not exceed 1.5 percent when determined in conformance with the requirements of ASTM Designation: C 618.

The amounts of cement and mineral admixture used in cementitious material for portland cement concrete shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:

The minimum amount of cement shall not be less than 75 percent by weight of the specified minimum cementitious material content.

The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:

- A. When the calcium oxide content of a mineral admixture, as determined in conformance with the requirements in ASTM Designation: C 618 and the provisions in Section 90-2.04, "Admixture Materials," is equal to or less than 2 percent by weight, the amount of mineral admixture shall not be less than 15 percent by weight of the total amount of cementitious material to be used in the mix.
- B. When the calcium oxide content of a mineral admixture, as determined in conformance with the requirements in ASTM Designation: C 618 and the provisions in Section 90-2.04, "Admixture Materials," is greater than 2 percent, the amount of mineral admixture shall not be less than 25 percent by weight of the total amount of cementitious material to be used in the mix.

- C. When a mineral admixture is used, which conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," is used, the amount of mineral admixture shall not be less than 10 percent by weight of the total amount of cementitious material to be used in the mix.

If more than the required amount of cementitious material is used, the balance of the additional cementitious material in the mix may be either cement, a mineral admixture conforming to the provisions in Section 90-2.04, "Admixture Materials," or a combination of both; however, the maximum total amount of mineral admixture shall not exceed 35 percent by weight of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in pounds per cubic yard, the total weight of cement and mineral admixture per cubic yard shall not exceed the specified maximum cementitious material content.

Section 90-4.09, "Optional Use of Mineral Admixtures," of the Standard Specifications is deleted.

Section 90-4.11, "Storage, Proportioning, and Dispensing of Mineral Admixtures," of the Standard Specifications is amended to read:

**90-4.11 Storage, Proportioning, and Dispensing of Mineral Admixtures.**—Mineral admixtures shall be protected from exposure to moisture until used. Sacked material shall be piled to permit access for tally, inspection, and identification for each shipment.

Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for sampling mineral admixtures shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper.

Mineral admixtures shall be incorporated into concrete using equipment conforming to the requirements for cement weigh hoppers, and charging and discharging mechanisms in ASTM Designation: C 94, in Section 90-5.03, "Proportioning," and in this Section 90-4.11.

When interlocks are required for cement and mineral admixture charging mechanisms by Section 90-5.03A, "Proportioning for Pavement," and cement and mineral admixtures are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the weight of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."

Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be from the same source and of the same percentage.

Section 90-5.02, "Proportioning Devices," of the Standard Specifications is amended to read:

**90-5.02 Proportioning Devices.**—Weighing, measuring or metering devices used for proportioning materials shall conform to the provisions in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, automatic weighing systems used shall comply with the provisions for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." These automatic devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and mineral admixture for one batch of concrete is a single operation of a switch or starter.

Proportioning devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to insure their accuracy.

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the weight of each batch of material shall not vary from the weight designated by the Engineer by more than the tolerances specified herein.

Equipment for cumulative weighing of aggregate shall have a zero tolerance of  $\pm 0.5$  percent of the designated total batch weight of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be  $\pm 0.5$  percent of the individual batch weight designated for each size of aggregate. Equipment for cumulative weighing of cement and mineral admixtures shall have a zero tolerance of  $\pm 0.5$  percent of the designated total batch weight of the cement and mineral admixture. Equipment for weighing cement or mineral admixture separately shall have a zero tolerance of  $\pm 0.5$  percent of their designated individual batch weights. Equipment for measuring water shall have a zero tolerance of  $\pm 0.5$  percent of its designated weight or volume.

The weight indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

- A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch weight of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch weights.

- B. Cement shall be within 1.0 percent of its designated batch weight. When weighed individually, mineral admixture shall be within 1.0 percent of its designated batch weight. When mineral admixture and cement are permitted to be weighed cumulatively, cement shall be weighed first to within 1.0 percent of its designated batch weight, and the total for cement and mineral admixture shall be within 1.0 percent of the sum of their designated batch weights.
- C. Water shall be within 1.5 percent of its designated weight or volume.

Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, mineral admixture, or cement plus mineral admixture and aggregates shall not exceed that of commercially available scales having single graduations indicating a weight not exceeding the maximum permissible weight variation above, except that no scale shall be required having a capacity of less than 1,000 pounds, with one-pound graduations.

Section 90-5.03, "Proportioning," excluding Section 90-5.03A, "Proportioning for Pavement," of the Standard Specifications is amended to read:

**90-5.03 Proportioning.**—Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cement, mineral admixture, and water as provided in these specifications. Aggregates shall be proportioned by weight.

At the time of batching, aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry weight.

Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.

Bulk "Type IP (MS) Modified" cement that conforms to the provisions in Section 90-2.01, "Portland Cement," shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. Bulk cement to be blended with mineral admixture for use in portland cement concrete for pavement and structures may be weighed in separate, individual weigh-hoppers or may be weighed in the same weigh hopper with mineral admixture and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. If the cement and mineral admixture are weighed cumulatively, the cement shall be weighed first.

When cement and mineral admixtures are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the mineral admixture shall be individual and distinct from other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and an indicator to constitute an individual and independent material weighing device. The cement and the mineral admixture shall be discharged into the mixer simultaneously with the aggregate.

The scale and weigh hopper for bulk weighing cement, mineral admixture, and cement plus mineral admixture shall be separate and distinct from the aggregate weighing equipment.

When the source of an aggregate is changed for concrete structures, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using such aggregates. When the source of an aggregate is changed for other concrete, the Engineer shall be allowed sufficient time to adjust the mix and such aggregates shall not be used until necessary adjustments are made.

For batches with a volume of one cubic yard or more, the batching equipment shall conform to one of the following combinations:

- A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
- B. Single box and scale indicator for all aggregates.
- C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

In order to check the accuracy of batch weights, the gross weight and tare weight of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed at the Contractor's expense on scales designated by the Engineer.

Section 90-5.03A, "Proportioning for Pavement," of the Standard Specifications is amended to read:

**90-5.03A Proportioning for Pavement.**—Aggregates and bulk cement, mineral admixture, and cement plus mineral admixture for use in pavement shall be proportioned by weight by means of automatic proportioning devices of approved type conforming to the provisions in this Section 90-5.03A.

The Contractor shall install and maintain in operating condition an electrically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by weight of the fine aggregate.

The batching of cement, mineral admixture, or cement plus mineral admixture and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and mineral admixture hoppers or the cement plus mineral admixture hopper are charged with weights which are within the tolerances specified in Section 90-5.02, "Proportioning Devices."

The discharge gate on the cement and mineral admixture hoppers or the cement plus mineral admixture hopper shall be designed to permit regulating the flow of cement, mineral admixture, or cement plus mineral admixture into the aggregate as directed by the Engineer.

When separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.

Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.

When the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required weight is discharged into the weigh box, after which the gate shall automatically close and lock.

The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

The third paragraph in Section 90-6.01, "General," of the Standard Specifications is amended to read:

Concrete shall be homogeneous and thoroughly mixed. There shall be no lumps or evidence of undispersed cement, mineral admixture, or cement plus mineral admixture.

The third and fourth paragraphs in Section 90-6.02, "Machine Mixing," of the Standard Specifications are amended to read:

The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one-fourth of the specified mixing time.

Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, or in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cementitious material in the concrete mixture.

The sixth paragraph in Section 90-6.02, "Machine Mixing," of the Standard Specifications is amended to read:

The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

The seventh through tenth paragraphs in Section 90-6.03, "Transporting Mixed Concrete," of the Standard Specifications are amended to read:

When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours, or before 250 revolutions of the drum or blades, whichever comes first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85° F., or above, a time less than 1.5 hours may be required.

When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick

stiffening of the concrete, or when the temperature of the concrete is 85° F., or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

Each load of concrete delivered at the jobsite shall be accompanied by a weight certificate showing the mix identification number, non-repeating load number, date and time at which the materials were batched, the total amount of water (gallons) added to the load and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This weight certificate shall also show the actual scale weights (pounds) for the ingredients batched. Theoretical or target batch weights shall not be used as a substitute for actual scale weights.

Weight certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on a 3.5-inch diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be LFCR (one line, separate record) with allowances for sufficient fields to satisfy the amount of data required by these specifications.

The Contractor may furnish a weight certificate that is accompanied by a separate certificate which lists the actual batch weights or measurements for a load of concrete provided that both certificates are 1) imprinted with the same non-repeating load number that is unique to the contract and 2) delivered to the jobsite with the load.

Weight certificates furnished by the Contractor shall conform to the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

Section 90-6.05, "Hand-Mixing," of the Standard Specifications is amended to read:

**90-6.05 Hand-Mixing.**—Hand-mixed concrete shall be made in batches not more than one-third cubic yard and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than one foot in total depth. On this mixture shall be spread the dry cement and mineral admixture and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

The table in the first paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is replaced with the following table:

Type of Work	Nominal Penetration (inches)	Maximum Penetration (inches)
Concrete pavement	0 - 1	1 1/2
Non-reinforced concrete facilities	0 - 1 1/2	2
Reinforced concrete structures:		
Sections over 12 inches thick	0 - 1 1/2	2 1/2
Sections 12 inches thick or less	0 - 2	3
Concrete placed under water	3 - 4	4 1/2
Cast-in-place concrete piles	2 1/2 - 3 1/2	4

The second paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

The amount of free water used in concrete shall not exceed 312 pounds per cubic yard, plus 20 pounds for each required 100 pounds of cementitious material in excess of 564 pounds per cubic yard.

The fourth paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

Where there are adverse or difficult conditions which affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic yard of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 pounds of water per added 100 pounds of cementitious material per cubic yard. The cost of additional cementitious material and water added under these conditions shall be at the Contractor's expense and no additional compensation will be allowed therefor.

Section 90-9.01, "General," of the Standard Specifications is amended to read:

**90-9.01 General.**—Concrete compressive strength requirements consist of a minimum strength which must be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified in these specifications or are shown on the plans.

The compressive strength of concrete will be determined from test cylinders which have been fabricated from concrete sampled in conformance with California Test 539. Test cylinders will be molded and initial field cured in conformance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in conformance with California Test 521. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in conformance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

When concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall, at the Contractor's expense, make corrective changes, subject to approval by the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State \$10.00 for each in-place cubic yard of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to the State \$15.00 for each in place cubic yard of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. Concrete represented by a single test which indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials."

If the test result indicates that the compressive strength at the maximum curing age specified or allowed is below the specified strength, but 85 percent or more of the specified strength, payments to the State as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the requirements in ASTM Designation: C 42.

No single compressive strength test shall represent more than 300 cubic yards.

When a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders which have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. When the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

If concrete is specified by compressive strength, then materials, mix proportions, mixing equipment, and procedures proposed for use shall be prequalified prior to placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.

Certified test data, in order to be acceptable, must indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of cure days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

Trial batch test reports, in order to be acceptable, must indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after

molding shall be at least 600 pounds per square inch greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches which were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

Tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. Equipment employed in testing shall be in good condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

The certified test data and trial batch test reports shall include the following information:

- A. Date of mixing.
- B. Mixing equipment and procedures used.
- C. The size of batch in cubic yards and the weight, type and source of ingredients used.
- D. Penetration of the concrete.
- E. The air content of the concrete if an air-entraining admixture is used.
- F. The age at time of testing and strength of concrete cylinders tested.

Certified test data and trial batch test reports shall be signed by an official of the firm which performed the tests.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class of concrete required at that location.

After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making changes which, in the judgment of the Engineer, could result in a lowering of the strength of the concrete below that specified.

The Contractor's attention is directed to the time required to test trial batches. The Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

Section 90-10.02A, "Portland Cement," of the Standard Specifications is renamed "Cementitious Material" and is amended to read:

**90-10.02A Cementitious Material.**—Cementitious material shall conform to the provisions in Section 90-1.01, "Description." Compressive strength requirements consist of a minimum strength which must be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified in these specifications or are shown on the plans.

The fifth paragraph in Section 90-10.02B, "Aggregate," of the Standard Specifications is deleted.  
Section 90-10.03, "Production," of the Standard Specifications is amended to read:

**90-10.03 Production.**—Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice, which will result in concrete that is thoroughly and uniformly mixed, which is suitable for the use intended, and which conforms to provisions specified herein. Recognized standards of good practice are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or California Department of Transportation.

The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."

The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.

Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before any stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 90° F. will be considered as conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.

The required mixing time in stationary mixers shall be not less than 50 seconds nor more than 5 minutes.

The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.

Each load of ready-mixed concrete shall be accompanied by a weight certificate, which shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The ticket shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets contract requirements, including minimum cementitious material content specified.

The third and fourth paragraphs in Section 90-11.02, "Payment," of the Standard Specifications are amended to read:

Should the Engineer order the Contractor to incorporate admixtures into the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D.

Should the Contractor use admixtures in conformance with the provisions in Section 90-4.05, "Optional Use of Chemical Admixtures;" or Section 90-4.07, "Optional Use of Air-entraining Admixtures;" or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them in the concrete at the Contractor's expense and no additional compensation will be allowed therefor.

### **8-2.02 ROADWAY DECK SLAB REQUIREMENTS**

The amount of free water used in concrete for roadway deck slabs of highway bridges and structure approach slabs shall not exceed 325 pounds per cubic yard, plus 20 pounds for each required 100 pounds of cement in excess of 658 pounds per cubic yard.

## **SECTION 8-3. WELDING**

### **8-3.01 WELDING ELECTRODES**

Flux core welding electrodes conforming to the requirements of AWS A5.20 E6XT-4 or E7XT-4 shall not be used to perform any type of welding for this project.

### **8-3.02 WELDING QUALITY CONTROL**

Welding quality control shall conform to the requirements in the AWS welding codes, the Standard Specifications, and these special provisions.

Welding quality control shall apply when any work is welded in conformance with the provisions in Section 49, "Piling," Section 52, "Reinforcement," Section 55, "Steel Structures," Section 56-1, "Overhead Sign Structures," Section 75-1.035, "Bridge Joint Restrainer Units," or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

Wherever reference is made to the following AWS welding codes in the Standard Specifications, on the plans or in these special provisions, the year of adoption for these codes shall be as listed:

AWS Code	Year of Adoption
D1.1	1998
D1.4	1992
D1.5	1995

All requirements of the AWS welding codes shall apply unless specified otherwise in the Standard Specifications, on the plans or in these special provisions. Wherever the abbreviation AWS is used, it shall be equivalent to the abbreviations ANSI/AWS or ANSI/AASHTO/AWS.

The welding of all fracture critical members (FCMs) shall conform to the provisions specified in the Fracture Control Plan (FCP) and herein.

The Contractor shall designate in writing a welding Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of welding, including materials and workmanship, performed by the Contractor and all subcontractors.

The QCM shall be the sole individual responsible to the Contractor for submitting, receiving, and approving all correspondence, required submittals, and reports to and from the Engineer.

The QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

Welding inspection personnel or nondestructive testing (NDT) firms to be used in the work shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project, except for the following conditions:

1. The welding is performed at a permanent fabrication facility which is certified under the AISC Quality Certification Program, Category Cbr, Major Steel Bridges.
2. The welding is performed at a permanent fabrication facility which is certified under the AISC Quality Certification Program, Category Sbd, Conventional Steel Building Structures. This condition shall apply only for work welded in conformance with the provisions in Section 56-1, "Overhead Sign Structures" or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

For welding performed at such certified facilities, the inspection personnel or NDT firms may be employed or compensated by the fabrication facility performing the welding.

Prior to submitting the Welding Quality Control Plan (WQCP) required herein, a pre-welding meeting between the Engineer, Contractor and any welding subcontractors or entities hired by these subcontractors to be used in the work, shall be held to discuss the requirements for the WQCP.

Prior to performing any welding, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate WQCP for each item of work for which welding is to be performed. As a minimum, each WQCP shall include the following:

1. The name of the welding firm and the NDT firm to be used;
2. A manual prepared by the NDT firm that shall include equipment, testing procedures, code of safe practices, the Written Practice of the NDT firm, and the names, qualifications and documentation of certifications for all personnel to be used;
3. The name of the QCM and the names, qualifications and documentation of certifications for all Quality Control (QC) Inspectors and Assistant Quality Control Inspectors to be used;
4. An organizational chart showing all QC personnel and their assigned QC responsibilities;
5. The methods and frequencies for performing all required quality control procedures, including QC inspection forms to be used, as required by the specifications including:
  - (a) all visual inspections;
  - (b) all NDT including radiographic geometry, penetrameter and shim selection, film quality, film processing, radiograph identification and marking system, and film interpretation and reports; and
  - (c) calibration procedures and calibration frequency for all NDT equipment;
6. A system for the identification and tracking of all welds, NDT and any required repairs, and a procedure for the reinspection of any repaired welds. The system shall have provisions for 1) permanently identifying each weld and the person who performed the weld, 2) placing all identification and tracking information on each radiograph and 3) a method of reporting nonconforming welds to the Engineer;
7. Standard procedures for performing noncritical repair welds. Noncritical repair welds are defined as welds to deposit additional weld beads or layers to compensate for insufficient weld size and to fill limited excavations that were performed to remove unacceptable edge or surface discontinuities, rollover or undercut. The depth of these excavations shall not exceed 65 percent of the specified weld size;
8. The welding procedure specification (WPS), including documentation of all supporting Procedure Qualification Record (PQR) tests performed, and the name of the testing laboratory who performed the tests, to verify the acceptability of the WPS. The submitted WPS shall be within the allowable period of effectiveness;
9. Documentation of all certifications for welders for each weld process and position that will be used. Certifications shall list the electrodes used, test position, base metal and thickness, tests performed, and the witnessing authority. All certifications shall be within the allowable period of effectiveness; and
10. One copy each of all AWS welding codes and the FCP which are applicable to the welding to be performed. These codes and the FCP shall become the permanent property of the Department.
11. Example forms to be used for Certificates of Compliance, daily production logs, and daily reports.

The Engineer shall have 10 working days to review the WQCP submittal after a complete plan has been received. No welding shall be performed until the WQCP is approved in writing by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the WQCP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

An amended WQCP or addendum shall be submitted to, and approved in writing by the Engineer, for any proposed revisions to the approved WQCP. An amended WQCP or addendum will be required for any revisions to the WQCP, including but not limited to a revised WPS, additional welders, changes in NDT firms or procedures, QC or NDT personnel, or updated systems for tracking and identifying welds. The Engineer shall have 3 working days to complete the review of the amended WQCP or addendum. Work that is affected by any of the proposed revisions shall not be performed until the amended WQCP or addendum has been approved. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the amended WQCP or addendum, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

After final approval of the WQCP, amended WQCP, or addendum, the Contractor shall submit 7 copies to the Engineer each of these approved documents.

It is expressly understood that the Engineer's approval of the Contractor's WQCP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications. The Engineer's approval shall not constitute a waiver of any of the requirements of the plans and specifications nor relieve the Contractor of any obligation thereunder, and defective work, materials and equipment may be rejected notwithstanding approval of the WQCP.

A daily production log for welding shall be kept by the QCM for each day that welding is performed. The log shall clearly indicate the locations of all welding, and shall include the welders' names, amount of welding performed, any problems or deficiencies discovered, and any testing or repair work performed, at each location. The daily report from each Quality Control Inspector shall also be included in the log.

The following items shall be included in a Welding Report that is to be submitted to the Engineer within 7 days following the performance of any welding:

1. Reports of all visual weld inspections and NDT;
2. Radiographs and radiographic reports, and other required NDT reports;
3. Documentation that the Contractor has evaluated all radiographs and other nondestructive tests, corrected all rejectable deficiencies, and all repaired welds have been reexamined by the required NDT and found acceptable; and
4. Daily production log.

All radiographic envelopes shall have clearly written on the outside of the envelope the following information: name of the QCM, name of the nondestructive testing firm, name of the radiographer, date, contract number, complete part description, and all included weld numbers or a report number, as detailed in the WQCP. In addition, all innerleaves shall have clearly written on them the part description and all included weld numbers, as detailed in the WQCP.

All reports regarding NDT, including radiographs, shall be signed by both the NDT technician and the person that performed the review, and then submitted directly to the QCM for review and signature prior to submittal to the Engineer. Corresponding names shall be clearly printed or typewritten next to all signatures.

The Engineer will review the Welding Report to determine if the Contractor is in conformance with the WQCP. Except for steel piling, the Engineer shall be allowed 7 days to review the report and respond in writing after a complete Welding Report has been received. The review time for steel piling shall be as specified in "Piling" of these special provisions. Prior to receiving notification from the Engineer of the Contractor's conformance with the WQCP, the Contractor may encase in concrete or cover any welds for which a Welding Report has been submitted. However, should the Contractor elect to encase or cover those welds prior to receiving notification from the Engineer, it is expressly understood that the Contractor shall not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Any material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase or cover any welds pending notification by the Engineer, and should the Engineer fail to complete the review and provide notification within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in notification, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Sections 6.1.2 through 6.1.4.3 of AWS D 1.1, Sections 7.1.1 and 7.1.2 of AWS D 1.4, and Sections 6.1.1.1 through 6.1.3.3 of AWS D 1.5 are replaced with the following:

Quality Control (QC) shall be the responsibility of the Contractor. As a minimum, the Contractor shall perform inspection and testing prior to welding, during welding and after welding as specified in this section and additionally as necessary to ensure that materials and workmanship conform to the requirements of the contract documents.

The Quality Control (QC) Inspector shall be the duly designated person who performs inspection, testing, and quality matters for all welding.

Quality Assurance (QA) is the prerogative of the Engineer. The QA Inspector is the duly designated person who acts for and on behalf of the Engineer.

All QC Inspectors shall be responsible for quality control acceptance or rejection of materials and workmanship, and shall be currently certified as AWS Certified Welding Inspectors (CWI) in conformance with the requirements in AWS QC1, "Standard and Guide for Qualification of Welding Inspectors."

The QC Inspector may be assisted by an Assistant QC Inspector provided that this individual is currently certified as an AWS Certified Associate Welding Inspector (CAWI) in conformance with the requirements in AWS QC1, "Standard and Guide for Qualification of Welding Inspectors," or has equivalent qualifications. The QC Inspector shall monitor the Assistant QC Inspector's work, and shall be responsible for signing all reports.

When the term "Inspector" is used without further qualification, it shall refer to the QC Inspector.

Section 6.14.6, "Personnel Qualification," of AWS D 1.1, Section 7.7.6, "Personnel Qualification," of AWS D 1.4 and Section 6.1.3.4, "Personnel Qualification," of AWS D 1.5 are replaced with the following:

Personnel performing NDT shall be qualified in conformance with the requirements in the current edition of the American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A and the Written Practice of the NDT firm. The Written Practice of the NDT firm shall meet or exceed the requirements of the current edition of the ANST Recommended Practice No. SNT-TC-1A. Only individuals who are 1) qualified for NDT Level II, or 2) Level III technicians who have been directly certified by the ASNT and are authorized to perform the work of Level II technicians, shall perform NDT, review the results, and prepare the written reports.

Section 6.5.4, "Scope of Examination," of AWS D 1.1 and Section 7.5.4 of AWS D 1.4 are replaced with the following:

The QC Inspector shall inspect and approve the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code and the approved WPS are met.

Section 6.5.4 of AWS D 1.5 is replaced with the following:

The QC Inspector shall inspect and approve the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code and the approved WPS are met. The QC Inspector shall examine the work to make certain that it meets the requirements of section 3 and 9.21. The size and contour of welds shall be measured using suitable gages. Visual inspection for cracks in welds and base metal, and for other discontinuities should be aided by strong light magnifiers, or such other devices as may be helpful. Acceptance criteria different from those specified in this code may be used when approved by the Engineer.

The Engineer shall have the authority to verify the qualifications or certifications of any welder, Quality Control Inspector, or NDT personnel to specified levels by retests or other means.

A sufficient number of QC Inspectors shall be provided to ensure continuous inspection when any welding is being performed. Continuous inspection, as a minimum, shall include (1) having QC Inspectors continually present on all shifts when any welding is being performed, or (2) having a QC Inspector within such close proximity of all welding operations that inspections by the QC Inspector of each operation, at each welding location, shall not lapse for a period exceeding 30 minutes.

Inspection and approval of the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder shall be documented by the QC Inspector on a daily basis for each day that welding is performed.

The QC Inspector shall provide reports to the QCM on a daily basis for each day that welding is performed.

Except for noncritical weld repairs, base metal repairs, or any other type of repairs not submitted in the WQCP, the Engineer shall be notified immediately in writing when any welding problems or deficiencies are discovered and also of the proposed repair procedures to correct them. The Engineer shall have 5 working days to review these procedures. No remedial work shall begin until the repair procedures are approved in writing by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the proposed repair procedures, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

When joint details that are not prequalified by the applicable AWS codes are proposed for use in the work, all welders using these details shall perform a qualification test plate using the approved WPS variables and the joint detail to be used in production. The test plate shall be the maximum thickness to be used in production. The test plate shall be mechanically or radiographically tested as directed by the Engineer. Mechanical and radiographic testing and acceptance criteria shall be as specified in the applicable AWS codes.

The period of effectiveness for a welder's or welding operator's qualification shall be a maximum of 3 years for the same weld process, welding position, and weld type. A valid qualification at the beginning of work on a contract will be acceptable for the entire period of the contract, as long as the welder's work remains satisfactory.

All qualification tests for welders, welding operators, and WPSs used in welding operations will be witnessed by the Engineer.

Section 6.6.5, "Nonspecified Nondestructive Testing Other Than Visual," of AWS D 1.1, Section 6.6.5 of AWS D 1.4 and Section 6.6.5 of AWS D 1.5 shall not apply.

For any welding, the Engineer may direct the Contractor to perform NDT that is in addition to the visual inspection or NDT specified in the AWS welding codes, in the Standard Specifications or in these special provisions. Additional NDT required by the Engineer, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Should any welding deficiencies be discovered by this additional NDT, the cost of the testing will not be paid for as extra work and shall be at the Contractor's expense.

All required repair work to correct welding deficiencies, whether discovered by the required visual inspection or NDT, or by additional NDT directed by the Engineer, and any associated delays or expenses caused to the Contractor by performing these repairs, shall be at the Contractor's expense.

At the completion of all welding, the QCM shall sign and furnish to the Engineer, a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each item of work for which welding was performed. The certificate shall state that all of the materials and workmanship incorporated in the work, and all required tests and inspections of this work, have been performed in conformance with the details shown on the plans and the provisions of the Standard Specifications and these special provisions.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

## **SECTION 9. DESCRIPTION OF BRIDGE WORK**

The bridge work to be done consists, in general, of constructing a new bridge and widening an existing bridge as shown on the plans and briefly described as follows:

### **SIERRA AVENUE OVERCROSSING (REPLACE)**

(Bridge No. 54-537)

A two-span cast-in-place/prestressed concrete box girder bridge, approximately 200 feet in length.

### **SIERRA AVENUE OVERHEAD (WIDEN)**

(Bridge No. 54C-63)

An existing one-span precast/prestressed concrete I-girder bridge, approximately 86 feet in length, to be widened with precast/prestressed concrete I-girders.

## **SECTION 10. CONSTRUCTION DETAILS**

### **SECTION 10-1. GENERAL**

#### **10-1.01 CONSTRUCTION PROJECT INFORMATION SIGNS**

Before any major physical construction work readily visible to highway users is started on this contract, the Contractor shall furnish and erect 2 Type 2 Construction Project Information signs at the locations designated by the Engineer.

The signs and overlays shall be of a type and material consistent with the estimated time of completion of the project and shall conform to the details shown on the plans.

The sign letters, border and the Department's construction logos shall conform to the colors (non-reflective) and details shown on the plans, and shall be on a white background (non-reflective). The colors blue and orange shall conform to PR Color Number 3 and Number 6, respectively, as specified in the Federal Highway Administration's Color Tolerance Chart.

The sign message to be used for fund types shall consist of the following, in the order shown:

FEDERAL HIGHWAY TRUST FUNDS
STATE HIGHWAY FUNDS
SAN BERNARDINO COUNTY TRANSPORTATION FUNDS

The sign message to be used for type of work shall consist of the following:

**HIGHWAY IMPROVEMENT**

The sign message to be used for the Year of Completion of Project Construction will be furnished by the Engineer. The Contractor shall furnish and install the "Year" sign overlay within 10 working days of notification of the year date to be used.

The letter sizes to be used shall be as shown on the plans. The information shown on the signs shall be limited to that shown on the plans.

The signs shall be kept clean and in good repair by the Contractor.

Upon completion of the work, the signs shall be removed and disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13 of the Standard Specifications.

Full compensation for furnishing, erecting, maintaining, and removing and disposing of the construction project information signs shall be considered as included in the contract lump sum price paid for construction area signs and no additional compensation will be allowed therefor.

**10-1.02 ORDER OF WORK**

Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the Standard Specifications and these special provisions.

The first order of work shall be to place the order for the traffic signal and fiber optic equipment. The Contractor shall furnish the Engineer with a statement from the vendor that the order for said equipment has been received and accepted by said vendor.

The uppermost layer of new pavement shall not be placed until all underlying conduits and loop detectors have been installed.

Prior to commencement of the traffic signal functional test at any location, all items of work related to signal control shall be completed and roadside signs and all pavement delineation and pavement markings shall be in place at that location.

During this contract six call boxes within the project limits will be reset by others. The Engineer will schedule such work. The existing call boxes are located at the following locations:

BOX NO.	LOCATION
1	RT of STA 576+11 Centerline Route 10
2	LT of STA 578+00 Centerline Route 10
3	RT of STA 629+00 Centerline Route 10
4	LT of STA 630+38 Centerline Route 10
5	LT of STA 603+60 Centerline Route 10
6	RT of STA 604+42 Centerline Route 10

The Contractor shall protect such call boxes from damage during construction work near them. The Contractor shall give at least two weeks notice to the Engineer when such pull boxes need to be reset based on his work schedule. The Engineer will arrange to have reset operations completed in a timely manner so the work schedule will not be adversely affected. If the Engineer determines resetting the pull boxes shall be done by the Contractor, such work shall be done as extra work, as provided in Section 4-1.03D of the Standard Specifications.

Attention is directed to "Aerially Deposited Lead," "Clearing and Grubbing," "Material with Aerially Deposited Lead," "Maintaining Traffic" and "Temporary Pavement Delineation" of these special provisions and to the stage construction sheets of the plans.

Attention is directed to "Progress Schedule (Critical Path)" of these special provisions regarding the submittal of a general time-scaled logic diagram within 10 days after approval of the contract. The diagram shall be submitted prior to performing any work that may be affected by any proposed deviations to the construction staging of the project.

The work shall be performed in conformance with the stages of construction shown on the plans. Nonconflicting work in subsequent stages may proceed concurrently with work in preceding stages, provided satisfactory progress is maintained in said preceding stages of construction.

Temporary railing (Type K) and temporary crash cushion modules shall be secured in place prior to commencing work for which the temporary railing and crash cushions are required.

In each stage, after completion of the preceding stage, the first order of work shall be the removal of existing pavement delineation as directed by the Engineer. Pavement delineation removal shall be coordinated with new delineation so that lane lines are provided at all times on traveled ways open to public traffic.

Before obliterating any pavement delineation that is to be replaced on the same alignment and location, as determined by the Engineer, such pavement delineation shall be referenced by the Contractor, with a sufficient number of control points to reestablish the alignment and location of the new pavement delineation. The references shall also include the limits or changes in striping pattern, including one- and two-way barrier lines, limit lines, crosswalks and other pavement markings. Full compensation for referencing pavement delineation shall be considered as included in the contract prices paid for new pavement delineation and no additional compensation will be allowed therefor.

At locations exposed to public traffic where metal beam guard railing or barriers are to be constructed, or reconstructed, the Contractor shall schedule his operations so that at the end of each working day there shall be no post holes open nor shall there be any railing or barrier posts installed without the blocks and rail elements assembled and mounted thereon.

Attention is directed to "Bridge Removal" elsewhere in these special provisions.

### **10-1.03 WATER POLLUTION CONTROL**

Water pollution control work shall conform to the requirements in Section 7-1.01G, "Water Pollution," of the Standard Specifications, and these special provisions.

Water pollution control work shall conform to the requirements in the Construction Contractor's Guide and Specifications of the Caltrans Storm Water Quality Handbooks, dated April 1997, and addenda thereto issued up to and including the date of advertisement of the project, hereafter referred to as the "Handbook." Copies of the Handbook may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520.

Copies of the Handbook are also available for review at the Department of Transportation, District 08, Environmental Technical Branch, 464 West Fourth Street San Bernardino, California 92401-1400, Telephone (909) 383-4561.

The Contractor shall become fully informed of, and comply with the applicable provisions of the Handbook and Federal, State and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction.

Unless arrangements for disturbance of areas outside the project limits are made by the Department and made part of the contract, it is expressly agreed that the Department assumes no responsibility to the Contractor or property owner whatsoever with respect to any arrangements made between the Contractor and property owner to allow disturbance of areas outside the project limits.

The Contractor shall be responsible for the costs and for any liability imposed by law as a result of the Contractor's failure to comply with the requirements set forth in this section "Water Pollution Control" including, but not limited to, compliance with the applicable provisions of the Handbook and Federal, State and local regulations. For the purposes of this paragraph, costs and liabilities include but are not limited to fines, penalties and damages whether assessed against the State or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.

In addition to any remedy authorized by law, so much of the money due the Contractor under the contract that shall be considered necessary by the Department may be retained by the State of California until disposition has been made of the costs and liabilities.

The retention of money due the Contractor shall be subject to the following:

1. The Department will give the Contractor 30 days notice of its intention to retain funds from any partial payment which may become due to the Contractor prior to acceptance of the contract. Retention of funds from any payment made after acceptance of the contract may be made without prior notice to the Contractor.
2. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications.
3. If the Department has retained funds and it is subsequently determined that the State is not subject to the costs and liabilities in connection with the matter for which the retention was made, the Department shall be liable for interest on the amount retained at the legal rate of interest for the period of the retention.

Conformance with the requirements of this section "Water Pollution Control," shall not relieve the Contractor from the Contractor's responsibilities, as provided in Section 7-1.11, "Preservation of Property," and Section 7-1.12, "Responsibility for Damage," of the Standard Specifications.

**WATER POLLUTION CONTROL PROGRAM PREPARATION, APPROVAL AND UPDATES.**—As part of the water pollution control work, a Water Pollution Control Program, hereafter referred to as the "WPCP," is required for this

contract. The WPCP shall conform to the requirements in Section 7-1.01G, "Water Pollution," of the Standard Specifications, the requirements in the Handbook, and these special provisions.

No work having potential to cause water pollution, as determined by the Engineer, shall be performed until the WPCP has been approved by the Engineer.

Within 30 days after the approval of the contract, the Contractor shall submit 3 copies of the WPCP to the Engineer. The Contractor shall allow 7 days for the Engineer to review the WPCP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the WPCP within 7 days of receipt of the Engineer's comments and shall allow 7 days for the Engineer to review the revisions. Upon the Engineer's approval of the WPCP, 3 additional copies of the WPCP incorporating the required changes shall be submitted to the Engineer. Minor changes or clarifications to the initial submittal may be made and attached as amendments to the WPCP. In order to allow construction activities to proceed, the Engineer may conditionally approve the WPCP while minor revisions or amendments are being completed.

The objectives of the WPCP shall be to identify pollution sources that may adversely affect the quality of storm water discharges associated with the project and to identify, construct, implement and maintain water pollution control measures, hereafter referred to as control measures, to reduce to the extent feasible pollutants in storm water discharges from the construction site during construction under this contract.

The WPCP shall incorporate control measures in the following categories:

1. Soil stabilization practices;
2. Sediment control practices;
3. Sediment tracking control practices;
4. Wind erosion control practices; and
5. Nonstorm water management and waste management and disposal control practices.

Specific objectives and minimum requirements for each category of control measures are contained in the Handbook.

The Contractor shall consider the objectives and minimum requirements presented in the Handbook for each of the above categories. When minimum requirements are listed for any category, the Contractor shall incorporate into the WPCP and implement on the project, one or more of the listed minimum controls required in order to meet the pollution control objectives for the category. In addition, the Contractor shall consider other control measures presented in the Handbook and shall incorporate into the WPCP and implement on the project the control measures necessary to meet the objectives of the WPCP. The Contractor shall document the selection process in accordance with the procedure specified in the Handbook.

The WPCP shall include, but not be limited to, the following items as described in the Handbook:

1. Project description and Contractor's certification;
2. Project information;
3. Pollution sources, control measures, and water pollution control drawings; and
4. Amendments, if any.

The Contractor shall amend the WPCP, graphically and in narrative form, whenever there is a change in construction activities or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, municipal storm drain systems, or when deemed necessary by the Engineer. The WPCP shall also be amended if the WPCP has not achieved the objective of reducing pollutants in storm water discharges. Amendments shall show additional control measures or revised operations, including those in areas not shown in the initially approved WPCP, which are required on the project to control water pollution effectively. Amendments to the WPCP shall be submitted for review and approval by the Engineer in the same manner specified for the initially approved WPCP. Amendments shall be dated and attached to the on-site WPCP document.

The Contractor shall keep a copy of the WPCP, together with updates, revisions and amendments at the project site.

**WPCP IMPLEMENTATION.**—Upon approval of the WPCP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting and maintaining the control measures included in the WPCP and any amendments thereto and for removing and disposing of temporary control measures. Unless otherwise directed by the Engineer or specified in these special provisions, the Contractor's responsibility for WPCP implementation shall continue throughout any temporary suspension of work ordered in accordance with Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. Requirements for installation, construction, inspection, maintenance, removal and disposal of control measures are specified in the Handbook and these special provisions.

Soil stabilization practices and sediment control measures, including minimum requirements, shall be provided throughout the winter season, defined as between November 1 and March 15.

Implementation of soil stabilization practices and sediment control measures for soil-disturbed areas of the project site shall be completed, except as provided for below, no later than 20 days prior to the beginning of the winter season or upon start of applicable construction activities for projects which begin either during or within 20 days of the winter season.

Throughout the winter season, the active, soil-disturbed area of the project site shall be no more than 5 acres. The Engineer may approve, on a case-by-case basis, expansions of the active, soil-disturbed area limit. The Contractor shall demonstrate the ability and preparedness to fully deploy soil stabilization practices and sediment control measures to protect soil-disturbed areas of the project site before the onset of precipitation. The Contractor shall maintain a quantity of soil stabilization and sediment control materials on site equal to 100 percent of that sufficient to protect unprotected, soil-disturbed areas on the project site and shall maintain a detailed plan for the mobilization of sufficient labor and equipment to fully deploy control measures required to protect unprotected, soil-disturbed areas on the project site prior to the onset of precipitation. The Contractor shall include a current inventory of control measure materials and the detailed mobilization plan as part of the WPCP.

Throughout the winter season, soil-disturbed areas of the project site shall be considered to be nonactive whenever soil disturbing activities are expected to be discontinued for a period of 20 or more days and the areas are fully protected. Areas that will become nonactive either during the winter season or within 20 days thereof shall be fully protected with soil stabilization practices and sediment control measures within 10 days of the discontinuance of soil disturbing activities or prior to the onset of precipitation, whichever is first to occur.

Throughout the winter season, active soil-disturbed areas of the project site shall be fully protected at the end of each day with soil stabilization practices and sediment control measures unless fair weather is predicted through the following work day. The weather forecast shall be monitored by the Contractor on a daily basis. The National Weather Service forecast shall be used, or an alternative weather forecast proposed by the Contractor may be used if approved by the Engineer. If precipitation is predicted prior to the end of the following work day, construction scheduling shall be modified, as required, and the Contractor shall deploy functioning control measures prior to the onset of the precipitation.

The Contractor shall implement, year-round and throughout the duration of the project, control measures included in the WPCP for sediment tracking, wind erosion, nonstorm water management and waste management and disposal.

The Engineer may order the suspension of construction operations which create water pollution if the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

**MAINTENANCE.**—To ensure the proper implementation and functioning of control measures, the Contractor shall regularly inspect and maintain the construction site for the control measures identified in the WPCP. The Contractor shall identify corrective actions and time frames to address any deficient measures or reinitiate any measures that have been discontinued.

The construction site inspection checklist provided in the Handbook shall be used to ensure that the necessary measures are being properly implemented, and to ensure that the control measures are functioning adequately. The Contractor shall submit one copy of each site inspection record to the Engineer.

During the winter season, inspections of the construction site shall be conducted by the Contractor to identify deficient measures, as follows:

1. Prior to a forecast storm;
2. After all precipitation which causes runoff capable of carrying sediment from the construction site;
3. At 24 hour intervals during extended precipitation events; and
4. Routinely, at a minimum of once every 2 weeks.

If the Contractor or the Engineer identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected by the Contractor immediately, or by a later date and time if requested by the Contractor and approved by the Engineer in writing, but not later than the onset of subsequent precipitation events. The correction of deficiencies shall be at no additional cost to the State.

**PAYMENT.**—Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

The Engineer will retain an amount equal to 25 percent of the estimated value of the contract work performed during estimate periods in which the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

Retentions for failure to conform to the requirements of this section "Water Pollution Control" shall be in addition to the other retentions provided for in the contract. The amounts retained for failure of the Contractor to conform to the requirements of this section will be released for payment on the next monthly estimate for partial payment following the date that a WPCP has been implemented and maintained, and water pollution is adequately controlled, as determined by the Engineer.

#### **10-1.04 TEMPORARY FENCE (TYPE CL-6)**

Temporary chain link fence (Type CL-6) shall be furnished and constructed, maintained, and later removed as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Except as otherwise specified in this section, temporary chain link fences (Type CL-6) shall conform to the plan details and the specifications for permanent fences of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Used materials may be used providing such used materials are good, sound, and are suitable for the purpose intended.

Materials may be commercial quality providing the dimensions and sizes of said materials are equal to, or greater than, the dimensions and sizes shown on the plans or specified by the specifications.

Posts shall be either metal or wood at the Contractor's option.

Galvanizing and painting of steel items will not be required.

Treating wood with wood preservatives will not be required.

Concrete footings for metal posts will not be required.

Temporary chain link fences (Type CL-6) that are damaged from any cause during the progress of the work shall be repaired or replaced by the Contractor at his expense.

When no longer required for the work as determined by the Engineer, temporary chain link fences (Type CL-6) shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Removed temporary chain link fence (Type CL-6) materials that are not damaged may be reused in the permanent work providing such materials conform to all of the requirements specified for the permanent work and such materials are new when used for the temporary chain link fence (Type CL-6).

Holes caused by the removal of temporary chain link fences (Type CL-6) shall be backfilled in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Temporary fence (Type CL-6) will be measured and paid for in the same manner specified for permanent fences of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Full compensation for maintaining, removing, and disposing of temporary fence (Type CL-6) shall be considered as included in the contract price paid per linear foot for temporary fence (Type CL-6) and no additional compensation will be allowed therefor.

#### **10-1.05 PRESERVATION OF PROPERTY**

Attention is directed to the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications and these special provisions.

Existing trees, shrubs and other plants, that are not to be removed as shown on the plans or specified elsewhere in these special provisions, and are injured or damaged by reason of the Contractor's operations, shall be replaced by the Contractor. The minimum size of tree and shrub replacement shall be a 15-gallon container. Replacement ground cover plants shall be from flats and shall be planted 12 inches on center. Replacement of *Carpobrotus* ground cover plants shall be from cuttings and shall be planted 12 inches on center. Replacement planting shall conform to the requirements in Section 20-4.07, "Replacement," of the Standard Specifications.

Damaged or injured plants shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications. At the option of the Contractor, removed trees and shrubs may be reduced to chips. The chipped material shall be spread within the highway right of way at locations designated by the Engineer.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed prior to the start of the plant establishment period and shall conform to the provisions in Section 20-4.05, "Planting," of the Standard Specifications.

#### **10-1.06 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, except highway planting and irrigation systems in accordance with the provisions in Section 7-1.15, "Relief From Maintenance and Responsibility," of the Standard Specifications.

#### **10-1.07 COOPERATION**

Attention is directed to Sections 7-1.14, "Cooperation," and 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications

#### **10-1.08 PROGRESS SCHEDULE (CRITICAL PATH)**

Progress schedules will be required for this contract and shall conform to the requirements of these special provisions. Progress schedules shall utilize the Critical Path Method (CPM). Attention is directed to "Cooperation" and "Obstructions"

of these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7, "Legal Relations and Responsibility," of the Standard Specifications.

## **DEFINITIONS**

The following definitions shall apply to these special provisions:

- A. Activity.—A task or item of work that shall be performed in order to complete a project.
- B. Baseline Schedule.—The initial CPM progress schedule as accepted by the Engineer representing the Contractor's original work plan.
- C. Concurrent Delay.—Two or more delays on the critical path that occur at the same time.
- D. Contract Completion Date.—The date the Contractor is contractually obligated to complete the project, including any authorized adjustments, as specified in Section 8-1.06, "Time of Completion," of the Standard Specifications.
- E. Contractor Delay.—A delay that extends the time required to complete a controlling operation caused by and within the control of the Contractor, subcontractors at any tier or suppliers.
- F. Controlling Operation.—A feature of work or activity on the critical path.
- G. Critical Path.—In a project network, the sequence of activities yielding the longest path in a CPM analysis necessary to complete the project.
- H. Critical Path Method (CPM).—A mathematical calculation using the sequence of activities and their interrelationships, interdependencies, resources, and durations to determine the critical path that shows the expected time to complete a project.
- I. Data Date.—The day after the date through which progress updates have been calculated; everything occurring earlier than the data date is "As-Built"; and everything on or after the data date is "Planned."
- J. Early Completion Time.—The difference in time between the contract completion date and the current State-accepted scheduled completion date.
- K. Float.—The amount of time between the early start date and the late start date or the early finish date and the late finish date of any activity or group of activities in the network.
- L. Free Float.—The amount of time an activity can be delayed before delaying a subsequent activity.
- M. Fragnet.—A section or fragment of the network diagram comprised of a group of activities.
- N. Milestone.—A marker in a network which is typically used to mark a point in time or denote the beginning or end of a sequence of activities. A milestone has zero duration and zero resources, but will otherwise function in the network as if the milestone were an activity.
- O. Narrative Report.—A report that identifies potential problem areas, current and anticipated delaying factors and their impact, actions taken or proposed, proposed changes in schedule logic, extension or contraction of activities, proposed addition or deletion of activities, explanation for changes in the critical path, explanation for changes in scheduled completion date, out of sequence work, and other topics related to job progress or scheduling.
- P. Near Critical Path.—A path having 10 working days or less of total float.
- Q. Punch List.—A list of details needing attention to complete task or work for both contract item and extra work.
- R. Schedule Revision.—A change in the future portion of the schedule that modifies logic; alters construction sequences such as performing sequential activities concurrently or concurrent activities sequentially; adds or deletes activities or significantly alters activity durations, as determined or accepted by the Engineer.
- S. Scheduled Completion Date.—The Contractor's scheduled completion date as shown on the accepted baseline schedule as modified by subsequent accepted schedule updates and revisions.
- T. Time Impact Analysis.—An analysis demonstrating the estimated time impact of a contract change order, delay or other event on the scheduled completion date.
- U. Total Float.—The amount of time that an activity may be delayed without delaying the scheduled completion date.
- V. Update.—The routine modification of the CPM progress schedule through a regular monthly review to incorporate actual past progress to date by activity, projected completion dates and approved time adjustments.

## **MATERIALS (COMPUTER SYSTEM)**

The Contractor shall provide a computer system for the State's exclusive possession and use for CPM progress schedules. The minimum computer system to be furnished shall be complete with keyboard, mouse, monitor, printer and plotter. The system shall conform to the following requirements:

- A. Latest industry-available Intel Pentium processor, Motorola RISC processor or equivalent.
- B. Latest computer operating system software compatible with the selected processor, either Windows or MACINTOSH.
- C. Minimum of 64 megabytes of random access memory (RAM).

- D. Internal drives, including: one 4-gigabyte minimum hard disk drive, one 1.44-megabyte 90 mm (3.5-inch) floppy disk drive and one 32x speed CD-ROM drive.
- E. Internal fax/modem, latest speed and software version of U.S. Robotics, 3COM or equivalent.
- F. A 430 mm (17-inch) minimum, color monitor capable of at least 1,024 x 768 pixels.
- G. A color-ink-jet-type, B-size plotter compatible with the selected system capable of printing fully legible, time-scaled charts, network diagrams and reports.
- H. A manual parallel cable switching device, with connecting cables, allowing the user to alternate printing between the plotters.
- I. CPM software shall be compatible with the hardware provided, shall be the latest version of Primavera Project Planner for Windows, SureTrak for Windows, or equal, and shall be able to create files that can easily be imported into the latest version of Primavera.
- J. General software shall be the latest version of McAfee VirusScan virus protection or equal and shall be compatible with the hardware provided.
- K. Upgrades to the CPM and general software shall be provided, as the upgrades become available.

The computer hardware and software furnished by the Contractor shall be compatible with that used for the production of the CPM progress schedule required by these special provisions, including original instruction manuals and other documentation normally provided with the CPM and general software. Before delivery and setup of the computer system, the Contractor shall submit, for approval of the Engineer, a detailed list of the computer hardware and software the Contractor proposes to furnish, including an itemized schedule of costs for the system.

The Contractor shall furnish, install, set up, maintain, and repair the computer system ready-for-use, and provide plotter supplies as necessary during the course of the project at a location determined by the Engineer. The first submittal of the baseline schedule will not be considered complete until the hardware and software are installed and ready for use with the submitted baseline schedule. The Contractor shall instruct and assist the Engineer in the use of the hardware and software. When requested by the Engineer, the Contractor shall provide one 8-hour session of outside commercial training in the use of the CPM software for a maximum of 2 project staff at a location acceptable to the Engineer. Hardware repairs shall be made within 48 hours of notification by the Engineer, or replacement equipment shall be furnished and installed by the Contractor until repairs have been completed.

Computer hardware and software furnished shall remain the property of the Contractor and shall be removed by the Contractor upon acceptance of the contract if no claims involving contract progress are pending. If contract claims involving contract progress are pending, computer hardware or software shall not be removed until the final estimate has been submitted to the Contractor.

## **GENERAL**

Early completion time shall be considered a resource for the exclusive use of the Contractor. The Contractor may increase early completion time by increasing production or reallocating resources to be more efficient, or by proposing, and the State accepting, contract change orders that are the result of significant Contractor development and investment or from an appropriate share of an accepted cost reduction proposal in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications.

The State may reduce contract working days if the action is the result of a contract change order other than those that result from significant Contractor development and investment. The Contractor shall conduct a time impact analysis to determine the effect of the change in the same manner described in "Schedule Time Adjustment" specified herein, and shall include the impacts acceptable to the Engineer in the next update or revision.

The Contractor shall be responsible for assuring that the work sequences are logical and the network shows a coordinated plan for complete performance of the work. Failure of the Contractor to include in the schedule any element of work required for the performance of the contract shall not relieve the Contractor from completing the work within the time limit specified in the contract. If the Contractor or the Engineer discovers an undefined element of work, activity or logic, it shall be corrected by the Contractor in a schedule revision, as specified in these special provisions. If a planned activity requires greater-than-normal daily resources to accomplish, schedule revision submittals shall include a narrative describing the activity, and the amount and use of the extraordinary resources.

The Baseline Schedule or Schedule Update submitted for acceptance shall not show variances from the requirements of these special provisions unless approved by the Engineer. The Contractor shall make specific mention of the variations in the letter of transmittal and shall make the associated adjustments to the project schedule. The Contractor will not be relieved of the responsibility for executing the work in strict conformance with the provisions in the requirements of these special provisions. In the event of a conflict between the requirements of these special provisions and the information provided or shown on an accepted schedule, the requirements of these special provisions shall take precedence.

Each schedule submitted to the Engineer shall comply with the limits imposed by these special provisions, with the specified intermediate milestones and completion dates, and with the constraints, restraints or sequences included in these

special provisions, except that after the Engineer accepts the baseline schedule, the Contractor may show a late scheduled completion date on subsequent updates or revisions. The degree of detail shall include factors to the satisfaction of the Engineer, including, but not limited to:

- A. Physical breakdown of the project;
- B. Contract milestones and completion dates, substantial completion dates, constraints, restraints, sequences of work shown in these special provisions, the planned substantial completion date, and the final completion date;
- C. Type of work to be performed, the sequences and the activities to be performed by subcontractors;
- D. Procurement, submittal, submittal review, manufacture, test, delivery, and installation of major materials and equipment that require approval;
- E. Preparation, submittal and approval of shop or working drawings and material samples showing time, as specified in these special provisions for the Engineer's review;
- F. Identification of interfaces and dependencies with preceding, concurrent and follow-on contractors, railroads, and utilities as indicated in these special provisions;
- G. Identification of each utility relocation or interface as a separate activity;
- H. Batch plant erection and plant certification;
- I. Erection and removal of falsework or shoring;
- J. Submission and approval of reports or results for major tests, such as that for pile loading or traffic controllers;
- K. Indicate long-term ramp and connector closing and opening events, traffic switches, and opening and closing of pavements to traffic as separate one day activities;
- L. Punch-list and final clean-up;
- M. State-owned float as the last activity in the schedule, at the end of which is the Scheduled Completion Date;
- N. Activity coding conventions shall include the following:

	Code	Value	Description
(1) Responsibility	RESP	CT	Caltrans
		UTIL	Utility Company
		RAIL	Railroad
		xxxx	Contractor
		xxxx	Subcontractor
		xxxx	others, as needed
(2) Stage	STGE	1	Stage 1
		2	Stage 2
		other designations	other descriptions, as needed
(3) Phase	PHAS	1	Phase 1
		2	Phase 2
		other phases	other phases, as needed
(4) Utilities	UTIL	PGE	Pacific Gas & Electric
		BELL	Pacific Bell
		GTE	GTE
		SCE	Southern California Edison
		other utilities	other utilities, as needed

The Contractor may include additional coding conventions, such as Ramps (RAMP), Facilities (FAC), and Events (EVNT).

The work shall be executed in the sequence indicated in the accepted baseline schedule and subsequent accepted updates and revisions. Once the Engineer accepts a CPM schedule, the Contractor shall neither artificially improve the progress nor artificially change the quantity of float in any part of the schedule by artificially adding or deleting activities, revising schedule logic restraints, or changing planned activity durations. Schedule changes of planned work shall be documented in a properly submitted revision. The Contractor may improve the progress by performing sequential activities concurrently or by performing activities more quickly than planned. In the case of multiple critical paths, float generated by early completion of one or a sequence of activities will be considered in determining if that sequence of activities remains on the critical path.

The schedule shall be modified to reflect actual events and conditions, including non-work days, as these events and conditions occur for historical purposes and for use in time impact analysis. Submittals and Engineer review time shall be shown in the progress schedule, including CPM schedule updates and revisions. The duration of the Engineer review activity shall be 15 days unless specified otherwise in these special provisions.

The Contractor shall be allowed to show an early or late scheduled completion date on schedule updates and revisions. The Engineer will use the most current, accepted schedule update and revision, and Contractor-provided cause, time-impact and schedule-delay analysis that is acceptable to the Engineer to determine apparent impacts.

The Engineer shall have 20 days to review and accept or reject the baseline schedule. The Engineer shall have 15 days to review and accept or reject any updated or revised schedule. Rejected schedules shall be resubmitted to the Engineer within 5 days, at which time a new review period of 5 days will begin. After the baseline schedule is accepted, schedules that are not accepted or rejected within the required review period will be deemed to have been accepted by the Engineer. Acceptance of a schedule does not relieve the Contractor of the responsibility of submitting complete and accurate information.

### **PRE-CONSTRUCTION SCHEDULING CONFERENCE**

The Contractor shall schedule, and the Engineer will conduct, a Pre-construction Scheduling Conference with the Contractor's Project Manager and Construction Scheduler within 10 days after approval of the contract. At this meeting, the Engineer will review the requirements of this section of the special provisions with the Contractor. The Contractor shall submit a general time-scaled logic diagram displaying the major activities and sequence of planned operations and shall be prepared to discuss the proposed work plan and schedule methodology that complies with the requirements of these special provisions. If the Contractor proposes deviations to the construction staging of the project, the Contractor shall submit a general time-scaled logic diagram displaying the deviations and resulting time impacts and shall be prepared to discuss the proposal. At this meeting, the Contractor shall additionally submit the alpha-numeric coding structure and the activity identification system for labeling the work activities. To easily identify relationships, each activity description shall indicate its associated scope or location of work by including such terms as quantity of material, type of work, Bridge Number, Station to Station location, side of highway (such as left, right, northbound, southbound), lane number, shoulder, ramp name, ramp line descriptor or mainline. The Engineer will review and comment on the logic diagram, the coding structure and activity identification system within 15 days after submission by the Contractor. The Contractor shall make modifications to the time-scaled logic diagram, the coding structure, and activity identification system that the Engineer requests and shall employ that coding structure and identification system. The Contractor shall include the Engineer-requested modifications in the baseline schedule.

### **NETWORK DIAGRAM AND PROJECT SCHEDULE REPORTS**

Schedules submitted to the Engineer, including the baseline schedule, shall include originally-plotted time-scaled network diagram(s). Network diagrams shall be based on early start and early finish dates of activities shown. The network diagrams submitted to the Engineer shall also be accompanied by the CPM software-generated tabular reports for each activity included in the project schedule. Three different report sorts shall be provided: Early Start, Total Float, and Activity Number which shall show the predecessors and successors for each activity. Tabular reports, 215 mm x 280 mm size (8 1/2" x 11" ), shall be submitted to the Engineer and shall include at a minimum, the following:

- A. Data date;
- B. Predecessor and successor activity numbers and descriptions;
- C. Activity number and description;
- D. Activity code(s);
- E. Scheduled, or actual and remaining durations for each activity;
- F. Earliest start date (by calendar date);
- G. Earliest finish date (by calendar date);
- H. Actual start date (by calendar date);
- I. Actual finish date (by calendar date);
- J. Latest start date (by calendar date);
- K. Latest finish date (by calendar date);
- L. Free Float, in work days;
- M. Total Float, in work days;
- N. Percentage of activity complete and remaining duration for incomplete activities;
- O. Lag(s); and
- P. Imposed constraints.

The networks shall be drafted time-scaled to show a continuous flow of information from left to right. The primary path(s) of criticality shall be clearly and graphically identified on the network(s). The network diagram shall be prepared on E-size sheets, 860 mm x 1120 mm (34" x 44"), and shall have a title block in the lower right-hand corner and a timeline on each page. Exceptions to the size of the network sheets and the use of computer graphics to generate the networks shall be subject to the Engineer's approval.

The narrative report shall be organized as follows:

- A. Contractor's Transmittal Letter;
- B. Work completed during the period;
- C. Identification of unusual resources: manpower, material, or equipment restrictions or use, including multiple shifts, 6-day work weeks, specified overtime, or work at times other than regular days or hours;
- D. Description of the current critical path;
- E. Changes to the critical path since the last schedule submittal;
- F. Description of problem areas;
- G. Current and anticipated delays:
  - 1. Cause of delay,
  - 2. Impact of delay on other activities, milestones and completion dates,
  - 3. Corrective action and schedule adjustments to correct the delay;
- H. Pending items and status thereof:
  - 1. Permits,
  - 2. Change Orders,
  - 3. Time Adjustments,
  - 4. Non-Compliance Notices;
- I. Contract completion date(s) status:
  - 1. Ahead of schedule and number of days,
  - 2. Behind schedule and number of days,
  - 3. If date changes, explain the cause;
- J. Attached Updated Network Diagram and Reports.

Schedule network diagrams, tabular reports and narrative reports shall be submitted to the Engineer for acceptance in the following quantities:

- A. Two sets of originally-plotted, time-scaled network diagram(s);
- B. Two copies of each of the three sorts of the CPM software-generated tabular reports 215 mm x 280 mm size (8 1/2" x 11");
- C. One 1.44-megabyte 89 mm (3.5 inch) floppy diskette containing the schedule data;
- D. Two copies of the narrative report.

#### **BASELINE SCHEDULE REQUIREMENTS**

Within 30 days after approval of the contract, the Contractor shall submit a baseline schedule to the Engineer. The baseline project schedule shall have a data date of the first working day of the contract and shall not include any completed work to-date. The baseline schedule shall be practicable; include the entire scope of work; meet interim target dates, milestones, stage construction requirements, and internal time constraints; show logical sequence of activities; and shall not extend beyond the number of working days originally provided in these special provisions. An early completion schedule will be acceptable provided that the schedule meets the requirements of these special provisions and the Standard Specifications.

The baseline CPM progress schedule submitted by the Contractor shall have a sufficient number of activities to assure adequate planning of the project, to permit monitoring and evaluation of progress, and the analysis of time impacts. The baseline schedule shall depict how the Contractor plans to complete the whole work involved, and shall show the activities that define the critical path. Multiple critical paths and near-critical paths shall be kept to a minimum, as determined by the Engineer. A total of not more than 50 percent of the baseline schedule activities shall be critical or near-critical, unless otherwise approved by the Engineer.

Activities shall have a duration of not less than one working day nor more than 20 working days, unless otherwise approved by the Engineer. The activities in the baseline schedule, with the exception of the first and last activities, shall have a minimum of one predecessor and a minimum of one successor. The baseline schedule shall not attribute negative float or negative lag to an activity.

## **MONTHLY SCHEDULE UPDATES**

On or before the first calendar day of each month, the Contractor shall meet with the Engineer to review contract progress. At the monthly progress meeting the Contractor shall submit to the Engineer an update of the network diagram and project schedule reports as defined above. Update schedules shall have a data date of the twenty-first calendar day of the month, or other date as established by the Engineer, and shall include the information available up to that date. Durations for work that has been completed will be shown on the schedule as the work actually occurred, including Engineer submittal review and Contractor resubmittal times.

## **SCHEDULE REVISIONS**

When the Contractor proposes a revision to an accepted schedule, the Contractor shall state in writing the reasons for the change, as well as the specifics, such as, but not limited to, revisions to activities, logic, durations, and other matters pertinent to the proposed revisions. If the Engineer considers a schedule revision to be of a major nature, the Engineer may require the Contractor to revise and submit for acceptance the affected portion(s) of the project schedule and an analysis to show the effect on the entire project. In addition to the revision submittal, the Contractor shall submit a schedule update with the same data date as the revision which is to reflect the project condition just prior to implementing the revision. The Contractor shall discuss contemplated revisions with the Engineer prior to the submittal.

Within 15 days, the Contractor shall submit a revised CPM network for approval when requested by the Engineer, or when any of the following occurs:

- A. There is a significant change in the Contractor's operations that affects the critical or near critical path(s).
- B. The scheduled completion date of the current submitted updated CPM schedule indicates that the contract progress is 20 days or more behind the current accepted schedule or revision.
- C. The Contractor or the Engineer considers that an approved or anticipated change will impact the critical or near critical path or contract progress.

## **SCHEDULE TIME ADJUSTMENT**

When the Contractor requests a time adjustment due to contract change orders or delays, or if the Contractor or the Engineer considers that an approved or anticipated change will impact the critical path or contract progress, the Contractor shall submit a written time impact analysis to the Engineer illustrating the impacts of each change or delay on the current scheduled completion date or milestone completion date. The analysis shall use the currently accepted schedule that has a data date closest to and prior to the event. If the Engineer determines that the currently accepted schedule does not appropriately represent the conditions prior to the event, the schedule shall be updated to the day before the event being analyzed. An additional analysis shall be performed after the completion of the event. If the event is on the critical path at the time of its completion, then the difference between the scheduled completion dates of these 2 analyses shall be equal to the adjustment in time. The time impact analysis shall include one or more fragnet(s) demonstrating how the Contractor proposes to incorporate the event(s) into the schedule, including logic and duration of the proposed activities. Until such time that the Contractor provides the analysis, the Engineer may, at his option, construct and utilize the project as-built schedule or other recognized method to determine adjustments in contract time.

Time impact analyses shall be submitted in duplicate within 15 days of a delay and shall be used in determining contract change order days. Approval or rejection of each time impact analysis by the Engineer will be made within 15 days after receipt of the time impact analysis. In the event the Contractor does not agree with the decision of the Engineer regarding the impact of a change or delay, notice shall be given in conformance with the provisions in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications. The third paragraph of Section 4-1.03A of the Standard Specifications shall not apply.

## **FINAL SCHEDULE UPDATE**

Within 30 days after acceptance of the contract by the Director, the Contractor shall submit a final update of the schedule (as-built schedule) with actual start and actual finish dates for the activities. The Contractor shall submit a written certificate with this submittal signed by the Contractor's Project Manager and an officer of the company stating "To the best of my knowledge, the enclosed final update of the project schedule reflects the actual start and completion dates of the actual activities for the project contained herein." An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager. Submittal of the final schedule update and the certification shall be a condition precedent to the release of any retained funds under the contract.

## **PAYMENT**

Progress schedule (critical path) will be paid for at a lump sum price. The contract lump sum price paid for progress schedule (critical path) shall include full compensation for furnishing all labor, material (including computer hardware and

software), tools, equipment, and incidentals; and for doing all the work involved in preparing, furnishing, updating, and revising progress schedules; maintaining and repairing the computer hardware; and instructing and assisting the Engineer in the use of the computer hardware and software, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. Payments for the progress schedule (critical path) contract item will be made as follows:

- A. A total of 50 percent of the progress schedule (critical path) contract item amount will be made upon achieving all of the following: 5 percent of all work completed, accepted baseline, all accepted required schedule updates and revisions, and required CPM training.
- B. A total of 60 percent of the progress schedule (critical path) contract item amount will be made upon achieving all of the following: 25 percent of all work completed, accepted baseline, and all accepted required schedule updates and revisions.
- C. A total of 75 percent of the progress schedule (critical path) contract item amount will be made when 50 percent of all work completed, accepted baseline, and all accepted required schedule updates and revisions.
- D. A total of 100 percent of the progress schedule (critical path) contract item amount will be made when 100 percent of all work completed, accepted baseline, all accepted required schedule updates and revisions, and a completed and certified Final Schedule Update.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications shall not apply to the item of progress schedule (critical path). Adjustments in compensation for progress schedule (critical path) will not be made for any increased or decreased work ordered by the Engineer in furnishing progress schedules.

### **RETENTION**

The Department will retain an amount equal to 25 percent of the estimated value of the work performed during each estimate period in which the Contractor fails to submit pre-construction scheduling documents, an acceptable baseline, acceptable updated schedule, or acceptable revised progress schedule (critical path) conforming to the requirements of these special provisions as determined by the Engineer. Retentions for failure to submit acceptable CPM progress schedules shall be in addition to other retentions provided for in the contract. Retentions for failure to submit progress schedules (critical path) will be released for payment on the next monthly estimate for partial payment following the date that pre-construction scheduling documents and acceptable progress schedules (critical path) are submitted to the Engineer, and no interest will be due the Contractor.

### **10-1.09 OVERHEAD**

Overhead shall conform to the provisions of this section, "Overhead," of these special provisions. The Contractor will be compensated for time-related overhead in accordance with these special provisions.

Attention is directed to "Force Account Payment" and "Progress Schedule (Critical Path)" of these special provisions.

The provisions in Section 9-1.08, "Adjustment of Overhead Costs," of the Standard Specifications shall not apply.

Time-related overhead shall consist of those overhead costs, including field and home office overhead, that are in proportion to the time required to complete the work. Time-related overhead shall not include costs that are not related to time, including but not limited to, mobilization, licenses, permits, and any other charges incurred only once during the contract.

Field office overhead expenses include time-related costs associated with the normal and recurring operations of the construction project, and shall not include costs directly attributable to any of the work of the contract. Such time-related costs include, but are not limited to, the salaries and benefits of project managers, general superintendents, field office managers and other field office staff assigned to the project, and rent, utilities, maintenance, security, supplies and equipment costs of the project field office.

Home office overhead or general and administrative expenses refer to the fixed costs of operating the Contractor's business. Such costs include, but are not limited to, general administration, insurance, personnel and subcontract administration, purchasing, accounting, and project engineering and estimating. The rate of home office overhead shall exclude expenses specifically related to other contracts or other businesses of the Contractor, equipment coordination, material deliveries, and consultant and legal fees.

