CITY OF CAMPBELL
STANDARD SPECIFICATIONS

FOR
PUBLIC WORKS CONSTRUCTION

JANUARY 2026

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FORWARD

2026 EDITION OF THE CITY OF CAMPBELL STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

This 2026 Edition of the *City of Campbell Standard Specifications for Public Works Construction*, (*CCSS) a.k.a. City Standard Specifications,* issued by the Public Works Department, is a complete revision of and supersedes the previous publications entitled *City of Campbell Standard Specifications and Details for Public Works Construction* dated July 1994, and *General Provisions* dated March 2022.

This CCSS incorporates by reference the following: the *State of California Department of Transportation Standard Specifications* (*SS*), the *Standard Plans* (*SP*), *California Manual on Uniform Traffic Control Devices (MUTCD)*, the *2024 Greenbook: Standard Specifications for Public Works Construction* (*Greenbook*) and all *Greenbook* supplements. Portions of each of these documents will be necessary for construction within the City of Campbell.

This CCSS also references the following Codes: Campbell Municipal Code as well as the State of California's Civil Code, Public Contract Code, Business and Professions Code, Labor Code, Government Code, Code of Civil Procedure, Vehicle Code, and Health and Safety Code.

Whenever a reference is made in the specifications to a publication of the ASTM, AASHTO, Federal Specifications, Caltrans, or any other publication, and the number or other identification representing the year of adoption or latest revision is omitted, it shall mean the publication with revisions in effect on the day the Notice to Proceed for the Work is dated.

The provisions noted herein are patterned after the *SS*; however, they have been modified for the City of Campbell's requirements. In addition, the subsections of the *CCSS* bear identical numbers and will cover the same subject matter of the *SS*. Additional subsections have been added as necessary to complete these *CCSS*.

Modifications to the aforementioned documents are presented herein the *CCSS*. It shall be the duty of the Bidder, Developer, and Contractor to follow the *CCSS* and apply sections of the *SS*, *SP*, *Greenbook,* publications, codes and laws to their construction.

SECTION 1 ABBREVIATIONS AND DEFINITIONS

1-1 GENERAL

Unless the context otherwise requires, wherever in the *City Standard Specifications* and other Contract Documents the following abbreviations and terms are used, the intent and meaning shall be interpreted as provided in this section.

1-2 ABBREVIATIONS

Abbreviation	Meaning
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
AB	Aggregate Base
AC	Asphalt Concrete
ACI	American Concrete Institute
ADL	Aerially Deposited Lead
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMA	Archaeological Monitoring Area
ANSI	American National Standards Institute
APCD	Air Pollution Control District
APHA	American Public Health Association
API	American Petroleum Institute
APWA	American Public Works Association
AREMA	American Railway Engineering and Maintenance-of-Way Association
AQMD	Air Quality Management District
AS	Aggregate Subbase
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASHVE	American Society of Heating & Ventilating Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ASQ	American Society for Quality
ATPB	Asphalt Treated Permeable Base
ATS	Active Treatment System
AWG	American Wire Gauge
AWPA	American Wood Protection Association
AWS[a]	American Welding Society
AWWA	American Water Works Association
AWIS	Automated Work Zone Information System
BBS	Battery Backup System
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe

Abbreviation	Meaning
Cal	California, California Test
CALGreen	*California Green Building Standards Code, Title 24, Part 11*
Cal/OSHA	California Division of Occupational Safety and Health Administration
CBC	*California Building Code*
CCSD	*City of Campbell Standard Details for Public Works Construction*
CCSS	*City of Campbell Standard Specifications*
CDF	Controlled Density Fill
CDPH	California Department of Public Health
CEC	*California Electrical Code*
CFR	Code of Federal Regulations
CIDH	Cast-In-Drilled-Hole
CIH	Certified Industrial Hygienist
CIP	Cast In Place
CISS	Cast-In-Steel-Shell
CJP	Complete Joint Penetration
CMU	Concrete Masonry Unit
CPM	Critical Path Method
CPL	Composite Plastic Lumber
CPRA	California Public Records Act
CRCP	Continuously Reinforced Concrete Pavement
CRM	Crumb Rubber Modifier
CSL	Crosshole Sonic Logging
CSS	Cement Stabilized Soil
CT	Caltrans California Test
CTB	Cement Treated Base
CTPB	Cement Treated Permeable Base
CVN	Charpy V-Notch
CWI	AWS Certified Welding Inspector
DBE	Disadvantaged Business Enterprise
DEP	Data Entry Person
DFEH	California Department of Fair Employment and Housing
DIP	Ductile Iron Pipe
DIR	California Department of Industrial Relations
DPR	Department of Pesticide Regulation
DRA	Dispute Resolution Advisor
DRB	Dispute Resolution Board
DTSC	Department of Toxic Substances Control
DVBE	Disabled Veteran Business Enterprise
ECTC	Erosion Control Technology Council
EEI	Electrical Engineers Institute

Abbreviation	Meaning
EIA/ECIA	Electronic Industries Alliance/Electronic Components Industry Association
ELAP	Environmental Laboratory Accreditation Program
ESA	Environmentally Sensitive Area
ETL	Electrical Testing Laboratories
EUSERC	Electric Utility Service Equipment Requirements Committee
FAA	Federal Aviation Administration
fc	extreme fiber compressive stress in concrete at service loads
f'c	compressive strength of concrete
FCC	Federal Communications Commission
FHWA	Federal Highway Administration
FDR	Full Depth Reclamation
GAAP	Generally Accepted Accounting Principles
GGBFS	Ground Granulated Blast Furnace Slag; slag cement
GGL	Gamma-Gamma Logging
GPS	Global Positioning System
GSP	Galvanized Steel Pipe
HDPE	High Density Polyethylene
HMA	Hot Mix Asphalt
HMA-O	Hot Mix Asphalt (open graded)
HS	High Strength
IBC	International Building Code
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineers Society
IMSA	International Municipal Signal Association
ITE	Institute of Transportation Engineers
ITP	Independent Third Party
JMF	Job Mix Formula
JPCP	Jointed Plain Concrete Pavement
KSF	Kips per Square Foot
KSI	Kips per Square Inch
LAS	Liquid Antistrip
LCB	Lean Concrete Base
LCS	Caltrans Lane Closure System
LEED	Leadership in Energy and Environmental Design
LTDS	Long Term Design Strength
MC	Medium Curing
METS	Caltrans Materials Engineering and Testing Services
MPI	Master Painters Institute

Abbreviation	Meaning
MPQPM	*Material Plant Quality Program Manual* published by Caltrans
MR	Movement Rating
MSDS[b]	Material Safety Data Sheet
MT	Magnetic Particle Testing
MUTCD	*California Manual on Uniform Traffic Control Devices*
NAL	Numeric Action Level
NDT	Non-Destructive Testing
NEL	Numeric Effluent Limitation
NETA	International Electrical Testing Association
NEC	*National Electrical Code*
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NOI	Notice of Intent
NMAS	Nominal Maximum Aggregate Size
NPDES	National Pollutant Discharge Elimination System
NPT	National Pipe Thread Taper
NRTL	Nationally Recognized Testing Laboratory
NSF	National Sanitation Foundation
NTU	Nephelometric Turbidity Unit
OBC	Optimum Binder Content
OGFC	Open Graded Friction Course
OSD	Offices of Structure Design
PC	Pre-Cast
PCC	Portland Cement Concrete
PCF	Pounds per Cubic Foot
PCMS	Portable Changeable Message Sign
PEU	Photoelectric Unit
PG	Performance Grade
PI0	Zero (null) blanking band Profile Index
PJP	Partial Joint Penetration
PLAC	Point Load Area of Contamination
PLAC	Permit License Agreement Certification
POC	Pedestrian Overcrossing
PoP	Probability of Precipitation
PQR	Procedure Qualification Record
PS	Pre-Stressed
PSF	Pedestrian Signal Face
PUC	Public Utilities Commission
PV	Programmed Visibility
PVC	Polyvinyl Chloride
QAC	California Qualified Applicator’s Certification

Abbreviation	Meaning
QAL	California Qualified Applicator License
QAP	Quality Assurance Program
QC	Quality Control
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
QPF	Quantitative Precipitation Forecast
RAP	Reclaimed Asphalt Pavement
RCP	Reinforced Concrete Pipe
RCSC	Research Council on Structural Connections
REA	Rural Electrification Administration
RECP	Rolled Erosion Control Product
RFI	Request for Information
RHMA	Rubberized Hot Mix Asphalt
RHMA-G	Rubberized Hot Mix Asphalt (gap graded)
RHMA-O	Rubberized Hot Mix Asphalt (open graded)
RHMA-O-HB	Rubberized Hot Mix Asphalt (open graded high binder)
RPL	Recycled Plastic Lumber
RPP	Reduce Pressure Backflow Preventers
RSC	Rapid Strength Concrete
RSP	Rock Slope Protection
RSS	Revised (Caltrans) Standard Specifications
RT	Radiographic Testing
RWQCB	Regional Water Quality Control Board
SAMI	Stress Absorbing Membrane Interlayers
SMSA	Standard Metropolitan Statistical Area
SC	Slow Curing
SCC	Self-Consolidating Concrete
SCM	Supplementary Cementitious Material
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SDS	Safety Data Sheet
SJWC	San Jose Water Company
SMARTS	Stormwater Multiple Application and Report Tracking System
SS	*(Caltrans) Standard Specifications*
SSPC	The Society for Protective Coatings
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TEES	*Transportation Electrical Equipment Specifications*
TIA	Telecommunications Industry Association; time impact analysis
TRO	Time-Related Overhead
TV	Target Value
UBC	Uniform Building Code updated to IBC

Abbreviation	Meaning
UFFA	Ultra Fine Fly Ash
UL	Underwriters Laboratories, Inc
USA	Underground Service Alert
USC	United States Code
USLE	Universal Soil Loss Equation
USM	Unidentified Stock Material
UT	Ultrasonic Testing
VECP	Value Engineering Change Proposal
VFD	Variable-Frequency Drive
VMA	Voids in Mineral Aggregate
VPM	Volts Per Mil
WMA	Warm Mix Asphalt
WMP	Waste Management Plan
WPC	Water Pollution Control
WPCP	Water Pollution Control Program
WPS	Welding Procedure Specification
WQO	Water Quality Objective

[a]Interpret a reference to AWS as a reference to AWS, ANSI/AWS, or AASHTO/AWS

[b]Interpret a reference to MSDS as a reference to SDS under 29 CFR 1910.1200

1-3 TERMS AND DEFINITIONS

1-3.01 GENERAL

Interpret terms and definitions as defined in the Contract Documents.

1-3.02 GLOSSARY

Abandon: Render unserviceable in place.

Acts of God: *Acts of God* as defined in Public Contract Code § 7105.

Acceptance: The formal written acceptance by the City Council, of the entire contract which has been completed in all respects by Contractor in accordance with the Contract Documents, and any modifications thereof previously approved.

Activity: Task, event, or other project element on a schedule that contributes to completing the project. An activity has a description, start date, finish date, duration, and one or more logic ties.

Addendum: A written modification of the Contract Documents provided to holders of the Contract Documents prior to the opening of proposals issued by the City.

Adjust: Raise or lower a facility to match a new grade line.

Admitted Surety, Insurer or Carrier: A surety or insurance carrier admitted to transact insurance in the State of California, as evidenced by the surety's or insurer's possession of a valid Certificate of

Authority issued by the California Department of Insurance, as defined by the California Insurance Code.

Aerially deposited lead: Lead primarily from vehicle emissions deposited within unpaved areas or formerly unpaved areas.

As-Built Drawings: The Contractor-marked drawings, indicating all Project conditions, locations, configurations, and any other changes or deviations which may vary from the Project Drawings, including references to any addenda, Change Orders, or shop drawings. Also referred to as "Record Drawings."

Authorized laboratory: Independent testing laboratory (1) not employed or compensated by any subcontractor or subcontractor's affiliate providing other services for the Contract and (2) authorized by the City.

Award: The acceptance by the City of a contractor's Proposal.

Base: Layer of specified material of planned thickness placed immediately below the pavement or surfacing.

Basement material: Material in an excavation or embankment under the lowest layer to be placed.

Bid: See Proposal.

Bidder: Any individual, firm, partnership, corporation, or combination thereof, private or municipal, submitting a Proposal for the Work contemplated, acting directly or through a duty authorized representative.

Bid Guaranty: Proposal guaranty accompanying the Proposal submitted by the Bidder, in the form of cash, a certified or cashier's check, or a Bidder's Bond made to the benefit of the City of Campbell in an amount equal to at least ten percent (10%) of the total amount of the Proposal, including all alternates.

Bidder's Bond: A form of a Bid Guaranty, provided by an admitted Surety insurer, authorized to issue Surety bonds in the State of California, on the form provided by the City in the Proposal Forms.

Bid item: Work unit for which the Bidder provides a price.

Bid Opening: The date and time set forth in the Notice Inviting Bids for the City to open all Proposals received for the Work.

Bid Proposal Forms: The approved form upon which the City requires formal bids be prepared and submitted for the work.

Bid Schedule: List of bid items, units of measure, and the associated quantities. The verified Bid Item List is the Bid Item List with verified prices.

Bond for Faithful Performance: A bond in the form approved by the City and in the sum of at least 100 percent of the Contract Sum, secured by a surety, and conditioned upon the Contractor's faithful performance of the Contract terms within the Contract Time.

Bond for Labor and Materials: A bond in the form approved by the City and in the sum of at least 100 percent of the Contract Sum, secured by a surety, and conditioned upon the Contractor paying

those named in Section 3181 of the California Civil Code involved in the Project for labor and materials.

Borrow: Fill acquired from an excavation source outside the described cut area:

- **Local borrow**: Material obtained by widening cuts or excavating from sources outside the planned or authorized cross section on the job site. The location of the local borrow is described or designated by the Engineer.
- **Imported borrow**: Borrow that is not local borrow.

Bridge: Structure that:

- Has a bridge number.
- Carries a (1) utility, (2) railroad, or (3) vehicle, pedestrian, or other traffic over, under, or around obstructions or waterways.

Building-construction Contract: Contract that has *Building Construction* on the cover of the *Notice Inviting Bids and Special Provisions*.

Calendar Day: Any day, including all legal holidays, Saturdays, and Sundays.

California Test: Caltrans-developed test for determining work quality. For California Tests, go to the METS website.

Caltrans: The Department of Transportation of the State of California.

/Caltrans Standard Specifications: The *Standard Specifications* of Caltrans, as most recently adopted.

Certificate of Compliance: Certificate stating the material complies with the Contract.

Certified Industrial Hygienist: Industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.

Change Order: A written order to the Contractor, covering changes to the Contract found by the City to be necessary for the proper completion of the Work contemplated by the Contract, and establishing the basis of payment and/or time adjustments for the Work affected by the changes.

City Clerk: The City Clerk of the City of Campbell.

City of Campbell: A municipal corporation of the State of California, as created by law. Also referred to as “City” or “Campbell.”

City Compliance Officer: The Engineer or such other City employee as the City Manager may designate as having primary responsibility for administering and enforcing labor standard requirements in these *City Standard Specifications.*

City Council: The City Council of the City of Campbell.

City Engineer: The City Engineer of the City of Campbell acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties properly delegated to them.

City Manager: The Chief Administrative Officer of the City.

Claim: A separate demand by the Contractor for any event arising out of or related to the Work or Project, including but not limited to the following:

- A time extension.
- Payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the Contract.
- An amount of payment which is disputed by the City.
- A rejected Change Order request.

Closure: Closure of a traffic lane or lanes, including shoulder, ramp, or connector lanes, within a single traffic control system.

Commercial Quality: Quality meeting the best general practices.

Commercial Source: Established business operating as a material source for the general public.

Conduit: A pipe or tube in which smaller pipes, tubes, or electrical conductors are inserted or are to be inserted.

Contract: The written agreement covering the performance of the Work and the furnishing of labor, materials, tools, and equipment for the Work. Also referred to as the "Contract Documents." The Contract shall include the Notice Inviting Bids, Proposal, plans, specifications, General Conditions, Special Provisions, written addenda, contract bonds, insurance certificates, Change Orders, the Agreement, and any other agreements amending or extending the Work and which may be required to complete the Work in a substantial and acceptable manner. Any permit issued by the City for construction within the public right-of-way shall also be deemed a contract.

Contract Documents: All documents identified by the City as Contract Documents in the Contract.

Contract Item: A specific unit of Work for which a price is provided in the Contract.

Contract Time: The number of working or calendar days allowed for completion of the Contract. If a calendar date of completion is shown in the Notice Inviting Bids in lieu of a number of working or calendar days, the Contract shall be completed by that date.

Contract Sum: The price indicated in Contractor's signed Proposal and as agreed upon by the Contractor and City in the Contract.

Contractor: The person or persons, firm, partnership, corporation, or combination thereof private or municipal, who enters into the Contract with the City or the City's legal representative to perform the Work, including those working under a Public Works encroachment permit.

Controlling Operation: That particular Work which must be wholly or partially completed before the next logical portion of the Work can be carried out.

Critical Path: Longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path extends the scheduled completion date.

Critical Path Method: Network-based planning technique using activity durations and relationships between activities to calculate a schedule for the entire project.

Culvert: Structure other than a bridge that provides an opening under a roadway.

Data Date: Day after the date through which a schedule is current. Everything occurring earlier than the data date is as-built and everything on or after the data date is planned.

Date of Acceptance: The date which the Notice of Completion is filed at the office of the County Clerk in the county in which the Work is performed.

Day: 24 consecutive hours running from midnight to midnight; calendar day.

- **Business day**: Day on the calendar except a Saturday and a holiday.
- **Working day or Workday**: Time measure unit for work progress. A working day is any 24-consecutive-hour period except:
  - Saturdays, Sundays and Legal Holidays (days designated as holidays in the City of Campbell Municipal Code).
  - Day during which you cannot perform work on the controlling operation or operations for at least 60 percent of the scheduled work shift with at least 75 percent of the scheduled labor and equipment engaged on that operation or operations due to any of the following:
    - Adverse weather-related conditions.
    - Traffic maintenance under the Contract Documents.
    - Suspension of a controlling activity that you and the Engineer agree benefits both parties.
    - Unanticipated event not caused by either party, such as:
      - Act of God
      - Act of a public enemy.
      - Pandemic.
      - Fire.
      - Flood.
      - Governor-declared state of emergency.
      - Landslide.
      - Quarantine restriction.
    - Issue involving a third party, including:
      - Industry or area-wide labor strike.
      - Material shortage.
      - Freight embargo.
      - Jurisdictional requirement of a law enforcement agency.
      - Workforce labor dispute of a utility or nonhighway facility owner resulting in a nonhighway facility rearrangement not described and not solely for the Contractor's convenience. Rearrangement of a nonhighway facility includes installation, relocation, alteration, or removal of the facility.
  - Day during a concurrent delay.
- **Original working days:**
  - Working days to complete the work shown on the *Notice to Bidders* for a non-cost-plus-time-based bid
  - Working days bid to complete the work for a cost-plus-time-based bid

Where working days is specified without the modifier *original* in the context of the number of working days to complete the work, interpret the number as the number of original working days as adjusted by any time adjustment.

Deduction. Money permanently taken from a progress payment or the final payment. Deductions are cumulative and are not retentions under Public Contract Code § 7107.

Delay. Event that extends the completion of an activity.

- **Excusable delay**: Delay caused by the City and not reasonably foreseeable when the work began, such as:
  - Change in the work

  - City action that is not part of the Contract
  - Presence of an underground utility main not described in the Contract or in a location substantially different from that specified
  - Described facility rearrangement not rearranged as described, by the utility owner by the date specified, unless the rearrangement is solely for the Contractor's convenience
  - City's failure to obtain timely access to the right-of-way
  - City's failure to review a submittal or provide notification in the time specified
- **Critical delay**: Excusable delay that extends the scheduled completion date
- **Concurrent delay**: Occurrence of at least 2 of the following events in the same period of time, either partially or entirely:
  - Critical delay
  - Delay to a controlling activity caused by you
  - Non–working day

Department: City of Campbell, as created by law; its authorized representatives.

Detour: Temporary route for traffic around a closed road part. A passageway through a job site is not a detour.

Directed Change Order: City imposed change order work performed at contract unit price or force account when both the City and Contractor cannot agree on a price. The Contractor does not have the right to terminate the Contract based upon the issuance of the Directed Change Order, however, they may file a Claim for additional compensation which the Contractor believes is due or owed for performing said Directed Change Order work.

Director of Public Works: The executive officer of the Department of Public Works for the City of Campbell, as created by law. Also referred to as the "Director."

Disabled Veteran Business Enterprise: Business certified as a DVBE by the Department of General Services, Office of Small Business and DVBE Services.

Disadvantaged Business Enterprise: Disadvantaged business enterprise as defined in 49 CFR 26.5.

Dispose of: Remove from the job site.

Divided Highway: Highway with separated traveled ways for traffic, generally in opposite directions.

Encroachment Permit: A permit issued by the Public Works Department on behalf of the City authorizing work in the public right-of-way. Special provisions for encroachment permit work are included with the permit and take precedence over all other specifications or details and may only be superseded by the Engineer.

Engineer: Resident Engineer responsible for the Contract's administration; Resident Engineer's authorized representatives. The City's representative for the Project.

Engineer's Estimate: The list of estimated quantities of work to be performed as contained in the Proposal.

Early Completion Time: Difference in time between an early scheduled completion date and the work completion date.

Environmentally Sensitive Area: Area within or near construction limits where access is prohibited or limited to protect environmental resources.

Estimated Cost: Estimated cost of the project as shown on the Notice Inviting Bids.

Extra Work: New and unforeseen work when determined by the City that such work is not covered by any of the various items for which there is a bid price or by combinations of such items in the Proposal.

Federal-Aid Contract: Contract that has a federal-aid project number on the cover of the Notice to Bidders and Special Provisions.

Final Acceptance: When Engineer has made the final inspection of the Work and determines that the Work has been completed in all respects and in its entirety in accordance with the Contract Documents and recommends that the City formally accept the Work.

Final Estimate: The written proposed estimate submitted to the Engineer by Contractor after Final Acceptance.

Final Pay Item: Bid item whose quantity shown on the Bid Item List is the quantity paid.

Finished Grade: Final surface of the completed facility. If the work under the Contract includes stage construction, the relation between the finished grade and the work under the Contract is shown.

Fixed Cost: Labor, material, or equipment cost directly incurred by the Contractor as a result of performing or supplying a particular bid item that remains constant regardless of the item's quantity.

Float: Difference between the earliest and latest allowable start or finish times for an activity.

- **City-owned float**: Time saved on the critical path by actions of the City. It is the last activity shown on the schedule before the scheduled completion date.

Force Account Work: Work ordered on a construction project without an existing agreement on its cost and performed with the understanding that the contractor will bill the owner according to the cost of labor, materials, and equipment, plus a certain percentage for overhead and profit.

Full Compensation: Total and complete payment including overhead and profit for furnishing all supervision, labor, materials, tools, equipment and doing all work involved in providing the item complete and in place in accordance with the requirements of the Contract Documents.

Grading Plane: Basement material surface on which the lowest layer of subbase, base, pavement, surfacing, or other specified layer is placed.

Guarantee Period: The Contractor’s work on the Project shall be guaranteed to be free from any and all defects arising out of faulty materials or workmanship for one (1) year after Work acceptance, except for Work parts for which Contractor was relieved of maintenance or protection, if any.

Highway: The whole right of way or area which is reserved for and secured for use of the public for purposes of vehicular travel. Also referred to as “street” or “road.”

Holiday: Those days designated as holidays in the City of Campbell Municipal Code.

Hours of darkness: Hours of darkness as defined in Vehicle Code § 280.

Idle Equipment: Equipment:

- On the job site at the start of a delay
- Idled because of the delay
- Not operated during the delay

Informal-bid Contract: Contract that has Informal Bid Authorized by Public Contract Code § 10122 on the cover of the Notice Inviting Bids and Special Provisions.

Inspector: An authorized representative of the Engineer, acting exclusively for the benefit of City, properly assigned to make all necessary inspections of the Work performed or being performed, or of the materials furnished or being furnished by the Contractor for conformance to the Contract Documents.

Job Site: Area within the defined boundaries of a project.

Labor Surcharge and Equipment Rental Rates: Caltrans publication that lists labor surcharge and equipment rental rates.

Laboratory: The established laboratory of the City or other laboratories authorized by the City to test materials and work involved in the Contract.

Landscaping: Practice of a landscaping contractor under 16 CA Code of Regs § 832.27.

Limit of Work: The area described or outlined on the project plans. This area shall constitute the extent of the Contractor's operation related to the project.

Liquidated Damages: The amount prescribed in the Contract Documents to be paid to the City or to be deducted from any payments due or to become due to the Contractor for each day's delay in completing the whole or any specified portion of the Work beyond the time allowed in the Contract Documents.

Material: Any product or substance specified for use in the construction of a project.

Material Storage Area: An area, if any, described or outlined on the Project plans to be used by the Contractor for material and equipment storage related to the Project.

Material Shortage:

- Shortage of raw or produced material that is area-wide and caused by an unusual market condition except if any of the following occurs:
  - Shortage relates to a produced, nonstandard material.
  - Supplier's and the Contractor's priority for filling an order differs.
  - Event outside the United States for a material produced outside the United States.
- Unavailability of water that delays a controlling activity.

Material Source Facility Audit: Self-audit and a City audit evaluating a facility's capability to consistently produce materials that comply with City standards.

Median: Portion of a divided highway separating the traveled ways including inside shoulders.

Milestone: Event activity that has zero duration and is typically used to represent the start or end of a certain stage of the project.

Mobilization: Preparatory work that must be performed or costs incurred before starting work on the various items on the job site (Public Contract Code § 10104).

Modify: Add to or subtract from an appurtenant part.

Narrative Report: Document submitted with each schedule that discusses topics related to project progress and scheduling.

Near Critical Path: Chain of activities with total float exceeding that of the critical path but having not more than 10 working days of total float.

Notice of Intent to Award of Contract: The notice posted by the City setting forth the name of the lowest responsive and responsible Bidder the City intends to award the Contract for the Work.

Notice of Award: The signed notice sent by the City to the lowest responsive and responsible Bidder setting forth who the City has awarded the Contract for the Work.

Notice Inviting Bids: The advertisement for proposals for all Work on which proposals or bids are required. Such advertisement will indicate, among other things, the location of the Work, bonding requirements, licensing requirements, and the time and place of opening of proposals or bids.

Notice to Proceed: The notice issued by the Engineer authorizing the Contractor to proceed with the Work, among other particulars.

Notice of Termination: The written notice issued by the Engineer specifying that the Contract is terminated.

Obliterate: Place an earth cover over or root, plow, pulverize, or scarify.

Partnering: The commitment between the City, the Contractor, and all Project stakeholders to create a cooperative Project environment in an effort to prevent disputes whether through formal or informal Partnering.

Pavement: Uppermost layer of material placed on a traveled way or shoulder.

Permanent Erosion Control Establishment Period: Number of working days shown on the Notice Inviting Bids for permanent erosion control establishment work.

Plans: The official Project Plans and Standard Plan Details, profiles, typical cross sections, working drawings and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions, and details of the Work to be performed. All such documents are to be considered as part of the Plans whether or not reproduced in the Contract Documents. The following terms are defined as follows:

- **Standard Plan Details:** The Standard Plan Details of the City, approved by City Council. Also referred to herein as “Standard Details.”

- **Project Plans:** The specific details and dimensions peculiar to the Work and supplemented by the Standard Plans insofar as the same apply.

Plant Establishment Period: Number of working days shown on the Notice Inviting Bids for plant establishment work.

Project: Any Work carried out in connection with the services described in the Contract Documents.

Project Plan Drawings: Drawings included in the Proposal Forms accompanying the City’s Notice Inviting Bids.

Project Site: The physical location where the project is carried out as identified in the plans.

Proposal: The offer of the bidder for the Work when made out and submitted on the prescribed Proposal Form, properly signed and guaranteed. Also referred to as a "Bid."

Proposal Form: The approved form upon which the City requires formal Proposals be prepared and submitted for the Work.

Proposal Guaranty: The cash, cashier's check, certified check, or Bidder's Bond accompanying the Proposal submitted by the bidder as a guaranty that the bidder will enter into a contract with the City for the performance of the Work if it is awarded to the bidder, and will provide all documents (including but not limited to the contract bonds and insurance) required of the bidder.

Public Works: The Public Works Department of the City of Campbell.

Quality Characteristic: Characteristic of a material that is measured to determine conformance with a given requirement.

Quality Control Plan: Contractor's plan to ensure QC.

Reconstruct: Remove and disassemble and construct again at an existing or new location.

Record Drawings: The Contractor-marked drawings, indicating all Project conditions, locations, configurations, and any other changes or deviations which may vary from the Project Plan Drawings, including references to any addenda, Change Orders, or shop drawings. Also referred to as "As-Built Drawings."

Relocate: Remove and install or place in a new location.

Remove: Remove and dispose of.

Request for Information: A request submitted by Contractor to Engineer for clarification of a discrepancy or confusion arising from the Contract Documents.

Reset: Remove and install or place laterally at the same station location.

Right of Way: The whole right of way or area which is reserved for and secured for use the Work.

Roadbed: Roadway portion extending from the curb line to curb line or the shoulder line to shoulder line.

- A divided highway has 2 roadbeds.

Roadside: Area between the outside shoulder edge and the right-of-way limits.

Roadway: That portion of the right of way included between the outside lines of sidewalks, or curbs, slopes, ditches, channels, waterways, and including all the appertaining structures, and other features necessary to proper drainage and protection.

Salvage: Remove, clean, and haul to a specified location.

Schedule:

- **Baseline schedule:** Initial schedule showing the original work plan starting on the date of Contract approval. This schedule shows no completed work to date and no negative float or negative lag to any activity.

- **Revised schedule:** Schedule that incorporates a proposed or past change to logic or activity durations.

- **Updated schedule:** Current schedule developed from the accepted baseline and any subsequent accepted updated or revised schedules through regular monthly review to incorporate actual past progress.

Scheduled Completion Date: Planned work completion date shown on the current schedule.

Shoulder: Roadway portion contiguous with the traveled way for accommodation of a stopped vehicle, emergency use, and lateral support of base and surface courses.

Small Tool: Tool or piece of equipment not listed in Labor Surcharge and Equipment Rental Rates that has a replacement value of $500 or less.

Special Provisions: Specific clauses setting forth conditions or requirements peculiar to the Work and supplementary to these Standard Specifications. The Caltrans publications entitled “Labor Surcharge and Equipment Rental Rates” and “General Prevailing Wage Rates”, and the Davis Bacon Wage Rates (for federally funded projects) are to be considered as a part of the Special Provisions,

Specifications: The directions, provisions, and requirements contained in these City Standard Specifications, and Special Provisions.

State: State of California, including its agencies, departments or divisions whose conduct or action is related to the work.

Stop Notice: A written notice, signed and verified by the claimant or its agent, as defined in California Civil Code Section 3103.

Structure Design: Offices of Structure Design of the California Department of Transportation (Caltrans).

Subbase: Layer of material between a base and the basement material.

Subcontractor: An individual, firm, partnership, corporation, or combination thereof who has entered into a construction contract with the Contractor to perform a portion of Contractor’s Work.

Subgrade: Roadbed portion on which pavement, surfacing, base, subbase, or a layer of any other material is placed.

Submittal:

- **Action submittal:** Written and graphic information and samples that require the City’s response.

- **Informational submittal:** Written information that does not require the City’s response.

Substantial Completion: When the Work, or designated portion thereof, is sufficiently complete in accordance with the Contract Documents so that the City can occupy or utilize the Work, or designated portion thereof, for the use for which it was intended, as evidenced by the Engineer’s Certificate of Substantial Completion. The Certificate of Substantial Completion shall set forth the date on which Substantial Completion is deemed by City in its sole discretion to have occurred, subject to the provision of these Standard Specifications.

Substantial Defects: Defects plainly seen as damaged, displaced, or missing parts or improper functioning of materials, parts, equipment, or systems.

Substructure: Bridge parts below the bridge seats, pier tops, and haunches for rigid-framed bridges or spring lines for arched bridges; includes abutment backwalls, abutment parapets, and wingwalls.

Superintendent: The Contractor's designated authorized representative for the Project, with the authority to represent and act for the Contractor at the Project site.

Superstructure: Bridge parts except the substructure.

Supplemental Project Information: Information relevant to the project, specified as supplemental project information, and made available to bidders.

Surety: One who promises to answer for the debt, default, or miscarriage of another.

Surfacing: Uppermost layer of material placed on a traveled way or shoulders; pavement.

Time Impact Analysis: Analysis using a CPM schedule developed specifically to demonstrate the effect a proposed or past change or delay has on the current scheduled completion date.

Time-scaled Network Diagram: Graphic depiction of a CPM schedule comprised of activity bars with relationships for each activity represented by arrows. The tail of each arrow connects to the activity bar for the predecessor and points to the successor.

Total bid: Sum of the item totals as verified by the City; original Contract price.

Total Float: Amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

Traffic: Pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances.

Traffic break: Traffic operation performed by a California Highway Patrol officer or other law enforcement officer to slow or stop traffic within the traveled way.

Traffic lane: Portion of traveled way used for the movement of a single line of vehicles.

Traveled way: Portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes.

Tunnel: Tunnel as defined in 8 CA Code of Regs § 8405 et seq.

Unauthorized work: Work performed beyond the lines and grades described in the Contract or established by the Engineer or extra work performed without City authorization.

Unsuitable material: Material encountered below the natural ground surface in embankment areas or below the grading plane in excavation areas that the Engineer determines to be in any of the following conditions:

- Of such unstable nature that it cannot be compacted to the specified density using ordinary methods at optimum moisture content.
- Too wet to be properly compacted and cannot be dried before incorporating it into the work. Excessive moisture alone is not sufficient cause for determining that the material is unsuitable.

- Inappropriate for the planned use.

Withhold: Money temporarily or permanently taken from a progress payment.

Work: All the work specified, indicated, shown, or contemplated in the Contract to construct the improvement, including but not limited to all alterations, amendments, or extensions thereto made by Change Order or other written orders of the Engineer.

Work plan: Detailed formulation of a program of action.

Work zone: Area of a highway with construction, maintenance, or utility work activities.

END OF SECTION

SECTION 2 PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 CONTENTS OF PROPOSAL FORMS

Prospective Bidders will be furnished with Proposal Forms. A Proposal Form may contain a schedule of items for which only lump sum amounts are asked to be bid. It may contain estimated quantities of various kinds of Work to be performed or materials to be furnished with a schedule of items for which unit prices are asked to be bid. The unit prices or lump sum amounts bid shall include full compensation for furnishing all labor, materials, tools, and equipment and doing all Work, completed and in place for that particular item of Work.

2-1.02 APPROXIMATE ESTIMATE OF QUANTITIES

The quantities stated in the Proposal Forms are approximate only, given as a basis for the comparison of Proposals. The City does not, expressly or by implication, represent or guaranty that the actual amount of Work will correspond therewith, and reserves the right to increase or decrease the amount of any class or portion of the Work, or to omit portions of the Work, as may be deemed necessary or advisable by the Engineer. The bidder shall verify the actual quantities necessary for the Work.

Where the City has prepared an Engineer's Estimate for the cost of the Work, such estimate is made only for the purpose of comparison, study, and design by the City. Such estimate is not a part of the Contract.

2-1.03 EXAMINATION OF PLANS, SPECIFICATIONS, CONTRACT, AND SITE OF WORK

The Bidder shall examine carefully the Work site, the Proposal Forms, the Project plans, specifications, drawings, and maps, and all other Contract Documents therefor. Copies of these documents are on file and may be examined through the City's online solicitation webpage, as listed on the Proposal Forms.

In the event of any inconsistency between the terms of these *City Standard Specifications* and the Project plans, specifications, drawings, and maps, the terms of the Project-specific documents shall control to the extent necessary to resolve such inconsistency.

The submission of a Bid shall serve as conclusive evidence that the Bidder has investigated and is fully aware of the conditions and difficulties to be encountered, the character, quality, and scope of Work to be performed, the current site conditions, the quantities of materials to be furnished, and the requirements of the Proposal Forms, plans, specifications, and the Contract Documents.

Where the City has made investigations of site conditions, including but not limited to subsurface conditions, geotechnical reports, test boring logs, or compiled "Materials Information" in areas where Work is to be performed under the Contract, or in other areas, some of which may constitute possible local material sources, such investigations are made only for the purpose of study and design. Where such investigations have been made, Bidders may, upon written request, inspect the records of the City as to such investigations subject to and upon the conditions hereinafter set forth. The records of such investigations are not a part of the Contract and are shown solely for the convenience of the Bidder. It is expressly understood and agreed that the City assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the City investigations thus made, the records thereof, or of the interpretations set forth therein or made by the City in its use thereof and there is no warranty or guaranty either express or implied, that the conditions indicated by such investigations or records thereof are representative of those existing throughout such areas, or any part thereof, or that unlooked-for developments may not occur, or that materials other than. or in proportions different from those indicated, may not be encountered. No information derived from such inspection of City records of investigations or compilation thereof will in any way relieve the bidder or contractor from any risk or from properly fulfilling the terms of the contract.

Only written requests to inspect records of such preliminary investigations will be considered. Such written requests may be submitted to the Department of Public Works, 70 North First Street, Campbell, California 95008, or by email to publicworks@campbellca.gov. The written request shall clearly state the Project title in the subject line with attention to the Engineer specified in the Notice Inviting Bids.

Bidders or Contractors are cautioned to make such independent investigation and examination as they deem necessary to satisfy themselves as to conditions to be encountered in the performance of the Work and, with respect to possible local material sources, the quality and quantity of material available from such property, and the type and extent of processing that may be required in order to produce material conforming to the requirements of the specifications.

2-1.04 PROPOSAL FORMS

The City will furnish to each Bidder the Proposal Forms which, when completely filled out and executed by the Bidder as directed in the “Notice Inviting Bids”, shall be submitted as its Proposal. Proposals not presented on the Proposal Forms may, in the City's sole discretion, be deemed nonresponsive and rejected on that basis.

On all bid items for which bids are to be received on a unit price basis, the unit price for all items bid shall be shown, as well as the extended price (unit price multiplied by the number of units shown on the proposal form) for each bid item bid. In the case of any discrepancy between the extended price for any bid item bid. the unit price multiplied by the number of units shall prevail. In the event of any discrepancy between the total contract amount and the sum of the extended prices of all items, the sum of the extended prices of all items shall prevail.

When Proposals are signed by an agent, other than the officer or officers of a corporation authorized to sign contracts on its behalf or a member of a co-partnership, an executed "Power of Attorney" shall be submitted with the Proposal; otherwise, the Proposal may be rejected at the City's sole discretion as irregular and unauthorized. Proof of the authority of the person or persons signing on behalf of the bidder shall be provided to City upon request after the Bid opening.

2-1.05 INELIGIBILITY TO BID

No City employees or firm that has provided architectural or engineering services to the City for this Project may submit a bid, subcontract for a party of the Work, or supply materials for the Project.

2-1.06 REJECTION OF BIDS

The City may, in its sole discretion, reject any or all Bids presented, including rejecting all Bids, a nonresponsive Bid, or a Bid from an entity that is a parent, affiliate, or subsidiary, or that is under common ownership, control, or management with any other entity submitting a Bid on the Project. The City may, in its sole discretion, waive any informalities or minor irregularities in the Bid.

2-1.07 BID GUARANTY

All Bids shall be presented under sealed cover and accompanied by cash, a certified or cashier's check, or a bidder's bond. The Bid Bond must be provided by an admitted Surety insurer, authorized to issue Surety bonds in the State of California, and it must execute the Bid Bond. Said check or bond shall be made payable to the City of Campbell.

The security shall be in an amount equal to at least ten (10) percent of the total amount of the Bid including all alternates. A Bid will not be considered by the City unless one of the above specified forms of bidder's security is enclosed with it.

2-1.08 WITHDRAWAL OF PROPOSALS

A Bidder may withdraw its Bid at any time prior to the date and time fixed in the Notice Inviting Bids for the opening of Bids only by written request for the withdrawal of the Bid filed with the City Clerk. The request shall be executed by the Bidder or the Bidder's duly authorized representative. The withdrawal of a Bid does not prejudice the right of the Bidder to file a new Bid, if timely. No Bids will be received, and no Bid may be withdrawn, after the time fixed for the opening of Bids, as set forth in the Notice Inviting Bids.

2-1.09 PUBLIC OPENING OF BIDS

Bids will be publicly opened and read at the time and place indicated in the Notice Inviting Bids. Bidders or its authorized agents are invited to be present.

2-1.09A Bid Relief

The City may grant bid relief under Public Contract Code Section 5100 to 5110, inclusive, which set forth the criteria and procedures for relief of Bidders, and for authorizing Contract award to another Bidder. Submit any request for bid relief to the Engineer.

2-1.10 DISQUALIFICATION OF BIDDERS

Any one or more of the following causes may, at City's sole discretion, be considered as sufficient for the disqualification of bidder and provide cause for the rejection of a bid or bids:

1. No more than one Bid from any individual, firm, partnership, corporation, or combination thereof, as a principal, under the same or different names will be considered. Reasonable grounds for believing that any individual, firm, partnership, corporation, or combination thereof is a principal in more than one Bid for the work contemplated may cause the rejection of all Bids in which such individual, firm, partnership, corporation, or combination thereof is a principal. If there is reason for believing that collusion exists among the bidders, any or all Bids may be rejected.
2. Bids in which unit prices are obviously unbalanced may be rejected. A person, firm, or corporation submitting a sub-bid to a Bidder, or who has quoted prices on materials to a bidder, is not thereby disqualified from submitting a sub-bid or quoting prices to other Bidders or from being a principal Bidder for the same work.
3. Lack of competency as revealed by any financial statement, as may be required by the special provisions, or by experience or plant and equipment statements submitted.
4. Lack of responsibility as shown by past work on any Public Works project for any public entity judged from the standpoint of workmanship and progress.
5. Incomplete work on any Public Works project for any public entity which, in the judgment of the City, might hinder or prevent the prompt completion of additional work if awarded.
6. Being in arrears on any existing Public Works contract for any public entity, in litigation with the City or having defaulted on a previous contract with any public entity.
7. Failure of the Bidder to have a valid Contractor's license in the class specified in the Notice Inviting Bids at the time of bid opening.
8. Failure of the Bidder to provide prices for all items in the Proposal, including alternatives, or submitting an incomplete or otherwise non-responsive proposal.
9. Any other ground which the City determines, in the City’s sole discretion, significantly impairs the ability of the Bidder to perform on a City project.
10. Any other ground which the Engineer determines would significantly impair the ability of the Bidder to perform the proposed work. In making this determination, the Engineer may consider, without limitation, items such as any previous or current prevailing wage violations by the bidder, the number of stop notices on previous public works projects performed by the bidder, and the existence of past or current agreements with other public entities to not bid on public works projects.

2-1.11 INELIGIBILITY TO CONTRACT

Pursuant to Public Contract Code Section 10285.1, Bidder is ineligible to submit a Bid for this Project if Bidder has been suspended from bidding upon or being awarded a public works or services contract with the State or any public entity in the State in the past three years or if Bidder (or any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof) has been convicted by a court of competent jurisdiction of any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of State or federal antitrust law in connection with the bidding

upon, award of, or performance of, any public works contract, as defined in Section 1101 of the Public Contracting Code, with any public entity, as defined in Section 1100.

2-1.12 GENERAL GUARANTY.

The Contractor's work shall be guaranteed to be free from any and all defects arising out of faulty materials or workmanship for 1 year after Work acceptance, except for Work parts for which Contractor was relieved of maintenance or protection, if any ("Guarantee Period"). Neither the final inspection, the final payment, nor any provision in the Contract, nor partial or entire use or occupancy of the premises by the City shall constitute an acceptance of the Work not done in accordance with the Contract, or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty material or workmanship.

This guaranty excludes damage or displacement caused by an event outside Contractor's control, including only: normal wear and tear, improper operation, insufficient maintenance, abuse, unauthorized change, epidemic, and Act of God.

The final acceptance of the Work shall be contingent upon sufficient sureties being provided to guarantee the foregoing obligations. These sureties may take any of the following forms: a cash retention in the amount of twenty-five percent (25%) of the consideration for the completed Contract, Bond for Faithful Performance of the Maintenance Period, or other security acceptable to the City.

During the Guarantee Period, Contractor shall repair or replace each Work part having a substantial defect. The City shall not pay for such corrective work. During Contractor's corrective work activities, Contractor must provide the same insurance specified before Contract acceptance.

During the Guarantee Period, the City will monitor the Contractor's completed work. If the City finds work having a substantial defect, the City will list the defective components and furnish Contractor with a list. Within ten (10) days of receipt of the list, Contractor shall submit for authorization a detailed plan to correct the work. Contractor shall include in the schedule:

1. Start and completion dates;
2. List of labor, equipment, materials, and any special services Contractor plans to use; and
3. A description of any work incidental to the corrective work, including but not limited to, traffic control and temporary and permanent pavement markings.

The City will notify Contractor when the plan is authorized. Contractor must start the corrective work within fifteen (15) days of the City's notice.

If the City determines that the corrective work is urgently required to prevent injury or property damage, then the City will provide Contractor with an order to start emergency repair work and a list of the parts requiring corrective work. Contractor must mobilize and start the corrective work within twenty-four (24) hours. Contractor must submit a corrective work plan to the City within five (5) business days of starting the emergency repair work.

If Contractor fails to perform corrective work, as specified, the City may perform the work and bill Contractor for any and all costs related to its performance of the corrective work.

2-1.13 PROOF OF COMPETENCY OF BIDDERS

All Bidders must meet all qualification requirements contained in the Proposal Forms.

Any Bidder may also be required to furnish evidence satisfactory to City that the Bidder and its proposed subcontractors have sufficient means and experience in the type of work called for in the Proposal Forms to assure completion of the Contract in a satisfactory manner.

The City may withhold award of the Contract from any Bidder not satisfactorily demonstrating sufficient means and experience, and the Contract may be awarded to the responsible Bidder submitting the lowest responsive bid.

2-1.14 ADDENDA AND INTERPRETATIONS PRIOR TO BIDDING

The City may issue written addenda by way of clarifications, amendments, changes, or additions to the Contract Documents may be issued by the City before the opening of Bids. Any and all addenda will be posted to the City's online solicitation webpage, as listed on the Proposal Forms. Failure of any Bidder to review any addenda shall not relieve the Bidder from any obligations imposed or information presented in the addenda. All addenda issued shall become part of the Contract and the price therefore, set forth in the Bid. The Bidder's failure to review, consider, sign, and submit any or all Project addenda with the Bid shall be a cause for rejection of the Bid.

If any person contemplating submitting a Bid for the construction of the Project is in doubt as to the true meaning of any part of the Proposal Forms, Plans, Special Provisions, or other Contract Documents, or finds discrepancies in, or omissions from, the Proposal Forms, Plans, Special Provisions, or other Contract Documents, that person shall submit to the Engineer a written request for an interpretation or correction thereof at least seven (7) days before the deadline for receipt of Bids or as specified in the Proposal Forms. A request received by the Engineer later than the above-said deadline will not be answered. Any interpretation or correction of the Contract Documents will be made only by Addendum and will be posted to the City's online solicitation webpage, as listed on the Proposal Forms. The City will not be responsible for any other explanation or interpretation of the Contract Documents. Failure to submit a written request for an interpretation or correction shall serve as evidence that the Bidder finds no ambiguities, discrepancies, or omissions in the Proposal Forms, Plans, Special Provisions, or other Contract Documents.

No oral interpretation of the meaning of the plans, specifications, or other documents will be made. If any such oral interpretation is made, it shall not be considered by the bidder in preparing its bid.

2-1.15 SUBCONTRACTING REQUIREMENTS

In completing the Bid Proposal, Bidder must follow the applicable subcontracting sections as specified in Section 8-1.01, "Subcontracting."

2-1.16 BID SUBMITTAL

Each Bid must be submitted on the City-approved Proposal Forms, which shall be completed by the Bidder, executed, and submitted as its Bid. No facsimile or electronically transmitted Bid or modification of a Bid will be considered. No Bid received after the date and time fixed for receiving Bids will be considered. All late Bids will be returned to the Bidder unopened.

Each Bid shall be enclosed in a sealed envelope bearing the title of the Project, the name of the Bidder, and the date and time of the Bid opening, as specified in the Notice Inviting Bids. Formal Proposal Forms shall be addressed and delivered to the City Clerk. All Bids shall be delivered on or before the date and time set for the opening of the Bids published in the Notice Inviting Bids. It is the sole responsibility of the Bidder to insure delivery and receipt of its Bid in proper time.

2-1.17 COMPLIANCE WITH CONTRACTOR'S LICENSING LAWS

Attention is directed to the provisions of Chapter 9 of Division 3 of the California Business and Professions Code concerning the licensing of contractors.

All Bidders and Contractors shall possess the required classification of Contractor's License, as specified in the Contract Documents, at the time the Bid is submitted, per Business and Professions Code Section 7028.15. If federal funds are involved in this Project, the Contractor shall possess the required classification of Contractor's License, as specified in the Contract Documents at the time of Contract award, per Public

Contract Code Section 20103.5. If the Bidder does not possess the required Contractor's License at the time a Bid is submitted or at the time the Contract is awarded in the case of a federally funded Project, the Bid shall be considered non-responsive and shall be rejected by the City. The City may require forfeiture of the Bidder's Bond.

2-1.18 CONTRACTOR REGISTRATION REQUIREMENTS

The Contractor shall comply with the registration requirements set forth in Sections 1725.5 and 1771.1 of the California Labor Code, which are incorporated into this Contract. The registration requirements include, but are not limited to, the following.

1. Contractor Registration. A Contractor must be registered in accordance with Sections 1725.5 and 1771.1 of the California Labor Code in order to be qualified to submit a Bid Proposal. The City will reject a Bid Proposal from a Contractor that is not properly registered at the time the Contractor submits the Bid Proposal.

    1.1. Proof of Registration. The Contractor must include its registration number on its Bid Proposal.
    1.2. Late Submission of Registration Number. The Contractor's Bid will not be deemed non-responsive for failure to include the Contractor's registration number if the Contractor submits the number within 24 hours after the Bid Opening or if the City is otherwise readily able to verify that the Contractor is properly registered. Notwithstanding the foregoing, the Contractor must still be properly registered at the time it submits its Bid Proposal.
    1.3. Maintaining Registration. The Contractor must be properly registered in accordance with this provision for the entire term of the Contract.

2. Subcontractor Registration. Every Subcontractor performing any Work, whether or not listed in the Contractor's Bid Proposal, must be registered in accordance with Sections 1725.5 and 1771.1 of the California Labor Code before starting such Work and for the entire time that it performs such Work.

    2.1. Unregistered Subcontractors. The City will reject a Bid Proposal from a Contractor listing a subcontractor that is not registered unless the Contractor submits adequate proof of one of the following:
        2.1.1. The subcontractor is registered before the Bid Proposal is opened; or
        2.1.2. Within 24 hours of the Bid Proposal opening, the subcontractor is registered and has paid the penalty registration fee specified in Section 1725.5 of the California Labor Code; or
        2.1.3. The Contractor replaces the Subcontractor with another registered Subcontractor pursuant to Public Contract Code Section 4107.5.
    2.2. Proof of Registration. The Contractor must include on the Subcontractor listing form in its Bid Proposal the registration number of each listed Subcontractor. Notwithstanding the foregoing, the Contractor's Bid will not be deemed nonresponsive for failure to include the registration number of a Subcontractor if the Contractor submits the number within 24 hours after the Bid Opening or if the City is otherwise readily able to verify that the Subcontractor is properly registered.
    2.3. Subcontractor Substitution. A Subcontractor's failure to be properly registered is an additional ground for substitution in accordance Public Contract Code Section 4107. The substitution must be with a properly registered Subcontractor.
    2.4. Contractor's Responsibility. The Contractor is responsible for ensuring compliance with all of the Subcontractor registration requirements set forth herein.

3. Noncompliance. Once the Contract is executed, it is a material breach of the Contract for the Contractor to be in violation of any of the registration requirements set forth in this Section.

END OF SECTION

SECTION 3 AWARD AND EXECUTION OF CONTRACT

3-1.01 AWARD OF CONTRACT

The City, in its sole discretion, reserves the right to reject any and all Bids, including for failure to submit the required Bid Security or any other item required by the Proposal Forms, or a Bid which is in any other way incomplete or irregular. The City has the right, but is not required, to waive nonmaterial irregularities in a Bid.

If the City awards the Contract, the award will be to the lowest responsive and responsible Bidder whose Bid complies with all the requirements prescribed. If two (2) or more Bids are the same and the lowest, the City may accept either Bid it chooses in its sole discretion. Pursuant to Municipal Code Section 3.20.050(7), if all Bids presented are rejected, the City Council may re-advertise the Project or authorize the City Manager to proceed with the purchase of the materials, services, or equipment by negotiation in the open market subject to final approval of purchase by City Council.

The City will compare all Bids on the basis of the Engineer's Estimate of the quantities of Work to be done.

3-1.01A Timing of Award

If the City awards the Contract, it will award the Contract no earlier than five (5) business days after the City sends its Notice of Intent to Award the Contract to all Bidders and no later than ninety (90) calendar days after the opening of the Bids.

If the lowest responsible Bidder refuses or fails to execute the contract, the City may award the contract to the second lowest responsive and responsible Bidder. Such award, if made, will be made within 105 calendar days after the opening of the Bids. If the second lowest responsible Bidder refuses or fails to execute the Contract, the City may award the Contract to the third lowest responsive and responsible Bidder. Such award, if made, will be made within 120 calendar days after the opening of the Bids. The Public Works Department may proceed in like manner until the Director either finds a responsible and responsive Bidder willing to be awarded the contract or determines that it is not in the best interest of the City to proceed further.

The periods of time specified above within which the award of Contract may be made shall be subject to extension for such further period as may be agreed upon in writing between the Director and the Bidder concerned.

3-1.01B Notice of Intent to Award

If the City intends to award a Contract, the City will notify or cause to be notified all Bidders of that decision through posting a Notice of Intent to Award through the City's online solicitation webpage, as listed on the Proposal Forms.

3-1.01C Notice of Award

If the City intends to award a Contract, the City will notify the successful Bidder with a signed Notice of Award.

3-1.01D Contractor License & Registration

For a federal-aid contract, the Contractor must be properly licensed as a contractor from Contract award through Contract acceptance (Public Contract Code Section 10164).

For a non-federal-aid contract:

1. Contractor must be properly licensed as a contractor from Bid opening through Contract acceptance (Bus. & Prof. Code Section 7028.15),

2. Joint venture bidders must obtain a joint venture license before Contract award (Bus. & Prof. Code Section 7029.1).

All Contractors and Subcontractors doing work in the City of Campbell shall have a valid City of Campbell Business License in addition to the appropriate State Contractor's License.

No Contractor or Subcontractor may be awarded a contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

3-1.01E Alternates

City will have the right to accept alternates in any order or combination, unless otherwise specifically provided in the Proposal Documents.

3-1.01F Basis of Bid

For a lump-sum-based bid, the City compares Bids based on the total price. For a unit-price-based bid, the City compares Bids based on the sum of the item totals. For a cost-plus-time-based bid, the City compares Bids based on the sum of the item totals and the total bid for time.

3-1.02 EXECUTION OF CONTRACT

The successful Bidder shall, within ten (10) business days after receipt of the Notice of Award, execute and deliver the following documents to the City:

1. Two originals of the Contract executed by Contractor,
2. One original of the Bond for Faithful Performance,
3. One original of the Bond for Labor and Materials,
4. Certificates of Insurance, as required in Section 3-1.05 "Insurance Requirements," and
5. Any and all other documents required to be submitted to the City at the time of execution of the Contract, as required in the Contract Documents.

Execution of the Contract may be completed electronically using software specified by the City, subject to the requirements of California Government Code section 16.5.

If Bidder submits all the above-stated documents to City within ten (10) business days, and if all such items comply with the requirements of the Proposal Forms and are acceptable to City, City will sign the Contract and return a signed copy of the Contract to Bidder.

3-1.03 FAILURE TO EXECUTE CONTRACT

Failure of the successful Bidder to execute the Contract in the form satisfactory to City and file acceptable bonds and insurance as required shall be just cause in the City's sole discretion for voiding the award and the forfeiture of the proposal guaranty.

The successful Bidder may file with the City a written notice, signed by the Bidder or their authorized representative, specifying that the Bidder will refuse to execute the Contract if presented to the Bidder, in effect withdrawing its Bid. The filing of such notice shall have the same force and effect as the failure of the Bidder to execute the Contract and furnish acceptable bonds within the time hereinbefore prescribed.

If City consents to the withdrawal of the Bid of the apparent lowest responsive and responsible Bidder, or the apparent lowest responsive and responsible Bidder fails or refuses to sign the Contract or submit to City all of the items required by the Bid Documents, within ten (10) business days after receipt of the Notice of Award, or that Bidder is not financially or otherwise qualified to perform the Contract, City may reject such Bidder's Bid and select the next apparent lowest responsible Bidder, until all Bids are exhausted, or reject all Bids. Any Bidder whose Bid is rejected because the Bidder has failed or refused, within ten (10) business days after receipt of Notice of Award, to sign the Agreement or submit to City all of the items required by the Bid Documents, shall be liable to the City for all resulting damages.

3-1.04 CONTRACT BONDS

The successful bidder shall furnish a Bond for Faithful Performance and a Bond for Labor and Materials to the Engineer at the time of execution of the Contract.

Each bond shall conform to the form included in the Proposal Forms. All alterations, extensions of time, extra and additional work, and other changes authorized by Contract Documents may be made without securing the consent of the surety or sureties of the contract bonds. All surety companies must be authorized to transact business within the State of California.

3-l.04A Faithful Performance Bond

The Contractor shall provide a performance and payment bond covering the Contractor's obligations under the Contract Documents, each in the full amount of the Contract Price (or another term representing the amount). The surety and form shall be approved by the City and the City shall be named as oblige.

A Bond for Faithful Performance of the Maintenance Period shall be required as indicated in Section 2-1.12, "General Guaranty."

3-1.04B Labor & Materials Bond

The Bond for Labor & Materials shall be a good and sufficient bond approved by the City in an amount not less than 100 percent of the Contract Sum. To be approved, the Bond for Labor & Materials must provide that if the Contractor or any Subcontractor fails to pay any of the persons named in Section 3181 of the California Civil Code, or amounts due under the Unemployment Insurance Code with respect to the work or labor contracted to be done and performed by any claimant, then the surety or sureties will pay for same, in an amount not exceeding the amount of the bond, and also, in case suit is brought upon the bond, a reasonable attorney's fee to be fixed by the court. To be approved, the bond must be issued by an admitted surety and shall, by its term, inure to the benefit of any of the persons named in Section 9100 of the California Civil Code, to give a right of action to such persons or their assigns in any suit brought upon the bond, including the right of action to recover on the bond, in any suit brought to foreclose the liens provided for in Title 15, Part 4, Division 3 of the California Civil Code or in a separate suit brought on this bond. The Bond shall otherwise comply with all of the provisions of Title 15, Part 4, Division 3 of the California Civil Code.

Unless a Labor & Materials Bond is filed and approved as herein provided, no claim in favor of the Contractor arising under the Contract shall be audited, allowed, or paid by the City. Any persons named in Section 3181 of the Civil Code of the State of California, shall receive payment of their respective claims in the manner provided by Chapter 4, Part 4, Division 3, Title 15 of the Civil Code of the State of California upon having complied with the conditions of Section 3183 of the Civil Code.

3-1.05 INSURANCE REQUIREMENTS

Contractor shall, at its sole expense, purchase and maintain in full force and effect, such insurance as will protect itself and the City from claims, such as bodily injury, wrongful death, and property damage, which may arise out of or result from the Work required by the Contract Documents, whether such Work is done by Contractor, by any Subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. The amounts of such insurance and any additional insurance requirements are specified in the Contract Documents.

In the event Contractor does not comply with the required insurance requirements, City may, at is option, provide insurance coverage to protect City and the cost of such insurance shall be paid by Contractor and may be deducted from the Contract Sum.

3-1.06 NOTIFICATION OF SURETY AND INSURANCE COMPANIES

The surety companies and other signers of any of the above mentioned bonds, and all insurance companies, shall familiarize themselves with all of the conditions and provisions of this Contract, and they waive the right of special notification of any change or modification of this Contract or of extension of time, or of decreased or increased Work, or of the cancellation of the Contract, or of any other act or acts by the City or its authorized agents, under the terms of this Contract, and failure to notify the sureties or insurance companies of changes shall not relieve the sureties or insurance companies of their obligation under this Contract.

3-1.07 DAMAGES FOR COLLUSION

If at any time it is found that the person, firm, or corporation to whom the Contract has been awarded, in presenting any bid or bids, colluded with any other party or parties, then the Contract awarded may be declared by the City to be null and void, and the Contractor and their sureties shall be liable to the City for all loss or damage which the City may have suffered as a result of such collusion, and the City may re-advertise anew for bids for said Work.

3-1.08 RETURN OF BID GUARANTIES

Until the award and execution by the Contractor of the Contract, the Engineer shall hold the Bid Guaranties of the three lowest Bidders until the Contract has been executed. Any other Bid Guaranties may be released by the Engineer when the Engineer determines in the Engineer's sole discretion that the best interest of the City would not be served by retaining such Bid Guaranties.

If the Bid is not accepted by City within 60 days after the date set for the opening of Bids, or if the Bidder, to whom the Contract is awarded, executes and delivers to City all the required documents and insurance, City shall return the Bid Guaranty to each Bidder.

3-1.09 PROTESTING OF BID AWARD

A Bidder may protest the City's award of a Contract. A protesting Bidder shall submit its protest by notifying the City Clerk, in writing, of their grounds for believing the award was improper within five (5) calendar days from the date upon which the City issues its Notice of Intent to Award, specifying in detail the ground(s) of the protest and the facts supporting the protest. The Bidder shall submit their bid protest pursuant to the provisions of Chapter 3.22, "Bid Protest Procedures," of the Campbell Municipal Code.

Bidders are instructed that, irrespective of any changes to the information contained in the Notice of Intent to Award, there is a single protest period, and any and all protests must be delivered by the deadline specified above, regardless of whether or not the protest is directed at the Bid of the proposed awardee or at the Bid of another Bidder. By way of example only, should the City indicate in its Notice of Intent to Award that it intends to award to the lowest Bidder, the third lowest Bidder will be required to deliver any protest it may have as to the Bid of the second lowest Bidder, regardless of whether or not it is also prepared to protest the bid of the lowest Bidder. Failure to provide such notice within the five (5) calendar day period will constitute waiver of any and all rights, claims, damages or causes of action against the City arising out of the award of the Contract.

The procedure and time limits set forth in this Section are mandatory and the Bidders' sole and exclusive remedy in the event of protest. Failure to comply with these procedures shall constitute a waiver of any right to further pursue the protest, including filing a Government Code claim or legal proceedings.

The decision of the City shall be final.

END OF SECTION

SECTION 4 SCOPE OF WORK

4-1.01 INTENT

The intent of the Contract Documents, including Project plans and specifications, is to prescribe the details for the construction and completion of the Work which the Contractor undertakes to perform in accordance with the terms of the Contract. Where the Contract Documents describe portions of the Work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment and incidentals, and do all the Work involved in executing the Contract in a satisfactory and workmanlike manner, commensurate with trade standards.

Nothing in the Contract Documents voids the Contractor's public safety responsibilities.

4-1.02 WORK DESCRIPTION

Contractor will construct the Work as described in the Notice Inviting Bids and as described in the Contract Documents.

4-1.03 CHANGES IN THE WORK

4-1.03A General

The City reserves the right, without notice to the Sureties, and as may be deemed by the City to be necessary for the proper completion of the Work, to order or authorize changes to the scope of the Work without invalidating the Contract.

Any such changes will be set forth in a Change Order which will specify the work to be done in connection with the change, adjustment of Contract Time, if any, and the basis of full compensation for such work. A Change Order will not become effective until approved in writing by the City. Contractor shall proceed promptly with any changes in the Work, unless otherwise provided in the relevant Change Order.

4-1.03B Change Order Issuance Procedures

The City may issue a proposed Change Order, issued by the Director or the Director's properly authorized agent, to the Contractor at any time. Upon receipt of a Change Order from the City, the Contractor shall promptly proceed with the ordered work.

If ordered in writing by the City, by letter of intent to perform extra work, executed by the Director or the Director's properly authorized agent, the Contractor shall proceed with the work so ordered prior to actual receipt of an approved Change Order therefor. In such cases, the City will, as soon as practicable, issue an approved Change Order for such work and the provisions of this section shall be fully applicable to such subsequently issued Change Order.

If the Contractor signifies acceptance of the terms and conditions of such proposed Change Order by executing such document and if such Change Order is approved by the City and issued to the Contractor, payment in accordance with the provisions as to compensation therein set forth shall constitute full compensation for all work included therein or required thereby. A Change Order executed by the Contractor and approved by the City is an executed Change Order, as that term is defined in Section 1, "Abbreviations and Definitions." An approved Change Order shall supersede a proposed, but unapproved, Change Order covering the same work.

Contractor can submit a Change Order Request by providing all supporting documentation, as specified herein. Such a Change Order Request shall not become an operative Change Order until signed by the City.

4-1.03C Price Adjustment

If a Change Order adjusts the compensation for an item of work, the Contractor shall, upon request, furnish the Engineer with adequate detailed cost data for such item of work. If the Contractor requests an adjustment in compensation for an item of work by means of a Change Order Request, such cost data shall be submitted with the Request.

If the City and Contractor cannot agree upon a price for performing a Change Order, the City has the right to issue a Directed Change Order requiring Contractor to perform the Change Order work at the contract unit price or force account as noted in Section 9-2.02 “Force Account Payment.” Contractor will thereafter perform work for the price and on the terms set forth in such Directed Change Order. The Contractor shall not have the right to terminate the Contract based upon the issuance of a Directed Change Order. Contractor may, however, make a Claim as provided for in the Contract, pursuant to Section 9-3, “Claims,” and Section 4-1.03D, “Change Order Claim Procedures,” for additional compensation which the Contractor believes is due and owing for performing Directed Change Order work.

The compensation provided for in each and every Change Order shall include all costs and taxes applicable thereto, and the City shall not be liable for any increase in taxes during the term of Change Order work. Any Extra Work costs for a Change Order shall mean the actual costs incurred or to be incurred by Contractor and each Subcontractor.

The total cost of a Change Order shall be the sum of labor, costs, material costs, equipment rental costs, and specialist costs as defined in Section 9, “Measurement, Payment, and Claims.” This limit applies in all cases of Claims for Extra Work, whether calculating Contract modifications, RFPs, or calculating claims of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including strict liability or negligence. No other costs, including special damages of any type and lost profit arising out of or connected with the performance of Extra Work of any nature may be recovered by Contractor.

The following constitute charges included in overhead for all Contract modifications, including force account work:

1. Drawings: filed drawings, shop drawings, etc. including submissions of drawings.
2. Routine field inspection of work proposed.
3. General superintendence.
4. General administration of Change Orders.
5. Computer services.
6. Salaries of Project engineer, superintendent, timekeeper, storekeeper, and secretaries.
7. Janitorial services.
8. Temporary on-site facilities, such as offices, utilities (including telephones, plumbing, electrical (power, lighting), internet platforms), fencing, etc.
9. Home office expenses.
10. Insurance and Bond premiums.
11. Procurement and use of vehicles and fuel used coincidentally in base bid work.
12. Protection of Work.
13. Final cleanup.
14. Other incidental work.

Overhead and profit on labor for Extra Work shall not exceed a total of 15 percent. Overhead and profit on materials for Extra Work shall not exceed a total of 15 percent. Overhead and profit on equipment rentals for Extra Work shall not exceed a total of 15 percent. When Extra Work is performed by a first tier Subcontractor, Contractor shall receive a five (5) percent markup on Subcontractors’ total actual costs of Extra Work.

As a condition to Contractor’s right to an adjustment of the Contract Sum herein, Contractor must keep detailed and accurate records itemizing each element of cost and shall provide substantiating records and

documentation, including timecards and invoices, to City. Such records and documentation shall be submitted to Engineer daily.

4-1.03C(1) City-Operated Equipment

When City-operated equipment is used to perform Extra Work, Contractor shall be paid as follows:

1. Payment for equipment will be made in accordance with Section 9-2.02A(3), “Equipment Rental.”
2. Payment for cost of labor will be made at not more than rates of such labor established by collective bargaining agreements for type of worker and location of work, whether or not owner-operator is actually covered by such an agreement.

4-1.03C(2) Work Performed by Special Forces or Other Special Services

When City and Contractor, by agreement, determine that special service or item of Extra Work cannot be performed by Contractor or those of any Subcontractors, service may be performed by a specialist. Invoices for such services based on current market prices thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with established practice of special service industry to provide complete itemization.

In those instances wherein Contractor is required to perform Extra Work necessitating a fabrication or machining process in a fabrication or machine shop facility away from the Project Site, charges for that portion of Extra Work performed off-site may, by agreement, be accepted as specialist billing. City must be notified in advance of all off-site work. To specialist invoice price, less credit to City for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added 15 percent in lieu of the percentages provided in Section 9-2.02A, “Work Performed by Contractor.”

4-1.03D Change Order Claim Procedures

Notwithstanding the terms of Section 4-1.03C, “Price Adjustment,” should the Contractor disagree with any term or condition set forth in a Change Order which the Contractor has not executed, including but not limited to the scope of Work and the Contract Time, the Contractor shall submit a Claim pursuant to Section 9-3, “Claims.” The Claim shall state the points of disagreement, and, if possible, the Contract Document references, quantities, and costs involved. If Contractor does not timely submit a Claim, the Change Order will be considered executed, and Contractor shall be deemed to have assented that the Work is within the Contract requirements and with payment made as set forth in the Change Order. Such payment shall constitute full compensation for all work included therein or required thereby.

If Contractor’s Claim concerns an adjustment to compensation, the compensation payable for all work required by said Change Order to which such Claim relates will be determined as provided in Sections 4-1.03F, “Changes in Character of Work,” Sections 4-1.03G, “Extra Work,” and Section 4-1.03H, “Revocable Contract Items,” inclusive.

Where the Claim concerns an adjustment to a Contract Time, the time to be allowed therefor will be determined as provided in Section 8-1.07, "Liquidated Damages."

4-1.03E Increased or Decreased Quantities

Increases or decreases in the quantity of a Contract item of work will be determined by comparing the total pay quantity of such item of work with the Engineer's Estimate therefor.

If the total pay quantity of any item of work required under the Contract varies from the Engineer's Estimate by 25 percent or less, payment will be made for the quantity of work of said item performed at the Contract unit price, unless eligible for adjustment pursuant to Section 4-1.03F, "Changes in Character of Work."

If the total pay quantity varies from the Engineer's Estimate by more than 25 percent, in the absence of an executed Change Order specifying the compensation to be paid, the compensation payable to the

Contractor will be determined in accordance with Sections 4-1.03-E(I), “Increases of More Than 25 Percent,” (2), “Decreases of More Than 25 Percent,” or (3), “Eliminated Items,” as the case may be.

4-1.03E(I) Increases of More Than 25 Percent

Should the total pay quantity of any item of work required under the Contract exceed the Engineer's Estimate by more than 25 percent, the work in excess of 125 percent of such estimate and not covered by an executed Change Order specifying the compensation to be paid will be paid for by adjusting the Contract unit price, as hereinafter provided, or at the sole option of the City, payment for the work involved in such excess will be made on the basis of force account as provided in Section 9-2.02, "Force Account Payment."

Such adjustment of the Contract unit price will be the difference between the Contract unit price and the actual unit cost, which will be determined as hereinafter provided, of the total quantity of the item. If the costs applicable to such item of work include fixed costs, such fixed costs will be deemed to have been recovered by the Contractor by the payments made for 125 percent of the Engineer's Estimate of the quantity for such item, and in computing the actual unit cost, such fixed costs will be excluded. Subject to the above provisions, such actual unit cost will be determined by the City in the same manner as if the work were to be paid for on a force account basis as provided in Section 9-2.02, “Force Account Payment,” or such adjustment will be as agreed to by the Contractor and the City.

When the compensation payable for the number of units of an item of work performed in excess of 125 percent of the Engineer's Estimate is less than $5,000 at the applicable contract unit price, the Engineer reserves the right to make no adjustment in said price if the Engineer so elects, except that an adjustment will be made if requested in writing by the Contractor within 10 working days from the date the Contractor became aware, or should have reasonably become aware, of the increase.

4-1.03E(2) Decreases of More Than 25 Percent

Should the total pay quantity of any item of work required under the contract be less than 75 percent of the Engineer's Estimate therefor, an adjustment in compensation pursuant to this section will not be made unless the Contractor so requests in writing within 10 working days from the date when the Contractor became aware, or should have reasonably become aware, of the decrease. If the Contractor so requests, the quantity of said item performed, unless covered by an executed contract change order specifying the compensation payable therefor, will be paid for by adjusting the contract unit price as hereinafter provided, or at the option of the City payment for the quantity of the work of such item performed will be made on the basis of force account as provided in Section 9-2.02, “Force Account Payment,” provided however, that in no case shall the payment for such work be less than that which would be made at the contract unit price.

Such adjustment of the contract unit price will be the difference between the contract unit price and the actual unit cost, which will be determined as hereinafter provided, of the total pay quantity of the item, including fixed costs. Such actual unit cost will be determined by the City in the same manner as if the work were to be paid for on a force account basis as provided in Section 9-2.02, “Force Account Payment,” or such adjustment will be as agreed to by the Contractor and the City.

The payment for the total pay quantity of such item of work will in no case exceed the payment which would be made for the performance of 75 percent of the Engineer's Estimate of the quantity for such item at the original contract unit price.

4-1.03E(3) Eliminated Items

Should any Contract item of the work be eliminated in its entirety for any reason, including but not limited to the convenience of the City, in the absence of an executed Change Order covering such elimination, payment will be made to the Contractor for actual costs incurred in connection with such eliminated contract item if incurred prior to the date of notification in writing by the City of such elimination.

If acceptable material is ordered by the Contractor for the eliminated item prior to the date of notification of such elimination by the City, and if orders for such material cannot be canceled, it will be paid for at the actual cost to the Contractor. In such case, the material paid for shall become the property of the City and the actual cost of any further handling will be paid. If the material is returnable to the vendor and if the Engineer so directs, the material shall be returned, and the Contractor will be paid for the actual cost of charges made by the vendor for returning the material. The actual cost of handling returned material will be paid. The actual costs or charges to be paid by the City to the Contractor as provided in this section will be computed in the same manner as if the work were to be paid for on a force account basis as provided in Section 9-2.02, "Force Account Payment."

4-1.03F Changes in Character of Work

The City adjusts the unit price of an item if:

1. Ordered plan or specification change materially changes the character of a work item from that on which the bid item price was based.
2. Unit cost of the charged item differs from the unit cost of that item under the original plans and specifications.
3. No approved Change Order addresses the payment.

The basis of such adjustment in compensation will be the difference between the actual unit cost to perform the Work of said item or portion thereof involved in the change as originally planned and the actual unit cost of performing the Work of said item or portion thereof involved in the change, as changed. Actual unit costs will be determined by the City in the same manner as if the Work were to be paid for on a force account basis as provided in Section 9-2.02, “Force Account Payment,” or such adjustment will be as agreed to by the Contractor and the City. Any such adjustment will apply only to the portion of the Work of said item actually changed in character. At the option of the City, the Work of said item or portion of item which is changed in character will be paid for by force account as provided in Section 9-2.02, “Force Account Payment.”

If the compensation for an item of Work is adjusted under this section, the costs recognized in determining such adjustment shall be excluded from consideration in making an adjustment for such item of work under the provisions in Section 4-l.03E, "Increased or Decreased Quantities.

4-1.03G Extra Work

New and unforeseen work will be classified as extra work when determined by the City that such work is not covered by any of the various items for which there is a bid price or by combinations of such items. In the event portions of such work are determined by the City to be covered by some of the various items for which there is a bid price or combinations of such items, the remaining portion of such work will be classified as extra work. Extra work also includes work specifically designated as extra work in the plans or specifications. The Contractor shall do such extra work and furnish labor, material, and equipment therefor upon receipt of Contract Change Order or other written order of the City, and in the absence of such Contract Change Order or other written order of the City, the Contractor shall not be entitled to payment for such extra work.

Payment for extra work required to be performed pursuant to the provisions in this section, in the absence of an executed Contract Change Order, will be made by force account as provided in Section 9-2.02, “Force Account Payment,” or as agreed to by the Contractor and the City.

4-1.03H Revocable Contract Items

Items noted as "Revocable" in the Proposal may be deleted entirely or in part at the sole discretion of the City. The provisions of Section 4-1.03E "Increased or Decreased Quantities," shall not apply to entire or partial deletion of Revocable items.

4-1.04 USE OF MATERIALS FOUND ON THE JOB SITE

Unless designated as selected material as provided in Section 19-2.03, "Selected Material," the Contractor, with the approval of the Engineer, may use in the proposed construction such stone, gravel, sand or other material suitable in the opinion of the Engineer as may be found in excavation that comply with the Contract Documents. The Contractor will be paid for the excavation of such materials at the contract price for such excavation, but the Contractor shall replace at their sole expense with other suitable material all of that portion of the material so removed and used which was contemplated for use in the Work, except that the Contractor need not replace, at their expense, any material obtained from structure excavation used as structure backfill. No charge for materials so used will be made against the Contractor. The Contractor shall not excavate or remove any material from within the Project location that is not within the excavation, as indicated by the slope and grade lines, without written authorization from the Engineer.

4-1.05 DIFFERING SITE CONDITIONS

Consistent with Public Contracts Code Section 7104, for all excavations extending deeper than four feet below the surface, the Contractor shall promptly, and before the following conditions are disturbed, notify the City in writing, of any:

1. Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the California Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.
2. Subsurface or latent physical conditions at the site differing from those indicated in the Contract Documents.
3. Unknown physical conditions at the site of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

The City shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor’s costs of, or the time required for, performance of any part of the Work, City shall issue a Change Order.

In the event a dispute arises between the City and the Contractor as to whether or not the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by the Contract Documents or by law which pertain to the resolution of disputes and protests between the contracting parties.

If Contractor fails to promptly notify the Engineer of differing site conditions, Contractor waives its right to claim a differing site condition for the period between Contractor’s discovery of the differing site condition and Contractor’s notification to the Engineer.

If Contractor disturbs the site after discovery and before the Engineer’s investigation, Contractor waives its differing site condition claim.

4-1.06 CONCEALED, UNFORESEEN, OR UNKNOWN CONDITIONS OR EVENTS

Except and only to the extent provided otherwise in Section 4, “Scope of Work,” the Contractor agrees to (1) bear the risk of concealed, unforeseen, or unknown conditions or events, if any, which may be encountered in performing the Contract, and (2) that Contractor’s bid for the Contract was made with full knowledge of this risk.

In agreeing to bear the risk of concealed, unforeseen, or unknown conditions or events, Contractor understands that, except and only to the extent otherwise provided in Section 4, “Scope of Work,” concealed, unforeseen, or unknown conditions or events shall not excuse Contractor from its obligation to

achieve Final Completion of the Work within the Contract Time, and shall not entitle Contractor to an adjustment of the Contract Sum.

If Contractor encounters concealed, unforeseen, or unknown conditions or events that may require a change to the design shown in the Contract Documents, Contractor shall immediately notify Engineer in writing such that Engineer can determine if a change to the design is required. Contractor shall be liable to City for any extra costs incurred as the result of Contractor's failure to immediately give such notice.

If, as the result of concealed, unforeseen or unknown conditions or events, the City issues a Change Order that changes the design from the design depicted in the Contract Documents, Contractor shall be entitled, subject to compliance with all the provisions of the Contract, including those set forth in Section 4, "Scope of Work," to an adjustment of the Contract Sum and/or Contract Time, for the cost and delay resulting from implementing the changes to the design. Except as provided in this section, or as may be expressly provided otherwise in the Contract, there shall be no adjustment of the Contract Sum and/or Contract Time as a result of concealed, unforeseen or unknown conditions or events.

Contractor shall, as a condition precedent to any adjustment in Contract Sum or Contract Time herein, fully comply with Section 4, "Scope of Work," (including the timely filing of a Change Order Request and all other requirements for Change Orders Requests and Claims).