The quantity of time-related overhead to be paid will be measured by the working day, as specified in the Engineer's Estimate as WDAY. The estimated amount will be based on the number of working days, excluding any days for plant establishment, as specified in "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions. In the event an early completion progress schedule, as defined in "Progress Schedule (Critical Path)" of these special provisions, is submitted by the Contractor and approved by the Engineer, the quantity of time-related overhead eligible for payment will be based on the total number of working days as specified in "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions, rather than the Contractor's early completion progress

schedule. The quantity of time-related overhead, as measured above, will be adjusted only as a result of suspensions and adjustments of time which revise the current contract completion date and which are also any of the following:

1. suspensions of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications, except:
  - a. suspensions ordered due to weather conditions being unfavorable for the suitable prosecution of the controlling operation or operations; or
  - b. suspensions ordered due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the contract; or
  - c. any other suspensions mutually agreed upon between the Engineer and the Contractor.
2. extensions of time granted by the State in conformance with the provisions in the fifth paragraph in Section 8-1.07, "Liquidated Damages," of the Standard Specifications; or
3. reductions in contract time set forth in approved contract change orders, in conformance with the provisions in Section 4-1.03, "Changes," of the Standard Specifications.

In the event a cost reduction proposal is submitted by the Contractor, and is subsequently approved by the Engineer, which provides for a reduction in contract time, the contract amount of time-related overhead associated with the reduction in contract time shall be considered as a net savings in the total cost of time-related overhead. The Contractor will be paid 50 percent of the estimated net savings of the time-related overhead, in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications.

If the quantity of time-related overhead, measured as specified in this special provision, exceeds 149 percent of the number of working days specified in the Engineer's Estimate, the Contractor shall, within 60 calendar days of the Engineer's written request, submit to the Engineer an audit examination and report performed by an independent Certified Public Accountant of the Contractor's actual overhead costs. The independent Certified Public Accountant's audit examination shall be performed in conformance with the requirements of the American Institute of Certified Public Accountants Attestation Standards. The audit examination and report shall depict the Contractor's project and company-wide financial records and shall specify the actual overall average daily rates for both field and home office overhead for the entire duration of the project, and whether the costs have been properly allocated. The rates of field and home office overhead shall exclude all unallowable costs as determined in the Federal Acquisition Regulations, 48 CFR, Chapter 1, Part 31. The audit examination shall determine if the rates of field and home office overhead:

1. are allowable in conformance with the requirements of the Federal Acquisition Regulations, 48 CFR, Chapter 1, Part 31;
2. are adequately supported by reliable documentation; and
3. related solely to the project under examination.

Upon the Engineer's written request, the Contractor shall make its financial records available for audit by the State for the purpose of verifying the actual rate of time-related overhead specified in the audit submitted by the Contractor. The actual rate of time-related overhead specified in the audit, submitted by the Contractor, will be subject to approval by the Engineer.

If the Engineer elects, or if requested in writing by the Contractor, contract item payments for time-related overhead, in excess of 149 percent of the number of working days designated in the Engineer's Estimate, will be adjusted to reflect the actual rate.

The cost of performing an audit examination and submitting the report, requested by the Engineer, will be borne equally by the State and the Contractor. The division of the cost will be made by determining the cost of providing an audit examination in conformance with the provisions of Section 9-1.03B, "Work performed by Special Forces or Other Special Services" of the Standard Specifications, and paying to the Contractor one-half of that cost.

The contract price paid per working day for time-related overhead shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in time-related overhead, complete in place, including all field and home office overhead costs incurred by the Contractor and by any joint venture partner, subcontractor, supplier or other party associated with the Contractor, and the Contractor's share of costs of audits of overhead costs requested by the Engineer, as specified in these special provisions, and as directed by the Engineer. The provisions in Sections 4-1.03B, "Increased or Decreased Quantities," 4-1.03C, "Changes in Character of the Work," of the Standard Specifications shall not apply to time-related overhead.

Full compensation for additional overhead costs involved in the performance of extra work at force account shall be considered as included in the markups specified in "Force Account Payment," of these special provisions.

Full compensation for additional overhead cost involved in performing additional contract item work that is not a controlling operation and for all overhead, other than the time-related overhead measured and paid for as specified in this

section "Overhead", shall be considered as included in the various items of work involved, and no additional compensation will be allowed therefor.

For the purpose of making partial payments pursuant to the provisions in Section 9-1.06, "Partial Payments," of the Standard Specifications, the number of working days to be paid for time-related overhead in each monthly partial payment will be the number of working days, specified above to be measured for payment, that occurred during that monthly estimate period. The amount earned per working day for time-related overhead shall be either the contract item price, or 20 percent of the original total contract amount divided by the number of working days specified in "Beginning of Work, Time of Completion and Liquidated Damages," of these special provisions, whichever is the lesser.

After all work has been completed, except plant establishment work, as provided in Section 20-4.08, "Plant Establishment Work," of the Standard Specifications, the amount, if any, of the total contract item price for time-related overhead not yet paid will be included for payment in the first estimate made after completion of all roadway construction work, in conformance with the provisions in Section 9-1.06, "Partial Payments," of the Standard Specifications.

**10-1.10 OBSTRUCTIONS**

Attention is directed to Sections 8-1.10, "Utility and Non-Highway Facilities," and 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

The Contractor's attention is directed to the existence of certain underground facilities that may require special precautions be taken by the Contractor to protect the health, safety and welfare of workmen and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 150 mm (6 inches) in diameter or pipelines operating at pressures greater than 415 kPa (60 psi) gauge; underground electric supply system conductors or cables, with potential to ground of more than 300 volts, either directly buried or in duct or conduit which do not have concentric grounded conductors or other effectively grounded metal shields or sheaths.

If such facilities are not located on the plans in both alignment and elevation, no work shall be performed in the vicinity of said facilities until the owner, or his representative, has located the facility by potholing, probing, or other means that will locate and identify the facility. If, in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the utility facilities not being located by the owner or his representative, the State will compensate the Contractor for such delays to the extent provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications, and not otherwise, except as provided in Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 10 working days, but not more than 14 calendar days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include but are not limited to the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert-Southern California (USA)	1-800-422-4133 1-800-227-2600

The Contractor shall notify the Engineer and the Union Pacific 24-hour Telecommunications "Call Before You Dig" number 1-800-336-9193 at least 48 hours prior to performing any work on Union Pacific Railroad Company property. No work shall be performed on Union Pacific Railroad Company property until optical conduit structures have been located and flagged by Union Pacific Telecommunications personnel.

Installation of the following utility facilities will require coordination with the Contractor's operations. The Contractor shall make necessary arrangements with the utility company, through the Engineer, and shall submit a schedule of work, verified by a representative of the utility company, to the Engineer. The schedule of work shall provide not less than the following number of working days, as defined in Section 8-1.06, "Time of Completion," of the Standard Specifications for the utility company to complete their work.

Utility (address)	Location	Working Days
Pac Bell	Sierra Ave OC (Br No 54-537)	30

**10-1.11 MOBILIZATION**

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications.

**10-1.12 CONSTRUCTION AREA SIGNS**

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to commencing any excavation for construction area sign posts. The regional notification centers include but are not limited to the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert-Southern California (USA)	1-800-422-4133 1-800-227-2600

All excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes.

Construction area signs shall be covered or removed when work is not actively in progress and when the Engineer has determined that construction area sign messages are no longer needed to advise public traffic of unusual conditions in the construction area. No construction area signs shall remain after completion of the project.

Sign substrates for stationary mounted construction area signs may be fabricated from fiberglass reinforced plastic as specified under "Approved Traffic Products" elsewhere in these special provisions.

Type IV reflective sheeting for sign panels for portable construction area signs shall conform to the requirements specified under "Approved Traffic Products" elsewhere in these special provisions.

The term "construction area signs" shall also include temporary object markers required for the direction of public traffic through or around the work during construction. Object markers listed or designated on the plans as construction area signs shall be considered to be signs and shall be furnished, erected, maintained, and removed by the Contractor in the same manner specified for construction area signs and the following:

Object markers shall be stationary mounted on wood or metal posts in accordance with the details shown on the plans and the requirements in Section 82, "Markers and Delineators," of the Standard Specifications.

Marker panels for Type N, and Type P object markers shall conform to the requirements for sign panels for stationary mounted signs.

Target plates for Type K object markers, and posts, reflectors, and hardware shall conform to the requirements in said Section 82, but need not be new.

**10-1.13 MAINTAINING TRAFFIC**

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to the Section entitled "Public Safety" elsewhere in these special provisions, and these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7-1.09.

Night closure is required for removing the existing southbound sidewalk at the Sierra Avenue Overcrossing (Replacement) for the Stage 1 construction.

Portable changeable message signs shall be installed where designated by the Engineer to maintain traffic throughout the life of this contract. Attention is directed to "Portable Changeable Message Signs" of these special provisions.

A temporary signal system shall be installed in stage 1B of the work on Sierra Avenue to control traffic as shown on the plans. Attention is directed to "Temporary Signal System" of these special provisions.

The minimum size specified for Type II flashing arrow signs in the table following the second paragraph of Section 12-3.03, "Flashing Arrow Signs," of the Standard Specifications is amended to read "36 inches by 72 inches".

The second and third paragraphs of Section 12-3.10, "Traffic Cones," of the Standard Specifications are amended to read:

During the hours of darkness traffic cones shall be affixed with reflective cone sleeves. The reflective sheeting of sleeves on the traffic cones shall be visible at 1,000 feet at night under illumination of legal high beam headlights, by persons with vision of or corrected to 20/20.

Reflective cone sleeves shall conform to the following:

1. Removable flexible reflective cone sleeves shall be fabricated from the reflective sheeting specified in the special provisions, have a minimum height of 13 inches and shall be placed a maximum of 3 inches from the top of the cone. The sleeves shall not be in place during daylight hours.
2. Permanently affixed semitransparent reflective cone sleeves shall be fabricated from the semitransparent reflective sheeting specified in the special provisions, have a minimum height of 13 inches, and shall be placed a maximum of 3 inches from the top of the cone. Traffic cones with semitransparent reflective cone sleeves may be used during daylight hours.
3. Permanently affixed double band reflective cone sleeves shall have 2 white reflective bands. The top band shall be 6 inches in height, placed a maximum of 4 inches from the top of the cone. The lower band shall be 4 inches in height, placed 2 inches below the bottom of the top band. Traffic cones with double band reflective cone sleeves may be used during daylight hours.

The type of reflective cone sleeve used shall be at the option of the Contractor. Only one type of reflective cone sleeve shall be used on the project.

Lane closures shall conform to the provisions in the section of these special provisions entitled "Traffic Control System for Lane Closure."

The Contractor shall notify the Engineer at least 15 working days in advance of any and each planned lane or ramp closure or reduction of lane or paved roadbed width or reduced vertical clearance. All lane closures, vertical clearance reductions, and ramp closures shall be approved by the Engineer prior to vertical clearance reduction or closure.

At least 10 working days in advance of any planned ramp closure, the Contractor shall post a SC-6 sign, as shown on the plans, to alert approaching traffic of the planned ramp closure. Such signs shall advise motorists of the times and dates of the closure.

No 2 consecutive entrance or exit ramps in the same direction shall be closed concurrently. At the interchange only one ramp may be closed at a time unless otherwise directed by the Engineer.

At all locations where falsework pavement lighting are designated, falsework lighting shall be installed in conformance with the provisions in Section 86-6.11, "Falsework Lighting," of the Standard Specifications.

Openings shall be provided through bridge falsework for the use of public traffic at each location where falsework is constructed over the streets or routes listed in the following table. The type, minimum width, height and number of openings at each location, and the location and maximum spacing of falsework lighting if required, for each opening, shall conform to the requirements in said table. The width of vehicular openings shall be the clear width between temporary railings or other protective work. The spacing shown for falsework pavement lighting is the maximum distance center to center in feet between fixtures.

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	Number	Width	Height
Vehicle Openings	2	46	15

Location and Spacing of  
Falsework Pavement Lighting

R and L 30

(Width and Height in feet.)

(R=right side of traffic. L=left side of traffic)

(C=Centered overhead.)

The exact location of openings will be determined by the Engineer.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders, including any section closed to public traffic.

The Contractor shall notify local authorities of his intent to begin work at least 5 days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make his own arrangements relative to keeping the working area clear of parked vehicles.

Whenever vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed as shown on the plans.

Lanes shall be closed only during the hours shown on the Lane Closure Charts included in this section "Maintaining Traffic." Except work required under said Sections 7-1.08 and 7-1.09, work that interferes with public traffic shall be performed only during the hours shown for lane closures.

During construction operations on Sierra Avenue a minimum of one paved traffic lane, not less than 12 feet wide, shall be open for use by public traffic in each direction of travel. When construction operations are not actively in progress, not less than 2 such lanes shall be open to public traffic.

Designated legal holidays are: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, and December 25th. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if in the opinion of the Engineer public traffic will be better served and the work expedited. Such deviations shall not be adopted until the Engineer has indicated his written approval. All other modifications will be made by contract change order.

Chart No. 1																									
Multilane Lane Requirements																									
Location: 08-SBd - 10 - 15.4/16.9 (Eastbound)																									
FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9		10	11
Mondays through Thursdays																									
Fridays																									
Saturdays																									
Sundays																									
Day before designated legal holiday																									
Designated legal holidays																									
Day after designated legal holiday																									
Legend:																									
 One lane open in direction of travel  Two adjacent lanes open in direction of travel  Three adjacent lanes open in direction of travel  No lane closure allowed																									
REMARKS: Full freeway closure shall be allowed for falsework erection, structure removal and falsework removal between the hours of 12 midnight and 4:30 a.m. on Monday through Thursday only for Sierra Avenue Overcrossing (Bridge No. 54-537).																									

Chart No. 2 Multilane Lane Requirements																									
Location: 08-SBd - 10 - 15.4/16.9 (Westbound)																									
FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays																									
Fridays																									
Saturdays																									
Sundays																									
Day before designated legal holiday																									
Designated legal holidays																									
Day after designated legal holiday																									

Legend:

-  One lane open in direction of travel
-  Two adjacent lanes open in direction of travel
-  Three adjacent lanes open in direction of travel
-  No lane closure allowed

REMARKS: Full freeway closure shall be allowed for falsework erection, structure removal, and falsework removal between the hours of 12 midnight and 4:30 a.m. on Monday through Thursday only for Sierra Avenue Overcrossing (Bridge No. 54-537).

Chart No. 3 Multilane Lane Requirements																									
Location: Sierra Avenue (NB & SB)																									
FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays																									
Fridays																									
Saturdays																									
Sundays																									
Day before designated legal holiday																									
Designated legal holidays																									
Day after designated legal holiday																									

Legend:

-  One lane open in direction of travel
-  No lane closure allowed

REMARKS: During full freeway closure of Route 10, Sierra Avenue shall be closed to through traffic. Through traffic shall be detoured to Citrus Avenue and Cedar Avenue.

Chart No. 4 Ramp Lane Requirements																									
Location: 08-SBd-10-15.4/16.9 (Eastbound Entrance/Exit, Westbound Entrance/Exit Ramps)																									
FROM HOUR TO HOUR	a.m.											p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays																									
Fridays																									
Saturdays																									
Sundays																									
Day before designated legal holiday																									
Designated legal holidays																									
Day after designated legal holiday																									
Legend:																									
<div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 20px; height: 15px; background-color: gray; border: 1px solid black; margin-right: 5px;"></div> <span>Ramp may be closed</span> </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="width: 20px; height: 15px; background-color: white; border: 1px solid black; margin-right: 5px;"></div> <span>No work that interferes with public traffic will be allowed</span> </div>																									
REMARKS:																									

Pedestrian traffic which normally uses Sierra Avenue to walk southerly, or northerly of the freeway will be transported by Omnitrans buses during the life of this contract. No pedestrian access facilities shall be provided through construction areas within the right of way during this contract. The girders at Sierra Avenue Overhead (Widen) shall be erected during the railroad track shutdown periods. The Contractor shall coordinate with UPRR for railroad track shutdown periods prior to erecting girders.

Erection and removal of falsework at locations where falsework openings are required shall be undertaken at one location at a time. During falsework erection and removal, public traffic in the lanes over which falsework is being erected or removed shall be routed around the work area by means of a local detour as shown on the plans. Removal shall include lowering falsework, blowing sand from sand jacks, turning screws on screw jacks and removing wedges.

Retrouting of traffic during erection or removal of falsework shall be undertaken only at night between the hours of 10:00 pm and 3:00 am of Monday through Thursday except designated legal holidays and days preceding designated legal holidays, for the period necessary for erecting or removing the falsework.

Regardless of the construction procedure, methods and equipment selected, the Contractor shall have all necessary materials and equipment on the site to erect or remove the falsework in any one span or over any one opening prior to detouring public traffic, and shall erect or remove the falsework in an expeditious manner in order that inconvenience to public traffic will be a minimum.

**10-1.14 LANE CLOSURE REQUIREMENTS AND CONDITIONS**

Lane closures shall be made in conformance with the details shown on the plans, the provisions of Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Construction Area Signs" and "Maintaining Traffic" of these special provisions, and these special provisions.

A lane closure, as used in this section, is defined as the closure of a lane or lanes, ramp or connector or any combination thereof within a single temporary traffic control system.

The Contractor shall not perform contract work requiring a lane closure outside the time limits specified in Section "Maintaining Traffic" of these special provisions.

**CLOSURE SCHEDULES**

On or before each Monday at noon, unless Monday falls on a legal holiday when the schedule will be delivered on Tuesday, the Contractor shall furnish to the Engineer a written schedule of all lane closures for the week period beginning the following Saturday and ending on the following Friday. This schedule shall identify in advance all planned closures required in the performance of contract work.

The written schedule shall show the locations and times when the proposed closures are to be in effect. The Contractor will be provided with copies of a closure request form for this purpose. Proposed closures not conforming to the time limits specified in these special provisions or submitted with incomplete, unintelligible or inaccurate information will be returned for correction. The Contractor will be notified promptly of any disapproved closures or any closure that will require coordination with other parties as a condition of approval.

**LANE CLOSURE ADDITIONS AND CANCELLATIONS**

Requests for additional lane closures submitted more than 3 working days in advance and not included in the Lane Closure Schedule will be approved by the Engineer only if the additional closure does not conflict with a scheduled closure. Approval of amendments to the closure schedule will be at the discretion of the Engineer. Written notice of changes or cancellations to any lane closure shall be submitted to the Engineer between the office hours of 07:00 a.m. and 3:30 p.m., Monday through Friday, excluding designated legal holidays.

The Contractor shall confirm all scheduled closures as shown in the following table. All closures not confirmed as scheduled shall be cancelled. If the confirmation or approval day falls on a designated legal holiday, the confirmation or approval will occur on the preceding working day.

Day of Scheduled Closure	Confirm Closure By 8:00 A.M. On The Preceding	Final Approval Or Denial By 4:00 P.M. On The Preceding
Saturday	Wednesday	Thursday
Sunday	Wednesday	Thursday
Monday	Wednesday	Thursday
Tuesday	Thursday	Friday
Wednesday	Friday	Monday
Thursday	Monday	Tuesday
Friday	Tuesday	Wednesday

Confirmed lane closures that are cancelled for unsuitable weather may be rescheduled for the next working day.

**CONTINGENCY PLAN**

The Contractor shall provide the Engineer a contingency plan for reopening closed lanes to public traffic in the event of an equipment breakdown, shortage of materials, lack of production of materials or other production failures or when it becomes necessary to reopen the lane closure for use by public traffic. The Contractor shall, when requested by the Engineer, submit the contingency plan within one working day.

**LATE REOPENING OF CLOSED LANES**

If a lane closure is not reopened to public traffic by the specified time, work shall then be suspended in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. The Contractor shall not make any further lane closures until the Engineer has accepted a work plan, submitted by the Contractor, that will insure that future closures will be reopened to public traffic at the specified time. The Engineer shall have 2 working days to accept or reject the Contractor's proposed work plan.

For each 15-minute interval, or fraction thereof past the time specified to completely reopen the highway or freeway lanes, ramps or connectors, the Department will deduct \$3,080 per 15-minute interval from moneys due or that may become due the Contractor under the contract.

**DENIAL OF PREVIOUSLY REQUESTED OR APPROVED LANE CLOSURES**

If the Contractor is denied a requested or confirmed closure that was included in the Closure Schedule or is directed by the Engineer not to install a previously approved closure, the Contractor may be compensated as provided herein. The Contractor shall not be entitled to any compensation other than that specified herein. Compensation will be made only if the Contractor sustains a loss that could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment, and plant. No compensation will be made for additional closures not included in the Lane Closure Schedule.

If an approved closure is in place within the approved closure times and it becomes necessary to reopen the closure for use by public traffic, as determined by the Engineer, the Contractor will be compensated for the cost of implementing the contingency plan as provided herein. The Contractor shall not be entitled to any compensation other than that specified herein.

### **COMPENSATION FOR DENIAL OF PREVIOUSLY REQUESTED OR APPROVED LANE CLOSURES**

The Contractor will be granted an extension of contract time commensurate with the delay in conformance with the provisions in Section 8-1.07, "Liquidated Damages," of the Standard Specifications and Section "Progress Schedule (Critical Path)" of these special provisions.

The Contractor will be compensated for the idle time of forces and equipment in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

### **10-1.15 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE**

A traffic control system shall consist of closing traffic lanes and ramps in accordance with the details shown on the plans, the provisions of Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" elsewhere in these special provisions and these special provisions.

The provisions in this section will not relieve the Contractor from the responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining, or removing the components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining, or removing the components when operated within a stationary type lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on the vehicles which are doing the placing, maintaining, and removing, of components of a traffic control system, and shall be in place before a lane closure requiring its use is completed.

The traffic cones shown to be placed transversely across closed traffic lanes and shoulders on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be placed.

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the component to its original condition or replace the component and shall restore the component to its original location.

When lane and ramp closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations, approved by the Engineer, within the limits of the highway right of way.

The contract lump sum price paid for traffic control system shall include full compensation for furnishing all labor (except for flagging costs), materials (including signs), tools, equipment and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. Flagging costs will be paid for as provided in Section 12-2.02, "Flagging Costs," of the Standard Specifications.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications, shall not apply to the item of traffic control system. Adjustments in compensation for traffic control system will be made only for increased or decreased traffic control system required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased traffic control necessary. Such adjustment will be made on a force account basis as provided in Section 9-1.03, "Force Account Payment," of the Standard Specifications for increased work, and estimated on the same basis in the case of decreased work.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.03D of the Standard Specifications, will be paid for as a part of the extra work.

### **10-1.16 TEMPORARY PAVEMENT DELINEATION**

Temporary pavement delineation shall be furnished, placed, maintained and removed in accordance with the provisions in Section 12-3.01, "General," of the Standard Specifications and these special provisions. Nothing in these special provisions shall be construed as to reduce the minimum standards specified in the Manual of Traffic Controls published by the Department or as relieving the Contractor from the responsibilities specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

**GENERAL.--**Whenever the work causes obliteration of pavement delineation, temporary or permanent pavement delineation shall be in place prior to opening the traveled way to public traffic. Laneline or centerline pavement delineation shall be provided at all times for traveled ways open to public traffic. On multilane roadways (freeways and expressways) edge line delineation shall be provided at all times for traveled ways open to public traffic.

All work necessary, including any required lines or marks, to establish the alignment of temporary pavement delineation shall be performed by the Contractor. Surfaces to receive temporary pavement delineation shall be dry and free of dirt and loose material. Temporary pavement delineation shall not be applied over existing pavement delineation or other temporary pavement delineation. Temporary pavement delineation shall be maintained until superseded or replaced with a new pattern of temporary pavement delineation or permanent pavement delineation.

Temporary pavement markers and temporary traffic stripe (paint) which is applied to the final layer of surfacing or existing pavement to remain in place or which conflicts with a subsequent or new traffic pattern for the area shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

**TEMPORARY LANELINE AND CENTERLINE DELINEATION.**--Whenever lanelines or centerlines are obliterated and temporary pavement delineation to replace the lines is not shown on the plans, the minimum laneline and centerline delineation to be provided for that area shall be temporary reflective pavement markers placed at longitudinal intervals of not more than 24 feet. The temporary reflective pavement markers shall be the same color as the laneline or centerline the pavement markers replace. Temporary reflective pavement markers shall be, at the option of the Contractor, one of the temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (6 months or less) in "Approved Traffic Products" elsewhere in these special provisions.

Temporary reflective pavement markers shall be placed in accordance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used to place pavement markers in areas where removal of the pavement markers will be required.

Temporary laneline or centerline delineation consisting entirely of temporary reflective pavement markers placed on longitudinal intervals of not more than 24 feet, shall be used on lanes opened to public traffic for a maximum of 14 days. Prior to the end of the 14 days the permanent pavement delineation shall be placed. If the permanent pavement delineation is not placed within the 14 days, the Contractor shall provide additional temporary pavement delineation and the cost thereof shall be borne by the Contractor. The additional temporary pavement delineation to be provided shall be equivalent to the pattern specified for the permanent pavement delineation for the area, as determined by the Engineer.

Full compensation for furnishing, placing, maintaining and removing the temporary reflective pavement markers, used for temporary laneline and centerline delineation for those areas where temporary laneline and centerline delineation is not shown on the plans and for providing equivalent patterns of permanent traffic lines for those areas when required, shall be considered as included in the contract prices paid for the items of work that obliterated the laneline and centerline pavement delineation and no separate payment will be made therefor.

**TEMPORARY EDGELINE DELINEATION.**--On multilane roadways (freeways and expressways) whenever edgelines are obliterated and temporary pavement delineation to replace those edgelines is not shown on the plans, the edgeline delineation to be provided for those areas adjacent to lanes open to public traffic shall be as follows:

Temporary pavement delineation for right edgelines shall, at the option of the Contractor, consist of either a solid 4-inch wide traffic stripe of the same color as the stripe the temporary edgeline delineation replaces, or traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 100 feet.

Temporary pavement delineation for left edgelines shall, at the option of the Contractor, consist of either solid 4-inch wide traffic stripe of the same color as the stripe the temporary edgeline delineation replaces, or traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 100 feet; or temporary reflective pavement markers placed at longitudinal intervals of not more than 6 feet. Temporary pavement markers used for temporary left edgeline delineation shall be one of the types of temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (6 months or less) in "Approved Traffic Products" elsewhere in these special provisions.

Four-inch wide traffic stripe placed for temporary edgeline delineation which will require removal shall conform to the requirements of temporary traffic stripe (tape) specified herein. Where removal of the 4-inch wide traffic stripe will not be required painted traffic stripe conforming to the requirements of temporary traffic stripe (paint) specified herein may be used. The quantity of temporary traffic stripe (tape) or temporary traffic stripe (paint) used for this temporary edgeline delineation will not be included in the quantities of tape or paint to be paid for.

The lateral offset for traffic cones, portable delineators or channelizers used for temporary edgeline delineation shall be as determined by the Engineer. If traffic cones or portable delineators are used as temporary pavement delineation for edgelines, the Contractor shall provide personnel to remain at the jobsite to maintain the cones or delineators during all hours of the day that they are in use.

Channelizers used for temporary edgeline delineation shall be the surface mounted type and shall be orange in color. Channelizer bases shall be cemented to the pavement in the same manner provided for cementing pavement markers to pavement in the section of these special provisions entitled "Pavement Markers," except epoxy adhesive shall not be used to

place channelizers on the top layer of pavement. Channelizers shall be, at the Contractor's option, one of the surface mount types (36") listed in "Approved Traffic Products" elsewhere in these special provisions.

Temporary edgeline delineation shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

The quantity of channelizers used as temporary edgeline delineation will not be included in the quantity of channelizers to be paid for. Full compensation for furnishing, placing, maintaining and removing the temporary edgeline delineation for those areas where temporary edgeline delineation is not shown on the plans shall be considered as included in the contract prices paid for the items of work that obliterated the edgeline pavement delineation and no separate payment will be made therefor.

**TEMPORARY TRAFFIC STRIPE (PAINT).**--Temporary traffic stripe consisting of painted traffic stripe shall be applied and maintained at the locations shown on the plans. The painted temporary traffic stripe shall be complete in place at the location shown, prior to opening the traveled way to public traffic. Removal of painted temporary traffic stripe will not be required.

Temporary painted traffic stripe shall conform to "Paint Traffic Stripes and Pavement Markings" of these special provisions, except for payment and the number of coats shall be, at the option of the Contractor, either one or 2 coats regardless of whether on new or existing pavement.

When painted traffic stripe is specified for temporary left edgeline delineation, temporary reflective pavement markers placed at longitudinal intervals of not more than 6 feet may be used in place of the temporary painted traffic stripe. Temporary reflective pavement markers shall be one of the types of temporary pavement markers listed for long term day/night use (6 months or less) in "Approved Traffic Products" elsewhere in these special provisions. When temporary reflective pavement markers are used in place of temporary painted traffic stripe, payment for those temporary pavement markers will be made on the basis of the theoretical quantity of temporary traffic stripe (paint), required for the left edgeline the temporary pavement markers replace.

**TEMPORARY PAVEMENT MARKING (PAINT).**--Temporary pavement marking consisting of painted pavement marking shall be applied and maintained at the locations shown on the plans. The painted temporary pavement marking shall be complete in place at the location shown, prior to opening the traveled way to public traffic. Removal of painted temporary pavement marking will not be required.

Temporary painted pavement marking shall conform to "Painted Traffic Stripes and Pavement Markings" of the Standard Specifications, except for payment and the number of coats shall be, at the option of the Contractor, either one or two coats regardless whether on new or existing pavement.

**TEMPORARY PAVEMENT MARKERS.**--Temporary pavement markers shall be applied at the locations shown on the plans. The pavement markers shall be applied complete in place at the location shown, prior to opening the traveled way to public traffic.

Temporary pavement markers shown on the plans shall be, at the option of the Contractor, one of the temporary retro-reflective pavement markers for long term day/night use (6 months or less) listed in "Approved Traffic Products" elsewhere in these special provisions.

Temporary pavement markers shall be placed in accordance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used in areas where removal of the pavement markers will be required.

Where the temporary pavement delineation shown on the plans for lanelines or centerlines consists entirely of a pattern of broken traffic stripe and pavement markers, the Contractor may use groups of the temporary retro-reflective pavement markers for long term day/night use (6 months or less) listed in "Approved Traffic Products" elsewhere in these special provisions, in place of the painted temporary traffic stripe. The groups of pavement markers shall be spaced as shown on the plans for a similar pattern of permanent traffic line, except pavement markers shown to be placed in the gap between the broken traffic stripe shall be placed as part of the group to delineate the pattern of broken temporary traffic stripe. The kind of laneline and centerline delineation selected by the Contractor shall be continuous within a given location. Payment for temporary pavement markers used in place of painted temporary traffic stripe will be made on the basis of the theoretical quantities of temporary traffic stripe (paint) and temporary pavement markers required for the pattern the pavement markers replace.

Reflective pavement markers conforming to the requirements of "Pavement Markers" of these special provisions may be used in place of temporary reflective pavement markers for long term day/night use (6 months or less) except at locations to simulate patterns of broken traffic stripe. Placement of the reflective pavement markers used for temporary pavement markers shall conform to said section "Pavement Markers" of these special provisions except; the waiting period requirements before placing the pavement markers on new asphalt concrete surfacing as specified in Section 85-1.06, "Placement," of the Standard Specifications shall not apply and epoxy adhesive shall not be used to place pavement markers in areas where removal of the pavement markers will be required.

**MEASUREMENT AND PAYMENT.**--Temporary traffic stripe (paint) and temporary pavement marking (paint) will be measured and paid for in the same manner as specified for paint traffic stripe (1-coat) and paint pavement marking (1-coat) specified in Section 84-3.06, "Measurement," and Section 84-3.07, "Payment," of the Standard Specifications.

Temporary pavement markers, shown on the plans, will be measured and paid for as units in the same manner specified for reflective pavement markers as provided in Section 85-1.08, "Measurement," and Section 85-1.09, "Payment," of the Standard Specifications. Temporary pavement markers, used for temporary laneline and centerline delineation for areas which are not shown on the plans will not be included in the quantities of temporary pavement markers to be paid for. Full compensation for removing temporary pavement markers, when no longer required, shall be considered as included in the contract unit price paid for temporary pavement marker and no separate payment will be made therefor.

The contract price paid per linear foot for temporary traffic stripe (paint) and per square foot for temporary pavement marking (paint) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying, maintaining and removing the temporary traffic stripe (paint) and temporary pavement marking (paint) complete in place, as shown on the plans, as specified in the Standard Specification and these special provisions, and as directed by the Engineer.

#### **10-1.17 PORTABLE FLASHING BEACONS**

Portable flashing beacons conforming to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications shall be furnished, placed and maintained at the locations shown on the plans or as directed by the Engineer.

If flashing beacons are displaced or are not in an upright position, from any cause, during the progress of the work, the Contractor shall immediately repair and repaint or replace the flashing beacons in their original locations.

At the end of each night's work, all portable flashing beacon units shall be removed from the traveled way. If the Contractor so elects, the flashing beacon units may be stored at selected central locations, approved by the Engineer, within the limits of the highway right of way. Full compensation for placing, removing and storing flashing beacon units daily as the work progresses shall be considered as included in the contract unit price paid for furnishing portable flashing beacons and no additional compensation will be allowed therefor.

The quantity of portable flashing beacons to be paid for will be measured as units determined from actual count in place at the locations shown on the plans or at other locations as determined by the Engineer. Each flashing beacon will be counted once at each location shown on the plans, or at other locations as determined by the Engineer, repaired or replacement portable flashing beacons placed at such locations will not be considered as additional units for payment purposes. Portable flashing beacons shown on the plans as part of a traffic control system shall be considered as part of that traffic control system and will be paid for as specified under "Traffic Control System for Lane Closures," elsewhere in these special provisions.

The contract unit price paid for flashing beacon (portable) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in furnishing, placing, operating, maintaining, repairing, replacing and removing portable flashing beacons, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.18 BARRICADES**

Barricades shall be furnished, placed, and maintained at the locations designated by the Engineer, shown on the plans, or specified and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Type II reflective sheeting for stripes on barricade rail faces shall conform to the requirements specified under "Approved traffic Products," elsewhere in these special provisions.

Construction area sign and marker panels conforming to the requirements in Section 12-3.06, "Construction Area Signs," of the Standard Specifications shall be installed on barricades as directed by the Engineer at the locations shown on the plans.

Sign panels for construction area signs and marker panels installed on barricades shall conform to the requirements of sign panels for stationary mounted signs in Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications.

Full compensation for furnishing, installing, maintaining, and removing construction area signs and markers on barricades shall be considered as included in the contract unit price or prices paid for the type or types of barricade and no separate payment will be made therefor.

Barricades shown on the plans as part of a traffic control system will be paid for as provided in "Traffic Control System for Lane Closure," elsewhere in these special provisions, and will not be included in counts for payment for barricades.

### **10-1.19 PORTABLE CHANGEABLE MESSAGE SIGN**

Four (4) portable changeable message signs shall be furnished, placed, operated, relocated, and maintained at locations designated by the Engineer and shall conform to the provisions of Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Maintaining Traffic" of these special provisions concerning the use of the portable changeable message signs.

All of the portable changeable message signs shall be maintained at the job site and available for use throughout the life of the contract.

### **10-1.20 TEMPORARY SIGNAL SYSTEM**

The temporary signal system (TSS) shall consist of installing and maintaining temporary traffic signals for traffic control in accordance with the details shown on the plans entitled, "Temporary Traffic Signal Plan," within the Stage Construction and Traffic Handling plans, the provisions under "Maintaining Traffic," elsewhere in these special provisions, the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications, and these special provisions. The TSS shall be installed in stages 1,2, 3, and 4 of the work, as shown on the plans.

The provisions in this section shall not relieve the Contractor from his responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

All materials and equipment for temporary signal system including, but not limited to, signal heads, mast arms, video detection cameras and vehicle detection system, wood poles, conductors, and hardware shall be furnished by the Contractor.

Materials and equipment to be used in temporary signal system shall be new equipment suitable for the intended use.

Each signal face shall be oriented to be clearly visible to traffic approaching from the direction which the signal is intended to control.

**OPERATION.--**Temporary signal system shall operate at nominal 120 volts AC.

Unless otherwise directed by the Engineer, the system shall be operated on a continuous 24-hour basis except for the periods when it is necessary to control traffic by flaggers.

Timing of temporary signal system will be performed by State forces.

**MAINTAINING TEMPORARY SIGNAL SYSTEM.--**Maintaining temporary signal system, except controller assembly, shall be the sole responsibility of the Contractor.

If any component in the temporary signal system is damaged, displaced or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location. Components shall include signs, generator, video detection cameras, and signal equipment.

In the event the temporary signal system is out of operation, for any reason, the Contractor shall provide flaggers, at his expense, to maintain traffic control until the temporary traffic signals are returned to service.

**CONDUIT.--**Conduit shall conform to the requirements in "Conduit" of these special provisions.

**CONDUCTORS AND WIRING.--**Conductors shall be the types specified in Section 86-2.08, "Conductors," of the Standard Specifications, or shall be Type UF cable of the size and number of conductors shown on the plans. Minimum conductor size shall be No. 12.

The minimum insulation thickness, at any point, for Type USE, RHH or RHW wire shall be 1.0 mm for conductor sizes No. 14 to No. 10, inclusive, and 1.3 mm for No. 8 to No. 2, inclusive. The minimum insulation thickness, at any point, for Type THW and TW wires shall be 0.69 mm for conductor sizes No. 14 to No. 10, inclusive, 1.02 mm for No. 8, and 1.37 mm for No. 6 to No. 2, inclusive.

Where conductors are to be placed across paved areas, they shall be placed in conduit or they shall be suspended at least 25 feet above the roadway.

Conductors to a terminal compartment or signal head on a post or pole may be spliced to through conductors of the same phase in a pull box adjacent to the post or pole. Conductors or cables shall not be spliced except in pull boxes or in NEMA Type 3R enclosures.

**BONDING AND GROUNDING.--**Signal heads, standards with metal bases and the controller cabinet shall be mechanically and electrically secure to form a continuous system effectively grounded by the grounding conductor.

Generator neutral grounding shall conform to the requirements for multiple service points in Section 86-2.10, "Bonding and Grounding," of the Standard Specifications.

**SERVICE.**--The Contractor shall obtain commercial power from an existing utility company to provide power for the TSS. Electrical power costs to operate the TSS during the contract will be paid by the State.

**COMMERCIAL POWER.**--Commercial power shall be 120-volt or 120/240-volt, 60 Hz AC. All power sources shall be protected in locked enclosures. The Contractor shall provide the Engineer with keys to all such locks.

Power shall not be obtained from private parties, other than a direct connection to a utility company service point.

The use of electrical power from existing highway facilities will not be permitted, except when approved in writing by the Engineer.

The Contractor shall make his own arrangements with the utility company for providing service. The cost to provide such commercial power shall be at the expense of the Contractor.

Commercial electrical power is available at the work site.

**CONTROLLER ASSEMBLY.**--The Contractor shall furnish Model 170 traffic signal controller assemblies and shall construct the controller cabinet foundation as shown on Standard Plan ES-4B for Model 332 cabinets (including furnishing and installing anchor bolts), shall install the controller cabinet on said foundation, and shall make all field wiring connections to the terminal blocks in the controller cabinet.

A listing of field conductor terminations, in each controller cabinet, shall be furnished by the Contractor at the site of the work.

State forces will maintain all controller assemblies.

During stage construction the model 170 traffic signal controller assembly and model 332 cabinet housing it shall be relocated to a new controller cabinet foundation constructed as shown on Standard Plan ES-4B (including furnishing and installing anchor bolts), as shown on the plans.

Upon completion of the work requiring temporary traffic signals as determined by the Engineer, all materials and equipment shall become the property of the Contractor and shall be removed and disposed of as provided in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Post holes shall be backfilled.

**PAYMENT.**--The contract lump sum price paid for temporary signal system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing, maintaining, relocating and removing the temporary traffic signal, including the video detection camera and vehicle detection system, during all stages of construction as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.21 TEMPORARY RAILING**

Temporary railing (Type K) shall be placed at the locations shown on the plans, specified in these special provisions or in the Standard Specifications or ordered by the Engineer, and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

The fourth paragraph of Section 12-4.01, "Measurement and Payment," of the Standard Specifications is amended to read:

When the Engineer's Estimate includes a contract item for temporary railing (Type K), the temporary railing (Type K) will be measured by the linear foot along the top of the railing, at each location shown on the plans, specified, or ordered by the Engineer. If the Engineer orders a lateral move of the temporary railing (Type K), and the repositioning is not shown on the plans, moving the temporary railing will be paid for as extra work as provided in Section 4-1.03D and the temporary railing will not be measured in the new position. Temporary railing (Type K) placed in excess of the length shown, specified, or ordered will not be paid for. The contract price paid per linear foot for temporary railing (Type K) shall include full compensation for furnishing all labor, materials (including reinforcement and Type P marker panels), tools, equipment and incidentals, and for doing all the work involved in furnishing, placing, maintaining, repairing, replacing, and removing the temporary railing, including excavation and backfill, drilling holes and bonding threaded rods or dowels when required, removing threaded rods or dowels and filling the drilled holes with mortar, furnishing and installing reflectors, and moving and replacing removable panels as required, complete in place, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Approved Traffic Products," of these special provisions. Adhesive shall conform to the reflector manufacturer's recommendations. The Contractor shall provide reflectors and adhesive and install them as directed by the Engineer.

Temporary railing (Type K), conforming to the details shown on 1995 Standard Plan T3 or 1997 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may

be used, provided the fabrication date is printed on the required Certificate of Compliance and vertical holes are not drilled in the top of the temporary railing to secure temporary traffic screen to the temporary railing.

The Contractor's attention is directed to the provisions in "Public Safety" and "Order of Work" elsewhere in these special provisions.

Temporary railing (Type K) placed in accordance with the provisions in "Public Safety" elsewhere in these special provisions will not be measured nor paid for.

Full compensation for providing and installing reflectors and adhesive shall be considered as included in the contract price paid per linear foot for temporary railing (Type K) and no additional compensation will be allowed therefor.

#### **10-1.22 CHANNELIZERS**

Channelizers shall be surface mounted type and shall be furnished, placed and maintained at the locations shown on the plans and shall conform to the provisions in Sections 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Channelizers shall conform to the provisions in "Approved Traffic Products" elsewhere in these special provisions.

Channelizer posts shall be orange in color.

At the option of the Contractor, channelizer bases may be cemented to the pavement using hot melt bitumen adhesive and in the same manner provided for cementing pavement markers to pavement in the section of these special provisions entitled "Pavement Markers."

#### **10-1.23 TEMPORARY TRAFFIC SCREEN**

Temporary traffic screen shall be furnished, installed, and maintained on top of temporary railing (Type K) at the locations designated on the plans, specified in the special provisions or directed by the Engineer and shall conform to the provisions specified for traffic handling equipment and devices in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Temporary traffic screen panels shall be new or used CDX Grade, or better, plywood or weather resistant strandboard mounted and anchored on temporary railing (Type K). Wale boards shall be new or used Douglas fir, rough sawn, Construction Grade, or better. Pipe screen supports shall be new or used galvanized steel pipe, Schedule 40. Nuts, bolts, and washers shall be cadmium plated. Screws shall be black or cadmium plated flat head, cross slotted screws with full thread length.

When no longer required, as determined by the Engineer, temporary traffic screen shall be removed from the site of the work and shall become the property of the Contractor.

Temporary traffic screen will be measured by the linear foot from actual measurements along the line of the completed temporary traffic screen, at each location designated on the plans, specified or directed by the Engineer. If the Engineer orders a lateral move of temporary railing, with temporary traffic screen attached, and the repositioning is not shown on the plans, moving the temporary traffic screen will be paid for as part of the extra work for moving the temporary railing as specified in Section 12-4.01, "Measurement and Payment," of the Standard Specifications. Temporary traffic screen placed in excess of the length shown, specified or directed by the Engineer will not be paid for.

The contract price paid per linear foot for temporary traffic screen shall include full compensation for furnishing all labor, materials (including anchoring systems), tools, equipment, and incidentals, and for doing all the work involved in installing, maintaining, and removing the temporary traffic screen, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.24 TEMPORARY CRASH CUSHION MODULE**

This work shall consist of furnishing, installing, and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the plans, as specified in these special provisions or where designated by the Engineer. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in conformance with the details shown on the plans and these special provisions.

Attention is directed to "Public Safety", "Order of Work", and "Temporary Railing" of these special provisions.

#### **GENERAL**

Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 15 feet or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no

longer required, as determined by the Engineer, sand filled temporary crash cushions shall be removed from the site of the work.

## **MATERIALS**

At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either Energite III Inertial Modules, Fitch Inertial Modules or Traffix Sand Barrels manufactured after March 31, 1997, or equal:

- A. Energite III Inertial Modules, manufactured by Energy Absorption Systems, Inc., One East Wacker Drive, Chicago, IL 60601-2076, Telephone 1-312-467-6750, FAX 1-800-770-6755.
  - 1. Distributor (Northern): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, Telephone 1-800-884-8274, FAX 1-916-387-9734
  - 2. Distributor (Southern): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805, Telephone 1-800-222-8274, FAX 1-714-937-1070.
- B. Fitch Inertial Modules, manufactured by Roadway Safety Service, Inc., 1050 North Rand Road, Wauconda, IL 60084, Telephone 1-800-426-0839, FAX 1-847-487-9820.
  - 1.. Distributor (Northern): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, Telephone 1-800-884-8274, FAX 1-916-387-9734
  - 2. Distributor (Southern): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805, Telephone 1-800-222-8274, FAX 1-714-937-1070.
- C. Traffix Sand Barrels, manufactured by Traffix Devices, Inc., 220 Calle Pintoresco, San Clemente, CA 92672, Telephone 1-949-361-5663, FAX 1-949-361-9205.
  - 1. Russ Enterprises, Inc., 1533 Berger Drive, San Jose, CA 95112, Telephone 1-408-287-4303, FAX 1-408-287-1929.
  - 2. Statewide Safety, P.O. Box 1440, Pismo Beach, CA 93448, Telephone 1-800-559-7080, FAX 1-805-929-5786.

Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color, as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified herein may be utilized. If used Fitch modules requiring a seal are furnished, the top edge of the seal shall be securely fastened to the wall of the module by a continuous strip of heavy duty tape.

Modules shall be filled with sand in conformance with the manufacturer's directions, and to the sand capacity in kilograms for each module shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain not more than 7 percent water as determined by California Test 226.

Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

## **INSTALLATION**

Temporary crash cushion modules shall be placed on movable pallets or frames conforming to the dimensions shown on the plans. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement or bridge deck.

A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the plans, when the closest point of the crash cushion array is within 12 feet of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods determined by the Engineer.

At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in the permanent work.

## **MEASUREMENT AND PAYMENT**

Temporary crash cushion modules will be measured by the unit as determined from the actual count of modules used in the work or ordered by the Engineer at each location. Temporary crash cushion modules placed in conformance with the

provisions in "Public Safety" of these special provisions and modules placed in excess of the number specified or shown will not be measured nor paid for.

Repairing modules damaged by public traffic will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Modules damaged beyond repair by public traffic, when ordered by the Engineer, shall be removed and replaced immediately by the Contractor. Modules replaced due to damage by public traffic will be measured and paid for as temporary crash cushion module.

If the Engineer orders a lateral move of the sand filled temporary crash cushions and the repositioning is not shown on the plans, moving the sand filled temporary crash cushion will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications and these temporary crash cushion modules will not be counted for payment in the new position.

The contract unit price paid for temporary crash cushion module shall include full compensation for furnishing all labor, materials (including sand, pallets or frames and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing, installing, maintaining, moving, and resetting during a work period for access to the work, and removing from the site of the work when no longer required (including those damaged by public traffic) sand filled temporary crash cushion modules, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

### **10-1.25 EXISTING HIGHWAY FACILITIES**

The work performed in connection with various existing highway facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Plans of the existing bridges may be requested by fax from the Office of Structure Maintenance and Investigations, 1801 30th Street, Sacramento, CA, Fax (916) 227-8357, and are available at the Office of Structure Maintenance and Investigations, Los Angeles, CA, Telephone (213) 897-6156.

Plans of existing bridges available to the Contractor are reproductions of the original contract plans with significant changes noted and working drawings and do not necessarily show normal construction tolerances and variances. Where dimensions of new construction required by this contract are dependent on the dimensions of existing bridges, the Contractor shall verify the controlling field dimensions and shall be responsible for adjusting dimensions of the work to fit existing conditions.

#### **10-1.25A REMOVE TREES**

Existing trees, where shown on plans to be removed, shall be removed and disposed of outside the highway right-of-way in accordance with Section 7-1.13 of the Standard Specifications and these special provisions.

Attention is directed to "Clearing and Grubbing" of these special provisions regarding tree removal.

#### **10-1.25B REMOVE SIGN STRUCTURES**

Existing sign structures, where shown on the plans to be removed, shall be removed and disposed of.

Sign structure removal shall consist of removing posts, frames, portions of foundations, sign panels, and sign lighting electrical equipment.

Bridge mounted sign structure removal shall consist of removing sign panels and frames, sign lighting electrical equipment, walkways with safety railings, structural braces and supports, and hardware. Bridge mounted sign structure removal will be measured and paid for by the unit as remove bridge mounted sign.

A sign structure shall not be removed until said structure is no longer required for the direction of public traffic.

Concrete foundations may be abandoned in place, except that the top portion, including anchor bolts, reinforcing steel, and conduits shall be removed to a depth of not less than 1 foot below the adjacent finished grade. The resulting holes shall be backfilled and compacted with material equivalent to the surrounding material.

Electrical wiring shall be removed to the nearest pull box. Fuses within spliced connections in the pull box shall be removed and disposed of.

#### **10-1.25C REMOVE PAVEMENT MARKERS**

Existing pavement markers, when no longer required for traffic lane delineation as directed by the Engineer, shall be removed and disposed of.

#### **10-1.25D REMOVE PAINTED TRAFFIC STRIPES AND PAVEMENT MARKINGS**

Painted traffic stripes and pavement markings to be removed are shown on the plans, or will be designated by the Engineer.

Where blast cleaning is used for the removal of painted traffic stripes and pavement markings or for removal of objectionable material, and such removal operation is being performed within 10 feet of a lane occupied by public traffic,

the residue including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation.

Nothing in these special provisions shall relieve the Contractor from his responsibilities as provided in Section 7-1.09, "Public Safety," of the Standard Specifications.

Blast cleaning for the removal of painted traffic stripes and pavement markings shall be feathered out to a uniform width to totally remove such traffic stripes or pavement markings.

After removal of the traffic stripes, or pavement markings a paint binder shall be applied in conformance with the provisions in Section 37, "Bituminous Seals" of the Standard Specifications and these special provisions.

In traffic stripe and pavement marking removal areas, the paint binder shall be applied to the stripe or pavement marking removal area to a uniform width of 2 feet on each side of the blast cleaned traffic stripe or pavement marking removal area.

Full compensation for furnishing and applying a paint binder as specified herein shall be considered as included in the contract price paid per linear foot for remove painted traffic stripe or per square foot for remove painted pavement marking and no separate payment will be made therefor.

#### **10-1.25E REMOVE THERMOPLASTIC TRAFFIC STRIPE**

Thermoplastic traffic stripe to be removed are shown on the plans, or will be designated by the Engineer.

Where blast cleaning is used for the removal of thermoplastic traffic stripe or for removal of objectionable material, and such removal operation is being performed within 10 feet of a lane occupied by public traffic, the residue including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation.

Nothing in these special provisions shall relieve the Contractor from his responsibilities as provided in Section 7-1.09, "Public Safety," of the Standard Specifications.

Blast cleaning for the removal of thermoplastic traffic stripe shall be feathered out to a uniform width to totally remove such traffic stripes or pavement markings.

After removal of the thermoplastic traffic stripe, a paint binder shall be applied in conformance with the provisions in Section 37, "Bituminous Seals" of the Standard Specifications and these special provisions.

In thermoplastic traffic stripe removal areas, the paint binder shall be applied to the stripe removal area to a uniform width of 2 feet on each side of the blast cleaned traffic stripe or pavement marking removal area.

Full compensation for furnishing and applying a paint binder as specified herein shall be considered as included in the contract price paid per linear foot for remove thermoplastic traffic stripe and no separate payment will be made therefor.

#### **10-1.25F REMOVE DRAINAGE FACILITIES**

Existing pipe, inlets, and headwalls, where shown on the plans to be removed, shall be completely removed and disposed of.

#### **10-1.25G REMOVE ASPHALT CONCRETE DIKE**

Existing asphalt concrete dike, where shown on the plans to be removed, shall be removed.

Prior to removing the dike the outside edge of the asphalt concrete to remain in place shall be cut to a neat line. The cut shall be a minimum depth of 0.17-foot.

The dike shall be removed in such a manner so that the surfacing which is to remain in place is not damaged.

The dike may be buried in embankments in the same manner as provided for burying concrete in embankments in Section 15-3, "Removing Concrete," of the Standard Specifications.

#### **10-1.25H REMOVE ROADSIDE SIGNS**

Existing roadside signs, at locations shown on the plans to be removed, shall be removed and disposed of.

Existing roadside signs shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless otherwise directed by the Engineer.

#### **10-1.25I RECONSTRUCT CHAIN LINK FENCE**

Existing chain link fence shall be removed and reconstructed as shown on the plans.

Fence removed in excess of that required for reconstructing chain link fence shall be disposed of. Full compensation for removing and disposing of excess fence shall be considered as included in the contract price paid per linear foot for reconstruct chain link fence and no separate payment will be made therefor.

#### **10-1.25J RECONSTRUCT METAL BEAM GUARD RAILING**

Existing metal beam guard railing, where shown on the plans to be reconstructed, shall be reconstructed as shown on the plans.

Attention is directed to "Order of Work" of these special provisions regarding the reconstruction of guard railing at locations exposed to public traffic.

Existing metal beam guard railing to be reconstructed shall be disassembled by removing the rail elements, end sections, terminal sections, and return sections from the posts and blocks. Posts and blocks shall be removed completely and concrete anchors shall be removed to a depth of not less than one foot below the adjacent finished grade.

New posts and blocks shall be furnished and used to reconstruct metal beam guard railing. Posts and blocks from the removed guard railing shall be disposed of. New posts and blocks shall conform to the requirements in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications.

Where field cutting or boring of wood posts and blocks is required after treatment, all cuts and holes shall be treated with copper naphthenate as specified in AWP Standard M4. Application of preservative in the field shall conform to the requirements in the last paragraph in Section 58-1.04, "Wood Preservative for Manual Treatment," of the Standard Specifications.

All metal components of the removed metal beam guard railing that are not used in the reconstruction work, excluding any damaged components, shall be salvaged. Damaged metal components and other components of the removed guard railing that are not used in the reconstruction work shall be disposed of.

Full compensation for furnishing and installing additional new posts, blocks, and hardware, and for removing, disposing and salvaging of metal components, including cable anchor assemblies, not used in the reconstruction work shall be considered as included in the contract price paid per linear foot for reconstruct metal beam guard railing and no separate payment will be made therefor.

Terminal system (Type SRT) shall be furnished and installed for the reconstructed metal beam guard railing at each location, as shown on the plans, and as specified in these special provisions. Attention is directed to "Metal Beam Guard Railing." of these special provisions regarding terminal system (Type SRT).

Cable anchor assemblies (breakaway, Type B) for reconstructed metal beam guard railing will be measured and paid for separately and shall conform to the provisions in "Metal Beam Guard Railing" of these special provisions.

#### **10-1.25K RESET ROADSIDE SIGNS**

Existing roadside signs shall be removed and reset as shown on the plans.

Each roadside sign shall be reset on the same day said sign is removed.

Two holes shall be drilled in each existing post as required to provide a breakaway feature as shown on the plans.

#### **10-1.25L RELOCATE ROADSIDE SIGNS**

Existing roadside signs shall be removed and relocated at new locations shown on the plans.

Each roadside sign shall be installed at the new location on the same day said sign is removed from its original location.

Two holes shall be drilled in each existing post as required to provide a breakaway feature as shown on the plans.

#### **10-1.25M MODIFY INLET**

The existing drainage inlet shall be modified as shown on the plans.

Portland cement concrete shall conform to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications. Modification of the inlet shall be performed during stage construction prior to paving and shall be limited to the area to be paved or resurfaced during the working day in which such adjustment is performed. The top of the inlet grate or cover shall be adequately protected from the asphalt concrete during paving operations by means of plywood covers, or by other methods approved by the Engineer. All excess paving material shall be removed prior to rolling.

Modify inlet will be measured by the unit from actual count. The contract price paid for each inlet modified shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in modifying inlets, including removing portions of inlets, bar reinforcing steel, concrete and structure excavation and structure backfill, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.25N REMOVE BASE AND SURFACING**

Existing base and bituminous surfacing shown on the plans to be removed, shall be removed to a depth of at least 0.5-foot below the grade of the existing surfacing. Resulting holes and depressions shall be backfilled with earthy material selected from excavation to the lines and grade established by the Engineer.

The material removed may be buried in embankments as provided for burying concrete in embankments in Section 15-3 "Removing Concrete," of the Standard Specifications or shall be disposed of outside the highway right of way in conformance with the provisions in Section 15-2.03, "Disposal," of the Standard Specifications.

Removing base and surfacing will be measured by the cubic yard in the same manner specified for roadway excavation as provided in Section 19, "Earthwork," of the Standard Specifications and will be paid for at the contract price per cubic yard for remove base and surfacing.

#### **10-1.250 COLD PLANE ASPHALT CONCRETE PAVEMENT**

Existing asphalt concrete pavement shall be cold planed at the locations and to the dimensions shown on the plans.

Planing asphalt concrete pavement shall be performed by the cold planing method. Planing of the asphalt concrete pavement shall not be done by the heater planing method.

Cold planing machines shall be equipped with a cutter head not less than 30 inches in width and shall be operated so as not to produce fumes or smoke. The cold planing machine shall be capable of planing the pavement without requiring the use of a heating device to soften the pavement during or prior to the planing operation.

The depth, width and shape of the cut shall be as indicated on the typical cross sections or as directed by the Engineer. The final cut shall result in a uniform surface conforming to the typical cross sections. The outside lines of the planed area shall be neat and uniform. Planing asphalt concrete pavement operations shall be performed without damage to the surfacing to remain in place.

Planed widths of pavement shall be continuous except for intersections at cross streets where the planing shall be carried around the corners and through the conform lines. Following planing operations, a drop-off of more than 0.15-foot will not be allowed at any time between adjacent lanes open to public traffic.

Where transverse joints are planed in the pavement at conform lines no drop-off shall remain between the existing pavement and the planed area when the pavement is opened to public traffic. If asphalt concrete has not been placed to the level of existing pavement before the pavement is to be opened to public traffic a temporary asphalt concrete taper shall be constructed. Asphalt concrete for temporary tapers shall be placed to the level of the existing pavement and tapered on a slope of 30:1 or flatter to the level of the planed area.

Asphalt concrete for temporary tapers shall be commercial quality and may be spread and compacted by any method that will produce a smooth riding surface. Temporary asphalt concrete tapers shall be completely removed, including the removal of all loose material from the underlying surface, before placing the permanent surfacing. Such removed material shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Operations shall be scheduled such that not more than 7 days shall elapse between the time when transverse joints are planed in the pavement at the conform lines and the permanent surfacing is placed at such conform lines.

The material planed from the roadway surface, including material deposited in existing gutters or on the adjacent traveled way, shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications. Removal operations of cold planed material shall be concurrent with planing operations and follow within 50 feet of the planer, unless otherwise directed by the Engineer.

Cold plane asphalt concrete pavement will be measured by the square yard. The quantity to be paid for will be the actual area of surface cold planed irrespective of the number of passes required to obtain the depth shown on the plans.

The contract price paid per square yard for cold plane asphalt concrete pavement shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in cold planing asphalt concrete surfacing and disposing of planed material, including furnishing the asphalt concrete for and constructing, maintaining, removing, and disposing of temporary asphalt concrete tapers, as specified in these special provisions and as directed by the Engineer.

#### **10-1.25P BRIDGE REMOVAL**

Removing portions of bridge shall conform to the requirements in Section 15-4, "Bridge Removal," of the Standard Specifications and these special provisions.

LOCATION A  
SIERRA AVENUE OVERCROSSING (REPLACEMENT)  
(Br. No. 54-537)

Bridge removal shall consist of removing the existing overcrossing structure in two stages as shown on the plans including the existing concrete slope paving.

LOCATION B  
SIERRA AVENUE OVERHEAD (WIDEN)  
(Br. No. 54C-63)

Contract No. <<Dist>>-<<Contract\_No>>

Bridge removal (portion) shall consist of removing portions of existing deck overhang, sidewalks, railings, wingwalls, retaining walls, and retaining wall footings and piles.

All removed materials that are not to be salvaged or used in the reconstruction shall become the property of the Contractor and 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.

The Contractor shall submit complete bridge removal plans to the Engineer detailing procedures and sequence for removing portions of bridges, including all features necessary to remove the bridges in a safe and controlled manner.

Bridge removal plans shall be furnished for Sierra Avenue OC (Br. No. 54-537) and Sierra Avenue Overhead (Br. No. 54C-63) and shall include the following:

The bridge removal sequence for the entire structure or portions to be removed, including staging of bridge removal;

Equipment locations on the structure during removal operations;

Temporary support shoring or temporary bracing;

Locations where work is to be performed over public traffic or railroad property; and

Details and locations of protective covers or other measures to assure that people, property, and improvements will not be endangered.

Temporary support shoring, temporary bracing, and protective covers as required, shall be designed and constructed in conformance with the provisions in Section 51-1.06, "Falsework," of the Standard Specifications and these special provisions.

The assumed horizontal load to be resisted by the temporary support shoring, and temporary bracing, for removal operations only, shall be the sum of the actual horizontal loads due to equipment, construction sequence or other causes and an allowance for wind, but in no case shall the assumed horizontal load to be resisted in any direction be less than 5 percent of the total dead load of the structure to be removed.

The following additional requirements apply to the removal of portions of bridges that are over or adjacent to roadways that may be closed to public traffic for only brief periods of time:

The closure of roadways to public traffic shall conform to the provisions in "Order of Work" and "Maintaining Traffic" of these special provisions.

Prior to closing a roadway to public traffic to accommodate bridge removal operations, the Contractor shall have all necessary workers, materials and equipment at the site as needed to proceed with the removal work in an expeditious manner. While the roadway is closed to public traffic, work shall be pursued promptly and without interruption until the roadway is reopened to public traffic.

All removal operations shall be performed during periods of time that the roadway is closed to public traffic except as specified herein for preliminary work.

Preliminary work shall be limited to operations that will not reduce the structural strength or stability of the bridge, or any element thereof, to a level that in the judgment of the Engineer would constitute a hazard to the public. Such preliminary work shall also be limited to operations that cannot cause debris or any other material to fall onto the roadway. Protective covers may be used in order to perform preliminary work such as chipping or cutting the superstructure into segments, provided the covers are of sufficient strength to support all loads and are sufficiently tight to prevent dust and fine material from sifting down onto the traveled way. Protective covers shall extend at least 4 feet beyond the limit of the work underway. Bottom slabs of box girders may be considered to be protective covers for preliminary work performed on the top slab inside the limits of the exterior girders.

Temporary support shoring, temporary bracing, and protective covers shall not encroach closer than 8 feet horizontally from the edge or 15 feet vertically above any traffic lane or shoulder that is open to public traffic.

During periods when the roadway is closed to public traffic, debris from bridge removal operations may be allowed to fall directly onto the lower roadway provided adequate protection is furnished for all highway facilities. The minimum protection for paved areas shall be a 2 feet thick earthen pad or a 1 inch thick steel plate. Prior to reopening the roadway to public traffic, all debris, protective pads and devices shall be removed and the roadway swept clean with wet power sweepers or equivalent methods.

The removal operations shall be conducted in such a manner that the portion of the structure not yet removed remains in a stable condition at all times. For girder bridges, each girder shall be completely removed within a span before the removal of the adjacent girder is begun. For slab type bridges, removal operations within a span shall be performed along a front that roughly parallels the primary reinforcing steel.

The following additional requirements apply to the removal of portions of bridges whenever the removal work is to be performed over public traffic or railroad property:

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A protective cover supported by falsework or members of the existing structure shall be constructed before beginning bridge removal work.

The construction and removal of the protective cover and the installation and removal of temporary railings shall conform to the provisions in "Order of Work," "Maintaining Traffic," and "Temporary Railings" of these special provisions.

The protective cover shall prevent any materials, equipment or debris from falling onto the public traffic or railroad property. The protective cover shall have a minimum strength equivalent to that provided by good, sound Douglas fir planking having a nominal thickness of 2 inches. Additional layers of material shall be furnished as necessary to prevent fine materials or debris from sifting down upon the traveled way and shoulders.

During the removal of bridge segments, and when portions of the bridge, such as deck slabs or box girder slabs, comply with the requirements for the protective cover, a separate protective cover need not be constructed.

Before removal, the protective cover shall be cleaned of all debris and fine material.

The protective cover shall provide the openings specified under "Maintaining Traffic" of these special provisions, except that when no openings are specified for bridge removal a vertical opening of 15 feet and a horizontal opening of 32 feet shall be provided for the passage of public traffic.

The protective cover shall be in conformance with the guidelines of the railroad company involved and shall provide the minimum clearances required under "Relations with Railroad Company" of these special provisions for the passage of railroad traffic.

Falsework or supports for protective covers shall not extend below the vertical clearance level nor to the ground line at any location within the roadbed.

The Contractor shall submit working drawings, with design calculations, to the Engineer for the proposed bridge removal plan. The bridge removal plan shall be prepared by an engineer who is registered as a Civil Engineer in the State of California. The design calculations shall be adequate to demonstrate the stability of the structure during all stages of the removal operations. Calculations shall be provided for each stage of bridge removal and shall include dead and live load values assumed in the design of protective covers. At a minimum, a stage will be considered to be removal of the deck, the soffit, or the girders, in any span; or walls, bent caps, or columns at support locations.

The bridge removal plan shall conform to the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The number of sets of drawings and design calculations and times for review for any bridge removal plans shall be the same as specified for falsework working drawings in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications.

The time to be provided for the Engineer's review of the working drawings for removing specific structures, or portions thereof, shall be as follows:

Structure or Portion of Structure	Review Time - Weeks
Br. No. 54-537	5
Br. No. 54C-63	9

For bridge removal over railroads, approval by the Engineer of the bridge removal plans will be contingent upon the drawings being satisfactory to the railroad company involved.

Prior to proceeding with bridge removal where a bridge removal plan is required, an engineer for the Contractor who is registered as a Civil Engineer in the State of California shall inspect the temporary support shoring, including temporary bracing and protective coverings, for conformity with the working drawings. The Contractor's registered engineer shall certify in writing that the temporary support shoring, including temporary bracing and protective coverings, substantially conform to the details on the working drawings, and that the material and workmanship are satisfactory for the purpose intended. A copy of this certification shall be available at the site of the work at all times.

At a bridge site where a bridge removal plan is required, the Contractor's registered engineer shall be present at all times when bridge removal operations are in progress. The Contractor's registered engineer shall inspect the bridge removal operation and report in writing on a daily basis the progress of the operation and the status of the remaining structure. A copy of the daily report shall be available at the site of the work at all times. Should an unplanned event occur, the Contractor's registered engineer shall submit immediately to the Engineer for approval, the procedure of operation proposed to correct or remedy the occurrence.

#### **10-1.25Q REMOVE CONCRETE**

Concrete, designated on the plans to be removed, shall be removed.

Concrete removed may be buried in embankments in the manner provided for burying concrete in Section 15-3, "Removing Concrete," of the Standard Specifications. Concrete removal for concrete channel (including spillway and vehicle access ramps), concrete sidewalk and concrete curb and gutter will be measured and paid for by the cubic yard. Concrete removal for retaining wall and concrete barrier (Type K) will be measured and paid for by the linear foot.

Other concrete to be removed will not be measured nor paid for as remove concrete. Attention is directed to Sections 16, "Clearing and Grubbing," and 19-1.04, "Removal and Disposal of Buried Man-Made Objects," of the Standard Specifications.

#### **10-1.25R RESETTING EMERGENCY CALL BOXES**

Six existing emergency call boxes shall be protected in place prior to widening Route 10 as shown on the plans. Emergency call boxes will be reset by others prior to the start of any work at the location of each emergency call box. The Contractor shall notify the Engineer at least 6 weeks prior to the scheduled start of Route 10 widening in the vicinity of emergency call boxes.

The six emergency call boxes are located at the following locations:

Right of Station 576+11 centerline Route 10  
Left of Station 578+00 centerline Route 10  
Right of Station 604+42 centerline Route 10  
Left of Station 603+60 centerline Route 10  
Right of Station 629+00 centerline Route 10  
Left of Station 630+38 centerline Route 10

#### **10-1.25S RELOCATE FIRE HYDRANT, RELOCATE WATER METER, AND RECONSTRUCT IDENTIFICATION SIGNS**

An existing fire hydrant and a water meter where shown on the plans shall be relocated by Fontana. The identification signs shown on the plans to be reconstructed will also be reconstructed by Fontana.

The existing fire hydrant will be relocated to its new location right of Station 26+11 Sierra Avenue prior to commencement of this contract. It shall be protected in place during construction.

The existing water meter shown on the plans left of Station 591+88 Route 10 will be relocated to its new location prior to commencement of this contract. The Contractor shall tie into it during construction of the new irrigation facilities.

The identification signs shown on the plans to be reconstructed will be reconstructed during this contract. Reconstruction will be coordinated by the Engineer.

#### **10-1.25T EXTEND REINFORCED CONCRETE BOX CULVERT**

Reinforced concrete box culverts shall be extended as shown on the plans. Class A concrete and bar reinforcing steel used in extension of reinforced concrete box culverts shall conform to the requirements in Section 51, "Concrete Structures", and Section 52, "Reinforcement," of the Standard Specifications, and these special provisions.

The Contractor shall submit a plan to the Engineer 14 working days prior to the extension of the existing reinforced concrete box culvert that crosses Sierra Avenue at Station 23+82.34 for approval. This plan will detail the measures that will be employed to maintain the existing storm drain flow during construction. The Contractor shall conform to the requirements in "Water Pollution Control" and "Temporary Erosion Control" elsewhere in these special provisions.

The existing RCB headwall shall be removed as shown on the plans. Existing longitudinal bar reinforcing steel shall not be removed, but shall be exposed to properly bond with new Class A concrete.

Extending reinforced concrete box culvert complete in place, including excavation and backfill, as well as removal of the existing headwalls and exposure of existing longitudinal bar reinforcing steel, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, shall be considered as included in the contract prices paid per cubic yard for Class A concrete (structure) and per pound for bar reinforcing steel, and no separate payment will be made therefor.

#### **10-1.25U REMOVE CHAIN LINK FENCE**

Existing chain link fence, where shown on the plans to be removed, shall be removed and disposed of.

#### **10-1.26 CLEARING AND GRUBBING**

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications and these special provisions.

Attention is directed to "Aerially Deposited Lead" of these special provisions.

The Contractor shall separate all vegetable growth and other objectionable material from the soils, and the soils shall remain on the site.

Existing Eucalyptus and Palm trees, as shown on the plans, shall be removed, or protected in place. Trees to be removed shall be removed prior to performing any roadwork in the vicinity of such trees. Trees to be protected, shall be protected in place from any damage from the Contractor's operations as specified in Section 7-1.11, "Preservation of Property," of the Standard Specifications and "Preservation of Property," of these special provisions.

During tree removal operations earthen material excavated to a depth of two feet below the surface of existing ground shall be retained on the project site, stored, and used in embankment construction. Attention is directed to "Material with Aerially Deposited Lead," of these special provisions.

Existing eucalyptus and palm trees to be removed, within the station limits identified on the plans, are painted with a red X at about five feet above ground level. Other eucalyptus and palm trees, as shown on the plans, shall be protected in place. Tree removal shall also include removing existing tree roots to a depth of 3 feet below ground level, sterilization of the remaining soil, and backfilling to the existing ground level.

Soil shall be sterilized with one of the following pesticides applied at the maximum label rate unless otherwise directed by the Engineer:

1. Trifluralin emulsifiable concentrate.
2. Dichlobenil.

Pesticides shall be mixed according to the manufacturer's recommendations and shall be applied by a device approved by the Engineer. Pesticides shall not be applied more than 12 inches beyond removal areas.

The contract lump sum price paid for clearing and grubbing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in removing palm trees and eucalyptus trees, including excavation, storage and placement of material with aerially deposited lead in embankments; excavation and backfill of the removal area; root removal up to 3 feet below ground level; and disposal of the tree trunks, branches, leaves and roots as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Existing highway planting and irrigation facilities where shown to be replaced from station 597+30± centerline Route 10 to station 618+35± centerline Route 10 shall be removed and disposed as part of clearing and grubbing.

Vegetation shall be cleared and grubbed only within the excavation and embankment slope lines.

At locations where there is no grading adjacent to a bridge or other structure, clearing and grubbing of vegetation shall be limited to 5 feet outside the physical limits of the bridge or structure.

Existing vegetation, outside the areas to be cleared and grubbed, shall be protected from injury or damage resulting from the Contractor's operations.

Activities controlled by the Contractor, except cleanup or other required work, shall be confined within the graded areas of the roadway.

Nothing herein shall be construed as relieving the Contractor of Contractor's responsibility for final cleanup of the highway as provided in Section 4-1.02, "Final Cleaning Up," of the Standard Specifications.

### **10-1.27 EARTHWORK**

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Soil stabilization methods or bracing, lagging, or temporary walls shall be used to shore and prevent disturbing the existing bridge abutments at Sierra Avenue Overcrossing. Lateral displacement of the excavation shall be prevented. Original ground behind the excavation face that has been disturbed by the Contractor's operations shall be restored by the Contractor, at the Contractor's expense, to a condition equal to the undisturbed condition as determined by the Engineer. The Contractor shall install a monitoring system as approved by the Engineer to detect shifting or bulging of the soil retaining structure towards the exposed face.

Where a portion of existing surfacing is to be removed, the outline of the area to be removed shall be cut on a neat line with a power-driven saw to a minimum depth of 0.17-foot before removing the surfacing. Full compensation for cutting existing surfacing shall be considered as included in the contract price paid per cubic yard for roadway excavation and no additional compensation will be allowed therefor.

The portion of imported borrow placed within 4 feet of the finished grade shall have a Resistance (R-Value) of not less than 50.

Embankment shall be constructed of imported borrow or of material obtained from required excavation within the project limits or a combination of borrow and material obtained from required excavation within the project limits.

Roadway excavation, structure excavation, and ditch excavation will be paid for as specified in these special provisions and in Sections 19-2, "Roadway Excavation," 19-3, "Structure Excavation and Backfill," and 19-4, "Ditch Excavation," respectively, of the Standard Specifications, except that when material is used in roadway embankment, full compensation for the work of spreading after depositing, compacting and preparing subgrade at the grading plane in roadway embankments will be included in the contract prices paid per cubic yard for roadway excavation and ditch excavation.

Imported borrow will be measured and paid for by the cubic yard and the quantity to be paid for will be computed in the following manner:

The total quantity of embankment will be computed by the method specified for roadway excavation in Section 19-2.08, "Measurement," of the Standard Specifications, on the basis of the planned or authorized cross section for embankments as shown on the plans and the measured ground surface.

The Contractor, at his option, may compact the ground surface on which embankment is to be constructed before placing any embankment thereon. If said compaction results in an average subsidence exceeding 0.25-foot, the ground surface will be measured after completion of the compaction. The Engineer shall be allowed the time necessary to complete the measurement of an area before placement of embankment is started in said area.

The quantities of roadway excavation, structure excavation and ditch excavation, which have been used in the embankment, will be adjusted by multiplying by a grading factor to be determined in the field by the Engineer. No further adjustment will be made in the event that the grading factor determined by the Engineer does not equal the actual grading factor.

The quantity of imported borrow to be paid for will be that quantity remaining after deducting the adjusted quantities of excavation from the total embankment quantity and then adding a quantity of 3,000 cubic yards for the anticipated effect of subsidence. No adjustment will be made in the event that the anticipated subsidence does not equal the actual subsidence.

The Contractor may propose a plan whereby he would be paid on the basis of measured settlement in lieu of the allowance specified above. Such proposal shall include complete details of the subsidence-measuring devices and a detailed plan of each installation. If the proposed plan is approved by the Engineer, the Contractor, at his expense, shall provide, install and maintain the said subsidence-measuring devices. The Engineer will take such readings as are necessary to determine the progress of subsidence, if any, and the Contractor shall provide such assistance as is necessary to make possible all such readings.

Any installed device which is determined by the Engineer to have been damaged will not be used for the determination of subsidence for the area it represents in the pattern of approved installations. The subsidence of all of the area as determined to be represented by that installation shall be considered as zero, regardless of the subsidence measured at other installations.

The volumes required as a result of the subsidence will be computed from the original measurements and the final measurements, including zero subsidence at all points and for all areas as provided herein, by the average-end-area method. It shall be understood and agreed that the subsidence at the point of intersection of the side slopes (and end slopes at structures) with the ground line as established by the original cross sections shall be considered as zero. Unless otherwise agreed to by the Engineer, the subsidence shall be considered as zero at the points on the cross sections 50 feet beyond the beginning and ending of the instrumented area. The computed volumes for such subsidence will be added to the quantities of embankment measured as specified herein.

Detachable elements of the subsidence-measuring devices which can be salvaged without damage to the work shall remain the property of the Contractor and shall be removed by him from the right of way after all final measurements are made.

At the locations and to the limits shown on the plans, material below the bottom of bridge footings shall be removed and replaced with Class 2 aggregate base material in accordance with the placing and compacting requirements for structure backfill. The relative compaction shall be not less than 95 percent. Removal of the material will be measured and paid for as structure excavation (bridge) and furnishing, placing and compacting the replacement material will be measured and paid for as structure backfill (bridge).

At the locations and to the limits shown on the plans, material below the bottom of retaining wall footings shall be removed and replaced with Class 2 aggregate base material in accordance with the placing and compacting requirements for structure backfill. The relative compaction shall be not less than 95 percent. Removal of the material will be measured and paid for as structure excavation (retaining wall) and furnishing, placing and compacting the replacement material will be measured and paid for as structure backfill (retaining wall).

At the footings where material is removed and replaced, as described herein, a relative compaction of not less than 95 percent shall be obtained for a minimum depth of 0.5-foot below the bottom of excavation.

The geocomposite drain shall conform to the details shown on the plans and the following:

Attention is directed to "Engineering Fabrics" under "Materials" elsewhere in these special provisions.

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Geocomposite drain shall consist of a manufactured core not less than 0.25-inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate, through the drainage void, of at least 2.0 gallons per minute per foot width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 3,500 pounds per square foot.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain produces the required flow rate and complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates for externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.

Filter fabric for the geocomposite drain shall conform to the provisions for fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications.

The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.

The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having nonconnecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.

The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 3 inches at all joints and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.

Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a 6-inch overlap.

Plastic pipe shall conform to the provisions for pipe for edge drains and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.

Treated permeable base to be placed around slotted plastic pipe at the bottom of the geocomposite drain shall be cement treated permeable base conforming to the provisions for cement treated permeable base in Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions.

The treated permeable base shall be enclosed with a high density polyethylene sheet or PVC geomembrane, not less than 10 mils thick, which is bonded with a suitable adhesive to the concrete and geocomposite drain. Surfaces to receive the polyethylene sheet shall be cleaned before applying the adhesive. The treated permeable base shall be compacted with a vibrating shoe type compactor.

Pervious backfill material in connection with the bridge work will be measured and paid for as structure backfill (bridge).

Pervious backfill material within the limits of payment for retaining walls will be measured and paid for as structure backfill (retaining wall).

If structure excavation or structure backfill involved in bridges is not otherwise designated by type, and payment for such structure excavation or structure backfill has not otherwise been provided for in the Standard Specifications or these special provisions, such structure excavation or structure backfill will be paid for at the contract price per cubic yard for structure excavation (bridge) or structure backfill (bridge).

Full compensation for installation, monitoring, and removal of temporary shoring and monitoring systems shall be considered as included in the contract price paid per cubic yard for structure excavation (bridge) and no additional compensation will be allowed therefor.

#### **10-1.28 MATERIAL CONTAINING AERIALY DEPOSITED LEAD**

Earthwork involving materials containing aerially deposited lead shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Attention is directed to "Aerially Deposited Lead" of these special provisions.

#### **HEALTH AND SAFETY**

The Contractor shall prepare a project specific Lead Compliance Plan to prevent or minimize worker exposure to lead contamination in soil. Attention is directed to Title 8, California Code of Regulations, Section 1532.1, "Lead," for specific Cal-OSHA requirements when working with lead.

The Lead Compliance Plan shall contain the elements listed in Title 8, California Code of Regulations, Section 1532.1(e)(2)(B). Before submission to the Engineer, the Lead Compliance Plan shall be approved by an Industrial Hygienist

certified in Comprehensive Practice by the American Board of Industrial Hygiene and paid by the Contractor. The Plan shall be submitted to the Engineer at least 15 days prior to beginning work in areas containing aurally deposited lead.

Prior to performing work in areas containing aurally deposited lead, personnel who have no prior training or are not current in their training status, including State personnel, shall complete a safety training program provided by the Contractor. The safety training program shall meet the requirements of Title 8, California Code of Regulations, Section 1532.1, "Lead."

Personal protective equipment, training, washing facilities, and medical surveillance required by the Contractor's Lead Compliance Plan shall be supplied to State personnel by the Contractor. The number of State personnel will be 2.

The Lead Compliance Plan shall include perimeter air monitoring incorporating upwind and downwind locations as shown on the plans and as approved by the Engineer. Monitoring shall be by high volume sampler for total suspended particulates. Analysis for lead shall be by California Air Resources Board SOP 005-5.1. Daily monitoring shall take place while the Contractor clears and grubs and constructs earthwork. A single representative daily sample shall be analyzed for lead. Analytical data shall be submitted to the Engineer in writing within 5 working days of obtaining the sample. Average lead concentrations shall not exceed 1.5 microgram per cubic meter of air per day. If concentrations exceed this level the contractor shall stop work and modify work to prevent release of lead.

The Contractor shall not clear and grub or construct earthwork within the project limits, unless authorized in writing by the Engineer, until the Lead Compliance Plan has been accepted by the Engineer.

The Lead Compliance Plan will be paid for as a lump sum.

The contract lump sum price paid for Lead Compliance Plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing the Lead Compliance Plan, and for providing personal protective equipment, training and medical surveillance, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.29 GRAVEL MULCH**

Gravel mulch shall be rock particles placed at locations shown on the plans in two layers, each 1 1/2" thick as specified in these special provisions.

Gravel mulch shall be crushed rock or decomposed granite, coral red in color, matching 'Pantone' Color Guide Palette number S 70-5.

Gravel mulch shall consist of fine materials not to exceed 1/4" in particle size, obtained from a single source and shall be approved for use by the Engineer.

Prior to placing the gravel mulch, the areas to receive the gravel mulch shall be cleared as specified under "Clearing and Grubbing" elsewhere in these special provisions.

After clearing, the areas to receive gravel mulch shall be excavated and graded to a smooth surface, compacted to 90% relative compaction and scarified to a depth of 1 1/2". Excess material shall be removed and disposed of outside the highway right of way in accordance with the provisions specified in Section 7-1.13 'Disposal of Material Outside the Highway Right of Way' of the Standard Specifications. After scarification, the areas shall be sterilized with Dichlobenil. The sterilant shall be applied at the maximum label rate unless otherwise directed by the Engineer and shall not be applied more than 6 inches beyond the gravel mulch limits.

Soil sterilant shall conform to the provisions as specified under 'Pesticides', elsewhere in these special provisions and Section 20-4.026, "Pesticides," of the Standard Specifications, except recommendations from a licensed Pest Control Advisor will not be required.

A liquid surface hardener consisting of an acrylic and vinyl acetate polymer, shall be used in the various applications of gravel mulch installation to harden surface areas and limit water penetration. The liquid surface hardener shall be a soluble solution mixed with water and applied as recommended by the manufacturer. The hardener shall not impair the aesthetic character of gravel mulch coloring and shall be approved for use by the Engineer.

Soil sterilization and liquid surface hardener shall not be applied within a 5 foot diameter area centered at each plant location.

After soil sterilization is complete, liquid surface hardener and gravel mulch applications shall be completed within each area of work during the same working day and shall conform to the following:

1. The first layer of gravel mulch shall be placed and spread to form a smooth uniform surface. Two applications of liquid surface hardener shall be applied to the gravel mulch areas as recommended by the manufacturer.

Immediately following the application of hardener, gravel mulch shall be compacted to not less than 90% relative compaction.

2. The second layer of gravel mulch shall be placed and spread to form a smooth uniform surface. Two applications of liquid surface hardener shall be applied to the gravel mulch areas as recommended by the manufacturer. Immediately following the application of hardener, gravel mulch shall be compacted to not less than 90% relative compaction.

Following approval by the Engineer of the compacted layer, one application of liquid surface hardener shall be applied to the gravel mulch areas as recommended by the manufacturer.

Care shall be taken to prevent any over spray of liquid surface hardener onto adjacent paved areas.

Liquid surface hardener should not runoff the surface of gravel mulch.

Edgings shall be installed to delineate the limits of the gravel mulch areas as shown on the plans and as specified in these special provisions.

Edgings will not be required between the gravel mulch areas and the adjacent edge of pavement or rock blanket areas.

Edgings shall be manufactured of steel and include metal anchor stakes and connectors, and shall be installed in accordance with the manufactures written instructions.

Edgings shall be a minimum 4 inches in height by 1/4 inch thick and shall be colored black.

**MEASUREMENT AND PAYMENT.**--Gravel mulch will be measured by the cubic yard as determined from actual measurements made parallel to the ground slope.

The contract price paid per cubic yard for gravel mulch shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing gravel mulch, complete in place, including furnishing and applying steel edgings with metal anchor stakes, liquid surface hardener and soil sterilant, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

### **10-1.30 IRRIGATION CROSSOVERS**

Irrigation crossovers shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Irrigation crossovers shall include conduits, water line crossovers, sprinkler control crossovers and appurtenances. Sizes of the conduits, water line crossovers and sprinkler control crossovers shall be as shown in the table for "Irrigation Crossovers" in the plans.

Conduits shall be installed under existing pavement by jacking or drilling methods or for new pavement placed in open trenches in accordance with the provisions in Section 20-5.03B, "Conduit for Water Line Crossovers and Sprinkler Control Crossovers," of the Standard Specifications. Jacking or drilling pits shall be at least 2 feet from pavement edge.

Conduits shall be 15" welded steel pipe (.250" thick).

Water line crossovers shall conform to the provisions in Section 20-5.03C, "Water Line Crossovers," of the Standard Specifications, and shall be polyvinyl chloride (PVC) plastic pipe, 1120 or 1220. PVC plastic pipe water line crossovers shall have a minimum pressure rating (PR) of 315 psi for 2-inch and 1 1/2-inch pipe and a minimum pressure rating of 200 psi for all smaller pipe sizes.

Sprinkler control crossovers shall conform to the provisions in Section 20-5.027D, "Sprinkler Control Crossovers," of the Standard Specifications.

Installation of pull boxes shall conform to the provisions in Section 20-5.027I, "Conduits, Electrical Conduit and Pull Boxes," of the Standard Specifications. Irrigation crossovers will be measured and paid for by the linear foot as 15" welded steel pipe conduit (.250" thick).

Full compensation for jacking and drilling installation, including proper disposal of removed material, and installation of sprinkler control crossovers, water line crossovers, pavement markers, and appurtenances, and for pressure testing water line crossover in the conduit shall be considered as included in the contract price paid per linear foot for 15" welded steel pipe conduit (.250" thick) and no additional compensation will be allowed therefor.

### **10-1.31 WATER LINE CROSSOVER CONDUIT**

Waterline crossover conduit shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Water line crossover conduit shall be 24" welded steel pipe (WSP) (.250" thick). Such 24" WSP conduits shall be installed as shown on the plans and then capped with 30-pound asphalt saturated felt as specified in Section 20-5.03B "Conduit for Water line Crossovers and Sprinkler Control Crossovers," of the Standard Specifications. These 24" WSP conduits will be utilized in a future contract to install water lines carrying reclaimed water for landscape use in this area.

Conduits shall be installed under existing pavement by jacking or drilling methods in accordance with the provisions in Section 20-5.03B, "Conduit for Water Line Crossovers and Sprinkler Control Crossovers," of the Standard Specifications.

Water line crossover conduit will be measured and paid for by the linear foot as 24" welded steel pipe conduit (.250" thick).

Full compensation for jacking and drilling installation, including proper disposal of removed material, and capping the ends with 30-pound asphalt saturated felt shall be considered as included in the contract price paid per linear foot for 24" welded steel pipe conduit (.250" thick) and no additional compensation will be allowed therefor.

**10-1.32 FINISHING ROADWAY**

Finishing roadway shall conform to the provisions in Section 22, "Finishing Roadway," of the Standard Specifications.

**10-1.33 AGGREGATE BASE**

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

The first paragraph of Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications is amended by adding the following sentences:

Aggregate may include or consist of material processed from reclaimed asphalt concrete, portland cement concrete, lean concrete base, cement treated base, glass or a combination of any of these materials. Aggregate base incorporating reclaimed glass shall not be placed at locations where surfacing will not be placed over the aggregate base.

The fourth paragraph in said Section 26-1.02A, is amended by adding the following sentence:

Untreated reclaimed asphalt concrete and portland cement concrete will not be considered to be treated with lime, cement or other chemical material for purposes of performing the Durability Index test.

**10-1.34 LEAN CONCRETE BASE**

Lean concrete base shall conform to the provisions in Section 28, "Lean Concrete Base," of the Standard Specifications.

**10-1.35 TREATED PERMEABLE BASE**

Treated permeable base shall be cement treated and shall conform to the provisions in Section 29, "Treated Permeable Bases," of the Standard Specifications.

**10-1.36 ASPHALT CONCRETE**

Asphalt concrete shall be Type A and shall conform to the provisions in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions and these special provisions.

Surfacing of miscellaneous areas with asphalt concrete shall conform to the provisions in "Asphalt Concrete (Miscellaneous Areas)" elsewhere in these special provisions.

The aggregate for Type A asphalt concrete shall conform to the 3/4" Maximum, Coarse grading specified in Section 39-2.03, "Aggregate," in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions.

If the Contractor selects the batch mixing method, asphalt concrete shall be produced by the automatic batch mixing method as provided in Section 39-5.03B, "Automatic Proportioning," in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions.

If the finished surface of the asphalt concrete on the Route 10 traffic lanes, and entrance and exit ramps does not meet the specified surface tolerances, it shall be brought within tolerance by either (1) abrasive grinding (with fog seal coat on the areas which have been ground), (2) removal and replacement, or (3) placing an overlay of asphalt concrete. The method will be selected by the Engineer. The corrective work shall be at the Contractor's expense.

If abrasive grinding is used to bring the finished surface to specified surface tolerances, additional grinding shall be performed as necessary to extend the area ground in each lateral direction so that the lateral limits of grinding are at a constant offset from, and parallel to the nearest lane line or pavement edge, and in each longitudinal direction so that the grinding begins and ends at lines normal to the pavement centerline, within any ground area. All ground areas shall be neat rectangular areas of uniform surface appearance. Abrasive grinding shall conform to the requirements in the first paragraph and the last 4 paragraphs in Section 42-2.02, "Construction," of the Standard Specifications.

In addition to the aggregate requirements listed in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions, the combined aggregates shall conform to the following quality requirement when mixed with paving asphalt Grade AR-4000 in the amount of asphalt determined to be optimum by California Test 367:

Test	California Test	Requirement
Surface Abrasion	360, Method A	Loss not to exceed 15 grams

In addition to the requirements in Section 39-7.01, "Spreading Equipment," in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions, asphalt paving equipment shall be equipped with automatic screed controls and a sensing device or devices.

When placing asphalt concrete to lines and grades established by the Engineer, the automatic controls shall control the longitudinal grade and transverse slope of the screed. Grade and slope references shall be furnished, installed and maintained by the Contractor. Should the Contractor elect to use a ski device, the minimum length of the ski device shall be 30 feet. The ski device shall be a rigid one piece unit and the entire length shall be utilized in activating the sensor.

When placing the initial mat of asphalt concrete on existing pavement, the end of the screed nearest the centerline shall be controlled by a sensor activated by a ski device not less than 30 feet long. The end of the screed farthest from centerline shall be controlled by an automatic transverse slope device set to reproduce the cross slope designated by the Engineer.

When paving contiguously with previously placed mats, the end of the screed adjacent to the previously placed mat shall be controlled by a sensor that responds to the grade of the previously placed mat and will reproduce the grade in the new mat within a 0.01-foot tolerance. The end of the screed farthest from the previously placed mat shall be controlled in the same manner as when placing the initial mat.

Should the methods and equipment furnished by the Contractor fail to produce a layer of asphalt concrete conforming to the requirements, including straightedge tolerance, of Section 39-8.04, "Compacting," in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions, the paving operations shall be discontinued and the Contractor shall modify his equipment or furnish substitute equipment.

Should the automatic screed controls fail to operate properly during any day's work, the Contractor may use manual control of the spreading equipment for the remainder of that day, however, the equipment shall be corrected or replaced with alternative automatically controlled equipment conforming to the requirements in this section before starting another day's work.

The Contractor shall operate all asphalt paving equipment within the range recommended by its manufacturer. The Contractor shall provide the Engineer with documentation showing the manufacturer's recommended operating range for asphalt paving equipment.

In addition to the straightedge requirements in Section 39-8.04, "Compacting," in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions, asphalt concrete pavement shall conform to the surface tolerances specified herein.

The top surface of the uppermost layer of asphalt concrete surfacing shall be profiled, by the Contractor in the presence of the Engineer, using a California Profilograph or equivalent in accordance with California Test 526 and as specified in these special provisions. Prior to beginning profiles, the profilograph shall be calibrated in the presence of the Engineer. Profiles shall be made on the traveled way 3 feet from and parallel to each edge of traveled way and at the approximate location of the planned lane lines.

Pavement so profiled shall conform to the following Profile Index requirements:

1. Pavement on tangent alignment and pavement on horizontal curves having a centerline radius curve of 2,000 feet or more shall have a Profile Index of 5 inches per mile or less for each 0.1-mile section profiled.
2. Pavement on horizontal curves having a centerline radius curve of 1,000 feet or more but less than 2,000 feet including the pavement within the superelevation transition of such curves, and pavement thicker than 0.20-foot total thickness placed on existing surfacing, shall have a Profile Index of 10 inches per mile or less for each 0.1-mile section profiled.
3. Pavement shall not have individual deviations in excess of 0.3-inch, as determined by California Test 526. The location of the profiles for determining deviations shall be designated by the Engineer.

Checking the following areas of pavement surface with the California Profilograph or equivalent will not be required:

1. Pavement on horizontal curves having a centerline radius curve of less than 1,000 feet and pavement within the superelevation transition of such curves.
2. Pavement with a total thickness of 0.20-foot or less, or pavement with extensive grade correction which does not receive advance leveling operations as specified in Section 39-8.03, "Spreading," in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions, or where the edge of asphalt concrete conforms to curbs or gutters with a Profile Index greater than 5 inches per mile.
3. Pavement for ramps and connectors with steep grades and high rates of superelevation and short sections of city or county streets and roads.
4. Pavement within 50 feet of a transverse joint that separates the pavement from an existing pavement not constructed under the contract.
5. All shoulders and miscellaneous areas.

The Contractor shall schedule paving operations such that final rolling of asphalt concrete pavement is completed and initial runs of the profilograph are completed prior to opening new pavement to public traffic. The scheduling of these operations shall be in consideration of the lane closure requirements specified in "Maintaining Traffic" of these special provisions. In the event that initial profiles are not made prior to opening the pavement to public traffic, the initial profilograph runs shall be made the next day that traffic control is permitted for the area to be profiled.

The top surface of the uppermost layer of asphalt concrete surfacing that does not meet all specified surface tolerances shall be brought within tolerance by abrasive grinding. Areas which have been abrasively ground shall receive a fog seal coat. Deviations in excess of 0.3-inch which cannot be brought into specified surface tolerances by abrasive grinding shall be corrected by either (1) removal and replacement or, (2) placing an overlay of asphalt concrete. The corrective method for each area shall be selected by the Contractor and shall be as approved by the Engineer prior to beginning the corrective work. Any replacement or overlay pavement not meeting specified tolerances shall be corrected by the methods specified above. All corrective work shall be at the Contractor's expense except that flagging costs will be paid for as provided in Section 12-2, "Flagging," of the Standard Specifications.

After abrasive grinding has been completed to reduce individual deviations in excess of 0.3-inch, additional grinding or corrections to the surface as specified above shall be performed as necessary to reduce the Profile Index of the pavement to the specified Profile Index value required for the area. The Contractor shall run profilograms of such areas that have received abrasive grinding or corrective work until the final profilograms indicate the Profile Index of the area is within the specified tolerance.

When abrasive grinding is used to bring the top surface of the uppermost layer of asphalt concrete surfacing within specified surface tolerances, additional abrasive grinding shall be performed as necessary to extend the area ground in each lateral direction so that the lateral limits of grinding are at a constant offset from, and parallel to the nearest lane line or pavement edge, and in each longitudinal direction so that the grinding begins and ends at lines normal to the pavement centerline, within any ground area. All ground areas shall be neat rectangular areas of uniform surface appearance.

Abrasive grinding shall conform to the requirements in the first paragraph and the last 4 paragraphs in Section 42-2.02, "Construction," of the Standard Specifications, except that the grinding residue shall be disposed of outside the highway right of way.

The original of final profilograms that indicate the pavement surface is within the Profile Index specified shall become the property of the State and shall be delivered to the Engineer prior to acceptance of the contract.

Full compensation for performing all profile checks for Profile Index and furnishing final profilograms to the Engineer, for performing all corrective work to the pavement surface including abrasive grinding, removing and replacing asphalt concrete or placing asphalt concrete overlay to bring the surface within the tolerance specified shall be considered as included in the contract price paid per ton for asphalt concrete and no separate payment will be made therefor.

The area to which paint binder has been applied shall be closed to public traffic. Care shall be taken to avoid tracking binder material onto existing pavement surfaces beyond the limits of construction.

The Contractor shall schedule his paving operations such that each layer of asphalt concrete is placed on all contiguous lanes of a traveled way each work shift. At the end of each work shift, the distance between the ends of the layers of asphalt concrete on adjacent lanes shall not be greater than 10 feet nor less than 5 feet. Additional asphalt concrete shall be placed along the transverse edge at the end of each lane and along the exposed longitudinal edges between adjacent lanes, hand raked, and compacted to form temporary conforms. Kraft paper, or other approved bond breaker, may be placed under the conform tapers to facilitate the removal of the taper when paving operations resume.

Where the existing pavement is to be widened by constructing a new structural section adjacent to the existing pavement, the new structural section, on both sides of the existing pavement, shall be completed to match the elevation of the edge of the existing pavement at each location prior to spreading and compacting asphalt concrete over the adjacent existing pavement.

Shoulders or median borders adjacent to a lane being paved shall be surfaced prior to opening the lane to traffic.

#### **10-1.37 ASPHALT CONCRETE (MISCELLANEOUS AREAS)**

Surfacing of miscellaneous areas with asphalt concrete shall conform to the provisions for miscellaneous areas in Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions.

Prior to placing asphalt concrete for the median gutters, overside drains, and inlet aprons, the areas to be paved shall be cleared of all debris and vegetation and shall be sterilized with dichlobenil to prevent weeds, grasses, and other organic material from cracking or otherwise damaging the paving. The sterilant shall be applied at the maximum label rate unless otherwise directed by the Engineer and shall not be applied more than 12 inches beyond the limits of the areas to be paved.

Soil sterilant shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications, except recommendations from a licensed Pest Control Adviser will not be required.

Asphalt concrete placed in miscellaneous areas may be produced in accordance with the requirements for asphalt concrete placed on the traveled way in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions.

The amount of asphalt binder used in asphalt concrete placed in dikes and overside drains shall be increased one percent by weight of the aggregate over the amount of asphalt binder determined for use in asphalt concrete placed on the traveled way.

Aggregate for asphalt concrete dikes shall conform to the 3/8 inch maximum grading as specified in Section 39-2.02, "Aggregate," of the Standard Specifications.

The miscellaneous areas to be paid for at the contract price per square yard for place asphalt concrete (miscellaneous area) in addition to the prices paid for the materials involved shall be limited to the areas listed on the plans.

Asphalt concrete placed in miscellaneous areas will be paid for at the contract price per ton for asphalt concrete specified in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions. Section 39-10.02, "Statistical Evaluation and Determination of Pay Factor," in Section 11-1, "Asphalt Concrete," elsewhere in these special provisions, shall not apply to asphalt concrete placed in miscellaneous areas. Payment for placing asphalt concrete in miscellaneous areas and dikes will be as specified in Section 39-8.02, "Payment," of the Standard Specifications.

### **10-1.38 CONCRETE PAVEMENT**

Portland cement concrete pavement shall conform to the provisions in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications and these special provisions.

The concrete for pavement shall contain a minimum of 517 pounds of portland cement per cubic yard.

An air-entraining admixture conforming to the requirements in Section 90-4, "Admixtures," of the Standard Specifications shall be added to the concrete at the rate required to result in an air content of 6 ( $\pm 1/2$ ) percent in the freshly mixed concrete.

Transverse weakened plane joints across portland cement concrete shoulders shall be continuous with such joints across the traveled way. Longitudinal joints shall be constructed between portland cement concrete shoulders and adjacent traffic lanes, and tie bars shall be installed at such joints as provided herein.

Tie bars shall be installed at longitudinal joints between portland cement concrete shoulders and adjacent traffic lanes and at transverse contact joints, as shown on the plans. Tie bars shall be deformed reinforcing steel bars conforming to the specifications of ASTM Designation: A 615, Grade 40 or 60, ASTM Designation: A 616, Grade 50 or 60, or ASTM Designation: A 706 and shall be epoxy coated as specified in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications.

The joint detail for transverse and longitudinal joints, as shown on the plans, shall apply only to all weakened plane joints. All weakened plane joints shall be constructed by the sawing method. In addition to sawing weakened plane joints, secondary saw cuts shall be made along the transverse and longitudinal weakened plane joints to the width and depth shown on the plans to accommodate joint seal. The secondary saw cuts shall be made when the portland cement concrete pavement has cured a minimum of 3 days and the concrete has hardened sufficiently to prevent spalling and raveling during sawing operations and after any grinding of pavement surface in the area of the joint has been completed. Should grinding or grooving be required over or adjacent to any joint after silicone joint sealant has been placed, the joint materials shall be completely removed and replaced at the Contractor's expense.

In not less than 7 days after the placement of concrete pavement and not more than 4 hours before placing backer rods and joint sealant materials, the top one inch of the joint walls shall be cleaned by the dry sand blast method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, all traces of sand, dust and loose material shall be removed from and near the joint by the use of a vacuum device. Surface moisture shall be removed at the joints by means of compressed air or moderate hot compressed air or other means, approved by the Engineer. Drying procedures that leave a residue or film on the joint wall shall not be used.

Backer rod shall be installed as shown on the plans and shall be an expanded, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Backer rod shall be installed when the temperature of the portland concrete pavement is above the dew point of the air and when the air temperature is 40° F. or above. Backer rod shall be installed when the joints to be sealed have been properly patched, cleaned and dried, as determined by the Engineer. Methods of placing backer rod which leave a residue or film on the joint walls shall not be used.

Immediately after placement of the backer rod, low modulus silicone joint sealant shall be placed in the clean, dry, prepared joints as shown on the plans. The silicone sealant shall be applied by a mechanical device with a nozzle shaped to fit inside the joint to introduce the sealant from inside the joint. Adequate pressure shall be applied to the sealant to ensure that the sealant material is extruded evenly and that full continuous contact is made with the joint walls. After application of the sealant the surface of the sealant shall be recessed as shown on the plans.

Any failure of the joint material in either adhesion or cohesion of the material will be cause for rejection of the joint. The finished surface of silicone joint sealant shall conform to the dimensions and allowable tolerances shown on the plans. Rejected joint materials or joint material whose finished surface do not conform to the dimensions shown on the plans, as determined by the Engineer, shall be repaired or replaced, at the Contractor's expense, with joint material that conforms to the requirements.

Low modulus silicone joint sealant shall be furnished in a one part silicone formulation. Acid cure sealants shall not be used. The compound shall be compatible with the surface to which it is applied and shall conform to the following requirements:

Specification	Test Method	Requirement
Tensile stress, 150% elongation, 7-day cure at 77° ± 3° F. and 45% to 55% R.H. <sup>e</sup>	ASTM D 412 (Die C)	45 psi max.
Flow at 77° ± 3° F.	ASTM C 639a	shall not flow from channel
Extrusion Rate at 77° ± 3° F.	ASTM C 603b	75-250 gms/min.
Specific Gravity	ASTM D 792 Method A	1.01 to 1.51
Durometer Hardness, at 0° F., Shore A, cured 7 days at 77° ± 3° F.	ASTM C 661	10 to 25
Ozone and Ultraviolet Resistance, after 5,000 hrs.	ASTM C 793	No chalking, cracking or bond loss
Tack free at 77° ± 3° F. and 45% to 55% R.H. <sup>e</sup>	ASTM C 679	less than 75 minutes
Elongation, 7 day cure at 77° ± 3° F. and 45% to 55% R.H. <sup>e</sup>	ASTM D 412 (Die C)	500 percent min.
Set to touch, at 77° ± 3° F. and 45% to 55% R.H. <sup>e</sup>	ASTM D 1640	less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.
Bond, to concrete mortar-concrete briquets, air cured 7 days at 77° ± 3° F.	AASHTO T 132 <sup>c</sup>	50 psi min.
Movement capability and adhesion. 100 percent extension at 0° F. after, air cured 7 days at 77° ± 3° F., and followed by 7 days in water at 77° ± 3° F.	ASTM C 719d	No adhesive or cohesive failure after 5 cycles

Notes:

- a ASTM C 639 Modified (15 percent slope channel A).
- b ASTM C 603, through 1/8 inch opening at 50 psi.
- c Mold briquets in accordance with AASHTO Designation: T 132, sawed in half and bonded with a 1/16 inch maximum thickness of sealant and tested in accordance with AASHTO Designation: T 132. Briquets shall be dried to constant weight at  $100 \pm 5^\circ$  C.
- d Movement Capability and Adhesion: Prepare 1' x 1" x 3" concrete blocks in accordance with ASTM Designation: C 719. A sawed face shall be used for bond surface. Seal 2 inches of block leaving 1/2 inch on each end of specimen unsealed. The depth of sealant shall be 3/8 inch and the width 1/2 inch.
- e R.H. equals relative humidity.

The silicone joint sealant shall be formulated to cure rapidly enough to prevent flow after application on grades of up to 15 percent.

A Certificate of Compliance shall be furnished to the Engineer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. Said certificate shall also be accompanied with a certified test report of the results of the required tests performed on the sealant material within the previous 12 months prior to proposed use. Said certificate and accompanying test report shall be provided for each lot of silicone joint sealant prior to use on the project.

After each joint is sealed, all surplus joint sealer on the pavement surface shall be removed. Traffic will not be permitted over the sealed joints until the sealant is track free and set sufficiently to prevent embedment of roadway debris into the sealant.

Sealing longitudinal and transverse weaken plane joints in portland cement concrete pavement will be measured by the linear foot.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing pavement joints complete in place, including sawing and preparing the joints in the concrete pavement, furnishing and installing backer rod, repairing and patching spalled or raveled sawed joints, and replacing or repairing rejected joints and for furnishing and placing epoxy-coated tie bars in portland cement concrete pavement shall be considered as included in the contract price paid per cubic yard for concrete pavement and no separate payment will be made therefor.

Full compensation for furnishing and placing epoxy-coated tie bars in portland cement concrete pavement shall be considered as included in the contract price paid per cubic yard for concrete pavement and no separate payment will be made therefor.

#### 10-1.39 EXIT RAMP TERMINI

Portland cement concrete pavement at exit ramp termini shall be constructed as shown on the plans and as provided in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications and these special provisions.

The concrete for portland cement concrete pavement at exit ramp termini shall contain a minimum of 517 pounds of portland cement per cubic yard.

An air-entraining admixture conforming to the requirements in Section 90-4, "Admixtures," of the Standard Specifications shall be added to the concrete for exit ramp termini at the rate required to result in an air content of  $6 (\pm 1 \frac{1}{2})$  percent in the freshly mixed concrete.

#### 10-1.40 ROCK COBBLE PAVING

Rock cobble paving shall be placed at the locations shown on the plans and in accordance with these special provisions.

**MATERIALS.**--Rock for the rock cobble paving shall be clean, smooth rock obtained from a single source. Rock for the rock blanket shall conform to the following grading:

Screen Size (Inches)	Percentage Passing (By Weight)
12	100
10	90-100
8	0-10
6	0

**SITE PREPARATION.**--Prior to placing rock on areas to receive rock cobble paving, the areas shall be cleared as specified under "Clearing and Grubbing" elsewhere in these special provisions.

Prior to placing the rock on areas to receive rock cobble paving, the areas shall be cleared of trash and debris. Weeds shall be killed and removed to the ground level. Cleared trash, debris, and removed weeds shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

After clearing, the areas to receive rock cobble paving shall be excavated and graded to a smooth surface and compacted to 90 percent relative compaction. Excess material shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications. After compaction, the areas shall be sterilized with dichlobenil or oxadiazon. Dichlobenil or oxadiazon shall be the granular type. The sterilant shall be applied at the maximum label rate unless otherwise directed by the Engineer and shall not be applied more than 12 inches beyond the rock cobble paving limits.

Soil sterilant shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications, except recommendations from a licensed Pest Control Adviser will not be required.

Concrete base used for rock cobble paving shall be wet mix minimum Class A concrete conforming to Section 90, "Portland Cement Concrete" of the Standard Specifications. A 3/8" pea gravel maximum graded aggregate shall be used. Rock shall be placed in concrete while in a workable state. Excess concrete shall be removed from the face of the rock.

Rock cobble paving shall be secured in place with mortar. The mortar used for the rock cobble paving shall be thoroughly mixed and shall be 3 parts sand and one part Type 2 cement. The mortar shall be dry-applied in such a manner that the rock is secure in place. Any rock which loosens after installation shall be reset at the Contractor's expense, by methods approved by the Engineer. Water shall be lightly applied to the mortared areas to ensure hydration. Excess mortar shall be removed from the exposed faces of the rock cobble paving with muriatic acid and then washed with water. The rock cobble paving shall be watered 3 times per day for a period of 3 days following initial mortar setting.

**MEASUREMENT AND PAYMENT.**--Rock cobble paving will be measured by the square foot as determined from actual measurements made parallel to the ground slope .

The contract price paid per square foot for rock cobble paving shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing rock cobble paving, complete in place, including grading, removing and disposing of excess material and compacting the areas to receive the rock cobble paving, placing concrete base and mortar, and furnishing and applying soil sterilant, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.41 PILING**

Piling shall conform to the provisions in Section 49, "Piling," of the Standard Specifications, and these special provisions.

Foundation recommendations are included in the "Information Handout" available to the Contractor as provided for in Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," of the Standard Specifications.

Attention is directed to "Welding Quality Control" of these special provisions.

Attention is directed to "Public Safety" of these special provisions. Before performing pile handling or pile installation operations at a location that is closer than the length of the pile being handled or installed to the edge of areas open to public traffic or public use, the Contractor shall submit to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, a detailed plan describing the measures that will be employed to provide for the safety of traffic and the public.

The second paragraph in Section 49-1.03, "Determination of Length," of the Standard Specifications is amended to read:

For driven piling, the Contractor shall furnish piling of sufficient length to obtain both the specified tip elevation and design load shown on the plans or specified in the special provisions. For cast-in-drilled-hole concrete piling, the Contractor shall construct piling of such length to develop the compression nominal resistance and to obtain the specified tip elevation shown on the plans or specified in the special provisions.

At the Contractor's option, the Contractor may conduct additional foundation investigation, including installing and axial load testing additional non-production indicator piling. The Engineer shall approve locations of additional foundation testing. The Contractor shall notify the Engineer at least 5 working days prior to beginning additional foundation investigation.

Additional foundation investigation shall be completed prior to requesting revised specified pile tip elevations or modification to the installation methods specified herein. Revisions to specified tip elevations and modifications to the specified installation methods will be subject to the provisions of Section 5-1.14, "Cost Reduction Incentive."

Modification to the specified installation methods and specified pile tip elevation will not be considered at locations where lateral load demands control design pile tip elevations or when the plans state that specified pile tip elevation shall not be revised.

The pile structural capacity design is based on the nominal strength as defined in Caltrans Bridge Design Specifications (Article 8.1.3) or the nominal resistance as defined in the LRFD Bridge Design Specifications

(Article 1.3.2.1). The nominal resistance of the pile, as shown on the plans, is the design capacity required to resist the factored axial load demands.

Indicator compression pile load testing shall conform to the requirements of ASTM Designation: D 1143. The acceptance criteria for compression pile load testing shall be as follows:

The pile shall sustain the first compression test load applied which is equal to the nominal compression resistance, as shown on the plans, with no more than 0.5-inch total vertical movement at the top of the pile measured relative to the top of the pile prior to the start of compression load testing.

Indicator tension pile load testing shall conform to the requirements of ASTM Designation: D 3689. The loading apparatus described as "Load Applied to Pile by Hydraulic Jack(s) Acting at One End of Test Beam(s) Anchored to the Pile" shall not be used. The acceptance criteria for tension pile load testing shall be as follows:

The pile shall sustain the first tension test load applied which is equal to the nominal tension resistance, as shown on the plans, with no more than 0.5-inch total vertical movement at the top of the pile measured relative to the top of the pile prior to the start of tension load testing.

Indicator piling shall be removed in conformance with the requirements in Section 15-4.02, "Removal Methods," and the remaining holes shall be backfilled with earth or other suitable material approved by the Engineer.

Section 49-1.04, "Test Piles," of the Standard Specifications is amended to read:

**49-1.04 Load Test Piles.**—When load test piles and anchor piles are shown on the plans or specified for a structure, the loading tests using those piles shall be completed before the remaining piles for that structure or specified control location are drilled, cast, cut to length, or driven.

Load test piles shall be installed with the same type of equipment that is to be used for installation of foundation piles.

Load test piles which are shown on the plans or specified in the special provisions shall conform to the requirements for piling as specified in these specifications and, unless otherwise shown, shall be so located that they may be cut off and become a part of the completed structure.

Load test piles which are not to be incorporated in the completed structure shall be removed in conformance with the requirements in Section 15-4.02, "Removal Methods," and the remaining holes shall be backfilled with earth or other suitable material approved by the Engineer.

Load test anchorages in piles used as anchor piles shall conform to the following requirements:

High strength threaded steel rods shall conform to the provisions for bars in Section 50-1.05, "Prestressing Steel," except Type II bars shall be used.

High strength steel plates shall conform to the requirements in ASTM Designation: A 709, Grade 50.

Anchor nuts shall conform to the provisions in the second paragraph in Section 50-1.06, "Anchorages and Distribution."

The Contractor, at the Contractor's expense, may use additional cement or Type III cement in the concrete for the load test and anchor piles.

Testing of load test piles shown on the plans and specified in the special provisions will be performed by the Engineer without cost to the Contractor. The loading tests will be made when the concrete in the load test and anchor piles has developed a compressive strength of at least 2,000 pounds per square inch. The Engineer will require not more than 5 working days to perform each load test.

Should the Engineer fail to complete the load tests within the time specified in the special provisions and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in load testing of piles, the delay will be considered a right of way delay as specified in Section 8-1.09, "Right of Way Delays."

The Contractor shall furnish labor, materials, tools, equipment, and incidentals as required to assist the Engineer in the installation, operation and removal of State-furnished steel load test beams, State-furnished jacks, bearing plates, drills, and other test equipment. This work will be paid for as extra work as provided in Section 4-1.03D.

The first and second paragraphs in Section 49-1.05, "Driving Equipment," of the Standard Specifications are amended to read:

**49-1.05 Driving Equipment.**—Driven piles shall be installed with impact hammers that are approved in writing by the Engineer. Impact hammers shall be steam, hydraulic, air, or diesel hammers. Impact hammers shall develop sufficient energy to drive the piles at a penetration rate of not less than 1/8 inch per blow at the specified bearing value.

Vibratory hammers shall not be used for installation of piles, unless otherwise shown on the plans or specified in the special provisions.

Hammers with an external combustion engine that are not single action, shall have a transducer that records ram velocity.

Double acting diesel hammers with internal combustion engines shall have a transducer that records bounce chamber pressure.

For hammers with no visual way of observing the ram stroke, a printed readout showing hammer energy during driving operation shall be provided to the Engineer by the Contractor.

The fifth paragraph in Section 49-1.05, "Driving Equipment," of the Standard Specifications is deleted.

Difficult pile installation is anticipated due to the presence of underground utilities, overhead utilities, and traffic control.

Driven piles for sound walls shall be driven to obtain the specified penetration; bearing value will not be determined in conformance with the provisions in the third through seventh paragraphs of Section 49-1.08, "Bearing Value and Penetration," of the Standard Specifications, nor by the provisions specified in these special provisions.

The first sentence of the first paragraph in Section 49-1.08, "Bearing Value and Penetration," of the Standard Specifications is amended to read:

**49-1.08 Bearing Value and Penetration.**—Except for piles to be load tested, driven piles shall be driven to a bearing value of not less than the design loading shown on the plans unless otherwise specified in the special provisions or permitted in writing by the Engineer.

The third through seventh paragraphs in Section 49-1.08, "Bearing Value and Penetration," of the Standard Specifications are amended to read:

The bearing values for driven piles shall be determined from the following formula in which "P" is the design loading shown on the plans in pounds, "E" is the manufacturer's rating for foot-pounds of energy developed by the hammer, and "s" is the penetration per blow in inches, averaged over the last few blows.

$$P =$$

The penetration per blow "s" shall be measured only when there is no appreciable rebound of the hammer and only when the last blow is struck on a sound pile head or driving block. The penetration per blow "s" may be measured either during initial driving or during redriving following a set period as determined by the Engineer.

Section 49-1.10, "Load Testing," of the Standard Specifications is deleted.

The third paragraph in Section 49-2.03, "Requirements," of the Standard Specifications is amended to read:

Untreated and treated timber piles shall be of Douglas fir or Southern Pine timber and shall be clean peeled.

The third paragraph in Section 49-4.04, "Steel Shells," of the Standard Specifications is amended to read:

Steel shells shall conform to the provisions for steel pipe piles specified in Section 49-5, "Steel Piles."

Section 49-5.01, "Description," of the Standard Specifications is amended to read:

**49-5.01 Description.**—Steel piles shall include structural shape piles and pipe piles. Structural shape steel piles shall be of the rolled section shown on the plans or of the section specified in the special provisions and shall be structural steel conforming to the specifications of ASTM Designation: A 36/A 36M, or at the option of the Contractor, structural steel conforming to the specifications of ASTM Designation: A 572/A 572M.

Steel pipe piling shall conform to the following requirements:

1. Piles shall be of the nominal diameter and the nominal wall thickness as the pipe piles shown on the plans unless otherwise specified in the special provisions.

2. The carbon equivalency (CE) as defined in AWS D 1.1, Section XI5.1, shall not exceed 0.45.
3. The sulfur content shall not exceed 0.05 percent.
4. Piles shall conform to any additional requirements in the special provisions, including but not limited to, tolerances for diameter, edge alignment, end match marking, roundness, and straightness, that are required in order to conform with steel pile splice welding and welding inspection provisions.
5. Steel pipe pile seams shall be complete penetration welds and shall conform to the requirements of AWS D1.1 and any additional amendments to AWS D1.1 listed herein and in the special provisions. Incomplete penetration welds and defective welds of steel pipe piles shall be repaired or restored to achieve complete joint penetration groove welds.
6. Steel pipe piles that are less than 14 inches in diameter shall conform to the specifications of ASTM Designation: A 252, Grade 2 or 3, and steel pipe piles that are 14 inches and greater in diameter shall conform to the specifications of ASTM Designation: A 252, Grade 3, as amended by the above requirements.

Steel piles shall not be joined by welded lap splicing.

The manufacturer or fabricator of steel piling shall furnish a Certificate of Compliance stating that the piling being supplied conforms to these specifications and to the special provisions. The Certificate of Compliance shall include test reports for tensile, chemical, and any specified nondestructive tests. Samples for testing shall be taken from the base metal, steel, coil or from the manufactured or fabricated piling.

Section 49-5.02, "Splicing," of the Standard Specifications is amended to read:

**49-5.02 Splicing.**—Steel pile splices shall conform to the requirements of AWS D 1.1 and the special provisions. Structural shape steel piling splices shall be complete joint penetration groove welds. Steel pipe pile splices that are made at a permanent manufacture or fabrication facility, and that are made prior to furnishing the Certificate of Compliance shall be complete penetration welds. Steel pipe pile splices that are made in the field shall be complete joint penetration groove welds.

Ends of steel pipe piling to be spliced that have been damaged during driving shall be removed to a sound and uniform section conforming to the tolerances for diameter, edge alignment and roundness required to meet the steel pile splice welding requirements. Pipe ends shall be field cut using automated guided cutting equipment. Manual flame cutting shall not be used.

**Predrilled Holes.**—Piles shall be driven in over sized drilled holes in conformance with the provisions in Section 49-1.06, "Predrilled Holes," of the Standard Specifications at the locations and to the corresponding bottom of hole elevations listed in the following table.

Bridge Name or Number	Abutment Number	Elevation of Bottom of Hole
54C-63	1 (Front row only)	1086

The elevation of the bottom of the predrilled holes at the location shown in the above table shall be 3 feet below the adjacent existing utility lines or at the elevation shown in the above table, whichever is lower.

Full compensation for predrilling, filling the space around piles driven in predrilled holes with sand or pea gravel, and disposing of material resulting from predrilling shall be considered as included in the contract unit price paid for drive pile and no additional compensation will be allowed therefor.

**MEASUREMENT AND PAYMENT.**—Measurement and payment for the various types and classes of piles shall conform to the provisions in Sections 49-6.01, "Measurement," and 49-6.02, "Payment," of the Standard Specifications and these special provisions.

The sixth paragraph in Section 49-6.02, "Payment," of the Standard Specifications is amended to read:

If piling is manufactured or fabricated more than 300 air 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 extremely difficult to ascertain and determine the actual increase in such expenses, it is agreed that payment to the Contractor for furnishing piling of the types shown in the Engineer's Estimate will be reduced \$5000 for each manufacture or fabrication site located more than 300 air line miles from both Sacramento and Los Angeles and an additional \$3000 (\$8000 total) for each manufacture or fabrication site located more than 3000 air line miles from both Sacramento and Los Angeles.

The eighth paragraph in Section 49-6.02, "Payment," of the Standard Specifications is amended to read:

Load test piles and adjacent anchor piles that become a part of the completed structure, or are shown on the plans, or are specified, will be paid for at the contract prices for the type or class of piling shown in the Engineer's Estimate.

Full compensation for furnishing and placing additional testing reinforcement, load test anchorages, and for cutting off test piles as specified shall be considered as included in the contract price paid for piling of the type or class shown in the Engineer's Estimate, and no additional compensation will be allowed therefor.

No extension of time will be made for additional foundation investigation, installation and testing of indicator piling, cutting off piling and restoring the foundation investigation and indicator pile sites, or review of request by the Engineer.

#### **10-1.42 PRESTRESSING CONCRETE**

Prestressing concrete shall conform to the provisions in Section 50, "Prestressing Concrete," of the Standard Specifications and these special provisions.

The first paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

The Contractor shall submit to the Office of Structure Design (OSD) for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," working drawings of the prestressing system proposed for use. For initial review, 6 sets of the drawings shall be submitted for railroad bridges and 4 sets shall be submitted for other structures. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to OSD for final approval and for use during construction.

The sixth paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

At the completion of each structure on the contract, one set of reduced prints on 20 pound (minimum) bond paper, 11 inches by 17 inches in size, of the corrected original tracings of all working drawings for each structure shall be furnished to the Engineer. Reduced prints of drawings which are common to more than one structure shall be submitted for each structure. An index prepared specifically for the drawings for each structure containing sheet numbers and titles shall be included on the first reduced print in the set for each structure. Reduced prints for each structure shall be arranged in the order of drawing numbers shown in the index.

The seventh paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

The edge of the corrected original tracing image shall be clearly visible and visually parallel with the edges of the page. A clear, legible symbol shall be provided as near to the upper left side of each page as is feasible within the original print to show the amount of reduction and a horizontal and vertical scale shall be provided on each reduced print to facilitate enlargement to original scale.

The eighth paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

For railroad bridges, in addition to the reduced prints of the working drawings, the Contractor shall furnish to the Engineer one set of working drawings consisting of either ink tracings on cloth, ink tracings on polyester base drafting film, silver sensitized cloth duplicate tracings, or silver sensitized polyester based reproduction films with matte surface on both sides.

The second paragraph in Section 50-1.08, "Prestressing," of the Standard Specifications is amended to read:

The maximum temporary tensile stress (jacking stress) in prestressing steel shall not exceed 75 percent of the specified minimum ultimate tensile strength of the prestressing steel. Pretensioned prestressing steel shall be anchored at stresses that will result in the ultimate retention of working forces at not less than those shown on the plans, but in no case shall the stress at anchorages after seating exceed 70 percent for normal relaxation strand, or 75 percent for low relaxation strand, of the specified minimum ultimate tensile strength of the prestressing steel.

The seventh paragraph in Section 50-1.08, "Prestressing," of the Standard Specifications is amended to read:

Each jack used to stress tendons shall come equipped with either: (1) two pressure gages or (2) one pressure gage and a load cell, at the option of the Contractor. The jack body shall be permanently marked with the ram area. Each pressure gage shall be fully functional and have accurately reading dials at least 6 inches in diameter. The jack and each gage shall be calibrated as a unit with the cylinder extension in the approximate position that it will be at final jacking force. The load cell, if used, shall be calibrated and shall be provided with an indicator which may be used to determine the prestressing force in the tendon. The range of the load cell shall be such that the lower 10 percent of the manufacturer's rated capacity will not be used in determining the jacking stress. The jacking equipment calibration procedure shall be as follows:

Each jack used to stress tendons, which are permanently anchored at 25 percent or more of the specified minimum ultimate tensile strength of the prestressing steel, shall be calibrated by the Transportation Laboratory within one year prior to use and after each repair, unless otherwise directed. The Contractor shall be responsible for:

- 1) scheduling of calibration of the jacking equipment with the Transportation Laboratory, telephone (916) 227-7251;
- 2) verifying that the jack and supporting systems are complete, with proper components, and are in good operating condition;
- 3) mechanically calibrating the gages with a dead weight tester or other approved means prior to calibration of the jacking equipment by the Transportation Laboratory,
- 4) providing sufficient labor, equipment, and material to install and support the jacking and calibration equipment and to remove the equipment after the calibration is complete, and;
- 5) plotting the calibration results.

Each jack used to stress tendons, which are permanently anchored at less than 25 percent of the specified minimum ultimate tensile strength of the prestressing steel, shall be calibrated by a private laboratory approved by the Transportation Laboratory within 6 months prior to use and after each repair, unless otherwise directed.

The fourth paragraph in Section 50-1.11, "Payment," of the Standard Specifications is amended to read:

Full compensation for furnishing and placing additional concrete and deformed bar reinforcing steel required by the particular system used, ducts, anchoring devices, distribution plates or assemblies and incidental parts, for furnishing samples for testing, for calibration of jacking equipment done by a private laboratory, and for pressure grouting ducts shall be considered as included in the contract lump sum price paid for prestressing cast-in-place concrete or in the contract price for furnish precast members, and no additional compensation will be allowed therefor.

The details shown on the plans for cast-in-place prestressed box girder bridges are based on a bonded full length draped tendon prestressing system. For such bridges the Contractor may, in conformance with the provisions of Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications, propose an alternative prestressing system utilizing bonded partial length tendons providing the proposed system and associated details meet the following requirements:

The proposed system and details must provide moment and shear resistances at least equal to those used for the design of the structure shown on the plans.

The concrete strength shall not be less than that shown on the plans.

Not less than 35 percent of the total prestressing force at any section shall be provided by full length draped tendons.

Anchorage blocks for partial length tendons shall be located so that they will not interfere with the placement of any utility facilities shown on the plans or of any future utilities to be placed through openings shown on the plans.

Temporary prestressing tendons, if used, shall be detensioned and any temporary ducts shall be filled with grout before completion of the work. Temporary tendons shall be either removed or fully encased in grout before completion of the work.

All details of the proposed system, including supporting checked calculations, shall be included in the drawings submitted in conformance with Section 50-1.02, "Drawings," of the Standard Specifications.

Moments and shears for loads used in the design shown on the plans will be made available to the Contractor upon written request to the Engineer.

#### **10-1.43 CONCRETE STRUCTURES**

Portland cement concrete structures shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Manholes shall be constructed as shown on the plans. Manholes will be measured and paid for as Class A concrete (Structure) and bar reinforcing steel. The contract prices paid per cubic yard for Class A concrete (Structure) and per pound for bar reinforcing steel shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing manholes, complete in place, including structure excavation and structure backfill, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Shotcrete shall not be used as an alternative construction method for reinforced concrete members unless otherwise specified.

The first sentence of the tenth paragraph in Section 51-1.05, "Forms," of the Standard Specifications is amended to read:

Form panels for exposed surfaces shall be plywood conforming to or exceeding the requirements of U.S. Product Standard PS 1 for Exterior B-B (Concrete Form) Class I Plywood or any material which will produce a smooth uniform concrete surface substantially equal to that which would result from the use of such plywood.

The second paragraph in Section 51-1.22, "Measurement," of the Standards Specifications is amended to read:

The estimated quantity of concrete for minor structures designated as final pay in the Engineer's Estimate will not be revised as specified in Section 9-1.015, "Final Pay Items," of the Standard Specifications, when the constructed height of said minor structure, including revisions by the Engineer, is within 0.5-foot of the vertical dimension shown on the plans.

Neoprene strip shall be furnished and installed at abutment backwall joint protection locations in conformance with the details shown on the plans, the provisions in the Standard Specifications, and these special provisions.

Furnishing and installation of neoprene strip shall conform to the requirements for strip waterstops as provided in Section 51-1.145, "Strip Waterstops," of the Standard Specifications, except that protective board will not be required.

Materials for access opening covers in soffits of new cast-in-place concrete box girder bridges shall conform to the provisions for materials in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

#### **10-1.44 COLORED CONCRETE.**

Colored concrete shall conform to the provisions in Section 51, "Concrete Structures," and Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

The color of the deck slab and approach slabs of Sierra Avenue Overcrossing, Bridge No 54-537 shall be integrally pigmented colored concrete conforming to Color No. 36293 of Federal Standard 595B (Gray Family). Colored concrete shall conform to the limits shown on the plans.

Color pigments shall be of high quality black iron oxides conforming to ASTM C979 "Standard Specification for Pigments Used to Integrally Color Concrete." The manufacturer of the color pigments shall specify the dosage rate for achieving the specified color. The dosage shall not exceed 10 percent by weight of cementitious materials in the concrete mix design.

The Contractor shall submit technical data and manufacturer's specifications for colored concrete components and a proposed plan for mixing, delivery, placement, finishing and curing of the colored concrete. This plan shall be submitted to the Engineer for approval, at least 15 days prior to constructing the test panel as specified herein.

At the Contractor's option air-entraining admixtures may be used in conformance with Section 90-4.07 "Optional Use of Air-entraining Admixtures" except the average air content of 3 successive tests shall not exceed 3 percent and no single test value shall exceed 5 percent.

In addition to the requirements for the use of admixtures in Section 90-4, "Admixtures," of the Standard Specifications, admixtures used in colored concrete shall be certified by both the color additive manufacturer and the concrete supplier. These written certifications shall be submitted to the Engineer at least 15 days prior to constructing the test panel.

A test panel at least 15 feet by 15 feet in size, with a depth of 6 inches, shall be successfully completed, at a location approved by the Engineer, at least 30 days before placing colored deck concrete. The test panel shall be constructed, finished and cured with the same materials, tools, equipment, and methods that will be used in placing the colored deck concrete. At

the completion of the curing period, the test panel shall exhibit a color that closely matches the specified color. If ordered by the Engineer, additional test panels shall be constructed, finished and cured until the specified color is obtained.

The approved test panel shall be the standard of comparison in determining the acceptability of colored concrete. Upon successful completion of all colored concrete, all test panels shall become property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Samples of cementitious materials and aggregates used in the approved test panel shall be retained. Cementitious materials and aggregates from the same sources used in the approved test panel shall be used for the colored concrete and sampled in conformance with California Test 201 for comparison of color and gradation with the material used for the approved test panel.

The Contractor shall monitor the water content, weight of cement, and size, weight, and color of aggregate to maintain consistency and accuracy of the mixed colored concrete. The Contractor shall schedule delivery of concrete to provide consistent mix times from batching until discharge. No water shall be added after a portion of the batch has been discharged.

When more than one concrete pump is used to place deck concrete, the Contractor shall designate which pumps shall receive colored concrete. The designated pumps shall receive only colored concrete throughout the concrete placement operation.

Consistent finishing practices shall be used to insure uniformity of texture and color. Surrounding exposed surfaces shall be protected from discoloring during placement and finishing operations of colored concrete.

Curing of the colored concrete shall conform to Section 90-7.03, "Curing Structures" of the Standard Specification and these special provisions. The curing compound used for curing colored concrete surfaces shall be clear or match the color of the colored concrete and shall be manufactured specifically for colored concrete. Curing compounds containing calcium chloride shall not be used. Curing compound shall be applied at a consistent time period after concrete finishing operations. The curing mediums used for the water method curing of colored concrete deck surfaces shall be certified by the color pigments manufacturer and approved by the Engineer. Surrounding exposed surfaces shall be protected from discoloring during curing operations of colored concrete.

Unless otherwise provided, colored concrete will be measured and paid for as structure concrete, bridge (color).

The contract price paid per cubic yard for structural concrete, bridge (color) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing the colored concrete work, complete in place, including test panels, as shown on the plans, and as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

**FALSEWORK.**--Falsework shall be designed and constructed in conformance with the requirements in Section 51-1.06, "Falsework," of the Standard Specifications and these special provisions.

Attention is directed to the reduced depth available for falsework at Sierra Avenue Overcrossing (Replacement), Bridge Number 54-537.

Attention is directed to "Railroad Relations and Insurance" of these special provisions for additional requirements for falsework over railroads.

In addition to the requirements in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications, the following requirements shall apply:

The time to be provided for the Engineer's review of the working drawings for specific structures, or portions thereof, shall be as follows:

Structure or Portion of Structure	Review Time - Weeks
Sierra Avenue OC Br. No. 54-537	5
Sierra Avenue OH Br. No. 54C-63	10

The first paragraph of Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications is amended to read:

The Contractor shall submit to the Engineer working drawings and design calculations for falsework proposed for use at bridges. For bridges where the height of any portion of the falsework, as measured from the ground line to the soffit of the superstructure, exceeds 14 feet; where any individual falsework clear span length exceeds 16 feet; or where provision for vehicular, pedestrian, or railroad traffic through the falsework is made; the drawings shall be signed by an engineer who is registered as a Civil Engineer in the State of California. Six sets of the working drawings and 2 copies

of the design calculations shall be furnished. Additional working drawings and design calculations shall be submitted when specified in "Railroad Relations and Insurance" of the special provisions.

The falsework drawings shall include details of the falsework removal operations showing the methods and sequences of removal and equipment to be used.

The seventeenth paragraph of Section 51-1.06A is amended to read:

Temporary bracing shall be provided, as necessary, to withstand all imposed loads during erection, construction and removal of any falsework. The falsework drawings shall show provisions for such temporary bracing or methods to be used to conform to this requirement during each phase of erection and removal. Wind loads shall be included in the design of such bracing or methods.