4-1.07 WAIVER

The Contractor agrees and understands that no oral approval, express or implied, of any adjustment of the Contract Sum or Contract Time by City or its agents shall be binding upon City unless and until such approval is ratified by execution of a written Change Order.

4-1.08 FINAL CLEANING UP

Before final inspection of the Work, the Contractor shall clean the job site, staging site, highway, material sites, and all ground occupied by the Contractor in connection with the Work of all rubbish, excess materials, falsework, temporary structures, temporary pavement striping and markings, temporary storm water protection measures, and equipment. Contractor shall remove all USA markings from all paved and concrete surfaces throughout the Project site without damaging said surfaces. Contractor shall also remove all construction information signage, including but not limited to temporary warning, regulatory, and guide signs. All parts of the Work and project site shall be left in a neat and presentable condition.

Full compensation for final cleaning up will be considered as included in the prices paid for the various Contract items of Work and no separate payment will be made therefor.

END OF SECTION

SECTION 5 CONTROL OF WORK

5-1.01 GENERAL

Contractor shall furnish all resources, except City-furnished materials, required to complete the Work as described in the Contract Documents and provide quality control. Contractor's Work is subject to the City's inspection, sampling, and testing. The City's inspection, sampling, and testing, however, does not relieve Contractor of its responsibility to provide quality control. Contractor shall provide City with safe and unrestricted access to the Work, including furnishing all facilities necessary for the City's inspection.

Where the Contract Documents do not specify means and methods to complete the Work, Contractor shall choose such means and methods. Where the Contract Documents describe more than one construction method, material, or equipment, the City does not assure that the stated construction method, material, or equipment can be used successfully throughout all or any part of the Work. Contractor is solely responsible to use the alternative or alternatives that will accomplish the Work under the conditions encountered at the Project site.

Contractor's failure to comply with any Contract Document part is a waiver of its right to an adjustment of Contract Time or Contract Price related to that Contract Document part.

5-1.02 AUTHORITY OF ENGINEER

The Engineer makes the final decision on questions regarding the Contract Documents, including but not limited to the following:

1. Work and material quality and acceptability
2. Manner of performance of the Work
3. Drawing and specification interpretation
4. Contract fulfillment
5. Time and progress rate
6. Measurement and payment

Engineer's responses are for the sole benefit of the City and shall not act as a waiver of defects in the Work. Failure of the Engineer to enforce any part of the Contract does not waive City's enforcement of any Contract provision. The Engineer's decision shall be final and the Engineer shall have authority to enforce and make effective such decisions and orders which the Contractor fails to carry out promptly. The Engineer shall have the right to order the Work stopped, if in the Engineer's opinion such action becomes necessary, until the Engineer has determined and ordered that the Work may proceed in due fulfillment of all Contract requirements. The Engineer may reject Work that does not comply with the Contract Documents at any time, including after a payment has been made.

5-1.03 PLANS AND SHOP DRAWINGS

The Contract plans furnished consist of general drawings and show such details as are necessary to give a comprehensive idea of the construction contemplated. All authorized alterations affecting the requirements and information given on the Contract plans shall be in writing.

The Contract plans shall be supplemented by such shop drawings prepared by the Contractor as are necessary to adequately control the Work. No change shall be made by the Contractor in any shop drawing after it has been reviewed by the Engineer without further written approval by the City.

Contractor shall submit all shop drawings as specified and as otherwise required to control the Work. Each shop drawing and calculation sheet must be in black ink and sequentially numbered.

Text and graphics must be legible for photocopying and reduction.

In addition, it is the sole responsibility of the Contractor to identify any potential impact and changes to the Work as a result of the implementation of the items shown and described by shop drawings and any associated documentations.

Contractor's calculations must demonstrate the design adequacy. Calculations specified as independently checked must be sealed and signed by a registered civil engineer in California and who did not seal and sign the drawings.

For Contractor to make a change to an authorized drawing, Contractor shall submit the change as specified above for a new shop drawing submittal. Contractor shall note any and all changes.

After the work shown on the shop drawings is complete, Contractor shall submit electronic copies of the record drawings to the City. Contractor shall include an index of the sheet numbers and titles on the first sheet for each structure and arrange the drawings in a drawing-number order as indicated on the index.

Shop drawings shall include all information requested by, and are subject to review by, the City.

Shop drawings shall be reviewed by the Engineer before any Work involving such drawings is performed. It is expressly understood that review of the Contractor's shop drawings 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 Contract Documents. Such review shall not operate to waive any of the requirements of the Contract Documents or relieve the Contractor of any obligation thereunder, and defective Work, materials, and equipment may be rejected notwithstanding such review.

Moreover, it is expressly understood that approval by the Engineer does not relieve the Contractor of any responsibility for accuracy of dimensions and details, or for mutual agreement of dimensions and details. It is mutually agreed that the Contractor shall be responsible for agreement and conformity of its shop drawings with the approved Contract Documents.

Full compensation for furnishing all shop drawings shall be considered as included in the prices paid for the Contract items of Work to which such drawings relate, and no additional compensation will be allowed therefor.

The Engineer's review of shop drawings and other submittals submitted for the Engineer's review by the Contractor shall not act as a waiver of defects subsequently discovered in such documents or in Work performed by the Contractor in reliance on those documents.

Shop drawings shall be submitted in such number as required by the Engineer, accompanied by letter of transmittal which shall give a list of the numbers and dates of the drawings submitted. Shop drawings shall be complete in every respect and bound in sets. Unless otherwise requested, shop drawings shall be submitted electronically to Engineer for approval.

Contractor must allow 20 days for City review of all shop drawings and calculation sheets. The City will provide comments, including descriptions of any deficiencies, with a date stamp for the date of review, in its response to Contractor. The Contractor shall submit all working drawings and schedules sufficiently in advance of construction requirements to allow ample time for checking, corrections, resubmitting, and rechecking.

The Engineer's review of the Contractor's plans and working drawings shall in no way be construed to impose tort liability on the City or any of its officers, employees, or agents by reason of any damage to property or injury to person, including death, resulting from or arising out of the use of such plan, and the Contractor shall indemnify, defend, and hold harmless the City, its officers, employees, and agents from any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, losses or liabilities arising out of or in connection with the use of such plans and working drawings on the Project.

The Contractor shall keep at the Project site a copy of all plans and specifications, including all Change Orders, any written authorization and directives, and authorized shop drawings, and shall at all times give the Engineer and the Engineer's representatives access thereto.

Plans and specifications, including authorized shop drawings, and copies thereof furnished by the Engineer shall not be used on other projects without the Engineer's written consent.

5-1.04 CONFORMITY WITH CONTRACT DOCUMENTS AND ALLOWABLE DEVIATIONS

Work and materials shall conform to the lines, grades, cross sections, dimensions, and material requirements, including tolerances, shown on the plans or indicated in the specifications. Although measurement, sampling and testing may be considered evidence as to such conformity, the Engineer shall be the sole judge as to whether the Work or materials deviate from the plans and specifications, and the Engineer's decision as to any allowable deviations therefrom shall be final.

5-1.05 COORDINATION AND INTERPRETATION OF PLANS, STANDARD SPECIFICATIONS, AND SPECIAL PROVISIONS

These *City Standard Specifications,* the *Standard Plan Details*, Project plans, special provisions, Change Orders, and all supplementary documents are essential parts of the Contract Documents, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary, and to describe and provide for a complete Work.

If a discrepancy exits, the order of precedence shall be as follows:

1. Governing ranking of Contract Documents in descending order is:
   - 1.1. Project Special Provisions
   - 1.2. Project Plans
   - *1.3. City of Campbell Revised Standard Specifications*
   - *1.4. City of Campbell Standard Specifications*
   - 1.5. *City of Campbell Revised Standard Details*
   - *1.6. City of Campbell Standard Details*
   - *1.7. Caltrans Revised Standard Specifications*
   - *1.8. Caltrans Standard Specifications*
   - *1.9. Caltrans Revised Standard Plans*
   - *1.10. Caltrans Standard Plans*
2. *California Manual on Uniform Traffic Control Devices (CA MUTCD)*
3. Written numbers and notes on a drawing govern over graphics.
4. A detail drawing governs over a general drawing.
5. A specific specification governs over a general specification.
6. Specification in a section governs over a specification referenced by that section.

If a discrepancy is found or confusion arises in the Contract Documents, the Contractor shall submit a Request for Information to the Engineer for clarification and shall conform to the Engineer’s explanation as part of the Contract. The Engineer’s decision thereon shall be final.

If the Contractor, in the course of the Work, discovers any discrepancies between the plans and the conditions actually encountered at the Project site, or any errors or omissions in the plans or in the layout given by stakes, points, or instructions, it shall be the Contractor's duty to inform the Engineer immediately in writing; and the Engineer shall promptly investigate the same. Any Work done after such discovery until authorized by Engineer will be done at the Contractor's sole risk and no additional compensation will be granted.

5-1.05A Project Plan and Record Drawings

The Contractor shall keep and maintain at the Project site one set of Project Plan Drawings, or drawings included in the Proposal Forms accompanying the Notice Inviting Bids. On these, the Contractor shall mark all Project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the original Contract Documents, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated in the Contract Documents. Said Record Plan Drawings, or As-Built Drawings, shall be supplemented by any detailed sketches as necessary or directed to fully indicate the Work as actually constructed. These Record Drawings are the Contractor's representation of as-built conditions, including all revisions made necessary by addenda, Change Orders, and the like and Contractor shall maintain and keep the Record Plan Drawings up to date during the progress of the Work.

The Record Plan Drawings shall include specific reference information to any addenda, Change Orders, or shop drawings, including any appropriate addenda or Change Order number or shop drawing manufacturer, drawing, and revision number.

Record Plan Drawings shall be accessible to the Engineer at all times during the Work.

On a monthly basis and as a condition of payment, the Contractor shall submit an updated set of the Record Plan Drawings to the Engineer. Final payment will not be approved until the Contractor-prepared Record Plan Drawings are delivered to the Engineer. Said up to date Record Plan Drawings may be in the form of a set of prints with carefully plotted information as approved by the Engineer.

Upon substantial completion of the Work and prior to final acceptance, the Contractor shall complete and deliver a complete set of Record Plan Drawings to the Engineer for transmittal to the City, conforming to the construction records of the Contractor. This set of drawings shall consist of corrected plans showing the reported location of the Work. The information submitted by the Contractor and incorporated by the Engineer into the Record Plan Drawings will be assumed to be reliable, and the Engineer will not be responsible for the accuracy of such information, nor for any errors or omissions which may appear on the Record Plan Drawings as a result.

5-1.05B Arrangement

The specifications and drawings herein referred to are arranged and numbered for convenience. Such arrangement and numbering shall not limit the Work required by any separate trade. The terms and conditions of limitation are between Contractor and their Subcontractors. The General Conditions apply to all Work including authorized extra Work.

5-1.06 ORDER OF WORK

When required by the Contract Documents, the Contractor shall follow the sequence of operations as set forth therein.

Unless otherwise stated in the Contract Documents, the Contractor may re-sequence Work to suit their means and method by submitting a written request to City. Such re-sequencing shall not cause adverse impacts to the Work, and shall be approved in advance by City in writing. Any cost associated with such re-sequencing is borne solely by the Contractor and no additional compensation will be allowed thereof.

Full compensation for conforming to such requirements will be considered as included in the prices paid for the various Contract items of Work and no additional compensation will be allowed therefor.

5-1.07 SUPERINTENDENCE

The Contractor shall designate in writing before starting Work a competent authorized representative, or Superintendent, who shall have the authority to represent and act for the Contractor at the Project site. A

competent Superintendent approved for the Project must be able to read, write, and verbally communicate in English. The Superintendent may not perform the Work of any trade, pick-up materials, or perform any Work not directly related to the supervision and coordination of the Work at the Project site when Work is in progress.

The Superintendent will receive the Engineer's orders, prosecute the Engineer's orders, supervise workers, and coordinate the subcontractor's work.

The Superintendent shall be present at the Project site at all times while Work is actually in progress on the Contract. Failure to maintain a Superintendent on the Project site when Work is in progress shall be considered a material breach of this Contract, entitling City to terminate the Contract or alternatively, issue a stop Work order until the Superintendent is on the Project site. If, by virtue of issuance of said stop Work order, Contractor fails to complete the Contract on time, Contractor will be assessed Liquidated Damages in accordance with the Agreement.

Whenever the Contractor or their Superintendent is not present on any particular part of the Work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the Subcontractor or foreman who may have charge of the particular Work in reference to which the orders are given. The resultant cost of such orders shall be borne solely by the Contractor and no additional compensation will be allowed thereof.

Any order given by the Engineer, not otherwise required by the specifications to be in writing, will on request of the Contractor, be given or confirmed by the Engineer in writing.

The Engineer shall always be supplied with the names and telephone numbers of at least two persons in charge of or responsible for the Work, including but not limited to the Superintendent, who can be reached for emergency work 24 hours a day, 7 days a week. The 24-hour contact number shall not direct calls to a recorder, other message taking service, or voicemail. The 24-hour contact number shall be a mobile number that accepts and receives text messaging.

5-1.07A Status of Contractor

The City's right of supervision hereunder shall not make the Contractor an agent of the City, and the liability of the Contractor for all damages to persons or to public or private property arising from the Contractor's execution of the Work, shall not be lessened because of such supervision.

5-1.08 LINES AND GRADES

The Contractor shall be responsible for providing all stakes and marks as necessary to establish the lines and grades required for completion of the Work specified in the specifications, on the plans, and in the special provisions. All stakes and marks shall be set and cut sheets provided by an individual licensed in the State of California to provide such stakes, marks, and cut sheets. The cut sheets shall be subject to review and approval by the Engineer and shall be provided to the Engineer at least two working days prior to planned start of Work. All plans shall reference the City's benchmark circuit.

Stakes and marks set by the Contractor shall be carefully preserved by the Contractor. In case such stakes and marks are destroyed or damaged, they will be replaced at the Contractor's earliest convenience. The Contractor will pay for the cost of necessary replacement or restoration of stakes and marks which were destroyed or damaged. The Contractor shall not disturb any monuments not indicated for removal or replacement on the plans found within the area of the Work or improvements unless they have first procured written permission from the Engineer. The Contractor shall bear all expenses associated with tying out, resetting, and re-documenting any monuments which may be disturbed or damaged during the Work.

5-1.09 INSPECTION

The Engineer shall, at all times, have safe access to the Work wherever it is in preparation or progress, and shall be furnished with every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements and intentions of these specifications, the special provisions, and the plans. All Work done and all materials furnished shall be subject to the Engineer's inspection.

The Engineer will have the authority to reject the Work, or any portion thereof, which does not conform to the Contract Documents. Engineer will have the authority to stop the Work or any portion thereof. Engineer will have the authority to require additional inspection or testing of the Work in accordance with the Contract Documents, whether or not such Work is fabricated, installed, or completed. The Engineer shall have, however, no obligation to exercise the authority granted to Engineer in the Contract Documents.

The inspection of the Work or materials shall not relieve the Contractor of any obligations to fulfill the Contract as prescribed. Contractor shall make all Work and materials designated by Engineer as not meeting Contract requirements compliant and City may reject unsuitable Work or materials, notwithstanding that such Work or materials may have been previously inspected by the Engineer or that payment therefor has been included in a progress estimate.

Projects financed in whole or in part with Federal, State, County, or Regional agency funds or otherwise subject to the jurisdiction or control by another public entity, shall be subject to inspection at all times by the appropriate Federal, State, County, or Regional agency or other public entity involved.

The Contractor shall notify the Engineer at least forty-eight (48) hours in advance of the time required for the services of the City Inspector and any specialized inspections, such as material and compaction testing. Should the Contractor fail to notify the Engineer and proceeds with Work requiring inspection, all said Work shall be rejected by the Engineer. The Work so rejected may be subsequently accepted by the Engineer only after receipt of the certification described below and only if the Engineer approves such certification. Should the Contractor request acceptance of such rejected Work, the Contractor shall, at the Contractor's sole expense, secure the services of private material testing laboratories, consulting engineers, or licensed land surveyors, as previously approved by the City, who shall certify that said Work does, in fact, conform to the requirements of the Contract Documents, plans, and specifications.

Neither the inspection by the Engineer, nor any order, measurement, approved notification, certificate, payment of money, or acceptance of any part or whole of the Work, nor any extension of time or any possession by the City or its agents shall operate as a waiver of any provision of this Contract or of any power reserved therein to the City or its agents, or any right to damage thereunder; nor shall any waiver by the City of any breach of this Contract be held to be a waiver of any subsequent breach of the same provision or any other provision of the Contract. All remedies shall be taken and construed as cumulative.

5-1.09A Inspection for Sole Benefit of the City

The Contractor is hereby advised that inspection of the Contractor's Work during the Contract is for the sole and exclusive benefit of the City. Such inspection shall not relieve the Contractor from any obligation to perform the Work pursuant to the Contract Documents, plans, and specifications, even if defects or deficiencies in such Work were noted or observed at the time of such inspection and not communicated to the Contractor.

5-1.10 REMOVAL OF REJECTED AND UNAUTHORIZED WORK

All Work which has been rejected by the Engineer shall be remedied or removed and replaced by the Contractor in an acceptable manner and no compensation will be allowed to the Contractor for such removal, replacement, or remedial work. Any Work done beyond the lines and grades shown on the plans or established by the Engineer, or any extra Work done without written authority from the City, will be considered as unauthorized Work and will not be paid for. Upon order of the Engineer, unauthorized Work shall be remedied, removed, or replaced at the Contractor's sole expense.

Upon failure of the Contractor to comply promptly with any order of the Engineer made under this section, the Engineer may cause rejected or unauthorized Work to be remedied, removed, or replaced, and to deduct the costs from any moneys due or to become due the Contractor.

5-l.10A Acceptance of Defective or Nonconforming Work

If the City prefers to accept defective or nonconforming Work, the City may do so in its sole discretion and without the consent of the Contractor instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract amount. Such adjustment shall be affected whether or not final payment has been made. Acceptance of defective or nonconforming Work may occur only upon issuance by the City of a Change Order or as set forth above.

5-1.10B Modification to Contractor's Work

The City may modify the Contractor's Work, either before or after acceptance of the Project, without commencing or voiding any of the warranties or accepting, in part or in whole, the Contractor’s Work. Notification of the City's intent to modify the Contractor's Work will be made in writing forty-eight (48) hours prior to commencement of the modification. Whenever the City makes a Claim against the Contractor for defective workmanship or materials, it shall be the sole obligation of the Contractor to establish that the defect being complained of was due solely to a modification, if any, made by the City.

5-1.11 EQUIPMENT AND PLANTS

Contractor shall provide and pay for all equipment and plants for proper execution and final completion of the Work. Contractor warrants to City that only equipment and plants suitable to produce the quality of Work and materials required by the Contract will be permitted to operate on the Project.

Plants shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to ensure the production of sufficient material to carry the Work to completion within the time limit.

The Contractor shall provide adequate and suitable equipment and plants to meet the above requirements, and when ordered by the Engineer, shall remove unsuitable equipment from the Work and discontinue the operation of unsatisfactory plants.

The Contractor shall identify each piece of their equipment, other than hand tools, by means of an identifying number plainly stenciled or stamped on the equipment at a conspicuous location, and shall furnish to the Engineer a written list giving the description of each piece of equipment and its identifying number. In addition, the make, model number and empty gross weight of each unit of compacting equipment shall be plainly stamped or stenciled in a conspicuous place on the unit. The gross weight shall be either the manufacturer's rated weight or the scale weight.

The make, model, serial number, and manufacturer's rated capacity for each scale shall be clearly stamped or stenciled on the load receiving element and its indicator or indicators. All meters shall be similarly identified, rated, and marked. Upon request of the Engineer, the Contractor shall furnish a statement by the manufacturer designating sectional and weighbridge capacities of portable vehicle scales.

Each machine or unit of equipment shall be operated by an experienced operator skilled in handling the particular make of machine or unit of equipment in use, at a speed or rate of production not to exceed that recommended by the manufacturer.

All vehicles used to haul materials over existing traveled ways shall be equipped with pneumatic tires and operated within legal wheel load limits.

On a daily basis, the Contractor shall provide to the Engineer a list of employees and equipment used on the Project.

5-1.12 ALTERNATIVE EQUIPMENT

While certain of these specifications may provide that equipment of a particular size and type is to be used to perform portions of the Work, it is to be understood that the development and use of new or improved equipment is to be encouraged.

The Contractor may request, in writing, permission from the Engineer to use equipment of a different size or type in place of the equipment specified.

The Engineer, before considering or granting such request, may require the Contractor to furnish, at the Contractor's expense, evidence satisfactory to the Engineer that the equipment proposed for use by the Contractor is capable of producing work equal to, or better than, that which can be produced by the equipment specified.

If such permission is granted by the Engineer, it shall be understood that such permission is granted for the purpose of testing the quality of Work actually produced by such equipment and is subject to continuous attainment of results which, in the opinion of the Engineer, are equal to, or better than, that which can be obtained with the equipment specified. The Engineer shall have the right to withdraw such permission at any time that the Engineer determines that the alternative equipment is not producing work that is equal, in all respects, to that which can be produced by the equipment specified. Upon withdrawal of such permission by the Engineer, the Contractor will be required to use the equipment originally specified and shall, in accordance with the directions of the Engineer, remove and dispose of or otherwise remedy, at the Contractor's expense, any defective or unsatisfactory work produced with the alternative equipment.

Neither the City nor the Contractor shall have any Claim against the other for either the withholding or the granting of permission to use alternative equipment, or for the withdrawal of such permission.

Permission to use alternative equipment in place of equipment specified will only be granted where such equipment is new or improved and its use is deemed by the Engineer to be in furtherance of the purposes of this section. The approval for use of particular equipment on any project shall in no way be considered as an approval of the use of such equipment on any other project.

Nothing in this section shall relieve the Contractor of responsibility for furnishing materials or producing finished Work of the quality specified in the Contract Documents.

5-1.12A Alternative Methods of Construction

Whenever the plans or specifications provide that more than one specified method of construction or more than one specified type of material or construction equipment may be used to perform portions of the Work and leave the selection of the method of construction or the type of material or equipment to be used up to the Contractor, it is understood that the City does not guarantee that every such method of construction or type of material or equipment can be used successfully throughout all or any part of any project. It shall be the Contractor's responsibility to select and use the alternative or alternatives which will satisfactorily perform the Work under the conditions encountered. In the event some of the alternatives are not feasible or it is necessary to use more than one of the alternatives on any Project, full compensation for any additional cost involved shall be considered as included in the Contract price paid for the item of Work involved and no additional compensation will be allowed therefor.

5-1.13 CHARACTER OF WORKERS

If any subcontractor or person employed by the Contractor shall appear to the Engineer to be incompetent, not possess the proper license or certification for the Work performed as required by the California Labor Code or other applicable regulations, or act in a disorderly or improper manner, they shall be discharged from the Work immediately on the request of the Engineer without cost to the City, and such person shall not again be employed on the Work.

5-1.14 FINAL INSPECTION AND CONTRACT ACCEPTANCE

Upon substantial completion of all items of Work, and written request from the Contractor, the Engineer will make a preliminary final inspection and prepare a deficiency list. The Contractor is required to complete all items of Work and all deficiency items within the allotted Contract Days per Contract Documents. Upon completion of said items, the Contractor shall make a written request for final inspection and acceptance of the Work. The Engineer will then make a final inspection and, if warranted, recommend acceptance of the Work.

5-1.15 COST REDUCTION INCENTIVE

The Contractor may submit to the Engineer, in writing, proposals for modifying the plans, specifications, or other requirements of the Contract for the sole purpose of reducing the total cost of construction. The cost reduction proposal shall not impair, in any manner, the essential functions or characteristics of the Project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, or design and safety standards.

Cost reduction proposals shall contain the following information:

1. A description of both the existing Contract requirements for performing the Work and the proposed changes.
2. An itemization of the Contract requirements that must be changed if the proposal is adopted.
3. A detailed estimate of the cost of performing the Work under the existing Contract and under the proposed change.
4. A statement of the time within which the Engineer must make a decision thereon.
5. The Contract items of work affected by the proposed changes, including any quantity variation attributable thereto.

The provisions of this section shall not be construed to require the Engineer to consider any cost reduction proposal which may be submitted hereunder; the City will not be liable to the Contractor for failure to accept or act upon any cost reduction proposal submitted pursuant to this section nor for any delays to the work attributable to any such proposal. If a cost reduction proposal is similar to a change in the plans or specifications, under consideration by the City for the Project, at the time said proposal is submitted or if such a proposal is based upon or similar to Standard Specifications, Special Provisions or Standard Plans adopted by the City after the advertisement for the Contract, the Engineer will not accept such proposal and the City reserves the right to make such changes without compensation to the Contractor under the provisions of this section.

The Contractor shall continue to perform the Work in accordance with the requirements of the Contract until a Change Order, incorporating the cost reduction proposal, has been issued. If Change Order has not been issued by the date upon which the Contractor's cost reduction proposal specifies that a decision thereon should be made, or such other date as the Contractor may subsequently have specified in writing, such cost reduction proposal shall be deemed rejected.

The Engineer shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in construction costs from the adoption of all or any part of such proposal. In determining the estimated net savings, the right is reserved to disregard the Contract bid prices if in the judgment of the Engineer, such prices do not represent a fair measure of the value of Work to be performed or to be deleted.

The City reserves the right where it deems such action appropriate, to require the Contractor to pay in part or whole the City's costs of investigating a cost reduction proposal submitted by the Contractor as a condition of considering such proposal. Where such a condition is imposed, the Contractor shall indicate acceptance thereof in writing, and such acceptance shall constitute full authority for the City to deduct amounts payable to the City from any monies due or that may become due to the Contractor under the Contract.

If the Contractor's cost reduction proposal is accepted in whole or in part, such acceptance will be by a Change Order, which shall specifically state that it is executed pursuant to this section. Such Change Order shall incorporate the changes in the plans and specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted to be put into effect, and shall include any conditions upon which the City's approval thereof is based if the approval of the City is conditional. The Change Order shall also set forth the estimated net savings in construction costs attributable to the cost reduction proposal effectuated by the Change Order. The Contractor's cost of preparing the cost reduction incentive proposal and the City's cost of investigating a cost reduction incentive proposal, including any portion thereof paid by the Contractor, shall be excluded from consideration in determining the estimated net savings in construction costs.

Acceptance of the cost reduction proposal and performance of the Work thereunder shall not extend the time of completion of the Contract unless specifically provided for in the Change Order authorizing the use of the cost reduction proposal.

The amount specified to be paid to the Contractor in the Change Order which effectuates a cost reduction proposal shall constitute full compensation to the Contractor for the cost reduction proposal and the performance of the Work thereof pursuant to the said Change Order.

The City expressly reserves the right to adopt a cost reduction proposal for general use on contracts administered by the City when it determines that said proposal is suitable for application to other contracts. When an accepted cost reduction proposal is adopted for general use, only the Contractor who first submitted such proposal will be eligible for compensation pursuant to this section, and in that case, only as to those contracts awarded to the Contractor prior to submission of the accepted cost reduction proposal and as to which such cost reduction proposal is also submitted and accepted. Cost reduction proposals identical or similar to previously submitted proposals will be eligible for consideration and compensation under the provisions of this section if the identical or similar previously submitted proposals were not adopted for general application to other contracts administered by the City. Subject to the provisions contained herein, the City or any other public agency shall have the right to use all or any part of any submitted cost reduction proposal without obligation or compensation of any kind to the Contractor.

This section shall apply only to contracts awarded to the lowest bidder pursuant to competitive bidding.

5-1.16 PROJECT APPEARANCE

The Contractor shall maintain a neat appearance to the Work and Project site, confining operations at the Project site to areas permitted by law, ordinances, permits, and the Contract Documents. Contractor shall not unreasonably encumber the Project site with materials or equipment in any area visible to the public, the following shall apply:

1. When practicable, broken concrete and debris developed during clearing and grubbing shall be disposed of concurrently with its removal. If stockpiling is necessary, the material shall be removed or disposed of daily unless otherwise specified in the special provisions or as directed by the Engineer.
2. The Contractor shall furnish trash bins for all construction debris, including all excess dirt, waste material, and rubbish caused by Contractor. All debris shall be placed in trash bins daily. Forms or falsework that are to be re-used shall be stacked neatly concurrently with their removal. Forms and falsework that are not to be re-used shall be disposed of concurrently with their removal.
3. The Contractor shall not sweep construction and other debris into the storm drainage system and shall prevent such materials from entering the storm drains.
4. The Contractor shall keep the Project site and surrounding area free from the accumulation of equipment, machinery, and surplus materials.

The Contractor is advised that disposal of dirt and other debris into the Municipal Storm Drain System or a Watercourse is prohibited under the California State Fish & Game Code and the Regional Water Quality

Control Board. Any fines or penalties levied against the Contractor for violation of the above and related regulations are the sole responsibility of the Contractor.

Except as otherwise provided as a separate pay item, full compensation for conforming to the provisions in this section shall be considered as included in prices paid for the various contract items of Work involved and no additional compensation will be allowed therefor.

Personnel of Contractor and Subcontractors shall not occupy or otherwise make use of the Project site during any time that Work is not being performed at the Project site, except as otherwise provided in the Contract Documents.

Personal vehicles of the Contractor's employees shall not be parked in the neighborhood or on the traveled way unless otherwise approved in advance and in writing by the Engineer.

When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic and shall travel in the normal direction of travel.

The City prohibits the use of any public property or public rights of way locations as construction staging points, unless specifically approved in writing by the Engineer. Contractor shall adhere to Section 5-1.16A, “Contractor Equipment Staging and Good Neighbor Guidelines.”

5-1.16A Contractor Equipment Staging and Good Neighbor Guidelines

As applicable or as directed by the Engineer, it shall be the Contractor’s responsibility to survey the City of Campbell for an appropriate location for its construction staging.

The following requirements shall apply to the Contractor’s construction staging area:

1. The staging area shall be located on an existing asphalt, concrete, or non-permeable surfaced area. No staging area shall be allowed on undeveloped lots.
2. The staging area shall be included in the Contractor’s Stormwater Pollution Prevention Plan (SWPPP) or Water Pollution Control Plan (WPCP).
3. The staging area shall not be located in an environmentally or culturally sensitive area and/or impact water resources (rivers, streams, bays, inlets, lakes, and drainage sloughs).
4. The staging area shall not be located in a regulatory floodway or within the base floodplain (100-year).
5. The staging area shall not affect the access to adjacent properties and/or roadways.
6. The Contractor shall install a minimum of two Project information signs at the staging area. Such signs shall include, but are not limited to the following information:

[Staging Area Location/Address]
Will be used by: [Insert Contractor’s Name]
[Insert Contractor’s Contact Info]
For: [Insert Project Title & Description]
From: [Insert Duration of Use]

7. The Contractor shall maintain and keep the information current on the signs for the duration of the Project.
8. The Contractor shall submit a proposed truck route plan showing routes to and from the staging area to be taken by its construction related vehicles. Such plan shall be submitted to the Engineer no later than 10 working days prior to the first day of Work.

9. The Contractor shall maintain the staging area and its surrounding streets, sidewalk, curb & gutter at a level of cleanliness and tidiness as specified by the Engineer.
10. Hours of Work as specified in Section 8, “Prosecution and Progress,” shall apply to accessing the staging area.
11. The City’s Noise Ordinance shall be strictly enforced. Violators will be cited.
12. The Contractor’s construction crew shall carpool to and from the staging area whenever possible to minimize the number of construction vehicles on the surrounding streets and to minimize the parking impact to the immediate area of the Project site.
13. The Contractor shall not store construction debris/waste in the staging area. All debris shall be hauled off and disposed of the same working day in which the debris/waste was generated.
14. The Contractor shall not store any equipment, materials, and debris in the public right-of-way or on City property.
15. If using private property for staging, the Contractor shall provide proof of an agreement with the property owner at the Engineer’s request.
16. The Contractor shall coordinate and work with the City on staging areas necessary for construction operations. The Contractor shall submit a plan indicating their staging and shall work with the City so that staging will minimize disruptions.

At the conclusion of the Project, the Contractor shall return the staging area to its original condition or better. The Contractor shall survey the area for construction staging.

5-1.17 CONFERENCES

At any time during progress of the Work, the Engineer shall have authority to require the Contractor and any Subcontractors and/or suppliers at any tier to attend a job-site conference. Any notice of such conference shall be duly observed and complied with by the Contractor and Subcontractors and suppliers.

5-1.18 PARTNERING

The City and Contractor will use good faith efforts to promote the formation of a successful Partnering relationship in order to effectively complete the Contract to the benefit of both parties. The purpose of this relationship is to establish and maintain cooperative communication and to mutually resolve conflicts at the lowest responsible management level. 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.

The City and Contractor will engage in either Formal Partnering or Informal Partnering, depending upon the size of the Project.

5-1.18A Formal Partnering

In Formal Partnering, the City and Contractor implement the Partnering relationship through at least one pre-construction workshop conducted by an independent facilitator. The purpose of the initial pre-construction workshop is to mutually develop a strategy for forming a successful partnering relationship. The City and Contractor may participate in additional facilitated workshops during the life of the project as they mutually agree is necessary and appropriate.

For all projects in which the Engineer’s estimate for the entire project prior to advertising for bids is $15 million or more, the City and Contractor may participate in Formal Partnering agreed to by both parties. The Contractor shall elect Formal Partnering by submitting a request in writing to the Engineer after approval of the Contract.

The scheduling of a partnering workshop, selection of the partnering facilitator and workshop site, and other administrative details shall be as agreed to by both parties. The parties shall use good faith efforts to schedule the initial, pre-construction partnering workshop and to select the facilitator for the workshop as soon as reasonably possible following award of the Contract where Formal Partnering is mandatory or as

soon as reasonably possible following a Contractor's election to require Formal Partnering for all other projects.

The costs of Formal Partnering involved in providing the pre-construction partnering workshop, any subsequent, additional partnering workshops, and the facilitator for the partnering workshops shall be borne equally by the City and Contractor. These costs may be provided elsewhere in this Contract either as an allowance item or a specific bid item. If not, then the Engineer may issue a Change Order in the amount of one-half of the estimated cost of the facilitator and the partnering workshops.

The division of costs for the facilitator and partnering workshops will be made by determining the cost in conformance with the provisions in Section 9-2.02B "Work Performed by Special Forces or Other Special Services," of the *City Standard Specifications*, and paying to the Contractor one-half of that costs, except no markups will be allowed.

All other costs associated with Formal Partnering, including but not limited to attending the partnering workshops and sessions, completing partnering evaluations, and attending trainings, will be borne separately by the party incurring the costs, such as wages and travel expenses, and no additional compensation will be allowed therefor.

5-1.18B Informal Partnering

In Informal Partnering, the City and Contractor will implement the Partnering relationship through partnering discussions that are not conducted by an independent facilitator. The City and Contractor may participate in additional unfacilitated partnering meetings during the life of the project as they mutually agree is necessary and appropriate.

The City and Contractor may engage in informal partnering on all projects in which the Engineer's estimate for the entire project prior to advertising for bids is below $15 million.

5-1.19 COORDINATION WITH OTHER ENTITIES

Other entities may perform work at or near the Project site and material sources at any time. Contractor shall coordinate its activities to avoid delays. Contractor is responsible to the other entities for damage to work, persons, or property and for costs due to unnecessary delays.

5-1.20 SUBMITTALS

Contract Documents will specify Submittals required for the Work.

5-1.20A Material Submittal Format

The materials and/or equipment proposed by the Contractor to be used on the Work shall be submitted to and approved by the Engineer before the start of the affected Work to allow for review and corrections without work delays – especially those materials and/or equipment that have long lead time for ordering.

The Contractor shall submit four (4) hard copies of each submittal for review and approval by the Engineer.

The Contractor may elect to email each submittal to the Engineer for review and approval.

The Contractor is to allow 10 business days to review each submittal and subsequent resubmittal with the exception of shop drawings.

The Contractor is to allow 15 working days to review each shop drawing submittal and subsequent re-submittal.

The time allowed for the review of the submittal starts when the City receives the submittal.

Submittals and support information shall be separated and clearly labeled when submitted to the Engineer. The list supplied in the Contract Documents is intended to be comprehensive, but no claim for its completeness is implied and submittal of the complete list will not relieve the Contractor of supplying all the information needed or of complying with any of the other requirements of the Contract Documents. Revised lists may be issued by the Engineer, and items may be added to the Material List supplied.

Manufacturer's specifications shall be supplied along with the submittal list for all applicable products mentioned in the Contract Documents.

The Engineer reserves the right to reject any item that does not fulfill the requirements of the Contract Documents.

All submittals shall contain:

1. The date of submission and the dates of any previous submissions, including identification of revision or resubmittals.
2. The Project title and number.
3. Contractor identification and the names of subcontractors, suppliers, and manufacturers.
4. Specification Section number(s) and Bid Item(s) which pertain.
5. Applicable standards, such as ASTM, Federal, or State Specification numbers. Certified test results indicating performance of materials/products with regard to Specification requirements.
6. The Contractor shall be required to initial or sign, certifying the review of submittals and verification of products, field construction criteria, and coordination of the information within the submittal and the Project plans and specifications.

The Contractor shall be required to review and approve all submittals and provide them stamped and signed as evidence thereof, prior to submitting to the Engineer for review. Submittals which are not stamped and signed by the Contractor will be rejected. Submittals shall be numbered consecutively.

The preparation of plans, drawings, and necessary documents, as required by the Contract Documents for each submittal shall be considered as part of the requirements of other items of work and no additional compensation shall be allowed therefor.

The Engineer reserves the right to reject any item that does not fulfill the requirements of the Contract Documents.

The Engineer reserves the right to require additional submittals from the Contractor that are not specifically identified in the Contract Documents. If so requested, the Contractor shall provide the requested material pursuant to this section.

5-1.20B(1) Additional Submittals

The Contractor shall submit to the Engineer the following:

1. Critical Path Method (CPM) Construction Schedule.
2. Traffic Control Plan.
3. Material Submittals / Schedule of Values.
4. Storm Water Pollution / Erosion Control Plan.
5. Notice to Residents (Draft Form) – for all phases of work.
6. Staging and Site Logistic Plan.

The City reserves the right to delay the issuance of the Notice to Proceed (NTP) or start of Work unless all submittals listed above are received and approved by the Engineer. Any exceptions or rejected submittals will be remedied and resubmitted for the Engineer’s review and approval prior to the issuance of the NTP or start of Work.

5-1.21 PROPERTY AND FACILITY PRESERVATION

5-1.21A General

Contractor shall preserve and protect:

1. Roadway improvements and facilities.
2. Property adjacent to the Project site.
3. Waterways.
4. ESAs.
5. Lands administered by other agencies.
6. Railroads and other railroad equipment.
7. Non-roadway facilities, including utilities.
8. Survey monuments.
9. City instrumentation.
10. Temporary Work.
11. Roadside vegetation not to be removed.

Further, Contractor shall comply with Government Code Section 4216 et seq. Contractor shall notify the Engineer at least three (3) business days before it contacts the regional notification center. Contractor's failure to contact the regional notification center prohibits excavation.

Contractor shall immediately report any and all property and facility damage to the Engineer. If Contractor, or any of its employees, agents, subcontractors, or suppliers, causes any such damage, Contractor shall be responsible for all costs associated with remedying the damage. If the Contractor fails to comply with providing the necessary remedy to the damage, the Engineer may elect to have the City or contract forces to perform the remedy and deduct all expenses incurred from this work from any monies that are due or to become due to the Contractor. By exercising this option, the Contractor is in no way relieved of its aforementioned responsibilities to perform these duties.

Contractor shall install suitable safeguards to preserve and protect property and facilities from damage.

Contractor shall also install temporary facilities, such as sheet piling, cribbing, bulkheads, shores, or other supports, necessary to support existing facilities or to support materials carrying the facilities.

5-1.21B Railroad Property

If Contractor's Work is on or adjacent to railroad property, the Work shall not interfere with railroad operations.

For an excavation on or affecting railroad property, Contractor shall submit work plans showing the system to be used to protect the railroad facilities 65 days in advance of the planned excavation for review.

If the Contract Documents do not include an agreement with a railroad company, Contractor shall not allow any personnel or equipment on the railroad property.

Contractor shall ensure all construction-related material, equipment, and debris are not on railroad property.

5-1.21C Nonhighway Facilities

Before starting any Work that could damage or interfere with underground infrastructure, Contractor shall locate the infrastructure described in the Contract Documents, including laterals and other appurtenances, and determine the presence of other underground infrastructure inferred from visible facilities, such as buildings, meters, and junction boxes.

Underground infrastructure described in the Contract Documents may be in different locations from those described, and additional infrastructure may exist.

Upon discovering an underground main or trunk line not described in the Contract Documents, Contractor shall immediately notify both the Engineer and the infrastructure owner. The Engineer orders the locating and protecting of the infrastructure. The locating and protecting of underground infrastructure not described in the Contract Documents is subject to a Change Order. If ordered, Contractor shall repair infrastructure damage at no additional cost. If the damage is not due to Contractor's negligence, damaged infrastructure repair is subject to a Change Order.

Contractor shall immediately notify the Engineer of a Work delay due to the presence of main-line underground infrastructure not described in the Contract Documents or in a substantially different location. Contractor shall also immediately notify the Engineer if the infrastructure described in the Contract Documents cannot be found.

5-1.21C(1) Nonhighway Facility Rearrangement

The City may rearrange a nonhighway facility during the Contract. Such rearrangement may include installation, relocation, alteration, or removal of the facility.

The City may authorize facility owners and their agents to enter the highway to perform such rearrangement work for their facilities or to make connections or repairs to their property. Contractor shall coordinate its Work with the facility owners to avoid Work delays.

If necessary rearrangement of underground infrastructure is not described in the Contract Documents, the Engineer may issue a Change Order for the performance of such work.

To rearrange work from that described in the Contract Documents, the Contractor shall:

1. Immediately notify the Engineer.
2. Make an arrangement with the infrastructure owner.
3. Obtain authorization for the rearrangement from the Engineer.
4. Pay the infrastructure owner any additional costs.

The Contractor shall incorporate the nonhighway facility work into their overall schedule. The Contractor will be granted additional days to coordinate their work with the facility owners and no additional compensation will be granted thereof.

5-1.21D Survey Monuments

Contractor shall protect survey monuments on and off the roadways and highways. Upon discovery of a survey monument not identified and located in the Contract Documents, Contractor shall immediately stop all work near the monument and notify the Engineer. Contractor shall not resume Work near the monument until so authorized by the Engineer.

5-1.21E Landscape

If Contractor damages landscaping not to be removed, then Contractor shall (1) dispose of the damaged landscaping, unless Engineer authorizes otherwise, and (2) replace the damaged landscaping at Contractor's sole cost.

Contractor shall replace damaged plants with plants of the same species. Contractor shall replace shrubs with a minimum No. 15 gallon container sized shrubs. Contractor shall replace trees per the following:

Damaged Tree Replacement Size and Quantity

Trunk Size of Damaged Tree (measured at 4 feet above grade)		Replacement Ratio Required (per tree damaged)	
Diameter (in inches)	Circumference (in inches)	Number of replacement trees	Minimum Size
12 to 24	38 to 75	3	24 inch box
Greater than 24	Greater than 75	3	36 inch box
Heritage trees		3	48 inch box

If a plant establishment or permanent erosion control establishment plan is specified in the Contract Documents, Contractor shall replace plants before the start of the plant establishment or permanent erosion control establishment period; otherwise Contractor shall replace plants within the allotted contract days and before the Contract acceptance by City.

Contractor shall water each plant immediately after planting, as well as saturate the backfill soil around and below the roots or the ball of earth around the roots of each plant. Contractor shall water all plants as necessary to maintain each plant in a healthy condition until Contract acceptance by the City or as noted in the plant establishment period as specified in the Contract Documents.

Contractor shall refer to Section 20, “Landscaping,” of these Specifications.

5-1.21F Irrigation Facilities

Contractor shall keep existing irrigation facilities in place that are described to be removed, relocated, or modified until the Engineer determines that they are no longer needed.

Contractor shall maintain the existing water supply. If the existing water supply is interrupted for more than three consecutive days, Contractor shall provide an alternative water supply. Contractor shall water the existing plants in the irrigated area from that alternative water supply, including those maintained by the City, as necessary to maintain healthy plant growth.

If Contractor and the City irrigate existing plants from the same water supply, Contractor shall furnish enough water to the City for watering plantings on and off the roadway as necessary to maintain a healthy condition of the plants through Contract acceptance by the City.

If Contractor damages irrigation facilities not to be removed, Contractor shall:

1. Remove and dispose of the damaged facilities.
2. Repair and replace damaged facilities within three days.
3. Use similar commercial-quality components from the same manufacturer or components that are compatible with the existing irrigation system if authorized.
4. After completing the repair or replacement of the facilities, Contractor shall perform an operational test in the presence of the Engineer. If Contractor repairs or replaces the remote control valves, Contractor shall conduct the test with the irrigation controller in the automatic mode.

Contractor shall notify the Engineer at least two (2) business days before shutting off the water supply to any portion of the existing irrigation system and inform Engineer how long the shut off will last. Contractor shall restore the water supply to any portion of the existing irrigation system immediately after the appropriate work is completed.

Contractor shall refer to Section 20, “Landscaping,” of these Specifications.

5-1.22 MAINTENANCE AND PROTECTION

Contractor shall maintain and protect Work until the City grants relief from maintenance or accepted the Contract.

Contractor shall not remove any padlock used to secure a portion of the Work until the Engineer is present to replace it. Notify the Engineer at least three (3) business days before removing the lock.

Contractor shall prevent construction equipment that exceeds the maximum weight limits in Vehicle Code Div. 15 from operating on completed or existing treated base, pavement, or structures.

5-1.23 REQUEST FOR INFORMATION

Contractor shall submit a Request for Information (RFI) upon recognition of any event or question of fact arising under the Contract Documents. The Engineer will respond to the RFI within five (5) business days. Contractor shall proceed with the Work while waiting for a response from the Engineer, unless otherwise ordered.

Contractor may protest the Engineer's response by submitting an Initial Potential Claim Record form within five (5) business days after receiving the Engineer's response and complying with Section 9-3, "Claims."

END OF SECTION

SECTION 6 CONTROL OF MATERIALS

6-1 GENERAL

6-1.01 MATERIALS

Contractor warrants free and clear title to all material supplied and equipment installed or incorporated in the Work. Contractor agrees, upon completion of the Work, to deliver the premises together with all improvements and appurtenances constructed or placed thereon by the Contractor, to City free from any claims, liens, or charges. Contractor further agrees that neither the Contractor, nor any person, firm, or corporation furnishing any materials or labor for any Work covered by the Contract, shall have the right to lien upon the premises or any improvement or appurtenances therein, except that Contractor may install metering devices and other equipment of utility companies or of political subdivisions the title to which is commonly retained by the utility company or the political subdivision. In the event of the installation of any such metering device or equipment, Contractor shall advise City in writing as to the ownership thereof.

Nothing contained herein, however, shall defeat or impair the right of persons furnishing material or labor under any bond given by Contractor for their protection of any rights under any law permitting such persons to look to funds due Contractor held by City.

The provision of this section shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing material for the Work when no formal contract is entered into for such material.

6-1.02 SOURCE OF SUPPLY AND QUALITY OF MATERIALS

The Contractor shall furnish all materials required to complete the Work, except materials that are designated in the Contract Documents to be furnished by the City and materials furnished by the City in accordance with Section 9-2.02, "Force Account Payment."

Only materials conforming to the requirements of the Contract Documents shall be incorporated in the Work. All material must be authorized for use and approved by the Engineer.

The materials furnished and used shall be new, except as may be provided elsewhere in the Contract Documents. The materials shall be manufactured, handled, and used in a workmanlike manner to ensure completed Work in accordance with the Contract Documents.

The Contractor shall furnish the Engineer a list of the sources of materials including those of its Subcontractors. The list shall be submitted to the Engineer in sufficient time to permit inspecting and testing in advance of the materials' use.

Materials to be used in the Work will be subject to inspection and tests by the Engineer or the Engineer's designated representative. The Contractor shall furnish, without charge, such samples as may be required. After testing, if it is found that the proposed sources of supply do not furnish a uniform product, or if the product from any such sources proves unacceptable at any time, the Contractor shall furnish approved material from other sources subject to prior approval of City. No material which, even after approval, has in any way become unfit for use shall be used in the Work. The Engineer may inspect, sample, or test materials at the source of supply or other locations, but such inspection, sampling, or testing will not be undertaken until the Engineer is assured by the Contractor of the cooperation and assistance of both the Contractor and the supplier of the material. The Contractor shall ensure that the Engineer or the Engineer's authorized representative has free access at all times to the material to be inspected, sampled, or tested.

It is understood that such inspections and tests in no way shall be considered as a guaranty of acceptance of such material nor of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made, and that inspection and testing performed by the City shall not relieve the Contractor or the Contractor's suppliers of responsibility for quality control.

Manufacturers' warranties, guaranties, instruction sheets and parts lists, which are furnished with certain articles or materials incorporated in the Work, shall be delivered to the Engineer before final acceptance of the Work.

Reports and records of inspections made and tests performed, when available at the Project site, may be examined by the Contractor.

6-1.03 CITY-FURNISHED MATERIALS

Materials which are listed as City furnished materials in the Special Provisions will be available to the Contractor free of charge, unless otherwise specified in the Contract Documents.

The Contractor shall submit a written request to the Engineer for the delivery of City furnished material at least fifteen (15) days in advance of the date of its intended use or scheduled installation, except that the written request for the delivery of City furnished sign panels for roadside signs and overhead sign structures shall be submitted at least thirty (30) days in advance of their intended installation. The request shall state the quantity and the type of each material required.

The locations at which City furnished materials will be available to the Contractor free of charge will be designated in the Contract Documents. In such cases, said materials shall be hauled to the Project site by the Contractor at the Contractor's sole expense, including any necessary loading and unloading that may be involved. If the locations are not designated in the Contract Documents, the City furnished materials will be furnished to the Contractor free of charge at the Project site. In either case, all costs of handling and placing City furnished material shall be considered as included in the Contract Price paid for the item involving such City furnished material.

The Contractor shall be responsible for all materials furnished to the Contractor and shall pay all demurrage and storage charges. City furnished materials lost or damaged from any cause whatsoever shall be replaced by the Contractor at the Contractor's sole expense. The Contractor shall be liable to the City for the cost of replacing lost or damaged City furnished material and such costs may be deducted from any monies due or to become due the Contractor. Such material, after receipt at the point of delivery, shall form part of the work for all purposes of the contract as if it had been supplied by the Contractor itself.

All City furnished material that the Contractor does not use for the Work shall remain the property of the City and shall be returned to the Engineer at the location requested by the City.

If the Contractor discovers any defect in materials furnished by the City, it shall immediately notify the City. Any work done by Contractor after discovery, until authorized, will be done at the Contractor’s risk.

6-1.03A No Stopping Signs

Prior to the start of Work which requires parking restriction(s), the Contractor shall request from City approval to post and maintain temporary “No Stopping” signs on each street where the Work will take place. The City will provide signs for the Contractor's use during the construction of a City Project, at no extra cost to Contractor. For all other (private & utility) projects, the “No Stopping” signs may be purchased at the Public Works Department located at City Hall – 70 N. 1st Street, Campbell, California 95008.

It shall be the Contractor's sole responsibility to post and maintain "No Stopping" signs in areas where the Contractor's Work will require restricted parking. To be enforceable, Contractor must post signs not less than 72 hours prior to the start of the Work at a maximum spacing of 60 feet. The signs must clearly show the date(s) and hours of the parking prohibition, as well as the date and time the signs were posted. Contractor is required to fill in all applicable information on the “No Stopping” signs.

If Contractor does not perform all Work during the timeframe indicated on the “No Stopping” signs, Contractor will reschedule the Work with at least five (5) working days advance notice. The Contractor shall perform all re-posting of “No Stopping” signs and re-notification of businesses, tenants, and residents as a

result of its failure to meet the posted schedule. Any delays caused by Contractor's failure to adhere to the approved schedule will be at the Contractor's sole expense. No additional compensation will be allowed for costs resulting from said delays.

The Contractor shall remove the "No Stopping" signs immediately when they are no longer needed for use in the respective area of the Project.

The Contractor shall notify the Campbell Police Department directly after posting, and immediately upon removal of the said signs at (408) 866-2121.

During the morning of each scheduled workday, the Contractor shall be responsible for calling the City of Campbell's Police Dispatch to tow cars violating the "No Stopping" signs and posted schedule, if necessary. The Contractor shall have available for the Community Services Officer (CSO) responding to the call photo documentation of the "No Stopping" signs posted, if the signs were removed or vandalized the previous night.

6-1.04 STORAGE OF MATERIALS

Articles or materials to be incorporated in the Work shall be stored in such a manner as to ensure the preservation of their quality and fitness for the Work and to facilitate inspection. The Contractor shall pay for all damage and storage charges, and shall not be entitled to any additional compensation from City for such charges.

6-1.05 DEFECTIVE MATERIALS

All materials, which the Engineer has determined do not conform to the requirements of the Contract Documents, will be rejected whether in place or not. Contractor shall remove all rejected materials immediately from the Project site, unless otherwise permitted by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used in the Work, unless the Engineer provides written preapproval. Upon failure of the Contractor to comply promptly with any order of the Engineer made under the provisions in this section, the Engineer shall have authority to cause the removal and replacement of rejected material and to deduct the cost thereof from any moneys due or to become due the Contractor.

6-1.06 TRADE NAMES AND ALTERNATIVES

Whenever in the Contract Documents, any articles or materials to be incorporated in the Work is designated or specified under a trade name or the name of a manufacturer and catalog information, such specification shall be deemed to be followed by the words "or approved equal." The use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements and to the Contract Documents:

1. The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor and the Contractor shall furnish all information necessary and as required by the Engineer to confirm approval. The Engineer shall be the sole judge as to the quality and suitability of alternative articles or materials and the Engineer's decision shall be final.
2. Whenever the specifications permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of such substitute material will be made until the request for substitution is made in writing by the Contractor to Engineer accompanied by complete data as to the equality of the material or article proposed. Such request shall be made in ample time to permit approval without delaying the work, or not less than thirty (30) days for review.
3. Wherever in the Contract Documents the name or the name and address of a manufacturer or supplier is given for a material, product, or equipment, or if any other source of a material, product, or equipment is indicated therefor, such information is given for the convenience of the Contractor only, and no limit, restriction, or direction is indicated or intended thereby, nor is the accuracy or reliability of such information guaranteed. It shall be the responsibility of the Contractor to

determine the accurate identity and location of any such manufacturer, supplier, or other source of any material, product, or equipment called for in the Contract Documents.

4. Approval by the Engineer of a substitute item proposed by the Contractor shall not relieve Contractor of the responsibility for full compliance with the Contract Documents and for adequacy of the substituted item. The Contractor shall also be responsible for resultant changes and all additional costs which the substitution requires in the Work, the Work of Subcontractors and of other contractors, and shall effect such changes without cost to the City.
5. If Engineer rejects a substitution request, Contractor shall furnish the originally specified items.
6. The substitution request shall include substantiating data that proves that substitution causes no delay and is of equal or better quality and suitability for the Work.

The City will consider proposals for substitution of materials, equipment, methods, and services only when such proposals are accompanied by full and complete technical data, and all other information requested is provided, in order to evaluate the proposed substitution. Each request for substitution shall include a statement of cause. City may require substantiating documents to prove quality, delivery time, and cost.

6-1.06A No Warranty for Listed Material Supplier or Equipment Manufacturer

The City does not warrant nor guarantee the ability of any material supplier or equipment manufacturer listed in the Contract Documents to perform their work in a timely manner or in a manner acceptable to City. Furthermore, the City does not warrant that such materials or equipment installed and in place will be acceptable to the City.

6-1.07 PLANT INSPECTION

The Engineer may inspect the production of material, or the manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the Engineer is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer or the Engineer's authorized representative shall have free entry at all times to such parts of the plant as concerns the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The City assumes no obligation to inspect materials at the source of supply.

6-1.08 CERTIFICATES OF COMPLIANCE

A Certificate of Compliance shall be furnished prior to the use of any materials for which these Specifications or the Contract Documents require that such a certificate be furnished. In addition, when so authorized in the Contract Documents, the Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the Contract Documents. A Certificate of Compliance shall be furnished with each lot of material delivered to the Work and the lot so certified shall be clearly identified in the certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the Contract Documents and any such material not conforming to such requirements will be subject to rejection whether in place or not.

The City reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.

6-1.09 FOREIGN MATERIALS AND ASSEMBLIES

Materials which are manufactured, produced, or fabricated outside of the United States shall be delivered to a distribution point in Santa Clara County, unless otherwise required in the Contract Documents, where they shall be retained for a sufficient period of time to permit inspection, sampling, and testing.

Attention is directed to the provisions in Section 8-1.07, "Liquidated Damages." The Contractor shall not be entitled to an extension of time for acts or events occurring outside of the United States and it shall be the Contractor's responsibility to deliver materials obtained from outside of the United States to the point of entry into the continental United States in sufficient time to permit timely delivery to the job site.

The Contractor, at no cost to the City, shall supply the facilities and arrange for any testing required in California and by City, which the City is not equipped to perform. All testing by the Contractor shall be subject to witnessing by the Engineer.

The manufacturer, producer, or fabricator of foreign material or assemblies shall furnish to the Engineer a Certificate of Compliance in accordance with the provisions in Section 6-1.08, "Certificates of Compliance." In addition, certified mill test reports clearly identifiable to the lot of material shall be furnished where required in the Contract Documents or otherwise requested by the Engineer.

If the welding of steel for structural steel members or the casting and prestressing of precast prestressed concrete members is to be performed outside of the United States, the following requirements shall apply:

1. Such fabrication shall be performed only within the plants and by fabricators who have previously established, to the satisfaction of the Engineer, that they have the experience, knowledge, trained manpower, quality controls, equipment and other facilities required to produce the quality and quantity of work required. At the option of the Engineer, prequalification of the plant and fabricator will be established either by the submission of detailed written proof thereof or through in-plant inspection by the Engineer or the Engineer's representative, or both.
2. The Contractor shall make written application to the Engineer for approval for such foreign fabrication at the earliest possible time and, in no case, later than fifty (50) calendar days in advance of the planned start of fabrication. The application shall list the specific units or portion of a work which will be fabricated outside of the United States.
3. The Contractor shall advise the Engineer, in writing, at least twenty (20) calendar days in advance of the actual start of any such foreign fabrication.
4. All documents pertaining to the Contract, including but not limited to, correspondence, bid documents, working drawings, and data shall be written in the English language and all numerical data shall use the foot-pound-second system of units of measurement.

6-1.10 COMMENCEMENT OF WARRANTY

Unless expressly agreed to in writing by the City, all warranties required under the Contract Documents shall commence upon acceptance by the City of the entire Project. Use or occupancy by the City of a portion of the Project either before or after completion of that portion of the Work shall not commence the running of any warranty required under the Contract Documents.

6-1.11 SAMPLES

All materials must be of specified quality and fully equal to samples previously submitted to the City. The Contractor shall furnish to the Engineer for testing, free of charge, samples of all materials proposed to be used in the Work, and also samples of completed mock-up panels of Portland cement concrete or asphaltic concrete work. When so required by the Engineer, the Contractor shall submit for approval samples of the various materials, together with the finish thereon, as specified for that intended to be used in the Work. All materials and workmanship shall be equal in every respect to that of the samples so submitted and approved. These samples shall be sent to such place as the Engineer may direct. In all cases, freight must be prepaid by the Contractor. These samples will be returned to the Contractor, if requested, freight collect.

Where samples are called for, two (2) or more samples of materials to be used in fulfilling the requirements of the specifications shall be deposited with the Engineer as soon as possible prior to their use in the Work.

No materials or equipment of which samples are required to be submitted for approval shall be used on the Work until such approval has been given by the Engineer, save only at the Contractor's risk and expense.

6-2 LOCAL MATERIALS

6-2.01 GENERAL

Local material must be rock, sand, gravel, earth, or mineral material other than local borrow or selected material obtained or produced from a source in the work vicinity specifically for use on the Project. Local borrow must not be a material from an established commercial source.

The Contractor shall be responsible for making all arrangements necessary to obtain materials from any local material source other than a mandatory local material source. This shall include making any arrangements necessary for hauling the material to the Project site.

Contractor is responsible for all other testing expenses. Samples of material from local sources shall be taken in the presence of the Engineer.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the Work involved in conforming to the provisions in this section for furnishing and producing materials from any source shall be considered as included in the Contract Price and no additional compensation will be allowed therefor.

6-3 TESTING

6-3.01 CITY REQUIRED QUALITY ASSURANCE

Quality assurance includes all activities used to (1) guaranty an overall level of quality for the Project and (2) ensure compliance with the Contact Documents.

The Engineer may at any time require materials to be tested to ensure conformance with Contract Documents. Contractor shall allow sufficient time for tests to be conducted and the results to be reviewed prior to continuing with the Work, which may be affected by any test results. Unless otherwise specified, all tests shall be performed in accordance with the methods used by the Department of Public Works, and shall be made by the Engineer or the Engineer's designated representative.

The City uses Caltrans, American Association of State Highway and Transportation Officials (AASHTO), and American Society for Testing and Material (ASTM) developed methods for testing the quality of materials and work. These methods are identified by number and are referred to in the Contract Documents as California (Cal), AASHTO, and ASTM Tests.

Whenever the specifications require compliance with specified values for the following properties, tests will be made by the California Test indicated unless otherwise specified in the Contract Documents or the City’s Quality Assurance Program (QAP).

Whenever a reference is made in the Contract Documents to a California Test by number, it shall mean the California Test in effect on the day the Notice to Proceed for the Work is dated.

Whenever the Contract Documents provide an option between two (2) or more tests, the Engineer will determine the test to be used.

Whenever a reference is made in the specifications to a Contract Documents, manual, or test designation of the ASTM, AASHTO, Federal Specifications, or any other recognized national organization, and the number or other identification representing the year of adoption or latest revision is omitted, it shall mean

the specification, manual, or test designation in effect on the day the Notice to Proceed for the Work is dated. Whenever said specification manual or test designation provides for test reports (such as certified mill test reports) from the manufacturer, copies of such reports, identified as to the lot of material, shall be furnished to the Engineer. The manufacturer's test reports shall supplement the inspection, sampling, and testing provisions in Section 6, "Control of Materials," and shall not constitute a waiver of the City's right to inspect. When material which cannot be identified with specific test reports is proposed for use, the Engineer may, at the Engineer's discretion, select random samples from the lot for testing. Test specimens from the random samples, including those required for retest, shall be prepared in accordance with the referenced specification and furnished by the Contractor at the Contractor's expense. The number of such samples and test specimens shall be entirely at the discretion of the Engineer.

The Contractor shall furnish, without charge, adequate samples of all materials necessary for testing, and no material shall be used prior to approval by the Engineer, except as provided in Section 6-1.08, "Certificates of Compliance."

City acceptance includes sampling, testing and inspections performed by the City to verify compliance with the Contract Documents.

6-3.01A Failed Tests

Unless otherwise specified, all required tests whose results fail to meet the specifications shall be paid for by the Contractor. Any such charges shall be deducted from monies due, or to become due, to the Contractor.

6-3.01B Permit Testing

All testing for Work performed under Public Works permits issued by the City shall be accomplished at the expense of the permittee, regardless of the test results.

6-3.02 CONTRACTOR REQUIRED QUALITY CONTROL

Quality control includes sampling, testing, and inspections performed by the Contractor’s Quality Control program to (1) control material quality and (2) ensure the specified quality characteristics for the Project are met.

Full compensation for performing quality control tests and making the results available to the Engineer 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. Such services shall comply with the following Quality Control Requirements:

6-3.02A General

Material production and testing equipment must measure accurately and precisely.

6-3.02B Quality Control (QC) Program

Contractor shall develop, implement and maintain a QC program.

The Contractor shall prepare and maintain QC records, including but not limited to the following:

1. Names and qualifications of:
   1.1. Samplers.
   1.2. Testers.
   1.3. Inspectors.
2. Testing laboratories’ identification and certifications.
3. Testing equipment calibrations and certifications.
4. Inspection reports.
5. Sampling and testing records organized by date and type of material.

6. Test results with comparison of quality characteristic requirements.
7. Test results in relation to action and any suspension limits.
8. Records of corrective actions and suspensions.

The Contractor shall notify the Engineer within 24-hours of any noncompliance identified in their QC program.

The Contractor shall allow the City access to all QC records.

The Contractor shall submit all QC test data and QC test results within 2-business days of test completion.

6-3.02C Quality Control Manager

This subsection applies to work requiring a QC Manager, as noted in the Special Provisions.

The Contractor's QC Manager must be responsible for the quality of work, including but not limited to materials and workmanship performed by its own workers and subcontractor.

The Contractor shall assign a QC Manager before the start of the affected work. The QC Manager shall be the sole individual responsible for the following:

1. Receiving, reviewing and approving all correspondence, submittals, and reports before submitting to the City.
2. Signing the QC plan.
3. Implementing the QC plan.
4. Maintaining the QC plan and records.

The QC Manager must be employed by the Contractor or must be hired by subcontractor providing only QC services. The QC Manager must not be employed or compensated by a subcontractor or by other persons or entities hired by subcontractors who will provide other services or materials for the Project.

The Contractor shall provide to the Engineer the name and contact information of the QC Manager.

6-3.02D Quality Control Plans

The Contractor shall submit one copy of each authorized QC plan to the Engineer.

The Contractor shall make 1 copy of the quality control plan available at the jobsite.

6-3.03 STATISTICAL TESTING

Whenever both individual test results and operating range requirements are specified in the Contract Documents, materials shall meet both requirements. Materials used in the Work to replace materials which did not comply with requirements and were removed shall conform to the limits specified for the operating range.

Individual samples tested prior to the first use of aggregates from each source, or prior to the first use of aggregates after appreciable changes have been made in aggregate processing procedures, shall conform to the limits specified for the operating range.

If individual test results on materials used in the Work do not fall within specified limits, but the operating range utilizing such test results is within the specified operating range limits, the individual test results may be waived at the discretion of the Engineer. No test result for material used in the Work shall be omitted from the operating range determination.

Operating ranges shall be computed as follows:

1. Operating ranges shall be rounded to the same number of significant figures as are reported for individual test results.

2. When the figure to be dropped is less than 5, round down; if greater than 5, round up, and if it is 5, round up or down to the even number.

Operating ranges shall be continuous for the entire Project. In determining an operating range for a material property, all of the individual test results that represent material actually used in the Work, except individual test results for portions of such material for which requirements have been revised by a Change Order, shall be used in the calculation. The test results shall enter the calculation sequence in the chronological order that the Work is performed. The first individual test results shall start an operating range and shall meet the operating range requirements. Until more than four (4) test results are available, the operating range shall be the numerical average of the individual test results. When more than four (4) test results are available, the operating range shall be determined by adding the last four (4) individual test results, adding the new individual test results to this product and then dividing this sum by five (5).

Where more than one source is used for a single material and the sources are not similar in all respects, a separate operating range shall be calculated for each source.

Where a single source provides material to more than one project, a separate operating range shall be calculated for each project. A single test result representing material delivered to different projects shall be used in each operating range for which it is appropriate and separate tests will not be required.

6-3.04 FIELD TESTS, OR ADJUSTMENTS AND OPERATIONS

The Contractor shall arrange for the presence of a manufacturer's representative or other qualified persons who shall instruct City operating personnel in the operation and care of all the various pieces of equipment and parts of the installation as determined by the Engineer. The Contractor shall superintend the operations of the equipment during the thirty (30) day period and shall be responsible for the proper operation thereof, and shall make no claim against the City for any damage to the equipment during such operation, or for the services of the above-mentioned representatives or other qualified persons. The Contractor shall make changes, adjustments, or replacements of equipment as may be required to make the equipment comply with the specifications, or to replace any defective parts or material.

6-4 SUBSTITUTIONS

6-4.01 GENERAL

Contractor’s proposed requests for changes in products, materials, equipment, and methods of construction required by the Contract Documents after award of the Contract are considered "requests for substitutions." The following are not considered permitted substitutions:

1. Revisions to Contract Documents requested by the City
2. Specified options of products and construction methods included in the Contract Documents.
3. Compliance with governing regulations and orders issued by governing authorities.

6-4.02 SUBMITTAL

Requests for substitution will be considered by the City only if received within ten (10) calendar days from the date of award. Requests received after this period may be accepted or rejected at the sole discretion of the City.

Each request for substitution shall be prepared and presented to the City in accordance with the procedures for submittals as specified in the Contract Documents and shall be submitted on the Substitution Request Form as included in the Contract Documents. The following additional information shall be provided:

1. An explanation of the advantages to the City for accepting the substitution.
2. A comparison of significant qualities of the proposed substitution with those specified in the Contract Documents.

3. A list of any and all changes or modifications needed to other parts of the Work, including to construction performed by the City and separate contractors, that will be necessary to accommodate the proposed substitution.
4. A statement indicating the substitution's effect on the Construction Schedule compared to the Construction Schedule without acceptance of the substitution. Indicate the effect of the proposed substitution on the overall Contract Time.
5. Cost information, including a proposal of the net change, if any, in the Contract Sum.
6. Certification that the substitution is equal to or better in every respect to that is required by the Contract Documents, and that it will perform adequately in application indicated. Include Contractor's waiver of rights to additional payment or time extensions that may be necessary because of the substitution's failure to perform adequately.

6-4.03 SUBSTITUTION CONDITIONS

The Contractor's substitution request will be considered by the City when the following conditions are satisfied, as determined solely by the City; otherwise, requests will be returned without action except to record noncompliance with these requirements.

1. Extensive revisions to Contract Documents are not required.
2. Proposed substitution is consistent with the general intent of the Contract Documents.
3. The request is timely, fully documented, and properly submitted.
4. The product or method of construction specified in the Contract Documents cannot be provided within the specified Contract Time. The request for substitution may not be considered if the product or method cannot be provided as a result of failure of the Contractor to pursue the work promptly or coordinate activities properly.
5. A substantial advantage is offered to the City, in terms of cost, time, energy conservation, or other considerations of merit, after deducting offsetting any additional responsibilities the City may be required to bear due to the substitution. Additional responsibilities for the City may include additional compensation to the Consulting Engineer/Architect for redesign and evaluation services, increased cost of other construction by the City or separate contractors, and similar considerations.
6. The specified product or method of construction cannot receive necessary approval by a regulatory agency, and the requested substitution can be approved.
7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the compatibility.
8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution can provide the required warranty.

6-4.04 UNACCEPTABLE SUBSTITUTION CONDITIONS

The Contractor's submittal and City's acceptance of Shop Drawings, Product Data, or Samples that do not comply with the Contract Documents do not constitute requests for substitution, nor do they constitute acceptance of a substitution.

6-4.05 CITY'S ACTION

The City will notify the Contractor of acceptance or rejection of the request for substitution within 28 calendar days of receipt. If a decision on use of a substitute cannot be made within these time limits, the product originally specified in the Contract Documents shall be used.

6-4.06 TIME EXTENSION

No extension of Contract Time will be allowed through failure of the Contractor to either transmit requests for substitution sufficiently in advance of the work, or on account of processing time outside the time limits noted above.

Should the originally specified materials not be available within the specified Contract Time due to the negligence of the Contractor to order and obtain such materials, the Contractor shall be responsible to provide, install, and maintain a temporary “equal” material as approved by the City, and shall replace such temporary material with the required product upon availability. The Contractor shall be responsible for all costs associated with the installation, maintenance, and removal of the temporary product and the installation of the specified product, including an extended one-year warranty to cover the final product installed. Sufficient funds to cover the purchase and installation of the specified product will be withheld from monies due the Contractor until such work has been completed and accepted by the City.

6-4.07 SPECIFIED “OR EQUAL” ITEMS

Wherever catalog numbers and specific brands of trade names followed by the designation "or equal" are used in conjunction with a designated material, product, item, or service mentioned in the Contract Documents, they are used to establish the standards of quality and utility required. Contractor shall submit “or equal” items for review within thirty (30) calendar days of Contract Award pursuant to Section 6-1.06, “Trade Names and Alternatives.” "Or equal" proposals will be subject to acceptance by the City.

END OF SECTION

SECTION 7 LEGAL RELATIONS AND RESPONSIBILITY

7-1.01 LAWS TO BE OBSERVED

The Contractor shall keep fully informed of all existing and future State and Federal laws and county and municipal ordinances and regulations which in any manner affect those engaged or employed in the Work, or the materials used in the Work, or which in any way affect the conduct of the Work**,** and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Contractor shall at all times observe and comply with, and shall cause all the Contractor's agents and employees to observe and comply with, all such existing and future laws, ordinances, regulations, orders, and decrees of bodies or tribunals having any jurisdiction or authority over the Work; and shall to the fullest extent allowed by law indemnify, defend, and hold harmless the City of Campbell, and all officers, employees, and agents thereof connected with the Work against any claim or liability arising from any work performed under the Contract or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or their employees, Subcontractors, or suppliers at any tier unless such claim or liability arises due to the sole negligence or willful misconduct of the City, its officers, employees, or agents. If any discrepancy or inconsistency is discovered in the plans, drawings, specifications, or Contract Documents for the Work in relation to any such law, ordinance, regulation, order, or decree, the Contractor shall forthwith report the same to the Engineer in writing.

7-1.01A Labor Standards

The Contractor shall comply with the labor standard requirements set forth below in this Section 7-1.01A, "Labor Standards."

7-1.01A(1) City Compliance Officer

1. **City Compliance Officer**: For purposes of this Section 7-1.01A, the "City Compliance Officer," is the Engineer or such other City employee as the City Manager may designate as having primary responsibility for administering and enforcing the labor standard requirements set forth in this section. The term includes the City Compliance Officer's staff and any other City employees and agents authorized to assist in the administration and enforcement of these labor standards.

2. **Contact Information**: The address for the City Compliance Officer for purposes of correspondence and inquiries is 70 N. 1st Street, Campbell, CA. The Office's phone number is 408-866-2150.

3. **Scope of Authority**: The City Compliance Office has primary responsibility for administering and enforcing the prevailing wage requirements, the payroll requirements, and all other labor standards required by this Contract.

7-1.01A(2) Working Hours

The Contractor shall comply with the working-hour requirements set forth in Sections 1810 through 1815 of the California Labor Code, which are incorporated into this Contract.

7-1.01A(3) Prevailing Wage

Contractor shall comply with and shall ensure that all Subcontractors comply with prevailing wage law pursuant to the State of California Labor Code, including but not limited to Section 1720 *et seq* or if federal funds are involved, the Federal (Davis Bacon) Wage Rates, as indicated in the Contract Documents. However, if the California prevailing wage rate for a particular job classification is higher than the Federal (Davis Bacon) Wage Rates, the Contractor and Subcontractors shall pay the higher wage between the two rates. Compliance with these sections is mandatory. The Work under this Contract is subject to compliance monitoring and enforcement by the State of California Department of Industrial Relations.

The State of California Department of Industrial Relations ascertains the general prevailing per diem wage rates where the Work is to be performed for each craft, classification, or type of worker required to perform the Work. A copy of the general prevailing per diem wage rates will be as shown in the Contract Documents.

Contractor shall post a copy of the general prevailing per diem wage rates as well as job site notices as prescribed by regulation at the Project site. By this reference, such schedule is made part of the Contract Documents. Contractor shall pay not less than the prevailing wage rates, as specified in the schedule and any amendments thereto, to all workers employed by Contractor in the execution of the Work.

Contractor shall cause all subcontracts to include the provision that all Subcontractors shall pay not less than the prevailing rates to all workers employed by such Subcontractors in the execution of the Work.

Additional prevailing wage requirements include, but are not limited to, the following:

1. **Unlisted Job Classifications:** The prevailing wage rate applicable to a craft, classification, or type of worker not shown on the General Prevailing Wage Determinations shall be the rate applicable to the most closely related craft, classification, or type of worker. Contact the Public Works Department at (408) 866-2150 for crafts, classifications, or types of workers not listed in the General Prevailing Wage Determinations.

2. **Paying Higher Wages:** The prevailing wage rates listed in the General Prevailing Wage Determination are minimum rates. The Contractor may pay workers more than the applicable prevailing wage rate. The City will not pay extra compensation based on the inability of the Contractor to hire workers at the prevailing wage rates.

3. **No Adjustments:** The City will not pay extra compensation based on increases in the prevailing wage rates listed in the General Prevailing Wage Determination during the term of the Contract.

4. **Posting Notice:** The Contractor must post at a prominent place at each Project site at which Work is performed a sign at all times informing employees that the City's prevailing wage requirements apply to the Work and that these requirements are enforced by the City Compliance Officer. The sign shall include the telephone number and address of Public Works Department. The Contractor also must post at each Project site where Work is performed the General Prevailing Wage Determinations in effect for each craft, classification, and type of worker employed required to perform the Work. If the Contractor fails to post the sign or General Prevailing Wage Determinations as required, the City Compliance Officer shall have the right to do so.

5. **Restitution for Underpayment:** The Contractor, or any Subcontractor of the Contractor, must pay the following amount to each employee who was paid less than the applicable prevailing wage rate during any period of time that such employee was performing Work: the difference between the applicable prevailing wage rate and the actual amount paid.

6. **Penalties:** Contractor shall forfeit to City, as a penalty, not more than $200 for each calendar day or portion thereof for each worker that is 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 portion of the Work done by Contractor or any Subcontractor under the Contract. The amount of this penalty shall be determined pursuant to applicable law. Such forfeiture amounts may be deducted from the Contract Sum or sought directly from the surety under its Performance Bond if there are insufficient funds remaining in the Contract Sum. Contractor shall also pay to any worker who was paid less than the prevailing wage rate for the work or craft for which the worker was employed for any portion of the Work, for each day, or portion thereof, for which the worker was paid less than the specified prevailing per diem wage rate, an amount equal to the difference between the specified prevailing per diem wage rate and the amount which was paid to the worker. Review of any civil wage and penalty assessment shall be made pursuant to the California Labor Code.

7. **Liability for Subcontractor's Penalties:** The Contractor is liable for any penalties resulting from the payment of less than the prevailing wage rate by one of its Subcontractors, unless the Contractor can clearly demonstrate to the City Compliance Officer all of the following has a defensible position pursuant to Labor Code Section 1775(b):

a. The contract between the Contractor and its Subcontractor for the performance of the Work included a copy of Sections 1771, 1775, 1776, 1777.5, 1813, and 1815 of the California Labor Code; and

b. The Contractor periodically reviewed the certified payroll records of its Subcontractor for payment of the specified general prevailing rate of per diem wages; and

c. Upon becoming aware of the Subcontractor's payment of less than the applicable prevailing wage rate, the Contractor diligently took corrective action to halt or rectify the violation, including, but not limited to, retaining sufficient funds from payments due the subcontractor for Work performed; and

d. Before making final payment to its Subcontractor, the Contractor obtained an affidavit, signed under penalty of perjury, from the Subcontractor stating that the Subcontractor paid each of its workers not less than the applicable general prevailing rate of per diem wages and any amounts due pursuant to Section 1813 of the California Labor Code.

8. **Withholding:** The Engineer may withhold and retain from payments or moneys due the Contractor the following: (1) the amount of any outstanding restitution resulting from an underpayment, (2) penalties resulting from such underpayment, and (3) any amounts required to satisfy any civil wage and penalty assessment issued by the California Labor Commission in accordance with the California Labor Code. The Engineer's right to withhold under this provision is separate and independent from any other right to withhold moneys included in this Contract.

9 **Notice of Withholding:** The City Compliance Officer will provide written notice to the Contractor, if applicable, of any withholding resulting from a prevailing wage violation by Contractor or any applicable Subcontractor. The notice will describe the nature of the violation, the amount of wages, penalties, and forfeitures withheld, and the procedure for obtaining review of the withholding.

a. **Service of Notice:** The City Compliance Officer will serve the notice by first-class and certified mail, in a sealed envelope, with postage prepaid, addressed to the person on whom it is to be served, at the office address last given for that person.

b. **Service on Surety:** The City Compliance Officer will also serve a copy of the notice by certified mail to the surety that issued the payment and performance bonds for the Contract.

c. **Appeal of Withholding:** In accordance with California Labor Code Section 1771.6, the Contractor or the affected Subcontractor may seek review of the City's withholding by transmitting a written request for review to the Office of the Labor Commissioner for the State of California. The Contractor or the affected Subcontractor shall transmit a copy of the written request for review to the City Compliance Officer.

d. **Time to Appeal Withholding:** In accordance with California Labor Code Section 1742, the Contractor or affected Subcontractor may appeal the withholding by transmitting a written request to review a notice of withholding to the Office of the Labor Commissioner for the State of California within sixty (60) calendar days after service of the Notice of Withholding. If review is not requested within sixty (60) calendar days, then the City Compliance Officer's determination is final.