The fifth paragraph of Section 51-1.06A(1), "Design Loads," of the Standard Specifications is amended to read:

The minimum horizontal load to be allowed for wind on heavy-duty steel shoring or steel pipe column falsework having a vertical load carrying capacity exceeding 30 kips per leg or column shall be the sum of the products of the wind impact area, shape factor, and the applicable wind pressure value for each height zone. The wind impact area is the total projected area of all the elements in the tower face or falsework bent normal to the direction of the applied wind. The shape factor shall be taken as 2.2 for heavy-duty shoring and 1.0 for pipe column falsework. Wind pressure values shall be determined from the following table:

Height Zone (Feet above ground)	Wind Pressure Value	
	Shores or Columns Adjacent to Traffic	At Other Locations
0 to 30	20 psf	15 psf
30 to 50	25 psf	20 psf
50 to 100	30 psf	25 psf
Over 100	35 psf	30 psf

The first 2 sentences of the sixth paragraph of Section 51-1.06A(1), "Design Loads," of the Standard Specifications are amended to read:

The minimum horizontal load to be allowed for wind on all other types of falsework, including falsework supported on heavy-duty shoring or pipe column falsework, shall be the sum of the products of the wind impact area and the applicable wind pressure value for each height zone. The wind impact area is the gross projected area of the falsework and any unrestrained portion of the permanent structure, excluding the areas between falsework bents or towers where diagonal bracing is not used.

The second entry under "Timber" in the second paragraph of Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications is amended to read:

Compression parallel to the grain .... psi, but not to exceed 1,600 psi.

The third entry under "Timber" in the second paragraph of Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications is amended to read:

Flexural stress ..... 1,800 psi, 1,500 psi for members with a nominal depth of 8 inches or less.

The last paragraph under "Timber" in the second paragraph of Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications is amended to read:

Timber connections shall be designed in conformance with the procedures, stresses and loads permitted in the Falsework Manual as published by the Department of Transportation, Division of Structures, Office of Structure Construction.

The third sentence in the first paragraph of Section 51-1.06B, "Falsework Construction," of the Standard Specifications is amended to read:

When manufactured assemblies are used in falsework, the Contractor shall furnish to the Engineer a letter of certification which certifies that all components of these manufactured assemblies are used in conformance with the manufacturer's recommendations.

The third paragraph of Section 51-1.06B "Falsework Construction" of the Standard Specifications is amended to read:

When falsework is supported on piles, the piles shall be driven and the actual bearing value assessed in conformance with the provisions in Section 49, "Piling."

For falsework piles with a calculated loading capacity greater than 100 tons, the Contractor shall conduct dynamic monitoring of pile driving and conduct penetration and bearing analyses based on a wave equation analysis. These analyses shall be signed by an engineer who is registered as a Civil Engineer in the State of California and submitted to the Engineer prior to completion of falsework erection.

The first paragraph of Section 51-1.06C, "Removing Falsework," of the Standard Specifications is amended to read:

Falsework supporting any span of a simple span bridge shall not be released before 10 days after the last concrete, excluding concrete above the bridge deck, has been placed. Unless otherwise permitted by the Engineer, falsework supporting any span of a continuous or rigid frame bridge shall not be released before 10 days after the last concrete, excluding concrete above the bridge deck, has been placed in that span and in the adjacent portions of each adjoining span for a length equal to at least 1/2 the length of the span where falsework is to be released.

Section 51-1.06C, "Removing Falsework," of the Standard Specifications is amended by adding the following after the seventh paragraph:

Unless otherwise specified, removing falsework supporting any span of structural members subject to bending, shall conform to the requirements for removing falsework supporting any span of a simple span bridge.

Temporary crash cushion modules, as shown on the plans and conforming to the provisions in "Temporary Crash Cushion Module," elsewhere in these special provisions, shall be installed at the approach end of temporary railings which are located less than 15 feet from the edge of a traffic lane. For two-way traffic openings, temporary crash cushion modules shall be installed at the departing end of temporary railings which are located less than 6 feet from edge of a traffic lane.

**COST REDUCTION INCENTIVE PROPOSALS FOR CAST-IN-PLACE PRESTRESSED BOX GIRDER BRIDGES.**—Except as provided herein, cast-in-place prestressed box girder bridges shall be constructed in conformance with the details shown on the plans and the provisions in Sections 50, "Prestressing Concrete," and 51, "Concrete Structures," of the Standard Specifications

If the Contractor submits cost reduction incentive proposals for cast-in-place prestressed box girder bridges, the proposals shall be in conformance with the provisions of Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications and these special provisions.

The Engineer may reject any proposal which, in his judgment, may not produce a structure which is at least equivalent to the planned structure.

At the time the cost reduction incentive proposal (CRIP) is submitted to the Engineer, the Contractor shall also submit 4 sets of the proposed revisions to the contract plans, design calculations, and calculations from an independent checker for all changes involved in the proposal, including revisions in camber, predicted deck profile at each construction stage, and falsework requirements to the Office of Structure Design, Documents Unit, P.O. Box 942874, Sacramento, CA 94274-0001 (1801 30th Street, Sacramento, CA 95816), telephone (916) 227-8230. When notified in writing by the Engineer, the Contractor shall submit 12 sets of the CRIP plan revisions and calculations to said Office of Structure Design for final approval and use during construction. The calculations must verify that all requirements are satisfied. The CRIP plans and calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California.

The CRIP plans shall be either 11" x 17" or 22" x 34" in size and each CRIP plan sheet and calculation sheet shall include the State assigned designations for the contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Post Mile. Each CRIP plan sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.

Within 3 weeks after final approval of the CRIP plan sheets, one set of the corrected good quality prints on 20 pound (minimum) bond paper (22" x 34" in size) of all CRIP plan sheets prepared by the Contractor for each CRIP shall be furnished to the Office of Structure Design, Documents Unit.

Each CRIP shall be submitted prior to completion of 25 percent of contract working days and sufficiently in advance of the start of the work that is to be revised by the CRIP to allow time for review by the Engineer and correction by the Contractor of the CRIP plans and calculations without delaying the work. The Contractor shall allow a minimum of 10 weeks for the review of a CRIP. In the event that several CRIPs are submitted simultaneously, or an additional CRIP is submitted for review before the review of a previously submitted CRIP has been completed, the Contractor shall designate the sequence in which the CRIPs are to be reviewed. In such event, the time to be provided for the review of any proposal in the sequence shall be not less than the review time specified herein for that proposal, plus two weeks for each CRIP of higher priority which is still under review.

Should the review not be complete by the date specified in the Contractor's CRIP, or such other date as the Engineer and Contractor may subsequently have agreed to in writing and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in review of CRIP plans and calculations, an extension of time commensurate with the delay in completion of the work thus caused will be granted as provided in Section 8-1.07, "Liquidated Damages," of the Standard Specifications except that the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications shall not apply.

Permits and approvals required of the State have been obtained for the structures shown on the plans. Any proposal which results in a deviation in configuration may require new permits or approvals. The Contractor shall be responsible for obtaining the new permits and approvals before the Engineer will reach a decision on the proposal. Delays in obtaining permits and approvals will not be reason for granting an extension of contract time.

All proposed modifications shall be designed in conformance with the bridge design specifications and procedures currently employed by the Department. The proposal shall include all related, dependent or incidental changes to the structure and other work affected by the proposal. The proposal will be considered only when it includes all aspects of the design changes for the entire structure. Any changes, such as but not limited to, additional reinforcement and changes in location of reinforcement, necessary to implement the CRIP after approval by the Engineer, shall be made at the Contractor's expense.

Modifications may be proposed in (1) the thickness of girder stems and deck slabs, (2) the number of girders, (3) the deck overhang dimensions as specified herein, (4) the amount and location of reinforcing steel, (5) the amount and location of prestressing force in the superstructure, and (6) the number of hinges, except that the number of hinges shall not be increased. The strength of the concrete used may be increased but the strength employed for design or analysis shall not exceed 6,000 psi.

Modifications proposed to the minimum amount of prestressing force which must be provided by full length draped tendons are subject to the requirements in "Prestressing Concrete" of these special provisions.

No modifications will be permitted in (1) the foundation type, (2) the span lengths or (3) the exterior dimensions of columns or bridge superstructure, except that the overhang dimension from face of exterior girder to the outside edge of roadway deck may be uniformly increased or decreased by 25 percent on each side of the box girder section. Fixed connections at the tops and bottoms of columns shown on the plans shall not be eliminated.

The Contractor shall be responsible for determining construction camber and obtaining the final profile grade as shown on the plans.

The Contractor shall reimburse the State for the actual cost of investigating CRIPs for cast-in-place prestressed box girder bridges submitted by the Contractor. The Department will deduct such cost from any moneys due, or that may become due, the Contractor under the contract, regardless of whether or not the proposal is approved or rejected.

**PERMANENT STEEL DECK FORMS.**--Forms for the deck slabs between girders of the Sierra Avenue Overhead (Widen), Bridge Number 54C-63, at the option of the Contractor, shall either be constructed and removed as provided in Section 51-1.05, "Forms," of the Standard Specifications, or shall be constructed and left in place in conformance with the requirements of these special provisions.

Permanent steel deck forms and supports shall be steel conforming to ASTM Designation: A653/A653M (Designation SS, Grades 33 through 80) having a coating designation G165. The forms shall be mortar-tight, true to line and grade, and of sufficient strength to support the loads applied.

Detailed working drawings for forms shall be submitted to the Engineer for approval as provided in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. Three sets of drawings shall be submitted. These drawings shall show the grade of steel, the physical and section properties for all deck members, the method of support and grade adjustment, accommodation for skew, and methods of sealing against grout leaks.

Working drawings shall be submitted sufficiently in advance of the start of the affected work to allow time for review by the Engineer and correction by the Contractor of the drawings without delaying the work. Such time shall be proportional to the complexity of the work but in no case shall such time be less than 3 weeks after complete drawings and all support data are submitted.

The design of permanent steel deck forms shall be based on the combined dead load of the forms, reinforcement and plastic concrete plus an allowance for all anticipated construction loads. The allowance for construction loads shall be not

less than 50 pounds per square foot. The combined dead load shall be assumed to be not less than 160 pounds per cubic foot for normal concrete and not less than 130 pounds per cubic foot for lightweight concrete.

Physical design properties shall be computed in accordance with the requirements of the AISI specification for the "Design of Cold Formed Steel Structural Members."

The maximum allowable stresses and deflections used in the design of steel forms shall be as follows:

Tensile stress shall not exceed 0.725 of the specified yield strength of the material furnished or 36,000 pounds per square inch.

Deflection due to dead load shall not exceed 1/180 of form span or 1/2 inch, whichever is less. In no case shall the dead load for deflection calculations be less than 120 pounds per square foot total.

Form camber, used at the option of the Contractor, shall be based on the actual dead load condition. Camber shall not be used to compensate for deflection in excess of the allowable limits.

The design span of the form sheets shall be the clear span of the form plus 2 inches measured parallel to the form flutes.

Permanent steel deck forms shall not be used for those sections of deck slabs that contain a longitudinal expansion joint unless additional supports are placed under the joint.

Permanent steel deck forms shall not interfere with the movement at deck expansion joints.

The clearance between the surface of permanent forms and any bar reinforcement shall be not less than one inch, and the configuration of the forms shall be such that the weight of deck slab is not more than 110 percent of the weight of the total deck slab as dimensioned on the plans.

Permanent steel deck forms shall be installed in accordance with the approved working drawings.

Form sheets shall not rest directly on the top of the girder flanges. Sheets shall be securely fastened to form supports and shall have a minimum bearing length of one inch at each end. Form supports shall be placed in direct contact with the flange of the girder. Attachment of supports shall be made by bolts, clips, or other approved means.

Transverse deck construction joints shall be located at the bottom of a flute and 1/4 inch weep holes shall be field drilled at not less than 12 inches on center along the line of the joint.

Any permanently exposed galvanized form surfaces that are abraded or damaged prior to installation shall be repaired by thoroughly wire brushing the damaged areas and removing all loose and cracked coating, after which the cleaned areas shall be painted with 2 applications of unthinned zinc-rich primer (organic vehicle type) conforming to the provisions in Section 91, "Paint," of the Standard Specifications. Aerosol cans shall not be used. Minor heat discoloration in area of welds need not be repaired.

**DECK CLOSURE POURS.**--Where deck closure pour is shown on the plans, reinforcement protruding into the closure space and forms for the closure pour shall conform to the following:

During the time of placement of concrete in the deck, other than for the closure pour itself, reinforcing steel which protrudes into the closure space shall be completely free from any connection to the reinforcing steel, concrete, or other attachments of the adjacent structure, including forms. The reinforcing steel shall remain free of any connection for a period of not less than 24 hours following completion of the pour.

Forms for the closure pour shall be supported from the superstructure on both sides of the closure space.

**SLIDING BEARINGS.**--Sliding bearings consisting of elastomeric bearing pads lubricated with grease and covered with sheet metal shall conform to the following requirements:

Grease shall conform to the requirements of Military Specification: MIL-S-8660. A uniform film of grease shall be applied to the upper surface of the pads prior to placing the sheet metal.

Sheet metal shall be commercial quality galvanized sheet steel. The sheet metal shall be smooth and free of kinks, bends, or burrs.

Construction methods and procedures shall prevent grout or concrete seepage into the sliding bearing assembly.

**ELASTOMERIC BEARING PADS.**--Elastomeric bearing pads shall conform to the provisions in Section 51-1.12H, "Elastomeric Bearing Pads," of the Standard Specifications and these special provisions.

The fifth paragraph of Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearings," of the Standard Specifications is amended to read:

The peel strength test will be performed after immersing the sample in water for a minimum of 10 days. The bond between elastomer and fabric shall be such that when a sample is tested for separation, it shall have a minimum peel strength of 30 pounds per inch when tested in accordance with California Test 663.

The last 2 sentences of the tenth paragraph of Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearings," of the Standard Specifications are amended to read:

Pads shall be available for sampling at least 4 weeks in advance of intended use. All sample pads for testing shall be furnished by the Contractor at the Contractor's expense.

The fifth subparagraph of the first paragraph of Section 51-1.12H(2), "Steel Reinforced Elastomeric Bearings," of the Standard Specifications is amended to read:

One sample bearing shall be furnished to the Engineer from each lot of bearings to be furnished for the contract. Samples shall be available at least 3 weeks in advance of intended use. The sample bearing shall be one of the following:

BEARING PAD THICKNESS AS SHOWN ON THE PLANS	SAMPLE BEARING
2 inches or less	Smallest complete bearing shown on the plans.
Greater than 2 inches	* 2.25±0.125 inch thick sample not less than 8 inches by 12 inches in plan and cut by the manufacturer from the center of one of the thickest complete bearings.

\* The sample bearing plus remnant parts of the complete bearing shall be furnished to the Engineer.

**MEASUREMENT AND PAYMENT.**--Measurement and payment for concrete in structures shall conform to the provisions in Sections 51-1.22, "Measurement," and 51-1.23, "Payment," of the Standard Specifications and these special provisions.

The seventh paragraph of Section 51-1.22, "Measurement," of the Standard Specifications is deleted.

The thirteenth paragraph of Section 51-1.23, "Payment," of the Standard Specifications is amended to read:

Full compensation for waterstops, strip waterstops, and neoprene strip shall be considered as included in the contract price paid per cubic yard for the various items of concrete work involved and no separate payment will be made therefor.

Full compensation for furnishing and installing access opening covers in soffits of new cast-in-place box girder bridges shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no separate payment will be made therefor.

Full compensation for furnishing and constructing permanent steel deck forms shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no additional compensation will be allowed therefor.

#### **10-1.45 PRECAST PRESTRESSED CONCRETE BRIDGE MEMBERS**

Precast prestressed concrete members shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

The top surface of the member shall be given a coarse texture by brooming with a stiff bristled broom or by other suitable devices that will result in uniform transverse scoring, in advance of curing operations.

The anticipated deflection and method of accommodation of deflection of precast prestressed concrete girders, prior to the time the deck concrete is placed, shall be shown on the working drawings in conformance with the provisions Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The deflection shall include the following:

1. Anticipated upward deflection caused by the prestressing forces.
2. Downward deflection caused by the dead load of the girder.

3. Deflection caused by the creep and shrinkage of the concrete for the time interval between the stressing of the girders and the planned placement of the deck.

Such deflection shall be substantiated by calculations that consider the ages of the girder concrete at the time of stressing and the Contractor's planned placement of the deck. All deflection calculations shall be based on the concrete producer's estimate of the modulus of elasticity at the applicable concrete age.

Adjustments to accommodate girder deflections, which occur prior to the time the deck concrete is placed, may include revisions in bearing seat elevations, but any such adjustments shall be limited by the following conditions:

- A. The minimum permanent vertical clearance under the structure as shown on the plans shall not be reduced.
- B. The profile grade and cross slope of the deck shall not be changed.
- C. A minimum of one inch of deck slab concrete between the top of the precast girders and the deck slab reinforcement shall be maintained.

Girders with unanticipated girder deflection and which cannot comply with conditions A, B and C will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials," of the Standard Specifications.

Adjustments to accommodate girder deflections will not be considered a change in dimensions. Full compensation for any increase in the cost of construction, including any increase in the quantity of deck or bearing seat concrete, resulting from adjustments to accommodate girder deflections shall be considered as included in the contract price paid for the various items of work involved, and no additional compensation will be allowed therefor.

Temporary lateral bracing shall be provided for girders located over the railroad property at Sierra Avenue Overhead (Br. No. 54C-63). The bracing shall be installed at each end of each girder, except notched ends, prior to the release of the erection equipment from the girder and shall remain in place until 2 days after the concrete diaphragms have been placed. Said bracing shall be adequate to prevent overturning of the girders prior to completion of the work and as a minimum shall be capable of resisting a lateral force of 15 pounds per square foot of girder side area applied laterally in either direction to the top of the girder. Girder erection shall not be started until the temporary lateral bracing proposed for use by the Contractor has been approved by the Engineer.

**TEMPORARY SUPPORT DESIGN AND DRAWINGS.**--The temporary support shall be designed and constructed in conformance with the provisions in Sections 51-1.06, "Falsework," of the Standard Specifications. The Contractor shall submit to the Engineer working drawings and design calculations for the temporary supports. Such drawings and design calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The temporary support working drawings and design calculations shall conform to the Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The number of sets of drawings and design calculations for temporary supports shall be the same as specified for falsework working drawings in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications and these special provisions. The time to be provided for the Engineer's review of the working drawings for the temporary support drawings, shall be 10 weeks.

Full compensation for temporary support shall be considered as included in the contract unit price paid for erect precast prestressed concrete girder and no separate payment will be made therefor.

#### **10-1.46 STRUCTURE APPROACH SLABS (Type N Modified) and (Type N Modified) (Color)**

This work shall consist of constructing reinforced concrete approach slabs, structure approach drainage system and treated permeable base at structure approaches in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

**GENERAL.**--Attention is directed to the section, "Engineering Fabrics," of these special provisions.

#### **STRUCTURE APPROACH DRAINAGE SYSTEM**

**GEOCOMPOSITE DRAIN.**--Geocomposite drain shall consist of a manufactured core not less than 0.25-inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate, through the drainage void, of at least 2.0 gallons per minute per foot width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 3,500 pounds per square foot.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain produces the required flow rate and complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates and the externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.

Filter fabric for the geocomposite drain shall conform to the provisions for fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications.

The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.

The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having nonconnecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.

The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 3 inches at all joints and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.

Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a 6-inch overlap.

**PLASTIC PIPE.**--Plastic pipe shall conform to the provisions for pipe for edge drains and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.

**DRAINAGE PADS.**-- Concrete for use in drainage pads shall be minor concrete, except the concrete shall contain not less than 470 pounds of cement per cubic yard.

**TREATED PERMEABLE BASE AT BOTTOM OF GEOCOMPOSITE DRAINS.**--Treated permeable base to be placed around the slotted plastic pipe at the bottom of geocomposite drains shall conform to the provisions in "Treated Permeable Base Under Approach Slabs." If asphalt treated permeable base is used, it shall be placed at a temperature of not less than 180° F. nor more than 230° F.

The filter fabric to be placed over the treated permeable base at the bottom of geocomposite drains shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications.

**ENGINEERING FABRICS.**--Filter fabric to be placed between the structure approach embankment material and the treated permeable base shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications and these special provisions:

The subgrade to receive the filter fabric, immediately prior to placing, shall conform to the compaction and elevation tolerance specified for the material involved.

Filter fabric shall be aligned, handled and placed in a wrinkle-free manner in conformance with the manufacturer's recommendations.

Adjacent borders of the filter fabric shall be overlapped from 12 to 18 inches or stitched. The preceding roll shall overlap the following roll in the direction the material is being spread or shall be stitched. When the fabric is joined by stitching, it shall be stitched with yarn of a contrasting color. The size and composition of the yarn shall be as recommended by the fabric manufacturer. The stitches shall number 5 to 7 per inch of seam.

Equipment or vehicles shall not be operated or driven directly on the filter fabric.

**TREATED PERMEABLE BASE UNDER APPROACH SLAB.**--Treated permeable base under structure approach slabs shall consist of constructing either an asphalt treated permeable base or a cement treated permeable base in conformance with Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions:

The type of treatment, asphalt or cement, to be used shall be at the option of the Contractor.

Not less than 30 days prior to the start of placing the treated permeable base the Contractor shall notify the Engineer, in writing, which type of treated permeable base will be furnished. Once the Contractor has notified the Engineer of the selection the type to be furnished shall not be changed without a prior written request to do so and approval thereof in writing by the Engineer.

Asphalt treated permeable base shall be placed at a temperature of not less than 200° F. nor more than 250° F. Material stored in excess of 2 hours shall not be used in the work.

Asphalt treated permeable base material may be spread in one layer. It shall be compacted with a vibrating shoe type compactor or rolled with a roller weighing not less than 1 1/2 tons nor more than 5 tons. Rolling shall begin as soon as the mixture has cooled sufficiently to support the weight of the rolling equipment without undue displacement.

Cement treated permeable material may be spread in one layer. The material shall be compacted with either a vibrating shoe type compactor or with a steel-drum roller weighing not less than 1 1/2 tons nor more than 5-tons. Compaction shall follow within one-half hour after the spreading operation and shall consist of 2-complete coverages of the treated material.

**APPROACH SLABS:**

Concrete for use in approach slabs shall contain not less than 658 pounds of cement per cubic yard.

Attention is directed to "Colored Concrete" elsewhere in these special provisions.

Miscellaneous steel parts shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications. Except as listed herein, structure approach slabs shall be cured for not less than 5 days prior to opening to traffic.

At the following location, structure approach slabs may be constructed, at the option of the Contractor, using concrete with a non-chloride Type C chemical admixture conforming to these special provisions:

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Portland cement for use in concrete using a non-chloride Type C chemical admixture shall be Type II Modified, Type II Prestress, or Type III. Type II Modified and Type III cement shall conform to the provisions in Section 90-2.01, "Portland Cement," of the Standard Specifications. Type II Prestress cement shall conform to the requirements of Type II Modified cement, except the mortar containing the portland cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not contract in air more than 0.053 percent.

The non-chloride Type C chemical admixture, approved by the Engineer, shall conform to the requirements of ASTM Designation: C 494 and Section 90-4, "Admixtures," of the Standard Specifications.

The concrete with non-chloride Type C chemical admixture shall be prequalified prior to placement in conformance with the provisions for prequalification of concrete specified by compressive strength in Section 90-9.01, "General," of the Standard Specifications and the following:

Immediately after fabrication of the 5 test cylinders, the cylinders shall be stored in a temperature medium of 70 ± 3 degrees F until the cylinders are tested.

The 6-hour average strength of the 5 test cylinders shall not be less than 850 psi. No more than 2 test cylinders shall have a strength of less than 800 psi.

The top surface of approach slabs shall be finished in conformance with the provisions in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications. Edges of slabs shall be edger finished.

Approach slabs except as required in "Colored Concrete" of these special provisions, shall be cured with pigmented curing compound (1) in conformance with the provisions for curing structures in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

Structure approach slabs constructed using concrete with a non-chloride Type C chemical admixture shall be cured for not less than 6 hours prior to opening to public traffic. The curing period shall be considered to begin at the start of discharge of the last truck load of concrete to be used in the slab.

If the ambient temperature is below 65° F during the curing period for approach slabs using concrete with a non-chloride Type C chemical admixture, an insulating layer or blanket shall cover the surface. The insulation layer or blanket shall have an R-value rating given in the table below. At the Contractor's option, a heating tent may be used in lieu of or in combination with the insulating layer or blanket.

TEMPERATURE RANGE DURING CURING PERIOD	R-VALUE, MINIMUM
55° F. through 64° F.	1
45° F. through 54° F.	2
40° F. through 44° F.	3

**JOINTS.--**Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12D, "Sheet Packing, Preformed Pads and Board Fillers," of the Standard Specifications.

Type AL joint seals shall conform to the provisions in Section 51-1.12F, "Sealed Joints" of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods.

The pourable seal between the steel angle and concrete barrier shall conform to the requirements for Type A and AL seals in Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods. Immediately prior to placing the seal, the joint shall be thoroughly

cleaned, including abrasive blast cleaning of the concrete surfaces, so that all foreign material and concrete spillage are removed from all joint surfaces. Joint surfaces shall be dry at the time the seal is placed.

**MEASUREMENT AND PAYMENT.**--Structural concrete, approach slab (Type N Modified) and structural concrete, approach slab (Type N Modified) (Color) will be measured and paid for in conformance with the provisions in Sections 51-1.22, "Measurement," and 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for the structure approach drainage system, at all abutment locations, including geocomposite drain, plastic pipe, and drainage pads, treated permeable base, filter fabric, miscellaneous metal and pourable seals shall be considered as included in the contract price paid per cubic yard for structural concrete, approach slab of the type shown in the Engineer's Estimate and no additional compensation will be allowed therefor.

Full compensation for colored concrete at approach slab locations shown in the plans shall be considered as included in the contract price paid per cubic yard for structural concrete, approach slab (Type N Modified) (Color) and no additional compensation will be allowed therefor.

#### **10-1.47 DRILL AND BOND DOWELS**

Drilling and bonding dowels shall conform to the details shown on the plans, the provisions in Section 83-2.02D(1), "General," of the Standard Specifications and these special provisions.

Dowels shall conform to the provisions for bar reinforcement in "Reinforcement" elsewhere in these special provisions.

If reinforcement is encountered during drilling, before specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

Unless otherwise provided, dowels to be bonded into drilled holes will be paid for as bar reinforcing steel (bridge).

Unless otherwise provided, drilling and bonding dowels will be measured and paid for by the linear foot determined by the number and the required depth of holes as shown on the plans, or as ordered by the Engineer.

The contract price paid per linear foot for drill and bond dowel shall include full compensation for furnishing all labor, materials (except reinforcing steel dowels), tools, equipment, and incidentals, and for doing all the work involved in drilling the holes, including coring through reinforcement when approved by the Engineer, and bonding the dowels, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.48 SEALING JOINTS**

Joints in concrete bridge decks and joints between concrete structures and concrete approach slabs shall be sealed in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

When ordered by the Engineer, a joint seal larger than called for by the Movement Rating shown on the plans shall be furnished and installed. Payment to the Contractor for furnishing the larger seal and for saw cutting the increment of additional depth of groove required will be determined as provided in Section 4-1.03, "Changes," of the Standard Specifications.

**MATERIALS.**--For Type A seals a pourable 2-component polyurethane sealant that meets all of the test requirements identified in Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications and, in addition, has a minimum pot life of 10 minutes at a temperature of 90° F. may be used, at the option of the Contractor. The 2 components shall be thoroughly mixed in the ratio recommended by the manufacturer with power driven agitators.

**INSTALLATION.**--The fifth subparagraph of the second paragraph of Section 51-1.12F(3) (b), "Type B Seal," of the Standard Specifications is amended to read:

The seal shall be furnished full length for each joint with no more than one shop splice in any 60-foot length of seal.

One field splice per joint may be made at locations and by methods approved by the Engineer. The seals are to be manufactured full length for the intended joint, then cut at the approved splice section and rematched before splicing. The Contractor shall submit splicing details, prepared by the joint seal manufacturer, to the Engineer for approval prior to beginning splicing work.

The Contractor shall demonstrate the adequacy of the procedures to be used in the work before installing seal in the joints.

Shop splices and field splices shall have no visible offset of exterior surfaces, and shall show no evidence of bond failure.

## 10-1.49 REFINISHING BRIDGE DECKS

Surfaces of bridge decks that are exposed when existing railings, curbs, or sidewalks are removed shall be prepared and refinished flush with the adjoining deck surface with portland cement concrete or rapid setting concrete, at the option of the Contractor, in accordance with the requirements in these special provisions.

The exact area to be refinished will be designated by the Engineer.

Attention is directed to "Public Safety" of these special provisions.

When work is being performed within 10 feet of a traffic lane or performed over traffic, dust and residue from deck preparation and cleaning shall be removed or controlled by vacuum, water spray, or shield methods approved by the Engineer.

Concrete shall be removed without damage to concrete that is to remain in place. Damage to concrete which is to remain in place shall be repaired to a condition satisfactory to the Engineer.

The concrete in deck areas to be refinished shall be removed to a depth of approximately 3/4-inch below the adjoining deck surface. A 3/4-inch deep saw cut shall be made along the perimeter of areas prior to removing concrete.

Existing areas of the deck more than 3/4-inch below the adjoining deck surface shall be prepared by removing not less than 1/4-inch of surface material to expose sound aggregates.

Concrete removal may be done by abrasive blast cutting, abrasive sawing, impact tool cutting, machine rotary abrading, or other methods, all to be approved by the Engineer. Cut areas shall be cleaned free of dust and all other loose and deleterious materials by brooming, abrasive blast cleaning and high pressure air jets. Equipment shall be fitted with suitable traps, filters, drip pans or other devices to prevent oil or other deleterious matter from being deposited on the deck.

Existing reinforcement, exposed during the removal of concrete, that is to remain in place shall be protected from damage.

Steel dowels shall be cut off flush with the existing concrete or cut off at the bottom of concrete removal, whichever is lower. Patching around or over dowels in sound concrete will not be required. Existing voids around dowels, where refishing is not required, shall be chipped back to sound concrete, the dowels removed one inch below the finished surface and the hole filled with rapid setting concrete.

Refinishing isolated high areas in the existing deck may be accomplished by cutting the concrete down to be flush with the plane of the adjoining deck surface by abrasive sawing, grinding, impact tool cutting, or other methods subject to the approval of the Engineer. When grinding is performed to bring the deck concrete flush with the adjoining deck surface, the resulting surface shall have a coefficient of friction of not less than 0.35 as determined by California Test 342.

**Portland Cement Concrete.**—An epoxy adhesive shall be applied to the surfaces to be refinished before placing the portland cement concrete. Immediately prior to applying the adhesive, the area to receive the adhesive shall be cleaned by abrasive blasting and blown clean by compressed air to remove dust and any other loose material. The area to be covered shall be surface dry and the ambient temperature shall be 50°F or above when the adhesive is applied.

The epoxy adhesive shall be furnished and applied in conformance with the provisions in Sections 95-1, "General," and 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete," of the Standard Specifications. Whenever the ambient temperature is below 65°F., Type II epoxy shall be used. The exact rate of applying epoxy adhesive shall be as directed by the Engineer. The adhesive shall be worked onto the surface with stiff brushes or equal.

Portland cement concrete used to fill prepared areas shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and the following:

The concrete shall contain a minimum of 658 pounds of portland cement per cubic yard.

The amount of free water used in concrete shall not exceed 280 pounds per cubic yard.

The aggregate shall contain between 50 and 55 percent fine aggregate and the remainder shall be pea gravel. The grading of pea gravel shall be such that 100 percent passes the 1/2 inch screen and not more than 5 percent passes the No. 16 sieve, unless a larger size is ordered by the Engineer.

Admixtures shall be furnished and used if directed by the Engineer.

Immediately after depositing on the newly placed adhesive, the portland cement concrete shall be thoroughly consolidated until all voids are filled and free mortar appears on the surface and then struck off to the required grade.

Concrete shall be cured as provided in Section 90-7.03, "Curing Structures," of the Standard Specifications.

No loads of any kind shall be applied to the portland cement concrete for at least 7 days after placing, unless otherwise permitted by the Engineer.

**Rapid Setting Concrete.**—The concrete used to fill the prepared areas shall be a high-strength material consisting of either magnesium phosphate concrete, modified high alumina based concrete, or portland cement based concrete. Magnesium phosphate concrete shall conform to the requirements for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and these special provisions. Modified high alumina based concrete and portland

cement based concrete shall be water activated and shall conform to the requirements for single component (water activated) magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and the following:

A clean uniform rounded aggregate filler may be used to extend the concrete. The moisture content of the aggregate shall not exceed 0.5 percent. Grading of the aggregate shall conform to the following:

Sieve Size	Percentage Passing
1/2 "	100
No. 16	0-5

The amount of aggregate filler shall conform to the manufacturer's recommendation, but in no case shall the concrete strengths be less than that specified for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications.

Mixing of components of dual component (with a prepackaged liquid activator) magnesium phosphate shall be by complete units, supplied by the manufacturer. Portions of units shall not be used. Water shall not be added to dual component magnesium phosphate.

Immediately prior to applying the rapid setting concrete, the surface shall be dry and blown clean by compressed air to remove accumulated dust and any other loose material. If the surface becomes contaminated at any time prior to placing the concrete, the surface shall be cleaned by abrasive blasting. The surface temperature of the areas to be covered shall be 40°F or above when the concrete is applied. Methods proposed to heat said surfaces are subject to approval by the Engineer. The surface for the magnesium phosphate concrete shall be dry. The surfaces for modified high alumina based concrete or portland cement based concrete may be damp but not saturated.

Magnesium phosphate concrete shall not be mixed in containers or worked with tools containing zinc, cadmium, aluminum or copper. Modified high alumina based concrete shall not be mixed in containers or worked with tools containing aluminum.

Retempering concrete will not be permitted. Finishing tools that are cleaned with water shall be thoroughly dried before working the concrete.

When placing concrete on slopes exceeding 5 percent, the Engineer may require the Contractor to provide a flow controlled modified material.

Modified high alumina based concrete and portland cement based concrete shall be cured in conformance with the provisions in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. Magnesium phosphate concrete shall not be cured.

Unless otherwise permitted in writing by the Engineer, traffic shall not be permitted on the new concrete until at least 24 hours after final set.

**Finishing Requirements.**—In advance of curing operations, the surface of the concrete shall be textured by brooming with a stiff bristled broom or by other suitable devices which will result in uniform scoring. Brooming shall be performed transversely. The operation shall be performed at a time and in a manner to produce a hardened surface having a uniform texture and a coefficient of friction of not less than 0.35 as determined by California Test 342.

Refinished surfaces that are found to have a coefficient of friction less than 0.35 shall be ground or grooved by the Contractor at his expense in conformance with the applicable requirements in Section 42, "Groove and Grind Pavement," of the Standard Specifications.

In the longitudinal direction, refinished surfaces shall not vary more than 0.02-foot from the lower edge of a 12-foot straightedge. The refinished surface shall be flush with the existing adjoining surface.

**Measurement and Payment.**—No adjustment of compensation will be made for any increase or decrease in the quantity of refinish bridge deck, regardless of the reason for such increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to the contract item of refinish bridge deck.

The quantity in square feet of refinish bridge deck to be paid for will be determined from the lengths and widths of the refinished areas, measured horizontally, plus 0.2-square foot for patching around each dowel.

The contract price paid per square foot for refinish bridge deck shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in refinishing areas of the existing bridge deck (including cutting steel dowels), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

## 10-1.50 REINFORCEMENT

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

The first paragraph of Section 52-1.02A, "Bar Reinforcement," of the Standard Specifications is amended to read:

**52-1.02A Bar Reinforcement.**—Reinforcing bars shall be low-alloy steel deformed bars conforming to the requirements in ASTM Designation: A 706/A 706M, except that deformed or plain billet-steel bars conforming to the requirements in ASTM Designation: A 615/A 615M, Grade 40 or 60, may be used as reinforcement in the following:

1. Slope and channel paving;
2. Minor structures;
3. Sign and signal foundations (pile and spread footing types);
4. Roadside rest facilities; and
5. Concrete barrier Type 50 and Type 60 series and temporary railing.

Deformations specified in ASTM Designation: A 706/A 706M will not be required on bars used as spiral or hoop reinforcement in structures and concrete piles.

Section 52-1.02C, "Welded Wire Fabric," of the Standard Specifications is amended to read:

**52-1.02C Welded Wire Fabric.**—Welded wire fabric shall be either plain or deformed conforming to the requirements in ASTM Designation: A 185 or ASTM Designation: A 497, respectively.

Section 52-1.02D, "Reinforcing Wires and Plain Bars," of the Standard Specifications is amended to read:

**52-1.02D Reinforcing Wire.**—Wire used as reinforcement in structures and concrete piles, as shown on the plans, shall be cold drawn steel wire conforming to the specifications of ASTM Designation: A 82.

The third paragraph of Section 52-1.04, "Inspection," of the Standard Specifications is amended to read:

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall also be furnished for each shipment of epoxy-coated bar reinforcement or wire reinforcement certifying that the coated reinforcement conforms to the requirements in ASTM Designation: A 775/A 775M or A 884/A 884M, respectively, and the provisions in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications. The Certificate of Compliance shall include all the certifications specified in ASTM Designation: A 775/A 775M or A 884/A 884M, respectively, and a statement that the coating material has been prequalified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

The last paragraph of Section 52-1.07, "Placing," of the Standard Specifications is amended to read:

Whenever a portion of an assemblage of bar reinforcing steel that is not encased in concrete exceeds 20 feet in height, the Contractor shall submit to the Engineer for approval, in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," working drawings and design calculations for the temporary support system to be used. The working drawings and design calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The temporary support system shall be designed to resist all expected loads and shall be adequate to prevent collapse or overturning of the assemblage. If the installation of forms or other work requires revisions to or temporary release of any portion of the temporary support system, the working drawings shall show the support system to be used during each phase of construction. The minimum horizontal wind load to be applied to the bar reinforcing steel assemblage, or to a combined assemblage of reinforcing steel and forms, shall be not less than 20 pounds per square foot on the gross projected area of the assemblage.

The sixth paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Except when otherwise specified, mechanical lap splicing shall conform to the details shown on the plans, the requirements for mechanical butt splices as specified in this Section 52-1.08, and Sections 52-1.08C, "Mechanical Butt Splices," 52-1.08D, "Qualification of Welding and Mechanical Splicing," and 52-1.08E, "Job Control Tests," and the following:

The mechanical lap splice shall be a unit consisting of a sleeve, in which the reinforcing bars are positioned, and a wedge driven through holes in the sleeve and between the reinforcing bars. The mechanical lap splice shall only be used for splicing non-epoxy-coated deformed reinforcing bars Nos. 4, 5 and 6.

The eighth and ninth paragraphs of Section 52-1.08, "Splicing," of the Standard Specifications are amended to read:

Unless otherwise shown on the plans or approved by the Engineer, splices in adjacent reinforcing bars at any particular section shall be staggered. The minimum distance between staggered lap splices or mechanical lap splices shall be the same length required for a lapped splice in the largest bar. The minimum distance between staggered butt splices shall be 2 feet. Distances shall be measured between the midpoints of the splices along a line which is centered between the axes of the adjacent bars.

Completed butt splices shall develop a minimum tensile strength, based on the nominal bar area, of 63,000 psi for ASTM Designation: A 615/A 615M Grade 40 bars, and of 80,000 psi for ASTM Designation: A 615/A 615M Grade 60 and ASTM Designation: A 706/A 706M bars. If butt splices are made between two bars of dissimilar strengths, the minimum required tensile strength for the splice shall be that required for the weaker bar.

The second sentence of the eleventh paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Job control tests shall be made on sample splices representing each lot of mechanical butt splices as provided in Section 52-1.08E, "Job Control Tests."

Section 52-1.08B, "Butt Welded Splices," of the Standard Specifications is amended to read:

**52-1.08B Butt Welded Splices.**— Butt welded splices in reinforcing bars shall be complete joint penetration butt welds conforming to the requirements in AWS D1.4, and the requirements of these specifications and the special provisions. At the option of the Contractor, shop produced resistance butt welds, that are produced by a fabricator who is approved by the Transportation Laboratory, may be used. These welds shall conform to the requirements of these specifications and the special provisions

Only the joint details and dimensions as shown in Figure 3.2, "Direct Butt Joints," of AWS D 1.4-92, shall be used for making complete joint penetration butt welds of bar reinforcement. Split pipe backing shall not be used.

Material used as backing for complete joint penetration butt welds of bar reinforcement shall be a flat plate conforming to the requirements of ASTM Designation: A 709, Grade 36. The flat plate shall be 0.25-inch thick with a width, as measured perpendicular to the axis of the bar, equal to the nominal diameter of the bar, and a length which does not exceed twice the nominal diameter of the bar. The flat plate backing shall be fitted tightly to the bar with the root of the weld centered on the plate. Any bar deformation or obstruction preventing a tight fit shall be ground smooth and flush with the adjacent surface. Tack welds used to fit backing plates shall be within the weld root area so that they are completely consumed by the finished weld. Backing plates shall not be removed.

Butt welds shall be made with multiple weld passes using a stringer bead without an appreciable weaving motion. The maximum stringer bead width shall be 2.5 times the diameter of the electrode and slagging shall be performed between each weld pass. Weld reinforcement shall not exceed 1/8-inch in convexity.

Before any electrodes or flux-electrode combinations are used, the Contractor, at the Contractor's expense, shall furnish certified copies of test reports for all the pertinent tests specified in AWS A5.1, AWS A5.5, AWS A5.18 or AWS A5.20, whichever is applicable, made on electrodes or flux-electrode combinations of the same class, brand and nearest specified size as the electrodes to be used. The tests may have been made for process qualification or quality control, and shall have been made within one year prior to manufacture of the electrodes and fluxes to be used. The report shall include the manufacturer's certification that the process and material requirements were the same for manufacturing the tested electrodes and the electrodes to be used. The forms and certificates shall be as directed by the Engineer.

Electrodes for manual shielded metal arc welding of ASTM Designation: A 615/A 615M, Grade 60 bars shall conform to the requirements of AWS A5.5 for E9018-M or E10018-M electrodes.

Electrodes for manual shielded metal arc welding of ASTM Designation: A 706/A 706M bars shall conform to the requirements of AWS A5.5 for E8016-C3 or E8018-C3 electrodes.

Solid and composite electrodes for semiautomatic gas metal-arc and flux-cored arc welding of Grade 40 reinforcing bars shall conform to the requirements of AWS A5.18 for ER70S-2, ER70S-3, ER70S-6 or ER70S-7 electrodes; or AWS A5.20 for E70T-1, E70T-5, E70T-6 or E70T-8 electrodes.

Electrodes for semiautomatic welding of ASTM Designation: A 615/A 615M, Grade 60 and ASTM Designation: A 706/A 706M bars shall produce a weld metal deposit with properties conforming to the requirements of Section 5.3.4 of AWS D1.1-96 for ER80S-Ni1, ER80S-Ni2, ER80S-Ni3, ER80S-D2, E90T1-K2 and E91T1-K2 electrodes.

Reinforcing bars shall be preheated for a distance of not less than 6 inches on each side of the joint prior to welding. For all welding of ASTM Designation: A 615/A 615M, Grade 40 or Grade 60 bars, the requirements of Table 5.2, "Minimum Preheat and Interpass Temperatures," of AWS D1.4-92 are superseded by the following:

The minimum preheat and interpass temperatures shall be 400° F. for Grade 40 bars and 600° F. for Grade 60 bars. Immediately after completing the welding, at least 6 inches of the bar on each side of the splice shall be covered by an insulated wrapping to control the rate of cooling. The insulated wrapping shall remain in place until the bar has cooled below 200° F.

When welding different grades of reinforcing bars, the electrode shall conform to Grade 40 bar requirements and the preheat shall conform to the Grade 60 bar requirements.

In the event that any of the specified preheat, interpass and post weld cooling temperatures are not met, all weld and heat affected zone metal shall be removed and the splice rewelded.

Welding shall be protected from air currents, drafts, and precipitation to prevent loss of heat or loss of arc shielding. The method of protecting the welding area from loss of heat or loss of arc shielding shall be subject to approval by the Engineer.

Reinforcing bars shall not be direct butt spliced by thermite welding.

The first paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications is amended to read:

**52-1.08C Mechanical Butt Splices.**—Mechanical butt splices shall be the sleeve-filler metal type, the sleeve-threaded type, the sleeve-swaged type, the sleeve-filler grout type, the sleeve-lockshear bolt type, the two-part sleeve-forged bar type, or the two-part sleeve-friction bar type, at the option of the Contractor.

The following is added after the third paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications:

Slip requirements shall not apply to mechanical lap splices.

The following is added after Section 52-1.08C(3), "Sleeve-Swaged Mechanical Butt Splices," of the Standard Specifications:

**52-1.08C(4) Sleeve-Filler Grout Mechanical Butt Splices.**—The sleeve-filler grout type of mechanical butt splices shall consist of a steel splice sleeve that fits closely over the reinforcing bars with a non-shrink grout filler in the annular space between the reinforcing bars and the sleeve and between the ends of the reinforcing bars.

No vibration or movement of the reinforcing steel or sleeve at the splice shall be allowed while the splice is developing sufficient strength to support the reinforcing bars. The Contractor shall submit complete details of the bracing and clamping system to eliminate all vibration or movement at the splice during setup of the filler in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings."

**52-1.08C(5) Sleeve-Lockshear Bolt Mechanical Butt Splices.**—The sleeve-lockshear bolt type of mechanical butt splices shall consist of a seamless steel sleeve, 2 serrated steel strips welded to the inside of the sleeve, center hole with centering pin, and bolts that are tightened until the bolt heads shear off and the bolt ends are embedded in the reinforcing bars.

**52-1.08C(6) Two-Part Sleeve-Forged Bar Mechanical Butt Splices.**— The two-part sleeve-forged bar type of mechanical butt splices shall consist of a shop machined two-part threaded steel sleeve that interlocks two hot-forged reinforcing bars ends. The forged bar ends may be either shop produced or field produced.

**52-1.08C(7) Two-Part Sleeve-Friction Bar Mechanical Butt Splices.**— The two-part sleeve-friction bar type of mechanical butt splices shall consist of a shop machined two-part threaded steel sleeve whose ends are friction welded, in the shop, to the reinforcing bars ends.

The third paragraph of Section 52-1.08D, "Qualification of Welding and Mechanical Splicing," of the Standard Specifications is amended to read:

Resistance butt welds shall be produced by a fabricator approved by the Transportation Laboratory.

Each operator qualification test for mechanical splices shall consist of 2 sample splices. Each mechanical splice procedure test shall consist of 2 sample splices.

For sleeve-filler, sleeve-threaded, sleeve-lockshear bolt and two-part sleeve friction bar mechanical butt splices, all sample splices shall be made on the largest reinforcing bar size to be spliced by the procedure or operator being tested except that No. 14 bars may be substituted for No. 18 bars.

For sleeve-swaged and two-part sleeve-forged mechanical butt splices, and mechanical lap splices, all sample splices shall be made on the largest reinforcing bar size of each deformation pattern to be spliced by the procedure or operator being tested. When joining new reinforcing bars to existing reinforcement, the qualification test sample bars shall be made with the deformation pattern of the new reinforcement to be joined.

Section 52-1.08E, "Job Control Tests," of the Standard Specifications is amended to read:

**52-1.08E Job Control Tests.**—When mechanical butt splices, shop produced complete joint penetration butt welded splices, or shop produced resistance butt welded splices are used, the Contractor shall furnish job control tests from a local qualified testing laboratory. A job control test shall consist of the fabrication, under conditions used to produce the splice, and the physical testing of 3 sample splices for each lot of 150 splices.

A lot of mechanical butt splices is defined as 150, or fraction thereof, of the same type of mechanical butt splices used for each combination of bar size and bar deformation pattern that is used in the work.

A lot of shop produced complete joint penetration butt welded splices, or shop produced resistance butt welded splices, is defined as 150, or fraction thereof, of the same type of welds used for each combination of bar size and bar deformation pattern that is used in the work.

When joining new reinforcing bars to existing reinforcement, the job control test shall be made using only the deformation patterns of the new reinforcement to be joined.

A sample splice shall consist of a splice made at the job site to connect two 30-inch, or longer, bars using the same splice materials, position, location, and equipment, and following the same procedures as are being used to make splices in the work. Shorter sample splice bars may be used if approved by the Engineer.

Sample splices shall be made and tested in the presence of the Engineer or the Engineer's authorized representative.

Sample splices shall be suitably identified with weatherproof markings prior to shipment to the testing laboratory.

For sleeve-threaded mechanical butt splices, the reinforcing bars to be used for job control tests shall be fabricated on a random basis during the cutting of threads on the reinforcing bars of each lot and shipped to the job site with the material they represent.

For shop produced complete joint penetration butt welds, shop produced resistance butt welded splices and all types of mechanical butt splices, except the sleeve-threaded type, the Engineer will designate when samples for job control tests are to be fabricated, and will determine the limits of the lot represented by each job control test.

Should the average of the results of tests made on the 3 sample splices or should more than one sample splice in any job control test fail to meet the requirements for splices, all splices represented by that test will be rejected in accordance with the provisions in Section 6-1.04, "Defective Materials," of the Standard Specifications. This rejection shall prevail unless the Contractor, at the Contractor's expense, obtains and submits evidence, of a type acceptable to the Engineer, that the strength and quality of the splices in the work are acceptable.

Section 52-1.08F, "Nondestructive Splice Tests" of the Standard Specifications is amended to read:

**52-1.08F Nondestructive Splice Tests.**—All required radiographic examinations of complete joint penetration butt welded splices shall be performed by the Contractor in accordance with the requirements of AWS D 1.4 and these specifications.

Prior to radiographic examination, welds shall meet the requirements of Section 4.4, "Quality of Welds," of AWS D1.4-92.

Radiographic examinations shall be performed on 25 percent of all complete joint penetration butt welded splices from a production lot. The size of a production lot will be a maximum of 100 splices. The Engineer will select the splices which will compose the production lot and also the splices within each production lot to be radiographically examined.

Should more than 12 percent of the splices which have been radiographically examined in any production lot be defective, an additional 25 percent of the splices, selected by the Engineer from the same production lot, shall be radiographically examined. Should more than 12 percent of the cumulative total of splices tested from the same production lot be defective, all remaining splices in the lot shall be radiographically examined.

Additional radiographic examinations performed due to the identification of defective splices shall be at the Contractor's expense.

All defects shall be repaired in accordance with the requirements of AWS D1.4.

Radiographic examinations will not be required for either shop produced complete joint penetration butt welds or shop produced resistance butt welded splices of No. 8 or smaller bars used as spiral or hoop reinforcement.

In addition to radiographic examinations performed by the Contractor, any mechanical or welded splice may be subject to inspection or nondestructive testing by the Engineer. The Contractor shall provide sufficient access facilities in the shop and at the jobsite to permit the Engineer or his agent to perform the inspection or testing.

The Contractor shall notify the Engineer in writing 48 hours prior to performing any radiographic examinations.

The radiographic procedure used shall conform to the requirements of ASME Boiler and Pressure Vessels Code, Section V, Article 2 and the following:

Two exposures shall be made for each complete joint penetration butt welded splice. For each of the two exposures, the radiation source shall be centered on each bar to be radiographed. The first exposure shall be made with the radiation source placed at zero degrees from the top of the weld and perpendicular to the weld root and identified with a station mark of "0." When obstructions prevent a zero degree placement of the radiation source for the first exposure, and when approved in writing by the Engineer, the source may be rotated, around the centerline of the reinforcing bar, a maximum of 25 degrees. The second exposure shall be at 90 degrees to the "0" station mark and shall be identified with a station mark of "90."

For field produced complete joint penetration butt welds, no more than one weld shall be radiographed during one exposure. For shop produced complete joint penetration butt welds, if more than one weld is to be radiographed during one exposure, the angle between the root line of each weld and the direction to the radiation source shall be not less than 65 degrees.

Radiographs shall be made by either X-ray or gamma ray. Radiographs made by X-ray or gamma rays shall have densities of not less than 2.3 nor more than 3.5 in the area of interest. A tolerance of 0.05 in density is allowed for densitometer variations. Gamma rays shall be from the iridium 192 isotope and the emitting specimen shall not exceed 0.175-inch in the greatest diagonal dimension.

The radiographic film shall be placed perpendicular to the radiation source at all times; parallel to the root line of the weld unless source placement determines that the film must be turned; and as close to the root of the weld as possible.

The minimum source to film distance shall be maintained so as to insure that all radiographs maintain a maximum geometric unsharpness of 0.020 at all times, regardless of the size of the reinforcing bars.

Penetrators shall be placed on the source side of the bar and perpendicular to the radiation source at all times. One penetrator shall be placed in the center of each bar to be radiographed, perpendicular to the weld root, and adjacent to the weld. Penetrator images shall not appear in the weld area.

When radiography of more than one weld is being performed per exposure, each exposure shall have a minimum of one penetrator per bar, or 3 penetrators per exposure. When 3 penetrators per exposure are used, one penetrator shall be placed on each of the 2 outermost bars of the exposure, and the remaining penetrator shall be placed on a centrally located bar.

An allowable weld buildup of 1/8 inch may be added to the total material thickness when determining the proper penetrator selection. No image quality indicator equivalency will be accepted. Wire penetrators or penetrator blocks shall not be used.

Penetrators shall be sufficiently shimmed using a radiographically identical material. Penetrator image densities shall be a minimum of 2.0 and a maximum of 3.6.

All radiographic film shall be Class 1, regardless of the size of reinforcing bars.

Radiographs shall be free of film artifacts and processing defects, including, but not limited to, streaks, scratches, pressure marks, or marks made for the purpose of identifying film or welding indications.

Each splice shall be clearly identified on each radiograph and the radiograph identification and marking system shall be established between the Contractor and the Engineer before radiographic inspection begins. Film shall be identified by lead numbers only; etching, flashing, or writing in identifications of any type will not be permitted. Each piece of film identification information shall be legible and shall include, as a minimum, the following information: Contractor's name, date, name of nondestructive testing firm, initials of radiographer, contract number, part number, and weld number. The letter "R" and repair number shall be placed directly after the weld number to designate a radiograph of a repaired weld.

Radiographic film shall be developed within a time range of one minute less to one minute more than the film manufacturer's recommended maximum development time. Sight development will not be allowed.

Processing chemistry shall be done with a consistent mixture and quality, and processing rinses and tanks shall be clean to ensure proper results. Records of all developing processes and any chemical changes to the developing processes shall be kept and furnished to the Engineer upon request. The Engineer may request, at any time, that a sheet of unexposed film be processed in the presence of the Engineer to verify processing chemical and rinse quality.

All radiographs shall be interpreted and graded by a Level II or Level III technician who is qualified in accordance with the American Society for Nondestructive Testing's Recommended Practice No. SNT-TC-1A. The results of these interpretations shall be recorded on a signed certification and a copy kept with the film packet.

Technique sheets prepared in accordance with ASME Boiler and Pressure Vessels Code, Section V, Article 2 Section T-291 shall also contain the developer temperature, developing time, fixing duration and all rinse times.

All radiographic envelopes shall have clearly written on the outside of the envelope the following information: name of the Contractor's Quality Control Manager (QCM), name of the nondestructive testing firm, name of the radiographer, date, contract number, complete part description, and all included weld numbers or a report number, as detailed in the Contractor's Quality Control Plan (QCP). In addition, all innerleaves shall have clearly written on them the part description and all included weld numbers, as detailed in the Contractor's QCP.

### 10-1.51 WATERPROOFING

Waterproofing shall conform to the provisions in Section 54, "Waterproofing," of the Standard Specifications and these special provisions.

At the option of the Contractor, a preformed membrane waterproofing system may be furnished and applied in lieu of the asphalt membrane waterproofing specified above. Preformed membrane waterproofing shall conform to the requirements in these special provisions.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the preformed membrane sheet. The Certificate of Compliance shall include the following information: (1) type of preformed membrane sheet, and (2) the conditioner or primer application rates.

The preformed membrane waterproofing system shall consist of an adhesive, conditioner or primer applied to a prepared surface; a preformed membrane sheet of rubberized asphalt, or polymer modified bitumen; mastic or tape for sealing the edges of the sheet; and a protective covering over the sheet held by an adhesive.

The preformed membrane sheet shall be either permanently applied to a polyethylene film or reinforced with a polypropylene mesh fabric, polyester/polypropylene fabric or a fiberglass mesh fabric. The membrane sheet shall conform to the following requirements:

Property	Test	Requirement	
		Polyethylene Film	Fabric Reinforced
Tensile Strength (Minimum)(1)	ASTM D 882 (2)	20 lbs/in. (3)	20 lbs/in. (3)
Percent Elongation at break (Minimum) (4)	ASTM D 882 (2)	150 percent (3)	25 percent (3)
Pliability	ASTM D 146 (5)	No cracks	No cracks
Thickness (Minimum) (6)		60 mils	60 mils
Rubberized Asphalt Softening Point (Minimum)	AASHTO T 53	165° F.	165° F
Polymer Modified Bitumen Softening Point (Minimum)	AASHTO T 53	210° F	210° F
Notes: (1) Breaking factor in machine direction. (2) Method A, average 5 samples. (3) At 73.4° F. ± 3.6° F. (4) Machine direction. (5) 180-degree bend over a one-inch mandrel at 10° F. (6) Total thickness of preformed membrane sheet and polyethylene film or fabric reinforcement.			

Adhesives, conditioners, primers, mastics and sealing tapes shall be manufactured for use with the respective preformed membrane sheet materials and shall be applied according to the manufacturer's recommendations.

The protective covering shall be 1/8 inch hardboard or other material that furnishes equivalent protection. Backfill material and equipment shall not cut, scratch, depress or cause any other damage to the preformed membrane.

Surfaces designated to receive preformed membrane waterproofing shall be thoroughly cleaned of dirt, dust, loose or unsound concrete and other extraneous material and shall be free from fins, sharp edges and protrusions that would, in the opinion of the Engineer, puncture or otherwise damage the membrane. Sharp corners to be covered shall be rounded (outside) or chamfered (inside).

Surfaces shall be dry when components of the preformed membrane waterproofing system are applied.

Preformed membrane waterproofing shall not be applied to any surface until the Contractor is prepared to follow its application with the placing of the protective covering and backfill within a sufficiently short time that the membrane will not be damaged by men or equipment, exposure to weathering, or from any other cause. Damaged membrane or protective covering shall be repaired or replaced by the Contractor at his expense.

All projecting pipe, conduits, sleeves or other facilities passing through the preformed membrane waterproofing shall be flashed with prefabricated or field-fabricated boots, fitted coverings or other devices as necessary to provide watertight construction.

All conditioner or primers shall be thoroughly mixed and continuously agitated during application. Conditioner, primers or adhesive shall be allowed to dry to a tack free condition prior to placing membrane sheets.

The surfaces shall be recoated if membrane sheets are not placed over primer, conditioner or adhesive within the time recommended by the manufacturer.

The preformed membrane sheet shall not be applied in wet or foggy weather, nor when the ambient temperature is below 40° F.

Preformed membrane material shall be placed starting at the bottom and lapped by a minimum of 6 inches at splices and at repairs to holes or tears.

Exposed edges of membrane sheets shall have a trowelled bead of manufacturer's recommended mastic or sealing tape applied after the membrane is placed.

The surface of the preformed membrane shall be cleaned free of dirt and other deleterious material before the protective covering is placed.

The protective covering shall be placed on a coating of adhesive of a type recommended by the manufacturer. The adhesive shall be applied at a rate sufficient to hold the protective covering in position until the backfill is placed.

Preformed membrane waterproofing will be measured and paid for by the square foot as asphalt membrane waterproofing.

Dampproofing will be measured and paid for as asphalt membrane waterproofing.

Full compensation for membrane waterproofing shall be considered as included in the contract price paid per cubic yard for structure backfill (bridge) and no separate payment will be made therefor.

#### **10-1.52 SIGN STRUCTURES**

Sign structures and foundations for overhead signs shall conform to the provisions in Section 56-1, "Overhead Sign Structures," of the Standard Specifications and these special provisions.

The second paragraph in Section 56-1.02C, "Bolts, Nuts and Washers," of the Standard Specifications is amended to read:

Headed anchor bolts for sign foundations shall conform to the specifications of ASTM Designation: A 307, Grade B with S1 supplementary requirements.

At the option of the Contractor, nonheaded anchor bolts for sign foundations shall conform either to the specifications of ASTM Designation: A 307, Grade C or to the provisions in AASHTO Designation: M 314, Grade 36 or 55 with S1 supplementary requirements. When nonheaded anchor bolts conforming to the specifications of ASTM Designation: A 307, Grade C are furnished, the end of each fabricated anchor bolt shall be either coded by end stamping as required in ASTM Designation: A 307 or the end that projects from the concrete shall be permanently coded with a green color by the manufacturer.

Where cast-in-drilled-hole concrete pile sign foundations are to be constructed in slag aggregate embankments, the diameter of the pile shall be increased to provide at least 3 inches of concrete cover over the reinforcing steel. Cast-in-drilled-hole concrete piles constructed with the additional dimension specified herein will be measured and paid for at the contract price per linear foot for the size of cast-in-drilled-hole concrete pile (sign foundation) shown on the plans for that location.

Full compensation for additional cost of constructing cast-in-drilled-hole concrete pile sign foundations in slag aggregate embankments, including the increased quantity of portland cement concrete, and any increased drilling cost, shall be

considered as included in the contract price paid per linear foot for the size of cast-in-drilled-hole concrete pile (sign foundation) shown on the plans and no additional compensation will be allowed therefor.

Tubular sign structure shall be galvanized and not painted.

Graffiti abatement on sign structures shall include placement of concertina razor wire on the overhead sign structures as directed by the Engineer. Furnishing and placing the concertina razor wire will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

### **10-1.53 ROADSIDE SIGNS**

Roadside signs shall be installed at the locations shown on the plans or where directed by the Engineer, and shall conform to the provisions in Section 56-2, "Roadside Signs," of the Standard Specifications and these special provisions.

Type N, Type P, and Type R marker panels mounted on a post with a roadside sign shall be considered to be sign panels and will not be paid for as markers.

### **10-1.54 ALTERNATIVE PIPE**

Alternative pipe culverts shall conform to the provisions in Section 62, "Alternative Culverts," of the Standard Specifications and these special provisions.

**SPIRAL RIB PIPE.**--Spiral rib pipe shall meet the requirements for corrugated aluminum pipe or corrugated steel pipe in Section 66, "Corrugated Metal Pipe," of the Standard Specifications, except for profile and fabrication requirements.

Spiral rib pipe shall, at the option of the Contractor, consist of either one rectangular rib spaced midway between seams or 2 rectangular ribs and one half-circle rib equally spaced between seams. All ribs shall be continuous helical ribs that project outward from the surface of the pipe. On single rib pipe the rib shall be 3/4 inch wide by 3/4 inch high and the maximum rib pitch shall be 7 1/2 inches. On the two rectangular rib with one half-circle rib pipe, rectangular ribs shall be 3/4 inch wide by one inch high. The half-circle rib diameter shall be 1/2 inch and shall be spaced midway between the rectangular ribs and the maximum rib pitch shall be 11 1/2 inches. Rib pitch measured at right angles to the direction of the ribs may vary  $\pm 1/2$  inch.

Corrugated steel spiral rib pipe shall be fabricated by a continuous helical lock seam fabricated in accordance with the requirements in Section 66-3.03C(1), "Fabrication by Continuous Lock Seam," of the Standard Specifications.

Corrugated aluminum spiral rib pipe shall be fabricated by a continuous helical lock seam fabricated in accordance with the requirements in Section 66-2.03B, "Fabrication by Continuous Helical Lock Seam," of the Standard Specifications.

Coupling bands for spiral rib pipe shall conform to the requirements in Section 66-1.07, "Coupling Bands," of the Standard Specifications. Any coupling band shown on the plans or approved by the Engineer in accordance with Section 61-1.02, "Performance Requirements for Culvert and Drainage Pipe Joints," of the Standard Specifications, for use on a pipe corrugation of 2 2/3" x 1/2" for corrugated metal pipe may be used on spiral rib pipe having 2 2/3" x 1/2" rerolled annular ends. The width of band (W) for hat bands for pipe sizes larger than 48 inches in diameter shall be 3 3/4 inches.

### **10-1.55 PLASTIC PIPE**

Plastic pipe shall conform to the provisions in Section 64, "Plastic Pipe," of the Standard Specifications.

Drain pipe for retaining walls, as shown on the plans will be measured and paid for as 4" plastic pipe (edge drain outlet).

Drain pipe for retaining walls shall be installed as shown on the plans, in conformance with the provisions in Section 68-3, "Edge Drains," of the Standard Specifications and these special provisions and as directed by the Engineer.

Plastic drain pipe and fittings outside the limits of the structure approach slab drainage systems shall be installed as shown on the plans, in conformance with the provisions in Section 68-3, "Edge Drains," of the Standard Specifications and these special provisions and as directed by the Engineer.

Plastic drain pipe and fittings shall be polyvinyl chloride (PVC) conforming to the provisions in Section 68-3.02A, "Pipe And Pipe Fittings," of the Standard Specifications. Plastic pipe shall be Schedule 80, PVC 1120 or PVC 1220 conforming to the requirements of ASTM Designation: D 1785. Fittings shall be injection molded PVC, Schedule 80.

Plastic drain pipe shall have solvent cemented type joints. Primers of a contrasting color of the pipe shall be used on all solvent cemented type joints.

Plastic pipe will be measured by the linear foot along the line of the pipe.

The contract prices paid per linear foot for 3" plastic pipe shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing plastic drain pipes, complete in place, including structure excavation, structure backfill, and connecting the plastic pipes to other facilities or to the structure approach slab drainage systems, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

### **10-1.56 REINFORCED CONCRETE PIPE**

Reinforced concrete pipe shall conform to the provisions in Section 65, "Reinforced Concrete Pipe," of the Standard Specifications and these special provisions.

The compaction required below the pipe spring line for pipe in Method 1 backfill in trench, where the pipe is not within the traveled way or under embankment, shall be 85 percent minimum.

Except as otherwise designated by classification on the plans or in the specifications, joints for culvert and drainage pipes shall conform to the plans or specifications for standard joints.

### **10-1.57 CORRUGATED STEEL PIPE**

Corrugated steel pipe culverts shall conform to the provisions in Section 66, "Corrugated Metal Pipe," of the Standard Specifications and these special provisions.

All corrugated steel pipe shall be bituminous coated. Corrugated steel pipe shall be fabricated from zinc-coated steel sheet.

The first paragraph in Section 66-1.03, "Protective Coatings, Linings and Pavings," of the Standard Specifications is amended to read:

**66-1.03 Protective Coatings, Linings and Pavings.**—When required by the special provisions or designated in the Engineer's Estimate, pipes shall be protected with bituminous coating, bituminous lining or have the invert paved with bituminous material or coated with polymerized asphalt. Moisture, dirt, oil, unbonded or incompatible paint, grease, alkalis, or other foreign matter shall be removed from the surface to be coated before the coating material is applied.

Section 66-1.03, "Protective Coatings, Linings and Pavings," of the Standard Specifications is amended by adding the following paragraphs after the eighth paragraph:

Polymerized asphalt invert coating shall be applied in conformance with the requirements in ASTM Designation: A 849 for "Invert Paved Type with Polymer Material (Class P)," except that polymerized asphalt coatings shall be applied by immersion to a minimum thickness of 0.05 inch above the crests and troughs of the corrugations of the interior and exterior invert including pipe ends. Polymerized asphalt material shall conform to the "Requirements for Polymer Coating" contained in ASTM Designation: A 742/A 742M, and the following:

Polymerized asphalt shall be hot-applied thermoplastic material containing a minimum of 7.0 percent styrene-butadiene-styrene block copolymer.