10. **Additional Requirements:** The Contractor is directed to review and comply with any and all additional prevailing wage requirements specified in the Contract Documents.

7-1.01A(4) Payroll Records

Contractor and all Subcontractors shall keep accurate payroll records, showing the name, address, social security number, job classification, straight time and overtime hours worked each day and week, the actual

per diem wages paid to each journey-worker, apprentice, worker, or other employee employed in connection with the Work, payrate, itemized deductions made, check number issued, and apprentices and the apprentice-to-journeyman ratio. All payroll records shall be certified as being true and correct by the Contractor or Subcontractors keeping such records.

Each certified payroll record must include a Statement of Compliance form signed under penalty of perjury that declares: (1) the information contained in the payroll record is true, correct, and complete; (2) the Contractor or Subcontractor has complied with the requirements of Labor Code Sections 177.1, 1811, and 1815 for any work performed by its employees on the Project; and (3) wage rates paid are at least those required in the Contract Documents. Electronic certified payroll records of the Contractor and all Subcontractors shall be submitted weekly for the life of the Project to the City Compliance Officer.

All payroll records for the Project shall be available for inspection at all reasonable hours at the principal office of Contractor on the following basis:

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

2. A certified copy of all payroll records shall be made available for inspection upon request to City, the State of California Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the State of California Division of Industrial Relations.

3. A certified copy of all payroll records shall be made available upon request by the public for inspection or copies thereof made; provided, however, that the request by the public shall be made to either City, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. The public shall not be given access to such records at the principal offices of Contractor or Subcontractors. Any copy of the records made available for inspection as copies and furnished upon request to the public or any public agency by City shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of Contractor awarded the Contract or performing the Contract shall not be marked or obliterated.

Contractor shall file a certified copy of the payroll records with the entity that requested the records within 10 days after receipt of a written request. Contractor shall inform City of the location of such payroll records for the Project, including the street address, city, and county; and Contractor shall, within 5 working days, provide notice of change of location of such records. In the event of noncompliance with the requirements of this Article 14.4 or with the State of California Labor Code Section 1776, Contractor shall have ten (10) days in which to comply following receipt of notice specifying in what respects Contractor must comply. Should noncompliance still be evident after the ten (10) day period, Contractor shall forfeit to City, as a penalty, $100 for each day, or portion thereof, for each worker, until strict compliance is accomplished. Such forfeiture amounts may be deducted from the Contract Sum.

Contractor shall submit certified payrolls for hauling and delivering ready-mixed concrete. Payrolls must be accompanied by a written time record. The time record must include the following:

1. Truck driver’s full name and address.
2. Name and address of the factory or batching plant.
3. Time the concrete was loaded at the factory or batching plant.
4. Time the truck returned to the factory or batching plant.
5. Truck driver’s signature certifying under penalty of perjury that the information contained in this written time record is true and correct.

7-1.01A(5) Nondiscrimination

Contractor shall comply with Section 1735 of the Labor Code, which reads as follows:

"No discrimination shall be made in the employment of persons upon public works because of the race, religious creed, color, national origin, ancestry, physical handicap, medical condition, marital status, or sex of such persons, except as provided in Section 12940 of the Government Code, and every Contractor for public works violating this section is subject to all the penalties imposed for a violation of this chapter."

Contractor shall also comply with the following "Nondiscrimination Clause" that is required pursuant to 2 C.C.R. Section 11105:

NONDISCRIMINATION CLAUSE

1. During the performance of this contract, Contractor and its Subcontractors shall not unlawfully discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, military and veteran status. Contractors and subcontractors shall insure that the evaluation and treatment of their employees and applicants for employment are free of such discrimination. Contractors and subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code § 12990 et seq.) and the applicable regulations promulgated thereunder (Cal. Code Regs., Title 2, § 11000 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code Section 12990, set forth in Subchapter 5 of Division 4.1 of Title 2 of the California Code of Regulations are incorporated into this contract by reference and made a part hereof as if set forth in full. Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.

2. Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

Contractor shall also comply with the following “Standard California Nondiscrimination Construction Contract Specifications that is required by 2 C.C.R. Section 11122:”

STANDARD CALIFORNIA NONDISCRIMINATION CONSTRUCTION CONTRACT SPECIFICATIONS (GOV. CODE, SECTION 12990)

These specifications are applicable to all state Contractors and subcontractors having a construction contract or subcontract of $5,000 or more.

1. As used in the specifications:

   a. “Act” means the Fair Employment and Housing Act.
   b. "Administrator” means Administrator, Office of Compliance Programs, California Department of Fair Employment and Housing, or any person to whom the Administrator delegates authority.

2. Whenever the Contractor or any subcontractor subcontracts a portion of the work, it shall include in each subcontract of $5,000 or more the nondiscrimination clause in this contract directly or through incorporation by reference. Any subcontract for work involving a construction trade shall also include the Standard California Construction Contract Specifications, either directly or through incorporation by reference.

3. The Contractor shall implement the specific nondiscrimination standards provided in paragraph 6(a) through (e) of these specifications.

4. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer members of any group protected by the Act shall excuse the Contractor's obligations under these specifications, Government Code Section 12990, or the regulations promulgated pursuant thereto.

5. In order for the non-working training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.

6. The Contractor shall take specific actions to implement its nondiscrimination program. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor must be able to demonstrate fully its efforts under Steps (a) through (e) below:

    a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and at all facilities at which the Contractor's employees are assigned to work. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligations to maintain such a working environment.

    b. Provide written notification within seven days to the director of DFEH when the union or unions with which the Contractor has a collective bargaining agreement has impeded the Contractor’s efforts to meet its obligations.

    c. Disseminate the Contractor's equal employment opportunity policy by providing notice of the policy to unions and training, recruitment and outreach programs and requesting their cooperation in assisting the Contractor to meet its obligations; and by posting the company policy on bulletin boards accessible to all employees at each location where construction work is performed.

    d. Ensure all personnel making management and employment decisions regarding hiring, assignment, layoff, termination, conditions of work, training, rates of pay or other employment decisions, including all supervisory personnel, superintendents, general foremen, on-site foremen, etc., are aware of the Contractor's equal employment opportunity policy and obligations, and discharge their responsibilities accordingly.

    e. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the equal employment opportunity policy and the Contractor's obligations under these specifications are being carried out.

7. Contractors are encouraged to participate in voluntary associations, which assist in fulfilling their equal employment opportunity obligations. The efforts of a contractor association, joint contractor-union, contractor-community, or other similar groups of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under these specifications provided that the Contractor actively participates in the group,

and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's.

8. The Contractor is required to provide equal employment opportunity for all persons. Consequently, the Contractor may be in violation of the Fair Employment and Housing Act (Gov. Code § 12990 et seq.) if a particular group is employed in a substantially disparate manner.

9. The Contractor shall not use the nondiscrimination standards to discriminate against any person because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status.

10. The Contractor shall not enter into any subcontract with any person or firm decertified from state contracts pursuant to Government Code Section 12990.

11. The Contractor shall carry out such sanctions and penalties for violation of these specifications and the nondiscrimination clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Government Code Section 12990 and its implementing regulations by the awarding agency. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Government Code Section 12990.

12. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company's equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by OCP and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, status, (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in any easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

7-1.0IA(6) Employee Sign In/Sign Out

The Contractor shall maintain a sign-in and sign-out sheet showing which employees are present on the Project site. The Contractor shall establish procedures so that all employees sign in and out of the job site daily. The Contractor shall provide, upon request, a copy of the sign-in and sign-out sheet to the City Compliance Officer and to any employee or the employee's authorized representative.

7-1.01A(7) Discrimination Prohibited

1. **Labor Code Prohibition:** The Contractor must comply with, and is subject to, the employment non-discrimination requirements set forth in California Labor Code Section 1735, which is incorporated into this Contract.

2. **City Prohibition:** The City is an equal opportunity employer. Contractor and its Subcontractors shall comply with all applicable federal, state, and local laws and regulations, including but not limited to the following: Title VII of the Civil Rights Act, Americans with Disabilities Act, The Rehabilitation Act of 1973 (Sections 503 and 504), California Fair Employment and Housing Act (Government Code Sections 12900 *et seq*.), and the regulations promulgated thereunder, and California Labor Code Sections 1101 and 1102. Contractor shall comply with Section 7-1.01A(6) "Employee Sign In/Sign Out," above.

7-1.01A(8) Apprentices

1. **Compliance:** The Contractor and its Subcontractors shall comply with all requirements of the State Apprenticeship Program, as set forth in Section 1777.5 and Chapter 4 of Division 3 of the California Labor Code (Section 3070 *et seq.*), which collectively are incorporated into this Contract. The Contractor is solely responsible for securing compliance with Section 1777.5 for all apprenticeable occupations.

2. **Subcontracts:** The Contractor shall include in all subcontracts the obligation for Subcontractors to comply with the requirements of the State Apprenticeship Program.

3. **Evidence of Compliance:** The Contractor shall comply promptly with all requests of the City Compliance Officer for documentation that the Contractor and its Subcontractors are in compliance with the State Apprenticeship Program.

4. **Penalties:** The Contractor is subject to the penalties set forth in Section 1777.7 of the California Labor Code for a failure to comply with the requirements of Section 1777.5. Section 1777.7 is incorporated into this Contract.

5. **Withholding:** The Engineer may withhold and retain from payments or moneys due to the Contractor the amount of any penalties imposed based on a violation of Section 1777.5 of the California Labor Code. The Engineer's right to withhold under this provision is separate and independent from any other right to withhold moneys included in this Contract.

7-1.01A(9) Workers' Compensation

1. **Requirement:** The Contractor shall secure worker's compensation for all of its employees in accordance with Section 3700 of the California Labor Code. By signing the Contract, the Contractor certifies and files with the City the following statement:

   "I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provision before commencing the performance of the Work of this Contract."

2. **Prohibition:** The Contractor is prohibited from performing Work if at any time during the course of performing such Work the Contractor is not in compliance with Section 3700 of the California Labor Code. The Contractor must not allow a Subcontractor to perform Work if at the time of such Work the Subcontractor is not in compliance with Section 3700 of the California Labor Code.

3. **Proof of Compliance:** Before starting any Work, the Contractor shall provide the Engineer with one of the following: (1) satisfactory proof that it is properly insured by one or more insurers authorized to write worker's compensation insurance in California, (2) a valid certificate of consent to self-insure issued by the Director of Industrial Relations for the State of California, or (3) certificate of exemption from Workers' Compensation laws.

   a. **Maintaining Compliance:** The Contractor shall maintain such insurance or certificate of consent to self-insure for the term of the Contract.

   b. **Requests for Proof of Compliance:** Upon the request of the Engineer and at any time during the term of the Contract, the Contractor must provide satisfactory proof that it is in compliance with Section 3700 of the California Labor Code.

4. **Failure to Comply:** The Contractor's failure to comply promptly with a request by the Engineer for proof of compliance with Section 3700 of the California Labor Code, or the Contractor's failure to be in compliance with Section 3700, is a material breach of this Contract. Such breach is a basis for the Engineer to suspend Work in accordance with Section 8-1.05, "Temporary Suspension of

Work." The Contractor is responsible for all costs and damages resulting from any such suspension of Work.

5. **Withhold:** If any injury occurs to any employee of the Contractor for which the employee, or the employee's dependents, is entitled to compensation from the City under the California Labor Code provisions applicable to worker's compensation, the Engineer may withhold and retain from any moneys due the Contractor an amount sufficient to cover such compensation.

6. **Subcontractors:** The Contractor shall include in all of its subcontracts the obligation for Subcontractors to comply with the requirements of this Section 7-1.01A. "Labor Standards."

7-1.01A(10) Certified Electricians

The Contractor must use, and must cause its Subcontractors to use, properly certified persons to perform any Work as electricians in accordance with Chapter 4.5 of Division 1 of the California Labor Code, entitled "Electrician Certification" (Labor Code Sections 108 – 108.5).

7-1.01A(11) Labor Standards Enforcement

1. **Cooperation:** The Contractor and its Subcontractors shall cooperate fully with the City Compliance Officer as part of any action by the City Compliance Officer to administer and/or enforce the labor standards set forth in this section.

2. **Inspections:** The Contractor and its Subcontractors agree that the City Compliance Officer has the following rights in the performance of the Officer's duties: (1) to engage in random inspections of job sites, (2) to have access to the employees performing Work, and (3) to have access to employee time sheets, inspection logs, payroll records, paychecks and any other documents reasonably related to an appropriate investigation of the Contractor's and subcontractor's compliance with the labor standards set forth in this section.

3. **Audit**: The City Compliance Officer may audit such records of the Contractor and its Subcontractors as the Officer deems necessary to determine compliance with the labor standards set forth in this section.

7-1.01A(12) Subcontractors

Notwithstanding anything to the contrary, the prevailing wage requirements, payroll record requirements, and all other labor standard requirements set forth in this section are applicable to each and every Subcontractor engaged by the Contractor to perform Work. The Contractor shall include in every such subcontract the following provision(s): (1) an agreement from the Subcontractor that it is subject to each of the labor standard requirements set forth in this section, (2) an agreement from the Subcontractor that it will comply with each of the labor standard requirements, and (3) an agreement from the Subcontractor that the City Compliance Officer can enforce each of the labor standard requirements against the Subcontractor to the same extent it can enforce the provisions against the Contractor.

7-1.01B Contractor's Licensing Laws

Attention is directed to the provisions of Chapter 9 of Division 3 of the Business and Professions Code concerning the licensing of contractors.

All Bidders and Contractors shall be licensed in accordance with the laws of this State at the time of bid in the classification set forth in these Contract Documents and any Bidder or Contractor not so licensed is subject to the penalties imposed by such laws and rejection of their Bid, pursuant to Business and Professions Code Section 7028.15.

In all City projects where federal funds are involved, no Bid submitted shall be invalidated by the failure of the Bidder to be licensed at the time of bidding in accordance with the laws of California. However, at the

time a federally funded contract is awarded, the Contractor shall be properly licensed in accordance with the laws of the State of California, pursuant to Public Contract Code Section 20103.5.

The first payment for Work or material under the Contract shall not be made by the City unless and until the Registrar of Contractors certifies to the City that the records of the Contractors State License Board indicate that the Contractor was properly licensed at the time the Contract was awarded. Any Bidder or Contractor not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractors State License Board. Failure of the Bidder to timely obtain proper and adequate licensing for an award of a Contract shall constitute a failure to execute the Contract as provided in Section 3-1.03, "Failure to Execute Contract," and shall result in the forfeiture of the security of the Bidder.

7-1.01B(1) City Business License

All Contractors and Subcontractors doing work in the City of Campbell shall have a valid City of Campbell Business License in addition to the appropriate State Contractor's License, pursuant to Campbell Municipal Code Section 5.01.008.

7-1.01C Vehicle Code

Pursuant to the authority contained in Vehicle Code Section 591, the City has determined that within the Project area and areas open to public traffic, the following requirements of the Vehicle Code will apply. The lighting requirements in Section 25803; the brake requirements in Chapter 3, Division 12; the splash apron requirements in Section 27600, and, when operated on completed or existing treated base, surfacing, pavement or structures, except as otherwise provided in Section 7-1.02 "Weight Limitations," the weight limitation requirements contained in Division 15.

Attention is directed to the statement in said Section 591 that this section shall not relieve the Contractor or any person from the duty of exercising due care while operating equipment. The Contractor and its Subcontractors shall take all necessary precautions for safe operation of their equipment and the protection of the public from injury and damage from such equipment.

Any other requirements set forth in Divisions 11, 12, 13, 14 and 15 of the Vehicle Code which the City, pursuant to the authority contained in Vehicle Code Section 591, will require compliance with, will be set forth in the Contract Documents.

7-1.01D Trench Safety

Contractor shall comply with the provisions of Section 6705 of the Labor Code concerning trench excavation safety plans, for trenches five (5) feet or more in depth. The trench excavation safety plan and shop drawings for a protective system shall be submitted to the Engineer for approval at least three (3) weeks before the Contractor intends to begin excavation for the trench.

The drawings must show the design and details for providing worker protection from caving ground during excavation.

Shop drawings of protective systems for which Construction Safety Orders require design by a registered professional engineer must be sealed and signed by an engineer who is registered as a civil engineer in California.

The submittal to the City must allow for review time and include the contents shown in the following table, except the review time is 65 days for an excavation on or affecting railroad property:

Trench Safety Design: Review Time and Contents

Topic	Plan not requiring a signature	Plan requiring a signature
Review Time	5 business days before excavating	20 days before excavating
Contents	Drawings Calculations Material information Proprietary system information	Drawings Calculations Material information Proprietary system information Soil classification Soil properties Soil design calculations

7-1.01E Air Pollution Control

The Contractor shall comply with all air pollution control rules, regulations, ordinances, and statutes of the Bay Area Air Pollution Control District and all other regulatory agencies which apply to any Work performed pursuant to the Contract.

Unless otherwise provided in the Contract Documents, material to be disposed of shall not be burned either inside or outside the Project right of way.

Contractor shall reference Section 14, “Environmental Stewardship,” of these Specifications.

7-1.01F Water Pollution

Contractor shall comply with all federal, state, and local water pollution prevention and storm drain pollution prevention rules, regulations, ordinances, statutes, and guidelines.

The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, bays, and coastal waters from pollution with fuels, oils, bitumens, calcium chloride, and other harmful materials and shall conduct and schedule their Work operations so as to avoid or minimize muddying and silting of said streams, lakes, reservoirs, bays, and coastal waters. Due care shall be exercised to preserve roadside vegetation beyond the limits of construction.

Water pollution control work is intended to provide prevention, control, and abatement of water pollution to streams. waterways, and other bodies of water, and shall consist of constructing those facilities which may be shown on the Contract Documents or as directed by the Engineer.

In order to provide effective and continuous control of water pollution, it may be necessary for the Contractor to perform the Contract Work in small or multiple units, on an out of phase schedule, and with modified construction procedures. The Contractor shall provide temporary water pollution control measures, including but not limited to, dikes, basins, ditches, and applying straw and seed, which become necessary as a result of the Work. The Contractor shall coordinate water pollution control work with all other Work done on the Contract.

Before starting any Work on the Project, the Contractor shall submit, for acceptance by the Engineer, a program to control water pollution effectively during construction of the Project. Such program shall show the schedule for the erosion control work included in the Contract Documents and for all water pollution control measures which the Contractor proposes to take in connection with construction of the Project to minimize the effects of its operations upon adjacent streams and other bodies of water. The Contractor shall not perform any clearing and grubbing or earthwork on the Project, other than that specifically authorized in writing by the Engineer, until such program has been accepted.

If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Engineer may direct the Contractor to revise its operations and its water pollution control program. Such directions will be in writing and will specify the items of Work for which the Contractor's water pollution control measures are inadequate. No further work shall be performed on said items until the water pollution control measures are adequate and, if also required, a revised water pollution control program has been accepted.

The Engineer will notify the Contractor of the acceptance or rejection of any submitted or revised water pollution control program in not more than five (5) working days.

The City will not be liable to the Contractor for failure to accept all or any portion of an originally submitted or revised water pollution control program, nor for any delays to the Work due to the Contractor's failure to submit an acceptable water pollution control program.

The Contractor may request the Engineer to waive the requirement for submission of a written program for control of water pollution when the nature of the Contractor's operation is such that erosion is not likely to occur. Waiver of this requirement will not relieve the Contractor from responsibility for compliance with the other provisions of this section. Waiver of the requirement for a written program for control of water pollution will not preclude requiring submittal of a written program at a later time if the Engineer deems it necessary because of the effect of the Contractor's operations.

Unless otherwise approved by the Engineer in writing, the Contractor shall not expose a total area of erodible earth material, which may cause water pollution, exceeding 750,000 square feet for each separate location, operation, or spread of equipment before either temporary or permanent erosion control measures are accomplished.

Where erosion which will cause water pollution is probable due to the nature of the material or the season of the year, the Contractor's operations shall be so scheduled that permanent erosion control features will be installed concurrently with or immediately following grading operations.

Nothing in the terms of the Contract Documents shall relieve the Contractor of the responsibility for compliance with Sections 5650 and 12015 of the Fish and Game Code, applicable regulations of the Regional Water Quality Control Board, Santa Clara Valley Water District requirements, or other applicable statutes relating to prevention or abatement of water pollution.

When borrow material is obtained from other than commercially operated sources, erosion of the borrow site during and after completion of the Work shall not result in water pollution. The material source shall be finished, where practicable, so that water will not collect or stand therein.

The requirements of this section shall apply to all Work performed under the Contract and to all non-commercially operated borrow or disposal sites used for the Project.

The Contractor shall also conform to the following provisions:

1. Where working areas encroach on live streams, barriers adequate to prevent the flow of muddy water into streams shall be constructed and maintained between working areas and streams, and during construction of such barriers, muddying of streams shall be held to a minimum.

2. Removal of material from beneath a flowing stream shall not be commenced until adequate means, such as a bypass channel, are provided to carry the stream free from mud or silt around the removal operations.

3. Should the Contractor's operations require transportation of materials across live streams, such operations shall be conducted without muddying the stream. Mechanized equipment shall not be operated in the stream channels of such live streams except as may be necessary to construct crossings or barriers and fills at channel changes.

4. Water containing mud or silt from aggregate washing or other operations shall be treated by filtration, or retention in a settling pond, or ponds, adequate to prevent muddy water from entering live streams.

5. Oily or greasy substances originating from the Contractor's operations shall not be allowed to enter or be placed where they will later enter a live stream.

6. Portland cement or fresh Portland cement concrete shall not be allowed to enter flowing water of streams.

7. When operations are completed, the flow of streams shall be returned as nearly as possible to its original course without creating possible future bank erosion, and settling pond sites shall be graded so they will drain and will blend in with the surrounding terrain.

8. Material derived from roadway work shall not be deposited in a live stream channel where it could be washed away by high stream flows.

9. Where there is possible migration of anadromous fish in streams affected by construction on the project, the Contractor shall conduct their operations so as to allow free passage of such migratory fish.

Compliance with the requirements of this section shall in no way relieve the Contractor from its responsibility to comply with the other provisions of the Contract Documents, in particular the Contractor's responsibility for damage and for preservation of property.

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 and no additional compensation will be allowed therefor.

Contractor shall reference Section 13, “Water Pollution Control,” of these Specifications.

7-1.01G Use of Pesticides

The Contractor shall comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Toxic Substances Control, and the Department of Industrial Relations, and all other agencies which govern the use of pesticides required in the performance of the Work on the Contract.

Pesticides shall include but shall not be limited to herbicides, insecticides, fungicides, rodenticides, germicides, nematocides, bactericides, inhibitors, fumigants, defoliants, desiccants, soil sterilant, and repellents.

Any substance or mixture of substances intended for preventing repelling, mitigating, or destroying weeds, insects, diseases, rodents, or nematodes and any substance or mixture of substances intended for use as plant regulator, defoliant, or desiccant shall be considered a pesticide.

Application shall be in accordance with the applicable State laws and the City of Campbell Policy on the Use of Pesticides on City Property. The application of the herbicide shall be applied by a person who holds a Qualified Applicator License (QAL) or Certificate (QAC) from the California Department of Pesticide Regulation and is registered with the Santa Clara Department of Agriculture or who has been trained and/or works under the direction of the QAL/QAC holder. The Contractor shall provide the Engineer with a copy of their QAL/QAC prior to the application of the herbicide on City Property. Contractor shall refer to Section 20-1.02C, “Pesticides.”

7-1.01H Sound Control Requirements

The Contractor shall minimize noise and comply with all local sound control and noise level rules, regulations, and ordinances which apply to any Work performed pursuant to the Contract, including but not limited to Campbell Municipal Code Section 18.04.052.

Each internal combustion engine used for any purpose on the Project or related to the Project shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the Project without said muffler.

Noise level from and hours of Contractor's work outside of City of Campbell Municipal Code Section 18.04.052 operations, if required by the Contract Documents, shall comply with the City's ordinances or requirements. Noise level requirements shall apply to all equipment used in the Project including, but not limited to, trucks, transit mixers, or transient equipment that may or may not be allowed by the Contractor. The use of loud sound signals shall be avoided in favor of warning lights, except those required by safety laws for the protection of personnel.

All work outside of the City of Campbell Municipal Code Section 18.04.052 hours shall require prior written approval of the Engineer unless specified otherwise in the Contract Documents.

Contractor shall refer to Section 14, "Environmental Stewardship," of these Specifications.

7-1.01I Assignment of Antitrust Actions

The Contractor's attention is directed to the following provisions of Government Code Sections 4550 – 4554 and Public Contract Code Section 7103.5, which shall be applicable to the Contractor and Subcontractors:

> In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor without further acknowledgement by the parties.

7-1.01J Time for Giving of Notice

The terms of Code of Civil Procedure Section 1013 shall not apply to any notices given by City under the Contract Documents.

7-1.01K Compliance with the Underground Notification System

To the extent it applies to the Contractor's Work, the Contractor shall comply with the requirements of Government Code Sections 4216 through 4216.24, inclusive.

7-1.01L Prohibition of Gifts

The Contractor agrees not to offer any City officer, official, or employee any gift prohibited by the City's Administrative Policies and Procedures, "Acceptance of Gifts," dated July 1, 2010.

The offer or giving of any gift prohibited by the City's Administrative Policies and Procedures shall constitute a material breach of this Contract by Contractor. In addition to any other remedies City may have in law or equity, City may terminate for cause this Contract for such breach as provided elsewhere in the Contract Documents.

7-1.02 WEIGHT LIMITATIONS

Unless expressly permitted in the Contract Documents, construction equipment or vehicles of any kind which, laden or unladen, exceed the maximum weight limitations set forth in Division 15 of the Vehicle Code, shall not be operated over completed or existing treated base, surfacing, pavement, or structures in any areas within the limits of the Project, whether or not such area is subject to weight limitations under Section 7-1.01C, "Vehicle Code," unless expressly permitted in the Contract Documents or except as hereinafter provided.

After application of the curing seal, no traffic or Contractor's equipment will be permitted on cement treated base or lean concrete base for a period of 72 hours. After 72 hours, traffic and equipment operated on the base shall be limited to that used in paving operations and placing additional layers of cement treated base. No traffic or equipment will be permitted on treated permeable base except for that equipment required to place the permeable base and the subsequent layer of pavement. Trucks used to haul treated base, Portland cement concrete, or asphalt concrete shall enter onto the base to dump at the nearest practical entry point ahead of spreading equipment. Empty haul trucks shall exit from the base at the nearest practical exit point. Entry and exit points shall not be more than 200 feet ahead of spreading equipment except in locations where specifications prohibit operation of trucks outside the area occupied by the base or where steep slopes or other conditions preclude safe operation of hauling equipment. In such locations. entry and exit points shall be established at the nearest point ahead of spreading equipment permitted by specifications and allowing safe operation of hauling equipment. Damage to curing seal or base shall be repaired promptly by the Contractor at the Contractor’s sole expense, as directed by the Engineer.

Within the limits of the Project and subject to the control of the Engineer, and provided that the Contractor at the Contractor's sole expense shall provide such protective measures as are deemed necessary by the Engineer and shall repair any damage caused by such operations, the Contractor will be permitted to:

1. Make transverse crossings of such portions of an existing public road or street as are within the highway right of way with construction equipment which exceeds the size or weight limitations set forth in Division 15 of the Vehicle Code.

2. Make transverse crossings of treated bases, surfacing, or pavement which are under construction or which have been completed, with construction equipment which exceeds the size or weight limitations set forth in Division 15 of the Vehicle Code.

3. Cross bridge structures that are not open to public traffic and which are designed for HS20-44 Live Loading (culverts and pipes excluded), with construction equipment which exceeds the size or weight limitations set forth in Division 15 of the Vehicle Code, but not exceeding the weight limitations hereinafter specified, provided that the Contractor furnishes to the Engineer the dimensions and maximum axle loadings of equipment proposed for use on bridge structures:

    a. The maximum loading on bridge structures due to pneumatic-tired truck and trailer combinations shall not exceed (1) 28,000 pounds for single axles, (2) 48,000 pounds for tandem axles, nor (3) 60,000 pounds total gross load for single vehicles or 110,000 pounds total gross load for truck and trailer or semi-trailer combinations.

    b. The loading on bridge structures due to 2 and 3 axle pneumatic-tired earth movers shall not exceed that shown in the following table.

ALLOWABLE CONSTRUCTION LOADING ON BRIDGES FOR 2 AND 3 AXLE EARTH MOVERS

Spacing of Bridge Girders (center to center in feet)	Maximum Axle Loading (in pounds)
4	28,000
5	29,000
6	30,000
7	32,000
8	34,000
9	37,000
10 and over	40,000
Minimum axle spacing:	
For 3-axle earth-movers:	
Axles 1 to 2 = 8 feet	
Axles 2 to 3 = 20 feet	
For 2-axle earth-movers:	
Axles 1 to 2 = 20 feet	

4. Move equipment within the limits of the Project over completed or existing base, surfacing, pavement, and structures, whether or not open to the public, in accordance with the limitations and conditions established by the Engineer.

Within the limits of the Project and subject to the condition that the Contractor shall repair, at the Contractor's sole expense, any damage caused thereby, the Contractor will be permitted to cross culverts and pipes with construction equipment which exceeds the size or weight limitations set forth in Division 15 of the Vehicle Code in accordance with the conditions set forth on the plans. If such conditions are not set forth on the plans. the provisions in the first paragraph in this section will apply.

Should the Contractor desire to increase the load carrying capacity of a structure or structures which are to be constructed as a part of the Contract, in order to facilitate its own operations, the Contractor may request the Engineer to consider redesigning the structure or structures. Proposals by the Contractor to increase the load carrying capacity of structures above 130,000 pounds per single axle or pair of axles less than 8 feet apart, or above 330,000 pounds total gross vehicle weight, will not be approved. The request shall include a description of the structure or structures involved and a detailed description of the overloads to be carried, the date the revised plans would be required, and a statement that the Contractor agrees to pay all costs involved in the strengthening of the structure or structures, including the cost of revised plans, and further that the Contractor agrees that no extension of time will be allowed by reason of any delay to the Work which may be due to the alteration of the structure or structures. If the Engineer determines that strengthening the structure or structures will be permitted, the Engineer will inform the Contractor of the estimated cost of the alterations, including engineering, and the date that revised plans could be furnished. If the cost and date are satisfactory to the Contractor, the Engineer will prepare a Change Order providing for the agreed upon alterations and payment to the City.

7-1.03 PAYMENT OF TAXES AND UTILITIES

The Contract Sum shall include full compensation for all taxes which the Contractor is required to pay, whether imposed by Federal, State or local government, including, without being limited to, Federal excise tax. No tax exemption certificate nor any document designed to exempt the Contractor from payment of

any tax will be furnished to the Contractor by the City, as to any tax on labor, services, materials, transportation, or any other items furnished pursuant to the Contract. Contractor shall pay all utilities used on the Project until the City's Final Acceptance.

7-1.04 PERMITS AND LICENSES

The Contractor shall procure all necessary permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the Work in sufficient time to prevent delays to the Work.

The Environmental Quality Act (Public Resources Code Sections 21000 to 21176, inclusive) may be applicable to permits, licenses, and other authorizations which the Contractor must obtain from local agencies in connection with performing the Work. The Contractor shall comply with the provisions of said statutes in obtaining such permits, licenses, and other authorizations and they shall be obtained in sufficient time to prevent delays to the Work.

In the event that the City has obtained permits, licenses, or other authorizations applicable to the Work, the Contractor shall comply with the provisions of said permits, licenses, and other authorizations.

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the City, its officials, officers, employees, and agents from all legal claims, demands, labilities, damages, losses, actions in law or equity, civil and/or criminal, or expenses (including attorneys' fees and costs), arising from any and all acts or omissions of the Contractor, Subcontractors, or any their officers, employees, or agents in violation of any permit or license issued, except where caused by the sole negligence or willful misconduct of City.

7-1.05 PATENTS

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the Work, and agrees to indemnify, defend, and hold harmless the City, its employees, duly authorized agents and duly authorized representatives, from any claim, liability, litigation, or actions of, or on account of the use of any patented materials, equipment devices, or processes.

7-1.06 SAFETY AND HEALTH PROVISIONS

Contractor is solely and completely responsible for conditions on the Project site, including safety of all persons and property during performance of the Work. This requirement applies continuously and is not limited to working hours.

Contractor shall take all necessary precautions for the safety of Contractor's and any Subcontractor's employees on the Work, and shall comply with all applicable occupational safety and health standards, rules, regulations, and orders established by the Federal Government, State of California, County of Santa Clara and the City of Campbell or any other government agency of competent jurisdiction to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is performed. Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all appropriate safeguards for the protection of workers and the public and shall post danger signs warning against hazards created by such features of construction (including but not limited to fire, toxics, chemicals, odors, noise, vibration, equipment operations, obstructions, falling objects, falls, and all other construction hazards), and Contractor shall designate a responsible member of its organization whose duty shall be the prevention of accidents. Contractor shall report the name and position of the person so designated to the Engineer.

The Contractor shall comply with the applicable provisions of the California Occupational Safety and Health Act of 1973 and the Labor Code.

The Contractor is the controlling employer and must ensure that hazardous conditions are corrected. (Labor Code Section 6400).

The Engineer may notify Cal/OSHA if Contractor fails to establish or maintain a safe and healthful workplace.

Contractor shall submit copies of its injury and illness Prevention Program and permits required by Cal/OSHA to the City. The Program must address the use of personal and company-issued electronic devices during work on the Project. Contractor will not permit the use of entertainment and personal communication devices at the Project site. Workers may use a communication device for business purposes in the work area, at a location where their safety and the safety of other workers and the traveling public is not compromised.

The City is not responsible for the health and safety of Contractor’s personnel, Subcontractor’s personnel, Supplier’s personnel, and any other persons present at the Project site at the request of Contractor or Subcontractors.

All working areas utilized by the Contractor to perform work during the hours of darkness, shall be lighted to conform to the minimum illumination intensities established by California Division of Occupational Safety and Health Construction Safety Orders. All lighting fixtures shall be mounted and directed in a manner precluding glare to approaching traffic.

Full compensation for conforming to the requirements of this section shall be considered as included in the Contract Price paid for the various items of work involved and no additional payment will be made therefor.

The Contractor shall provide for sanitary facilities for the sole use of the workers on the Project site. Such facilities shall be placed and maintained by the Contractor so as not to be aesthetically displeasing, annoying to the neighbors, nor offensive to the senses nor community standards of decency. The Engineer shall be the sole judge of the adequacy of the facilities, the placement, and the maintenance thereof. Upon notification by the Engineer of deficiencies in any of these areas, the Contractor shall make immediate corrections. Failure to take corrective action within 24 hours shall give the Engineer due cause to stop the Work in the Contract and to order the corrective work to be done on the toilet facility and to charge all costs of such work against the monies due or to become due to the Contractor.

Full compensation for conforming to the requirements of this section shall be considered as included in the Contract Price paid for the various items of work involved and no additional payment will be made therefor.

7-1.07 PUBLIC CONVENIENCE

This section defines the Contractor's responsibilities with regard to convenience of the public and public traffic in connection with the Contractor's operations.

Attention is directed to Section 12, "Detours," for provisions relating to the passage of traffic around the Work area.

Attention is directed to Section 7-1.08 "Public Safety," for additional provisions relating to the Contractor’s responsibility for the safety of the public in the Project area.

Attention is directed to Section 12, "Temporary Traffic Control," for requirements concerning traffic control.

In the event of a suspension of the Work, attention is directed to Section 8-1.05, "Temporary Suspension of Work."

The Contractor shall so conduct operations as to offer the least possible obstruction and inconvenience to the public and shall have under construction no greater length or amount of Work than can be prosecuted properly with due regard to the rights and safety of the public.

Unless otherwise provided in the Contract Documents, all public traffic shall be permitted to pass through the Work with as little inconvenience and delay as possible. Where possible, such traffic shall be routed on new or existing paved surfaces.

Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor at the Contractor's sole expense.

Existing traffic signals and highway lighting shall be kept in operation for the benefit of the traveling public during progress of the Work, and other forces will continue routine maintenance of existing systems.

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to abutting property owners. Convenient access to driveways, houses, and buildings along the line of the Work shall be maintained and temporary approaches to crossings or intersecting highways shall be provided and kept in good condition. When the abutting property owner's access across the right of way line is to be eliminated, or to be replaced under the Contract by other access facilities, the existing access shall not be closed until the replacement access facilities are usable.

The Contractor may be required to cover certain signs which regulate or direct public traffic to roadways that are not open to traffic. The Contractor shall include in the Traffic Control Plan any existing signs that need to be covered.

Upon completion of rough grading at the grading plane, or placing any subsequent layer thereon, the surface of the roadbed shall be brought to a smooth and even condition free of humps and depressions, satisfactory for the use of public traffic.

After subgrade preparation for a specified layer of material has been completed, the Contractor shall, at the Contractor's expense, repair any damage to the roadbed or completed subgrade, including damage caused by the Contractor's operations or use by public traffic.

While subgrade and paving operations are underway, public traffic shall be permitted to use the shoulders and, if half-width paving methods are used, shall also be permitted to use the side of the roadbed opposite the one under construction. When sufficient width is available, a passageway wide enough to accommodate at least two lanes of traffic shall be kept open at locations where subgrade and paving operations are in active progress.

Any shaping of shoulders or reshaping of subgrade necessary for the accommodation of public traffic thereon during subgrade preparation and paving operations shall be paid for at the Contractor’s own expense and no additional compensation will be allowed thereof.

The Contractor shall furnish flaggers for the purpose of expediting the passage of public traffic through the Work under one-way controls as required by the Engineer. Compensation for the convenience or direction or warning of public traffic shall be considered included in the Contract Sum and no additional payment shall be made therefor.

Water or dust palliative shall be applied if ordered by the Engineer for the alleviation or prevention of dust nuisance as provided in Section 10, "Dust Control."

In order to expedite the passage of public traffic through or around the Work and where ordered by the Engineer, the Contractor shall install signs, lights, flares, temporary barrier systems, barricades, and other facilities for the sole convenience and direction of public traffic. Also where directed by the Engineer, the Contractor shall furnish competent flaggers whose sole duties shall consist of directing the movement of public traffic through or around the Work.

The Contractor will be required to pay the cost of replacing or repairing all facilities installed for the convenience or direction or warning of public traffic that are lost while in the Contractor's custody, or are damaged.

If the closure of a street or blocking of the traffic in that street is anticipated or desired, the Contractor must have the Engineer's written approval prior to such closing or blocking. If a street is blocked or closed at any time, the Contractor shall also notify City Police Dispatch (Non-Emergency) at 408-866-2101 of such situations. The Contractor shall also notify City Police Dispatch (Non-Emergency) when such access restriction is eliminated.

Except as otherwise provided in this section or the Contract Documents, full compensation for conforming to the requirements in this section and the Contract Documents shall be considered as included in the Contract Prices paid for the various contract items of Work and no additional compensation will be allowed therefor.

7-1.08 PUBLIC SAFETY

It is the Contractor's responsibility to provide for the safety of traffic and the public during construction at the Project site.

Attention is directed to Section 7-1.11, "Responsibility for Damage."

Attention is directed to Section 7-1.07, "Public Convenience," for provisions relating to the Contractor's responsibility for providing for the convenience of the public in connection with the Contractor's operations.

Attention is directed to Section 12, "Temporary Traffic Control," for requirements concerning flagging and traffic-handling equipment and devices used in carrying out the provisions of said Section 7-1.07, "Public Convenience," and this section.

The Contractor is responsible for controlling dust resulting from the Work, inside and outside the City right-of-way.

Whenever the Contractor's operations create a condition hazardous to traffic or to the public, the Contractor shall, at the Contractor's sole expense and without cost to the City, furnish, erect, and maintain such fences, temporary barrier systems, barricades, lights, signs, and other devices and take such other protective measures as are necessary to prevent accidents, or damage or injury to the public.

Such fences, temporary barrier systems, barricades, lights, signs, and other devices furnished, erected and maintained by the Contractor, at the Contractor's expense, are in addition to any construction area traffic control devices for which payment is provided for elsewhere in the specifications.

The Contractor shall also furnish such flaggers as are necessary to give adequate warning to traffic or to the public of any dangerous conditions to be encountered.