There shall be not more than 0.25 inch undercutting or delamination from the scribe when a minimum 12 inches by 12 inches coupon cut from the coated pipe is exposed for 1000 hours in accordance with the requirements in ASTM Designation: B 117. Cut edges shall be sealed by dipping in a sample of the polymerized asphalt coating heated to the manufacturer's recommended application temperature. There shall be no corrosion or delamination from the sealed edges following exposure as specified.

The last paragraph in Section 66-1.03, "Protective Coatings, Linings and Pavings," of the Standard Specifications is amended to read:

Damaged protective coatings, linings and invert paving shall be repaired by the Contractor at the Contractor's expense. Bituminous material conforming to the requirements in AASHTO Designation: M 190 or other materials approved by the Engineer shall be used to repair damaged bituminous coatings; asphalt mastic material conforming to the requirements in AASHTO Designation: M 243 shall be used to repair damaged asphalt mastic coatings; and tar base material conforming to the provisions of AASHTO Designation: M 243 shall be used to repair damaged polymeric coatings. The repair of damaged polymerized asphalt coatings shall conform to the requirements in ASTM Designation: A 762, Section 11, "Repair of Damaged Coatings."

### **10-1.58 EDGE DRAINS**

Edge drains shall conform to the requirements in Section 68-3, "Edge Drains," of the Standard Specifications and these special provisions.

Outlet and vent covers will not be required.

### **10-1.59 MISCELLANEOUS FACILITIES**

Bituminous coated corrugated steel pipe inlets, welded steel pipe and steel flared end sections shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

Welded steel pipe shall be jacked at the location shown on the plans. The thickness of pipe specified shall be the minimum thickness permitted. Any thicker pipe or other facilities required to withstand the jacking pressure shall be determined and furnished by the Contractor at his expense. Other requirements in Section 61, "Culvert and Drainage Pipe Joints," and Section 66-3.10, "Jacking Pipes," of the Standard Specifications shall be applicable to jacking welded steel pipe.

The contract price paid per linear foot for jacked 42" welded steel pipe (.500" Thick) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in jacking 42" welded steel pipe (.500" Thick), complete in place, including excavation, jacking pit construction and removal, backfill, and positive joints, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.60 WELDED STEEL PIPE CASING (BRIDGE)**

Welded steel pipe casings through bridges and under approach slabs shall be of the size shown and shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

Unless otherwise shown on the project plans, casings shall be installed at each abutment, and casings shall be extended to the greater of: (1) five feet beyond the approach slab, (2) five feet beyond the end of the adjacent wingwall or (3) twenty feet beyond the abutment.

**Working drawings.**--Working drawings for temporary support of casing pipe at the abutments shall be submitted for approval as specified in Section 5-1.02, "Plans and Working Drawings" of the Standard Specifications.

**Casing pipe.**--Casing pipe shall be welded steel pipe conforming to Section 70-1.02B, "Welded Steel Pipe," of the Standard Specifications, except that the pipe shall be treated in accordance with the following requirements, prior to shipping. Exterior surfaces of welded steel pipe shall be cleaned and coated in accordance with specifications of ANSI/AWWA C213 or at the option of the Contractor, cleaned, primed, and coated in accordance with specifications of ANSI/AWWA C214.

**Pipe wrapping tape.**--Wrapping tapes for pipe in contact with the ground shall be a pressure sensitive polyvinyl chloride or polyethylene tape having thickness of 50 mils, minimum.

If a blockout is provided in the bridge abutment wall for casing pipe, the space between the casing pipe and bridge abutment wall shall be filled with portland cement mortar conforming to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications.

Openings for utilities through bridge superstructure concrete shall either be formed or shall consist of pipe sleeves.

**Wrapping and coating pipe.**--Damaged coating on steel pipe casing in contact with earth shall be wrapped as specified as follows:

1. Pipe to be wrapped shall be thoroughly cleaned and primed as recommended by the tape manufacturer.
2. Tapes shall be tightly applied with 1/2 uniform lap, free from wrinkles and voids to provide not less than 100 mils thickness.
3. Field joints and fittings for wrapped pipe shall be covered by double wrapping 50 mil thick tape. Wrapping at joints shall extend a minimum of 6 inches over adjacent pipe coverings. Width of tape for wrapping fittings shall not exceed 2 inches. Adequate tension shall be applied so tape will conform closely to contours of joint.

Where a welded steel pipe casing passes through the abutment wall, the welded steel pipe casing shall be additionally wrapped with 2 layers of 15-pound asphalt-felt building paper, securely taped or wired in place.

**Measurement and payment.**--Measurement and payment for Welded steel pipe casing for each size listed in the Engineers Estimate will be measured and paid for by the linear foot in the same manner for Welded steel pipe in Sections 70-1.04, "Measurement," and 70-1.05, "Payment," of the Standard Specifications.

Full compensation for furnishing and installing casing, steel cover plates, mortar and building paper, and other fittings shall be considered as included in the contract prices paid per linear foot for the sizes of welded steel pipe casing involved and no additional compensation will be allowed therefor.

#### **10-1.61 SLOPE PROTECTION**

Rock slope protection and concrete channel lining shall conform to the provisions in Section 72, "Slope Protection," of the Standard Specifications.

Rock slope protection fabric shall be woven or nonwoven type fabric, Type A or Type B, at the option of the Contractor.

The elongation at break for nonwoven type rock slope protection fabric shall be 50 percent, minimum, instead of 50 percent, maximum.

### **10-1.62 SLOPE PAVING**

Slopes under the bridge ends, 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 first paragraph of Section 72-6.06, "Payment," of the Standard Specifications is amended to read:

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 and timber spacers), tools, equipment and incidentals, and for doing all the work involved in constructing slope paving, complete in place (including excavation, backfill and installing timber spacers), as shown on the plans, as specified in the special provisions and these specifications, and as directed by the Engineer.

The slope paving shall be colored in conformance with the provisions in Section 72-6.03, "Materials," of the Standard Specifications.

The portion of abutment face under the slope paving shall be protected with a high density polyethylene sheet, not less than 10 mils thick. The polyethylene sheet shall overlap a minimum of 6 inches at all joints.

Full compensation for polyethylene sheet shall be considered as included in the contract price paid per cubic yard for slope paving (concrete) and no additional compensation will be allowed therefor.

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 feet by 6 feet 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.

### **10-1.63 MISCELLANEOUS CONCRETE CONSTRUCTION**

Curb, curb ramps, sidewalks, cross gutters, driveways, median island and gutter depressions shall conform to the provisions in Section 73, "Concrete Curbs and Sidewalks," of the Standard Specifications and these special provisions.

Curb ramp detectable warning surfacing shall conform to the details shown on the plans and shall not be constructed or installed on curb ramps with a slope that exceeds 6.67 percent. The finished surfaces of the detectable warning surface shall be free from blemishes.

Curb ramp detectable warning surface shall consist of raised truncated domes constructed or installed on curb ramps. The detectable warning surface, at the option of the Contractor, shall be either cast or stamped into the surface of the curb ramp, or shall be a prefabricated surface installed on the curb ramp. Prefabricated detectable warning surface shall be either Pathfinder Tactile Tiles, as manufactured by Carsonite International Corporation; or Detectable Warning Mats manufactured by Detectable Warning Systems or equal.

Prior to constructing curb ramps with cast-in-place or stamped detectable warning surface, the Contractor shall construct a test panel on the job site of a size not less than 2 feet by 2 feet. The test panel shall be constructed, finished and cured with the same materials, tools, equipment and methods to be used in constructing the proposed permanent work. Additional test panels shall be constructed as necessary until a panel is produced which demonstrates, to the satisfaction of the Engineer, the ability of the selected procedure to produce a detectable warning surface that meets all of the specified requirements.

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

The contract unit price paid for median island shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the median island, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Minor concrete (textured paving) shall be constructed left of Station 26+65 centerline Sierra Avenue as shown on the plans. Minor concrete (textured paving) shall conform to the existing textured concrete at this location. The existing textured concrete has a sienna brown tone in conformance with pantone number 470 C, with a stamped brick pattern.

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

Samples of the colors specified for textured paving are available for review by prospective bidders at the office of the Department of Transportation District 8 located at 464 West Fourth Street, San Bernardino, California 92401-1400. 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, conforming to the provisions in Section 52, "Reinforcement," of the Standard Specifications, shall be placed in the textured paving areas 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 and these special provisions.

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) as specified 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 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.

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.

#### **10-1.64 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.

The second paragraph in Section 75-1.06, "Measurement," of the Standards Specifications is amended to read:

Scale weights will not be required when miscellaneous iron and steel, miscellaneous bridge metal, miscellaneous metal (restrainer), or pumping plant metal work are designated as final pay items in the Engineer's Estimate.

#### **10-1.65 MISCELLANEOUS METAL (BRIDGE)**

Miscellaneous metal (bridge) shall conform to the provisions for miscellaneous bridge metal in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Attention is directed to "Welding Quality Control" of these special provisions.

The second paragraph of Section 75-1.02, "Miscellaneous Iron and Steel" of the Standard Specifications is amended to read:

Unless otherwise specified, materials shall conform to the following specifications:

MATERIAL	SPECIFICATION
Steel bars, plates and shapes	ASTM Designation: A 36/A 36M or A 575, A 576 (AISI or M Grades 1016 through 1030 except Grade 1017)
Other parts for general applications	Commercial quality
Steel fastener components for general applications:	
Bolts and studs	ASTM Designation: A 307
Headed anchor bolts	ASTM Designation: A 307, Grade B, including S1 supplementary requirements
Nonheaded anchor bolts	ASTM Designation: A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation: M 314 supplementary requirements or AASHTO Designation: M 314, Grade 36 or 55, including S1 supplementary requirements
High-strength bolts and studs which include threaded rods and high-strength nonheaded anchor bolts	ASTM Designation: A 449, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1 <sup>(a)</sup>
Washers	ASTM Designation: F 844
Components of high-strength steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM Designation: A 325, Type 1
Tension control bolts	ASTM Designation: F 1852, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1 <sup>(a)</sup>
Hardened washers	ASTM Designation: F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM Designation: F 959, Type 325, zinc-coated
Stainless steel fasteners for general applications:	Alloys 304 or 316
Bolts, screws, nuts and studs which include threaded rods and nonheaded anchor bolts	ASTM Designation: F 593 or F 738M ASTM Designation: A 240 and ANSI B 18.22M
Washers	
Carbon-steel castings	ASTM Designation: A 27/A 27M, Grade 65-35 [450-240], Class 1
Malleable iron castings	ASTM Designation: A 47, Grade 32510 or A 47M, Grade 22010
Gray iron castings	ASTM Designation: A 48, Class 30B
Ductile iron castings	ASTM Designation: A 536, Grade 65-45-12
Cast iron pipe	Commercial quality standard soil
Steel pipe	Commercial quality welded
(a) Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.	

Miscellaneous metal (bridge) shall consist of the miscellaneous bridge metal items listed in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications

Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended by adding the following paragraph after paragraph 3:

High-strength bolted connections shall conform to the provisions for high-strength steel fasteners and for bolted connections in Section 55, "Steel Structures."

The third subparagraph of the second paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

3. Manhole frames and covers, frames and grates, ladder rungs, guard posts, and access door assemblies.

The third subparagraph of the eleventh paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Cast-in-place inserts shall be ferrule loop or cast iron type.

All metal parts of anchorage devices shall be fabricated from steel, except iron castings for cast-in-place inserts shall be malleable iron or ductile iron.

All metal parts of anchorage devices, except mechanical expansion anchors and iron castings for cast-in-place inserts, shall be hot-dip or mechanically galvanized. Mechanical expansion anchors may be hot-dip or mechanically galvanized, made from stainless steel, or coated with electrodeposited zinc conforming to the requirements of ASTM Designation: B 633. Iron castings shall be mechanically galvanized.

The second paragraph in Section 75-1.06, "Measurement," of the Standards Specifications is amended to read:

Scale weights will not be required when miscellaneous iron and steel, miscellaneous bridge metal, miscellaneous metal (restrainer), or pumping plant metal work are designated as final pay items in the Engineer's Estimate.

#### **10-1.66 CHAIN LINK FENCE AND CHAIN LINK GATES**

Chain link fence and chain link gates, as shown on the plans shall be Type CL-6 and shall conform to the provisions in Section 80, "Fences," of the Standard Specifications and these special provisions.

Chain link gates shall be installed in new fences at the locations shown on the plans. Gate installations shall be complete with gate post, latch post, concrete footings, braces, truss rods, and hardware. Gate and latch posts shall be braced to the next line post as shown on the plans.

Gate mounting and latching hardware shall not contain open-end slots for the fastening bolts.

Chain link fabric for gates shall be of the same mesh size as the new fence in which the gates are installed.

Full compensation for furnishing, and installation of chain link gates shall be considered as included in the contract price paid per linear foot for chain link fence and no additional compensation will be allowed therefor.

#### **10-1.67 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 be as specified in "Prequalified and Tested Signing and Delineation Materials," elsewhere in 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.

Reflective sheeting for metal and flexible target plates shall be the reflective sheeting designated for channelizers, markers, and delineators specified in "Prequalified and Tested Signing and Delineation Materials," elsewhere in these special provisions.

#### **10-1.68 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 and blocks shall be wood.

Delete the ninth and eleventh paragraphs in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications.

The grades and species of wood posts and blocks shall be No. 1 timbers (also known as No. 1 structural) Douglas fir or No. 1 timbers Southern yellow pine. Wood posts and blocks shall be graded in conformance with the provisions in

Section 57-2, "Structural Timber," of the Standard Specifications, except allowances for shrinkage after mill cutting shall in no case exceed 5 percent of the American Lumber Standards minimum sizes, at the time of installation.

Wood posts and blocks shall be pressure treated after fabrication in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," of the Standard Specifications with creosote, creosote coal tar solution, creosote petroleum solution (50-50), pentachlorophenol in hydrocarbon solvent, copper naphthenate, ammoniacal copper arsenate, or ammoniacal copper zinc arsenate. In addition to the preservatives listed above, Southern yellow pine may also be pressure treated with chromated copper arsenate. When other than one of the creosote processes is used, blocks shall have a minimum retention of 6.4 Kg/m<sup>3</sup>, and need not be incised.

**TERMINAL SYSTEM (TYPE SRT).**—Terminal system (Type SRT) shall be furnished and installed as shown on the plans, and as specified in these special provisions.

Terminal system (Type SRT) shall be a SRT-350 Slotted Rail Terminal as manufactured by Syro, Inc., a Trinity Industries Company, and shall include all the items detailed for terminal system (Type SRT) shown on the plans.

Arrangements have been made to insure that any successful bidder can obtain the SRT-350 Slotted Rail Terminal from the manufacturer, Syro, Inc., a Trinity Industries Company, P.O. Box 99, 950 West 400S, Centerville, UT 84014, Telephone (800) 772-7976. The price quoted by the manufacturer for the SRT-350 Slotted Rail Terminal, FOB Centerville, Utah is \$865.00, not including sales tax.

The above price will be firm for orders placed on or before December 31, 2000, provided delivery is accepted within 90 days after the order is placed.

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 terminal systems (Type SRT) 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.

The terminal system (Type SRT) shall be installed in conformance with the manufacturer's installation instructions and these requirements. At the Contractor's option, steel foundation tubes with soil plates attached, shall be either driven, with or without pilot holes, or placed in drilled holes. Any 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 terminal 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 150° 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.

Surplus excavated material remaining after the terminal system (Type SRT) has been constructed shall be disposed of in a uniform manner along the adjacent roadway as directed by the Engineer.

The quantity of terminal systems (Type SRT) will be measured as units determined from actual count in place in the completed work.

The contract unit price paid for terminal system (Type SRT) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in furnishing and installing terminal system (Type SRT), complete in place, including excavation, backfill and disposal of surplus material and connecting the terminal system to new or existing metal beam guard railing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### **10-1.69 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, 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.

#### **10-1.70 CABLE RAILING**

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

#### **10-1.71 CONCRETE BARRIER**

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

Type 25A Modified concrete barriers will be measured and paid for as concrete barrier (Type 25 Modified).

Type 26A Modified concrete barriers will be measured and paid for as concrete barrier (Type 26 Modified).

The last subparagraph of the seventh paragraph of Section 83-2.02D(2), "Materials," of the Standard Specifications is amended to read:

Grease shall conform to the requirements of Military Specification: MIL-S-8660.

If reinforcement is encountered during drilling, before specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

#### **10-1.72 THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS**

Thermoplastic traffic stripes (traffic lines) and pavement markings shall conform to the provisions in Sections 84-1, "General," and 84-2, "Thermoplastic Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

The State Specification No. for glass beads in Section 84-2.02, "Materials," of the Standard Specifications is amended to read "8010-21C-22 (Type II)."

Thermoplastic material shall conform to the requirements of State Specification No. 8010-21C-19.

At the option of the Contractor, permanent striping tape as specified in "Prequalified and Tested Signing and Delineation Materials" elsewhere in these special provisions, may be placed instead of the thermoplastic traffic stripes and pavement markings specified herein, except that 3M, "Stamark" Series A320 Bisymmetric Grade, manufactured by the 3M Company, shall not be used. Pavement tape, if used, shall be installed in accordance with the manufacturer's specifications. If pavement tape is placed instead of thermoplastic traffic stripes and pavement markings, the pavement tape will be measured and paid for as thermoplastic traffic stripe and thermoplastic pavement marking.

#### **10-1.73 PAVEMENT MARKERS**

Pavement markers shall conform to the provisions in Section 85, "Pavement Markers," of the Standard Specifications and these special provisions.

The second paragraph in Section 85-1.02, "Type of Markers," of the Standard Specifications shall not apply.

Certificates of compliance shall be furnished for pavement markers as specified in "Approved Traffic Products" elsewhere in these special provisions.

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

### **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.

The Contractor shall notify the Engineer not less than 72 hours prior to requiring initial access to the existing irrigation controllers. When the Engineer determines that access to the controllers is required at other times, arrangements will be made to provide this access.

**PROGRESS INSPECTIONS.**--Progress inspections will be performed by the Engineer for completed highway planting and irrigation system work at designated stages during the life of the contract.

Progress inspections will not relieve the Contractor of his responsibility for installation in accordance with the special provisions, plans and Standard Specifications. Work within an area shall not progress beyond each stage until the inspection has been completed; corrective work has been performed; and the work is approved, unless otherwise permitted by the Engineer.

The requirements for progress inspections will not preclude additional inspections of work by the Engineer at any time during the life of the contract.

The Contractor shall notify the Engineer in writing, at least 4 working days prior to completion of the work for each stage of an area and shall allow a minimum of 3 working days for the inspection.

Progress inspections will be performed at the following stages of work:

**PRESSURE TESTING OF PIPELINES.**--During pressure testing of the pipelines on supply side of control valves.

**TESTING OF CONDUCTORS.**--During testing of low voltage conductors.

**PREPARING PLANTING AREAS.**--Before planting begins and after completion of the work specified for planting in Section 20-4.03, "Preparing Planting Areas," of the Standard Specifications.

**PLANTING.**--Before plant establishment work begins and after completion of the work specified for planting in Section 20-4.05, "Planting," of the Standard Specifications.

**PLANT ESTABLISHMENT WORK.**--At intervals of two months during the plant establishment period.

#### **10-2.01A COST BREAK-DOWN**

The Contractor shall furnish to the Engineer a cost break-down for the contract lump sum items of highway planting and irrigation system.

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

No adjustment in compensation will be made in the contract lump sum prices paid for highway planting and irrigation system due to any 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.

The sum of the amounts for the units of work listed in each cost break-down for highway planting and irrigation system work shall be equal to the contract lump sum price bid for the work. Overhead and profit shall be included in each individual unit listed in each cost break-down. Cost break-downs shall be submitted to the Engineer for approval within 15 working days after the contract has been approved. Cost break-downs shall be approved, in writing, by the Engineer before any partial payment for the items of highway planting and irrigation system will be made.

Approved cost break-downs will be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the items of highway planting and irrigation system due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation will be determined in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

**HIGHWAY PLANTING COST BREAK-DOWN**  
**Contract No. 08-340804**

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
PREPARE HOLE (SOIL AMENDMENT)	EA	25,739		
MULCH	CY	580		
COMMERCIAL FERTILIZER (GRANULAR)	LB	7,500		
PLANT (GROUP A)	EA	14,489		
PLANT (GROUP B)	EA	290		
PLANT (GROUP F)	EA	10,791		
PLANT (GROUP K)	EA	89		
PLANT (GROUP U)	EA	80		
ROADSIDE CLEARING	LS	LUMP SUM		

**TOTAL** \_\_\_\_\_

**IRRIGATION SYSTEM COST BREAK-DOWN**

**Contract No. 08-340804**

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
CHECK, TEST, RELOCATE AND REMOVE EXISTING IRRIGATION FACILITIES	LS	LUMP SUM		
CONTROL AND NEUTRAL CONDUCTORS	LS	LUMP SUM		
1"ELECTRIC REMOTE CONTROL VALVE	EA	42		
1 1/4" ELECTRIC REMOTE CONTROL VALVE	EA	25		
1 1/2" ELECTRIC REMOTE CONTROL VALVE	EA	5		
2" ELECTRIC REMOTE CONTROL VALVE (MASTER)	EA	2		
1 1/2" PLASTIC PIPE (PR 315) (SUPPLY LINE)	LF	1,647		
2" PLASTIC PIPE (PR 315) (SUPPLY LINE)	LF	1,539		
2" BACKFLOW PREVENTER ASSEMBLY	EA	1		
BACKFLOW PREVENTER ASSEMBLY ENCLOSURE	EA	1		
3/4" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	6,014		
1" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	2,990		
1 1/4" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	1,310		
1 1/2" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	652		
2" PLASTIC PIPE (SCHEDULE 40) (SUPPLY LINE)	LF	45		
RE-IDENTIFY EXISTING ELECTRIC REMOTE CONTROL VALVE BOXES	LS	LUMP SUM		
REMOTE CONTROL VALVE ACTUATOR SYSTEM	LS	LUMP SUM		
ANTI DRAIN VALVES	EA	155		
VALVE ASSEMBLY UNITS	EA	4		
OPEN TRENCHES IN EXISTING ASPHALT CONCRETE SURFACING	LS	LUMP SUM		
2" GATE VALVE	EA	9		
1" WYE STRAINER	EA	10		
SPRINKLER (TYPE A-6)	EA	281		
SPRINKLER (TYPE A-7)	EA	38		
SPRINKLER (TYPE B-2)	EA	163		
SPRINKLER (TYPE B-4)	EA	4		
SPRINKLER (TYPE B-6)	EA	145		
SPRINKLER (TYPE C-2)	EA	98		
FLOW SENSOR	EA	2		
FIELD UNIT (TYPE 2)	EA	3		

**TOTAL** \_\_\_\_\_

## **10-2.02 EXISTING HIGHWAY PLANTING**

In addition to the provisions in Section 20 of the Standard Specifications, work performed in connection with existing highway planting shall be in accordance with the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Replacement planting shall conform to the requirements specified under "Preservation of Property" elsewhere in these special provisions.

### **10-2.02A MAINTAIN EXISTING PLANTS**

Existing plants within the project limits, not being removed for replanting shall be maintained throughout the life of the contract in accordance with these special provisions.

Existing plants shall be watered as provided in Section 20-4.06, "Watering," of the Standard Specifications.

Existing plants and plant basins to be maintained shall be inspected for deficiencies by the Contractor in the presence of the Engineer. Deficiencies requiring corrective action shall include, but are not necessarily limited to, dead, diseased, or unhealthy plants, missing plant stakes and tree ties, and inadequate plant basins. The inspection shall be completed within 10 working days after the start of work.

When directed by the Engineer, deficiencies found during the inspection shall be corrected by the Contractor within 10 working days after the inspection. Correction of deficiencies, as directed by the Engineer, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

After initial deficiencies have been corrected as directed by the Engineer, the Contractor shall continue to maintain existing plants and the work shall include but not be limited to the following:

Trash, debris and weeds shall be removed from existing planting areas. Weeds shall be killed prior to removal. Trash, debris and weed removal in ground cover areas shall extend beyond the outer limits of ground cover areas to the adjacent edges of paving, fences and proposed plants and planting areas, and 6-foot diameter area centered at each existing tree and shrub outside of existing ground cover areas.

When a portion of a new automatic irrigation system is completed, the existing plants to be watered by that portion of the irrigation system shall be watered automatically.

Pesticides for maintaining existing plants shall conform to the provisions in "Pesticides" elsewhere in these special provisions.

If after completion of the initial inspection and correction of deficiencies, the Engineer determines that existing plants show signs of failure to grow, or are so injured or damaged as to render the plants unsuitable for the purpose intended, the existing plants shall be replaced. Removal, disposal and replacement of the existing plants, shall be in accordance with the requirements specified under "Preservation of Property" elsewhere in these special provisions.

## **10-2.03 EXISTING HIGHWAY IRRIGATION FACILITIES**

In addition to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications, the work performed in connection with the various existing highway irrigation system facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Existing irrigation facilities specified in these special provisions to be removed shall remain in place until their use, as determined by the Engineer, is no longer required.

Existing irrigation facilities outside the planting replacement limits from station 560+00± to station 597+30± centerline Route 10 and from station 618+35± centerline Route 10 to station 638+00±) that are to remain, shall be maintained and protected from damage. If the Contractor's operations damage such existing irrigation facilities, the Contractor shall, at the Contractor's expense, repair or replace the damaged facilities as follows:

Repair or replacement of damaged facilities shall be completed within 10 working days of the damage.

Replaced irrigation facilities shall be new, and of equal or better quality than the damaged facility. Replacement irrigation facilities shall be compatible with the irrigation systems to remain.

After repair or replacement of the facilities is complete, the Contractor shall demonstrate to the Engineer that the repaired or replaced facilities operate properly. When remote control valves are repaired or replaced, the valves shall be tested with the irrigation controller in the automatic mode.

### **10-2.03A CHECK AND TEST EXISTING IRRIGATION FACILITIES**

Existing irrigation facilities that are to remain outside the planting replacement limits from station 560+00± centerline Route 10 to station 597+30± centerline Route 10 and from station 618+35± centerline Route 10 to station 638+00± centerline Route 10), and that are within areas where clearing and grubbing or earthwork operations are to be performed, shall be checked for missing or damaged components and proper operation prior to performing the

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operations. Existing irrigation facilities outside of work areas that are affected by the construction work shall also be checked for proper operation.

The Contractor shall submit a written list of existing irrigation system deficiencies to the Engineer within 5 working days after checking the existing facilities.

Deficiencies found during checking existing facilities shall be corrected by the Contractor as directed by the Engineer. Corrective work ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

When existing irrigation facilities are checked, existing backflow preventers to remain shall be tested for proper operation by a certified Backflow Preventer Tester. The tester shall hold a valid certification as a Backflow Preventer Tester from the county in which the device to be tested is located or, if the county does not have a certification program for Backflow Preventer Testers, the tester shall have a certificate from one of the following:

1. A county which has a certification program for Backflow Preventer Testers.

Existing backflow preventers shall be tested in accordance with the requirements specified under "Irrigation Systems" elsewhere in these special provisions.

Length of watering cycles for use of potable water from water meters for checking or testing existing irrigation facilities shall be as determined by the Engineer.

Repairs to the existing irrigation facilities ordered by the Engineer after checking and testing the facilities, and any further repairs required thereafter as ordered by the Engineer, except as otherwise provided for under "Maintain Existing Irrigation Facilities" elsewhere in these special provisions, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

#### **10-2.03B MAINTAIN EXISTING IRRIGATION FACILITIES**

Existing irrigation facilities, outside the planting replacement limits from station 560+00± to station 597+30± centerline Route 10 and from station 618+35± centerline Route 10 to station 638+00±) shall be maintained by the Contractor throughout the life of the contract. Prior to the start of maintaining existing irrigation facilities work, the facilities shall be checked for proper operation, and repaired as specified under "Check and Test Existing Irrigation Facilities" elsewhere in these special provisions.

After the existing facilities have been checked and repaired, the Contractor shall be responsible for the routine maintenance of existing irrigation systems. The work shall include, but not be limited to, checking irrigation systems for proper operation and adjusting, repairing or replacing valves, valve boxes, sprinklers, risers, swing joints, wye strainers, valve assembly units and filter assembly units.

Existing automatic irrigation systems shall be operated automatically during the life of the contract, except manual operation will be allowed for work during plant replacement, fertilization, weed germination and the repair of irrigation facilities.

Irrigation controllers shall be programmed by the Contractor for seasonal water requirements. During winter seasons irrigation systems shall be operated automatically a minimum of 2 minutes every 2 weeks.

Irrigation systems and facilities shall be checked for proper operation at least once every 30 days. When required, as determined by the Engineer, adjusting, repairing or replacing irrigation facilities shall be completed within 5 working days after checking of the irrigation systems. Repair and replacement of irrigation facilities shall conform to the requirements specified under "Existing Highway Irrigation Facilities" elsewhere in these special provisions

#### **10-2.03C REMOVE EXISTING IRRIGATION FACILITIES**

Existing irrigation facilities to be removed from station 591+80± to Station 618+35±, shall be removed and disposed of, except for facilities that are more than 6 inches below finished grade may be abandoned in place. Removed facilities shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Immediately after disconnecting an existing irrigation facility to be removed or abandoned from an existing facility to remain, the remaining facility shall be capped or plugged, or shall be connected to a new or existing irrigation facility.

Full compensation for removing and disposing of existing irrigation facilities, and abandoning existing irrigation facilities, shall be considered as included in the contract lump sum price paid for irrigation system and no separate payment will be made therefor.

#### **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.

#### 10-2.04A HIGHWAY PLANTING MATERIALS

**PLANTS.**--Plants that are found to be in a root bound condition or have an underdeveloped root ball as determined by the Engineer will not be accepted.

**MULCH.--GREEN MATERIAL.**--Mulch shall be woody material. Woody materials shall consist of chipped, shredded or ground green materials such as shrubs, tree trimmings or clean processed wood products.

Deleterious materials such as rocks, glass, plastics, metals, clods, weeds, weed seeds, coarse objects, sticks larger than the specified particle size, salts, paint, petroleum products, pesticides or other chemical residues that would be harmful to plant or animal life shall not exceed 0.1 percent of the mulch volume. Chipping shall include shredding, grinding or any other method used to reduce mulch materials to the specified size. At least 85 percent of the mulch, by volume, shall conform to the particle size specified.

Mulch shall also conform to the following:

The particle size and quality shall conform to the requirements for wood chips in Section 20-2.08, "Mulch," of the Standard Specifications.

**COMMERCIAL FERTILIZER.**--Commercial fertilizer (granular) shall be a granular form and shall have the following guaranteed chemical analysis:

Ingredient	Percentage
Nitrogen	6
Phosphoric Acid	20
Water Soluble Potash	20

#### 10-2.04B ROADSIDE CLEARING

Prior to preparing planting areas and wild flower seeding areas, or commencing irrigation trenching operations for planting areas, trash and debris shall be removed from proposed planting areas and within the areas extending beyond the outer limits of the proposed planting areas to the adjacent edges of existing planting to remain or to be maintained, shoulders, dikes, curbs, sidewalks, fences and walls.

In addition to removing trash and debris, the project area shall be cleared as specified herein:

Weeds shall be killed within the entire highway right of way, within the project limits, except for existing planting areas to be maintained, and excluding median areas, new and existing pavement, curb, sidewalk and other surfaced areas.

Weeds shall be killed and removed within proposed ground cover, and weeds shall be killed and within the area extending beyond the outer limits of the proposed ground cover areas to the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, existing planting and fences. At locations where proposed ground cover 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 ground cover areas.

Areas outside the areas specified for weeds to be killed shall be mowed. Limits of mowing shall extend from the weeds to be killed areas out to the adjacent edges of shoulders, dikes, curbs, sidewalks and fences.

Roadside clearing for wild flower seeding areas shall consist of mowing weeds and removing trash and debris in the areas to be seeded until the start of the wild flower seeding operation.

After the initial roadside clearing is complete, additional roadside clearing work shall be performed as often 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:

Trash and debris shall be removed.

Rodents shall be controlled.

Weed growth shall be killed before the weeds reach the seed stage of growth or exceed 6 inches in length, except for weeds in wild flower seeding areas.

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

Areas outside the areas specified to be cleared of weeds shall be mowed.

**WEED CONTROL.**--Weed control shall also conform to the following:

Stolon type weeds shall be killed with glyphosate.

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

Removed weeds and ground cover shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Areas to be mowed shall be mowed when weed height exceeds 12 inches. Weeds shall be mowed to a height of 2 inches to 6 inches.

Disposal of mowed material and killed weeds after initial roadside clearing will not be required, unless otherwise directed by the Engineer. When directed by the Engineer, mowed material and killed weeds shall be disposed of and the disposal will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

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

#### **10-2.04C 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:

- Diquat
- Fluazifop-butyl
- Glyphosate
- Oxadiazon - 50 percent WP (Preemergent)
- Oryzalin (Preemergent)
- Pendimethalin (Preemergent)
- Trifluralin (Preemergent)
- Melfluidide (Growth regulator)

Glyphosate shall be used to kill stolon type weeds.

Oxadiazon shall be of the emulsifiable concentration or wettable powder type.

Ground cover plants shall be planted a minimum of 5 days and shall be watered prior to the application of preemergents.

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 wild flower seeding areas.

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

No pesticides, except diquat, fluazifop-butyl, or glyphosate shall be applied within the limits of plant basins. Pesticides shall not be applied in such a manner as to allow the pesticides to come in contact with the foliage and woody parts of proposed plants.

#### **10-2.04D 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.

**PREPARE HOLES.**—Holes for plants shall be excavated to the minimum dimensions shown on the plans.

Plant holes excavated by drilling shall have the sides of the holes scarified to encourage plant root penetration.

Backfill material for plant holes shall be a mixture of native soil. and commercial fertilizer (granular) Backfill material shall be thoroughly mixed and uniformly distributed throughout the entire depth of the plant hole without clods and lumps.

#### **10-2.04E PLANTING**

Commercial fertilizer (granular) shall be applied at the time of planting and at the rates shown on the plans.

Commercial fertilizer (granular) shall be mixed into the plant hole soil a minimum depth of 2 inches near the root ball of Plant (Group A, B, F, K, U)plants.

Mulch of 4" depth will be required in the plant basins shown on the plans for Basins, Type I .

Mulch for plant basins shall be placed so that the mulch does not come in contact with the plant stem.

Attention is directed to the requirements specified under "Irrigation Systems Functional Test" elsewhere in these special provisions regarding functional tests of irrigation systems. Planting shall not be performed in an area until the functional test has been completed on the irrigation system serving that area.

**ANNUAL COLOR PLANT (GROUP F).**--Annual color shall be planted as shown on the plans. The type of plants, size and spacing shall vary depending on the planting season.

The specific layout or configuration of the listed plants shall be at the direction of the Engineer. The Contractor shall request in writing to the Engineer at least 4 work weeks prior to scheduled annual color planting the Engineer's layout plan for planting annual color.

**SPRING OR SUMMER SEASON PLANTING.**--During the spring or summer season (March through September) the following types of plants, size and spacing shall be used.

Botanical Name (Common Name)	Size	Spacing
Ageratum houstonianum (Floss Flower)	4" Pot	6"
Dianthus sp. (Dianthus)	4" Pot	6"
Tagetes sp. (Marigold)	4" Pot	6"
Salvia sp. (Sage)	4" Pot	6"
Zinnia sp. (Zinnia)	4" Pot	6"

**FALL OR WINTER SEASON PLANTING.**--During the fall or winter season (October through February) the following types of plants, size and spacing shall be used.

Botanical Name (Common Name)	Size	Spacing
Calendula officinalis (Calendula)	4" Pot	6"
Papaver nudicaule (Iceland Poppy)	4" Pot	6"
Voilaceae sp. (Pansy)	4" Pot	6"
Antirrhinum majus (Snapdragon)	4" Pot	6"

If the Contractor wants to substitute different plants for those listed he shall make a written recommendation at least 4 work weeks prior to scheduled annual color planting to the Resident Engineer for such substitution. The Resident Engineer will determine acceptance of such recommendation within 10 working days.

**10-2.04F WILD FLOWER SEEDING**

Wild flower seeding shall conform to the provisions in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Wild flower seeding work shall consist of mowing weeds, scarifying the soil, furnishing and dry applying native wild flower seed to areas designated on the plans as "Wild Flower Seeding."

Pesticides shall not be used on wild flower seeding areas after the seed has been applied.

**SITE PREPARATION.**--Just prior to planting wild flower seeding areas, trash and debris shall be removed, and weeds shall be mowed as close to the ground as possible. Removal of mowed material will not be required. After mowing and just prior to seed application, wild flower seeding areas shall be scarified to a minimum depth of two inches.

Removed trash and debris shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

**MATERIALS.**--Materials shall conform to the provisions in Section 20-2, "Materials," of the Standard Specifications and the following:

**SEED.**--Seed shall conform to the provisions in Section 20-2.10, "Seed," of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Engineer.

Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists.

Seed shall have been tested for purity and germination not more than one year prior to application of seed.

Results from testing seed for purity and germination shall be furnished to the Engineer prior to applying seed.

**LEGUME SEED.**--Legume seed shall be industrial-inoculated.

Pellet-inoculated seed shall be inoculated in accordance with the provisions in Section 20-2.10, "Seed," of the Standard Specifications.

Industrial-inoculated seed shall be inoculated with Rhizobia and coated using an industrial process by a manufacturer whose principal business is seed coating and seed inoculation.

Industrial-inoculated seed shall be sown within 180 calendar days after inoculation.

Legume seed shall consist of the following:

LEGUME SEED		
Botanical Name (Common Name)	Percent (Minimum) Germination	Pounds pure live seed per acre (Slope measurement)
Lotus scoparius (Small Fescue)	30	3.6
Lupinus succulentus (Arroyo Lupine)	43	2.7

**NON-LEGUME SEED.**--Non-legume seed shall consist of the following:

NON-LEGUME SEED		
Botanical Name (Common Name)	Percent (Minimum) Germination	Pounds pure live seed per acre (Slope measurement)
Vulpia microstachys (Small Fescue)	30	5.3
Eschscholzia Californica (California Poppy)	70	0.9
Phacelia campanularia (California Blue Bell)	38	1.8
Eriophyllum Confertiflorum (Golden Yarrow)	30	0.9
Baileya multiradiata (Desert Marigold)	30	0.9
Gaillardia pulchella (Indian Blanket)	38	2.7
Eriogonum fasciculatum (California Buckwheat)	33	0.5

If site is to be hydroseeded, the following materials must be utilized as part of the hydroseeding slurry.

Product	Lbs/Acre
Cellulose 100% Wood Fiber	2000
Ecology Controls M-Binder	100
15-15-15 Fertilizer	200

Seed shall be delivered to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag will not be accepted.

A sample of approximately one ounce of seed will be taken from each seed container by the Engineer.

**APPLICATION.--**Wild flower seed shall be applied at the rate of 19.3 pounds per acre (slope measurement).

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

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

Wild flower seeding will be measured by the acre.

The contract price paid per acre for wild flower seeding shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in wild flower seeding, complete in place, including trash and debris removal, clearing weeds, and scarification , as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

#### 10-2.04G PLANT ESTABLISHMENT WORK

The plant establishment period shall be Type 2 and shall be not less than 1,000 working days.

Wild flower 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 wild flower seeding and applying seed shall be in accordance with the requirements specified under "Wild Flower Seeding" elsewhere in these special provisions.

After sowing wild flower seed plant establishment work for wild flower seeding areas will not be required except for trash and debris removal. Wild flower seeding areas shall be mowed when directed by the Engineer, and the mowing will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

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

Eight (8) semiannual applications of commercial fertilizer (granular) shall be applied to trees, shrubs, vines and ground cover areas when directed by the Engineer. Commercial fertilizer shall be applied at the rates shown on the plans and shall be spread with a mechanical spreader wherever possible.

The center to center spacing of replacement plants for unsuitable ground cover plants shall be determined by the number of completed plant establishment working days at the time of replacement and the original spacing in accordance with the following:

ORIGINAL SPACING (Inches)	SPACING OF REPLACEMENT GROUND COVER PLANTS (Inches)		
	Number of Completed Plant Establishment Working Days		
	1-125	126-190	191-250
9"	9"	6"	6"
12"	12"	9"	6"
18"	18"	12"	9"
24"	24"	18"	12"
36"	36"	24"	18"

During the plant establishment period, the Contractor shall water the plants utilizing the Remote Irrigation Control System (RICS) software program. The Contractor shall submit a watering schedule 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 ground cover, but outside of plant basins, shall be controlled by killing.

After 125 working days of the plant establishment period have been completed, replacement of plants, except for ground cover plants, shall be 5-gallon size for one gallon size plants; 15-gallon size for 5-gallon size plants; and other plant replacement plants shall be the same size as originally planted. When the Engineer determines that the plant stakes are inadequate to support the plants during the plant establishment period, the Contractor, at his cost, shall replace the plant stakes with a larger diameter stake adequate to support the plant. Plant stakes shall be removed at any time during the plant establishment period when ordered by the Engineer. Plant stakes shall be completely removed within 15 working days prior to completion of the plant establishment period.

The Contractor shall submit a watering schedule program, for each irrigation controller, to the Engineer for approval not less than 40 working days prior to the completion of the plant establishment period. If the Engineer determines the submitted watering schedule is unacceptable, the Contractor shall submit a revised watering schedule to the Engineer for approval within 5 working days after receiving notice that the previously submitted schedule is unacceptable.

Written instructions shall be given to the Engineer during the plant establishment period on the use and adjustment of the installed irrigation controllers. The approved watering schedule program shall be implemented by the Contractor not less than 10 working days prior to the completion of the plant establishment period. The programming shall not relieve the Contractor of the responsibility to apply sufficient water as conditions may require to keep the plants in a healthy condition.

The final inspection, as specified in Section 5-1.13 of the Standard Specifications, shall be completed a minimum of 20 working days before the estimated completion of the contract.

#### **10-2.04H PAYMENT**

Highway planting work will be paid for as a single contract lump sum price for highway planting, except that wild flower seeding, maintain existing plants, and plant establishment work will be paid for separately as provided elsewhere in these special provisions.

#### **10-2.05 IRRIGATION SYSTEMS**

Irrigation systems shall be furnished and installed in accordance with the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications, except materials containing asbestos fibers shall not be used.

Attention is directed to the requirements specified under "Obstructions" elsewhere in these special provisions, regarding work over or adjacent to existing underground facilities. Excavation for proposed irrigation facilities shall not be started until the existing underground facilities have been located.

Materials for irrigation systems, unless otherwise specified, shall be commercial quality.

Primers and paints for application on metal and wood surfaces shall be the best quality grade of the type specified elsewhere in these special provisions and shall be manufactured by a recognized paint manufacturer. Thinners and coloring tints shall conform to the paint manufacturer's recommendations. Coatings shall not be thinned except as recommended by the paint manufacturer for application. Each application of paint shall be compatible with the previous application and shall be from paint made by the same manufacturer. Testing of primers and paints will not be required.

Two-inch gate valves shall be furnished with a square lug and shall be operated by use of long shank keys. Prior to acceptance of the contract, 3 long shank keys shall be delivered to the Engineer.

**VALVE BOXES.**--Valve boxes shall conform to the requirements 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 or steel.

Valve boxes, including existing electric remote control valve boxes to be re-identified, shall be identified on the top surface of the covers by labels containing the appropriate abbreviation for the irrigation facility contained in the valve box as shown on the plans. Valve boxes that contain remote control valves shall be identified by the appropriate letters and numbers (field unit and station numbers). Labels for valve boxes shall conform to the provisions in Section 20-5.03F, "Valves and Valve Boxes," of the Standard Specifications.

Label material shall be plate plastic.

Full compensation for re-identifying existing electric remote control valve boxes shall be considered as included in the contract lump sum price paid for irrigation system and no additional compensation will be allowed therefor.

#### **10-2.05A REMOTE IRRIGATION CONTROL SYSTEM**

The Remote Irrigation Control System (RICS) shall be a Weathermatic/Valcon based system and shall consist of field units, Cellular Phone service and manufacturer/supplier support.

Field units shall interface with the existing base station located at the Department of Transportation, Magana-Ortega Maintenance Office, 451 W. Slover Avenue, Rialto, CA. 92376. Telephone (909) 877-9258.

**FIELD UNITS.**--The field units shall consist of an irrigation controller, communication equipment, remote control valve actuator system and rain sensor. All equipment to be assembled on and within each field unit enclosure cabinet, including the cabinet, shall be furnished and assembled by the equipment supplier of Weather-match/Valcon Division of Tesac Industries. The supplier is Hydro-scope Products, 610 N. Batavia, Orange, California 92868, Telephone Number (714) 639-9886.

The contractor shall perform the on-site installation of each fully equipped field unit, including concrete pads, electrical conduits to adjacent pull boxes, grounding equipment and the pull boxes themselves.

The existing concrete pads, electrical conduits, adjacent pull boxes and the pull boxes themselves adjacent to field units 'B' and 'E' may be used in lieu of constructing such new facilities.

Copper grounding rods shall be a minimum 1/2-inch diameter by 9 feet-10 inches in length. 8 feet-2 inches of the rod shall be set below finished grade and 1 foot-8 inches shall be extended above grade through the concrete pad and into the field unit enclosure cabinet. The grounding rod shall be connected to the cabinets by means of a number 10 size ground wire with clamp.

110-volts surge arrests shall be mounted on each on-off switching box located in all field unit enclosure cabinets.

The specified equipment and prices are as follows:

**FIELD UNIT (TYPE 2):**

<b>Description</b>	<b>Unit Price(*)</b>	<b>Unit</b>	<b>Total</b>
VAC. 36/PS CONTROLLER WITH PUMP START/FLOW BOARD	\$9,735.19	3	\$29,205.57
FIELD UNIT ENCLOSURE CABINET		3	
TRUNKED RADIO		3	
DOME TRUNK ANTENNA		3	
PERMANENT MOUNTED EICON RECEIVER FOR HAND HELD TRANSMITTER		3	
PANCAKE ANTENNA FOR PERMANENT MOUNTED EICON RECEIVER		3	
RAIN SENSOR UNIT		3	
SIB SENSOR INPUT BOARD		3	
RF-SURGE RADIO SURGE PROTECTION		3	
HS-GND GROUNDING KIT		3	
PADLOCK BEST CALTRANS PADLOCK		3	
TAX @ 7.75%		\$2,263.43	2,263.43
		<b>TOTAL</b>	<b>\$31,469.00</b>

\*The field unit prices listed will be valid to **February 1, 2001.**

**MANUFACTURER/SUPPLIER SUPPORT.**--The remote irrigation control system equipment supplier shall be responsible for the following system support work:

1. Conduct on-site system familiarization meetings for the Contractor to insure that employees understand the system installation.
2. Provide on-site system assistance during the installation period when requested by the Contractor or the Engineer.
3. Verify that all equipment is properly grounded.
4. Provide written certification that the equipment conforms to and is installed in accordance with the plans, these special provisions and the manufacturer's recommendations.
5. Test all system components for proper operation.
6. Verify the system flow range.

**MEASUREMENT AND PAYMENT.**--Full compensation for field unit (Type 2) shall be considered as included in the contract lump sum price paid for irrigation system and no separate payment will be allowed therefor.

**ELECTRIC REMOTE CONTROL VALVES.**--Electric remote control valves, except the 2" electric remote control valve (master), shall conform to the following:

1. Valves shall be of glass filled nylon, brass, bronze, or cast iron body and bonnet construction.
2. Valve stems shall be stainless steel.
3. Valves shall be completely serviceable from the top without removing the valve body from the system.
4. Valves shall be equipped with a device that will regulate and adjust the flow of water and shall be provided with a manual shutoff.
5. Valves for each new field unit irrigation controller shall be the same model series and shall be compatible with the model series of the new field unit irrigation controllers.
6. Valve solenoids shall operate on the low voltage AC current supplied from the field unit.
7. Valves shall be straight pattern (side inlet) as shown on the plans.
8. Valves shall be provided with manual bleeding devices.
9. Valves shall be equipped with internal diaphragms installed in the valve body casting.
10. Valve inlets and outlets shall have threaded fittings.
11. Valves shall be contamination resistant.

**ELECTRIC REMOTE CONTROL VALVE (MASTER).**--Electric remote control valve (master) shall be a globe type valve, consisting of a main valve and 3-way solenoid control with built-in-impeller type flow meter.

2" electric remote control valve (master) shall be installed as shown on the irrigation mainline detail, shall be normally open(energized to close) and shall include a valve box with wire mesh and gravel or crushed rock, valve box extensions, brick extensions, concrete support block, flanged slip joints, ductile iron reducers and flanged fittings.

The valves shall conform to the following:

1. Valves shall be pressure rated to 125 psi and shall be equipped with cast iron, flange type end connections.
2. Flow meters shall be equipped with an electric pulse transmitter for remote monitoring, factory preset to provide a pulse signal every 10 gallons
3. Valves shall operate on the 24-volt AC current supplied by the field units.
4. Main valve bodies and covers shall be of cast iron construction with internal and external epoxy coatings.
5. Four low voltage control and neutral conductors shall be required between each valve and field unit. One pair of conductors shall be used for solenoid control and the second pair for pulse transmissions from the flow meter to the field unit. Electric remote control valve (master) shall be furnished and installed in accordance with the manufacturer's recommendations and the requirements in these special provisions.

**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 subsection "Conductors" shall mean 36 V or less. Conductors shall be a minimum number 14-size wire.

Control and neutral conductors shall be used for valve activation and for data communication between each electric remote control valve (master) and field unit.

Low voltage control and neutral conductors in pull boxes and valve boxes, at field unit terminals, and at splices shall be marked as follows:

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Conductor terminations and splices shall be marked with adhesive backed paper markers or adhesive cloth wrap-around markers, with clear, heat-shrinkable sleeves sealed over the markers.

Markers for the control conductors shall be identified with the appropriate number or letter designations of field units and station numbers. Markers for neutral conductors shall be identified with the appropriate number or letter designation for each field unit.

The color of low voltage neutral and control conductor insulation shall be homogeneous throughout the entire thickness of the insulation.

Type "C," Type "S" or Type "T" splices shall be used. Splices for low voltage control and neutral conductors shall conform to provisions in Section 86-2.09C, "Connectors and Terminals," 86-2.09D, "Splicing," and 86-2.09E, "Splice Insulation," of the Standard Specifications, except Type "S" splices shall be soldered.

**ARMOR-CLAD CONDUCTORS.**--Armor-clad conductors shall be used in direct burial applications from pull boxes adjacent to field unit enclosure cabinets to remote control valves and other irrigation facilities in accordance with the details shown on the plans and these special provisions.

Armor-clad conductors shall conform to the following:

1. Conductors shall be the proper size for the application, and shall be solid, uncoated copper with a conductor size of not less than 90 percent of the AWG diameter required.
2. Conductor insulation coverings shall be manufactured of polyvinyl chloride (PVC) conforming to UL style, Type UF 60°C, 600 V. Average thickness of insulation shall be not less than 1.52 mm with a minimum thickness of 1.37 mm at any one point.
3. Armor shall be a minimum of 0.13-mm thick by 12.7 mm wide, Type 304 stainless steel tape that is helically wrapped over each conductor with a 33 percent minimum overlap.
4. 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 0.76-mm with a minimum thickness of 0.61-mm at any one point.

Nonarmor-clad conductors conforming to the provisions in Section 20-2.31D, "Conductors," of the Standard Specifications, shall be used in lieu of armor-clad conductors when the conductors are installed in irrigation crossovers and sprinkler control conduit.

#### **10-2.05B REMOTE CONTROL VALVE ACTUATOR SYSTEM**

A remote control valve actuator system shall consist of a receiver mounted within each field unit cabinet, a receiver antenna mounted on each field unit cabinet, two hand held transmitters with carrying cases, an AC power charging unit and receiver connectors. The remote control valve actuator equipment shall be manufactured by the same manufacturer as the irrigation controller and shall be fully compatible with the irrigation controller. The receiver and transmitter shall comply with Federal Communications Commission (FCC) Rules and Regulations, Part 15, as of the date of manufacture.

The receiver connector shall be attached directly to the terminal strip of each irrigation controller and antenna. The receiver shall be capable of operating the stations of the irrigation controller on radio signals from the transmitter. The receiver shall be capable of receiving radio signals a minimum distance of one mile. Receiver circuitry shall be protected from overload by a field replaceable fuse. The transmitter shall be capable of providing a 2-way FM, radio signal for a minimum range of one mile to the receiver located within each field unit enclosure cabinet. The transmitter shall have a digital key pad and be capable of instant actuation of the stations and master valves in random, numerical or reverse numerical sequences. The transmitter shall be capable of allowing for manual control, and two-way voice communication. The transmitter shall be capable of operating a master valve independently of the controller stations. The transmitter shall be capable of transmitting a FM radio frequency of 460MHz.

The power source for the transmitter shall consist of an internal charged battery pack which shall be recharged by the charging unit. The charging unit shall have an input of 110 volts AC, and an output of 12 volts DC.

The field carrying case shall allow complete and convenient operation of the unit while in the case. The receiver and antenna shall be furnished and assembled on and within each field unit cabinet prior to on-site installation. The antenna shall be a vandal resistant pancake type as recommended by the manufacturer of the remote control valve actuator system.

### **10-2.05C IRRIGATION SYSTEMS FUNCTIONAL TEST**

Functional tests for remote irrigation controller system (RICS) field units, and associated automatic irrigation systems shall conform to the provisions in Section 20-5.027J, "Testing," of the Standard Specifications and these special provisions.

Two functional tests shall be performed, one without and one with connection to the RICS base station. Both tests shall consist of demonstrating to the Engineer, that the associated automatic components of the irrigation systems operate properly.

The existing RICS base station is located at 451 west Slover Avenue in Rialto California.

Associated automatic components for both tests shall include, but not be limited to field units, remote control valves, conductors, and rain sensors. Associated automatic components for the second test shall include, but not be limited to, existing irrigation software programs, existing trunked radio transmission systems and flow alarms for-flows in excess of 40 gallons per minute for 2 inches electric remote control valves (master)..

The first test shall be done prior to planting the plants and consist of testing the irrigation controllers and associated automatic irrigation systems without connection to the RICS base station. Upon completion of a satisfactory functional test, and correction of any deficiencies, the plants to be planted in the areas watered by the irrigation system may be planted, provided the planting areas have been prepared as specified elsewhere in these special provisions.

The second test shall be done prior to the start of plant establishment and consist of testing the (field units) and associated automatic irrigation systems with connection to the existing RICS base station. As part of the second test the Contractor shall submit a watering schedule for each field unit to the Engineer. The Engineer will enter the watering schedule into the existing software program, and a computer printout will be made available to the Contractor for verification. If the Engineer determines the submitted watering schedule is unacceptable, the Contractor shall submit a revised watering schedule to the Engineer for approval within 5 working days. Also as part of the second test the Contractor shall demonstrate to the Engineer that the existing RICS base station detects, reports and reacts to flows in excess of 40 gallons per minute for 2 inches electric remote control valve (master). Upon completion of a satisfactory test, including correction of deficiencies, the plant establishment period may begin, provided planting work as specified elsewhere in these special provisions has been completed except for plant establishment work.

If existing and new automatic components of the irrigation systems, fail a functional test, the components shall be repaired at the Contractor's expense and the testing shall be repeated until satisfactory operation. Repair or replacement of existing irrigation facilities due to unsatisfactory performance shall conform to the provisions in "Existing Highway Irrigation Facilities" elsewhere in these special provisions.

### **10-2.05D OPEN TRENCHES IN EXISTING ASPHALT CONCRETE SURFACING**

Irrigation main lines, plastic pipe supply lines and control and neutral conductors, to be installed under existing asphalt concrete surfacing , shall be installed in open trenches. Plastic pipe and control and neutral conductors installations shall conform to the provisions in Section 20-5.03D, "Trenching and Backfilling," of the Standard Specifications.

For pipe supply lines 4 inches or less in diameter and for control and neutral conductors trench widths in asphalt concrete surfacing shall not exceed 12 inches. The outline of areas of surfacing to be removed shall be cut with an abrasive type saw or a rock cutting excavator specifically designed for this purpose. The minimum depth of cuts in asphalt concrete shall be 6 inches. Cuts shall be neat and true with no shatter outside the removal area. Removed asphalt concrete and surplus excavated material shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Once the plastic pipes or control and neutral conductors have been installed, the remainder of the trench, excluding the 2 inches asphalt concrete surfacing placed at finished grade, shall be backfilled with material excavated from the trenches, except that rocks, broken concrete, asphalt concrete and other lumps larger than 2 in greatest dimension shall not be used.

The compacted thickness of the replacement underlying material and asphalt concrete surfacing shall be not less than the 6 inches thickness removed. The finished surface of the compacted asphalt concrete surfacing shall be flush with the adjacent surface. Asphalt concrete for replacing removed asphalt concrete facilities and surfacing shall conform to the requirements specified under "Asphalt Concrete" elsewhere in these special provisions.

### **10-2.05E PIPE**

**STEEL PIPE.**--Galvanized steel pipe supply lines installed between water meters and backflow preventer assemblies shall be installed not less than 18 inches below finished grade, measured to the top of the pipe.

**PLASTIC PIPE.**--Plastic pipe supply lines shall be polyvinyl chloride (PVC) 1120 or 1220 pressure rated pipe. Plastic pipe supply lines that are smaller than 2 inches in diameter shall be PR 200 pressure rated pipe.

Plastic pipe supply lines that are 2 inches or larger in diameter shall be Schedule 40 pipe and shall conform to the requirements of ASTM Designation: D 1785.

**10-2.05F WATER METERS**

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 Fontana Water Company has established a fee of \$ 3,500 for furnishing and installing a water meter. If, at the time of installation, this fee has been changed, the State will take a credit for any reduction in the fee, or the State will pay the difference for any 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. The Contractor shall furnish the Engineer with a copy of the invoice for the installation fee.

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 as units determined from actual count in place.

The contract unit price paid for water meter shall include full compensation for 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, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

**10-2.05G BACKFLOW PREVENTER ASSEMBLIES**

Backflow preventers shall be one of the approved reduced pressure principle devices listed by the California Department of Health Services, Division of Drinking Water and Environmental Management, 601 North 7th Street, MS 92, P O Box 942732, Sacramento, CA 94234-7320.

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

BACKFLOW PREVENTER SIZE (inches)	FLOW RATE (GPM)	PRESSURE LOSS (psi)
2	80	12

Backflow preventer assemblies shall be painted with a minimum of 2 applications of a commercial quality enamel paint. The color of the paint shall be light brown.

**BACKFLOW PREVENTER ASSEMBLY ENCLOSURES.**--Enclosures shall be installed over backflow preventer assemblies on a portland cement concrete pad as shown on the plans. There shall be a 2 inches minimum clearance between the backflow preventer assembly and the backflow preventer assembly enclosure. Enclosures shall be fabricated of structural steel angles and flattened expanded metal in accordance with the details shown on the plans and these special provisions. Expanded metal for sides, ends, and top panels shall be fabricated from 0.074-inch (14-gage), minimum thickness, sheet steel. The flattened expanded metal openings shall be approximately 3/4 inch by 1 3/4 inches in size.

Expanded metal panels shall be attached to the steel frames by a series of welds, not less than 1/4 inch in length and spaced not more than 4 inches on centers, along the edges of the enclosures.

Enclosure door handles shall have provisions for padlocking in the latched position. Padlocks will be State-furnished as provided under "State-furnished Materials" elsewhere in these special provisions.

Enclosures shall be galvanized, after fabrication, in accordance with the requirements specified 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 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 light brown.

**TESTING BACKFLOW PREVENTERS.**--New backflow preventers installed by the Contractor and existing backflow preventers to remain in place shall be tested for proper operation by a certified Backflow Preventer Tester.

The backflow preventer tester shall hold a valid certification as a Backflow Preventer Tester from the county in which the device to be tested is located, or if the county does not have a certification program for Backflow Preventer Testers, the tester shall have a certificate from one of the following:

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1. The American Water Works Association.
2. A county which has a certification program for Backflow Preventer Testers.

Testing for proper operation shall conform to the provisions of the county in which the testing is being performed or, if these procedures are not available, the tests shall conform to the provisions in the latest edition of the Guidance Manual for Cross-Connection Control Program, which is available from the California Department of Health Services, Division of Drinking Water and Environmental Management, 601 North 7th Street, MS 92, P.O. Box 942732, Sacramento, CA 94234-7320, Telephone: (916) 327-4097 or (916) 323-6111.

Tests for new backflow preventers shall be satisfactorily completed after installation of the backflow preventer assembly and before operation of the irrigation systems. Existing backflow preventers shall be tested, and repaired if required, when existing irrigation facilities are checked.

Repair of existing backflow preventers will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications when ordered by the Engineer, except damage caused by the Contractor's operations.

The Contractor shall notify the Engineer at least 5 days prior to testing backflow preventers. New backflow preventers failing required tests shall be repaired or replaced at the Contractor's expense.

One copy of the test results for each backflow preventer and a valid certification from the backflow preventer tester shall be furnished to the Engineer. New backflow preventers failing required tests shall be repaired or replaced at the Contractor's expense.

Backflow preventers shall be retested once each year after the satisfactory completion of the first tests throughout the plant establishment period. Full compensation for retesting the backflow preventers shall be considered as included in the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

#### **10-2.05H SPRINKLERS**

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

**ANTI-DRAIN VALVES.**-- Anti-drain valves for Type C-2 sprinklers shall have 1/2 inch female pipe threads and shall be manufactured of polyvinyl chloride (PVC) plastic exterior housings. Anti-drain valves shall provide adjustable protection against drain out between a minimum range of 5 pounds per square inch and 14 pounds per square inch. Anti-drain valves for Type C-2 sprinklers shall be installed in place of the lower coupling for the Type I riser and in the Type V riser with the top surface set 1 inch below finish grade.

Type V risers shall consist of two sections of prefabricated flexible hose.

Full compensation for furnishing and installing anti-drain valves shall be considered as included in the contract lump sum price paid for irrigation system and no additional compensation will be allowed therefore.

#### **10-2.05I WYE STRAINERS**

Wye strainers shall be installed on the upstream side of the electric remote control valves as shown on the plans. Removable stainless steel strainers for wye strainers shall be 40 mesh.

Garden valves shall be positioned in such a manner that when opened the discharge will be up and out of the valve box.

#### **10-2.05J VALVE ASSEMBLY UNIT**

A valve assembly unit shall consist of an electric remote control valve, wye strainer, garden valve, 5/8 inch hose, valve box, wire mesh and gravel or crushed rock as shown on plans.

Electric remote control valves shall conform to the provisions in "Electric Automatic Irrigation Components" elsewhere in these special provisions.

The stainless steel strainer for the wye strainer shall be 80-mesh.

The garden valve shall be positioned in such a manner that when opened the discharge will be up and out of the valve box.

Pipe used for valve assembly units shall be Schedule 80 polyvinyl chloride (PVC) and shall conform to the provisions in Section 20-2.15, "Pipe," of the Standard Specifications. Fittings shall be injection molded PVC, Schedule 80, conforming to the requirements of ASTM Designation: D 2467.

Fifteen working days prior to completion of the plant establishment period, wye strainers shall be cleaned.

**GATE VALVES.**-- Gate valve stems shall be manufactured of stainless steel.

Gate valves 2 inches and larger shall be manufactured of ductile iron with non rising stems and shall be capable of withstanding a minimum cold water working pressure of 150 pounds per square inch.

#### **10-2.05K FINAL IRRIGATION SYSTEM CHECK**

A final check of the existing and new irrigation facilities, including the remote irrigation control system (RICS) shall be done not more than 20 working days prior to the acceptance of the contract.

Length of watering cycles for use of potable water from water meters for the final check of irrigation facilities will be determined by the Engineer.

All remote control valves, including master remote control valves connected to irrigation controllers and field units, connected to existing and new irrigation controllers shall be checked for automatic performance when controllers are in the automatic mode.

The final check shall include operation of the of the field units through the RICS to generate printed reports indicating flow per valve and total run time per valve at the base station.

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

Nothing in this section, "Final Irrigation System Check," shall be construed as relieving the Contractor of full responsibility to make good or repair the defective work or materials found at any time 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.

#### **10-2.05L PAYMENT**

Irrigation system work will be paid for at a single contract lump sum price for irrigation system, except that irrigation crossovers, and electric service for irrigation systems will be paid for as provided elsewhere in these special provisions.

### **SECTION 10-3. SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS**

#### **10-3.01 DESCRIPTION**

Traffic signals, lighting, irrigation controller enclosure cabinet, sign illumination, electric service (irrigation), and ramp metering systems shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

Lighting equipment is included in the following structures:

- A. Sierra Avenue OC, Bridge No. 54-537
- B. Sierra Avenue OH, Bridge No. 54C-63

#### **10-3.02 COST BREAK-DOWN**

The Contractor shall furnish to the Engineer a cost break-down for each contract lump sum item of work described in this Section 10-3.

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

No adjustment in compensation will be made in the contract lump sum prices paid for the various electrical work items due to any differences between the quantities shown in the cost break-down furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in the cost break-down for electrical work shall be equal to the contract lump sum price bid for the work. Overhead and profit shall be included in each individual unit listed in the cost break-down, however, costs for traffic control system shall not be included. Bond premium, temporary construction facilities, plant and other items will not be paid for under the various electrical work items and shall be included in the mobilization bid item for the entire project.

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.

At the Engineer's discretion the approved cost break-down may be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost

break-down, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

The cost breakdown shall, as a minimum, include the following items:

- foundations - each type
- standards and poles - list by each type
- conduit - list by each size and installation method
- pull boxes - each type
- conductors - each size and type
- service equipment enclosures
- telephone demarcation box
- signal heads and hardware - each type
- pedestrian signal heads and hardware - each type
- pedestrian push buttons
- loop detectors - each type
- luminaires - each type

### **10-3.03 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS**

Traffic signal system shutdowns shall be limited to periods between the hours of 9:00 a.m. and 3:00 p.m.

Full compensation for maintaining existing and temporary electrical systems shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

Traffic signal system shutdowns shall be limited to periods allowed for lane closures listed or specified in "Maintaining Traffic" of these special provisions.

### **10-3.04 FOUNDATIONS**

Foundations for all electrical systems shall conform to Section 86-2.03 Foundations of the Standard Specifications.

The first sentence of the eighth paragraph in Section 86-2.03, "Foundations," of the Standard Specifications is amended to read:

Anchor bars or studs and nuts, except for Type 30 and Type 31 lighting standards, shall conform to ASTM Designation: A 307. Headed anchor bolts for foundations shall conform to the specifications of ASTM Designation: A 307, Grade B with S1 supplementary requirements. At the option of the contractor, nonheaded anchor bolts for foundations shall conform either to the specifications of ASTM Designation: A 307, Grade C or to the provisions in AASHTO Designation: M 314, Grade 36 or 55 with S1 supplementary requirements. When nonheaded anchor bolts conforming to the specifications of ASTM Designation: A 307, Grade C are furnished, the end of each fabricated anchor bolt shall be either coded by end stamping as required in ASTM Designation: A 307 or the end that projects from the concrete shall be permanently coded with a green color by the manufacturer.

Portland cement concrete shall conform to Section 90-10, "Minor Concrete," of the Standard Specifications except concrete for reinforced pile foundations shall contain not less than 564 pounds of cement per cubic yard.

Except when located on structures, foundations for posts, standards and pedestals shall be placed "in the solid" and monolithic except for the top 2 inches which shall be placed after the post, standard or pedestal is in proper position.

When a foundation is to be abandoned, the top of foundation, anchor bolts and conduits shall be removed to a depth of not less than 0.5-foot below surface of sidewalk or unimproved ground. The resulting hole shall be backfilled with material equivalent to the surrounding material.

### **10-3.05 STANDARDS, STEEL PEDESTALS AND POSTS**

Where the plans refer to the side tenon detail at the end of the signal mast arm, the applicable tip tenon detail may be substituted.

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

The sign panels will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Sheet steel shall have a minimum yield of 48,000 psi.

Handholes for signal standards shall be located 90° clockwise from the traffic signal mast arm.

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.

### 10-3.06 CONDUIT

Conduit to be installed underground shall be Type 1. . Detector termination conduits shall be Type 3 or Type 4.