Signs, lights, flags, and other warning and safety devices and their use shall conform to the requirements set forth in the current *California Manual on Uniform Traffic Control Devices (MUTCD*). Signs or other protective devices furnished and erected by the Contractor at the Contractor's sole expense, as above provided, shall not obscure the visibility of, nor conflict in intent, meaning, and function of either existing signs, lights and, traffic control devices or any construction area signs and traffic control devices for which furnishing of, or payment for, is provided elsewhere in the Contract Documents. Signs furnished and erected by the Contractor at the Contractor's sole expense shall be approved by the Engineer as to size, wording, and location. The installation of general roadway illumination shall not relieve the Contractor of any responsibility for furnishing and maintaining any of the protective facilities hereinbefore specified.

Unless otherwise indicated in the Contract Documents, the Contractor shall keep all existing traffic signal and street lighting in operation.

Contractor shall cover any existing signs that direct traffic to a closed area.

Construction equipment shall enter and leave the highway via existing ramps and crossovers and shall move in the direction of public traffic. All movements of workers and construction equipment on or across lanes open to public traffic shall be performed in a manner that will not endanger the public or traffic.

The Contractor's trucks or other mobile equipment which leave a roadway lane, that is open to public traffic, to enter the construction area, shall slow down gradually in advance of the location of the turnoff to give following public traffic an opportunity to slow down.

When leaving a work area and entering a roadway carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic.

Contractor shall immediately remove hauling spillage from the roadway or shoulder open to traffic. When hauling on roadways, the Contractor shall trim the loads and remove material from shelf areas to minimize spillage on the roadway.

Lanes, ramps, and shoulders shall be closed in accordance with the details shown on the plans, the provisions of Section 12, "Temporary Traffic Control," and as provided in the Contract Documents.

Pedestrian openings through falsework shall be paved or provided with full width continuous wood walks and shall be kept clear. Pedestrians shall be protected from falling objects and curing water for concrete. Overhead protection for pedestrians shall extend not less than 4 feet beyond the edge of the bridge deck. All pedestrian openings through falsework shall be illuminated Temporary pedestrian facilities must comply with the *California MUTCD*, Part 6, Chapter 6D “Pedestrian and Worker Safety.”

The Contractor shall notify the Engineer not less than fifteen (15) calendar days before the anticipated start of each falsework and girder erection operation whenever such falsework or girders will reduce clearances available to public traffic.

Where the height of vehicular openings through falsework is less than fifteen and a half (15.5) feet, a W34C(CA) “CAUTION VERTICAL CLEARANCE __' __" Arrow” sign shall be provided on all approaches to structures with vertical clearances less than fifteen and a half (15.5) feet.

Temporary facilities which the Contractor uses to perform the Work shall not be installed or placed where they will interfere with the free and safe passage of public traffic.

Temporary facilities which could be a hazard to public safety if improperly designed shall comply with design requirements specified in the Contract Documents for such facilities or, if none are specified, with standard design criteria or codes appropriate for the facility involved. Working drawings and design calculations for such temporary facilities shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California and shall be submitted to the Engineer for review pursuant to Section 5-1.03, “Plans and Shop Drawings.” Such submittal shall designate thereon the standard design criteria or codes used. Installation of such temporary facilities shall not start until the Engineer has reviewed the drawings. Provision for the payment for signs, lights, flares, barrier systems, barricades, and other facilities by Extra Work as provided in Section 7-1.07, "Public Convenience," or by Contract item as provided in Section 12, "Temporary Traffic Control," shall in no way relieve the Contractor from any responsibility as provided in this section.

The Contractor shall install temporary barrier systems or other authorized protective systems under any of the following conditions:

1. Excavations: Where the near edge of the excavation is within 15-feet from the edge of an open traffic lane

2. Temporarily unprotected permanent obstacles: When 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 before installing the protective system; or the

Contractor for their convenience and as authorized, removes a portion of an existing protective railing at an obstacle and does not replace such railing completely on the same day

3. Storage areas: When material or equipment is stored within 15-feet of the edge of an open traffic lane and the storage is not otherwise prohibited by the Contract

4. Height differentials: When construction operations create a height differential greater than 0.15 feet within 15-feet of the edge of a traffic lane.

Installation of temporary barrier systems is not required if an excavation within 15-feet from the edge of an open traffic lane is protected by any of the following:

1. Steel plate or concrete covers of adequate thickness to prevent accidental entry by traffic or the public

2. Side slope where the downhill slope is 4:1 (Horizontal:Vertical) or less unless a naturally occurring condition

3. Barrier or railing.

The Contractor shall offset the approach end of temporary barrier systems a minimum of 15-feet from the edge of an open traffic lane. The Contractor shall install the temporary railing on a skew toward the edge of the traffic lane of not more than 1-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 must 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 must be installed at the approach end of the temporary railing.

The Contractor shall secure the temporary barrier system in place before starting work for which the temporary barrier systems is required.

If a traffic lane is closed with channelizers for excavation work, the Contractor shall move the devices to the adjacent edge of the raveled way when not excavating. The Contractor shall space the devices as specified for the closure.

The Contractor shall never move or temporarily suspend anything over a traffic lane that is open to the public, unless the traffic lane is protected.

Except as otherwise provided in this section or elsewhere in the Contract Documents, full compensation for conforming to all of the provisions in this section and in the special provisions shall be considered as included in the Contract prices paid for the various contract items of work and no additional compensation will be allowed therefor.

Should the Contractor be negligent or fail to furnish and/or maintaining warning and protective facilities as required herein, the City may furnish and/or maintain such facilities and charge Contractor therefor by deducting the cost thereof from periodic progress payments due the Contractor as such costs are incurred by City.

In the event the Contractor does not provide such flaggers and guards as are required by this section, the Engineer may request that the Campbell Police Department provide for public safety and that the costs related thereto shall be deducted from any periodic progress payments due the Contractor.

No material or equipment shall be stored where it will interfere with the free and safe passage of the public and traffic, and at the end of each day's work and at all other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from that

portion of the right-of-way open for use by the public and traffic. Contractor shall be solely responsible for its failure to provide such free and safe passage.

The Contractor shall always provide for emergency vehicle access and fire engine access to all fire hydrants in or around the Project area.

The Contractor shall follow the Contract Documents as related to the City's Storm Water Pollution Control Ordinance and the City's Best Management Practice for Construction Industry document.

7-1.09 USE OF EXPLOSIVES

The use of explosives is expressly prohibited, unless specifically provided for in the Contract Documents. When the use of explosives is necessary for the prosecution of the Work pursuant to the Contract Documents, the Contractor shall use the utmost care not to endanger life or property.

7-1.10 PRESERVATION OF PROPERTY

Attention is directed to Section 7-1.11, "Responsibility for Damage," and to Section 8-1.09, "Utilities and Other Facilities." Due care shall be exercised to avoid injury to existing highway improvements or facilities, utility facilities, adjacent property, and roadside trees, shrubs, and other plants that are not to be removed.

Roadside trees, shrubs, and other plants that are not to be removed, and pole lines, fences, signs, markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and water lines, all highway facilities, and any other improvements or facilities within or adjacent to the Project shall be protected from injury or damage, and if ordered by the Engineer, the Contractor shall provide and install suitable safeguards, approved by the Engineer, to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored at the Contractor's sole expense. The facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the Work, or as good as required by the Contract Documents, if any such objects are a part of the Work being performed under the Contract. The Engineer may make or cause to be made such temporary repairs as are necessary to restore to service any damaged facility. The cost of such repairs shall be borne by the Contractor and may be deducted from any moneys due or to become due to the Contractor under the Contract. The fact that any underground facility is not shown upon the plans shall not relieve the Contractor of any responsibility under Section 8-1.09, "Utilities and Other Facilities." It shall be the Contractor's responsibility, pursuant thereto, to ascertain the location of such underground improvements or facilities which may be subject to damage by reason of the Contractor's operations.

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the Work involved in protecting or repairing property as specified in this section shall be considered as included in the Contract Price and no additional compensation will be allowed therefor.

7-1.11 RESPONSIBILITY FOR DAMAGE

The City, including but not limited to, its agents, officials, officers~~,~~ and employees thereof including but not limited to the Engineer, shall not be answerable or accountable in any manner for: any loss or damage that may happen to the Work or any part thereof; for any loss or damage to any of the materials or other things used or employed in performing the Work; for injury to or death of any person, either workers or the public; or damage to property from any cause which might have been prevented by the Contractor, Subcontractor, or their workers, or anyone employed by the Contractor, except where caused by the sole negligence or willful misconduct of City.

The Contractor shall be responsible for any liability imposed by law and for injuries to or death of any person or damage to property resulting from defects or obstructions or from any cause whatsoever during the progress of the Work or at any time before its completion and final acceptance.

To the fullest extent permitted by law, the Contractor shall indemnify, defend, and hold harmless the City, its agents, officers, officials, employees, and volunteers including but not limited to the Engineer, from and against any and all claims, demands, suits or actions of every name, kind, and description, liabilities, damages, or expenses (including attorney's fees and costs) brought for or on account of, injuries to or death of any person, including but not limited to workers and the public or damage to property resulting from the acts or omissions of Contractor, Subcontractors, or their employees or agents in any way related to the Contract, except where caused by the sole negligence or willful misconduct of City. It is the intent of the parties that this obligation applies regardless of the existence or degree of fault or negligence on the part of the City.

With respect to third party claims against the Contractor, the Contractor waives any and all rights to any type of express or implied indemnity against the City, its agents, officers, or employees.

In addition to any remedy authorized by law, so much of the money due the Contractor under and by virtue of the Contract as shall be considered necessary by the City may be retained by the City until disposition has been made of such suits or claims for damages as aforesaid.

The retention of money due the Contractor shall be subject to the following:

1. The City will give the Contractor thirty (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 such 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 9-2.05, "Progress Payments."

3. If the City has retained funds and it is subsequently determined that the City is not entitled to be indemnified and held harmless by the Contractor in connection with the matter for which such retention was made, the City shall pay interest on the amount retained at the same rate as that received by the City on such funds for the period of such retention.

The Contractor shall be responsible for any liability imposed by law and for injuries to or death of any person including but not limited to workers and the public, or damage to property. Contractor shall indemnify and hold harmless any county, city, or district, their officers and employees connected with the Work, within the limits of which county, city, or district the Work is being performed hereunder, all in the same manner and to the same extent as provided above for the protection of the City and all officers and employees thereof connected with the Work.

Nothing in this Contract is intended to make the public or any member thereof a third-party beneficiary hereunder, nor is any term and condition or other provision of the Contract intended to establish a standard of care owed to the public or any member thereof.

7-1.11A Protection of Contractor's Work and Property

The Contractor shall protect its work, supplies, and materials from damage due to the nature of the Work, the action of the elements, trespassers, or any cause whatsoever which is under the Contractor's control, until the completion and acceptance of the Work. Neither the City nor any of its agents assumes any responsibility for collecting indemnity from any person or persons causing damage to the Work of the Contractor.

7-1.11B Insurance Requirements

Contractor agrees to follow all insurance requirements specified in the applicable Contract Documents and/or Permit Conditions.

7-1.11C Insurance During Termination and/or Suspension

If the City elects to suspend the Work as provided for in the Contract Documents, it shall be the Contractor's obligation to keep all insurance policies required under the Contract Documents in place and effective throughout the period of such suspension. If the City should elect to terminate the Contract, it shall be the Contractor's obligation to keep all insurance required under the Contract Documents in place and in effect until the acceptance of the Project by the Engineer.

7-1.11D Legal Actions Against the City

In the event litigation is brought against the City concerning compliance by the City with State, Federal, regional, or local laws, ordinances, rules, or regulations applicable to the Work, the provisions of this section shall apply.

A. If, pursuant to court order, the City prohibits the Contractor from performing all or any portion of the Work, the delay will be considered a right of way delay within the meaning of Section 8-1.08, "Right of Way Delays," unless the Contract is terminated as hereinafter provided.

B. If, pursuant to court order (other than an order to show cause), the City is prohibited from requiring the Contractor to perform all or any portion of the Work, the City may, if it so elects, eliminate the enjoined work pursuant to Section 4-1.03, "Changes in the Work," or terminate the Contract.

C. If the final judgment in an action prohibits the City from requiring the Contractor to perform all or any portion of the Work, the City will either eliminate the enjoined work pursuant to Section 4-1.03, "Changes in the Work," or terminate the Contract.

D. If the Contract is to be terminated, the termination and the determination of the total compensation payable to the Contractor shall be governed by the provisions of Section 8-1.10, "Termination of Contract."

E. If any legal action is filed involving the Project, the City may, in its sole discretion, elect to terminate the Contract for convenience or suspend the Contract, as provided elsewhere in the Contract Documents. This right to terminate and/or suspend the Contract shall include but not be limited to an action brought under the California Environmental Quality Act (CEQA).

7-1.12 DISPOSAL OF MATERIAL OUTSIDE THE PROJECT LIMITS

If the Contractor elects to dispose of materials at locations other than those where arrangements have been made by the City, or, if material is to be disposed of and the City has not made arrangements for disposal of such material, the Contractor shall make arrangements for disposing of materials outside the Project limits and the Contractor shall pay all costs involved. Arrangements shall include, but not be limited to, entering into agreements with property owners and obtaining necessary permits, licenses, testing, and environmental clearances. Before disposing of any material outside the Project limits, the Contractor shall furnish to the Engineer satisfactory evidence that the Contractor has entered into agreements with the property owners of the site involved and has obtained said permits, licenses, and clearances.

When any material is to be disposed of outside the Project right of way, and the City has not made arrangements for disposal of such material, the Contractor shall first obtain written authorization from the property owner on whose property the disposal is to be made and the Contractor shall file with the Engineer said authorization or a certified copy thereof together with a written release from the property owner absolving the City from any and all responsibility in connection with the disposal of material on said property, and before any material is disposed of on said property, the Contractor shall obtain written permission from the Engineer to dispose of the material at the location designated in said authorization.

When material is disposed of as above provided and the disposal location is visible from a highway, the Contractor shall dispose of the material in a neat and uniform manner to the satisfaction of the Engineer.

Where the City has made arrangements with owners of land in the vicinity of the Project for the disposal of materials on an owner's property, such arrangements are made solely for the purpose of providing all bidders an equal opportunity to dispose of said materials on such property. Bidders or Contractors may, upon written request, inspect the documents evidencing such arrangements between property owners and the City. If the Contractor so elects, it may exercise any rights that have been obtained by the City, which may be exercised by a Contractor under such arrangements, subject to and upon the conditions hereinafter set forth.

Such arrangements are not a part of the Contract and it is expressly understood and agreed that the City assumes no responsibility to the bidder or Contractor whatsoever in respect to the arrangements that the City made with the property owner to dispose of materials thereon and that the Contractor shall assume all risks in connection with the use of such property, the terms upon which such use shall be made, and there is no warranty or guaranty, either express or implied, as to the quantity or types of materials that can be disposed of on such property.

In those instances in which the City has compiled "Materials Information" as referred to in Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," said compilation will include the documents setting forth the arrangement made with some of the property owners for the disposal of material on such owners' properties. The inclusion of such documents therein shall not in any respect operate as a waiver of any of the provisions in this section concerning said documents.

The bidder or Contractor is cautioned to make such independent investigation and examination as they deem necessary to satisfy themselves as to the quantity and types of materials which may be disposed of on such property and the rights, duties, and obligations acquired or undertaken under such arrangement with the property owner.

Notwithstanding that the Contractor may elect to dispose of materials on any such property owner's property, no material may be disposed of on such property unless the Contractor has first either:

1. Executed a document that will guarantee to hold such owner harmless from all claims for injury to persons or damage to property resulting from the Contractor's operations on the property owner's premises and also agree to conform to all other provisions set forth in the arrangement made between the City and the property owner. Said document will be prepared by the Engineer for execution by the Contractor, or

2. Entered into an agreement with the owner of the disposal site on any terms mutually agreeable to the owner and the Contractor; provided that the Contractor shall furnish to the Engineer a release, in a form satisfactory to the Engineer, executed by the owner, relieving the City of any and all obligations under the City's arrangement with the owner.

If the Contractor elects to dispose of material under (1), the use of such site shall be subject to the terms, conditions, and limitations of the arrangement made between the property owner and the City and the Contractor shall pay such charges as are provided for in the arrangement made by the City with the property owner, and deductions will be made from any moneys due or that may become due the Contractor under the contract sufficient to cover the charges for such material disposed of.

If the Contractor elects to dispose of material under (2), the Contractor shall pay such charges as are provided for in the agreement between the owner and the Contractor and deductions will not be made from any moneys due or that may become due the Contractor under the contract to cover such charges.

Before acceptance of the Contract, the Engineer may require the Contractor to submit written evidence that the owner of the disposal site is satisfied that the Contractor has satisfactorily complied with the provisions of either: (1), the arrangement between the City and the owner, or (2), the agreement between the owner and the Contractor, as the case may be.

Full compensation for all costs involved in disposing of materials as specified in this section, including all costs of hauling, shall be included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

7-1.13 COOPERATION

Should construction be under way by other forces or by other contractors within or adjacent to the limits of the Work specified or should work of any other nature be under way by other forces within or adjacent to said limits, the Contractor shall cooperate with all such other contractors or other forces to the end that any delay or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site (including material sources) at any time, by the use of other forces.

When two or more contractors are employed on related or adjacent work, or obtain materials from the same material source, each contractor shall conduct their operations in such a manner as not to cause any unnecessary delay or hindrance to the other.

Each contractor shall be responsible to the other for all damage to work, to persons or property caused to the other by his/her operations, and for loss caused the other due to his/her unnecessary delays or failure to finish their work within the time specified for completion. The Contractor shall conduct, adjust, correct, and coordinate its Work with the work of others so that no discrepancies shall result in the whole Work and shall defend, indemnify, and hold the City harmless against any claims arising therefrom. The Contractor, including its Subcontractors at any tier, shall keep informed of the progress and the detail work of other contractors and shall notify the Engineer immediately of lack of progress or defective workmanship on the part of other contractors, where such delay or such defective workmanship will interfere with the Contractor's own operations. Failure of a Contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by the Contractor of the status of the work as being satisfactory for proper coordination with the Contractor's Work. If the Work of the Contractor is delayed because of any acts or omissions of any other contractor, the Contractor shall on that account have no claim against the City other than for an extension of time.

7-1.13A Mutual Responsibility of Contractors

If the Contractor or any of its Subcontractors or employees cause loss or damage to any other contractor, and if such other contractor makes a claim against the City, its officers, officials, employees, or agents, on account of any loss so sustained, the City shall notify the Contractor, who shall defend, indemnify, and hold harmless the City, its officers, officials, employees, and agents against any such claim, expense, or judgement arising therefrom.

7-1.14 RELIEF FROM MAINTENANCE AND RESPONSIBILITY

Only upon the written request of the Contractor and written consent of the Engineer, the Engineer may make a partial acceptance of a major portion of the Work of the Contract, such as a traffic control signal system, a highway lighting system, or a storm sewer system. Such partial acceptance will relieve the Contractor from responsibility for maintenance and repair due to damage by vehicular or pedestrian traffic or other public use. Such partial acceptance may or may not begin the one-year maintenance period responsibility of the Contractor as specified in Section 2-1.12, "General Guaranty," contained herein. A partial acceptance will only be considered upon a written request from the Contractor specifying the circumstances and the specific portion of the Work to be accepted. The Engineer shall be the sole and final judge of whether the indicated special circumstances warrant a partial acceptance and of what portion of the completed work may be subject to partial acceptance, and whether the maintenance period responsibilities commence.

Nothing in this section will be construed as relieving the Contractor of full responsibility for making good defective work or materials found at any time before Final Acceptance and accompanying end of the one-year maintenance period.

7-1.15 CONTRACTOR'S RESPONSIBILITY FOR THE WORK AND MATERIALS

Until Final Acceptance of the Work, the Contractor shall have the charge and care of the Work and of the materials to be used therein (including materials for which the Contractor has received partial payment or materials which have been furnished by the City) and shall bear the risk of injury, loss, or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the Work, except as otherwise expressly provided for in the Contract Documents.

The Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damages to any portion of the Work or the materials occasioned by any cause before its completion and acceptance and shall bear the expense thereof, except as otherwise expressly provided for in the Contract Documents and except for such injuries, losses, or damages as are directly and proximately caused by acts of the Federal, State, regional, or local Government or the public enemy.

Where necessary to protect the Work or materials from damage, the Contractor shall, at the Contractor's sole expense, provide suitable drainage of the Work area and erect such temporary structures as are necessary to protect the Work or materials from damage. The suspension of the Work from any cause whatsoever shall not relieve the Contractor of any responsibility for the Work and materials as herein specified. If ordered by the Engineer, the Contractor shall, at the Contractor's sole expense, properly store materials which have been furnished by the City. Such storage by the Contractor shall be on behalf of the City and the City shall at all times be entitled to the possession of such materials, and the Contractor shall promptly return the same to the site of the Work when requested. The Contractor shall not dispose of any of the materials so stored except on written authorization from the Engineer.

The City reserves the right to use or occupy any portion or all of the Work prior to completion. Upon occupying or commencing use of any such portion or all of the Work prior to completion, the Contractor shall not be relieved of any duty for maintaining and protecting said Work and the Contractor shall be required thereafter to complete said Work. The Contractor shall be fully responsible for coordinating with the City for the completion of such Work such that said Work will cause the least interference with the City's use and/or occupancy.

7-1.15A Damage by Storm, Flood, or Earthquake

Attention is directed to Section 7-1.15, "Contractor's Responsibility for the Work and Materials." In the event damage to the Work is caused by a storm, flood, tidal wave, or earthquake, and other natural disasters (hereinafter called an "Occurrence") the provisions of this section shall be applicable and the Contractor may apply in writing to the Engineer for the City to participate in the cost of repairing damage to the Work from such cause or, in lieu thereof, and at the sole discretion of the City, terminate the Contract and relieve the Contractor of further obligation to perform the Work, subject to the following:

A. **Occurrence**. "Occurrence" shall include only earthquakes, storms, and floods as to which the Governor of the State of California has proclaimed a State of Emergency pursuant to Government Code Section 8625 and when the damaged Work is located within the territorial limits to which such proclamation is applicable or, which were, in the opinion of the Engineer, of a magnitude at the site of the Work sufficient to have caused such a proclamation had they occurred in a populated area or in an area in which such a proclamation was not already in effect.

B. **Application by Contractor**. The Contractor's written request for the City to participate in the cost of rebuilding, repairing, restoring, or otherwise remedying the damage to the Work caused by the Occurrence shall be submitted to the Engineer before performing any work other than emergency work, including emergency work necessary to provide for passage of public traffic.

C. **Protecting the Work from Damage**. Nothing in this section shall be construed to relieve the Contractor of any responsibility to protect the Work from damage. The Contractor shall bear the entire cost of repairing damage to the Work caused by the Occurrence which the Engineer determines was due to the failure of the Contractor to comply with the requirements of the Contract

Documents, take reasonable and adequate measures to protect the Work, or exercise sound engineering and construction practices in the conduct of the Work, and such repair costs shall be excluded from consideration under the provisions of this section.

D. **Repair Work**. Repair of damaged Work under the provisions of this section shall be pursuant to a Change Order issued hereunder and specifying the repair work to be performed. Such repair work shall consist of restoring the in-place construction (for the purposes of this section erected falsework and formwork shall be considered in-place construction) to the same state of completion to which such Work had advanced prior to the Occurrence. Emergency work which the Engineer determines would have been part of the repair work if it had not previously been performed, will be considered to be part of said repair work.

The City reserves the right to make changes in the Contract Documents applicable to the portions of the Work to be repaired, and if such changes will increase the cost of repairing the damage over the Engineer's estimate of the cost of repair without the changes, the Contractor will be paid for such increased costs in accordance with Subsection E, “Determination of Costs” and the increased cost amount shall not be considered in determining the cost of repair to be borne by the Contractor under Subsection F, “Payment for Repair Work.”

Nothing in this section shall be construed to relieve the Contractor of full responsibility for the risk of injury, loss, or damage to materials not yet incorporated in the Work and to materials, tools, and equipment (except erected falsework and formwork) used to perform the Work, or to relieve the Contractor of any responsibility under Section 7-1.11, "Responsibility for Damage." The provisions of this section shall not be applicable to the repair of damage caused by an Occurrence to any portion of the Work as to which the Contractor has been granted relief from maintenance and responsibility pursuant to Section 7-1.14, "Relief From Maintenance and Responsibility," or to the removal of slides and slipouts or the repair and restoration of damage to the Work resulting from slides and slipouts pursuant to *Caltrans Construction Manual* Chapter 4, “Construction Details,” Section 4-1903A (3), "Slides and Slipouts."

E. **Determination of Costs**. Unless otherwise agreed between the Engineer and the Contractor, the cost of the Work performed pursuant to this section will be determined in accordance with the provisions in Section 9-2.02, "Force Account Payment," except there shall be no markup allowance pursuant to Section 9-2.02A, "Work Performed by Contractor," unless the Occurrence that caused the damage was a tidal wave or earthquake. The cost of emergency work, which the Engineer determines would have been part of the repair work if it had not previously been performed, will be determined in the same manner as the authorized repair work. The cost of repairing damaged work which was not in compliance with the requirements of the Contract Documents shall be borne solely by the Contractor, and such costs shall not be considered in determining the cost of repair under this Subsection E.

F. **Payment for Repair Work**. When the Occurrence that caused the damage was an earthquake, the City will pay the cost of repair determined as provided in Subsection E, “Determination of Costs,” that exceeds five percent (5%) of the amount of the Contractor's bid for bid comparison purposes.

When the Occurrence that caused the damage was a storm or flood, the City will participate in the cost of the repair determined as provided in Subsection, “Determination of Costs,” in accordance with the following:

1. On projects for which the amount of the Contractor’s bid for bid comparison purposes is $100,000 or less, the City’s participation will be ninety percent (90%) of the cost of repair that exceeds $5,000.

2. On projects for which the amount of the Contractor's bid for bid comparison purposes is more than $100,000, but less than $2,000,000 the City’s participation will be ninety percent (90%) of

the cost of repair that exceeds five percent (5%) of the amount of the Contractor's bid for bid comparison purposes.

3. On projects for which the Contractor's bid for bid comparison purposes is greater than $2,000,000, the City will pay ninety percent (90%) of the cost of repair that exceeds $100,000.

G. **Termination of Contract Due to Occurrence**. If the City elects to terminate the Contract, the termination and the determination of the total compensation payable to the Contractor shall be governed by the provisions of Section 8-1.10, "Termination of Contract."

7-1.16 ACCEPTANCE OF WORK

When the Engineer has made the final inspection as provided in Section 5-1.14, “Final Inspection and Contract Acceptance,” and determines that the Work has been completed in all respects, and in its entirety, in accordance with the Contract Documents, the Engineer will recommend that the City formally accept the Work. Immediately upon and after such acceptance of the Work by the City, the Contractor will be relieved of maintaining and protecting the Work as a whole, except for any specifically designated maintenance items and all warranty work as required by the Contract Documents.

7-1.17 PROPERTY RIGHTS IN MATERIALS

Nothing in the Contract Documents shall be construed as vesting in the Contractor any right of property in the materials used in the Work after they have been installed for their intended use in the Project. All such materials shall become the property of the City upon being so attached or affixed.

7-1.18 RIGHTS IN LAND AND IMPROVEMENTS

Nothing in the Contract Documents shall be construed as allowing the Contractor to make any arrangements with any person to permit occupancy or use of any land, structure, or building within the limits of the Contract for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the City and any owner, former owner. or tenant of such land, structure, or building.

The Contractor shall not occupy City-owned property limits as shown on the plans or outside the expressly designated areas in the Contract Documents unless the Contractor enters into a rental agreement with the City. Such a rental agreement will be based on the fair rental values.

7-1.19 REPAIR OF EQUIPMENT

The work of installing, assembling, repairing, or reconditioning, or other work of any nature on machinery, equipment, or tools used in or upon the Work shall be considered a part of the Work to be performed under the Contract and any laborers, workers, or mechanics working on such machinery, equipment, or tools, unless employed by bona fide commercial repair shops, garages, blacksmith shops, or machine shops, which have been established and operating on a commercial basis for a period of at least two months prior to the award of the Contract, shall be subject to all the requirements relating to labor set forth in the Contract Documents.

7-1.20 MATERIAL PLANT LABOR

The construction, erection, and operation of material production, proportioning, or mixing plants from which material is used wholly on the Contract or on contracts under the supervision of the City shall be considered a part of the Work to be performed under the Contract and any laborers, workers, or mechanics working on such plants shall be subject to all of the requirements relating to labor set forth in the Contract Documents.

7-1.21 PROVISIONS OF LAW AND VENUE

It is specifically provided that this Contract is to be interpreted and enforced in accordance with the laws of the State of California and subject to all the provisions of law regulating and controlling the performance of

work for the City, and that the rules of law shall prevail over any provision contained in any of the contract documents which may be in conflict or inconsistent therewith.

Each and every provision of law and clause required by law to be inserted in these Contract documents shall be deemed to be inserted herein and the Contract Documents shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provisions are not inserted, or are not correctly inserted, then upon application of either party, the Contract Documents shall forthwith be physically amended to make such insertion or correction at no additional cost to City.

Pursuant to California Code of Civil Procedure Section 394, proper venue for any legal action arising out of these Contract Documents shall be the County of Santa Clara, or, where otherwise appropriate, in the Federal District Court for the Northern District of California. There is no express or implied agreement between the parties to mediate and/or arbitrate in any forum any matter arising under this Contract. All depositions, document production, mediations, arbitrations, and any other meetings will take place in the City of Campbell, unless otherwise agreed-to by the parties.

In the event that a particular City public work contract is funded or required to be approved in whole or in part by the state or federal government and any provision contained herein is inconsistent with any applicable state or federal statutes, rules or regulations, orders, or controlling policies pertaining to such funding or approval, such provisions to the extent that it is inconsistent shall not apply to said City public works contract.

7-1.22 CALIFORNIA PUBLIC RECORDS ACT

City is a public agency subject to the disclosure requirements of the California Public Records Act (“CPRA”). If Contractor’s proprietary information is contained in documents or information submitted to City, and Contractor claims that such information falls within one or more CPRA exemptions, Contractor must clearly mark such information “Confidential and Proprietary,” and identify the specific lines containing the information. In the event of a request for such information, City will make best efforts to provide notice to Contractor prior to such disclosure. If Contractor contends that any documents are exempt from the CPRA and wishes to prevent disclosure, it is required to obtain a protective order, injunctive relief or other appropriate remedy from a court of law in Santa Clara County before the City is required to respond to the CPRA request. If Contractor fails to obtain such remedy within the time the City is required to respond to the CPRA request, City may disclose the requested information without any liability to Contractor. Contractor further agrees that it shall defend, indemnify, and hold City harmless against any claim, action or litigation (including but not limited to all judgments, costs, and attorney’s fees) that may result from denial by City of a CPRA request for information arising from any representation, or any action (or inaction), by the Contractor.

7-1.23 FINAL GUARANTEE

Neither the City’s final acceptance nor payment, nor any provisions in the Contract Documents, shall relieve the Contractor of its responsibility for faulty materials or workmanship.

Contractor shall guarantee all workmanship and materials for a period of one (1) year from the time the City Council accepts the improvements installed by the Work or as specified in the Contract Documents, excluding normal wear and tear, improper operation, insufficient maintenance, abuse, unauthorized change, or an Act of God. The Contractor may be required to furnish a written guaranty covering all or certain items of Work for varying periods of time from the date of Acceptance of the Work. The Work to be guaranteed, the form, and the time limit of the guaranty will be specified in the Contract Documents. Said guaranty shall be signed and delivered along with any and all manufacturers’ warranties, guaranties, instruction sheets, and parts lists which are furnished with certain articles or materials incorporated in the Work, shall be delivered to the Engineer before City acceptance of the Work.

The Contract bonds must be in force until the later of (1) the expiration of the guarantee period or (2) the completion of the corrective work.

The warranty/guarantee period shall be counted from the date of recording of the Notice of Completion by City. Contractor shall repair or replace any or all defective Work, together with any other Work that may be displaced in so doing, that is or becomes defective during the period of said guarantee without expense whatsoever to City.

The aforesaid one-year warranty/guarantee period does not in any way limit or waive City's rights to legal recourse for latent construction effects, pursuant to California Code of Civil Procedure Sections 337.15 and 337.1.

During the guarantee period, the Engineer monitors the completed Work. If the Engineer finds work having a substantial defect, the Engineer lists the defective work parts and will furnish the Contractor with a list. In the event Contractor fails to submit for authorization a detailed plan for correcting the work, consistent with the requirements of any guarantee required by the Contract Documents, within ten (10) days of the date of a written notification from the City and start all necessary corrective and related work within fifteen (15) days of the notification, it is expressly agreed and understood that City is authorized to proceed to have the defects remedied and made good at the expense of the Contractor, who shall pay the cost and charges therefor immediately on demand.

7-1.24 NOTICE

Any notice from one party to the other under the Contract shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notice shall not be effective for any purpose whatsoever unless served in the following manner:

1. If the notice is given to City, it must be by personal delivery thereof to the Engineer or by depositing the notice in the United States mail, enclosed in a sealed envelope, addressed to City for the attention of the Engineer, priority mail, and postage prepaid or by overnight mail.

2. If the notice is given to Contractor, it must be by personal delivery thereof to Contractor or to Contractor's Superintendent, or by depositing the same in the United States mail, enclosed in a sealed envelope, addressed to Contractor at its regular place of business or at such other address as may have been established for the conduct of the Work, priority mail, and postage prepaid or by overnight mail.

3. If the notice is given to the Surety or any other person, by personal delivery to such Surety, or by depositing the same in the United States mail, enclosed in a sealed envelope, addressed to Surety or person at the address of such Surety or person last communicated by him/her to the party giving the notice, priority mail, and postage prepaid or by overnight mail.

4. Deposit of notice in the United States mail shall be the date of receipt thereof.

7-1.25 MATERIAL STORAGE

The Contractor shall store materials only within the Work limits and Material Storage Areas designated in the Contract Documents. Should these areas prove inadequate, the Contractor shall make advance arrangements for and pay all fees in connection with the use of property other than the Project site for storage of materials or other purposes.

7-1.26 NON-WAIVER BY THE CITY

The Contractor hereby agrees that waiver by the City of any breach or violation or any term or condition of the Contract Documents shall not be deemed to be a waiver or any other term or condition contained herein or a waiver of any subsequent breach or violation of the same term or condition of the Contract. Payment for or acceptance by City of any Work or services by Contractor performed under this Contract shall not be deemed to be a waiver of any term or condition of this Contract even if at the time of such payment or acceptance the City was aware of the Contractor 's failure to comply with any term or condition of the

Contract. Conformance with any of the provisions in one part of the Contract Documents shall not relieve the Contractor from its responsibilities as set forth elsewhere in the Contract Documents.

7-1.27 ARCHEOLOGICAL AND PALEONTOLOGICAL RIGHTS

Notwithstanding any other provisions of this Contract, in the event any archeological or paleontological objects within the Project area are discovered during the course of the Work, the Contractor shall halt the Work within the area affected, and the City shall have and retain all right, title and interest to such objects and shall have the further right, during the course of the Contract, to examine or cause to have examined, the site of the Work for any such objects and to perform or have performed archeological or paleontological excavations and all other related work to explore for, discover, recover, and remove such objects from the site of the work.

In the event the work of archeological or paleontological examination and related work delays the Contractor's work, the Contractor shall be entitled to an extension of time to complete the work equal to the number of days thus delayed pursuant to Section 8-1.08, "Right of Way Delays," and compensation for such delay will be determined in accordance with said Section 8-1.08, "Right of Way Delays." The Contractor shall be entitled to no other compensation for any Archeological and Paleontological delays.

7-1.28 EMERGENCIES

In an emergency affecting the safety of persons or property, the Contractor shall act reasonably to prevent threatened damage, injury, or loss. The Contractor shall immediately notify the City in writing of such actions. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Section 4-1.03, "Changes in the Work."

7-1.29 INTEGRATION CLAUSE

The Contract, including the Contract Documents, constitutes the entire agreement between the parties. There are no prior or contemporaneous oral agreements between the parties not set forth in the contract. Any modification to the contract or these specifications must be in writing in order to be effective and binding on the parties to the Contract.

7-1.30 INDEMNIFICATION

To the fullest extent permitted by law, Contractor agrees to indemnify, defend and hold harmless the City, its officials, officers, and agents (collectively, "Indemnitees") from and against any and all liability, claim, action, loss, injury, damage, judgment, or expense (including attorneys' fees and costs) ("Losses") caused by or resulting from the negligence, recklessness, or willful misconduct of Contractor in connection with its performance of this Contract for (1) 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 you, Indemnitees, or any other contractor; and (2) 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 Contractor or anyone directly or indirectly employed by Contractor or anyone for use acts Contractor may be liable, except if proximately caused by the sole, active negligence of the City.

Contractor acknowledges and agrees that Contractor's obligation to defend City and the other Indemnitees arises at the time such Losses is tendered to Contractor by the Indemnitees and continues at all times until finally resolved, and/or decided by an adjudicatory body or a court of competent jurisdiction. This provision shall survive the termination of the Agreement or the completion of the Work.

The obligation to defend shall arise regardless of any claim or assertion that Indemnitees caused or contributed to the Losses.

END OF SECTION

SECTION 8 PROSECUTION AND PROGRESS

8-1.01 SUBCONTRACTING

No subcontract releases Contractor from the Contract or relieves Contractor of its responsibility for a Subcontractor's work. The Contractor shall be fully responsible to the City for the acts and omissions of Subcontractors, and of persons employed by the Contractor and Subcontractors. The Contractor shall be responsible for the coordination of trades, Subcontractors, and suppliers engaged upon this Work.

The Contractor shall perform not less than 30 percent of the Contract Sum, except that any designated "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the original total Contract Sum before computing the amount of work required to be performed by the Contractor with the Contractor's own organization.

All subcontracts and contracts with materials providers must comply with the Contract Documents, and all terms and provisions under the Contract Documents are incorporated into each subcontract. Subcontracts shall also contain certification by the Subcontractor that said Subcontractor is experienced in and qualified to do, and knowledgeable about the subcontracted work. Copies of subcontracts and contracts with materials providers shall be available to the Engineer at the time any litigation against the City concerning the Project is filed.

Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the City.

Pursuant to Public Contract Code Section 6109, the Contractor shall not perform work on this Project with any Subcontractor who is ineligible to perform work on public works projects pursuant to Section 1777.1 or 1777.7 of the Labor Code. Any contract on a public works project entered into between the Contractor and a debarred Subcontractor is void as a matter of law. For a list of debarred contractors, go to the Department of Industrial Relations' website. A debarred Subcontractor may not receive any public money for performing work as a Subcontractor on a public works contract, and any public money that may have been paid to a debarred Subcontractor by the Contractor on this Project shall be returned to City. The Contractor shall be responsible for the payment of wages to workers of a debarred Subcontractor who worked on the Project.

The Contractor and all subcontractors for the Work shall comply with the "Subletting and Subcontracting Fair Practices Act", as codified in Public Contract Code Sections 4100 et seq., unless otherwise specified in the Contract Documents. If Contractor, or any subcontractor, violates Public Contract Code Sections 4100 et seq., the City may exercise the remedies provided in Public Contract Code Section 4110. The City may refer the violation to the Contractor's State License Board, as provided under Public Contract Code Section 4111.

Before Work is started on a subcontract, the Contractor shall submit to the Engineer a written statement showing all Work to be subcontracted, the names of the Subcontractors, and the description of each portion of the Work to be so subcontracted.

When a portion of the Work which has been subcontracted by the Contractor is not being prosecuted in a manner satisfactory to the City, the Contractor shall immediately remove the Subcontractor or any designated employee of the Subcontractor upon the request of the Engineer and shall not again be employed on the Work.

The production of aggregates of all kinds with portable, semiportable, or temporary crushing or screening, proportioning, and mixing plants established or reopened for the purpose of supplying aggregate or material for a particular project or projects shall be considered as subcontracted if produced by other than Contractor's forces. The erection, establishment, or reopening of such plants and the operation thereof in the production of said materials for use on the Work shall conform to the requirements relating to labor set forth in the Contract Documents.

8-1.02 ASSIGNMENT

The performance of the Contract or any Contract part may be assigned only with prior written consent from the City. To request consent, Contractor must submit a written assignment request. The City does not consent to any requested assignment that would relieve Contractor or its surety of the responsibility to complete the Work or any part of the Work. To assign any subcontract, Contractor must comply with Public Contract Code Section 4107.

The Contractor may assign moneys due or to become due under the Contract and such assignment will be recognized by the City, if given proper notice thereof, to the extent permitted by law, but any assignment of moneys shall be subject to all proper set-offs in favor of the City and to all deductions provided for in the Contract and particularly all money withheld, whether assigned or not, shall be subject to being used by the City for the completion of the Work in the event that the Contractor should be in default therein.

8-1.03 COMMENCEMENT OF WORK

The date of commencement of the Work shall be set forth in the Notice to Proceed. Unless otherwise approved by the Engineer, the Contractor shall begin work within ten (10) calendar days from the date of the Notice to Proceed, and shall diligently prosecute the same to completion within the time limit provided in the Contract Documents. Should the eleventh (11) day after the issuance of the Notice to Proceed fall on a Saturday, Sunday, or legal holiday, the following working day shall be the first working day charged.

The date of commencement of the Work shall not be postponed by the failure of Contractor, Subcontractors, or of persons or firms for whom Contractor is responsible, to act.

The Contractor shall notify the Engineer, in writing, of the Contractor's intent to begin work at least 72 hours before Work is begun. The notice shall be delivered to the Engineer and shall specify the date the Contractor intends to start.

Under no circumstances shall the Contractor enter the site of the Work until receipt of the Notice to Proceed. Should the Contractor begin work in advance of receiving Notice to Proceed, any work so performed shall be considered as having been done by the Contractor's own risk and expense and as a volunteer unless a Notice to Proceed is subsequently issued. Should any work be performed prior to Notice to Proceed, such work shall be subject to inspection and acceptance by City as provided for elsewhere in these Contract Documents.

8-1.04 SCHEDULES

The Contractor shall furnish and submit a computerized construction schedule prepared using the Critical Path Method (CPM), which legibly describes each activity; shows all controlling activities; enumerates the order in which the Contractor proposes to carry out the Work; the sequence and interdependence of construction activities (showing logical links between the time-scaled work activities); all salient features of the Work (including procurement of materials and equipment, and material testing); the dates on which the contractor will start the salient features of the Work; and the scheduled dates for completing the said salient features. The CPM schedule shall be submitted to the Engineer 5 working days prior to the preconstruction meeting. Failure to timely submit an acceptable CPM schedule may result in damages in an amount as set forth in the Contract Documents. Progress schedules shall be in the form specified by the City unless otherwise specified in the Contract Documents or approved by the Engineer.

Updated progress schedules shall be provided to the Engineer weekly at the Weekly Field Meeting, or more frequently if deemed necessary by the Engineer. No progress payment will be made for any Work until an updated schedule has been submitted and approved by the Engineer. Updated schedules shall incorporate all current schedule information, including actual progress, approved time adjustments, and proposed changes in sequence and logic.

The monthly progress schedule shall include:

a. Time for submittals and reviews
b. Time for fabrication and delivery of manufactured products for the Work
c. The interdependence of procurement and construction activities
d. Be a time-scaled network diagram, with references to specific calendar dates
e. Time for the Engineer to review submittals or inspect the Work
f. Identify the activities which constitute the controlling operations or critical path.

The monthly progress schedule shall not contain multiple critical paths. Failure to comply with the monthly progress schedule outlined herein shall result in payment retention.

Full compensation for furnishing, updating, and submitting schedules for the Project shall be considered as included in the Contract Sum and no additional compensation will be allowed therefor.

Scheduling of Change Order work is the sole responsibility of the Contractor. The Contractor shall revise the schedule to incorporate all activities involved in completing the Change Order work, and submit a new schedule to the Engineer for review and approval.

Delays or changes to non-critical activities will not be considered for a Contract Time extension. Non-critical activities are those activities which when delayed, do not affect the Contract Time.

The Project schedules submitted shall be consistent in all respects with the time and order of Work requirements of the Contract. The Engineer, at his or her sole discretion, retains the right to reject any and all construction schedules submitted by the Contractor, including when the Engineer determines that the Contractor has too many items on the Critical Path, or the logic of the schedule is in error, or if the Engineer determines salient items of Work are missing from the schedule.

8-1.05 TEMPORARY SUSPENSION OF WORK

The Engineer shall have the authority to suspend the Work, wholly or in part, for any period as the Engineer may deem necessary, due to unsuitable weather, such other conditions as are considered unfavorable for the suitable prosecution of the Work, or for such time as the Engineer may deem necessary due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the Contract. The Contractor shall immediately comply with the written order of the Engineer to suspend the Work wholly or in part. The suspended Work shall be resumed when conditions are favorable and methods are corrected, as ordered or approved in writing by the Engineer.

In the event that a suspension of Work is ordered as provided above, and should such suspension be ordered by reason of the failure of the Contractor to carry out orders or to perform any provision of the Contract; or by reason of weather conditions being unsuitable for performing any item or items of Work, which Work, in the sole opinion of the Engineer, could have been performed prior to the occurrence of such unsuitable weather conditions had the Contractor diligently prosecuted the Work when weather conditions were suitable; the Contractor, at the Contractor's sole expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic; and provide for proper and efficient operations of sewer, drainage, and other facilities within the site of the work during the period of such suspension as provided in Section 7-1.07, "Public Convenience," and 7-1.08, "Public Safety," and as specified in the Contract Documents. If Contractor fails to perform the Work above specified, the City will perform such Work and the cost thereof will be deducted from moneys due or to become due the Contractor.

If the Engineer orders a suspension of all of the Work or a portion of the Work which is the current Controlling Operation(s), due to unsuitable weather or to such other conditions as are considered unfavorable to the suitable prosecution of the Work, the days on which the suspension is in effect shall not be considered working days as defined in Section 8-1.06, "Time of Completion." If a portion of Work at the time of such suspension is not a current Controlling Operation, but subsequently does become the current Controlling

Operation(s), the determination of working days will be made on the basis of the then current Controlling Operation(s).

If a suspension of Work is ordered by the Engineer due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the Contract, the days on which the suspension order is in effect shall be considered working days if such days are working days within the meaning of the definition set forth in Section 8-1.06, "Time of Completion."

In addition to the requirements specified above, the following shall apply:

If the performance of all or any portion of the Work is suspended or delayed by the Engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation and Contract Time is due as a result of that suspension or delay, the Contractor shall submit to the Engineer in writing a request for adjustment within 7 calendar days of receipt of the notice of suspension. The request shall set forth the reasons and support for the adjustment.

Upon receipt, the Engineer will evaluate the Contractor's request. If the Engineer agrees that the cost or time or cost and time requested for the performance of the Contract has increased as a result of the suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment (excluding profit) issue a Change Order, as appropriate. The Engineer will notify the Contractor of the Engineer's determination whether or not an adjustment of the Contract is warranted within ten calendar days.

No Contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time prescribed.

No Contract adjustment will be allowed under the provisions specified in this section to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any term or condition of this Contract.

Any Contract adjustment warranted due to suspension of Work ordered by the Engineer will be made in the same manner as provided for right of way delays in Section 8-1.08, "Right of Way Delays."

In the event of a suspension of Work under any of the conditions set forth under this section, such suspension of Work shall not relieve the Contractor of the Contractor's responsibilities as set forth in the Contract Documents, including but not limited to the Contractor's maintenance of the Project site in a safe condition and the responsibilities set forth in Section 7, "Legal Relations and Responsibility."

8-1.06 TIME OF COMPLETION

1. **Time of the Essence**. Time is of the essence in the performance of this Contract. The Contractor shall proceed expeditiously with adequate forces and shall achieve full completion of the Work within the Contract Time.

2. **Working Day.** A workday as defined under Section 1-3, "Terms and Definitions".

3. **Prevention of Work**. Should the Contractor prepare to begin work at the regular starting time of any day on which inclement weather, or the conditions resulting from the weather, or the condition of the work, prevents the work from beginning at the usual starting time and the crew is dismissed as a result thereof and the Contractor does not proceed with at least 75 percent of the normal labor and equipment force engaged in the current controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations, the Contractor will not be charged for a working day whether or not conditions should change thereafter during that day and the major portion of the day could be considered to be suitable for those construction operations.

   The current controlling operation or operations is to be construed to include any feature of the work (e.g. an operation or activity, or a settlement or curing period) considered at the time by the Engineer and the Contractor, which, if delayed or prolonged, will delay the time of completion of the contract.

   Determination that a day is a non-working day by reason of inclement weather or conditions resulting immediately therefrom, shall be made by the Engineer. The Contractor will be allowed 15 days from the issuance of the Weekly Statement of Working Days in which to file a written protest setting forth in what respects the Contractor differs from the Engineer; otherwise, the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The Engineer will furnish the Contractor a weekly statement showing the number of working days charged to the contract for the preceding week, the number of working days of time extensions being considered or approved, the number of working days originally specified for the completion of the contract and the number of working days remaining to complete the contract and the extended date for completion thereof, except when working days are not being charged in conformance with the provisions in Section 8-1.05, “Temporary Suspension of Work.”

   If Engineer determines and notifies Contractor that Contractor’s progress is such that Contractor will not achieve full completion of the Work within the Contract Time, Contractor shall immediately and at no additional cost to City, take all measures necessary, including working such overtime and additional shifts, as may be required to ensure that the Work is fully completed within the Contract Time. Upon receipt of such notice from Engineer, Contractor shall immediately notify Engineer of all measures to be taken to ensure full completion of the Work within the Contract Time. Contractor shall reimburse City for any extra costs or expenses (including the reasonable value of any services provided by City’s employees) incurred as a result of such measures.

4. **Completion Date**. By signing the Contract, the Contractor agrees that the Contract Time is reasonable for performing the Work and that Contractor will complete the Work within the Contract Time, unless such time is adjusted, in writing, by Change Order by the City. The Contractor may complete the Work before the completion date if it will not interfere with the City or its other contractors engaged in related or adjacent Work. The Work shall be regarded as completed as noted on the City’s Notice of Completion.

   The Contractor shall have no right to an adjustment in the time of completion due to weather conditions or industrial conditions which are normal for the locality of the Project site. The time period for completion of the Contract has been calculated with consideration given to the average climatic range and usual industrial conditions prevailing in the locality of the Project site.

5. **Inclement Weather**. Time extensions, including determinations that a day is a non-working day, due to inclement weather will be allowed only for weather conditions that affect the progress of activities that are on the critical path/controlling operation or operations as noted above and only upon the written consent of the Engineer. The Contractor shall exercise due diligence in protecting the Work area from weather as well as take corrective action after the weather has passed.

   Delays due to inclement weather are not compensable.

6. **Saturday, Sunday, Holiday and Night Work**. Unless otherwise provided in the Contract Documents, or authorized by the Engineer in writing, Work shall be done between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday. If Saturday work is authorized by the Engineer, hours of construction shall be between the hours of 9:00 a.m. and 4:00 p.m. There shall be no construction activity on Sundays or City observed holidays. These hour restrictions apply unless the Engineer has determined that the Work is necessary for the proper care and protection of Work already performed, or unless the Engineer has determined that the Work is of an emergency nature or would be in the best interest of the public. When the Engineer has made such a determination, all costs incurred by the City to provide inspection of the Work during these times shall be borne by the Contractor and shall be withheld from monies due or to become due to the Contractor, or in the case of permit work, all costs incurred by the City to provide inspection of the Work during these times shall be borne by the permittee.

7. **Annual Holiday Closure**. At the option of the Engineer, the Contractor may be required to suspend all Work and activities during the City's annual Holiday Closure in late December and early January of each year. No Work shall be done during this suspension except such work as is necessary for the proper care and protection of Work already performed, or except in case of an emergency, and in any case, only with the prior written permission of the Engineer. This suspension of Work will be at no cost to the City. Working days will not be assessed during this suspension of Work.

8-1.07 LIQUIDATED DAMAGES

Contractor agrees that if all the Work called for under the Contract is not finished or completed by Contractor within the Contract Time, or any authorized extension thereof, the City will suffer damage; and that it is and will be impracticable or extremely difficult to ascertain the actual amount of damage which the City will sustain by reason of such delay; and it is therefore agreed that the Contractor will pay to the City, the fixed sum set forth in the Contract Documents per day for each and every calendar day delay until the Work is completed including punch list items; and the Contractor and its Sureties agrees to pay said liquidated damages and further agrees that the City may deduct the amount thereof from any moneys due or that may become due the Contractor under the Contract.

It is further agreed that in case the Work called for under the Contract is not finished and completed in all parts and requirements within the Contract Time, the Engineer shall have the exclusive right to increase the number of calendar days, and if the Engineer decides to increase the Contract Time, the Engineer shall further have the right to charge to the Contractor, the Contractor's heirs, assigns, or sureties and to deduct from the final payment for the Work all or any part, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the Contract, and which accrue during the period of such extension, except that cost of final surveys and preparation of Final Estimate shall not be included in such charges.

Contractor shall, within twenty-four (24) hours from the beginning of any known delay of scheduled activities, notify Engineer in writing of the delay.

Contractor shall not be relieved of liability for liquidated damages or engineering and inspection charges for any delay period in excess of that expressly provided for in this section.

8-1.07A Contractor Caused Delay

Should the progress of the Work be delayed, disrupted, hindered, obstructed, or interfered with by any fault, neglect, act, or failure to act of the Contractor or any of its officers, agents, servants, employees, Subcontractors, or suppliers so as to cause any additional cost, expense, liability or damage to City (including legal fees and disbursements incurred by City) (whether incurred in defending claims arising from such delay or in seeking reimbursement and indemnity from the Contractor and its surety hereunder or otherwise) or any damages or additional costs or expenses for which City may or shall become liable, the

Contractor and its Surety shall and does hereby agree to compensate City for and indemnify them against all such costs, expenses, damages, and liability.

The Contractor shall, in addition to all of the other obligations imposed by the Contract Documents upon the Contractor in such case and at its own cost and expense, work such overtime as may be necessary to make up for all time lost in the completion of the Work and of the Project due to such delay. No additional compensation will be allowed therefor.

8-1.07B Delay Caused by Other.

The Contractor will be granted a Contract Time extension and will not be assessed liquidated damages or the cost of engineering and inspection for any portion of a delay in completion of the Work caused by acts beyond the control and without the fault or negligence of Contractor, including Acts of God or of the public enemy, fire, floods, tidal waves, earthquakes, epidemics, quarantine restrictions, strikes, labor disputes, shortage of materials and freight embargoes, changes made under Section 4-1.03, “Changes in the Work”, by the failure of the City to acquire or clear right of way, or by moving the Contractor’s plant pursuant to Section 6, “Local Materials.”

The Contractor shall not be entitled to a Contract Time extension unless the Contractor:

1. Notifies City in writing of the cause or causes of such delay, obstruction, hindrance, or interference within forty-eight (48) hours of the commencement thereof, and

2. Demonstrates that it could not have anticipated or avoided such delay, obstruction, hindrance, or interference and has used all available means to minimize the consequences thereof.

Contractor acknowledges that provision of such notice is an essential condition precedent to Contractor's rights in connection with any such delays, obstructive hindrances, or interferences and to City ability to fully identify and expeditiously address and avoid such cause or causes, and, accordingly, Contractor expressly waives all rights with respect to any such cause or causes for which notice hereunder was not provided. Notwithstanding the foregoing, if the Contract is at variance with granting such time extension, then the provisions of the Contract shall control.

The Engineer shall ascertain the facts and the extent of the delay, and the Engineer's findings thereon shall be final and conclusive.

8-1.07C Delay Caused by City

If the City causes a substantial delay to the Project and the Contractor sustains losses which could not have been avoided by Contractor’s judicious handling of the Project and those losses, the City, in its sole discretion, may elect to pay the Contractor an amount the City finds fair and reasonable for the Contractor’s actual losses, as in the sole opinion of the City, were unavoidable due to the delay. The total amount of any payment made pursuant to this section, shall be as determined in Section 8-1.08 “Right of Way Delays.”

The Contractor shall not be entitled to the aforesaid payment unless the Contractor notifies the City in writing of the City’s substantial delay within forty-eight (48) hours of the commencement thereof and includes facts and supporting documentation of the following:

1. That Contractor could not have anticipated or avoided such delay, obstruction, hindrance, or interference and has used all available means to minimize the consequences thereof; and

2. Evidence of the delay based upon and by incorporating the most recently updated and approved critical path method (CPM) schedule and narratives to explain that the City’s delay impacted the Project schedule.

Contractor acknowledges that provision of such notice is an essential condition precedent to Contractor's rights in connection with any such delays and to City ability to fully identify and expeditiously address and

avoid such cause or causes. Accordingly, Contractor expressly waives all rights with respect to any such cause or causes for which notice hereunder was not provided. Notwithstanding the foregoing, if the Contract is at variance with granting such time extension, then the provisions of the Contract shall control.

Contractor shall make all reasonable efforts to work with the City to remove or eliminate the cause for substantial delay, and shall, upon cessation of the cause, diligently pursue performance of its contractual obligations.

8-1.07D Delay Due to Material Shortage

No Contract Time extension will be granted for a delay caused by a shortage of materials unless the Contractor furnishes to the Engineer documentary proof that the Contractor has made every effort to obtain such materials from all known sources within reasonable reach of the Work in a diligent and timely manner, and further proof in the form of supplementary progress schedules, as required in Section 8-1.04, " Schedules," that the inability to obtain such materials when originally planned and did in fact cause a delay in final completion of the entire Work which could not be compensated for by revising the sequence of the Contractor's operations.

The term "shortage of materials," as used in this section, shall apply only to materials, articles, parts, or equipment which are standard items and are to be incorporated in the Work. It shall not apply to materials, parts, articles, or equipment which are processed, made, constructed, fabricated, or manufactured to meet the specific requirements of the Contract. Only the physical shortage of material will be considered under these provisions as a cause for extension of time. Delays in obtaining materials due to priority in filling orders will not constitute a shortage of materials.

8-1.08 RIGHT OF WAY DELAYS

If, through the failure of the City to acquire or clear right of way for the Work, the Contractor sustains a loss which could not have been avoided by the judicious handling of forces, equipment, and plant, the Engineer has sole discretion to adjust the Contract Sum as follows.

Compensation for idle time of equipment will be determined in the same manner as determinations are made for equipment used in the performance of Extra Work paid for on a force account basis, with the following exceptions:

1. The right of way delay factor for each classification of equipment shown in the Caltrans publication entitled Labor Surcharge And Equipment Rental Rates and General Prevailing Wage Rates," which is a part of the Contract, will be applied to such equipment rental rate.

2. The time for which such compensation will be paid, will be the actual normal working time during which such delay condition exists, but in no case will exceed eight (8) hours in any one day.

3. The days for which compensation will be paid, will be the business days during the existence of such delay, except that when rental of equipment is paid for under the provisions in Section 9-2.02, "Force Account Payment." No payment will be made for right of way delays in accordance with the provisions in this section.

Actual loss shall be understood to include no items of expense other than idle time of equipment and necessary payments for idle time of workers, cost of extra moving of equipment, and cost of longer hauls. Compensation for idle time of equipment will be determined as provided in this section and compensation for idle time of workers will be determined as force account labor and no markup will be added in either case for overhead and profit. The cost of extra moving of equipment and the cost of longer hauls will be paid for as Extra Work.

If performance of the Contractor's Work is delayed as the result of the failure of the City to acquire or clear right of way, an extension of time determined pursuant to the provisions in Section 8-1.07, "Liquidated Damages," will be granted.

8-1.09 UTILITIES AND OTHER FACILITIES

Attention is directed to Section 7-1.10, "Preservation of Property," and Section 7-1.11, "Responsibility for Damage."

The Contractor shall protect from damage utilities and other facilities that are to remain in place, be installed, relocated, or otherwise rearranged.

It is anticipated that some or all of the utilities and other facilities, both above ground and below ground, that are required to be rearranged (as used herein, rearrangement includes installation, relocation, alteration, or removal) as a part of the project site improvement will be rearranged in advance of construction operations. Where it is not anticipated that such rearrangement will be performed prior to construction, or where the rearrangement must be coordinated with the Contractor's construction operations, the existing utilities and other facilities that are to be rearranged will be indicated in the Contract Documents.

1. **Right of Entry**. The right is reserved to the City and the owners of utilities and other facilities, or their authorized agents, to enter upon the Project for the purpose of making such changes as are necessary for the rearrangement of their utilities and other facilities or for making necessary connections or repairs to their properties. The Contractor shall cooperate with forces engaged in such work and shall conduct their operations in such a manner as to avoid any unnecessary delay or hindrance to the work being performed by such other forces. Wherever necessary, the Work of the Contractor shall be coordinated with the rearrangement of such utilities or other facilities, for the coordination of the work.

2. **Right of Access**. Contractor shall obtain authorization from the owners of utilities and other facilities involved and shall notify City at least seventy-two (72) hours in advance, when it is necessary to interrupt any existing service to make connections. Interruption in service shall be of the shortest possible duration for the Work at hand and shall be approved in advance by City.

3. **Utilities and Other Facilities Not Shown on Contract Documents**. Where it is determined by the Engineer that the rearrangement of an utility or other facility, the existence of which is not shown on the Contract Documents, is essential in order to accommodate the improvement, the Engineer will provide for the rearrangement of such utility or other facility by other forces and the Contractor shall be given additional working days to accommodate for the coordination and rearrangement of such facility by the other forces and no additional compensation will be allowed thereof.

   Attention is directed to Government Code Sections 4215 through 4217 concerning the protection of public utilities in public contracts.

   Attention is directed to the possible existence of underground main or trunk line facilities not indicated in the Contract Documents and to the possibility that underground main or trunk lines may be in a location different from that which is indicated in the Contract Documents. The Contractor shall ascertain the exact location of underground main or trunk lines whose presence is indicated in the Contract Documents, the location of their service laterals or other appurtenances, and of existing service lateral or appurtenances of any other underground facilities which can be inferred from the presence of visible facilities such as buildings, meters, and junction boxes prior to doing work that may damage any of such facilities or interfere with their service.

   If the Contractor discovers underground main or trunk lines not indicated in the Contract Documents, the Contractor shall immediately give the Engineer and the pertinent Utility Company written notification of the existence of such facilities. Such main or trunk lines shall be located and protected from damage as directed by the Engineer and the cost of such work will be paid for as

Extra Work. The Contractor shall, if directed by the Engineer, repair any damage which may occur to such main or trunk lines. The cost of such repair work, not due to the failure of the Contractor to exercise reasonable care, will be paid for as Extra Work. Damage due to the Contractor's failure to exercise reasonable care shall be repaired at the Contractor's sole cost and expense and no additional compensation will be allowed therefor.

Where it is determined by the Engineer that the rearrangement of an underground facility is essential in order to accommodate the project site improvement and the Contract Documents do not provide that such facility is to be rearranged, the Engineer will provide for the rearrangement of such facility by other forces or such rearrangement shall be performed by the Contractor and will be paid for as Extra Work. In the instances where other forces will provide for the rearrangement of the facility, the Engineer shall provide the Contractor with extra days and no additional compensation will be allowed therefor.

The Contractor shall immediately notify the Engineer of any delays to operations as a direct result of underground main or trunk line facilities which were not indicated on the Contract Documents or were located in a position substantially different from that indicated on the Contract Documents, or as a direct result of utility or other facilities not being rearranged as herein provided (other than delays in connection with rearrangements made to facilitate construction operations or delays due to a strike or labor dispute). Any such delays will be considered right of way delays within the meaning of Section 8-1.08, "Right of Way Delays," and compensation for such delay will be determined in accordance with said Section 8-1.08. The Contractor shall be entitled to no other compensation for any such delay.

Notwithstanding any other provisions of the Contract Documents, the City shall, as between the City and Contractor, assume the responsibility and the cost therefor for the location, repair of damage not due to the Contractor's failure to exercise reasonable care, removal, or relocation of existing main and trunkline utility facilities located on the site of the Work, if such facilities are not identified in the Contract Documents made a part of the Notice to Contractors inviting bids for the Work, and for equipment on the Project necessarily idled during such location, repair, removal or relocation. If the Contractor, while performing the Contract, discovers utility facilities not identified by the City in the Contract Documents, the Contractor shall immediately notify the Engineer and the utility in writing within twenty-four (24) hours of discovery. The public utility, where it is the owner of an affected utility, shall have the sole discretion to perform repairs, removal, or relocation work or permit the Contractor to do such repairs, removal, or relocation work on the affected utility at a reasonable price.

The Contractor shall not be assessed liquidated damages for delay in completion of the Project when such delay was caused by the failure of the City to provide for removal or relocation of such unmarked utility facilities.

4. **Utilities and Other Facilities Shown on Contract Documents.** If the Contractor cannot locate an underground facility whose presence is indicated on the Contract Documents, the Contractor shall so notify the Engineer in writing. If the facility for which such notice is given is in a substantially different location from that indicated on the Contract Documents, the additional cost of locating the facility will be paid for as Extra Work.

   When ordered by the Engineer in writing, the Contractor shall rearrange any utility or other facility necessary to be rearranged as a part of the project site improvement, and such work will be paid for as Extra Work.

   Should the Contractor desire to have any rearrangement made in any utility facility, or other improvement, for the Contractor's convenience in order to facilitate construction operations, which rearrangement is in addition to, or different from, the rearrangements indicated on the Contract

Documents, the Contractor shall make whatever arrangements are necessary with the owners of such utility or other facility for such rearrangement and bear all expenses in connection therewith.

5. **Impact of Strike or Labor Dispute.** Any delays to the Contractor's operations as a direct result of utility or other facilities not being rearranged as provided in this section due to a strike or labor dispute, will entitle the Contractor to an extension of time as provided in Section 8-1.07, "Liquidated Damages." The Contractor shall be entitled to no other compensation for any such delay.

6. **Visible Utilities**. Nothing herein shall be deemed to require the City to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the site of the construction project can be inferred from the presence of other visible facilities, such as buildings, meter, and junction boxes, on or adjacent to the site of the construction. However, nothing herein shall relieve the City from identifying main or trunklines in the Contract Documents.

7. **Utility Delays**. Nothing herein shall preclude the City from pursuing any appropriate remedy against the utility for delays which are the responsibility of the utility.

   Nothing herein shall be construed to relieve the utility from any obligation as required either by law or by Contract to pay the cost of removal or relocation of existing utility facilities.

8-1.10 TERMINATION OF CONTRACT

The Contract may be terminated by the Engineer when termination is authorized by Section 7-1.11D, "Legal Actions Against the City," Section 7-1.15A, "Damage by Storm, Flood, or Earthquake," or by other provisions of the Contract Documents which authorize termination.

The City also reserves the right to terminate the Contract at any time upon a determination by the Engineer in the Engineer's sole discretion that termination of the Contract is in the best interest of the City. If the City elects to terminate the Contract for convenience, the termination of the Contract and the total compensation payable to the Contractor shall be governed by the following:

A. The City will issue the Contractor a written Notice of Termination signed by the Engineer. Upon receipt, the Contractor shall:

   1. Stop all Work under the Contract except that specifically directed to be completed prior to acceptance.

   2. Perform Work the Engineer deems necessary to secure the Project for termination.

   3. Remove equipment and plant from the site of the Work.

   4. Take such action as is necessary to protect materials from damage.

   5. Notify all Subcontractors and suppliers that the Contract is being terminated and that their Contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer.

   6. Provide the Engineer with an inventory list of all materials previously produced, purchased, or ordered from suppliers for use in the Work and not yet used in the Work, including its storage location, and such other information as the Engineer may request.

   7. Dispose of materials not yet used in the Work, as directed by the Engineer. It shall be the Contractor's responsibility to provide the City with good title to all materials purchased by the City hereunder, including materials for which partial payment has been made as provided in Section 9-2.06, “Progress Payments," and with bills of sale or other documents of title for such materials.

8. Subject to the prior written approval of the Engineer, settle all outstanding liabilities and all claims arising out of Subcontracts or orders for materials terminated hereunder. To the extent directed by the Engineer, the Contractor shall assign to the City all the right, title, and interest of the Contractor under Subcontracts or orders for materials terminated hereunder.

9. Furnish the Engineer with the documentation required to be furnished by the Contractor under the provisions of the Contract including, on projects as to which Federal and State funds are involved, all documentation required under the Federal and State requirements included in the Contract.

10. Take such other actions as the Engineer may direct.

B. Acceptance of the Contract as hereinafter specified shall not relieve the Contractor of responsibility for damage to materials. The Contractor shall continue to be responsible for damage to materials after issuance of the Notice of Termination, except as follows:

1. The Contractor's responsibility for damage to materials for which partial payment has been made as provided in Section 9-2.06, “Progress Payments," and for materials furnished by the City for use in the Work and unused shall terminate when the Engineer certifies that such materials have been stored in the manner and at the locations the Engineer has directed.

2. The Contractor's responsibility for damage to materials purchased by the City subsequent to the issuance of the Notice of Termination, shall terminate when title and delivery of such materials has been taken by the City.

3. When the Engineer determines that the Contractor has completed the Work under the Contract directed to be completed prior to termination and such other Work as may have been ordered to secure the Project for termination, the Contractor will recommend that the Engineer formally accept the Contract to the extent performed, and immediately upon and after such acceptance by the Engineer, the Contractor will not be required to perform any further Work thereon.

C. Termination of the Contract shall not relieve the Contractor or its Surety of its obligation for any just claims or warranties arising out of the Work performed by Contractor.

D. The total compensation to be paid to the Contractor shall be determined by the Engineer on the basis of the following:

1. The reasonable cost to the Contractor, without profit, for all Work performed under the Contract, including mobilization, demobilization, and Work done to secure the project for termination. In determining the reasonable cost, deductions will be made for the cost of materials to be retained by the Contractor, amounts realized by the sale of materials, and for other appropriate credits against the cost of the Work. Deductions will also be made, when the Contract is terminated under the authority of Section 7-1.15A, "Damage by Storm, Flood, or Earthquake," for the cost of materials damaged by the "occurrence." When, in the opinion of the Engineer, the cost of a Contract item of work is excessively high due to costs incurred to remedy or replace defective or rejected work, the reasonable cost to be allowed will be the estimated reasonable cost of performing such work in compliance with the requirements of the Contract Documents and the excessive actual cost shall be disallowed.

2. A reasonable allowance for profit on the cost of the Work performed as determined under Subsection (D)(1), provided the Contractor establishes to the satisfaction of the Engineer that it is reasonably probable that the Contractor would have made a profit had the Contract been completed and provided further, that the profit allowed shall in no event exceed four percent (4%) of said cost of Work actually performed.

3. The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the City or otherwise disposed of as directed by the Engineer.

4. A reasonable allowance for the Contractor's administrative costs in determining the amount payable due to termination of the Contract.

5. A reasonable credit to the City for defective or incomplete work not corrected.

All records of the Contractor and subcontractors necessary to determine compensation in accordance with the provisions of this section shall be available to the City at all times after the Notice of Termination and for a period of three (3) years thereafter, and Contractor shall retain such records for that period.

After acceptance of the Work then performed by the Engineer, the Engineer may make payments on the basis of interim estimates pending issuance of the Final Estimate in accordance with Section 9-2.07A, “Final Payment," when, in the Engineer's opinion, the amount thus paid, together with all amounts previously paid or allowed, will not result in total compensation in excess of that to which the Contractor will be entitled. All payments, including payment upon the Final Estimate shall be subject to deduction for prior payments and amounts, if any, to be kept or retained under the provisions of the Contract.

If this Contract is terminated by the City for cause, and it is later determined that the proper basis for a termination for cause did not exist, the termination shall be deemed to have been a termination for convenience and governed by the terms of this contract dealing with such termination.

If the Contract is terminated by the City for cause or convenience, such termination shall neither act as a waiver by the City of its right to require the Contractor to correct defects in the Work performed by the Contractor nor void any warranties applicable to the Work performed under the Contract.

The provisions of this section shall be included in all Subcontracts. In the event of conflict between the termination provisions of this section and any other provision of the Contract or subcontract, this section shall prevail.

8-1.11 A CONTINUATION OF CONTRACT

If a dispute should arise between the Contractor and the City regarding Work performed or to be performed or payment therefor, Contractor hereby agrees that it will continue to perform the Work called for under this Contract and hereby expressly waives its rights, if any, to terminate or suspend Work pending resolution of said dispute.

8-1.12 CONCURRENT DELAYS

Where there are concurrent delays to a controlling item of Work, no extension of time or additional compensation shall be granted to the Contractor where at least one of the delays is due, in part or in whole, to the Contractor's own acts.

8-1.13 CITY'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within seven (7) days of the date the written notice from the City was sent to commence and continue correction of such default or neglect with diligence and promptness, the City may make good such deficiencies. Contractor shall be responsible for any and all costs incurred by City in curing such default or neglect.

END OF SECTION

SECTION 9 MEASUREMENT, PAYMENT, AND CLAIMS

9-1 MEASUREMENT

9-1.01 GENERAL

All Work to be paid for at a Contract price per unit of measurement will be measured by the Engineer in accordance with United States Standard Measurements. A ton shall consist of 2,000 pounds avoirdupois.

9-1.02 WEIGHING EQUIPMENT AND PROCEDURES

Unless shipped by rail, material paid for by weight shall be weighed on scales furnished by and at the expense of the Contractor or on other sealed scales regularly inspected by the California Division of Measurement Standards or its designated representative.

All weighing, measuring, and metering devices used to measure the quantity of materials used in the Work shall be suitable for the purpose intended and shall conform to the tolerances and specifications as outlined in Title 4, Division 8 of the California Administrative Code, the California Business and Professions Code, Division 5, and the Contract Documents. Devices not Type-approved by the Division of Measurement Standards shall be Type-approved in accordance with California Test 109.

All weighing, measuring, or metering devices used to determine the quantity of materials to be paid for will be considered to be "commercial devices," and shall be sealed by the Division of Measurement Standards or its authorized representative as often as the Engineer may deem necessary. The installation of all portable vehicle scales must be approved by the Engineer prior to sealing.

All vehicle scales shall be of sufficient size to permit the entire vehicle or combination of vehicles to rest on the scale deck while being weighed. Combination vehicles may be weighed as separate units provided they are disconnected while being weighed. The maximum concentrated load shall not exceed the manufacturer's designed section capacity of the scale.

All weighing, measuring, or metering devices required by these Specifications for the purpose of proportioning a material or product will be considered to be "non-commercial devices," and shall be tested and approved in accordance with California Test 109. This testing shall be done by one of the following, in the presence of the Engineer, as often as the Engineer deems necessary:

1. A County Sealer of Weights and Measures,
2. A Scale Service Agency, or
3. A Division of Measurement Standards Official.

The Contractor shall notify the Engineer at least 24 hours in advance of testing the device.

All under-supports for scale bearing points shall be constructed of Portland cement concrete produced from commercial quality aggregates and cement, which contains not less than 470 pounds of cement per cubic yard. Under-supports shall be constructed in a manner to prevent any shifting or tilting of the support. They shall have a minimum height of 14 inches above ground line. The footings shall have a minimum depth of 6 inches below the ground line. The bearing surface of the footings shall have a minimum width of 30 inches and shall be of such area that the pressure does not exceed 4,000 pounds per square foot. Adequate drainage shall be provided to prevent saturation of the ground under the scale. Scale bulkheads shall be of adequate material and strength to resist displacement.

If timber bulkheads are used, the minimum cross section shall be 8-inches by 8-inches. Wedges shall not be used to shim the supports. If shimmying is necessary, it shall be done by securely attached metal shims or by grouting. Shimmying shall not exceed 3-inches. The approach ramps shall be level with the scale deck for a distance of not less than 1/2 the length of the scale deck. The mechanical indicating elements shall be installed level and plumb and shall be rigidly mounted upon a concrete foundation.

The lever system and mechanical indicating elements of hopper scales shall be rigidly attached to non-yielding supports in such a manner as to prevent any loss in weight due to bending and distortion of the supports.

When a multiple beam type scale is used in proportioning materials, an over and under indicator shall be provided which will give positive visible evidence of the amount of any over and underweight. The indicator shall be so designed that it will operate during the addition of the last 200 pounds of any weighing. The over-travel of the indicator shall be at least 1/3 of the loading travel. Indicators shall be enclosed to protect against moisture and dust.

All over and under, dial, and other indicators for weighing and measuring systems used in proportioning materials shall be grouped so that the smallest increment for each indicator can be accurately read from the point at which the proportioning operation is controlled.

The Contractor shall bear the expense of all service fees for testing and approving of "non-commercial devices." The cost of the equipment, labor, and materials furnished by the Contractor to assist in the testing of weighing, measuring, or metering devices will be considered as is included in the Contract prices paid for the various contract items requiring said weighing, measuring, or metering, included in the Contract Sum, and no separate payment will be made therein.

Whenever pay quantities of material are determined by weighing, the scales shall be operated by a weighmaster licensed in accordance with the provisions of the California Business and Professions Code, Division 5, Chapter 7. The Contractor shall furnish a Public Weighmaster's certificate or certified daily summary weigh sheets. A representative of the Department may, at the discretion of the Engineer, be present to witness the weighing and to check and compile the daily record of such scale weights.

When required by the Engineer, the operator of each vehicle weighed shall obtain a weight or load slip from the weigher and deliver said slip to the Engineer at the point of delivery of the material.

If material is shipped by rail, the car weights will be accepted provided that actual weight of material only will be paid for and not minimum car weight used for assessing freight tariff, and provided further that car weights will not be acceptable for material to be passed through mixing plants.

Vehicles used to haul material being paid for by weight, shall be weighed empty daily and at such additional times as the Engineer may direct. Each vehicle shall bear a plainly legible identification mark. Vehicles may from time to time be required by the Engineer to have the weight of the material to be paid for verified by weighing the empty and loaded vehicle on such other scales as the Engineer may designate.

All loads in vehicles hauled over streets and highways shall be legal loads and no payment will be made for the loads in excess of the legal load limits.

All materials which are specified for measurement by the cubic yard "measured in the vehicle" shall be hauled in vehicles of such type and size that the actual contents may be readily and accurately determined. Unless all vehicles are of uniform capacity, each vehicle must bear a plainly legible identification mark indicating its water level capacity. All vehicles shall be loaded to at least their water level capacity and all loads shall be leveled when the vehicles arrive at the point of delivery. Loads hauled in vehicles not meeting the above requirements or loads of a quantity less than the capacity of the vehicle, measured after being leveled off as above provided, will be subject to rejection, and no compensation will be allowed for such material.

When material is to be measured and paid for on a volume basis and it is impractical to determine the volume by the specified method of measurement, or when requested by the Contractor in writing and approved by the Engineer in writing, the material will be weighed in accordance with the requirements specified for weight measurement and such weights will be converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by

the Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities will be adopted.

Quantities of material wasted or disposed of in a manner not called for under the Contract, or rejected loads of material, including material rejected after it has been placed by reason of the failure of the Contractor to conform to the provisions of the Contract, or material not unloaded from the transporting vehicle, or material placed outside of the lines indicated on the plans or established by the Engineer, or material remaining on hand after completion of the Work; will not be paid for and such quantities will be deducted from the final total quantities. No compensation will be allowed for hauling and disposing of rejected material.

The weight of all aggregate or other roadway material which is to be paid for on a weight basis, except imported borrow, imported topsoil, straw, fiber, aggregate subbases, aggregate bases, or aggregate for cement treated bases, will be determined by deducting from the weight of material, the weight of water in the material at the time of weighing in excess of 3 percent of the dry weight of the material. When imported borrow, imported topsoil, or aggregate subbase is being paid for on weight basis, the weight to be paid for will be determined by deducting from the weight of the material, the weight of water in· the material at the time of weighing in excess of 6 percent of the dry weight of the material. When straw is being paid for on weight basis, the weight to be paid for will be determined by deducting from the weight of straw, the weight of water in the straw at the time of weighing in excess of 15 percent of the dry weight of the straw. When fiber is being paid for on a weight basis, the weight of water in the fiber at the time of weighing shall not exceed 15 percent of the dry weight of the fiber. No deduction will be made for the weight of water in fiber. The percentage of water in the material shall be determined by California Test 226. The weight of aggregate base and aggregate for cement treated bases which are to be paid for on a weight basis, will be determined as provided in Section 26, "Aggregate Bases," and Section 27, "Cement Treated Bases," respectively.

The weight of water deducted as provided in this section will not be paid for.