The conduit in a foundation and between a foundation and the nearest pull box shall be Type 1.

When a standard coupling cannot be used for joining Type 1 conduit, a UL listed threaded union coupling conforming to the provisions in Section 86-2.05C, "Installation," of the Standard Specifications, or a concrete-tight split coupling, or concrete-tight set screw coupling shall be used.

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 those locations where conduit is required to be installed under pavement and existing underground facilities require special precautions in conformance with the provisions in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" in conformance with the provisions in Section 86-2.05C, "Installation," of the Standard Specifications, except that conduit shall only be the rigid steel type..

At locations where conduit is required to be installed under pavement and if a delay to vehicles will not exceed 5 minutes, conduit may be installed by the "Trenching in Pavement Method."

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

**FIBER OPTIC CONDUIT.**--Fiber optic conduit is described elsewhere in these special provisions.

### 10-3.07 PULL BOXES

Grout shall be placed in the bottom of pull boxes. Grout shall be placed in between the pull box and pull box extension.

### 10-3.08 TRAFFIC PULL BOXES

Traffic pull boxes and covers shall have a vertical proof-load strength of 25,000 pounds. The 25,000 pound load shall be distributed through a 9" x 9" x 2" steel plate according to Federal Specification RR-F-621e. This load shall be placed anywhere on the box and cover for a period of one minute without causing any cracks or permanent deformations.

The No. 5(T) pull boxes shall be reinforced with a galvanized Z-bar welded frame and cover similar to that shown on the plans for No. 6(T) pull boxes. Frames shall be anchored to the boxes by means of 1/4 inch x 2 1/4-inch long concrete anchors. Six concrete anchors shall be provided for each No. 5(T) and No. 6(T) pull box, one placed in each corner and one placed near the middle of each of the longer sides.

Hold down screws shall be 3/8 inch hex flange cap screws of Type 316 stainless steel. The nut shall be zinc plated carbon steel and shall be made vibration resistant with a wedge ramp at the root of the thread. The nut shall be spot welded to the underside of, or fabricated with, the galvanized Z-bar pull box frame.

Steel covers shall be countersunk approximately 1/4 inch to accommodate the bolt head. The bolt head shall not extend more than 1/8 inch above the top of the cover when tightened down. A 1/4 inch tapped hole and brass bonding screw shall be provided.

The opening of traffic pull boxes shall have the following dimensions.

Pull Box Type	Width (±1 inch)	Length (±1 inch)
No. 5(T)	13"	24"
No. 6(T)	17"	30"

Concrete placed around and under traffic pull boxes as shown on the plans shall contain a minimum of 564 pounds of cement per cubic yard.

After the installation of traffic pull boxes, the steel covers shall be installed and kept bolted down during periods when work is not actively in progress at the pull box. When placing the steel cover for the final time, the cover and the Z-bar frame shall be cleaned of all debris and securely tightened down.

### 10-3.09 CONDUCTORS AND WIRING

Splices shall be insulated by "Method B". The third paragraph of Section 86-2.08B, "Multiple Circuit Conductors," of the Standard Specifications is amended to read:

Conductors for wiring wall and soffit luminaires shall be stranded copper, with insulation rated for use at temperatures up to 125°C.

In addition to the requirements for splices in detector circuits, the open end of cable jackets or tubing shall be sealed in a manner similar to the splicing requirements to prevent the entrance of water.

Section 86-2.09D, "Splicing," of the Standard Specifications is amended by retitling as "Splicing and Terminations," and the last paragraph is amended to read:

All splices and terminal lugs for conductor sizes No. 8 and smaller shall be soldered by the hot iron, pouring or dipping method. Open flame soldering will not be permitted.

The minimum insulation thickness, at any point, for Type USE, RHH or RHW wire shall be 1.0 mm for conductor sizes No. 14 to No. 10, inclusive, and 1.3 mm for No. 8 to No. 2, inclusive. The minimum insulation thickness, at any point, for Type THW and TW wires shall be 0.69 mm for conductor sizes No. 14 to No. 10, inclusive, 1.02 mm for No. 8, and 1.37 mm for No. 6 to No. 2, inclusive.

**SIGNAL INTERCONNECT CABLE**--Signal Interconnect Cable (SIC) shall be the 6-pair type.

**TESTING**--The Contractor shall perform a high-voltage series lighting test consisting of the open circuit voltage of the connected constant current transformer between conductors and ground.

The high-voltage test shall not be performed on existing circuits or equipment. Non-testing of existing circuits and equipment shall not relieve the Contractor from the responsibility for malfunctioning of existing lighting circuits due to the Contractor making splices in or connecting to the circuits and such malfunctions shall be corrected at the Contractor's expense.

### **10-3.10 SERVICE**

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

The Contractor shall pay all electrical and telephone service connection fees.

The State will pay electrical and telephone billing fees generated by usage of the project systems.

**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.

The inscription on 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.

### **10-3.11 NUMBERING ELECTRICAL EQUIPMENT**

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

### **10-3.12 STATE-FURNISHED CONTROLLER ASSEMBLIES**

The Model 170 controller assemblies, including controller unit, completely wired controller cabinet and inductive loop detector sensor units, but without anchor bolts, will be State-furnished as provided under "Materials" of these special provisions.

Model 170 controller assemblies will conform to the requirements in "Transportation Electrical Equipment Specifications," (TEES) and "Traffic Signal Control Equipment Specifications" (TSCES), issued by the State of California, Department of Transportation, and to all addendums thereto current at the time of project advertising.

The provisions in Sections 86-3.07, "Controller Cabinets," and 86-3.07D, "Cabinet Accessories," shall not apply to Model 170 controller assemblies.

The Contractor shall construct each controller cabinet foundation as shown on the plans for Model 332 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.

### **10-3.13 IRRIGATION CONTROLLER ENCLOSURE CABINET**

Irrigation controller enclosure cabinets (CEC) shall be constructed and the equipment within the cabinets shall be installed in conformance with the details shown on the plans, the provisions in the Standard Specifications, and these special provisions.

Irrigation controller enclosure cabinets shall be fabricated in conformance with the provisions in Section 86-3.07A, "Cabinet Construction," of the Standard Specifications.

Irrigation controller enclosure cabinets shall be fabricated of stainless steel .

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 "Materials" of these special provisions.

The plywood mounting panel shall be 3/4 inch exterior AC grade veneer plywood. The panel shall be painted with one application of an exterior, latex based, wood primer and 2 applications of an exterior, vinyl acrylic enamel, white in color. The plywood panel shall be painted on all sides and edges prior to installation of the panel in the cabinet and equipment on the panel.

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

Duplex convenience receptacles shall have ground-fault circuit interruption as defined by the Code. Circuit interruption shall occur on 6 mA of ground-fault current and shall not occur on less than 4 mA. Receptacles shall be installed in a weatherproof housing with rainproof lift covers.

Solid-state automatic shut-off rain sensor units shall be installed in vandal resistant enclosures mounted on the top of the irrigation controller enclosure cabinets. Rain sensor units shall automatically interrupt the master remote control valves(specified elsewhere in these special provisions) 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 controller enclosure cabinets will be measured by the unit as determined from actual count in place.

Full compensation for providing and installing irrigation controller enclosure cabinets, including rain sensor units, in place shall be considered as included in the contract lump sum price paid for irrigation system, as specified in these special provisions, and no additional compensation will be allowed therefor.

#### **10-3.14 VEHICLE SIGNAL FACES AND SIGNAL HEADS**

Lamps for vehicular traffic signal units (except programmed visibility type) will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

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 MODULES**

##### **GENERAL**

For traffic signal faces, the 300-mm red sections, the 200-mm red sections and the red arrow sections shall utilize light emitting diode (LED) signal modules.

Each LED signal module shall consist of an assembly that utilizes light emitting diodes as the light source.

Each Type 2 LED signal module shall be designed to mount in the standard lamp socket normally used with an incandescent lamp. When a Type 2 LED signal module is used, a standard traffic signal lens in the door frame shall be used or, at the option of the Contractor, the standard lens may be replaced with a translucent red lens to seal the signal section from weather. The installation of a Type 2 LED signal module shall not require modification to the standard lamp socket or reflector.

LED signal modules shall be from the same manufacturer and each size shall be the same model.

A Type 2 LED signal module shall be a sealed unit containing components necessary for operation except, at the option of the Contractor, use of a corresponding lens mounted in the door frame will be allowed.

Type 2 LED signal modules shall not require a specific mounting orientation or have a variance in light output, pattern or visibility for any mounting orientation.

The lens used with a Type 2 LED signal module shall be sealed in the door frame with a one-piece ethylene propylene rubber (EPDM) gasket.

The LEDs shall utilize AlInGaP technology and shall be the ultra bright type or equivalent rated for 100,000 hours of continuous operation from -40°C to +74°C.

The individual LEDs shall be wired such that physical damage or the failure of one LED will result in the loss of not more than 5 percent of the LED signal module light output.

Maximum power consumption requirements for LED signal modules shall be as follows:

	25°C	74°C
300 mm Circular	25.0 W	30.0 W
200 mm Circular	15.0 W	18.0 W
300 mm Arrow	15.0 W	18.0 W

LED signal modules shall be rated for a minimum useful life of 48 months.

LED signal modules shall be rated for use in the operating temperature range of -40°C to +74°C.

LED signal modules shall be single, self-contained devices, not requiring on-site assembly for installation into existing traffic signal housing. The power supply for the LED signal module shall be integral to the unit.

The LED signal module assembly shall be manufactured to withstand mechanical shock and vibration from high winds and other sources.

Enclosures containing either the power supply or electronic components of LED signal modules shall be made of UL94VO flame retardant materials. The lens of the LED signal module is excluded from this specification.

Each LED signal module shall have the manufacturer's name, trademark, model number, serial number, lot number, and the month and year of manufacture permanently marked on the back of the LED signal module.

The following operating characteristics shall be identified: rated voltage, power consumption and volt-ampere (VA).

### PHOTOMETRIC REQUIREMENTS

The minimum initial luminous intensity values for LED signal modules shall be as specified in Section 11.04 of the ITE publication ST-008B, "Vehicle Traffic Control Signal Heads (VTCSH)" at 25°C.

LED signal modules shall meet or exceed 85 percent of the standard light output values specified in the VTCSH, after 48 months of continuous use over the temperature range of -40°C to +74°C in a traffic signal operation.

The measured chromaticity coordinates of LED signal modules shall conform to the chromaticity specifications of Section 8.04 and Figure 1 of the VTCSH over the temperature range of -40°C to +74°C.

In addition to the specifications for circular LED signal modules, LED red arrow signal modules shall conform to the following:

The LED red arrow signal module indication shall meet existing specifications stated in Section 9.01 of the VTCSH for arrow lenses. The LEDs shall be spread evenly across the illuminated portion of the arrow area. Each LED signal section indication shall provide an average luminous intensity of 5500 cd/m<sup>2</sup>. Measurements shall be performed at rated operating voltage of 120 VAC.

### ELECTRICAL

LED signal modules shall operate from a 60 Hz ±3 Hz AC line over a voltage range from 95 V to 135 V. The LED circuitry shall prevent perceptible flicker over the specified voltage range. The fluctuations of line voltage shall have no visible effect on the luminous intensity of the indications. Rated voltage for the measurements shall be 120 V.

The LED signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients as specified in Section 2.1.6 of NEMA Standard TS2-1992.

LED signal modules shall be operationally compatible with currently used controller assemblies (solid state load switches, flashers and conflict monitors).

LED signal modules and associated on-board circuitry shall meet Federal Communications Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.

LED signal modules shall provide a power factor of 0.90 or greater while operating throughout the temperature range of -40°C to +74°C.

Total harmonic distortion (current and voltage) induced into an AC power line by a LED signal module shall not exceed 20 percent while operating throughout the temperature range of -40°C to +74°C.

### TESTING

The LED signal modules tested or submitted for testing shall be representative of typical average production units. Circular LED signal modules shall be tested in conformance with the requirements in California Test 604. Optical testing shall be performed with the LED signal module mounted in a standard traffic signal section but without a visor or hood attached to the signal section.

#### Design Qualification Testing

Design Qualification Testing shall be performed by the manufacturer on new LED signal module designs, and on an existing design when a major design change has been implemented.

A quantity of 2 units for each design shall be submitted for Design Qualification Testing. Test units shall be submitted to the Department of Transportation, Transportation Laboratory, Office of Materials Engineering and Testing Services (METS), 5900 Folsom Boulevard, Sacramento, CA 95819, after manufacturer's testing is complete.

Manufacturer's test data shall be submitted with test units for METS verification of Design Qualification Testing data.

The sample LED signal modules shall be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at or greater than 74°C before performing Design Qualification Testing. For Design Qualification Testing, specifications measured shall include but not be limited to:

The luminous intensity measurements shall be taken over the temperature range of -40°C to +74°C.

Color requirements shall be measured while operating throughout the temperature range of -40°C to +74°C.

Specified parameters shall be measured and used for quality comparison of Production Quality Assurance current measurement on production LED signal modules.

LED signal modules shall be tested for compatibility with the controller unit, conflict monitor and load switch. Each LED signal module shall be connected to the output of a standard load switch connected to an AC voltage supply between the values of 95 VAC and 135 VAC with the input to the load switch in the "OFF" position. The AC voltage developed across each LED signal module so connected shall not exceed 10 V rms as the input AC voltage is varied from 95 V rms to 135 V rms.

Mechanical vibration testing shall be according to MIL-STD-883, Test Method 2007, using 3 four minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 Hz to 120 Hz. The loosening of the lens, of internal components, or other physical damage shall be cause for rejection.

Temperature cycling shall be performed according to MIL-STD-883, Test Method 1010. The temperature range shall be according to "Environmental Requirements." A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at each temperature. LED signal modules shall be tested under operating conditions. Failure of an LED signal module to function properly or evidence of cracking of the LED signal module lens or housing after temperature cycling shall be cause for rejection.

Moisture resistance testing shall be performed on LED signal modules according to NEMA Standard 250-1991 for Type 4 enclosures. Evidence of internal moisture after testing shall be cause for rejection.

#### **Production Quality Control Testing**

The following Production Quality Control tests shall be performed on each new LED signal module prior to shipment:

A single point measurement with a correlation to the intensity requirements of Section 1.04 of the VTCSH may be used.

The ambient temperature for this measurement shall be greater than 25°C.

Each LED signal module not meeting minimum luminous intensity requirements according to Table 1 of VTCSH for circular indications, or 5500 cd/m<sup>2</sup> for arrow indications shall be cause for rejection. The manufacturer shall retain test results for 7 years.

For the burn-in period, each LED signal module shall be energized at rated voltage for a 30 minute stabilization period before the measurement is made.

Each LED signal module shall be tested for rated initial intensity after burn-in.

Each LED signal module shall be tested for required power factor after burn-in.

Each LED signal module shall be measured for current flow in amperes after burn-in. The measured current values shall be compared against rated values resulting from design qualification measurements under "Design Qualification Testing." The current flow shall not exceed the rated value. The measured ampere values with rated voltage shall be recorded as volt-ampere (VA) on the product labels.

Each LED signal module shall be visually inspected for exterior physical damage or assembly anomalies. Careful attention shall be paid to the surface of the lens to ensure that no scratches (abrasions), cracks, chips, discoloration or other defects are apparent. Defects shall be cause for rejection.

#### **Production Quality Assurance Testing**

Production Quality Assurance Tests may be performed on each new LED signal module. The LED signal modules tested or submitted for testing shall be representative of typical average production units.

Circular LED signal modules shall be tested in conformance with the requirements in California Test 604 and as specified in these special provisions.

Optical testing shall be performed with the LED signal module mounted in a standard traffic signal section but without a visor or hood attached to the signal section.

The number of units tested (sample size) shall be determined by the quantity of each model in the shipment. The sample size shall conform to the requirements of American National Standard Institute/Acceptance Sampling in Quality Control, ANSI/ASQC Z1.4.

The State will determine the sampling parameters to be used for the random sample testing.

Specified parameters may be tested on the sample.

Acceptance or rejection of the shipment shall conform to the requirements of ANSI/ASQC Z1.4 for shipments which are sampled randomly.

Upon rejection of the shipment, the vendor shall arrange for pick-up of the shipment at no cost to the State.

#### **Certificate of Compliance**

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 shall certify that the LED signal modules comply with the requirements of these specifications. The certificate shall also include a copy of applicable test reports on the LED signal modules.

### **10-3.16 LIGHT EMITTING DIODE PEDESTRIAN SIGNAL FACE "UPRAISED HAND" MODULE**

#### **GENERAL**

For Type A pedestrian signal faces on this project, the pedestrian signal face "Upraised Hand" section shall utilize a light emitting diode (LED) module.

Each LED pedestrian signal module shall consist of an assembly that utilizes light emitting diodes as the light source for pedestrian signal faces in lieu of an incandescent lamp.

LED pedestrian signal modules shall be designed to mount in the standard lamp socket of an existing Type A pedestrian signal housing. The installation of a LED pedestrian signal module shall not require modification to the standard lamp socket or reflector.

LED pedestrian signal modules shall be from the same manufacturer.

The circuit board and power supply shall be integral to the unit. Printed circuit boards shall conform to Chapter 1, Section 6 of the "Transportation Electrical Equipment Specifications" published by the State of California, Department of Transportation.

LED pedestrian signal modules shall not require a specific mounting orientation or have a variance in light output, pattern or visibility for any mounting orientation.

The LEDs shall utilize AlInGaP technology and shall be the ultra bright type or equivalent rated for 100,000 hours of continuous operation from -40°C to +74°C.

The individual LEDs shall be wired such that physical damage or the failure of one LED will result in the loss of not more than 5 percent of the pedestrian signal modules light output.

Maximum power consumption requirements for LED pedestrian signal modules shall be 15.0 W at 25°C and 18.0 W at 74°C.

The luminance of the UPRAISED HAND symbol shall be 348 cd/ft<sup>2</sup> minimum. The color of UPRAISED HAND shall be Portland orange conforming to the requirements of the Institute of Transportation Engineers Standards: "Pedestrian Traffic Control Signal Indications" and the "Manual on Uniform Traffic Control Devices." The height of each symbol shall be not less than 9.8 inches and the width of each symbol shall be not less than 6.5 inches.

The uniformity ratio of an illuminated symbol shall not exceed 4 to 1 between the highest luminance area and the lowest luminance area.

LED pedestrian signal modules shall be rated for a minimum useful life of 48 months.

#### **PHYSICAL AND MECHANICAL REQUIREMENTS**

LED pedestrian signal modules shall be designed as retrofit replacements for existing optical units and shall not require special tools for installation. LED pedestrian signal modules shall fit into existing pedestrian signal face housings built according to the specifications of "Vehicle Traffic Control Signal Heads (VTCSH)" without modification to the housing.

Installation of LED pedestrian signal modules shall only require removal of the lamp.

LED pedestrian signal modules shall be rated for use in the operating temperature range of -40°C to +74°C.

LED pedestrian signal modules shall be single, self-contained devices, not requiring on-site assembly for installation into an existing Type A Housing. The power supply for LED pedestrian signal modules shall be integral to the unit.

LED pedestrian signal modules shall be manufactured to withstand mechanical shock and vibration from high winds and other sources.

Enclosures containing either the power supply or electronic components of LED pedestrian signal modules shall be made of UL94VO flame retardant materials.

Each LED pedestrian signal module shall have the manufacturer's name, trademark, model number, serial number, lot number, and the month and year of manufacture permanently marked on the back of the module.

The following operating characteristics shall be identified: rated voltage, power consumption and volt-ampere (VA).

### **PHOTOMETRIC REQUIREMENTS**

The minimum initial luminous intensity values for LED pedestrian signal modules shall be 3750 cd/m<sup>2</sup>.

LED pedestrian signal modules shall meet or exceed 85 percent of 348 cd/ft<sup>2</sup> after 48 months of continuous use over the temperature range of -40°C to +74°C in a traffic signal operation.

The measured chromaticity coordinates of LED pedestrian signal modules shall conform to the chromaticity requirements of Section 5.3.2.1 and Figure C of the VTCSH while operating throughout the temperature range of -40°C to +74°C.

### **ELECTRICAL**

LED pedestrian signal modules shall operate from a 60 Hz ±3 Hz AC line over a voltage ranging from 95 V to 135 V. The circuitry of LED pedestrian signal modules shall prevent perceptible flicker over the voltage range specified above. The fluctuations of line voltage shall have no visible effect on the luminous intensity of the indications. Rated voltage for the measurements shall be 120 V.

On-board circuitry of the LED pedestrian signal modules shall include voltage surge protection to withstand high-repetition noise transients as stated in Section 2.1.6 of NEMA Standard TS2-1992.

LED pedestrian signal modules shall be operationally compatible with currently used controller assemblies (solid state load switches, flashers and conflict monitors).

LED pedestrian signal modules and associated on-board circuitry shall meet Federal Communications Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.

LED pedestrian signal modules shall provide a power factor of 0.90 or greater while operating throughout the temperature range of -40°C to +74°C.

Total harmonic distortion (current and voltage) induced into an AC power line by LED pedestrian signal modules shall not exceed 20 percent while operating throughout the temperature range of -40°C to +74°C.

### **TESTING**

The LED pedestrian signal modules tested or submitted for testing shall be representative of typical average production units. Modules shall be tested in conformance with the requirements in California Test 606. Optical testing shall be performed with the module mounted in a Type A Housing but without a visor or hood attached to the housing.

#### **Design Qualification Testing**

Design Qualification Testing shall be performed by the manufacturer on new LED pedestrian signal module designs, and on an existing design when a major design change has been implemented.

A quantity of 2 units for each design shall be submitted for Design Qualification Testing. Test units shall be submitted to the Department of Transportation, Transportation Laboratory, Office of Materials Engineering and Testing Services (METS), 5900 Folsom Boulevard, Sacramento, CA 95819, after manufacturer's testing is complete.

Manufacturer's test data shall be submitted with test units for METS verification of Design Qualification Testing data.

The sample LED pedestrian signal modules shall be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at or greater than 74°C before performing Design Qualification Testing. For Design Qualification Testing, specifications measured shall include but not be limited to:

The luminous intensity measurements shall be taken over the temperature range of -40°C to +74°C.

Color requirements shall be measured while operating throughout the temperature range of -40°C to +74°C.

Specified parameters shall be measured and used for quality comparison of Production Quality Assurance current measurement on production modules.

Modules shall be tested for compatibility with the controller unit, conflict monitor and load switch. Each module shall be connected to the output of a standard load switch connected to an AC voltage supply between the values of 95 VAC and 135 VAC. The AC voltage developed across each module so connected shall not exceed 10 V rms as the input AC voltage is varied from 95 V rms to 135 V rms.

Mechanical vibration testing shall be according to MIL-STD-883, Test Method 2007, using 3 four minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 Hz to 120 Hz. The loosening of the lens or of internal components, or other physical damage shall be cause for rejection.

Temperature cycling shall be performed according to MIL-STD-883, Test Method 1010. The temperature range shall be according to "Environmental Requirements." A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at each temperature. Modules under test shall be

tested under operating conditions. Failure of a module to function properly or evidence of cracking of the module lens or housing after temperature cycling shall be cause for rejection.

Moisture resistance testing shall be performed on modules mounted in a standard pedestrian signal housing according to NEMA Standard 250-1991 for Type 4 enclosures. Evidence of internal moisture after testing shall be cause for rejection.

#### **Production Quality Control Testing**

The following Production Quality Control tests shall be performed on each new LED pedestrian signal module prior to shipment:

The ambient temperature for this measurement shall be greater than 25°C.

Each module not meeting minimum luminous intensity of 348 cd/ft<sup>2</sup> shall be cause for rejection.

The LED pedestrian signal modules tested or submitted for testing shall be representative of typical average production units. The manufacturer shall retain test results for 7 years.

For the burn-in period, each LED pedestrian signal module shall be energized at rated voltage for a 30 minute stabilization period before the measurement is made.

After burn-in each LED pedestrian signal module shall be tested for rated initial intensity and for required power factor.

Each LED pedestrian signal module shall be measured for current flow in amperes after burn-in. The measured current values shall be compared against rated values resulting from design qualification measurements under "Design Qualification Testing." The current flow shall not exceed the rated value. The measured ampere values with rated voltage shall be recorded as volt-ampere (VA) on the product labels.

Each LED pedestrian signal module shall be visually inspected for exterior physical damage or assembly anomalies. Defects shall be cause for rejection.

#### **Production Quality Assurance Testing**

Production quality assurance testing may be performed on each new LED pedestrian signal module.

LED pedestrian signal modules shall be tested in conformance with the requirements in California Test 606 and as specified in these special provisions.

Optical testing shall be performed with the LED pedestrian signal module mounted in a standard Type "A" Pedestrian Housing, but without a visor or hood attached to the housing.

The number of units tested (sample size) shall be determined by the quantity of each model in the shipment. The sample size shall conform to the specifications of American National Standard Institute/Acceptance Sampling in Quality Control, ANSI/ASQC Z1.4.

The State will determine the sampling parameters to be used for the random sample testing.

Specified parameters may be tested on the sample.

Acceptance or rejection of the shipment shall conform to the requirements of ANSI/ASQC Z1.4 for shipments which are sampled randomly .

Upon rejection of the shipment, the vendor shall arrange for pick-up of the shipment at no cost to the State.

#### **Certificate of Compliance**

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 shall certify that the LED pedestrian signal modules comply with the requirements of these specifications. The certificate shall also include a copy of applicable test reports on the modules.

### **10-3.17 PROGRAMMED VISIBILITY VEHICLE TRAFFIC SIGNAL HEADS**

Lamps shall be furnished by the Contractor.

Programmed visibility vehicle traffic signal heads shall be provided on the signal bridge as shown on the plans at Station 20+83.50, Sierra Avenue.

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

Lamps for the signal units shall be 150-W, 120 V(ac), incandescent lamps with a minimum average rated life of 6000 hours. The lamp and socket shall be the 3-prong type.

### **10-3.18 PEDESTRIAN SIGNALS**

Lamps for Type A pedestrian signals will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Pedestrian signal faces shall be Type A unless otherwise specified and shall conform to the following:

Each Type A signal shall consist of a housing, two-color message plate, a reflector assembly, one incandescent lamp and one Light Emitting Diode Module conforming to the provisions in Section 86-4.07, "Light Emitting Diode Pedestrian Signal Face 'Upraised Hand' Module," with sockets and a front screen.

Each message plate shall be one piece and shall be made of 3-mm minimum thickness, ultraviolet stabilized polycarbonate plastic or 4.7-mm tempered glass. The symbols shall be applied to the inside smooth surface of the message plate.

Each reflector assembly shall consist of a double reflector or 2 single reflectors. Each reflector shall be made of either aluminum or plastic. Reflectors shall conform to the requirements in Institute of Traffic Engineers Publication: ST-008B, "Vehicle Traffic Control Signal Heads." Plastic reflectors shall consist of molded or vacuum-formed plastic with a vacuum-deposited aluminum reflecting surface. The plastic material shall not distort when the reflector is used with the lamp of the wattage normally furnished with the signal. In addition, the UL nonmechanical loading temperature of the material shall exceed, by at least 10°C, the maximum temperature in the signal section with the lamp "ON" and measured in an ambient air temperature of 25°C in conformance with the requirements in UL Publication UL 746B. Each completed reflector shall, when operated with the appropriate lamp and lens, provide the message brightness specified.

For Type C and Type G pedestrian signals at crossings where the distance from the near curb to the pedestrian signal indication is 60 feet or less, the luminance of the UPRaised HAND symbol shall be 280 foot-lamberts, minimum, and the luminance of the WALKING PERSON symbol shall be 1,000 foot-lamberts, minimum.

### **10-3.19 DETECTORS**

Loop detector sensor units will be State-furnished as provided under "Materials" of these special provisions.

Loop wire shall be Type 2.

Loop detector lead-in cable shall be Type B.

Slots shall be filled with hot-melt rubberized asphalt sealant. In addition to the requirements for splices in detector circuits, the open end of cable jackets or tubing shall be sealed in a manner similar to the splicing requirements to prevent the entrance of water.

At the Contractor's option, where a Type A or a Type B loop is designated on the plans, a Type E loop may be substituted.

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 3/4 inch. Loop wire for circular loops shall be Type 2. Slots of circular loops shall be filled with hot melt rubberized asphalt sealant.

### **PREFORMED INDUCTIVE LOOPS**

Prefomed inductive loops shall be the type shown on the plans.

The loop shall be 6 foot square unless otherwise shown. The loop shall consist of 4 turns of No. 16, or larger, wire with Type THWN or TFFN insulation.

The loop wires shall be encased in S3/8 inch, minimum, Schedule 40 or Schedule 80 PVC or polypropylene conduit. The conduit shall be sealed to prevent the entrance of water and the movement of wires within the conduit.

The loop wires from the preformed loop to the adjacent pull box shall be twisted together into a pair (at least 2 turns per foot) and encased in Schedule 40 or Schedule 80 PVC or polypropylene conduit between the preformed loop and the adjacent pull box or detector handhole. The lead-in conduit shall be sealed to prevent the entrance of water at the pull box or handhole end.

In new roadways, the preformed loops and lead-in conduits shall be placed in the base course, with the top of the conduit flush with the top of the base, and then covered with asphalt concrete or portland cement concrete pavement. Prefomed loops and lead-in conduits shall be protected from damage prior to and during pavement placement.

In new reinforced concrete structure decks, the preformed loops shall be secured to the top of the uppermost layer of reinforcing steel using nylon wire ties. The loop shall be held parallel to the structure deck by using PVC or polypropylene spacers where necessary. Conduit for lead-in conductors shall be placed between the uppermost 2 layers of reinforcing steel.

### **10-3.20 VEHICLE DETECTION SYSTEM**

The vehicle detection system, as shown on the Temporary Traffic Signal plans shall conform to these special provisions.

#### **GENERAL**

The following are the minimum requirements for a system that monitors vehicles on a roadway via processing of idea images and provides detector outputs to a traffic controller.

### **System Hardware**

The system shall consist of one to six synchronous television image sensors or other synchronous video source(s), an automatic control unit (ACU) and a supervisor computer.

### **System Software**

The system shall be able to detect vehicles in multiple traffic lanes. A minimum of 60 detection zones shall be user-definable through interactive graphics by placing lines or boxes in an image on a VGA monitor. The user shall be able to redefine previously defined detection zones. The ACU shall calculate traffic parameters in real time and provide local non-volatile data storage for later downloading and analysis.

## **FUNCTIONAL CAPABILITIES**

### **Real-Time Detection**

The ACU shall be capable of simultaneously processing information from up to six synchronous video sources including image sensors and video tape players. The video shall be digitized and analyzed at a rate of 30 times per second.

The system shall be able to detect the presence of vehicles in at least 60 detection zones within the combined field of view of the image sensors.

Different detector types shall be selectable via software. Detector types shall include stop-line detectors, presence detectors, directional presence detectors and speed trap detectors. The speed trap detectors shall report vehicle speed and vehicle classification based on length. Three length categories shall be user-definable in software.

Once the ACU has been properly set up using the supervisor computer, it shall be possible to disconnect the supervisor computer. The ACU shall then detect vehicles as a stand alone unit, calculate traffic parameters in real-time, and store traffic parameters in its own non-volatile memory.

### **Local Data Storage**

The ACU shall count vehicles in real-time and compute the average of traffic parameters over user-defined time intervals (or time slices), as follows:

Volume: Number of vehicles detected during the time interval.

Occupancy: Lane occupancy measure in percent of time.

Vehicle Classification: Number of automobiles, single unit trucks or tractor trailers, as defined by length.

Flow Rate: Vehicles per hour per lane.

Headway: Average time interval between vehicles.

Speed: Average vehicle speed in MPH or KPH.

The duration of the time intervals (or time slices) shall be user-selectable as none, 20 or 30 seconds, 1, 5, 10, 15, 30 or 60 minutes.

The time-interval data shall be retained in non-volatile EEPROM flash memory within the ACU for later downloading and analysis. The amount of memory shall be 2 MB or 4 MB, as specified. The base memory of 2 MB shall allow the accumulation of 15-minute time-interval traffic data for 48 detection collection zones for a minimum of seven days.

Retrieval of data stored in the non-volatile memory of the ACU shall be via a serial communications port. Provision shall be made for downloading of data via a modem and dial-up telephone lines, via private cable or fiber optic network, or via direct connection to another computer by cable.

### **Operation With Supervisor On-Line**

Once the detector configuration has been downloaded from the supervisor computer into the ACU, it shall be possible to operate the video detection system either with the supervisor computer disconnected or on-line.

When the supervisor computer is on-line, it shall be possible to view vehicle detections in real-time as they occur on the supervisor's color VGA display.

It shall be possible to automatically save the time-interval traffic data on hard disk following completion of each time interval. This traffic data shall include volume, flow rate, lane occupancy, headway, speed, and also be possible to save on hard disk the complete time data for each vehicle detection. The collected traffic and detection data shall be made available in readily accessible ASCII format. The video detection software of the host computer shall provide fine management routines for efficiently filing, retrieving and reporting of the collected traffic data.

It shall be possible to display the captured traffic data on the VGA screen of the supervisor computer in numeric format. The data to be displayed shall be selected by pull-down menus and shall be in the form of windows under the Windows 3.1 graphics operating environment.

Communications with the supervisor computer shall be done using either a point-to-point or a multi-drop communications architecture, and shall employ an error checking communications protocol.

## **VEHICLE DETECTION**

### **Detection Zone Placement**

The video detection system shall provide flexible detection zone placement anywhere and at any orientation within the combined field of view of the image sensors. Preferred presence detector configurations shall be lines placed across lanes of traffic or lines placed in-line with lanes of traffic. A single detector line shall be able to replace multiple conventional detector loops connected in series.

### **Detection Zone Programming**

Placement of detection zones shall be by means of a supervisor computer operating in the Windows 3.1 graphics environment and a mouse. The VGA monitor shall show images of the detection zones superimposed on the video image of traffic.

The detection zones shall be created by using the mouse to draw detection lines on the supervisor computer's VGA monitor. It shall be possible to save the detector configurations on disk, to download detector configurations to the ACU, and to retrieve the detector configuration that is currently running in the ACU.

It shall be possible to use the mouse to edit previously defined detector configurations so as to fine-tune the detection zone placement. Once a detection configuration has been created, the supervisor computer system shall provide a graphic display of the new configuration on its own VGA screen.

It shall be possible to individually adjust sensitivity, persistence and shadow compensation for each detection zone in the system.

When a vehicle is under a detection zone, the detection zone shall change in color or intensity on the VGA monitor thereby verifying proper operation of the detection system.

### **Optimal Detection**

The video detection system shall reliably detect vehicle presence when the image sensor is mounted 30 feet or higher above the roadway, when the image sensor is adjacent to the desired coverage area, and when the length of the detection area or field of view (FOV) is not greater than ten times the mounting height of the image sensor. The image sensor shall not be required to be mounted directly over the roadway. A single image sensor, placed at the proper mounting height with the proper lens, shall be able to monitor six to eight traffic lanes simultaneously.

### **Detection Performance**

Overall performance of the video detection system shall be comparable to inductive loops. Using standard image sensor optics and in the absence of occlusion, the system shall be able to detect vehicle presence with 98 percent accuracy under normal conditions, (day & night) and 96 percent accuracy under adverse conditions (fog, rain, snow).

## **ACU HARDWARE**

### **ACU Mounting**

The ACU shall mount into a 19 inch EIA equipment rack assembly or be shelf-mountable. Nominal outside dimensions excluding connectors shall be 5-1/2" x 17-1/4" x 10-1/8" (H x W x D).

### **ACU Environmental**

The ACU shall be designed to operate reliably in the adverse environment found in the typical roadside traffic cabinet. It shall meet the environmental requirements set forth by the NEMA (National Electrical Manufacturers Association) TS1 and TS2 specifications as well as the environmental requirements for Type 170 and Type 179 controllers. Operating temperature shall be from -35°C to +74°C at over a relative humidity range from 0 percent to 95 percent, non condensing.

### **ACU Electrical**

The ACU shall be modular in design and provide processing capability equivalent to the Intel 486SX microprocessor. The bus connections used to interconnect the modules of the ACU shall be gold-plated DIN connectors.

The ACU shall be powered over the following ranges: from 95 to 135 VAC, 60 Hz, single phase, and draw less than 2 A, or from 190 to 270 VAC, 50 Hz, single phase and draw less than 1 A. Surge ratings shall be as set forth in the NEMA TS1 and TS2 specifications.

Serial communications to the modem shall be through an RS-232 serial port. Serial communications to the supervisor shall be through an RS-232/RS-422 serial port. This port shall be able to down load traffic data stored in non-volatile

memory as well as the real-time detection information needed to show detector actuations. A "D" sub miniature connector on the front of the ACU shall be used for serial communications.

The ACU shall be available with a NEMA TS1 detector interface for 32 or 64 detector outputs. Output level shall be compatible with the NEMA TS1, NEMA TS2 Type 2, Type 170 and Type 179 standards.

NEMA red/green inputs for up to 12 phases shall be acceptable as inputs using an optional module to provide extend/delay functions. Sub miniature "D" connectors on the front of the ACU shall be used for discrete detector outputs.

The ACU shall be available with a NEMA TS2 Type 1 detector interface for 32 or 64 detector outputs, where the detector information is transmitted serially via RS-485. A "D" sub miniature connector shall be used for the serial detector output.

The ACU shall be available with two, four, or six RS-170 (NTSC) composite video inputs, so that signals from two, four, or six synchronous image sensors or other synchronous video sources can be processed in real-time. BNC connectors on the front of the ACU shall be used for video input.

The ACU shall be available with an RS-170 (NTSC) composite video output, which may correspond to any one of the video inputs, as selected remotely via RS-232. BNC connectors on the front of the ACU shall be used for video output.

As an alternative to RS-170 (NTSC) video format, the ACU shall be available with video inputs and outputs in the PAL format.

## **IMAGE SENSOR**

The video system shall use medium resolution, color or monochrome, CCD image sensors as the video source for real-time vehicle detection. As a minimum, each image sensor shall provide 383-line resolution and a 510 x 492 pixel CCD luminance level of 0.014 footcandle. The image sensor shall have automatic gain, automatic iris, and absolute black reference controls. The image sensor shall be factory adjusted and/or modified to have the limits of gain, iris and sensitivity set as required for proper performance with the video detection system.

The image sensor shall be equipped with an auto-iris lens with fixed focal length in the range from 3.7 mm to 75 mm. The focal length of the lens shall be selected to suit the site. The maximum aperture of the lens shall not be smaller than f1.4 and the minimum aperture of the lens shall not be larger than f300. The auto-iris capability of the lens shall operate reliably at -30°C.

The image sensor and lens assembly shall be housed in an environmental enclosure that is waterproof and dust-tight to NEMA-4 specifications. The environmental enclosure shall include provision to allow the image sensor horizon to be rotated. A heater shall be attached to the interior of the front face of the enclosure to avoid ice and condensation in cold weather. The environmental enclosure shall be light-colored and shall include a sunshield to minimize solar heating. The front edge of the sunshield shall project beyond the front edge of the environmental enclosure and shall include provision to divert water flow to the sides of the sunshield.

A galvanized steel junction box shall be provided as an option with each image sensor for installation on the pole used for image sensor mounting. The junction box shall contain a terminal block for power supply to the image sensor and connection points for coaxial cable.

A video interface panel shall be provided for installation inside of the traffic cabinet. The panel shall provide coaxial cable connection points and a transient voltage suppresser for each image sensor. The transient suppresser shall be equivalent to an Edco Model CX06-BNCY or equal.

The image sensor shall be connected to the ACU in such a manner that the attenuation of the RS170 video signal from the image sensor is not attenuated more than 3 db when measured at the ACU. When the connection between the image sensor and the ACU is coaxial cable, the coaxial cable used shall be Belden 8281 or an approved equal suited for outdoor installation.

## **SUPERVISOR COMPUTER SYSTEM**

The minimum supervisor computer system, as needed for detector setup and viewing of vehicle detections, shall consist of a supervisor computer and a video digitizer board.

Three types of supervisor computers shall be supplied:

A portable 386DX 33 Mhz computer with a proprietary digitizer card which permits viewing of real-time vehicle detections overlaying live roadway video on a integrated VGA monitor.

An environmentally hardened computer that is installed in the traffic cabinet or other site of the ACU, where the computer sorts and manages large amounts of traffic data.

A desktop computer located in control room environment, where the video signals are processed.

Each type of supervisor computer shall be supplied from the supplier of the video detection system. Minimum specifications for the supervisor computer shall be the following:

- PC-compatible
- 386 processor
- MS\_DOS 5.0
- Microsoft Window 3.1
- One free full-size AT-compatible expansion slot
- VGA monitor
- Keyboard
- Mouse
- 4 MB of RAM
- 3.5", 1.44 MB floppy disk drive
- 20 MB free space on hard disk drive

A video digitizer board shall be furnished and installed in the supervisor computer to capture video images. The board shall fit in the full-size AT-compatible expansion slot specified for the supervisor computer and shall be modified by the supplier as needed for operation with the vehicle detection system. This board shall replace the existing VGA board and duplicate its functionality. The digitizer will display real-time vehicle detections overlaid on a live roadway image when installed in the supervisor computer.

A 9600 baud modem shall be supplied for the supervisor computer to allow remote detector setup and retrieval of data stored in the ACU.

## **INSTALLATION AND TRAINING**

The supplier of the video detection system shall supervise the installation and testing of the video and computer equipment. The Contractor shall arrange for a factory certified representative from the supplier to be on-site for a minimum of one day for installation and testing of the furnished equipment.

In the event that the supervisor computer is furnished by the contracting agency, such installation and testing shall be done at the time that training is conducted.

Two days of training shall be provided to personnel of the contracting agency in the operation, setup and maintenance of the video detection system. Instruction and materials shall be provided for a maximum of 20 persons and shall be conducted at a location selected by the contracting agency. The contracting agency shall be responsible for any travel, room and board expenses for its own personnel.

The ACU and its support hardware/software are a sophisticated leading-edge of technology system. Proper instruction from certified instructors is required to ensure that the end-user has complete competency in system operation. The User's Guide is not an adequate substitute for practical classroom training and formal certification by an approved agency.

### **10-3.21 PEDESTRIAN PUSH BUTTONS**

Pedestrian push button housings shall be the die-cast or permanent mold cast aluminum type.

### **10-3.22 LUMINAIRES**

Ballasts shall be the lag regulator type.

Luminaires to be mounted on horizontal mast arms, when tested in conformance with California Test 611, shall be capable of withstanding cyclic loading in (G=Acceleration of Gravity):

- A. a vertical plane at a minimum peak acceleration level of 1.0 G peak-to-peak sinusoidal loading (same as 0.5-G peak) with the internal ballast installed, for a minimum of 2 million cycles without failure of any luminaire parts.

### **10-3.23 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 0.1875 inch, minimum thickness, clear acrylic or polycarbonate plastic or 0.125 inch nominal thickness glass fiber reinforced plastic, with molded, one piece, neoprene gasket. Message lettering for "METER" shall be "Series C," 4.5 inches high, with uniform 0.5 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 and silk screened on the second surface of the lens.

### 10-3.24 PHOTOELECTRIC CONTROLS

Contactors shall be the mechanical armature type.

Photoelectric controls (PEC) shall be Type V, delay type, 50 second on and 50 second off.

### 10-3.25 FIBER OPTIC CABLE PLANT SPECIFICATIONS

Fiber optic cable shall conform to the details shown on the plans and these special provisions

#### DEFINITIONS FIBER OPTICS GLOSSARY

The following definitions shall apply to these special provisions:

- A. Active Component Link Loss Budget.—The active component link loss budget is the difference between the average transmitter launch power (in dBm) and the receiver maximum sensitivity (in dBm).
- B. Backbone.—Fiber cable that provides connections between the TMC and hubs, as well as between equipment rooms or buildings, and between hubs. The term is used interchangeably with "trunk" cable.
- C. Connector.—A mechanical device used to align and join two fibers together to provide a means for attaching to and decoupling from a transmitter, receiver, or another fiber (patch panel).
- D. Connectorized.—The termination point of a fiber after connectors have been affixed.
- E. Connector Module Housing (CMH).—A patch panel used to terminate singlemode fibers with most common connector types. It may include a jumper storage shelf and a hinged door.
- F. Couplers.—Couplers are Devices which mate fiber optic connectors to facilitate the transition of optical light signals from one connector into another. They are normally located within FDU's, mounted in panels. They may also be used unmounted, to join two simplex fiber runs.
- G. Distribution Cable.—Fiber cable that provides connections between hubs. Drop cables are typically spliced into a distribution cable.
- H. Drop Cable.—Fiber cable that provides connections between a distribution cable to a field element. Typically these run from a splice vault to a splice tray within a field cabinet. Drop cables are usually short in length (less than 20m) and are of the same construction as outside plant cable. The term "breakout cable" is used interchangeably with drop cable.
- G. End-to-End Loss.—The maximum permissible end-to-end system attenuation is the total loss in a given link. This loss could be the actual measured loss, or calculated using typical (or specified) values. A designer should use typical values to calculate the end-to-end loss for a proposed link. This number will determine the amount of optical power (in dB) needed to meet the System Performance Margin.
- H. Fan Out Termination.—Permits the branching of fibers contained in an optical cable into individual cables and can be done at field locations; thus, allowing the cables to be connectorized or terminated per system requirements. A kit provides pull-out protection for individual bare fibers to support termination. It provides three layers of protection consisting of a Teflon inner tube, a dielectric strength member, and an outer protective PVC jacket. Fan out terminations shall not be used for more than 6 fibers. Using a patch panel would be appropriate.
- I. Fiber Distribution Frame (FDF).—A rack mounted system that is usually installed in hubs or the Transportation Management Center (TMC), that may consist of a standard equipment rack, fiber routing guides, horizontal jumper troughs and Fiber Distribution Units (FDU). The FDF serves as the termination and interconnection of passive fiber optic components from cable breakout, for connection by jumpers, to the equipment.
- J. Fiber Distribution Unit (FDU) .—An enclosure or rack mountable unit containing both a patch panel with couplers and splice tray(s). The unit's patch panel and splice trays may be integrated or separated by a partition.
- K. F/O.—Fiber optic.
- L. FOIP.—Fiber optic inside plant cable.
- M. FOOP.—Fiber optic outside plant cable.
- N. FOTP.—Fiber optic test procedure(s) as defined by TIA/EIA standards.
- O. Jumper.—A short cable, typically one meter or less, with connectors on each end, used to join two CMH couplers or a CMH to active electronic components.
- P. Light Source.—Portable fiber optic test equipment that, when coupled with a power meter, is used to perform end-to-end attenuation testing. It contains a stabilized light source operating at the wavelength of the system under test.
- Q. Link.—A passive section of the system, the ends of which are connectorized. A link may include splices and couplers. For example, a video link may be from a F/O transmitter to a video multiplexer (MUX).

- R. Loose Tube Cable.—Type of cable construction in which fibers are placed in buffer tubes to isolate them from outside forces (stress). A flooding compound or material is applied to the interstitial cable core to prevent water migration and penetration. This type of cable is primarily for outdoor applications.
- S. Mid-span Access Method.—Description of a procedure in which fibers from a single buffer tube are accessed and spliced to an adjoining cable without cutting the unused fibers in the buffer tube, or disturbing the remaining buffer tubes in the cable.
- T. MMFO.—Multimode Fiber Optic Cable.
- U. Optical Time Domain Reflectometer (OTDR).—Fiber optic test equipment similar in appearance to an oscilloscope that is used to measure the total amount of power loss in a F/O cable between two points. It provides a visual and printed display of the losses associated with system components such as fiber, splices and connectors.
- V. Optical Attenuator.—An optical element that reduces the intensity of a signal passing through it.
- W. Patchcord.—A term used interchangeably with "jumper".
- X. Patch Panel.—A precision drilled metal frame containing couplers used to mate two fiber optic connectors.
- Y. Pigtail.—A short optical fiber permanently attached to a source, detector, or other fiber optic device.
- Z. Power Meter.—Portable fiber optic test equipment that, when coupled with a light source, is used to perform end-to-end attenuation testing. It contains a detector that is sensitive to light at the designed wavelength of the system under test. Its display indicates the amount of optical power being received at the end of the link.
- AA.Riser Cable.—NEC approved cable installed in a riser (a vertical shaft in a building connecting floors).
- AB.Segment.—A section of F/O cable that is not connected to any active device and may or may not have splices per the design.
- AC.SMFO.—Singlemode Fiber Optic Cable.
- AD.Splice.—The permanent joining of two fiber ends using a fusion splicer.
- AE. Splice Closure.—A environmentally sealed container used to organize and protect splice trays. The container allows splitting or routing of fiber cables from multiple locations. Normally installed in a splice vault.
- AF. Splice Module Housing (SMH).—A unit that stores splice trays as well as pigtails and short cable lengths. The unit allows splitting or routing of fiber cables to or from multiple locations.
- AG.Splice Tray.—A container used to organize and protect spliced fibers.
- AH.Splice Vault.—An underground container used to house excess cable and/or splice closures.
- AI. System Performance Margin.—A calculation of the overall "End to End" permissible attenuation from the fiber optic transmitter (source) to the fiber optic receiver (detector). The system performance margin should be at least 6 dB. This includes the difference between the active component link loss budget, the passive cable attenuation (total fiber loss) and the total connector/splice loss.
- AJ. Tight Buffered, Non-Breakout Cable (Tight Buffer Cable).—Type of cable construction where each glass fiber is tightly buffered (directly coated) with a protective thermoplastic coating to 900 µm (compared to 250 µm for loose tube fibers).

**FIBER OPTIC OUTSIDE PLANT CABLE**

**General**

Each fiber optic outside plant cable (FOOP) for this project shall be all dielectric, gel filled or water-blocking material, duct type, with loose buffer tubes and shall conform to these special provisions. Cables with singlemode fibers shall contain 12, 24, 48 or 60 singlemode (SM) dual-window (1310 nm and 1550 nm) fibers as shown on the plans. The optical fibers shall be contained within loose buffer tubes. The loose buffer tubes shall be stranded around an all dielectric central member. Aramid yarn and/or fiberglass shall be used as a primary strength member, and a polyethylene outside jacket shall provide for overall protection.

All fiber optic (F/O) cable on this project shall be from the same manufacturer, who is regularly engaged in the production of this material.

The cable shall be qualified as compliant with RUS Federal Rule 7CFR1755.900.

CABLE TYPE	DESCRIPTION
A	24 SMFO
B	60 SMFO
C	48 SMFO
D	12 SMFO

### Fiber Characteristics

Each optical fiber shall be glass and consist of a doped silica core surrounded by concentric silica cladding. All fibers in the buffer tube shall be usable fibers, and shall be sufficiently free of surface imperfections and occlusions to meet the optical, mechanical, and environmental requirements of these specifications. The required fiber grade shall reflect the maximum individual fiber attenuation, to guarantee the required performance of each and every fiber in the cable.

The coating shall be a dual layered, UV cured acrylate. The coating shall be mechanically or chemically strippable without damaging the fiber.

The cable shall comply with the optical and mechanical requirements over an operating temperature range of -40°C to +70°C. The cable shall be tested in accordance with EIA-455-3A (FOTP-3), "Procedure to Measure Temperature Cycling Effects on Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components." The change in attenuation at extreme operational temperatures (-40°C to +70°C) for singlemode fiber shall not be greater than 0.20 dB/km, with 80 percent of the measured values no greater than 0.10 dB/km. The singlemode fiber measurement is made at 1550 nm.

For all fibers the attenuation specification shall be a maximum attenuation for each fiber over the entire operating temperature range of the cable.

Singlemode fibers within the finished cable shall meet the requirements in the following table:

Fiber Characteristics Table	
Parameters	Singlemode
Type	Step Index
Core diameter	8.3 μm (nominal)
Cladding diameter	125 μm ±1.0 μm
Core to Cladding Offset	0.8 μm
Coating Diameter	250 μm ±15 μm
Cladding Non-circularity defined as: [1-(min. cladding dia ÷max. cladding dia.)]x100	1.0%
Proof/Tensile Test	345 MPa, min.
Attenuation: (-40(C to +70(C) @1310 nm @1550 nm	0.4 dB/km 0.3 dB/km
Attenuation at the Water Peak	2.1 dB/km @ 1383 ±3 nm
Chromatic Dispersion: Zero Dispersion Wavelength Zero Dispersion Slope	1301.5 to 1321.5 nm 0.092 ps/(nm <sup>2</sup> *km)
Maximum Dispersion:	3.3 ps/(nm*km) for 1285 – 1330 nm <18 ps/(nm*km) for 1550 nm
Cut-Off Wavelength	<1260 1250 nm
Mode Field Diameter (Petermann II)	9.3 ±0.5 μm at 1300 nm 10.5 ±1.0 μm at 1550 nm

### Color Coding

In buffer tubes containing multiple fibers, each fiber shall be distinguishable from others in the same tube by means of color coding according to the following:

- |                |                 |
|----------------|-----------------|
| 1. Blue (BL)   | 7. Red (RD)     |
| 2. Orange (OR) | 8. Black (BK)   |
| 3. Green (GR)  | 9. Yellow (YL)  |
| 4. Brown (BR)  | 10. Violet (VL) |
| 5. Slate (SL)  | 11. Rose (RS)   |
| 6. White (WT)  | 12. Aqua (AQ)   |

Buffer tubes containing fibers shall also be color coded with distinct and recognizable colors according to the same table listed above for fibers.

These colors shall be targeted in accordance with the Munsell color shades and shall meet EIA/TIA-598 "Color Coding of Fiber Optic Cables."

The color formulation shall be compatible with the fiber coating and the buffer tube filling compound, and be heat stable. It shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

## **Cable Construction**

A. General: The fiber optic cable shall consist of, but not be limited to, the following components:

1. Buffer tubes
2. Central member
3. Filler rods
4. Stranding
5. Core and cable flooding
6. Tensile strength member
7. Ripcord
8. Outer jacket

B. Buffer Tubes

Clearance shall be provided in the loose buffer tubes between the fibers and the inside of the tube to allow for expansion without constraining the fiber. The fibers shall be loose or suspended within the tubes. The fibers shall not adhere to the inside of the buffer tube. Each buffer tube shall contain a maximum of 12 fibers.

The loose buffer tubes shall be extruded from a material having a coefficient of friction sufficiently low to allow free movement of the fibers. The material shall be tough and abrasion resistant to provide mechanical and environmental protection of the fibers, yet designed to permit safe intentional "scoring" and breakout, without damaging or degrading the internal fibers.

Buffer tube filling compound shall be a homogeneous hydrocarbon-based gel with anti-oxidant additives and used to prevent water intrusion and migration. The filling compound shall be non-toxic and dermatologically safe to exposed skin. It shall be chemically and mechanically compatible with all cable components, non-nutritive to fungus, non-hygroscopic and electrically non-conductive. The filling compound shall be free from dirt and foreign matter and shall be readily removable with conventional nontoxic solvents.

Buffer tubes shall be stranded around a central member by a method, such as the reverse oscillation stranding process, that will prevent stress on the fibers when the cable jacket is placed under strain.

3. Central Member

The central member which functions as an anti-buckling element shall be a glass reinforced plastic rod with similar expansion and contraction characteristics as the optical fibers and buffer tubes. To ensure the proper spacing between buffer tubes during stranding, a symmetrical linear overcoat of polyethylene may be applied to the central member to achieve the optimum diameter.

4. Filler Rods

Fillers may be included in the cable to maintain the symmetry of the cable cross-section. Filler rods shall be solid medium or high density polyethylene. The diameter of filler rods shall be the same as the outer diameter of the buffer tubes.

5. Stranding

Completed buffer tubes shall be stranded around the overcoated central member using stranding methods, lay lengths and positioning such that the cable shall meet mechanical, environmental and performance specifications. A polyester binding shall be applied over the stranded buffer tubes to hold them in place. Binders shall be applied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage.

6. Core and Cable Flooding

The cable core interstices shall contain a water blocking material, to prevent water ingress and migration. The water blocking material shall be either a polyolefin based compound which fills the cable core interstices, or an absorbent polymer, which fills voids and swells to block the ingress of water. The flooding compound or material shall be homogeneous, non-hygroscopic, electrically non-conductive, and non-nutritive to fungus. The compound or material shall also be nontoxic, dermatologically safe and compatible with all other cable components.

7. Tensile Strength Member

Tensile strength shall be provided by high tensile strength aramid yarns and/or fiberglass which shall be helically stranded evenly around the cable core and shall not adhere to other cable components.

## 8. Ripcord

The cable shall contain at least one ripcord under the jacket for easy sheath removal.

## 9. Outer Jacket

The jacket shall be free of holes, splits, and blisters and shall be medium or high density polyethylene (PE), or medium density cross-linked polyethylene with minimum nominal jacket thickness of  $1 \text{ mm} \pm 0.076 \text{ mm}$ . Jacketing material shall be applied directly over the tensile strength members and water blocking material and shall not adhere to the aramid strength material. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The jacket or sheath shall be marked with the manufacturer's name, the words "Optical Cable", the number of fibers, "SM", year of manufacture, and sequential measurement markings every meter. The actual length of the cable shall be within  $-0/+1$  percent of the length marking. The marking shall be in a contrasting color to the cable jacket. The height of the marking shall be  $2.5 \text{ mm} \pm 0.2 \text{ mm}$ .

### **General Cable Performance Specifications**

The F/O cable shall withstand water penetration when tested with a one meter static head or equivalent continuous pressure applied at one end of a one meter length of filled cable for one hour. No water shall leak through the open cable end. Testing shall be done in accordance with EIA-455-82 (FOTP-82), "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable."

A representative sample of cable shall be tested in accordance with EIA/TIA-455-81 (FOTP-81), "Compound Flow (Drip) Test for Filled Fiber Optic Cable". No preconditioning period shall be conducted. The cable shall exhibit no flow (drip or leak) at  $70^\circ\text{C}$  as defined in the test method.

Crush resistance of the finished F/O cables shall be  $220 \text{ N/mm}$  applied uniformly over the length of the cable without showing evidence of cracking or splitting when tested in accordance with EIA-455-41 (FOTP-41), "Compressive Loading Resistance of Fiber Optic Cables". The average increase in attenuation for the fibers shall be  $0.10 \text{ dB}$  at  $1550 \text{ nm}$  (singlemode) for a cable subjected to this load. The cable shall not exhibit any measurable increase in attenuation after removal of load. Testing shall be in accordance with EIA-455-41 (FOTP-41), except that the load shall be applied at the rate of  $3 \text{ mm}$  to  $20 \text{ mm}$  per minute and maintained for 10 minutes.

The cable shall withstand 25 cycles of mechanical flexing at a rate of  $30 \pm 1$  cycles/minute. The average increase in attenuation for the fibers shall be  $0.20 \text{ dB}$  at  $1550 \text{ nm}$  (singlemode) at the completion of the test. Outer cable jacket cracking or splitting observed under  $10\times$  magnification shall constitute failure. The test shall be conducted in accordance with EIA-455-104 (FOTP-104), "Fiber Optic Cable Cyclic Flexing Test," with the sheave diameter a maximum of 20 times the outside diameter of the cable. The cable shall be tested in accordance with Test Conditions I and II of (FOTP-104).

The cable shall withstand 20 impact cycles, with a total impact energy of  $5.9 \text{ N}\cdot\text{m}$ . Impact testing shall be conducted in accordance with TIA/EIA-455-25B (FOTP-25) "Impact Testing of Fiber Optic Cables and Cable Assemblies." The average increase in attenuation for the fibers shall be  $<0.20 \text{ dB}$  at  $1550 \text{ nm}$  for singlemode fiber. The cable shall not exhibit evidence of cracking or splitting.

The finished cable shall withstand a tensile load of  $2700 \text{ N}$  without exhibiting an average increase in attenuation of greater than  $0.20 \text{ dB}$  (singlemode). The test shall be conducted in accordance with EIA-455-33 (FOTP-33), "Fiber Optic Cable Tensile Loading and Bending Test." The load shall be applied for one-half hour in Test Condition II of the EIA-455-33 (FOTP-33) procedure.

### **Packaging and Shipping Requirements**

Documentation of compliance to the required specifications shall be provided to the Engineer prior to ordering the material.

Attention is directed to "Fiber Optic Testing," elsewhere in these special provisions.

The completed cable shall be packaged for shipment on reels. The cable shall be wrapped in a weather and temperature resistant covering. Both ends of the cable shall be sealed to prevent the ingress of moisture.

Each end of the cable shall be securely fastened to the reel to prevent the cable from coming loose during transit. Four meters of cable length on each end of the cable shall be accessible for testing.

Each cable reel shall have a durable weatherproof label or tag showing the manufacturer's name, the cable type, the actual length of cable on the reel, the Contractor's name, the contract number, and the reel number. A shipping record shall also be included in a weatherproof envelope showing the above information and also include the date of manufacture, cable characteristics (size, attenuation, bandwidth), factory test results, cable identification number and any other pertinent information.

The minimum hub diameter of the reel shall be at least thirty times the diameter of the cable. The F/O cable shall be in one continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel should be rolled to prevent loosening of the cable.

Installation procedures and technical support information shall be furnished at the time of delivery.

**LABELING**

**General**

The Contractor shall label all fiber optic cabling in a permanent consistent manner. All tags shall be of a material designed for long term permanent labeling of fiber optic and copper communications cables and shall be marked with permanent ink on non-metal types, or embossed lettering on metal tags. Metal tags shall be constructed of stainless steel. Non-metal label materials shall be approved by the Engineer. Labels shall be affixed to the cable per the manufacturer’s recommendations and shall not be affixed in a manner which will cause damage to the fiber. Handwritten labels shall not be allowed.

**Label Identification**

1. Labeling of Cables

Labeling of the backbone, distribution and drop fiber optic cables shall conform to the following unique identification code elements:

UNIQUE IDENTIFICATION CODE ELEMENTS for Backbone, Distribution or Drop Cables		
DESCRIPTION	CODE	NUMBER OF CHARACTERS
District	District number	2
Cable Type	Fiber: S: Singlemode M: Multimode Copper: T: 18 AWG, U: 19 AWG, V: 20AWG, W: 22AWG X: 24 AWG	1
Cable fiber (or copper pairs) Count	Number of fibers or conductor pairs (Examples: 144 fibers; or 100 TWP)	3
Route Number	Hwy. Rte (Example: 005)	3
Begin Function	T: TMC; H: HUB; V: Video Node; D: Data Node; C: Cable Node; M: CCTV Camera; N: CMS; P: Traffic Signal; Z: Ramp Meter; U: Traffic Monitoring/Count Station/Vehicle Count Station (VDS, TOS); S: Splice Vault	1
Begin Function Number	Unique ID number corresponds to Begin Function (Example: H02 [Hub 02])	2
End Function	T: TMC; H: HUB; V: Video Node; D: Data Node; C: Cable Node; M: CCTV Camera; N: CMS; P: Traffic Signal; Z: Ramp Meter; U: Traffic Monitoring/Count Station; S: Splice Vault	1
End Function Number	Unique ID number corresponds to Begin Function (Example: H03 [Hub 03])	2
Unique Identifier	XX: If two or more cables of the same count are in the same run	2
<b>TOTAL</b>		<b>17</b>

Each cable shall display one unique identification, regardless of where the cable is viewed. The begin function and end function correspond to the end points of each cable. The order of the begin and end function follow a hierarchy as listed below, where the lowest number corresponding to the begin/end function is listed first.

List of Hierarchy										
1	2	3	4	5	6	7	8	9	10	11
TMC	HUB	Video Node (VN)	Data Node (DN)	Cable Node	CCTV Camera	CMS	Traffic Signal	Ramp Meter	Traffic Monitoring/ Count Station	Splice Vault

This scheme will work as follows: A cable between the TMC and a HUB will always have the TMC listed as the start function and the HUB as the end function. Between a CMS and a Splice Vault, the start function will always be listed as the CMS, and so on. If a cable is connected between HUBs, for example HUB-01 and HUB-03, the lowest number, in this case HUB-01, will be listed as the start function and HUB-03 as the end function.

A. Example 1: 08S060010H02H0302

This cable is located in District 8, identified as a singlemode fiber optic cable containing 60 fibers, installed along highway Route 10, beginning in Hub 2, and ending in Hub 3, with unique ID of number 2. The implication for the unique ID is that there may be another 60 fiber optic cable between those hubs. This is an example for a backbone cable.

B. Example 2: 11S048008H01S04

This cable is located in District 11, identified as a singlemode fiber optic cable containing 48 fibers, installed along highway Route 8, beginning in Hub 1, and ending in Splice Vault 04. In this case, no additional digits are necessary for a unique ID. This is an example for a distribution cable.

C. Example 3: 11S006163N03S04

This cable is located in District 11, identified as a singlemode fiber optic cable containing 6 fibers, installed along highway Route 163, beginning at CMS-03, and ending in Splice Vault 04. In this case, no additional digits are necessary for a unique ID. This is an example for a drop cable.

2. Labeling of Jumpers and Pigtailed

Labeling of the jumpers and pigtailed shall conform to the following unique identification code elements:

UNIQUE IDENTIFICATION CODE ELEMENTS for JUMPERS (active component to FDU) and PIGTAILS (to connector # on patch panel)		
DESCRIPTION	CODE	NUMBER OF CHARACTERS
Hub Identifier	Hub, TMC, VN or DN ID Numbers or Alphanumeric or both	2
From (Source) Device	MU: Multiplexer FD: FDU (Fiber Distribution Unit) RP: Repeater	2
From (Source) Device Identifier	Numbers or Alphanumeric or both	2
Transmitter or Receiver	T or R	1
To (Destination) Device	MU: Multiplexer FD: FDU (Fiber Distribution Unit) RP: Repeater	2
To (Destination) Device Identifier	Numbers or Alphanumeric or both	2
Connector Identifier	Connector ID	2
<b>TOTAL</b>		<b>13</b>

A. Example 1: 01MU01TFD0203.

This pigtail is located in Hub 1, from multiplexer 01, transmitting to FDU 02 to patch panel position (connector) 03.

B. Example 2: 02MUA1TFD0B08.

This jumper is located in Hub 2, from multiplexer A1, transmitting to FDU B, to patch panel position (connector) 08.

## **Lable Placement**

### 1. Cables

All cables shall be clearly labeled with the unique identification code element method described elsewhere in these special provisions, at all terminations, even if no connections or splices are made, and at all splice vault entrance and exit points.

### 2. Cable to Cable Splices

All cable jackets entering the splice closure shall be labeled in accordance with the identification method described elsewhere in these special provisions.

### 3. Cable to Fiber Distribution Units

The cable jackets shall be clearly labeled at entry to the FDU in accordance with the unique identification code element method described elsewhere in these special provisions. In addition, each fiber shall be labeled with the Fiber ID and pigtails shall be labeled at the connector with the Fiber ID. The FDU shall be clearly labeled with the Cable ID on the face of the FDU. If multiple cables are connected to the FDU, each block of connectors relating to each individual cable shall be clearly identified by a single label with the Cable ID. Individual connections shall be clearly marked on the face of the FDU in the designated area with the Fiber ID.

### 4. Fiber

Fibers labels shall be placed next to the connectors of the individual fibers.

### 5. Patch Panels

The cable jackets shall be clearly labeled at entry to the Patch Panel in accordance with the unique identification code element method described elsewhere in these special provisions. In addition, each fiber shall be labeled with the Fiber ID and pigtails shall be labeled at the connector with the Fiber ID. The Patch panel shall be clearly labeled with the Cable ID on the face of the Panel. If multiple cables are connected to the Patch Panel, each block of connectors relating to each individual cable shall be clearly identified by a single label with the Cable ID. Individual connections shall be clearly marked on the face of the Panel in the designated area with the Fiber ID.

### 6. Jumpers

Equipment to FDU jumpers shall be labeled as to the equipment type connected and shall be labeled at both ends. FDU to FDU jumpers shall be labeled at each end in accordance with the unique identification code element method described elsewhere in these special provisions.

### 7. Pigtails

Pigtails shall be labeled at the connector in accordance with the unique identification code element method described elsewhere in these special provisions.

### 8. Copper Cable Labels

All twisted-pair communications cables shall be clearly labeled in a in accordance with the unique identification code element method described elsewhere in these special provisions.

## **CABLE INSTALLATION**

Installation procedures shall be in conformance with the procedures specified by the cable manufacturer for the specific cable being installed. The contractor shall submit the manufacturer's recommended procedures for pulling fiber optic cable at least 20 working days prior to installing cable. Mechanical aids may be used provided that a tension measuring device, and a break away swivel are placed in tension to the end of the cable. The tension in the cable shall not exceed 2225 N or the manufacturer's recommended pulling tension, whichever is less.

During cable installation, the bend radius shall be maintained at a minimum of twenty times the outside diameter. The cable grips for installing the fiber optic cable shall have a ball bearing swivel to prevent the cable from twisting during installation.

F/O cable shall be installed using a cable pulling lubricant recommended by the F/O cable and/or the innerduct manufacturer, and a pull tape conforming to the provisions described under "conduit" elsewhere in these special provisions. Contractor's personnel shall be stationed at each splice vault and pullbox through which the cable is to be pulled to lubricate and prevent kinking or other damage.

F/O cable shall be installed without splices except where specifically allowed on the plans. If splice locations are not shown on the plans, splicing shall be limited to one cable splice every 6 km. Any midspan access splice or FDU termination shall involve only those fibers being spliced as shown on the plans. Cable splices shall be located in splice closures, installed in splice vaults shown on the plans. A minimum of 20 m of slack shall be provided for each F/O cable at each splice vault. Slack shall be divided equally on each side of the F/O splice closure.

Unless shown or provided otherwise, only F/O cable shall be installed in each innerduct. Pulling a separate F/O cable into a spare duct to replace damaged fiber will not be allowed.

At the Contractor's option, the fiber may be installed using the air blown method. If integral innerduct is used, the duct splice points or any temporary splices of innerduct used for installation must withstand a static air pressure of 758 kPa.

The fiber installation equipment must incorporate a mechanical drive unit or pusher, which feeds cable into the pressurized innerduct to provide a sufficient push force on the cable, which is coupled with the drag force created by the high-speed airflow. The unit must be equipped with controls to regulate the flow rate of compressed air entering the duct and any hydraulic or pneumatic pressure applied to the cable. It must accommodate longitudinally ribbed, or smooth wall ducts from nominal 16 mm to 51 mm inner diameter. Mid assist or cascading of equipment must be for the installation of long cable runs. The equipment must incorporate safety shutoff valves to disable the system in the event of sudden changes in pneumatic or hydraulic pressure.

The equipment must not require the use of a piston or any other air capturing device to impose a pulling force at the front end of the cable, which also significantly restricts the free flow of air through the inner duct. It must incorporate the use of a counting device to determine the speed of the cable during installation and the length of the cable installed.

## **SPLICING**

Field splices shall be done either in splice vaults or cabinets as shown on the plans. All splices in splice vaults shall be done in splice trays, housed in splice closures. All splices in cabinets shall be done in splice trays housed in FDU's.

Unless otherwise specified, fiber splices shall be the fusion type. The mean splice loss shall not exceed 0.07 dB per splice. The mean splice loss shall be obtained by measuring the loss through the splice in both directions and then averaging the resultant values.

All splices shall be protected with a metal reinforced thermal shrink sleeve.

The mid-span access method shall be used to access the individual fibers in a cable for splicing to another cable as shown on the plans. Cable manufacturers recommended procedures and approved tools shall be used when performing a mid-span access. Only the fibers to be spliced may be cut. All measures shall be taken to avoid damaging buffer tubes and individual fibers not being used in the mid-span access.

The individual fibers shall be looped one full turn within the splice tray to avoid micro bending. A 45 mm minimum bend radius shall be maintained during installation and after final assembly in the optical fiber splice tray. Each bare fiber shall be individually restrained in a splice tray. The optical fibers in buffer tubes and the placement of the bare optical fibers in the splice tray shall be such that there is no discernable tensile force on the optical fiber.

The Contractor will be allowed to splice a total of 2 fibers to repair any damage done during mid-span access splicing without penalty. The Contractor will be assessed a fine of \$300.00 for each additional and unplanned splice. Any single fiber may not have more than 3 unplanned splices. If any fiber requires more than 3 unplanned splices, the entire length of F/O cable must be replaced at the Contractor's expense.

## **SPLICE CLOSURES**

The F/O field splices shall be enclosed in splice closures which shall be complete with splice organizer trays, brackets, clips, cable ties, seals and sealant, as needed. The splice closure shall be suitable for a direct burial or pull box application. Manufacturer's installation instructions shall be supplied to the Engineer prior to the installation of any splice closures.

Location of the splice closures shall be where a splice is required as shown on the plans, designated by the Engineer, or described in these special provisions.

The splice closure shall conform to the following specifications:

- A. Non-filled thermoplastic case
- B. Rodent proof, water proof, re-enterable and moisture proof
- C. Expandable from 2 cables per end to 8 cables per end by using adapter plates
- D. Cable entry ports shall accommodate 10 mm to 25 mm diameter cables
- E. Multiple grounding straps
- F. Accommodate up to 8 splice trays
- G. Suitable for "butt" or "through" cable entry configurations
- H. Place no stress on finished splices within the splice trays

The splice closure shall be bolted to the side wall of the splice vault.

The Contractor shall verify the quality of each splice prior to sealing the splice closure. The splice closure shall not be sealed until link testing is performed and is approved by the Engineer.

### **SPLICE TRAYS**

Splice trays must accommodate a minimum of 12 fusion splices and must allow for a minimum bend radius of 45 mm. Individual fibers must be looped one full turn within the splice tray to allow for future splicing. No stress is to be applied on the fiber when it is located in its final position. Buffer tubes must be secured near the entrance of the splice tray to reduce the chance that an inadvertent tug on the pigtail will damage the fiber. The splice tray cover may be transparent.

Splice trays in the splice closure shall conform to the following:

- A. Accommodate up to 24 fusion splices
- B. Place no stress on completed within the tray
- C. Stackable with a snap-on hinge cover
- D. Buffer tubes securable with channel straps
- E. Must be able to accommodate a fusion splice with the addition of an alternative splice holder
- F. Must be labeled after splicing is completed.

Only one single splice tray may be secured by a bolt through the center of the tray in the fiber termination unit. Multiple trays must be securely held in place as per the manufacturer's recommendation.

### **PASSIVE CABLE ASSEMBLIES AND COMPONENTS**

The F/O cable assemblies and components shall be compatible components, designed for the purpose intended, and manufactured by a company regularly engaged in the production of material for the fiber optic industry. All components or assemblies shall be best quality, non-corroding, with a design life of at least 20 years.

The cable assemblies and components manufacturer shall be ISO9001 registered.

### **FIBER OPTIC CABLE TERMINATIONS**

#### **General**

Fiber optic outside plant (FOOP) cable entering a building shall be routed as described in these special provisions and as shown on the plans. The cable shall continue within the conduit to the designated termination point for cable termination. All components shall be the size and type required for the specified fiber. Fiber optic cable terminations may take place in several locations such as TMCs, hubs, data nodes, cable nodes, TOS cabinets, camera sites, etc.

#### **Cable Termination**

Once the fiber optic cable arrives within the Traffic Management Center (TMC) communications room or hub, it shall be routed within conduit to a wall mounted fiber splice closure as shown on the plans.

Fiber Optic Inside Plant (FOIP) cable shall then be spliced to the incoming cable.

At the FDU, the cable jacket of the FOIP or outside plant cable, shall be removed exposing the aramid yarn, filler rods, and buffer tubes. The exposed length of the buffer tubes shall be at least the length recommended by the FDU manufacturer which allows the tubes to be secured to the splice trays. Each buffer tube shall be secured to the splice tray in which it is to be spliced. The remainder of the tubes shall be removed to expose sufficient length of the fibers in order to properly install on the splice tray, as described in "Splicing," elsewhere in these special provisions.

The cable shall then be spliced and secured with tie wraps and routed to its appropriate fiber distribution frame/unit (FDF/U) as shown on the plans.

When applicable, moisture blocking gel shall be removed from the exposed buffer tubes and fibers. The transition from the buffer tube to the bundle of jacketed fibers shall be treated by an accepted procedure for sleeve tubing, shrink tube and silicone blocking of the transition to prevent future gel leak. Manufacturer directions shall be followed to ensure that throughout the specified temperature range gel will not flow from the end of the buffer tube. The individual fibers shall be stripped and prepared for splicing.

Factory terminated pigtails shall then be spliced and placed in the splice tray.

All fibers inside a fiber optic cable entering an Fiber Distribution Unit (FDU), such as at a TMC or hub, shall be terminated and labeled. Attention is directed to "Fiber Distribution Unit" elsewhere in these special provisions.

A transition shall then be made, with flexible tubing, to isolate each fiber to protect the individual coated fibers. The final transition from bundle to individual fiber tube shall be secured with an adhesive heat shrink sleeve. Refer to Fan Out Termination, elsewhere in these special provisions.

### **Distribution Interconnect Package**

Distribution involves connecting the fibers to locations shown on the plans. The distribution interconnect package consists of FDFs and FDUs with connector panels, couplers, splice trays, fiber optic pigtails and cable assemblies with connectors. The distribution interconnect package shall be assembled and tested by a company that is regularly engaged in the assembly of these packages. Attention is directed to "Fiber Optic Testing" elsewhere in these special provisions. All distribution components shall be products of the same manufacturers, who are regularly engaged in the production of these components, and the respective manufacturers shall have quality assurance programs.

### **Fiber Optic Cable Assemblies and Pigtails**

#### **1. General**

Cable assemblies (jumpers and pigtails) shall be products of the same manufacturer. The cable used for cable assemblies shall be made of fiber meeting the performance requirements of these special provisions for the F/O cable being connected.

#### **2. Pigtails**

Pigtails shall be of simplex (one fiber) construction, in 900  $\mu\text{m}$  tight buffer form, surrounded by aramid for strength, with a PVC jacket with manufacturer identification information, and a nominal outer jacket diameter of 3 mm. Singlemode simplex cable jackets shall be yellow in color. All pigtails shall be factory terminated and tested and at least one meter in length.

#### **3. Jumpers**

Jumpers may be of simplex or duplex design. Duplex jumpers shall be of duplex round cable construction, and shall not have zipcord (siamese) construction. All jumpers shall be at least 2 meters in length, sufficient to avoid stress and allow orderly routing.

The outer jacket of duplex jumpers shall be colored according to the singlemode color (yellow) specified above. The two inner simplex jackets shall be contrasting colors to provide easy visual identification for polarity.

#### **4. Connectors**

Connectors shall be of the ceramic ferrule SC type for SM. Indoor SC connector body housings shall be either nickel plated zinc or glass reinforced polymer construction. Outdoor SC connector body housing shall be glass reinforced polymer.

The associated coupler shall be of the same material as the connector housing.

All F/O connectors shall be the 2.5 mm SC connector ferrule type with Zirconia Ceramic material with a PC (Physical Contact) pre-radiused tip.

The SC connector operating temperature range shall be  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ . Insertion loss shall not exceed 0.4 dB for singlemode, and the return reflection loss on singlemode connectors shall be at least -55 dB. Connection durability shall be less than a 0.2 dB change per 500 mating cycles per EIA-455-21A (FOTP-21). All terminations shall provide a minimum 222 N pull out strength. Factory test results shall be documented and submitted to the Engineer prior to installing any of the connectors. Singlemode connectors shall have a yellow color on the body and/or boot that renders them easily identifiable.

Field terminations shall be limited to splicing of adjoining cable ends and/or cables to SC pigtails.

### **Fiber Distribution Unit**

The Contractor shall furnish and install all components to terminate the incoming fiber optic communication cables.

FDU Type	Accommodates Termination of
A	6 SMFO fibers
B	12 SMFO fibers
C	24 SMFO fibers
D	48 SMFO fibers
E	60 SMFO fibers
F	72 SMFO fibers
G	144 SMFO fibers

The fiber distribution unit (FDU) shall include the following:

1. A patch panel to terminate the appropriate number of singlemode fibers with SC type connector feed through couplers.
2. Splice trays.
3. Storage for splice trays.
4. A slide out metal drawer for the storage of spare jumpers.

Strain relief shall be provided for the incoming fiber optic cable. Cable accesses shall have rubber grommets or similar material to prevent the cable from coming in contact with bare metal. All fibers shall be terminated and individually identified in the FDU and on the patch panel.

The patch panel shall be hinged or have coupler plates to provide easy access and maintenance. Brackets shall be provided to spool the incoming fiber a minimum of two turns, each turn shall not be less than 300 mm, before separating out individual fibers to the splice tray.

The FDU shall be 482 mm rack mountable.

The FDU shall not exceed 250 mm in height and 380 mm in depth.

### **Fan Out Termination**

A fan out termination shall be required as shown on the plans designated by the Engineer or described in these special provisions.

For fiber counts of less than 6 fibers, a fan out termination may be used to terminate the incoming fiber optic cable. The connector return loss shall be no greater than -40 dB.

The fan out termination shall consist of a splice connector and the appropriate number of fiber optic pigtailed which will be fusion spliced to the incoming fibers.

The pigtail shall be contained in a housing that will provide strain relief between the incoming fiber optic cable plant jacket, buffer tubes, fibers and pigtail jacket material.

Each fiber shall be spliced to a pigtail with a factory installed and polished SC connector, as specified elsewhere in these special provisions. The splices shall then be encapsulated in a weatherproof housing. Each connector shall have a weatherproof cap to protect it from the elements. The pigtail shall be of simplex (one fiber) construction, in a 900 µm tight buffer form, surrounded by Aramid yarn for strength. The buffer shall have a PVC jacket with manufacturer identification information, and a nominal outer jacket diameter of 3 mm. Singlemode simplex cable jackets shall be yellow in color. All pigtails shall be at least two meter in length.

Each pigtail shall be labeled, as specified elsewhere in these special provisions, and secured onto the cable using clear heat shrink tubing.

## **FIBER OPTIC TESTING**

### **General**

Testing shall include the tests on elements of the passive fiber optic components: (1) at the factory, (2) after delivery to the project site but prior to installation, (3) after installation but prior to connection to any other portion of the system. The Contractor shall provide all personnel, equipment, instrumentation and materials necessary to perform all testing. The Engineer shall be notified two working days prior to all field tests. The notification shall include the exact location or portion of the system to be tested.

Documentation of all test results shall be provided to the Engineer within 2 working days after the test involved.

A minimum of 15 working days prior to arrival of the cable at the site, the Contractor shall provide detailed test procedures for all field testing for the Engineer's review and approval. The procedures shall include the tests involved and how the tests are to be conducted. Included in the test procedures shall be the model, manufacturer, configuration, calibration and alignment procedures for all proposed test equipment.

### **Factory Testing**

Documentation of compliance with the fiber specifications as listed in the Fiber Characteristics Table shall be supplied by the original equipment manufacturer. Before shipment, but while on the shipping reel, 100 percent of all fibers shall be tested for attenuation. Copies of the results shall be (1) maintained on file by the manufacturer with a file identification number for a minimum of seven years, (2) attached to the cable reel in a waterproof pouch, and (3) submitted to the Contractor and to the Engineer.

### **Arrival On Site**

The cable and reel shall be physically inspected on delivery and 100 percent of the fibers shall be attenuation tested to confirm that the cable meets requirements. The failure of any single fiber in the cable to comply with these special provisions, is cause for rejection of the entire reel. Test results shall be recorded, dated, compared and filed with the copy accompanying the shipping reel in a weather proof envelope. Attenuation deviations from the shipping records of greater than five percent shall be brought to the attention of the Engineer. The cable shall not be installed until completion of this test sequence and the Engineer provides written approval. Copies of traces and test results shall be submitted to the Engineer. If the test results are unsatisfactory, the reel of F/O cable shall be considered unacceptable and all records corresponding to that reel of cable shall be marked accordingly. The unsatisfactory reels of cable shall be replaced with new reels of cable at the Contractor's expense. The new reels of cable shall then be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

### **After Cable Installation**

Index matching gel shall not be allowed in connectors during testing. After the fiber optic cable has been pulled but before breakout and termination, 100 percent of all the fibers shall be tested with an OTDR for attenuation. Test results shall be recorded, dated, compared and filed with the previous copies of these tests. Copies of traces and test results shall be submitted to the Engineer. If the OTDR test results are unsatisfactory, the F/O cable segment of cable shall be unacceptable. The unsatisfactory segment of cable shall be replaced with a new segment, without additional splices, at the Contractor's expense. The new segment of cable then shall be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

### **System Cable Verification At Completion**

#### **1. Power Meter and Light Source**

At the conclusion of the OTDR testing, 100 percent of the fiber links shall be tested end to end with a power meter and light source, in accordance with EIA Optical Test Procedure 171 and in the same wavelengths specified for the OTDR tests. These tests shall be conducted in one direction. As shown in Appendix A, the Insertion Loss (IC) shall be calculated. Test results shall be recorded, compared, and filed with the other recordings of the same links. Test results shall be submitted to the Engineer. These values shall be recorded in the Cable Verification Worksheet in Appendix A.

#### **2. OTDR Testing**

Once the passive cabling system has been installed and is ready for activation, 100 percent of the fibers shall be tested with the OTDR for attenuation at wavelengths of both 1310 nm and 1550 nm. OTDR testing shall be performed in both directions (bidirectional), on all fibers. Test results shall be generated from software of the test equipment, recorded, dated, compared and filed with previous copies. A hard copy printout and a electronic copy on a DOS based 89 mm diskette of traces and test results shall be submitted to the Engineer. The average of the two losses shall be calculated, and recorded in the Cable Verification Worksheet in Appendix A. The OTDR shall be capable of recording and displaying anomalies of at least 0.02 dB. All connector losses must be displayed on the OTDR traces.

#### **3. Cable Verification Worksheet**

The Cable Verification Worksheet shown in Appendix A shall be completed for all links in the fiber optic system, using the data gathered during cable verification. The completed worksheets shall be included as part of the system documentation.

#### 4. Test Failures

If the link loss measured from the power meter and light source exceeds the calculated link loss, or the actual location of the fiber ends does not agree with the expected location of the fiber ends (as would occur with a broken fiber), the fiber optic link will not be accepted. The unsatisfactory segments of cable, or splices shall be replaced with a new segment of cable or splice at the Contractor's expense. The OTDR testing, power meter and light source testing and Cable Verification Worksheet shall be completed for the repaired link to determine acceptability. Copies of the test results shall be submitted to the Engineer. The removal and replacement of a segment of cable shall be interpreted as the removal and replacement of a single contiguous length of cable connecting two splices and two connectors. The removal of a small section containing the failure and therefore introducing new unplanned splices, will not be allowed.

#### **Passive Component Package Testing and Documentation**

All components in the passive component package (FDUs, pigtails, jumpers, couplers, and splice trays) shall be from a manufacturer who is ISO9001 registered.

In developing the passive component package, each connector termination (pigtail, or jumper) shall be tested for insertion attenuation loss using an optical power meter and source. In addition, all singlemode terminations shall be tested for return reflection loss. These values shall meet the loss requirements specified earlier and shall be recorded on a tag attached to the pigtail or jumper.

Once an assembly is complete, the manufacturer shall visually verify all tagging of loss values is complete. As a final quality control measure, the manufacturer shall do an "end to end" optical power meter/light source test from pigtail end to end to the terminating point assure continuity and overall attenuation loss valued.

The final test results shall be recorded, along with previous individual component values, on a special form assigned to each FDU. The completed form shall be dated and signed by the Manufacturer's Quality Control supervisor. One copy of this form will be attached in a plastic envelope to the assembled FDU unit. Copies will be provided separately to the Contractor and to the Engineer, and shall also be maintained on file by the manufacturer or supplier.

The assembled and completed FDU unit shall then be protectively packaged for shipment to the Contractor for installation.

#### **Fiber Optic System Performance Margin Design Criteria**

The installed system performance margin shall be at least 6 dB for every link. If the design system performance margin is less than 6 dB, the Engineer shall be notified and informed of the Contractor's plan to meet that requirement.

#### **Active Component Testing**

The transmitters and receivers shall be tested with a power meter and light source, to record the transmitter average output power (dBm) and receiver sensitivity (dBm). These values shall be recorded in the Fiber System Performance Margin Calculations Worksheet in Appendix B, section C, number 6.

## APPENDIX A

### Cable Verification Worksheet

*End-to-End Attenuation (Power Meter and Light Source) Testing  
and OTDR Testing*

Contract No. \_\_\_\_\_ Contractor: \_\_\_\_\_

Operator: \_\_\_\_\_ Date: \_\_\_\_\_

Link Number: \_\_\_\_\_ Fiber Number: \_\_\_\_\_

Test Wavelength (Circle one):    1310 nm            1550 nm

Expected Location of fiber ends: End 1: \_\_\_\_\_ End 2: \_\_\_\_\_

#### Power Meter and Light Source Test Results:

Power In:	_____ dBm	1A
Output Power:	_____ dBm	1B
Insertion Loss [1A - 1B]:	_____ dB	1C

#### OTDR Test Results:

Forward Loss:	_____ dB	2A
Reverse Loss:	_____ dB	2B
Average Loss [(2A + 2B)/2]:	_____ dB	2C

-----  
To Be Completed by Caltrans:  
Resident Engineer's Signature: \_\_\_\_\_  
Cable Link Accepted: \_\_\_\_\_

## APPENDIX B

### Fiber System Performance Margin Calculations Worksheet

#### A. Calculate the Passive Cable Attenuation

1. Calculate Fiber Loss at Operating Wavelength: _____ nm	Cable Distance (times) Individual Fiber Loss (equal) @ 1310 nm (0.4 dB/km) @ 1550 nm (0.3 dB/km)	_____ km x ____ dB/km =
<b>Total Fiber Loss:</b>		_____ dB

#### B. Calculate the Total Connector/Splice Loss

2. Calculate Connectors/couplers Loss: (exclude Tx and Rx connectors)	Individual Connector Loss (times) Number of Connector Pairs (equal) <b>Total Connector Loss:</b>	0.4 dB x _____ = _____ dB
3. Calculate Splice Loss:	Individual Splice Loss (times) Number of Splices (equal) <b>Total Splice Loss:</b>	0.1 dB x _____ = _____ dB
4. Calculate Other Components Loss:	<b>Total Components:</b>	_____ dB
5. Calculate Total Losses:	Total Connector Loss (plus) Total Splice Loss (plus) Total Components (equal)	+     dB +     dB +     dB =
<b>Total Connector/Splice Loss:</b>		_____ dB

#### C. Calculate Active Component Link Loss Budget

System Wavelength: Fiber Type: Average Transmitter Output (Launch Power):	_____ nm singlemode _____ dBm
Receiver MAX Sensitivity (10 <sup>9</sup> BER) (minus) Receiver MIN Sensitivity (equal)	_____ dBm - _____ dBm = <b>Receiver Dynamic Range:</b> _____ dB
6. Calculate Active Component Link Loss Budget:	Average Transmitter Output (Launch Power) (minus) Receiver MAX Sensitivity (equal)
<b>Active Component Link Loss Budget:</b> _____ dB	

#### D. Verify Performance

7. Calculate System Performance Margin to Verify Adequate Power:	Active Component Link Loss Budget [C] (minus) Passive Cable Attenuation [A] (minus) Total Connector/Splice Lost [B] (equal)	_____ dB - _____ dB - _____ dB =
<b>System Performance Margin:</b>		_____ dB

## APPENDIX C

### Optical Modem Test

#### Worksheet

Contract No. \_\_\_\_\_ Contractor: \_\_\_\_\_

Operator: \_\_\_\_\_ Date: \_\_\_\_\_

Location: \_\_\_\_\_

DS-1 Optical Modem, Modem No. :

Optical Receiver Power (max) into modem ( $10^9$  BER) \_\_\_\_\_ dB 3A

Optical Receiver Level (minimum) into modem \_\_\_\_\_ dB 3B

Receiver Dynamic Range (3A-3B): \_\_\_\_\_ dB 3C

DS-1 Optical Modem, Modem No. :

Optical Receiver Power (max) into modem ( $10^9$  BER) \_\_\_\_\_ dB 4A

Optical Receiver Level (minimum) into modem \_\_\_\_\_ dB 4B

Receiver Dynamic Range (4A-4B): \_\_\_\_\_ dB 4C

DS-1 Optical Modem, Modem No. :

Optical Receiver Power (max) into modem ( $10^9$  BER) \_\_\_\_\_ dB 5A

Optical Receiver Level (minimum) into modem \_\_\_\_\_ dB 5B

Receiver Dynamic Range (5A-5B): \_\_\_\_\_ dB 5C

DS-1 Optical Modem, Modem No. :

Optical Receiver Power (max) into modem ( $10^9$  BER) \_\_\_\_\_ dB 6A

Optical Receiver Level (minimum) into modem \_\_\_\_\_ dB 6B

Receiver Dynamic Range (6A-6B): \_\_\_\_\_ dB 6C

### 10-3.26 INNERDUCT

Innerduct shall be installed wherever fiber optic cable is installed in conduit.

Innerduct consists of an extruded flexible annealed polyethylene tubing that is installed inside electrical conduit, and which in turn the fiber optic cable is installed. Innerduct within a conduit run shall be continuous without splices or joints. Innerduct for this project shall be continuous longitudinally ribbed inside and outside.

Unless otherwise shown on the plans, innerduct for this project shall be nominal 19 mm inside diameter, with wall thickness of  $2000\mu\text{m} \pm 80\mu\text{m}$ , and shall meet the following requirements:

Polyethylene for innerduct shall have a density of  $0.955 \pm 0.005 \text{ gm/cm}^3$  (ASTM Standard D-1505), and shall conform to the applicable portions of ASTM Designations: D 3485, D 3035, D 2239, and D 2447, and the applicable portions of NEMA TC7 and TC2. Tensile yield strength shall be 3300 psi, minimum (ASTM D-638).

The innerduct shall be shipped on reels marked with the manufacturer, the contract number, and the size and length of the innerduct. The product on reels shall be covered with aluminized material to protect colors from UV deterioration during shipment and storage.

Immediately prior to installing innerducts, all conduits shall be blown out with compressed air until all foreign material is removed. After cables, conductors and/or innerduct have been installed, the ends of innerducts shall be sealed with an approved type of sealing plugs.

A manufacturer recommended lubricant shall be applied between the innerducts and the conduit during installation to reduce friction.

Installation procedures shall conform to the procedures specified by the innerduct manufacturer. If the innerduct is installed using mechanical assistance, a dynamometer shall be used to record installation tension and a tension limiting device shall be used to prevent exceeding the maximum pulling tension during installation. The tension shall be set to the manufacturer's maximum limit. The maximum pulling tension shall be recorded for each innerduct run. The innerduct shall not be stressed beyond the minimum bending radius allowed by either the innerduct or fiber optic cable manufacturer.

Immediately prior to installing cables, innerduct shall be blown out with compressed air until all foreign material is removed. After cables have been installed, the ends of innerducts shall be sealed with an approved type of rubber conduit plug.

Each innerduct shall be one continuous unit within a conduit run.

### 10-3.27 ASYNCHRONOUS FIBER OPTIC MODEM

The asynchronous fiber optic modem (AFOM) shall be used as an RS-232C interface between Model 170 controller and T1/DS1 multiplexer via optical link. The modem located in the communication hub shall be a rack-mounted version installed in the card cage assembly. Model 170 controller interface modems shall be stand-alone units securely fastened on a rack-mounted shelf. An LED indicator shall be provided for use in determining received optical power.

The asynchronous fiber optic modem shall be fully compatible and interoperable with the existing International Fiber Systems Inc. models D9230SC (wall mount) and D9230SC-R3 (rack mount).

The modem shall meet the following requirements:

Electrical Signaling	Per EIA RS-232 with full handshake control signals
Electrical Power	VDC version: +9 to +14 VDC @ 32 mA, nominal. VAC version: 115 VAC ±10%, 60 Hz.
Bit Error Rate	1 in 10 <sup>9</sup> within optical budget.
Operating Mode	Asynchronous, simplex or full duplex.
Input/Output Logic Level	I: +3.75 to +12 V. O: -3.75 to -12 V.
Input/Output Impedance	Per RS-232D
System Bandwidth	DC to 56/64 kbps
Optical Wavelength	1300 nm.
Minimum Optical Receiver Sensitivity	-30 dBm
Minimum Transmit Output Power	-10 dBm
Connectors Optical:	SC
Connectors Electrical (Data)	DB25 female
Number of fibers	2
Mechanical Size	7.00"W x 5.00"D x 1.00"H for stand-alone module
Weight	6 oz. (170 g) for stand-alone module, nominal
Environmental Ambient:	
Temperature Range	-20°C to +70°C
Storage Temperature	-40°C to +85°C

The asynchronous fiber optic modem shall be tested as follows:

Each optical modem shall be functionally tested by looping back the optical transmit connector to the optical receive connector using a variable optical attenuator with measured optical loss of 20 dB, nominal, at 1300 nm. A test set shall be connected to the modem and set for RS-232 communications testing. A fifteen-minute test after burn-in shall be error free.

After performing the fifteen-minute bit error rate (BER) test, at least two modems shall be tested for receiver dynamic range. To do this the optical attenuation shall be increased to the point at which the data test just begins to register bit errors. The optical receive power into the modem shall be measured and recorded. The optical attenuation shall be then decreased until the data test once again registers errors. At no time shall the optical power into the receiver exceed the manufacturer's specified saturation level. The optical receive level shall once again be measured and recorded. These minimum and maximum receive levels define the modem receiver's dynamic range.

One pair of modems shall be interconnected using optical patchcords and attenuators with a loss of 20 dB, nominal, in each direction. The RS-232 interface shall be looped back on one modem and a test set connected to the RS-232 interface of the other modem. A bit error rate of less than 1 in 10<sup>9</sup> shall be demonstrated.

### 10-3.28 REMOVING, REINSTALLING AND REUSING ELECTRICAL EQUIPMENT

Existing electrical materials, as shown on the plans, shall be removed, reinstalled and reused during stage construction. The Contractor shall provide the necessary equipment to safely remove, reinstall and reuse electrical material.

### 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 shall be considered as included in the contract lump sum price paid for lighting and sign illumination.

Full compensation for removing, reinstalling and reusing existing electrical materials in the temporary signal system shall be considered as included in the contract lump sum price paid for temporary signal system and no additional compensation will be allowed therefor.

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 field unit (irrigation controllers), complete in place, including conductors, conduit and pull boxes to the pull box adjacent to field unit irrigation controller enclosure cabinets and field unit (irrigation controllers), as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

## **SECTION 11. QUALITY CONTROL / QUALITY ASSURANCE**

### **SECTION 11-1. ASPHALT CONCRETE**

#### **11-1.01 GENERAL**

Asphalt concrete for this project shall conform to the requirements of this Section 11-1, "Asphalt Concrete," and the section entitled "Asphalt Concrete" in Section 10-1, "General," elsewhere in these special provisions. Section 39, "Asphalt Concrete," of the Standard Specifications shall not apply for Type A and Type B asphalt concrete for this project.

### **SECTION 39**

#### **ASPHALT CONCRETE**

##### **39-1 GENERAL**

###### **39-1.01 Description**

This work shall consist of furnishing and mixing aggregate and asphalt binder at a central mixing plant, spreading and compacting the mixture, and furnishing and placing pavement reinforcing fabric, all as specified in this specification and the section entitled "Asphalt Concrete" in Section 10-1, "General," elsewhere in these special provisions.

The Contractor shall be responsible for controlling the quality of the asphalt concrete product entering the work, including mix design, mixing, spreading, and compacting asphalt concrete and of the work performed, and for developing, implementing and maintaining a quality control program. The Contractor shall also be responsible for the inspection, sampling and testing required to control the quality of the asphalt concrete and the work performed, and for the inspection, sampling and testing required to provide the Engineer with the information and test data necessary for acceptance of the asphalt concrete, complete in place.

The inspection, sampling and testing required by the Contractor to control the quality of the workmanship and the asphalt concrete product shall conform to the requirements specified herein, and the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete," dated April 1996.

Asphalt concrete is designated as Type A or Type B. The type of asphalt concrete will be shown on the plans or specified in "Asphalt Concrete" in Section 10-1, "General," elsewhere in these special provisions.

Asphalt concrete shall be produced in a batch mixing plant, a continuous pugmill mixing plant, or a drier-drum mixing plant. Proportioning shall be either by hot-feed control or cold-feed control.

##### **39-2 MATERIALS**

###### **39-2.01 Mix Design**

The Contractor shall submit to the Engineer a proposed mix design and material proposed for each asphalt concrete mixture to be used, at least two weeks prior to production of that asphalt concrete mixture. The proposed mix designs shall conform to the asphalt concrete mixture quality requirements specified in Section 39-2.03, "Aggregate," of this specification. Aggregate shall conform to the quality and gradation requirements specified in Section 39-2.03, "Aggregate," of this specification, for the asphalt concrete types and sizes specified in "Asphalt Concrete," in Section 10-1, "General," elsewhere in these special provisions.

The Contractor shall furnish test data in support of each proposed mix design. The test data furnished shall be for an asphalt concrete mixture that conforms to the proposed target values. In addition, the Contractor shall also furnish samples of the aggregate, asphalt binder and all additives proposed for use in each asphalt concrete mixture. The Contractor shall submit the following for each asphalt concrete mixture proposed for use under the contract:

###### **A. Aggregate and mineral filler:**

1. Target values for percent passing each sieve size for the aggregate blend. The proposed target values, for the specified type and aggregate size, shall conform to the aggregate gradation limits specified in Section 39-2.03, "Aggregate," of this specification;
2. Results of tests for aggregate quality requirements specified in Section 39-2.03, "Aggregate," of this specification;
3. Source of each aggregate to be used;
4. Percentage of each aggregate stockpile or hot bin to be used;
5. Gradation of each aggregate stockpile or hot bin to be used; and

6. Samples from each aggregate stockpile or hot bin to be used. These samples shall be representative of the material to be used and shall have been processed in a manner representative of that for the material to be used in the work.
  - a. 125 pounds of each coarse aggregate;
  - b. 75 pounds of each intermediate and fine aggregate; and
  - c. 10 pounds of each mineral filler.

B. Asphalt binder:

1. Target value for asphalt binder content for each proposed asphalt concrete mixture;
2. Four individual one-quart samples of the asphalt binder to be used in each proposed asphalt concrete mixture;
3. Results of the asphalt binder quality tests as specified in Section 92, "Asphalts," of the Standard Specifications; and
4. Material safety data sheets.

C. Antistrip additives, when applicable:

1. A 10-pound sample of dry additive or a one-quart sample of liquid antistrip additive, including name of product, manufacturer, manufacturer's numerical designation (if any) and proposed rate, location and method of addition; and
2. Material safety data sheets.

The Engineer will test the Contractor's proposed asphalt concrete mix design for verification using the proposed aggregate gradation and asphalt binder content target values, and the quality and asphalt concrete mixture requirements specified in Section 39-2.03, "Aggregate," of this specification. Asphalt concrete production for this project shall not begin until the Contractor has received written notification that the proposed mix design to be used has been verified by the Engineer.

Changes from one mix design to another shall not be made during the progress of the work, unless permitted in writing by the Engineer. The Contractor shall submit to the Engineer a proposed mix design for each new asphalt concrete mixture to be used at least two weeks prior to production of that mixture. Asphalt concrete mix designs not verified by the Engineer shall not be used. Changes in stockpile or hot bin proportions to conform to aggregate grading requirements will not be considered changes in the mix design. Changes in asphalt binder content or aggregate grading target values will not be applied retroactively for acceptance or payment.

The Engineer will determine all asphalt concrete mix design evaluation costs incurred as a result of Contractor requested verification of additional asphalt concrete mix design proposals. The mix design evaluation costs, as determined by the Engineer, will be deducted from any moneys due or to become due the Contractor.

### **39-2.02 Asphalts**

Asphalt binder to be mixed with aggregate shall be a steam-refined paving asphalt conforming to the provisions in Section 92, "Asphalts," of the Standard Specifications, and shall be of the grade designated in "Asphalt Concrete," in Section 10-1, "General," elsewhere in these special provisions, or as determined by the Engineer. The amount of asphalt binder to be mixed with the aggregate will be determined by the Contractor and verified by the Engineer, as specified in Section 39-2.01, "Mix Design," of this specification. In support of the material certification requirements specified in Section 92, "Asphalts," of the Standard Specifications, the Contractor shall obtain 2 individual one-quart samples of the asphalt binder for each day of asphalt concrete production. The sample containers shall be labeled with the date and time of sampling and shall be submitted to the Engineer on a weekly basis.

Liquid asphalt for prime coat shall conform to the provisions in Section 93, "Liquid Asphalts," of the Standard Specifications, and shall be the grade designated by the contract item or specified in "Asphalt Concrete," in Section 10-1, "General," elsewhere in these special provisions.

Asphalt emulsion for paint binder (tack coat) shall conform to the provisions in Section 94, "Asphaltic Emulsions," of the Standard Specifications, for the rapid-setting or slow-setting type and grade approved by the Engineer.

Paving asphalt to be used as a binder for pavement reinforcing fabric shall be a steam-refined paving asphalt conforming to the provisions in Section 92, "Asphalts," of the Standard Specifications, and shall be Grade AR-4000, unless otherwise ordered by the Engineer.

### **39-2.03 Aggregate**

All aggregates shall be clean and free from decomposed or organic materials and other deleterious substances. Coarse aggregate is material retained on the No. 4 sieve, fine aggregate is material passing the No. 4 sieve, and supplemental fine

aggregate is added fine material passing the No. 30 sieve, including, but not limited to, cement and stored fines from dust collectors.

The combined aggregate shall conform to the requirements of this section.

The target value for the percent passing each designated sieve size for the aggregate blend used in the proposed asphalt concrete mixture shall fall within the "Target Value Limits" of the following table:

**AGGREGATE GRADATION**  
Type A and Type B Asphalt Concrete  
Percentage Passing

3/4" Maximum, Coarse		3/4" Maximum, Medium	
Sieve Sizes	Target Value Limits	Sieve Sizes	Target Value Limits
1"	100	1"	100
3/4"	90-100	3/4"	90-100
3/8"	60-75	3/8"	65-80
No. 4	45-50	No. 4	49-54
No. 8	32-36	No. 8	36-40
No. 30	15-18	No. 30	18-21
No. 200	3-7	No. 200	3-8

1/2" Maximum, Coarse		1/2" Maximum, Medium	
Sieve Sizes	Target Value Limits	Sieve Sizes	Target Value Limits
3/4"	100	3/4"	100
1/2"	95-100	1/2"	95-100
3/8"	75-90	3/8"	80-95
No. 4	55-61	No. 4	59-66
No. 8	40-45	No. 8	43-49
No. 30	20-25	No. 30	22-27
No. 200	3-7	No. 200	3-8

During asphalt concrete production, aggregate gradation shall be within the limits specified in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification. Conformance with these grading requirements will be determined by California Test 202, modified by California Test 105 when there is a difference in specific gravity of 0.2 or more between the coarse and fine portions of the aggregate or between the blends of the different aggregates.

The combined aggregate shall conform to the following quality requirements prior to the addition of the asphalt binder:

**Aggregate Quality Requirements**

Quality	California Test	Asphalt Concrete	
		Type A	Type B
Percent of Crushed Particles	205		
Coarse Aggregate (Min.)		90%	25%
Fine Aggregate (Passing No. 4, Retained on No. 8) (Min.)		70%	20%
Los Angeles Rattler	211		
Loss at 100 Rev. (Max.)		12%	
Loss at 500 Rev. (Max.)		45%	50%
Sand Equivalent (Min.)	217	47	42
K <sub>C</sub> Factor (Max.)	303	1.7	1.7
K <sub>f</sub> Factor (Max.)	303	1.7	1.7

The asphalt concrete mixture, composed of the proposed aggregate blend and the proposed asphalt binder content as determined by California Test 367, shall conform to the following requirements:

**Asphalt Concrete Mixture Requirements**

Design Parameters	California Test	Asphalt Concrete	
		Type A	Type B
Hveem Stabilometer Value (Min.)	366	37	35
Percent air voids	367	3-5	3-5
Swell Max. (in.)	305	0.030	0.030

**39-2.04 Pavement Reinforcing Fabric**

Pavement reinforcing fabric shall conform to the provisions in Section 88, "Engineering Fabrics," of the Standard Specifications.

**39-3 CONTRACTOR QUALITY CONTROL**

**39-3.01 General**

The Contractor shall establish, provide and maintain a quality control system which will provide assurance to the Engineer that all materials and completed construction, submitted for acceptance, conform to the contract requirements specified herein. The Contractor shall also be responsible for the quality of all component materials contained within the asphalt concrete product, complete in place, procured from subcontractors or vendors.

At least 14 days prior to the start of production of asphalt concrete, the Contractor shall submit to the Engineer for approval a written Quality Control Plan which shall be used to ensure the quality of the product and the work. The production of asphalt concrete shall not begin until the Quality Control Plan is approved by the Engineer.

**39-3.02 Quality Control Plan**

The Contractor shall provide a Quality Control Plan which shall describe the organization and procedures which the Contractor shall use to administer the quality control system including the procedures used to control the production process, to determine when changes to the production process are needed, and the procedures proposed to be used to implement the required changes. The Quality Control Plan shall meet the minimum standards set forth in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete," dated April 1996.

Approval of the Quality Control Plan will be based on the inclusion of all of the required information. Approval of the Quality Control Plan does not imply any warranty by the Engineer that adherence to the plan will result in production of asphalt concrete that complies with these specifications. It shall remain the responsibility of the Contractor to demonstrate such compliance. The Contractor may propose in writing a supplement to the Quality Control Plan as work progresses and must propose a supplement whenever there are changes in production or placement of asphalt concrete or to quality control procedures or personnel. Asphalt concrete production and placement shall not resume or continue until the revisions to the Quality Control Plan or quality control personnel have been approved in writing by the Engineer.

The Quality Control Plan shall include the name and qualifications of a Quality Control Manager. The Quality Control Manager shall be responsible for the administration of the Quality Control Plan, including compliance with the plan and any plan modifications. The Quality Control Manager shall be directly responsible to the Contractor and shall have the authority to make decisions where quality of the work or product are concerned. All sampling, inspection and test reports shall be reviewed and signed by the Quality Control Manager prior to submittal to the Engineer.

The Quality Control Plan shall include the name and qualifications of an independent testing laboratory mutually agreed to by the Contractor and the Engineer to serve as the Third Party Laboratory in any dispute resolution. Attention is directed to Section 39-4.05, "Dispute Resolution," of this specification.

**39-3.03 Quality Control Inspection, Sampling and Testing**

The Contractor shall perform quality control sampling and testing, provide inspection, and exercise management control to ensure that asphalt concrete production and placement conforms to the requirements specified herein.

The Contractor shall provide the required sampling, testing and inspection during all phases of the asphalt concrete work. Sampling, testing and inspection shall be performed at a rate sufficient to ensure that the asphalt concrete product conforms to the requirements specified herein. Sampling, testing, and inspection to be used by the Engineer for acceptance and determination of payment shall be performed at the minimum frequency specified in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification, and as outlined in the approved Quality Control Plan. The Contractor shall provide quality control inspection on the project at all times asphalt concrete paving operations are in progress.

Sampling locations for quality control tests, as specified herein, shall be determined by the Contractor using a random sampling plan approved by the Engineer. The Contractor shall establish a statistically based procedure of random sampling.

The Contractor shall obtain and split into representative portions samples in conformance with California Test 125. One representative split portion of each sample shall be reserved for possible retest during dispute resolution, according to the requirements designated in Section 39-4.05, "Dispute Resolution," of this specification.

The Contractor shall provide a testing laboratory with adequate equipment and personnel for the performance of the quality control tests. Laboratory facilities shall be clean and all sampling and testing equipment shall be maintained in proper working condition. The Engineer shall be given unrestricted access to the laboratory for inspection and to witness the Contractor's quality control activities during working hours.

Testing laboratories and inspection, sampling and testing personnel shall conform to the minimum requirements as set forth in the Department's "Manual for Quality Control and Quality Assurance for Asphalt Concrete," dated April 1996.

### **39-3.04 Control Charts and Records**

The Contractor shall record all sampling, testing and inspection data on forms approved by the Engineer. The Contractor shall maintain complete testing and inspection records and post all test data in the laboratory.

Upon written request by the Contractor, the Engineer will provide the test data of testing done by the State.

#### **39-3.04A Control Charts**

The Contractor shall develop and maintain linear control charts. The control charts shall identify the project, test number, test parameter, applicable upper and lower specification limits, and test data. The control charts shall be used as part of the quality control system to document variability of the asphalt concrete production process, identify construction and equipment problems, and identify potential pay factor adjustments.

When test data for any quality characteristic deviates beyond the specification limits specified in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification, the Contractor shall take the necessary corrective action to bring the production within the specification limits, and shall document the corrective action taken in the records of inspection and testing as designated in Section 39-3.04B, "Records of Inspection and Testing," of this specification. When 3 consecutive sets of test data for any quality characteristic deviate beyond the specification limits designated in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification, the Contractor shall cease production of asphalt concrete, and shall propose corrective measures to the Engineer. Production of asphalt concrete may continue when the corrective measures have been approved by the Engineer and implemented by the Contractor.

Control charts shall be kept current and shall be posted in a location accessible to the Engineer. Control charts shall be updated each day of asphalt concrete production, and up-to-date copies shall be posted prior to the beginning of the next day's production of asphalt concrete.

#### **39-3.04B Records of Inspection and Testing**

For each day of asphalt concrete production, the Contractor shall prepare an "Asphalt Concrete Construction Daily Record of Inspection", on a form approved by the Engineer. The inspection record shall include the following certification signed by the Quality Control Manager:

"It is hereby certified that the information contained in this record is accurate, and that all work documented herein complies with the requirements of the contract. Any exceptions to this certification are documented as a part of this record."

For each day of asphalt concrete production,, the Contractor shall prepare an "Asphalt Concrete Testing Record" on a form approved by the Engineer. The testing record shall include the following certification signed by the Quality Control Manager:

"It is hereby certified that the information contained in this record is accurate, and that all tests and calculations documented herein comply with the requirements of the contract and the standards set forth in the testing procedures. Any exceptions to this certification are documented as a part of this record."

The Contractor shall submit sampling, testing and inspection records and certifications to the Engineer within 24 hours or by noon of the next day's asphalt concrete production, whichever period is agreed to by the Engineer at the beginning of the asphalt concrete production. If the record is incomplete or in error, a copy of the record will be returned to the Contractor with the deficiencies noted by the Engineer. The Contractor shall correct the deficiencies and return the updated record to the Engineer by the start of the following working day. When errors or omissions in the sampling, inspection or testing records repeatedly occur, the Contractor shall correct the procedures by which the records are produced.

If control charts, sampling, testing and inspection records and certifications are not posted or provided as required within the time specified herein, the Engineer may require work to be suspended until the missing control charts, sampling, testing and inspection records, and certifications have been provided.

## 39-4 ENGINEER QUALITY ASSURANCE

### 39-4.01 General

The Engineer will verify conformance to contract specifications by inspection of the Contractor's procedures, evaluation of the Contractor's quality control records, and independent sampling and testing of the materials. The Engineer will obtain random samples and perform tests to verify the test data of the quality control testing performed by the Contractor.

In addition to the minimum sampling and testing requirements specified in this specification, the Contractor shall, when directed by the Engineer, obtain representative samples of any asphalt concrete mixture or material component that appears defective or inconsistent. These samples will be obtained and split into representative portions in accordance with California Test 125. The Contractor shall provide the Engineer with one representative split portion of each sample taken and shall reserve one representative split portion of each sample for possible retest during dispute resolution, according to the requirements designated in Section 39-4.05, "Dispute Resolution," of this specification. The material need not be sampled if the Contractor elects to remove and replace the material, at the Contractor's expense, or if the Contractor uses a method of correcting the situation which has been approved by the Engineer. Test data from these additional material samples shall not be used as a basis for a calculated pay factor.

### 39-4.02 Engineer Sampling for Verification

The Engineer will obtain random samples of aggregate, asphalt binder and asphalt concrete mixture, and test for in-place density independent of the Contractor's quality control testing. These samples may be obtained at any time during asphalt concrete production and placement operations, and will be obtained and split into representative portions in accordance with California Test 125. One of the representative split portions will be provided to the Contractor, one of the representative split portions will be tested by the Engineer and used to verify quality control test data furnished by the Contractor that has not yet been verified, and two representative split portions will be reserved by the Engineer for third party testing in accordance with the requirements of Section 39-4.05, "Dispute Resolution," of this specification.

The Engineer will permit the Contractor to witness all verification sampling. However, the Engineer will not be required to notify the Contractor of anticipated sampling schedules or locations. The Engineer will not delay sampling for the Contractor to witness the sampling.

### 39-4.03 Engineer Testing for Verification

Test data from the samples taken by the Engineer will be used to verify the Contractor's quality control test data.

The Engineer will sample and test for all material quality characteristics specified for statistical acceptance of the work. The Engineer's verification tests will be at a frequency of not less than 10 percent of the minimum quality control sampling and testing frequency required of the Contractor, and will be in accordance with Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification. The Engineer's verification tests will be performed using the same test methods used by the Contractor.

A standard statistical test, the  $t$ -test for sample means, as specified in Section 39-4.04, "Statistical Verification Tests," of this specification, will be used by the Engineer to verify the Contractor's quality control sampling and testing for acceptance of the material. All quality control test data reported by the Contractor since the last completed verification by the Engineer, for each indexed quality characteristic, will be used in the comparison. If the  $t$ -test does not indicate that the difference between the Contractor's test data and the corresponding Engineer's verification test data is significant ( $t \leq t_{crit}$ ), the Contractor's test data will be deemed verified and used by the Engineer to accept the material. If the  $t$ -test indicates that the difference between the Contractor's test data and the corresponding Engineer's verification test data is significant ( $t > t_{crit}$ ), the Contractor's test data will be deemed unverified.

When the Contractor's test data are not verified by the Engineer, the Contractor will be notified in writing of the difference, and the Engineer and Contractor will cooperate to attempt to determine the source of the discrepancy. In addition, the Engineer will continue to sample asphalt concrete production, and will compare the cumulative verification test data to the cumulative unverified test data reported by the Contractor for the indexed quality characteristic in question.

If, after 5 consecutive verification tests by the Engineer, the Contractor's quality control test data is not verified ( $t > t_{crit}$ ), acceptance and payment determination for the indexed quality characteristic in question on the asphalt concrete represented by the unverified test data will be made on the basis of the Engineer's verification test data only. The unverified test data will not be considered for acceptance purposes by the Engineer, nor will the test data be included in any subsequent  $t$ -test verification by the Engineer, pending the findings of the dispute resolution process as designated in Section 39-4.05, "Dispute Resolution," of this specification. In addition, the Contractor's sampling and testing program shall be deemed unacceptable and shall be disqualified from further sampling and testing. Before proceeding with asphalt concrete production, the Contractor shall propose in writing remedial measures which will be taken to provide an acceptable sampling and testing program. Asphalt concrete production shall not resume until the Contractor has received written notification that the revised sampling and testing program has been approved by the Engineer.

The Contractor shall not use any representative split portion of the samples taken by the Engineer for verification tests for determination of quality control test data.

Test data from the reserved representative split portions of verification samples will be used in the dispute resolution process as designated in Section 39-4.05, "Dispute Resolution," of this specification.

**39-4.04 Statistical Verification Tests**

The Engineer shall determine the acceptability of the Contractor's quality control test data for material acceptance purposes using the *t*-test for sample means.

The Contractor's quality control test data will be considered verified at a level of significance,  $\alpha = 0.01$ .

The *t*-value of the group of test data to be verified (*t*) is computed as follows:

$$t = \frac{\bar{X}_c - \bar{X}_v}{S_p} \sqrt{\frac{n_c n_v}{n_c + n_v}}$$

and

$$S_p^2 = \frac{(n_c - 1)S_c^2 + (n_v - 1)S_v^2}{n_c + n_v - 2}$$

where:  $n_c$  = Number of Contractor's quality control tests (min. 2 required)

$n_v$  = Number of Verification tests (min. 1 required)

$\bar{X}_c$  = Mean of the Contractor's quality control tests

$\bar{X}_v$  = Mean of the Verification tests

$S_p$  = Pooled standard deviation

(When  $n_v = 1$ ,  $S_p = S_c$ )

$S_c$  = Standard deviation of the Contractor's quality control tests

$S_v$  = Standard deviation of the Verification tests (when  $n_v > 1$ )

(Use the standard deviation of the Contractor's quality control tests when  $n_v = 1$ )

Compute *t* using the equation above and compare to the critical *t*-value,  $t_{crit}$ , from the following table:

Critical t-value for Verification Testing

degrees of freedom (nc+nv-2)	tcrit for a = 0.01	degrees of freedom (nc+nv-2)	tcrit for a = 0.01
1	63.657	18	2.878
2	9.925	19	2.861
3	5.841	20	2.845
4	4.604	21	2.831
5	4.032	22	2.819
6	3.707	23	2.807
7	3.499	24	2.797
8	3.355	25	2.787
9	3.250	26	2.779
10	3.169	27	2.771
11	3.106	28	2.763
12	3.055	29	2.756
13	3.012	30	2.750
14	2.977	40	2.704
15	2.947	60	2.660
16	2.921	120	2.617
17	2.898		2.576

When the *t*-value of the test data from the Engineer's verification tests and the Contractor's quality control tests is compared to  $t_{crit}$  from the previous table, if *t* is less than or equal to  $t_{crit}$  ( $t \leq t_{crit}$ ), the difference between the Contractor's quality control test data and the corresponding Engineer's verification test data is not significant, and the Contractor's test data are verified. When *t* is greater than  $t_{crit}$  ( $t > t_{crit}$ ), the difference between the Contractor's quality control test data and the corresponding Engineer's verification test data is significant, and the Contractor's test data are not verified.

**39-4.05 Dispute Resolution**

The Contractor and Engineer will work in partnership to avoid potential conflicts and to resolve any differences that may arise from unverified test data. As soon as an unsuccessful verification attempt is reported by the Engineer, both parties will review their sampling and testing procedures and share their findings. If an error in the Contractor's testing is detected during this review, the Contractor will either recalculate, if appropriate, or retest using the reserved representative split portions of quality control samples. This new test data shall be resubmitted to the Engineer for verification purposes. If an error in the Engineer's testing is detected, the Engineer will recalculate, if appropriate, or retest using a reserved representative split portion of the verification samples. Using the new test data, the Engineer will repeat the verification calculation of the Contractor's resubmitted test data using the statistical  $t$ -test as designated in Section 39-4.04, "Statistical Verification Tests," of this specification.

If the initial review does not reveal the source of the discrepancy, the Contractor may test the split verification samples and submit this test data to the Engineer for verification according to the requirements designated in Section 39-4.04, "Statistical Verification Tests," of this specification.

If the Contractor's quality control test data remain unverified after 5 consecutive verification samples have been obtained and tested, the Engineer will use the statistical  $t$ -test as designated in Section 39-4.03, "Statistical Verification Tests," of this specification, to verify the Contractor's test data on the 5 representative split portions of the verification samples. If the Contractor's test data for the 5 representative split portions of the verification samples are verified by the Engineer, then for purposes of acceptance and payment determination, the Contractor's unverified quality control test data will be replaced by the paired averages of the Engineer's and Contractor's test data for the 5 verification samples. If the Contractor's test data for the 5 representative split portions of the verification samples are not verified, the asphalt concrete represented by the unverified quality control tests will be accepted and paid for solely on the basis of the Engineer's verification test data. In either case, the Contractor's sampling and testing program will remain disqualified.

If neither the Contractor's quality control test data nor the test data of the representative split portions of the verification samples are verified by the Engineer, the Contractor may retain the services of the Third Party Laboratory designated in the Contractor's approved Quality Control Plan to resolve the difference. The Third Party Laboratory will perform the test method in question using the reserved representative split portions of the 5 verification samples. This test data will be submitted to the Engineer for verification. The Engineer will use the statistical  $t$ -test designated in Section 39-4.04, "Statistical Verification Tests," of this specification, to compare the Third Party Laboratory test data to the Engineer's verification test data. Both the Contractor and Engineer may witness the Third Party Laboratory testing.

If the Third Party Laboratory test data verifies the Engineer's verification test data, the asphalt concrete represented by the unverified quality control test data will be accepted and paid for using the paired averages of the Third Party Laboratory test data and the Engineer's verification test data. All costs related to the Third Party Laboratory testing shall be responsibility of the Contractor, and no additional compensation will be allowed. The Contractor's sampling and testing program shall remain disqualified.

If the Third Party Laboratory test data does not verify the Engineer's verification test data, the Engineer will use the statistical  $t$ -test to compare the Third Party Laboratory test data to the Contractor's unverified quality control test data. If the Contractor's quality control test data are verified by the Third Party Laboratory test data, acceptance and payment determination by the Engineer will be based on the Contractor's quality control test data. All costs of the Third Party Laboratory testing will be the Engineer's responsibility. The Contractor's quality control sampling and testing program shall be considered qualified, and the Engineer's verification sampling and testing program will be modified as necessary.

If the Third Party Laboratory test data fails to verify either the Engineer's verification test data or the Contractor's quality control test data, acceptance and payment determination will be based on the Third Party Laboratory test data. All costs for the Third Party Laboratory testing shall be split equally by the Engineer and the Contractor. The Contractor's sampling and testing program shall remain disqualified. The Engineer's verification sampling and testing program will be modified as necessary.

When the dispute is over relative compaction, the Third Party Laboratory will obtain test maximum densities using the reserved representative split portions of the verification samples. The Third Party Laboratory will re-calibrate the Engineer's nuclear density gage with cores obtained from the most recent 500 feet of complete in place asphalt concrete surfacing not yet opened to public traffic. If no 500-foot section of asphalt concrete surfacing not yet opened to public traffic is available, the Contractor shall construct a 500-foot test strip, to the thickness to be placed, at a location on the project approved by the Engineer. The Third Party Laboratory will use the new calibration to re-calculate the nuclear density gage readings for determination of the Engineer's verification test data and will use the new calibration to determine relative compaction. If the re-calculated relative compaction test data verifies the Engineer's verification test data, subsequent testing by the Engineer will use the re-calibrated nuclear density gage. If the re-calculated relative compaction test data verifies the Engineer's verification test data, all costs related to the Third Party Laboratory testing shall be the responsibility of the Contractor, and no additional compensation will be allowed. The Contractor's sampling and testing program shall remain disqualified. If the re-calculated relative compaction test data do not verify the Engineer's verification test data, the Engineer may choose to re-calibrate the Engineer's nuclear density gage or may use the Third Party Laboratory calibration and all costs for the re-calibration shall be the responsibility of the Engineer. The Contractor's sampling and testing program shall remain disqualified.

If the Contractor's sampling and testing program is disqualified, the Contractor shall submit a plan for improving the Contractor's sampling and testing program which satisfies the requirements of the Quality Control Plan, as designated in Section 39-3, "Contractor Quality Control," of this specification. The Contractor shall not continue to use the disqualified sampling and testing program for quality control sampling and testing to be considered for acceptance and payment determination during the dispute resolution process as specified herein.

Should the Third Party Laboratory test data obtained during the process of dispute resolution, as specified herein, verify the Contractor's quality control test data and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay caused by the dispute resolution process, the delay will be considered a right of way delay as specified in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

## **39-5 STORING, PROPORTIONING AND MIXING MATERIALS**

### **39-5.01 Storage**

The Contractor shall store aggregate for asphalt concrete so that separately sized aggregates will not be intermingled, and shall store asphalt binder so that different grades of asphalt will not be intermingled. Any aggregate which has been intermingled with another size of aggregate shall be removed by the Contractor and replaced with aggregate of specified grading. "Hot-feed control" and "cold-feed control," indicates the location of measuring devices or controls.

When the Contractor adds supplemental fine aggregate, each such supplemental fine aggregate used shall be stored separately and kept thoroughly dry.

The measurement and storage requirements of this Section 39-5, shall not apply to the dust collected in skimmers and expansion chambers (knock-out boxes) or to the dust collected in centrifugal (cyclone) collectors. Dust from these collectors may be returned to the aggregate without being measured or stored separately, provided the dust is returned uniformly at a point in advance of the sampling device in batch-mixing plants or is returned at or before mixing in continuous mixing plants.

Aggregate and asphalt binder shall be stored in conformance with the following requirements:

#### **39-5.01A Aggregate Cold Storage**

The Contractor shall feed the material from storage with a mechanical feeder. Before being fed to the drier, aggregate shall be separated into 3 or more sizes and stored separately.

#### **39-5.01B Aggregate Hot Storage**

The Contractor shall store aggregate for asphalt concrete to be mixed in batch mixing plants, after being dried, in accordance with the following requirements:

Aggregates for asphalt concrete shall be separated into 3 or more sizes.

After the aggregate is separated, each size shall be stored in a separate bin and shall be recombined in conformance with the provisions specified in Section 39-5.03, "Proportioning for Batch Mixing," of this specification, to conform to the gradings specified in Section 39-2, "Materials," of this specification. Storage bins shall be provided with chutes to prevent overflow into adjacent bins.

#### **39-5.01C Asphalt Binder Storage**

Asphalt to be used as a binder for asphalt concrete shall be stored in tanks accurately calibrated in 100-gallon increments and maintained to this accuracy. The tanks shall be made accessible for measuring the volume of asphalt at any time.

The Contractor shall provide a suitable sampling device in asphalt feed lines connecting plant storage tanks to the asphalt weighing system or spray bar. The sampling device shall consist of a valve with a nominal diameter between 1/2 inch and 3/4 inch, constructed in such a manner that a one-quart sample may be withdrawn slowly at any time during plant operations. The Contractor shall maintain the valve in good condition and, if the valve fails to function properly, replace the valve. The sampling device shall be readily accessible and in an area free of dangerous obstructions and shall be between 24 and 30 inches above the platform. A drainage receptacle shall be provided by the Contractor for flushing the device prior to sampling.

The Contractor shall maintain the discharge end of the asphalt binder circulating pipe below the surface of the asphalt binder in the storage tank to prevent discharging hot asphalt binder into open air.

The Contractor shall install a temperature sensing device in the asphalt feed line. The device shall measure the temperature of the asphalt and shall be accurate to 10° F. increments. An automatic, continuous recording device shall be provided and used to maintain accurate records of the asphalt temperature during production.

### **39-5.02 Drying**

Aggregate shall be fed directly to a drier-drum mixer or to a drier at a uniform rate.

Drying shall continue for a sufficient period of time and at a sufficiently high temperature so that, at the time of spreading, the moisture content of the completed asphalt concrete mixture shall not exceed 1.0 percent and the minimum and maximum asphalt concrete mixture temperatures are not exceeded. Moisture content will be determined by California Test 310 or 370.

The drier or drier-drum mixer shall be provided with a device which senses the temperature of the material leaving the drier or the drier-drum mixer. The temperature-sensing device shall be accurate to the nearest 10° F. The device shall be located so that changes of 10° F. in temperature of the material will be indicated within one minute. An automatic continuous recording device shall be provided and used to maintain accurate records of the temperatures during production.

The burner used for heating the aggregate shall achieve complete combustion of the fuel.

### **39-5.03 Proportioning for Batch Mixing**

When the Contractor elects to use batch mixing equipment, each aggregate storage bin shall be equipped with a suitable, safe sampling device which will provide a sample, representative of actual production, of the aggregate discharged into the weigh hopper or volumetric proportioning bin. When such samples are taken from a location above ground level, a means shall be provided for lowering the aggregate samples to the ground.

Fine material collected in all dust control systems, other than centrifugal collectors or knock-out boxes, is considered to be supplemental fine aggregate. When supplemental fine aggregate is used, it shall be proportioned by weight as provided in the subsection, "Weight Proportioning," of Section 39-5.03A, "Manual Proportioning," of this specification. A suitable, safe sampling device shall be installed in each feed line or surge tank preceding the weigh hopper.

Aggregate and asphalt shall be proportioned by weight or by volume as follows:

#### **39-5.03A Manual Proportioning**

An automatic plant shall not be operated manually unless the automatic circuitry is disconnected to the extent that it cannot be activated by the mere operation of a switch, circuit breaker, or some other similar routine procedure.

When manual proportioning is used in the production of asphalt concrete, proportioning shall conform to the following:

1. Weight Proportioning.—The zero tolerance for aggregate scales shall be 0.5-percent of the total batch weight of the aggregate. The zero tolerance for separate scales for weighing supplemental fine aggregate or asphalt binder shall be 0.05-percent of the total batch weight of the aggregate.

The indicated weight of material drawn from storage for any draft of material shall not vary from the preselected scale setting by more than the following percentages of the total batch weight of the aggregate:

- a. Aggregate shall be within one percent, except that when supplemental fine aggregate is used and is weighed cumulatively with the aggregate, the draft of aggregate drawn immediately before the supplemental fine aggregate shall be within 0.5-percent.
- b. Supplemental fine aggregate shall be within 0.5-percent.
- c. Asphalt binder shall be within 0.1-percent.

The asphalt binder shall be measured by a tank scale.

2. Volumetric Proportioning.—Each size of aggregate, except supplemental fine aggregate, shall be proportioned in a separate bin that is adjustable in size. Each bin shall have a gate or other device designed so that the bin shall be completely filled and struck off in measuring the volume of aggregate to be used in the mix. Means shall be provided for calibrating the weight of material in each measuring bin at any time. The plant shall be operated so that the material in each aggregate bin is within 2 percent of the weight pre-selected for the type of mixture being produced.

Asphalt binder shall be proportioned by a meter or an adjustable calibrated tank. When meters are used, the asphalt lines leading to the asphalt meters shall be full-circulating or shall be regulated so that during plant stoppages, the temperature of the asphalt does not change more than 15° F. from the temperature maintained while the plant is in full operation. Asphalt binder shall be proportioned to within 2 percent of the weight preselected for the asphalt concrete mixture being produced.

#### **39-5.03B Automatic Proportioning**

When automatic batch mixing is required in "Asphalt Concrete," in Section 10-1, "General," elsewhere in these special provisions, or when the Contractor elects to use an automatic batching system, the proportioning devices shall be automatic to the extent that the only manual operation required for proportioning all materials for one batch shall be a single operation of a switch or starter.

When automatic proportioning is used in the production of asphalt concrete, proportioning shall conform to the following:

1. **Weight Proportioning.**—Automatic proportioning devices shall be of a type in which materials discharged from the several bins are controlled by gates or by mechanical conveyors. The batching devices shall be so interlocked that no new batch may be started until all weigh hoppers are empty, the scales are at zero, and the discharge gates are closed. The means of withdrawal from the bins and of discharge from the weigh box shall be interlocked so that not more than one bin can discharge onto any given scale at one time, and that the weigh box cannot be tripped until the required quantity from each of the bins has been deposited therein. In addition, automatic proportioning devices shall be interlocked so that the weighing cycle will be interrupted whenever the amount of material drawn from any storage varies from the preselected amount by more than the tolerances specified in Section 39-5.03A, "Manual Proportioning," of this specification. Whenever the weighing cycle is interrupted, that specific batch shall not be used in the work unless it can be manually adjusted to meet the specified tolerances based on the total weight of the batch. When partial batches are batched automatically, the interlock tolerances, except the zero tolerance, shall apply to the total weight of aggregate in the partial batch.

Automatic proportioning devices shall be operated so that all weight increments required for a batch are preset on the controls at the same time. Controls shall be designed so that these settings may be changed without delay, and the order of discharge from the several bins can be changed.

Automatic proportioning controls shall be equipped with means for inspection of the interlock tolerance settings, and instructions for doing so shall be immediately available at the point of operation.

The Contractor shall provide the necessary means to check the weights of various proportioned amounts on a separate scale located at the plant.

2. **Volumetric Proportioning.**—Asphalt binder shall be proportioned by an adjustable calibrated tank.

Automatic volumetric proportioning devices shall be of a type which will not allow the bins to discharge into the mixer unless the mixer is empty and the mixer discharge gate is closed and will not operate unless the aggregate bins and asphalt binder tank are full. The automatic proportioning device shall operate in such a manner that the material in each aggregate bin and the asphalt binder tank is within 2 percent of the preselected weights.

The Contractor shall provide the necessary means to check the weights of various proportioned amounts on a separate scale located at the plant.

### **39-5.03C Proportioning for Continuous Mixing**

Asphalt binder shall be introduced into the mixer through a meter conforming to the requirements of Section 9-1.01, "Measurement of Quantities," of the Standard Specifications. The asphalt meter shall automatically compensate for changes in asphalt temperature, unless the meter is of the mass flow, coriolis effect, type. The system shall be capable of varying the rate of delivery of binder proportionate with the delivery of aggregate. During any day's run, the temperature of asphalt binder shall not vary more than 50° F. The meter and lines shall be heated and insulated. The binder storage shall be equipped with a device for automatic plant cut-off when the level of binder is lowered sufficiently to expose the pump suction line.

When supplemental fine aggregate is used, it shall be proportioned by weight by a method that uniformly feeds the material within 2 percent of the required amount. Supplemental fine aggregate shall be discharged from the proportioning device directly into the mixer.

The supplemental fine aggregate proportioning system shall function with a degree of accuracy such that, when operated at between 30 percent and 100 percent of maximum operating capacity, the average difference between the indicated weight of material delivered and the actual weight delivered shall not exceed one percent of the actual weight for three, 15-minute runs. For any of the 3, individual 15-minute runs, the indicated weight of material delivered shall not vary from the actual weight delivered by more than 2 percent of the actual weight.

The fine material collected in all dust control systems may be returned to the aggregate production stream without proportioning if returned at a rate commensurate with overall plant production, and if returned at or before the mixer. Any return rate of less than 100 percent of the collection rate shall be metered as specified above for supplemental fine aggregate.

The asphalt feeder, each of the aggregate feeders, the supplemental fine aggregate feeder, if used, and the combined aggregate feeder, shall be equipped with devices by which the rate of feed can be determined while the plant is in full operation.

The combined aggregate shall be weighed using a belt scale. The belt scale shall be of such accuracy that, when the plant is operating between 30 percent and 100 percent of belt capacity, the average difference between the indicated weight of material delivered and the actual weight delivered shall not exceed one percent of the actual weight for three, 3-minute runs. For any of the 3 individual 3-minute runs, the indicated weight of material delivered shall not vary from the actual weight delivered by more than 2 percent of the actual weight.

The actual weight of material delivered for proportioning device calibrations shall be determined by a vehicle scale conforming to the requirements of Section 9-1.01, "Measurement of Quantities," of the Standard Specifications. The vehicle scale shall be located at the plant and shall be sealed within 24 hours of checking the plant's proportioning devices. The plant shall be equipped so that this accuracy check can be made prior to the first production operation for a project and at any other time as directed by the Engineer.

The belt scale for the combined aggregate, the proportioning devices for supplemental fine aggregate, if used, and the asphalt proportioning meter shall be interlocked so that the rates of feed of the aggregates and asphalt will be adjusted automatically (at all production rates and production rate changes) to maintain the asphalt ratio (pounds of asphalt per 100 pounds of dry aggregate including supplemental fine aggregate, if used) designated in the verified mix design provided by the Contractor in accordance with the requirements of Section 39-2.01, "Mix Design," of this specification. The plant shall not be operated unless this automatic system is functioning and in good working condition.

Asphalt meters and aggregate belt scales used for proportioning aggregates and asphalt shall be equipped with rate-of-flow indicators to show the rates of delivery of asphalt and aggregate. Meters and scales shall be equipped with resettable totalizers so that the total amounts of asphalt and aggregate introduced into the asphalt concrete mixture can be determined. Rate-of-flow indicators and totalizers for like materials shall be accurate within one percent when compared directly. The asphalt cement totalizer shall not register when the asphalt metering system is not delivering material to the mixer.

The bin or bins containing the fine aggregate and supplemental fine aggregate, if used, shall be equipped with vibrating units or other equipment which will prevent any hang-up of material while the plant is operating. Each belt feeder shall be equipped with a device to monitor the depth of aggregate between the troughing rollers. The device for monitoring depth of aggregate shall automatically shut down the plant whenever the depth of aggregate is less than 70 percent of the target depth. To avoid erroneous shut down by normal fluctuations, a delay between sensing less than 70 percent flow and shutdown of the plant will be permitted, as determined by the Engineer, at the time of the initial California Test 109. A second device shall be located either in the stream of aggregate beyond the belt or where it will monitor movement of the belt by detecting revolutions of the tail pulley on the belt feeder. The device for monitoring no-flow or belt movement, as the case may be, shall stop the plant automatically and immediately when there is no flow. The plant shall not be operated unless both low-flow and no-flow monitoring devices are in good working condition and functioning properly.

For continuous pugmill mixing plants an aggregate sampling device which will provide a 60 to 80-pound sample of the combined aggregate while the plant is in full operation shall be provided in advance of the point where the aggregate enters the mixer.

For drier-drum mixing plants an aggregate sampling device which will provide a 60 to 80-pound sample of the combined aggregate while the plant is in full operation shall be provided in advance of the point where the aggregate enters the drier-drum mixer.

When the samples are taken from a location above ground level, the Contractor shall provide a means for safely lowering the aggregate samples to the ground.

When supplemental fine aggregate is used, a suitable, safe sampling device shall be installed in each feed line or surge tank preceding the proportioning device for the supplemental fine aggregate.

#### **39-5.04 Mixing**

Aggregate, supplemental fine aggregate, and asphalt binder shall be mixed in a batch mixer, continuous mixing pugmill mixer, or continuous mixing drier-drum. The charge in a batch mixer, or the rate of feed to a continuous mixer, shall not exceed that which will permit complete mixing of all of the material. Dead areas in the mixer, in which the material does not move or is not sufficiently agitated, shall be corrected by a reduction in the volume of material or by other adjustments.

Asphalt binder shall be at a temperature of not less than 250° F. nor more than 375° F. when added to the aggregate.

The temperature of the aggregate before adding the binder shall be not more than 325° F.

Mixing shall conform to the following requirements:

##### **39-5.04A Batch Mixing**

When asphalt concrete is produced by batch mixing, the mixer shall be equipped with a sufficient number of paddles of a type and arrangement so as to produce a properly mixed batch.

The binder shall be introduced uniformly into the mixer along the center of the mixer parallel to the mixer shafts, or by pressure spraying. When a pan is used, it shall be equipped with movable vanes in order that the flow of binder may be directed across the width of the pan, as desired. The vanes shall be equipped with a means for quick adjustment, and a positive lock to prevent shifting.

The mixer platform shall be of ample size to provide safe and convenient access to the mixer and other equipment. The mixer housing and weighbox housing shall be equipped with gates of ample size to permit ready sampling of the discharge of aggregate from each of the plant bins and from each feed line or surge tank of supplemental fine aggregate,

if used. The Contractor shall provide a sampling device capable of delivering a representative sample of sufficient size to permit the required tests.

The mixer shall be equipped with a timing device which will indicate by a definite audible or visual signal the expiration of the mixing period. The device shall measure the time of mixing within 2 seconds.

The time of mixing a batch shall begin on the charging stroke of the weighhopper dumping mechanism and shall end when discharge is started. Mixing shall continue until a homogeneous asphalt concrete mixture of uniformly distributed and properly coated aggregates of unchanging appearance is produced. The time of mixing shall be not less than 30 seconds.

When automatic proportioning or automatic batch mixing is required in "Asphalt Concrete," in Section 10-1, "General," elsewhere in these special provisions, or when the Contractor elects to use an automatic batching system, an interval timer shall control the time of mixing. The interval timer shall be interlocked so that the mixer cannot be discharged until all of the materials have been mixed for the full amount of time specified.

#### **39-5.04B Continuous Mixing**

Continuous mixing plants shall utilize pugmill or drier-drum mixers.

When asphalt concrete is produced by pugmill mixing, the mixer shall be equipped with paddles of a type and arrangement to provide sufficient mixing action and movement to the asphalt concrete mixture to produce properly mixed asphalt concrete. The combined aggregate shall be fed directly from the drier to the mixer at a uniform and controlled rate.

Mixing shall continue until a homogeneous asphalt concrete mixture of thoroughly and uniformly coated aggregates of unchanging appearance is produced at the discharge point from the mixer.

The temperature of the completed asphalt concrete mixture shall not exceed 325° F. upon discharge from the mixer.

The mixer shall discharge into a storage silo with a capacity of not less than that specified in Section 39-5.05, "Asphalt Concrete Storage," of this specification. The Contractor shall provide a means of diverting the flow of asphalt concrete away from the silo to prevent incompletely mixed portions of the asphalt concrete mixture from entering the silo.

#### **39-5.05 Asphalt Concrete Storage**

When asphalt concrete is stored, it shall be stored only in silos. Asphalt concrete shall not be stockpiled. The minimum quantity of asphalt concrete in any one silo during mixing shall be 20 tons except for the period immediately following a shutdown of the plant of 2 hours or more. A means shall be provided to indicate that storage in each silo is being maintained as required.

Storage silos shall be equipped with a surge-batcher sized to hold a minimum of 4,000 pounds of material. A surge-batcher consists of equipment placed at the top of the storage silo which catches the continuous delivery of the completed asphalt concrete mix and changes it to individual batch delivery to prevent the segregation of product ingredients as the completed asphalt concrete mix is placed into storage. The surge-batcher shall be center loading and shall be thermally insulated or heated to prevent material buildup. Rotary chutes shall not be used as surge-batchers.

The surge-batcher shall be independent and distinct from conveyors or chutes used to collect or direct the completed asphalt concrete mixture being discharged into storage silos and shall be the last device to handle the material before it enters the silo. Multiple storage silos shall be served by an individual surge-batcher for each silo. Material handling shall be free of oblique movement between the highest elevation (conveyor outfall) and subsequent placement in the silo. Discharge gates on surge-batchers shall be automatic in operation and shall discharge only after a minimum of 4,000 pounds of material has been collected and shall close before the last collected material leaves the device. Discharge gate design shall prevent the deflection of material during the opening and closing operation.

Asphalt concrete stored in excess of 18 hours shall not be used in the work. Asphalt concrete mixture containing hardened lumps shall not be used. Any storage facility which contained the material with the hardened lumps shall not be used for further storage until the cause of the lumps is corrected.

#### **39-5.06 Asphalt Concrete Plants**

Any plant, including commercial plants, that produce asphalt concrete that is subject to these specifications shall conform to the provisions in Section 7-1.01F, "Air Pollution Control," of the Standard Specifications, and shall be equipped with a wet-tube dust washer or equal and other devices which will reduce the dust emission to the degree that adjacent property is not damaged. The washer and other equipment shall function efficiently at all times when the plant is in operation.

During production, petroleum products such as diesel fuel and kerosene shall not be used as a release agent on belts, conveyors, hoppers or hauling equipment.

Plants shall be equipped with an inspection dock constructed so that a quality control technician or inspector standing on the dock can inspect the completed asphalt concrete mixture and take samples, as necessary, from the hauling vehicle before the vehicle leaves the plant site. This inspection dock shall allow the hauling vehicle to pull alongside and shall meet all

applicable safety requirements of the California Division of Occupational Safety and Health. Haul vehicle drivers shall be instructed to stop at the dock whenever a quality control technician or inspector is on the dock and to remain there until directed to leave by that individual.

## **39-6 SUBGRADE, PRIME COAT, PAINT BINDER (TACK COAT), AND PAVEMENT REINFORCING FABRIC**

### **39-6.01 Subgrade**

Immediately prior to applying prime coat or paint binder (tack coat), or immediately prior to placing the asphalt concrete when a prime coat or paint binder (tack coat) is not required, the subgrade to receive asphalt concrete shall conform to the compaction requirement and elevation tolerances specified for the material involved and shall be free of loose or extraneous material. If the asphalt concrete is to be placed on an existing base or pavement which was not constructed as part of the contract, the surface shall be cleaned by sweeping, flushing or other means to remove all loose particles of paving, dirt and all other extraneous material immediately before applying the prime coat or paint binder (tack coat).

### **39-6.02 Prime Coat and Paint Binder (Tack Coat)**

A prime coat of liquid asphalt shall be applied to the areas to be surfaced when there is a contract item for the work or when the work is required in "Asphalt Concrete," in Section 10-1, "General," elsewhere in these special provisions.

Prime coat shall be applied only to those areas designated by the Engineer.

Prime coat shall be applied at the approximate total rate of 0.25-gallon per square yard of surface covered. The exact rate and number of applications will be determined by the Engineer.

Prime coat shall be applied at a temperature conforming to the range of temperatures provided in Section 93-1.03, "Mixing and Applying," of the Standard Specifications, for distributor application of the grade of liquid asphalt being used.

A paint binder (tack coat) of asphaltic emulsion shall be furnished and applied in accordance with the provisions in Section 94, "Asphaltic Emulsions," of the Standard Specifications, and shall be applied to all vertical surfaces of existing pavement, curbs, gutters, and construction joints in the surfacing against which additional material is to be placed, to a pavement to be surfaced, and to other surfaces designated in "Asphalt Concrete," in Section 10-1, "General," elsewhere in these special provisions.

Paint binder (tack coat) shall be applied in one application at a rate of from 0.02 to 0.10-gallon per square yard of surface covered. The exact rate of application will be determined by the Engineer.

At the Contractor's option, paving asphalt may be used for paint binder (tack coat) instead of asphaltic emulsion. If paving asphalt is used, the grade to be used and the rate of application will be determined by the Engineer. The paving asphalt shall be applied at a temperature of not less than 285° F., nor more than 350° F.

Prime coat or paint binder (tack coat) shall be applied only so far in advance of placing the surfacing as may be permitted by the Engineer. When asphaltic emulsion is used as a paint binder (tack coat), the asphalt concrete shall not be placed until the asphaltic emulsion has cured.

Immediately in advance of placing asphalt concrete, additional prime coat or paint binder (tack coat) shall be applied as directed by the Engineer to areas where the prime coat or paint binder (tack coat) has been damaged, and loose or extraneous material shall be removed, and no additional compensation will be allowed therefor.

### **39-6.03 Pavement Reinforcing Fabric**

Pavement reinforcing fabric shall be placed on existing pavement to be surfaced or between layers of asphalt concrete when such work is shown on the plans, or specified in "Asphalt Concrete," in Section 10-1, elsewhere in these special provisions, or ordered by the Engineer.

Before placing the pavement reinforcing fabric, a binder of paving asphalt shall be applied to the surface to receive the pavement reinforcing fabric at an approximate rate of 0.25-gallon per square yard of surface covered. The exact rate will be determined by the Engineer. The binder shall be applied to a width equal to the width of the fabric mat plus 3 inches on each side.

Before applying binder, large cracks, spalls and depressions in existing pavement shall be repaired as directed by the Engineer, and the repair work will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

The fabric shall be aligned and placed with no wrinkles that lap. The test for lapping shall be made by gathering together the fabric in a wrinkle. If the height of the doubled portion of extra fabric is 1/2-inch or more, the fabric shall be cut to remove the wrinkle, then lapped in the direction of paving. Lap in excess of 2 inches shall be removed. Pavement reinforcing fabric shall not be placed in areas of conform tapers where the thickness of the overlying asphalt concrete is 0.10-foot or less.

If manual laydown methods are used, the fabric shall be unrolled, aligned, and placed in increments of approximately 30 feet.

Adjacent borders of the fabric shall be lapped 2 to 4 inches. The preceding roll shall be lapped 2 to 4 inches over the following roll in the direction of paving at ends of rolls or at any break. At fabric overlays, both the binder and the fabric shall overlap previously placed fabric by the same amount.

Seating of the fabric with rolling equipment after placing will be permitted. Turning of the paving machine and other vehicles shall be gradual and kept to a minimum to avoid damage to the fabric.

A small quantity of asphalt concrete, to be determined by the Engineer, may be spread over the fabric immediately in advance of placing asphalt concrete surfacing in order to prevent fabric from being damaged by construction equipment.

Public traffic shall not be allowed on the bare reinforcing fabric, except that public cross traffic may be allowed to cross the fabric under traffic control after the Contractor has placed a small quantity of asphalt concrete over the fabric.

Care shall be taken to avoid tracking binder material onto the pavement reinforcing fabric or distorting the fabric during seating of the fabric with rolling equipment. If necessary to protect the pavement reinforcing fabric, exposed binder material may be covered lightly with sand.

## **39-7 SPREADING AND COMPACTING EQUIPMENT**

### **39-7.01 Spreading Equipment**

Asphalt pavers shall be self-propelled mechanical spreading and finishing equipment, provided with a screed or strike-off assembly capable of distributing the material to not less than the full width of a traffic lane. Screed action shall include any cutting, crowding, or other practical action which is effective on the asphalt concrete mixture without tearing, shoving, or gouging, and which produces a surface texture of uniform appearance. The screed shall be adjustable to the required section and thickness. The screed shall be provided with a suitable full width compacting device. Pavers that leave ridges, indentations or other marks in the surface shall not be used unless the ridges, indentations, or marks are eliminated by rolling or prevented by adjustment in the operation.

The asphalt paver shall operate independently of the vehicle being unloaded or shall be capable of propelling the vehicle being unloaded in a satisfactory manner. The load of the haul vehicle shall be limited to that which will insure satisfactory spreading. While being unloaded the haul vehicle shall be in contact with the machine at all times, and the brakes on the haul vehicle shall not be depended upon to maintain contact between the vehicle and the machine.

No portion of the weight of hauling or loading equipment, other than the connection, shall be supported by the asphalt paver, and no vibrations or other motions of the loader, which could have a detrimental effect on the riding quality of the completed pavement, shall be transmitted to the paver.

When asphalt concrete is placed directly upon asphalt treated permeable base, the asphalt concrete shall be placed with a paver equipped with tracks unless the layer being placed is 0.15-foot or less in compacted thickness.

### **39-7.02 Compacting Equipment**

The Contractor shall furnish a sufficient number of rollers to obtain the specified compaction and surface finish required by these specifications. One roller each shall be provided for breakdown, intermediate, and finish rolling. The Contractor shall size the rollers to achieve the required results.

All rollers shall be equipped with pads and water systems which prevent sticking of asphalt concrete mixtures to the pneumatic or steel-tired wheels. A parting agent which will not damage the asphalt concrete mixture, as approved by the Engineer, may be used to aid in preventing the sticking of the asphalt concrete mixture to the wheels.

## **39-8 SPREADING AND COMPACTING**

### **39-8.01 General Requirements**

Asphalt concrete shall be handled, spread and compacted in a manner which is in conformance with this specification.

Asphalt concrete shall be placed in such a manner so that cracking, shoving and displacement will be avoided.

Type A and Type B asphalt concrete shall be placed only when the atmospheric temperature is above 50° F.

Asphalt concrete shall not be placed when the underlying layer or surface is frozen or when weather conditions will prevent proper handling, finishing, or compaction of the mixture.

Asphalt concrete shall be spread and compacted in the number of layers of the thicknesses indicated in the following table:

All thicknesses shown are in hundredths of a foot							
Total Thickness Shown on the Plans*	Number of Layers	Top Layer Thickness		Next Lower Layer Thickness		All Other Lower Layers Thickness	
		Min.	Max.	Min.	Max.	Min.	Max.
20 or 25	one	—	—	—	—	—	—
35 through 45	2	15	20	20	25	—	—
50 or more	**	15	20	15	25	20	40

Notes:

\* When pavement reinforcing fabric is shown to be placed between layers of asphalt concrete, the thickness of asphalt concrete above the pavement reinforcing fabric shall be considered to be the "Total Thickness Shown on the Plans" for the purpose of spreading and compacting the asphalt concrete above the pavement reinforcing fabric.

\*\* At least 3 layers if total thickness is 0.50-foot or more and less than 0.90-foot. At least 4 layers if total thickness is 0.90-foot or more.

Asphalt concrete to be placed on shoulders, and on other areas off the traveled way having a width of 5 feet or more, shall be spread in the same manner as above.

The completed mixture shall be deposited on the roadbed at a uniform quantity per linear foot, as necessary to provide the required compacted thickness without resorting to spotting, picking-up or otherwise shifting the mixture.

Segregation shall be avoided, and the surfacing shall be free from pockets of coarse or fine material. Asphalt concrete containing hardened lumps shall not be used.

Longitudinal joints in the top layer shall correspond with the edges of proposed traffic lanes. Longitudinal joints in all other layers shall be offset not less than 0.5-foot alternately each side of the edges of traffic lanes.

Unless otherwise provided herein or permitted by the Engineer, the top layer of asphalt concrete for shoulders, tapers, transitions, road connections, private drives, curve widenings, chain control lanes, turnouts, left turn pockets, and other such areas, shall not be spread before the top layer of asphalt concrete for the adjoining through lane has been spread and compacted. At locations where the number of lanes is changed, the top layer for the through lanes shall be paved first. When existing pavement is to be surfaced and the specified thickness of asphalt concrete to be spread and compacted on the existing pavement is 0.25-foot or less, shoulders or other adjoining areas may be spread simultaneously with the through lane provided the completed surfacing conforms to the requirement of this specification. Tracks or wheels of spreading equipment shall not be operated on the top layer of asphalt concrete in any area until final compaction has been completed.

At location shown on the plans, specified in "Asphalt Concrete," in Section 10-1, "General," elsewhere in these special provisions, or as directed by the Engineer, the asphalt concrete shall be tapered or feathered to conform to existing surfacing or to other highway and non-highway facilities.

At locations where the asphalt concrete is to be placed over areas inaccessible to spreading and rolling equipment, the asphalt concrete shall be spread by any means practicable so as to obtain the specified results and shall be compacted thoroughly to the required lines, grades and cross sections by means of pneumatic tampers, or by other methods that will produce the same degree of compaction as pneumatic tampers.

### 39-8.02 Test Strip Start Up Procedures

On the first day of asphalt concrete production, of each asphalt concrete mixture, the Contractor shall produce an initial quantity of asphalt concrete mixture sufficient to construct a test strip of asphalt concrete surfacing to the thickness representative of the operations for each asphalt concrete mixture. The test strip shall contain a minimum of 100 tons, and a maximum of 500 tons, of complete in place asphalt concrete. The amount of asphalt concrete to be initially produced for the construction of the test strip shall be proposed to the Engineer by the Contractor, and shall be approved by the Engineer. The Contractor shall construct the test strip on the project at a location approved by the Engineer. The purpose of the test strip is to establish a rolling pattern which will produce the specified asphalt concrete density, to develop a correlation between cores taken from the test strip and the Contractor's and Engineer's nuclear density gage readings taken at the core locations on the test strip, and to verify the Contractor's mix design and asphalt concrete mixture quality characteristics which shall be produced for the contract.

The Contractor shall construct the test strip using asphalt concrete mix production, lay-down and compaction procedures and equipment intended for the entire project. The Contractor shall stop production of asphalt concrete after construction of the test strip until the specified quality characteristics of the asphalt concrete mixture and the density values of the test strip have been tested, verified and accepted by the Engineer according to the requirements designated in Section 39-4.03, "Engineer Testing for Verification," of this specification.

Attention is directed to longitudinal and transverse construction joint requirements specified in "Asphalt Concrete" in Section 10-1, "General," elsewhere in these special provisions.

The following sampling and testing requirements shall apply to the test strip:

The Contractor shall obtain 3 representative asphalt concrete mixture samples from the test strip and shall evaluate the material for conformance to the asphalt concrete mixture requirements specified in Section 39-2.03, "Aggregate," of this specification. The Engineer will also obtain 3 representative asphalt concrete mixture samples from the test strip at the same location for purposes of verification of the Contractor's test data. The Contractor's test data will be considered verified if the asphalt concrete mixture design parameters conform to the requirements specified herein for minimum and maximum values and the design parameter of asphalt concrete mixture percent air voids is within  $\pm 1.0$  percent of the percent air voids designated in the Contractor's verified mix design submitted in accordance with the requirements of Section 39-2.01, "Mix Design," of this specification. The asphalt concrete mixture is acceptable if the verified test data for the design parameters from the 3 asphalt concrete mixture samples are within the specified limits.

The Contractor shall obtain 5 representative samples and shall evaluate the material quality characteristics for conformance to the requirements specified in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification. If the test data from one or more samples are outside the specified limits, but the average of the test data from all samples is within the specification limits, the Engineer may tentatively accept the test strip with the Contractor's assurance that adjustments to the process will be made to correct the indicated quality characteristic deficiencies in the asphalt concrete mixture.

The Contractor shall obtain nuclear density gage readings for density and relative compaction determinations, and obtain 2 core samples each at a minimum of 10 locations selected at random within the test strip. The Engineer will obtain nuclear density gage readings at the same locations within the test strip as the Contractor. The Contractor shall perform the nuclear density gage tests according to California Test 375. The test data of each of the 2 cores shall be averaged to obtain one set of test data per location. The Contractor shall furnish the Engineer with the Contractor's calibration values for correlation of the nuclear density gage readings to the core densities. The test strip density will be acceptable if all core test data yield a pay factor of 0.90 or greater when determined in accordance with Section 39-10.02B, "Statistical Evaluation," of this specification.

The Contractor shall repeat the test strip process until the material properties and mix design parameters produced conform to the requirements specified herein and the test strip is accepted by the Engineer. Test strips that are accepted by the Engineer may remain in place and payment for the test strips will be determined by the procedure specified in Section 39-10.02B, "Statistical Evaluation and Determination of Pay Factor," of this specification. Test data used to accept the test strips will not be included with the test data used for acceptance of the work according to the requirements of Section 39-10, "Acceptance," of this specification. Upon receipt of written approval from the Engineer that the test strip has been accepted, full production of asphalt concrete may commence. The Contractor may request that unacceptable test strips be left in place.

The Contractor shall use the test strip start-up procedures specified herein when resuming production of asphalt concrete after a termination of asphalt concrete production due to unsatisfactory material quality characteristics.

### **39-8.03 Spreading**

All layers, except as otherwise specified, shall be spread with an asphalt paver, unless otherwise approved by the Engineer. Asphalt pavers shall be operated in such a manner as to insure continuous and uniform movement of the paver.

In advance of spreading asphalt concrete over an existing base, surfacing, or bridge deck, if there is a contract item for asphalt concrete (leveling), or if ordered by the Engineer, asphalt concrete shall be spread by any mechanical means that will produce a uniform smoothness and texture to level irregularities, and to provide a smooth base in order that subsequent layers will be of uniform thickness. Section 39-10.02, "Statistical Evaluation and Determination of Pay Factor," of this specification, shall not apply to asphalt concrete (leveling).

When directed by the Engineer, paint binder (tack coat) shall be applied to any layer in advance of spreading the next layer.

Before placing the top layer adjacent to cold transverse construction joints, the joints shall be trimmed to a vertical face and to a neat line. Transverse joints shall be tested with a 12-foot straightedge and shall be cut back as required to conform to the requirements specified in Section 39-8.04, "Compacting," of this specification, for surface smoothness. Connections to existing surfacing shall be feathered to conform to the requirements for smoothness. Longitudinal joints shall be trimmed to a vertical face and to a neat line if the edges of the previously laid surfacing are, in the opinion of the Engineer, in such condition that the quality of the completed joint will be affected.

### **39-8.04 Compacting**

Compacting equipment shall conform to the provisions of Section 39-7.03, "Compacting Equipment," of this specification.

Rolling shall commence at the lower edge and shall progress toward the highest portion, except that when compacting layers which exceed 0.25-foot in compacted thickness, and if approved by the Engineer, rolling shall commence at the center and shall progress outwards.

The Contractor shall monitor density during the compaction process with nuclear density gages calibrated to the control strip core density test data. Asphalt concrete shall be compacted to a relative compaction of not less than 96 percent and shall be finished to the lines, grades, and cross sections shown on the plans. In-place density of asphalt concrete will be determined prior to opening the pavement to public traffic.

Relative compaction shall be determined by California Test 375. Laboratory specimens shall be compacted in conformance with California Test 304. Test locations will be established for asphalt concrete areas to be tested, as specified in California Test 375.

Upon completion of rolling operations, if ordered by the Engineer, the asphalt concrete shall be cooled by applying water. Applying water shall conform to the provision in Section 17, "Watering," of the Standard Specifications.

The completed surfacing shall be thoroughly compacted, smooth, and free from ruts, humps, depressions, or irregularities. Any ridges, indentations or other objectionable marks left in the surface of the asphalt concrete by blading or other equipment shall be eliminated by rolling or other suitable means. The use of any equipment that leaves ridges, indentations, or other objectionable marks in the asphalt concrete shall be discontinued, and acceptable equipment shall be furnished by the Contractor.

When a straightedge 12 feet long is laid on the finished surface and parallel with the center line, the surface shall not vary more than 0.01-foot from the lower edge of the straightedge. The transverse slope of the finished surface shall be uniform to a degree such that no depressions greater than 0.02-foot are present when tested with a straightedge 12 feet long in a direction transverse to the center line and extending from edge to edge of a 12-foot traffic lane.

Pavement within 50 feet of a structure or approach slab shall conform to the smoothness tolerances specified in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications.

### **39-9 (BLANK)**

## **39-10 ACCEPTANCE OF WORK**

### **39-10.01 General**

The Engineer will select the procedure used to determine the quantities of asphalt concrete for acceptance and payment determination in conformance with the requirements specified herein.

The Contractor's quality control test data which has been verified by the Engineer will form the basis for acceptance of the work. The quality requirements on which acceptance will be based are specified in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification.

Work determined by the Engineer to conform to the requirements specified herein will be paid for at the contract price per ton for asphalt concrete and may be subject to compensation adjustment in accordance with Section 39-10.02C, "Pay Factor Determination and Compensation Adjustment," of this specification.

Work that does not conform to the specified requirements may be rejected by the Engineer at any time and shall be removed and replaced by the Contractor, at the Contractor's expense.

If a lot is concluded with fewer than 5 samples, the work will be accepted or rejected based on the quality requirements specified in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification. Section 39-10.02, "Statistical Evaluation and Pay Factor Determination," of this specification, shall not apply to the lot. The Engineer may reject any batch, load, or portion of roadway that appears to not be in compliance with these specifications.

Any quantity of material that is determined to be defective may be rejected by the Engineer based on visual inspection or noncompliance with the specifications herein.

Rejected material shall not be incorporated into the roadway unless authorized in writing by the Engineer. The Contractor may request that work rejected by the Engineer on a visual basis be tested for conformance to the specifications.

If the Contractor elects to have material tested which was visually rejected by the Engineer, a minimum of 5 random samples of the material shall be obtained and split into representative portions and tested for compliance with the material quality requirements specified herein. Sampling of the material shall be witnessed by the Engineer. The Contractor shall provide the Engineer with one representative split portion of each sample obtained for verification testing purposes according to the requirements of Section 39-4.04 "Statistical Verification Tests," of this specification. If the Engineer cannot verify the Contractor's test data, no payment will be made and the material shall be removed at the Contractor's expense. In addition, the cost of the Engineer's verification testing will be deducted from any moneys due or to become due the Contractor. If the Engineer verifies the Contractor's test data, and the test data indicates that the material is in compliance with the material quality requirements specified herein, the cost of the Engineer's verification testing will be borne by the State. The test data obtained from testing this rejected material will be excluded from the payment determination of the lot .

### **39-10.02 Statistical Evaluation and Determination of Pay Factor**

Statistical evaluation of the work shall be used to verify the Contractor's quality control test data to determine compliance with the specified requirements.

#### **39-10.02A General**

The quality characteristics to be evaluated, test methods, and specification limits are specified in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification. Asphalt content, aggregate gradation (No. 30 and No. 200), and relative compaction are considered for purposes of this specification to be critical quality characteristics.

A lot is a discrete quantity of work to which the statistical acceptance procedure is applied. For this contract, a lot represents the total quantity of asphalt concrete placed. More than one lot will occur if changes in the target values, material sources, or mix design are requested by the Contractor in writing and made in accordance with the requirements of this specification, or if production of asphalt concrete is terminated due to unsatisfactory material quality characteristics.

The frequency of sampling is specified in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification. Five samples is the minimum number of samples required to perform a statistical *t*-test evaluation. The maximum obtainable pay factor with 5 samples is 1.01. A minimum of 8 samples is required to obtain a 1.05 pay factor. If the sampling frequencies and quantity of work would otherwise result in fewer than 8 samples, the Contractor may submit a written request to increase the sampling frequency to provide for a minimum of 8 samples. The Contractor shall provide the Engineer with the request to increase the sampling frequency at least 48 hours before the beginning of asphalt concrete production.

The point of sampling is indicated in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification. The location of sampling shall be determined by a random method approved by the Engineer. The Engineer will obtain random samples for verification testing independent of the Contractor.

The work in the lot will be accepted and a final pay factor determined when all sampling, inspection and test data are completed and have been submitted, evaluated and approved by the Engineer. Contractor quality control test data shall be verified by the Engineer using the *t*-test as designated in Section 39-4.04, "Statistical Verification Tests," of this specification, before the data will be accepted by the Engineer.

If the current composite pay factor of a lot is less than 1.00, the work represented by the lot will be accepted by the Engineer, provided the lowest single pay factor is not within the reject portion of Table 39-2, "Pay Factors," of this specification.

If the current composite pay factor of a lot is less than 1.00, and the lowest single pay factor is within the reject portion of Table 39-2, "Pay Factors," of this specification, the lot will be rejected. The Contractor shall remove all rejected material from the work, at the Contractor's expense.

If the current composite pay factor of a lot is less than 0.90, the Contractor shall terminate asphalt concrete production and the Engineer will terminate the lot. Production of asphalt concrete may resume after the Contractor takes necessary actions to improve the quality of the asphalt concrete product, and the proposed actions are approved in writing by the Engineer.

If any pay factor for a critical quality characteristic designated in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification, is less than 0.90 for the lot, or is within the rejection range for the last five tests, the Contractor shall terminate asphalt concrete production. Asphalt concrete production may resume after the Contractor takes necessary actions to improve the quality of the asphalt concrete product and the proposed actions are approved in writing by the Engineer. A new lot will be established when production resumes.

When approved in writing by the Engineer, the Contractor may voluntarily remove defective material and replace it with new material to avoid or minimize a pay factor of less than 1.00. New material will be sampled, tested, and evaluated for acceptance according to the requirements of this specification.

#### **39-10.02B Statistical Evaluation**

The Variability-Unknown/Standard Deviation Method will be used to determine the estimated percentage of the lot that is outside specification limits. The number of significant figures used in the calculations will in accordance with the requirements of AASHTO Designation R-11, Absolute Method.

The estimated percentage of work that is outside of the specification limits for each quality characteristic will be determined as follows:

(1) Calculate the arithmetic mean ( $\bar{X}$ ) of the test values;

$$\bar{X} =$$

where:  $\Sigma$  = summation of  
x = individual test value  
n = total number of test values

(2) Calculate the standard deviation (s);

$$s =$$

where:  $\Sigma(x^2)$  = summation of the squares of individual test values  
 $\Sigma(x)^2$  = summation of the individual test values squared

(3) Calculate the upper quality index ( $Q_u$ );

$$Q_u =$$

where: USL = upper specification limit  
s = standard deviation  
 $\bar{X}$  = arithmetic mean

(Note: The USL is equal to the contract specification limit or the target value plus the allowable deviation.)

(4) Calculate the lower quality index ( $Q_L$ );

$$Q_L =$$

where: LSL = lower specification limit  
s = standard deviation  
 $\bar{X}$  = arithmetic mean

(Note: The LSL is equal to the contract specification limit or the target value minus the allowable deviation.)

(5) From Table 39-1 "Estimated Percent of Work Outside Specification Limits," of this specification, determine  $P_U$  ;

where:  $P_U$  = the estimated percentage of work outside the USL.  
( $P_U$  corresponds to a given  $Q_U$ ;  $P_U = 0$ , when USL is not specified.)

(6) From Table 39-1, "Estimated Percent of Work Outside Specification Limits," of this specification, determine  $P_L$ ;

where:  $P_L$  = the estimated percentage of work outside the LSL.  
( $P_L$  corresponds to a given  $Q_L$ ;  $P_L = 0$ , when LSL is not specified.)

(7) Calculate the total estimated percentage of work outside the USL and LSL, Percent Defective;

$$\text{Percent Defective} = P_U + P_L$$

(8) Repeat Steps 1 through 7 for each quality characteristic listed for acceptance.

1. From Table 39-2, "Pay Factors," of this specification, determine the pay factor for each quality characteristic, ( $PF_{QC}$ ) using the total number of test data values and the total estimated percentage outside the specification limits ( $P_U + P_L$ ) from Step 7 in Section 39-10.02B, "Statistical Evaluation," of this specification.
2. The pay factor for the lot is a composite of single pay factors determined for each quality characteristic designated in Table 39-3, "Minimum Quality Control Required for Acceptance," of this specification. The following formula is used:

$$PF_C =$$

where:  $PF_C$  = the composite pay factor for the lot,  
 $PF_{QC}$  = the pay factor for the individual quality characteristic,  
 $w$  = the weighting factor listed in Table 39-3, and  
 $i$  = the quality characteristic index number.

3. Payment to the Contractor for the lot of asphalt concrete will be subject to a compensation adjustment. The Compensation Adjustment Factor (CAF) will be determined as follows:

$$CAF = PF_C - 1$$

The amount of the compensation adjustment will be calculated as the product of: (1) the Compensation Adjustment Factor, (2) the total tons represented in the lot, and (3) the contract unit price per ton for the contract item of asphalt involved. If the compensation adjustment is a negative value, the compensation adjustment will be deducted from any moneys due, or that may become due, the Contractor under the contract. If the compensation adjustment is a positive value, it will be added to any moneys due, or that may become due, the Contractor under the contract.

Table 39-1.—Estimated Percent of Work Outside Specification Limits

Estimated Percent Outside Specification Limits (P <sub>U</sub> and/or P <sub>L</sub> )	Upper Quality Index Q <sub>U</sub> or Lower Quality Index Q <sub>L</sub>						
	n=5	n=6	n=7	n=8	n=9	n=10 to n=11	n=12 to n=14
0	1.72	1.88	1.99	2.07	2.13	2.20	2.28
1	1.64	1.75	1.82	1.88	1.91	1.96	2.01
2	1.58	1.66	1.72	1.75	1.78	1.81	1.84
3	1.52	1.59	1.63	1.66	1.68	1.71	1.73
4	1.47	1.52	1.56	1.58	1.60	1.62	1.64
5	1.42	1.47	1.49	1.51	1.52	1.54	1.55
6	1.38	1.41	1.43	1.45	1.46	1.47	1.48
7	1.33	1.36	1.38	1.39	1.40	1.41	1.41
8	1.29	1.31	1.33	1.33	1.34	1.35	1.35
9	1.25	1.27	1.28	1.28	1.29	1.29	1.30
10	1.21	1.23	1.23	1.24	1.24	1.24	1.25
11	1.18	1.18	1.19	1.19	1.19	1.19	1.20
12	1.14	1.14	1.15	1.15	1.15	1.15	1.15
13	1.10	1.10	1.10	1.10	1.10	1.10	1.11
14	1.07	1.07	1.07	1.06	1.06	1.06	1.06
15	1.03	1.03	1.03	1.03	1.02	1.02	1.02
16	1.00	0.99	0.99	0.99	0.99	0.98	0.98
17	0.97	0.96	0.95	0.95	0.95	0.95	0.94
18	0.93	0.92	0.92	0.92	0.91	0.91	0.91
19	0.90	0.89	0.88	0.88	0.88	0.87	0.87
20	0.87	0.86	0.85	0.85	0.84	0.84	0.84
21	0.84	0.82	0.82	0.81	0.81	0.81	0.80
22	0.81	0.79	0.79	0.78	0.78	0.77	0.77
23	0.77	0.76	0.75	0.75	0.74	0.74	0.74
24	0.74	0.73	0.72	0.72	0.71	0.71	0.70
25	0.71	0.70	0.69	0.69	0.68	0.68	0.67
26	0.68	0.67	0.67	0.65	0.65	0.65	0.64
27	0.65	0.64	0.63	0.62	0.62	0.62	0.61
28	0.62	0.61	0.60	0.59	0.59	0.59	0.58
29	0.59	0.58	0.57	0.57	0.56	0.56	0.55
30	0.56	0.55	0.54	0.54	0.53	0.53	0.52
31	0.53	0.52	0.51	0.51	0.50	0.50	0.50
32	0.50	0.49	0.48	0.48	0.48	0.47	0.47
33	0.47	0.48	0.45	0.45	0.45	0.44	0.44
34	0.45	0.43	0.43	0.42	0.42	0.42	0.41
35	0.42	0.40	0.40	0.39	0.39	0.39	0.38
36	0.39	0.38	0.37	0.37	0.36	0.36	0.36
37	0.36	0.35	0.34	0.34	0.34	0.33	0.33
38	0.33	0.32	0.32	0.31	0.31	0.31	0.30
39	0.30	0.30	0.29	0.28	0.28	0.28	0.28
40	0.28	0.25	0.25	0.25	0.25	0.25	0.25
41	0.25	0.23	0.23	0.23	0.23	0.23	0.23
42	0.23	0.20	0.20	0.20	0.20	0.20	0.20
43	0.18	0.18	0.18	0.18	0.18	0.18	0.18
44	0.16	0.15	0.15	0.15	0.15	0.15	0.15
45	0.13	0.13	0.13	0.13	0.13	0.13	0.13
46	0.10	0.10	0.10	0.10	0.10	0.10	0.10
47	0.08	0.08	0.08	0.08	0.08	0.08	0.08
48	0.05	0.05	0.05	0.05	0.05	0.05	0.05
49	0.03	0.03	0.03	0.03	0.03	0.03	0.03
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(Table continued next page)

Table 39-1 (continued).—Estimated Percent of Work Outside Specification Limits

Estimated Percent Outside Specification Limits (Pu and/or PL)	Upper Quality Index Qu or Lower Quality Index QL					
	n=15 to n=17	n=18 to n=22	n=23 to n=29	n=30 to n=42	n=43 to n=66	n=67 to
0	2.34	2.39	2.44	2.48	2.51	2.56
1	2.04	2.07	2.09	2.12	2.14	2.16
2	1.87	1.89	1.91	1.93	1.94	1.95
3	1.75	1.76	1.78	1.79	1.80	1.81
4	1.65	1.66	1.67	1.68	1.69	1.70
5	1.56	1.57	1.58	1.59	1.59	1.60
6	1.49	1.50	1.50	1.51	1.51	1.52
7	1.42	1.43	1.43	1.44	1.44	1.44
8	1.36	1.36	1.37	1.37	1.37	1.38
9	1.30	1.30	1.31	1.31	1.31	1.31
10	1.25	1.25	1.25	1.25	1.26	1.26
11	1.20	1.20	1.20	1.20	1.20	1.20
12	1.15	1.15	1.15	1.15	1.15	1.15
13	1.11	1.11	1.11	1.11	1.11	1.11
14	1.06	1.06	1.06	1.06	1.06	1.06
15	1.02	1.02	1.02	1.02	1.02	1.02
16	0.98	0.98	0.98	0.98	0.98	0.98
17	0.94	0.94	0.94	0.94	0.94	0.94
18	0.91	0.90	0.90	0.90	0.90	0.90
19	0.87	0.87	0.87	0.87	0.87	0.87
20	0.83	0.83	0.83	0.83	0.83	0.83
21	0.80	0.80	0.80	0.80	0.80	0.79
22	0.77	0.76	0.76	0.76	0.76	0.76
23	0.73	0.73	0.73	0.73	0.73	0.73
24	0.70	0.70	0.70	0.70	0.70	0.70
25	0.67	0.67	0.67	0.67	0.67	0.66
26	0.64	0.64	0.64	0.64	0.64	0.63
27	0.61	0.61	0.61	0.61	0.61	0.60
28	0.58	0.58	0.58	0.58	0.58	0.57
29	0.55	0.55	0.55	0.55	0.55	0.54
30	0.52	0.52	0.52	0.52	0.52	0.52
31	0.49	0.49	0.49	0.49	0.49	0.49
32	0.47	0.46	0.46	0.46	0.46	0.46
33	0.44	0.44	0.43	0.43	0.43	0.43
34	0.41	0.41	0.41	0.41	0.41	0.40
35	0.38	0.38	0.38	0.38	0.38	0.38
36	0.36	0.36	0.36	0.36	0.36	0.36
37	0.33	0.33	0.33	0.33	0.33	0.32
38	0.30	0.30	0.30	0.30	0.30	0.30
39	0.28	0.28	0.28	0.28	0.28	0.28
40	0.25	0.25	0.25	0.25	0.25	0.25
41	0.23	0.23	0.23	0.23	0.23	0.23
42	0.20	0.20	0.20	0.20	0.20	0.20
43	0.18	0.18	0.18	0.18	0.18	0.18
44	0.15	0.15	0.15	0.15	0.15	0.15
45	0.13	0.13	0.13	0.13	0.13	0.13
46	0.10	0.10	0.10	0.10	0.10	0.10
47	0.08	0.08	0.08	0.08	0.08	0.08
48	0.05	0.05	0.05	0.05	0.05	0.05
49	0.03	0.03	0.03	0.03	0.03	0.03
50	0.00	0.00	0.00	0.00	0.00	0.00

Notes: 1. If the value of  $Q_U$  or  $Q_L$  does not correspond to a value in the table, use the next lower value.

2. If  $Q_U$  or  $Q_L$  are negative values,  $P_U$  or  $P_L$  is equal to 100 minus the table value for  $P_U$  or  $P_L$ .

Table 39-2.—Pay Factors

PAY FACTOR	Sample Size												
	n=5	n=6	n=7	n=8	n=9	n=10 to n=11	n=12 to n=14	n=15 to n=17	n=18 to n=22	n=23 to n=29	n=30 to n=42	n=43 to n=66	n=67 to
	Maximum Allowable Percent of Work Outside Specification Limits for A Given Pay Factor ( $P_u + P_L$ )												
1.05				0	0	0	0	0	0	0	0	0	0
1.04			0	1	3	5	4	4	4	3	3	3	3
1.03		0	2	4	6	8	7	7	6	5	5	4	4
1.02		1	3	6	9	11	10	9	8	7	7	6	6
1.01	0	2	5	8	11	13	12	11	10	9	8	8	7
1.00	22	20	18	17	16	15	14	13	12	11	10	9	8
0.99	24	22	20	19	18	17	16	15	14	13	11	10	9
0.98	26	24	22	21	20	19	18	16	15	14	13	12	10
0.97	28	26	24	23	22	21	19	18	17	16	14	13	12
0.96	30	28	26	25	24	22	21	19	18	17	16	14	13
0.95	32	29	28	26	25	24	22	21	20	18	17	16	14
0.94	33	31	29	28	27	25	24	22	21	20	18	17	15
0.93	35	33	31	29	28	27	25	24	22	21	20	18	16
0.92	37	34	32	31	30	28	27	25	24	22	21	19	18
0.91	38	36	34	32	31	30	28	26	25	24	22	21	19
0.90	39	37	35	34	33	31	29	28	26	25	23	22	20
0.89	41	38	37	35	34	32	31	29	28	26	25	23	21
0.88	42	40	38	36	35	34	32	30	29	27	26	24	22
0.87	43	41	39	38	37	35	33	32	30	29	27	25	23
0.86	45	42	41	39	38	36	34	33	31	30	28	26	24
0.85	46	44	42	40	39	38	36	34	33	31	29	28	25
0.84	47	45	43	42	40	39	37	35	34	32	30	29	27
0.83	49	46	44	43	42	40	38	36	35	33	31	30	28
0.82	50	47	46	44	43	41	39	38	36	34	33	31	29
0.81	51	49	47	45	44	42	41	39	37	36	34	32	30
0.80	52	50	48	46	45	44	42	40	38	37	35	33	31
0.79	54	51	49	48	46	45	43	41	39	38	36	34	32
0.78	55	52	50	49	48	46	44	42	41	39	37	35	33
0.77	56	54	52	50	49	47	45	43	42	40	38	36	34
0.76	57	55	53	51	50	48	46	44	43	41	39	37	35
0.75	58	56	54	52	51	49	47	46	44	42	40	38	36
Reject	60	57	55	53	52	51	48	47	45	43	41	40	37
	61	58	56	55	53	52	50	48	46	44	43	41	38
	62	59	57	56	54	53	51	49	47	45	44	42	39
	63	61	58	57	55	54	52	50	48	47	45	43	40
	64	62	60	58	57	55	53	51	49	48	46	44	41

Reject Values Greater Than Those Shown Above

Notes:

- 1.To obtain a pay factor when the estimated percent outside specification limits from Table 39-1 does not correspond to a value in the table, use the next larger value.
- 2.The maximum obtainable pay factor is 1.05 (with a minimum of 8 test values).

Table 39-3.—Minimum Quality Control Required for Acceptance

<i>Index (i)</i>	<i>Quality Characteristic</i>	<i>Specification Limits</i>	<i>Weighting Factor (w) for Pay</i>	<i>Test Method</i>	<i>Minimum Sampling and Testing Frequency</i>	<i>Point of Sampling</i>
1	Asphalt Content **	TV ± 0.5%	0.30	Extraction or calibrated nuclear asphalt content gage California Test 310, 379 (Or) Ignition Oven (Test Method under development)	One sample per 500 tons or portion thereof In all cases not less than one sample per day	Mat behind paver
2	Gradation			Washed sieve analysis, California Test 202	One sample per 500 tons or portion thereof In all cases not less than one sample per day	Batch plant - from hot bins Drum Plant - from cold feed
3	3/4" or 1/2" *. 3/8"	TV ± 5% TV ± 6%	0.01 0.01			
4	No. 4	TV ± 7%	0.05			
5	No. 8	TV ± 5%	0.05			
6	No. 30**	TV ± 4%	0.08			
7	No. 200**	TV ± 2%	0.10			
8	Relative Compaction **	96%	0.40	California Test 375	Per Test Method. Test Lot 500 tons	Finished mat after final rolling
	Test Maximum Density			California Test 375	Per Test Method.	Mat behind the paver
	Mix Moisture Content	<1%		California Test 310 or 370	One sample per 500 tons or portion thereof In all cases not less than one sample per day	Mat behind the Paver
	Asphalt and Mix Temperature	250° to 350° F. (Asphalt) 325° F. (Mix)			Continuous using an automated recording device	Plant

## Notes:

- 1.TV = Target Value from Contractor's proposed mix design
  - 2 Production quantities which are less than the minimum specified in the Table shall be tested per the requirements of the Table.
  - 3.\* Depending on aggregate gradation specified.
- \*\*Quality characteristics 1, 6, 7 and 8 are defined as critical quality characteristics in the verification testing process.

## 39-11 MEASUREMENT AND PAYMENT

### 39-11.01 Measurement

Asphalt concrete will be measured by weight. The quantity to be paid for will be the combined weight of the mixture for the various types of asphalt concrete, as designated in the Engineer's Estimate.

The weight of the materials will be determined as provided in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

Quantities of paving asphalt, liquid asphalt and asphaltic emulsion to be paid for as contract items of work will be determined in accordance with the methods provided in Sections 92, "Asphalts," 93, "Liquid Asphalts," or 94, "Asphaltic Emulsions," of the Standard Specifications, as the case may be.

When recorded batch weights are printed automatically, these weights may be used for determining pay quantities providing the following requirements are complied with:

- A. Total aggregate and supplemental fine aggregate weight per batch shall be printed. When supplemental fine aggregate is weighed cumulatively with the aggregate, the total batch weight of aggregate shall include the supplemental fine aggregate.
- B. The total bitumen weight per batch shall be printed.
- C. Zero-tolerance weight shall be printed prior to weighing the first batch and after weighing the last batch of each truckload.
- D. The time, date, mix number, load number and truck identification shall be correlated with the load slip.
- E. A copy of the recorded batch weights shall be certified by a licensed weighmaster and submitted to the Engineer.

Pavement reinforcing fabric will be measured and paid for by the square yard for the actual pavement area covered.

### 39-11.02 Payment

Asphalt concrete placed in the work, unless otherwise specified, will be paid for at the contract price per ton for asphalt concrete of the types designated in the Engineer's Estimate.

Compensation adjustment for asphalt concrete will be as specified in Section 39-10.02C, "Pay Factor Determination and Compensation Adjustment," of this specification.

When there is a contract item for asphalt concrete (leveling), quantities of asphalt concrete placed for leveling will be paid for at the contract price per ton for asphalt concrete (leveling). When there is no contract item for asphalt concrete (leveling), and leveling is ordered by the Engineer, asphalt concrete so used will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Full compensation for the Contractor's Quality Control Plan, including furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in developing, implementing, modifying and fulfilling the requirements of the Quality Control Plan, as specified in this specification, shall be considered as included in the contract price paid per ton for asphalt concrete of the types designated in the Engineer's Estimate and no additional compensation will be allowed therefor.

Full compensation for Contractor sampling, testing, inspection, testing facilities, and preparation and submission of data, all as specified in these specifications, shall be considered as included in the contract price paid per ton for asphalt concrete of the types designated in the Engineer's Estimate and no additional compensation will be allowed therefor.

Quantities of pavement reinforcing fabric placed and paving asphalt applied as a binder for the pavement reinforcing fabric will be paid for at the contract price per square yard for pavement reinforcing fabric and per ton for paving asphalt (binder-pavement reinforcing fabric). Full compensation for furnishing and spreading sand to cover exposed binder material, if necessary, shall be considered as included in the contract price paid per ton for paving asphalt (binder-pavement reinforcing fabric) and no separate payment will be made therefor.

Small quantities of asphalt concrete placed on pavement reinforcing fabric to prevent the fabric from being displaced by construction equipment or to allow traffic to cross over the fabric, shall be considered as part of the layer of asphalt concrete to be placed over the fabric and will be measured and paid for by the ton as asphalt concrete.

When there is a contract item for liquid asphalt (prime coat), the quantity of prime coat will be paid for at the contract price per ton for the designated grade of liquid asphalt (prime coat). When there is no contract item for liquid asphalt (prime coat) and the special provisions require the application of prime coat, full compensation for furnishing and applying prime coat shall be considered as included in the contract price paid per ton for the asphalt concrete, and no separate payment will be made therefor.

When there is a contract item for asphaltic emulsion (paint binder), the quantity of asphaltic emulsion or paving asphalt used as paint binder (tack coat) will be paid for at the contract price per ton for asphaltic emulsion (paint binder). When there is no contract item for asphaltic emulsion (paint binder), full compensation for furnishing and applying paint binder (tack coat) shall be considered as included in the contract price paid per ton for the asphalt concrete, and no separate payment will be made therefor.

Fog seal coat will be paid for as provided in Section 37-1, "Seal Coats," of the Standard Specifications.

No adjustment of compensation will be made for any increase or decrease in the quantities of paint binder (tack coat) or fog seal coat required, regardless of the reason for such increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications, shall not apply to the items of paint binder or fog seal coat.

The above contract 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 asphalt concrete complete in place, as shown on the plans and as specified in this specification and in Section 10-1, "General," elsewhere in these special provisions, and as directed by the Engineer.

**SECTION 12. (BLANK)**

**SECTION 13. (BLANK)**

## SECTION 14 FEDERAL REQUIREMENTS FOR FEDERAL-AID CONSTRUCTION PROJECTS

**GENERAL.**—The work herein proposed will be financed in whole or in part with Federal funds, and therefore all of the statutes, rules and regulations promulgated by the Federal Government and applicable to work financed in whole or in part with Federal funds will apply to such work. The "Required Contract Provisions, Federal-Aid Construction Contracts, "Form FHWA 1273, are included in this Section 14. Whenever in said required contract provisions references are made to "SHA contracting officer", "SHA resident engineer", or "authorized representative of the SHA", such references shall be construed to mean "Engineer" as defined in Section 1-1.18 of the Standard Specifications.

**PERFORMANCE OF PREVIOUS CONTRACT.**—In addition to the provisions in Section II, "Nondiscrimination," and Section VII, "Subletting or Assigning the Contract," of the required contract provisions, the Contractor shall comply with the following:

The bidder shall execute the CERTIFICATION WITH REGARD TO THE PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS located in the proposal. No request for subletting or assigning any portion of the contract in excess of \$10,000 will be considered under the provisions of Section VII of the required contract provisions unless such request is accompanied by the CERTIFICATION referred to above, executed by the proposed subcontractor.

**NON-COLLUSION PROVISION.**—The provisions in this section are applicable to all contracts except contracts for Federal Aid Secondary projects.

Title 23, United States Code, Section 112, requires as a condition precedent to approval by the Federal Highway Administrator of the contract for this work that each bidder file a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the submitted bid. A form to make the non-collusion affidavit statement required by Section 112 as a certification under penalty of perjury rather than as a sworn statement as permitted by 28, USC, Sec. 1746, is included in the proposal.

**PARTICIPATION BY MINORITY BUSINESS ENTERPRISES IN SUBCONTRACTING.**—Part 23, Title 49, Code of Federal Regulations applies to this Federal-aid project. Pertinent sections of said Code are incorporated in part or in its entirety within other sections of these special provisions.

### Schedule B—Information for Determining Joint Venture Eligibility

(This form need not be filled in if all joint venture firms are minority owned.)

1. Name of joint venture \_\_\_\_\_
2. Address of joint venture \_\_\_\_\_
3. Phone number of joint venture \_\_\_\_\_
4. Identify the firms which comprise the joint venture. (The MBE partner must complete Schedule A.) \_\_\_\_\_  
\_\_\_\_\_  
  - a. Describe the role of the MBE firm in the joint venture. \_\_\_\_\_
  - b. Describe very briefly the experience and business qualifications of each non-MBE joint venturer: \_\_\_\_\_  
\_\_\_\_\_
5. Nature of the joint venture's business \_\_\_\_\_  
\_\_\_\_\_
6. Provide a copy of the joint venture agreement.
7. What is the claimed percentage of MBE ownership? \_\_\_\_\_
8. Ownership of joint venture: (This need not be filled in if described in the joint venture agreement, provided by question 6.).
  - a. Profit and loss sharing.
  - b. Capital contributions, including equipment.
  - c. Other applicable ownership interests.

9. Control of and participation in this contract. Identify by name, race, sex, and "firm" those individuals (and their titles) who are responsible for day-to-day management and policy decision making, including, but not limited to, those with prime responsibility for:

a. Financial decisions \_\_\_\_\_

b. Management decisions, such as:

(1) Estimating \_\_\_\_\_

(2) Marketing and sales \_\_\_\_\_

(3) Hiring and firing of management personnel \_\_\_\_\_

(4) Purchasing of major items or supplies \_\_\_\_\_

c. Supervision of field operations \_\_\_\_\_

Note.—If, after filing this Schedule B and before the completion of the joint venture's work on the contract covered by this regulation, there is any significant change in the information submitted, the joint venture must inform the grantee, either directly or through the prime contractor if the joint venture is a subcontractor.

**Affidavit**

"The undersigned swear that the foregoing statements are correct and include all material information necessary to identify and explain the terms and operation of our joint venture and the intended participation by each joint venturer in the undertaking. Further, the undersigned covenant and agree to provide to grantee current, complete and accurate information regarding actual joint venture work and the payment therefor and any proposed changes in any of the joint venture arrangements and to permit the audit and examination of the books, records and files of the joint venture, or those of each joint venturer relevant to the joint venture, by authorized representatives of the grantee or the Federal funding agency. Any material misrepresentation will be grounds for terminating any contract which may be awarded and for initiating action under Federal or State laws concerning false statements."

_____ Name of Firm	_____ Name of Firm
_____ Signature	_____ Signature
_____ Name	_____ Name
_____ Title	_____ Title
_____ Date	_____ Date

Date \_\_\_\_\_

State of \_\_\_\_\_

County of \_\_\_\_\_

On this \_\_\_\_ day of \_\_\_\_\_, 19 \_\_, before me appeared (Name) \_\_\_\_\_, to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of firm) \_\_\_\_\_ to execute the affidavit and did so as his or her free act and deed.

Notary Public \_\_\_\_\_

Commission expires \_\_\_\_\_

[Seal]

Date \_\_\_\_\_

State of \_\_\_\_\_

County of \_\_\_\_\_

On this \_\_\_\_ day of \_\_\_\_\_, 19 \_\_, before me appeared (Name) \_\_\_\_\_ to me personally known, who, being duly sworn, did execute the foregoing affidavit, and did state that he or she was properly authorized by (Name of firm) \_\_\_\_\_ to execute the affidavit and did so as his or her free act and deed.

Notary Public \_\_\_\_\_

Commission expires \_\_\_\_\_

[Seal]

**REQUIRED CONTRACT PROVISIONS  
FEDERAL-AID CONSTRUCTION CONTRACTS**

**I. GENERAL**

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.
3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.
4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;  
Section IV, paragraphs 1, 2, 3, 4, and 7;  
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.
6. **Selection of Labor:** During the performance of this contract, the contractor shall not:
  - a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or
  - b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

**II. NONDISCRIMINATION**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
  - a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.
  - b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall

include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.
3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
  - a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
  - b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
  - c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.
  - d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
  - e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.
  - a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.
  - b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)
  - c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.
5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
  - a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

- b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.
  - c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
  - d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.
6. Training and Promotion:
- a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
  - b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.
  - c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
  - d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.
7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:
- a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
  - b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
  - c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.
  - d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

- 8. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.
- a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.
  - b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.
  - c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.
- 9. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.
- a. The records kept by the contractor shall document the following:
    - (1) The number of minority and non-minority group members and women employed in each work classification on the project;
    - (2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;
    - (3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and
    - (4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.
  - b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

### III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

- a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.
- b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

- c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

#### **IV. PAYMENT OF PREDETERMINED MINIMUM WAGE**

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

##### **1. General:**

- a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3)] issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c) the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.
- b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.
- c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

##### **2. Classification:**

- a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.
- b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:
  - (1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;
  - (2) the additional classification is utilized in the area by the construction industry;
  - (3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and
  - (4) with respect to helpers, when such a classification prevails in the area in which the work is performed.
- c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized

representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

- d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary
- e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

### **3. Payment of Fringe Benefits:**

- a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.
- b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

### **4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

- a. Apprentices:
  - (1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.
  - (2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.
  - (3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different

practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

- (4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

- (1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.
- (2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.
- (3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.
- (4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

**5. Apprentices and Trainees (Programs of the U.S. DOT):**

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**6. Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or

part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

**7. Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**8. Violation:**

**Liability for Unpaid Wages; Liquidated Damages:** In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

**9. Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

## **V. STATEMENTS AND PAYROLLS**

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing

apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

- c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.
- d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
  - (1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;
  - (2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;
  - (3) that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.
- f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.
- g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

## **VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR**

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635) the contractor shall:
  - a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.
  - b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

- c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.
2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

#### **VII. SUBLETTING OR ASSIGNING THE CONTRACT**

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).
  - a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.
  - b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.
2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.
4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

#### **VIII. SAFETY: ACCIDENT PREVENTION**

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

## **IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

### **Notice To All Personnel Engaged On Federal-Aid Highway Projects**

18 U.S.C. 1020 READS AS FOLLOWS:

"Whoever being an officer, agent, or employee of the United States, or any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more than \$10,000 or imprisoned not more than 5 years or both."

## **X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.
2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.
3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.
4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

## **XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

### **1. Instructions for Certification - Primary Covered Transactions:**

(Applicable to all Federal-aid contracts - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.
- c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
- d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.
- f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
- g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.
- i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion — Primary Covered Transactions**

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
  - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
  - b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
  - c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and
  - d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

**2. Instructions for Certification - Lower Tier Covered Transactions:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.
- b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
- c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
- d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
- e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
- f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and

frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

- h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion — Lower Tier Covered Transactions**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

**XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
  - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
  - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

**FEDERAL-AID FEMALE AND MINORITY GOALS**

In accordance with Section II, "Nondiscrimination," of "Required Contract Provisions Federal-aid Construction Contracts" the following are the goals for female utilization:

Goal for Women (applies nationwide).....(percent) 6.9

The following are goals for minority utilization:

**CALIFORNIA ECONOMIC AREA**

		<b>Goal (Percent)</b>
<b>174</b>	<b>Redding, CA:</b> Non-SMSA Counties CA Lassen; CA Modoc; CA Plumas; CA Shasta; CA Siskiyou; CA Tehama.	6.8
<b>175</b>	<b>Eureka, CA</b> Non-SMSA Counties CA Del Norte; CA Humboldt; CA Trinity.	6.6
<b>176</b>	<b>San Francisco-Oakland-San Jose, CA:</b> SMSA Counties: 7120 Salinas-Seaside-Monterey, CA CA Monterey. 7360 San Francisco-Oakland CA Alameda; CA Contra Costa; CA Marin; CA San Francisco; CA San Mateo. 7400 San Jose, CA CA Santa Clara. 7485 Santa Cruz, CA. CA Santa Cruz. 7500 Santa Rosa, CA CA Sonoma. 8720 Vallejo-Fairfield- Napa, CA CA Napa; CA Solano Non-SMSA Counties CA Lake; CA Mendocino; CA San Benito	28.9 25.6 19.6 14.9 9.1 17.1 23.2
<b>177</b>	<b>Sacramento, CA:</b> SMSA Counties: 6920 Sacramento, CA CA Placer; CA Sacramento; CA Yolo. Non-SMSA Counties CA Butte; CA Colusa; CA El Dorado; CA Glenn; CA Nevada; CA Sierra; CA Sutter; CA Yuba.	16.1 14.3
<b>178</b>	<b>Stockton-Modesto, CA:</b> SMSA Counties: 5170 Modesto, CA CA Stanislaus. 8120 Stockton, CA CA San Joaquin. Non-SMSA Counties CA Alpine; CA Amador; CA Calaveras; CA Mariposa; CA Merced; CA Tuolumne.	12.3 24.3 19.8

	<b>Goal (Percent)</b>
<b>179 Fresno-Bakersfield, CA</b>	
SMSA Counties:	
0680 Bakersfield, CA	19.1
CA Kern.	
2840 Fresno, CA	26.1
CA Fresno.	
Non-SMSA Counties	23.6
CA Kings; CA Madera; CA Tulare.	
<b>180 Los Angeles, CA:</b>	
SMSA Counties:	
0360 Anaheim-Santa Ana-Garden Grove, CA	11.9
CA Orange.	
4480 Los Angeles-Long Beach, CA	28.3
CA Los Angeles.	
6000 Oxnard-Simi Valley-Ventura, CA	21.5
CA Ventura.	
6780 Riverside-San Bernardino-Ontario, CA.	19.0
CA Riverside; CA San Bernardino.	
7480 Santa Barbara-Santa Maria-Lompoc, CA	19.7
CA Santa Barbara.	
Non-SMSA Counties	24.6
CA Inyo; CA Mono; CA San Luis Obispo.	
<b>181 San Diego, CA:</b>	
SMSA Counties	
7320 San Diego, CA.	16.9
CA San Diego.	
Non-SMSA Counties	18.2
CA Imperial.	

In addition to the reporting requirements set forth elsewhere in this contract the Contractor and subcontractors holding subcontracts, not including material suppliers, of \$10,000 or more, shall submit for every month of July during which work is performed, employment data as contained under Form FHWA PR-1391 (Appendix C to 23 CFR, Part 230), and in accordance with the instructions included thereon.

## FEDERAL REQUIREMENT TRAINING SPECIAL PROVISIONS

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training to develop full journeymen in the types of trades or job classification involved.

The goal for the number of trainees or apprentices to be trained under the requirements of this special provision will be 12.

In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees or apprentices are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of trainees or apprentices in each occupation shall be in their first year of apprenticeship or training.

The number of trainees or apprentices shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing work, the Contractor shall submit to the Department for approval the number of trainees or apprentices to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee or apprentice employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees or apprentices as provided hereinafter.

Training and upgrading of minorities and women toward journeymen status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority and women trainees or apprentices (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees or apprentices) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee or apprentice in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by both the Department and the Federal Highway Administration. The Department and the Federal Highway Administration will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee or apprentice for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with the State of California, Department of Industrial Relations, Division of Apprenticeship Standards recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees or apprentices are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or apprentice or pays the trainee's or apprentice's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee or apprentice as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee or apprentice will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees or apprentices be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees or apprentices specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Only trainees or apprentices registered in a program approved by the State of California's State Administrator of Apprenticeship may be employed on the project and said trainees or apprentices shall be paid the standard wage specified under the regulations of the craft or trade at which they are employed.

The Contractor shall furnish the trainee or apprentice a copy of the program he will follow in providing the training. The Contractor shall provide each trainee or apprentice with a certification showing the type and length of training satisfactorily completed.

The Contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.