Full compensation for all expenses involved in conforming to the requirements specified in this section shall be considered as included in the Contract unit prices paid for the materials being measured or weighed and no additional compensation will be allowed therefor.

9-1.03 PAY QUANTITIES

All quantities shown in the Contract Documents, unless specifically designated as final pay quantities are estimated quantities and will be measured and paid for in accordance with the applicable provisions of the Contract Documents. The estimated quantities shall be considered as approximate only and no guaranty is made that the quantities which can be determined by computations, based on the details and dimensions of the plans, will equal the estimated quantities as shown in the Contract Documents.

9-1.04 FINAL PAY QUANTITIES

When the estimated quantities for a specific portion of the Work are designated in the Contract as final pay quantities, said estimated quantities shall be the final quantities for which payment for such specific portion of the Work will be made, unless the dimensions of said portions of the Work shown on the plans are revised by the Engineer. If such dimensions are revised, and such revisions result in an increase or decrease in the quantities of such Work, the final quantities for payment will be revised in the amount represented by the changes in the dimensions. The estimated quantities for such specific portion of the Work shall be considered as approximate only and no guarantee is made that the quantities which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantities. No allowance will be made in the event that the quantities based on computations do not equal the estimated quantities.

When portions of an item have been designated in the Contract as final pay quantities, portions not so designated will be measured and paid for in accordance with the applicable provisions of the Contract Documents.

In case of a discrepancy between the quantities designated in the Contract as final pay quantities and the quantity of the same item shown in the Engineer's Estimate, payment will be based on the final pay quantities shown on the Base Bid Schedule.

9-2 PAYMENT

9-2.00 GENERAL

Payment shall conform to the Contract Documents and these *City Standard Specifications*.

9-2.01 SCOPE OF PAYMENT

The Contractor shall accept the Contract Sum as full payment for furnishing all resources and activities necessary to complete the Work in accordance with the Contract Documents. Contractor shall accept the compensation provided in the Contract Sum and Contract Documents as full payment for:

1. Furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the Work;
2. Performing all Work contemplated and embraced under the Contract Documents;
3. Risk, loss, damage repair, suspension or discontinuation, or cost of whatever character and description arising from or relating to the Work and performance of the Work, including unforeseen difficulties;
4. All expenses incurred in consequence of the Work, including all permits, licenses, agreements, certifications, taxes, and royalties and costs arising from patents, trademarks, and copyrights involved in the Work;
5. All expenses incurred in consequence with the suspension or discontinuance of the Work as provided in the Contract; and
6. Completing the Work according to the Contract Documents.

The City does not pay for Contractor’s loss, damage, repair, or extra costs of whatever character arising from the Work that is a direct or indirect result of Contractor’s choice of construction methods, materials, equipment, or manpower, unless specifically mandated by the Contract.

No compensation will be made in any case for loss of anticipated profits.

Any payment to the Contractor for Work performed under this Contract, whether a partial progress payment or final payment, shall not waive City's right to demand that the Contractor correct defects in the Contractor's Work, whether or not defects were known to the Engineer, the City, or the City’s agents or employees at the time such payment was made.

Whenever it is specified or indicated in the Contract Documents that the Contractor is to do Work or furnish materials for which no price is fixed in the Contract, it is understood and agreed that there is included in each lump sum or unit price bid, the entire cost of all Work, incidental to the completion of that part of the Work covered by each lump sum or unit price bid, or if not directly incidental to any specific bid items, the cost thereof has been distributed among those bid items deemed most appropriate by the Contractor and is included in the Contract Sum.

Payment for a bid item includes payment for Work in sections referenced by the section set forth by that bid item.

The City pays for Change Order work based on one or a combination of the following:

1. Bid item prices
2. Agreed price
3. Force Account
4. Specialist billing

The Engineer shall work with the Contractor on an agreed price. If the Contractor and Engineer cannot agree on the Change Order price, then the City will pay for the Work by Force Account.

The Contractor shall pay their subcontractors within seven (7) days of receipt of each progress payment, pursuant to Public Contract Code Sections 10262 and 10262.5.

9-2.02 FORCE ACCOUNT PAYMENT

Payment as provided herein shall constitute full compensation to the Contractor for performance of Extra Work paid for on a force account basis and no additional compensation will be allowed therefor. When Extra Work is to be paid for on a force account basis, the labor, materials, and equipment used in the performance of such Work shall be subject to the preapproval of the Engineer and compensation will be determined as follows.

9-2.02A Work Performed by Contractor

The Contractor will be paid the direct and actual costs for labor, materials and equipment used in performing the Extra Work determined as hereinafter provided except where agreement has been reached to pay in accordance with Section 9-2.02B, "Work Performed by Special Forces or Other Special Services."

To the total of the direct and actual costs computed as provided herein, there will be added a markup of 15 percent to the cost of labor, 15 percent to the cost of materials, and 15 percent to the equipment rental and no additional markup will be allowed thereof.

The above markups shall constitute full compensation for all overhead costs (general overhead, supervision, office expenses, field office facilities, utilities, and transportation) and profit which shall be deemed to include all items of expense not specifically designated as cost or equipment rental herein. No additional markups will be permitted. The total payment made as provided above shall be deemed to be the actual and direct cost of such Extra Work and shall constitute full compensation therefor.

When Extra Work to be paid for on a force account basis is performed by a Subcontractor, approved in accordance with the provisions in Section 8-1.01, "Subcontracting," an additional markup of 5 percent will be added to the total cost of said Extra Work including all markups specified in this section. Said additional 5 percent markup shall reimburse the Contractor for any and all additional overhead, job site, home office, and administrative costs, and no other additional payment will be made by reason of performance of the Extra Work by a Subcontractor.

9-2.02A(1) Labor

The Contractor will be paid the cost of labor for the workers (including foremen, when authorized in advance by the Engineer) used in the actual and direct performance of the Extra Work. The cost of labor, whether the employer is the Contractor, Subcontractor, or other forces, will be the sum of the following:

a. **Actual Wages.** The actual wages paid shall include any employer payments to or on behalf of the workers for: health and welfare, pension, vacation, training and other State and Federal recognized fringe benefit payments.

b. **Labor Surcharge.** To the actual wages, as defined in Section (a), “Actual Wages,” above, will be added a labor surcharge set forth in the State of California, Department of Transportation publication entitled “Labor Surcharge And Equipment Rental Rates”, which is in effect on the date upon which the Extra Work is accomplished and which is a part of the Contract. Said labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws (i.e. Workers’ Compensation insurance, social security, Medicare, Federal Unemployment Insurance, State Unemployment Insurance, and State Training Taxes) and for all other payments made to, or on behalf of, the workers, other than actual wages as defined in this section.

c. **Subsistence and Travel Allowance.** The actual subsistence and travel allowance paid to such workers.

9-2.02A(2) Materials

The City reserves the right to furnish such materials as it deems advisable, and the Contractor shall have no claims for costs and markup on such materials.

Only materials furnished by the Contractor and necessarily used in the performance of the Extra Work will be paid for. The cost of such materials will be the cost to the purchaser, whether Contractor, Subcontractor, or other forces, from the supplier thereof, except as the following are applicable:

a. **Discount:** If a cash or trade discount by the actual supplier is offered or available to the purchaser of the materials, it shall be credited to the City notwithstanding the fact that such discount may not have been taken.

b. If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to such purchaser, the cost of such materials shall be deemed to be the price paid to the actual supplier as determined by the Engineer plus the actual costs, if any, incurred in the handling of such materials.

c. If the materials are obtained from a supply or source owned wholly or in part by the purchaser, the cost of such materials shall not exceed the price paid by the purchaser for similar materials furnished from said source on contract items or the current wholesale price for such materials delivered to the job site, whichever price is lower.

d. If the cost of such materials is, in the opinion of the Engineer, excessive, then the cost of such material shall be deemed to be the lowest current wholesale price at which such materials were available in the quantities concerned delivered to the job site, less any discounts as provided in Section (a), “Discount,” above.

e. If the Contractor does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof within thirty (30) days of billing, the City reserves the right to establish the cost of such materials at the lowest current wholesale prices at which such materials were available in the quantities concerned delivered to the location of the Work, less any discounts as provided in Section (a), “Discount,” above.

9-2.02A(3) Equipment Rental

a. **Rental Rate.** The Contractor will be paid for the use of equipment at the rental rates listed for such equipment in the State of California Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the Work is accomplished and which is a part of the Contract, regardless of ownership and rental or other agreement, if such may exist, for use of such equipment entered into by the Contractor, except that for those pieces of equipment with a rental rate of $10.00 per hour or less as listed in the Labor Surcharge And Equipment Rental Rates publication and which are rented from a local equipment agency, other than Contractor owned, the Contractor will be paid at the hourly rate shown on the rental agency invoice or agreement for the time used on force account work as provided in Section 9-2.02A(3)(b), "Equipment on the Work." If a minimum equipment rental amount is required by the local equipment rental agency, the actual amount charged will be paid to the Contractor.

   If it is deemed necessary by the Engineer to use equipment not listed in said publication, a suitable rental rate for such equipment will be established by the Engineer. The Contractor may furnish any cost data which might assist the Engineer in the establishment of such rental rate. If the rental rate established by the Engineer is $10.00 per hour or less, the provisions above concerning rental of equipment from a local equipment agency shall apply.

The rental rates paid as above provided shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Operators of rented equipment will be paid for as provided in Section 9-2.02A(1), "Labor."

All equipment shall, in the opinion of the Engineer, be in good working condition and suitable for the purpose for which the equipment is to be used.

Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum ratings recommended by the manufacturer.

Individual pieces of equipment or tools not listed in said publication and having a replacement value of $500 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.

Rental time will not be allowed while equipment is inoperative due to breakdowns.

b. **Equipment on the Work.** The rental time to be paid for equipment on the Work shall be the time the equipment is in operation on the Extra Work being performed, and in addition, shall include the time required to move the equipment to the location of the Extra Work and return it to the original location or to another location requiring no more time than that required to return it to its original location, except that moving time will not be paid for if the equipment is used at the site for Work other than the Extra Work. Loading and transporting costs will be allowed, except that no payment will be made if the equipment is used for Work other than the Extra Work.

   The following shall be used in computing the rental time of equipment on the Work:

   1. When hourly rates are listed, less than 30 minutes of operation shall be considered l/2 hour of operation.

   2. When daily rates are listed, less than 4 hours of operation shall be considered 1/2 day of operation.

c. **Equipment for Extra Work.** For the use of equipment moved in on the Work and used exclusively for Extra Work paid for on a force account basis, the Contractor will be paid the rental rates listed in the State of California Department of Transportation publication entitled ”Labor Surcharge And Equipment Rental Rates”, which is in effect on the date upon which the Work is accomplished and which is a part of the Contract, or determined as provided in Section 9-2.02A(3), “Equipment Rental,” and for the cost of transporting the equipment to the location of the Work and its return to its original location, all in accordance with the following provisions:

   1. The original location of the equipment to be hauled to the location of the Work shall be agreed to by the Engineer in advance.

   2. The City will pay the costs of loading and unloading such equipment.

   3. The cost of transporting equipment in low bed trailers shall not exceed the hourly rates charged by established haulers.

   4. The cost of transporting equipment shall not exceed the applicable minimum established rates of the Public Utilities Commission.

The rental period shall begin at the time the equipment is unloaded at the site of the Extra Work, shall include each day that the equipment is at the site of the Extra Work, excluding Saturdays, Sundays, and legal holidays unless the equipment is used to perform the Extra Work on such days, and shall terminate at the end of the day on which the Engineer directs the Contractor to discontinue the use of such equipment. The rental time to be paid per day will be a minimum of 4 hours. Any time beyond 4 hours, Contractor shall be paid on actual time equipment is used for Extra Work.

The hours to be paid for equipment which is operated less than 8 hours due to breakdowns, shall not exceed 8 less the number of hours the equipment is inoperative due to breakdowns.

When hourly rates are listed, less than 30 minutes of operation shall be considered to be 1/2 hour of operation.

When daily rates are listed, payment will not be made if the equipment is not used.

5. Should the Contractor desire the return of the equipment to a location other than its original location, the City will pay the cost of transportation in accordance with the above provisions, provided such payment shall not exceed the cost of moving the equipment to the Work.
6. Payment for transporting, loading, and unloading equipment, as above provided, will not be made if the equipment is used on the Work in any other way than upon Extra Work paid for on a force account basis.

When Extra Work other than work specifically designated as Extra Work in the Contract Documents is to be paid for on a force account basis and the Engineer determines that such Extra Work requires the Contractor to move on to the work equipment which could not reasonably have been expected to be needed in the performance of the Contract, the Engineer may authorize payment for the use of such equipment at equipment rental rates in excess of those listed as applicable for the use of such equipment subject to the following additional conditions:

1. The Engineer shall specifically approve the necessity for the use of particular equipment on such Work.

2. The Contractor shall establish to the satisfaction of the Engineer that such equipment cannot be obtained from a normal equipment source or sources and those of the Subcontractors.

3. The Contractor shall establish to the satisfaction of the Engineer that the proposed equipment rental rate for such equipment from the proposed source is reasonable and appropriate for the expected period of use.

4. The Engineer shall approve the equipment source and the equipment rental rate to be paid by the City before the Contractor begins Work involving the use of said equipment.

d. **Independently Owned and Operated Equipment.** When independently owned and operated equipment is used to perform Extra Work to be paid for on a force account basis, the Contractor will be paid for the equipment and operator, as follows:

1. Payment for the equipment will be made in accordance with the provisions in Section 9-2.02A(3), "Equipment Rental."

2. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the Contractor to other workers operating similar equipment already on the Project or, in the absence of such other workers, at the rates for such labor established by collective bargaining agreements for the type of worker and location of the Work, whether or not the owner-operator is actually covered by such an agreement. A labor surcharge will be added to

the cost of labor described herein, in accordance with the provisions in Section 9-2.02A(1)(b), "Labor Surcharge."

To the direct cost of equipment rental and labor, computed as provided herein, will be added the markups for equipment rental and labor as provided in Section 9-2.02A, "Work Performed by Contractor."

9-2.02B Work Performed by Special Forces or Other Special Services

When the Engineer and the Contractor, by agreement, determine that a special service or an item of Extra Work cannot be performed by the forces of the Contractor or those of any of the subcontractors, such service or Extra Work item may be performed by a specialist. Invoices for such service or item of Extra Work on the basis of the current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with the established practice of the special service industry to provide such complete itemization.

In those instances wherein a Contractor is required to perform Extra Work necessitating a fabrication or machining process in a fabrication or machine shop facility away from the job site, the charges for that portion of the Extra Work performed in such facility may, by agreement, be accepted as a specialist billing.

To the specialist invoice price, less a credit to the City for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added ten percent (10%) in lieu of the percentages provided in Section 9-2.02A, "Work Performed by Contractor."

9-2.03 RECORDS

The Contractor shall maintain all records in such a manner as to provide a clear distinction between the direct costs of Extra Work paid for on a force account basis and the costs of other operations.

From the above records, the Contractor shall furnish the Engineer completed daily Extra Work reports, on forms furnished by the City, for each day's Extra Work to be paid for on a force account basis. The daily Extra Work reports shall itemize the materials used, and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the Contractor, Subcontractor, or other forces, except for charges described in Section 9-2.02B, "Work Performed by Special Forces or Other Special Services." The daily Extra Work reports shall provide names or identifications and classifications of workers, the hourly rate of pay and hours worked, and also the size, type and identification number of equipment, and hours operated.

Material charges shall be substantiated by valid copies of vendor's invoices. Such invoices shall be submitted with the daily extra work reports, or if not available, they shall be submitted with subsequent daily Extra Work reports. Should said vendor's invoices not be submitted within thirty (30) days of billing the City reserves the right to establish the cost of such materials at the lowest current wholesale prices at which said materials were available in the quantities concerned delivered to the location of work less any discounts as provided in Section 9-2.02A(2), “Materials,” paragraph “a. Discount.”

Said daily Extra Work reports shall be signed by the Contractor or the Contractor's authorized representative.

The Engineer will compare his/her records with the completed daily Extra Work reports furnished by the Contractor and make any necessary adjustments. When these daily Extra Work reports are agreed upon and signed by both parties, said reports shall become the basis of payment for the Extra Work performed, but shall not preclude subsequent adjustment based on a later audit by the City.

The Contractor's cost records pertaining to Work paid for on a force account basis shall be open to inspection or audit by representatives of the City, during the life of the Contract and for a period of not less than 3 years after the date of acceptance thereof, and the Contractor shall retain such records for that

period. Where payment for materials or labor is based on the cost thereof to forces other than the Contractor, the Contractor shall make every reasonable effort to ensure that the cost records of such other forces will be open to inspection and audit by representatives of the City on the same terms and conditions as the cost records of the Contractor. If an audit is to be commenced more than 60 days after the acceptance date of the Contract, the Contractor will be given a 10-day notice of the time when such audit. is to begin.

9-2.04 STOP NOTICES

City will comply with California Civil Code Section 9350 et seq. regarding Stop Notices. All Preliminary and Stop Notices shall be sent to the attention and address indicated in the Contract Documents. The City withholds payments to cover claims filed under Civil Code Section 9000 et seq.

9-2.05 PROGRESS PAYMENTS

The Contractor shall be paid for the actual field accepted quantities of the various items of Work in accordance with the provisions below. However, the total invoiced and total payments shall not exceed the Contract Sum unless otherwise adjusted via Contract Change Order.

9-2.06 TIMELY PROGRESS PAYMENTS BY CITY AND INTEREST

By the 10th day of each month or as approved by the Engineer, the Contractor shall submit to the Engineer for approval an estimate in writing the value of the Work completed as compared to the time of the estimate. This shall include an itemization by bid items. The value of the Work shall be based upon the principals set forth in the measurement and payment portions of the bid items as set forth in the Contract Documents.

California Public Contract Code Section 20104.50 establishes the following procedures for timely progress payments and payment of interest.

1. In the event the City fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from the Contractor, the City shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.
2. Upon receipt of a payment request, the City shall act in accordance with both of the following:
   a. Each payment request shall be reviewed by the City as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request; and
   b. Any payment request determined by the City not to be a proper payment request suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven days after receipt. A request returned pursuant to this paragraph shall be accompanied by a document from the City setting forth in writing the reasons why the payment is not proper.
3. The number of days available to the City to make a payment without incurring interest shall be reduced by the number of days by which the City exceeds the above seven-day return requirement.
4. A “progress payment” includes all payment due to Contractor at the time of the invoice, except that portion of the final payment designated by the Contract as retention earnings.

No such estimate or payment shall be construed to be an acceptance of any defective work or improper materials.

Attention is directed to the express prohibition against payment to unlicensed contractors contained in Public Contract Code Section 10164.

The estimates of the Engineer shall be final and conclusive evidence of the amount of Work performed by the Contractor under this Contract, and shall be taken as full measure of compensation to be received by the Contractor.

Before any partial payment or the final payment is made, the Contractor may be required to submit satisfactory evidence that the Contractor is not delinquent in payments to employees, Subcontractors, suppliers, or creditors for labor and materials incorporated into the Work.

The Contractor shall maintain and provide to the City, with each partial payment request, certified payrolls for all of its employees and Subcontractor employees.

9-2.06A Payments Withheld

City may decline to certify payment and may withhold its certificate, or any certificate for payment previously issued, in whole or in part to such extent as may be necessary to protect City from loss because of defective work not remedied; third party claims filed or reasonable evidence indicating probable filing of such claims; payments which may be due and payable for just claims against Contractor or any Subcontractors in or about the performance of the Work; failure of Contractor to make proper payments to Subcontractors for labor, materials, or equipment; reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract amount; damage to City or to other work or property; reasonable evidence that the Work had not been or will not be completed within the Contract time; failure to carry out the Work in accordance with the Contract Documents; failure to provide weekly certified payroll records; Stop Notices filed, failure or refusal of Contractor to fully comply with the Contract; or costs to Owner resulting from the failure of Contractor to complete the Work within the Contract Time.

Whenever City withholds any monies otherwise due Contractor, City shall give written notice of the amount withheld and the reasons therefore to Contractor. When Contractor removes the grounds for such withholding, Contractor shall submit an invoice therefore, pursuant to Section 9-2.05, “Progress Payments.”

9-2.06B Retention

The City shall retain five percent (5%) of such estimated value of the Work done, and five percent (5%) of the value of the materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the Contract by Contractor. City will pay to Contractor, while Contractor carries on the Work, the balance not retained, after deducting therefrom all previous payments and all sums to be kept or retained after the provisions of the Contract and applicable laws.

No such estimate or payment shall be construed as an acceptance of any defective work or improper materials.

After completion of the Work and during project closeout for final project acceptance, if the Engineer finds that the Contractor’s Work is satisfactory and has been made in accordance with the approved Contract Documents, the City may reduce the total amount being retained to 2.5 percent of the total estimated value of Work. Such reduction will only be made upon the written request of the Contractor and shall be approved in writing by the surety on the Faithful Performance Bond and by the surety on the Labor & Materials Bond. The approval of the surety shall be submitted to the City and the signature of the person executing the approval for the surety shall be properly acknowledged and the power of attorney authorizing him/her to give such consent must either accompany the document or be on file with the City.

The City shall pay monthly to the Contractor, while carrying on the Work, the balance not retained after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of the Contract. No such estimate or payment shall be required to be made when, in the judgment of the Engineer, the Work is not proceeding in accordance with the provisions of the Contract, or the total value of the Work done since the last estimate amounts to less than $5,000.

9-2.06C Application for Progress Payment

1. By the 10th day of each month or as approved by the Engineer, the Contractor shall submit an application for progress payment for the Work done in the preceding month to the City. The

Contractor shall submit its monthly application for progress payment at a time acceptable to the Engineer, and the Contractor shall include whatever documentation the Engineer reasonably determines is necessary to authorize a progress payment.

The Contractor shall submit all field quantities completed to date for payment with each monthly pay estimate along with progress as-built drawings. The Contractor shall provide, in writing, who from their team will be responsible for field measuring quantities with the Engineer. Upon completion of a contract bid item, the Contractor's representative shall field measure the final quantities with the Engineer. This agreed upon amount will be considered final and no re-measuring of these field quantities will be allowed without the approval of the City. All supporting documentation required for payment of an item, shall be submitted by the Contractor within two pay periods following the work. Documentation submitted more than two pay periods after the work was completed will not be paid and the cost of this work shall be borne by the Contractor.

2. Before the City makes any partial payment or the final payment, and as a condition of a Contractor's application for progress or final payment being deemed complete, the Engineer may require the Contractor to submit satisfactory evidence that the Contractor is not delinquent in payments to employees, Subcontractors, suppliers, or creditors for labor and materials incorporated into the work.

3. The Contractor shall provide to the Engineer, with each application for progress payment, the verified and certified payroll records for all of its employees and those employees of its Subcontractors, as required in Section 7-1.01A(3), "Prevailing Wage," and in Section 7-1.01A(4), "Payroll Records." The verified and certified payroll records submitted with each application for progress payment shall be for the same period of time as the work for which the Contractor is seeking payment.

   a. The Contractor agrees that submission of the verified and certified payroll records with each application for progress payment is an express condition precedent to the Engineer's obligation to make a progress payment. The Engineer is not obligated to approve or make, in whole or in part, any progress payment due the Contractor until the Contractor has submitted the required payroll records.

   b. Any payment of a progress payment, in whole or in part, by the Engineer despite the Contractor's failure to submit the required payroll records in a timely manner is not a waiver of any other term or conditions contained in this Contract or a waiver of the right to withhold payment for any subsequent breach.

9-2.06D Payment of Withheld Funds

The Contractor may substitute securities for any moneys withheld by the City to ensure performance under this Contract, provided that substitution of securities shall not be allowed in contracts where federal or State statutes, regulations, or policies do not allow the substitution of securities. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the City, or with a State or federally chartered bank as the escrow agent, the City shall then pay such withheld moneys to the Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

Securities eligible for investment under this section shall include those listed in Section 16430 of the California Government Code, bank or savings and loans certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the City.

The Contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon.

The escrow agreement used to implement this section shall be null, void, and unenforceable unless it is substantially similar to the following form, pursuant to Public Contract Code Section 22300:

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between City of Campbell, whose address is 70 N. First Street, Campbell, CA 95008, hereinafter called "Owner," and _____ whose address is _____hereinafter called "Contractor", and _____ _____ whose address is _____ hereinafter called "Escrow Agent."

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

(1) Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for _____ ("Project") in the amount of _____($_____) dated _____ _____(hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within ten (10) days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of the City of Campbell and shall designate the Contractor as the beneficial owner.

(2) The Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

(3) When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this Contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

(4) Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

(5) The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

(6) Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account accompanied by written authorization from Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

(7) The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days written notice to the Escrow Agent from the Owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

(8) Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

(9) Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections (5) and (8), inclusive, of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest set forth above.

(10) The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

On behalf of Owner	On behalf of Contractor
_____	_____
Title	Title
_____	_____
Name	Name
_____	_____
Signature	Signature
_____	_____
Address	Address

On behalf of Escrow Agent

_____

Title

_____

Name

_____

Signature

_____

Address

9-2.07 PAYMENT AFTER ACCEPTANCE

After the Work has been accepted by the Engineer, as provided in Section 7-1.16, "Acceptance of Work," payments will be made to the Contractor subject to the provisions in this section.

9-2.07A Final Payment

Final payment is the final partial progress payment. No less than thirty (30) calendar days after final inspection and Final Acceptance of the Work, the Contractor will submit a written proposed Final Estimate to the Engineer. If the thirtieth (30th) calendar day falls on a Saturday, Sunday, or legal holiday, then receipt of the proposed Final Estimate by the Engineer shall not be later than close of business on the next business day. The Engineer shall review and approve or, if necessary, revise the proposed Final Estimate and return to the Contractor. The Contractor shall then handle such proposed Final Estimate as specified in this section. Payment on the Final Estimate, whether it be as proposed or as determined after resolution of any claims filed, will be ninety-five percent (95%) of the total amount due. The remaining five percent (5%) of the amount due will be paid thirty-five (35) days after the Notice of Completion has been recorded in compliance with the Code of Civil Procedure of the State of California, unless Contractor provides the City with other adequate sureties in accordance with Section 2-1.12, “General Guaranty,” or Section 9-2.06D, “Payment of Withheld Funds.” Moreover, final payment will be made only after Contractor has submitted the following satisfactory to the Engineer:

1. Evidence that all payrolls, material bills, and other indebtedness connected with said Work have been paid;
2. Contractor and Subcontractor certified payroll records;
3. As-Build record construction plans; and
4. Uniform Hazardous Waste Manifests, if applicable.

In any event, payment of the final payment of the five percent (5%) retention amount shall not relieve the Contractor of its responsibility and liability for the one-year guaranty of the Work as specified in Section 2-1.12, “General Guaranty.” It also shall not prevent City from withholding from final payment such amounts which are in dispute between City and Contractor.

Acceptance by Contractor of final payment of all undisputed Contract amounts shall constitute a release by Contractor of all claims against City arising by virtue of the Contract related to those amounts.

Notwithstanding the provisions of this section, for a period of three years after Acceptance of the Work, all estimates and payments made by City, including the Final Estimate and payment, shall be subject to correction and adjustment for clerical errors in the calculations involved in the determination of quantities and payments.

Acceptance of final payment by Contractor shall constitute a waiver of all claims, except claims meeting the following requirements: claims (a) previously made in writing in compliance with the notice, protest, claims, and dispute resolution procedures and requirements specified in the Contract Documents, (b) included in Contractor’s written statement of claims, and (c) identified by Contractor as unsettled at the time of final payment.

9-3 CLAIMS

9-3.01 GENERAL

This section shall be interpreted in accordance with, the claims resolution process established by Section 9204 of Chapter 9, Part 1, Division 2 of the California Public Contract Code (“Section 9204”). All provisions of Section 9204 are incorporated into and form an integral part of the Contract Documents for this Project. The City and Contractor shall comply with California Public Contract Code Section 9204 when applicable. The rights granted by Section 9204 may not be waived, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action; and (2) the City may prescribe reasonable change order, claim, and dispute resolution

procedures and requirements in addition to the provisions of Section 9204, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in Section 9204.

It is the intention of this section that disputes between the parties arising under and/or by virtue of the Contract be brought to the attention of the Engineer at the earliest possible time in order that the matters may be mitigated and/or resolved, if possible, or other appropriate action promptly taken.

A “Claim” shall mean a separate demand by the Contractor for: (a) a time extension, (b) payment of money or damages arising from Work done by or on behalf of the Contractor pursuant to the Contract, (c) an amount of payment which is disputed by the City, or (d) a rejected Change Order Request. In accordance with California Public Contract Code Sections 20104.2 and 9204, presuming Contractor has diligently pursued and exhausted the administrative procedures of the Contract, the following procedures apply to Claims between the Contractor and the City.

No Claims for Extra Work, materials, labor, equipment, or costs shall be considered or permitted if Contractor fails to timely notify the City of the Claim and thereafter diligently pursue and exhaust all the administrative remedies and processes set forth in the Contract Documents and State Specifications, including but not limited to Change Orders, Differing Site Conditions, Initial Potential Claim Records, Supplemental Potential Claim Records, and Full and Final Potential Claims Records. Contractor must exhaust all such processes in order to preserve and pursue any Claim, and failure to do so shall be deemed a waiver of the Claim.

Contractor’s compliance with the requirements specified in the Contract Documents (including, but not limited to, this section) shall be a prerequisite to initiation of litigation. Failure of the Contractor to conform to these procedures and requirements shall constitute a failure to pursue diligently and exhaust the administrative procedures in the Contract, and is deemed as the Contractor's waiver of the potential Claim and a waiver of the right to a corresponding Claim for the disputed work.

9-3.02 NOTICE OF POTENTIAL CLAIM

No claim will be considered or allowed unless the Contractor has first complied with the notice and/or protest requirements specified in the Contract Documents, including, but not limited to, this section. Nothing in the Contract Documents shall excuse the Contractor from its duty to file or give the required claim and/or protest notices. Contractor shall not be entitled to the payment of any additional compensation where the written notices of potential claim have not been given to the Engineer in the manner required by and within the time limitations of this section.

The written notice of potential claim shall set forth the reasons for which the Contractor believes a Contract adjustment will or may be due, the nature of the adjustment involved, and, insofar as possible, the amount of the potential Claim. The notice as above required must have been given to the Engineer prior to the time that the Contractor shall have performed the Work giving rise to the potential Claim for a Contract adjustment, if based on an act or failure to act by the Engineer, or in all other cases at the earliest possible time, but no later than within five (5) days after the happening of the event, thing, occurrence, or other cause giving rise to the potential Claim. The Contractor shall assign an exclusive identification number for each Claim that shall be used for all correspondence and documentation relating to the Claim. City may request additional information from Contractor regarding the Contractor's Claim which shall be provided to City within ten (10) days of the request.

It is the intention of this section 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 it 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.

The Contractor shall provide the City the opportunity to examine the site of Work within five (5) calendar days from the notice of potential Claim. The Contractor shall proceed with the performance of all Work unless otherwise specified by the Engineer.

9-3.03 SUPPLEMENTAL NOTICE OF CLAIM

Within fifteen (15) calendar days of submitting the notice of potential Claim, the Contractor shall provide a signed supplemental notice of potential Claim to the Engineer with reasonable documentation to support the Claim that provides at least the following information:

1. The complete nature and circumstances of the dispute giving rise to the potential Claim.
2. The Contract Document provisions and specifications supporting the basis of the Claim.
3. The estimated cost of the potential Claim and an itemized breakdown of individual costs and how the estimate was determined. An estimate of the costs and the cost breakdown must be provided even if the costs claimed have not been incurred when the Claim is submitted. The cost breakdown must include an itemization of costs for (a) labor including workers' names, classifications, regular hours and overtime hours worked, dates worked, and other pertinent information; (b) materials stored or incorporated in the Work including invoices, purchase orders, location of materials either stored or incorporated into the Work, dates materials were transported to the Project or incorporated into the Work, and other pertinent information; and (c) itemization of machinery and equipment including make, model, hours of use, dates of use, and equipment rental rates of any rented equipment.
4. A time impact analysis of the Project schedule that demonstrates the effect on the scheduled completion date due to schedule changes or disruptions where a request for adjustment of Contract Time is made.
5. The identification and copies of the Contractor's documents and communications and the substance of any oral communications that support the potential Claim.

The information provided in items 1 and 2, above, shall provide the Contractor's complete reasoning for additional compensation or Contract adjustments.

If the estimated cost or effect on the scheduled completion date changes, the Contractor shall update information in items 3 and 4, above, as soon as the change is recognized and submit this information to the Engineer.

9-3.04 CLAIM

The Claim shall be in writing, sent by registered or certified mail with return receipt requested, and include the documents necessary to substantiate the Claim. Claims must be filed within thirty (30) calendar days of the City's written rejection of Contractor's request for a Contract adjustment, or on or before the date of final payment, whichever is earlier. Nothing in this section is intended to extend the time limit or supersede notice requirements otherwise provided for in the Contract Documents.

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 City shall have access to those records and any other records as may be required by the City to determine the facts or contentions involved in the Claim.

Notwithstanding any other provisions, Contractor's recovery on Claims for additional compensation shall be limited to Contractor's proven direct and actual costs incurred. Contractor shall be precluded from claiming consequential damages, including lost profits, lost bonding capacity, and financing costs. Notwithstanding Section 9-2.02A, "Work Performed by Contractor," no markups shall be allowed on any Extra Work performed on a force account basis.

Any Claim for overhead type expenses or costs, in addition to being certified, shall be supported by an audit report of an independent Certified Public Accountant. Any Claim for overhead shall be subject to audit by the City at its discretion.

Any costs or expenses incurred by the City 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 City within the meaning of the California False Claims Act.

9-3.05 CLAIMS CERTIFICATION

All Claims submitted by the Contractor shall include the following notarized certification:

"I,_____, BEING THE _____(MUST BE AN OFFICER) OF _____(CONTRACTOR), DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA, AND DO PERSONALLY CERTIFY AND ATTEST THAT: I HAVE THOROUGHLY REVIEWED THE ATTACHED CLAIM FOR ADDITIONAL COMPENSATION AND/OR EXTENSION OF TIME, AND KNOW ITS CONTENTS, AND SAID CLAIM IS MADE IN GOOD FAITH; THE SUPPORTING DATA IS TRUTHFUL AND ACCURATE; THAT THE AMOUNT REQUESTED ACCURATELY REFLECTS THE CONTRACT ADJUSTMENT FOR WHICH THE CONTRACTOR BELIEVES THE OWNER IS LIABLE; AND, FURTHER, THAT I AM FAMILIAR WITH CALIFORNIA PENAL CODE SECTION 72 AND CALIFORNIA GOVERNMENT CODE 12650, ET SEQ, PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT, AND/OR OTHER SEVERE LEGAL CONSEQUENCES."

By: _____

Title: _____

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

9-3.06 CITY'S RESPONSE

Upon receipt of a Claim pursuant to Section 9-3, "Claims," the City shall conduct a reasonable review of the Claim and provide a written response to the Contractor within 45 days of the date of the Claim, identifying the portion of the Claim that is disputed and the portion that is undisputed. If additional information or details are required by the City to determine the basis and amount of the Claim, the Contractor shall furnish additional information or details so that the information is received by the City no later than the fifteenth (15th) day after receipt of the written request from the City. Failure to submit the information or details to the City within the time specified, or failure to permit access to relevant Contractor records, will be sufficient cause for denying the Claim. Contractor's acceptance of the City's payment toward any undisputed portion of the Claim shall constitute a waiver of all matters associated with that undisputed portion of the Claim.

Upon receipt of a Claim, the parties may by mutual agreement extend the time period provided herein. All amounts that the City identifies in its response as undisputed must be processed and paid within 60 days of the City's response. Pursuant to Public Contract Code Section 9204, if the City fails to pay within 60 days, undisputed amounts not paid will bear interest at 7 percent per annum.

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

9-3.07 MEET AND CONFER

If the Contractor disputes the City's written response, or the City fails to respond within the time prescribed, the Contractor may so notify the City in writing either within 15 days of the City's response or within 15 days

of the City's failure to timely respond and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand, the City shall schedule a meet and confer conference within 30 days for settlement of the dispute.

9-3.08 MEDIATION

Within 10 business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the City shall provide the Contractor with a written statement identifying the portion of the Claim that remains in dispute. Any payment due on the undisputed portion of the Claim shall be processed and made within 60 days of the City's written statement. Any disputed portion of the Claim, as identified in writing, shall be submitted to nonbinding mediation, with the City and the Contractor sharing costs equally. The parties shall mutually agree to a mediator within 10 business days after the disputed portion of the claim has been identified in writing, unless the parties agree to select a mediator at a later time.

A. If the parties cannot agree on a mediator, each party shall select a mediator and those mediators shall select a qualified third party to mediate the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in selecting the neutral mediator.
B. This section does not preclude the City from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.
C. The mediation shall be held no earlier than the date the Contractor completes the Work or the date that the Contractor last performs Work, whichever is earlier. All unresolved Claims shall be considered jointly in a single mediation, unless a new and unrelated Claim arises after mediation is complete.

9-3.09 ARBITRATION

Upon receipt of a Claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration.

9-3.10 CIVIL ACTIONS

Procedures for civil actions to resolve Claims of $375,000 or less between the parties are governed pursuant to Public Contract Code Section 20104.4.

9-3.11 GOVERNMENT CODE CLAIMS

In addition to any and all Contract requirements pertaining to notices of and requests for compensation or payment for Extra Work, disputed Work, construction claims, and/or changed conditions, the Contractor must comply with the Claim procedures set forth in Government Code Sections 900 et seq. prior to filing any lawsuit against the City. Such Government Code Claims and any subsequent lawsuit shall be limited to those matters that remain unresolved after all procedures pertaining to the Extra Work, disputed Work, construction claims, and/or changed conditions have been followed by the Contractor. If no such Government Code Claim is submitted, or if the prerequisite contractual requirements are not satisfied, no action against the City may be filed. A Government Code Claim must be filed no earlier than the date the Work is completed or the date the Contractor last performs Work on the Project, whichever occurs first. A Government Code Claim shall be inclusive of all unresolved Claims unless a new unrelated Claim arises after the Government Code Claim is submitted.

9-3.12 NON-WAIVER

The City's failure to respond to a Claim from the Contractor within the time periods described in this section or to otherwise meet the time requirements of this section shall result in the Claim being deemed rejected in its entirety. A Claim that is denied by reason of the City's failure to have responded to a Claim or its failure to otherwise meet the time requirements of this section, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of the Contractor.

9-3.13 FORUM FOR DISPUTE RESOLUTION

It is the express intention of the parties that all legal proceedings related to this Agreement or to the Project or to any rights or any relationship between the parties arising therefrom, shall be solely and exclusively initiated and maintained in Santa Clara County Superior Court. Contractor and City each irrevocably consent to the jurisdiction of such courts in any such legal proceeding and waive any objection it may have to jurisdiction of any such legal proceeding.

9-3.14 DUTY TO CONTINUE PERFORMANCE

Unless stated otherwise in the Contract Documents, Contractor shall continue to satisfy its payment obligations to Contractor, pending the final resolution of any dispute or disagreement between Contractor and City.

END OF SECTION

SECTION 10 MISCELLANEOUS CONSTRUCTION

Conform to Section 10, "General," of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

10-1 GENERAL

10-1.01 GENERAL

Add the following language:

The Contractor shall sweep streets daily and immediately following all construction operations. Always keep a power sweeper on the jobsite. If the Contractor fails to perform these duties, the Engineer at their sole discretion may elect to have the City or contract with other forces to perform these duties and will deduct the expenses incurred from any monies due to the Contractor.

10-1.02B Traffic Elements

Delete Section 10-1.02B, "Traffic Elements," of the *Caltrans Standard Specifications* and replace with the following:

Not used.

10-1.02C(2) Irrigation Facilities

Delete Section 10-1.02C(2), "Irrigation Facilities," of the *Caltrans Standard Specifications* and replace with the following:

Upon discovering an irrigation facility not described in the Contract, immediately notify the Engineer. The Engineer orders the locating and protecting of the irrigation facility.

The locating and protecting of existing irrigation facilities conforms to Section 20-6, "Existing Irrigation Facilities," and the Contract Documents.

10-1.02C(3) Landscaping

Delete Section 10-1.02C(3), "Landscaping," of the *Caltrans Standard Specifications* and replace with the following language:

Refer to Section 20, "Landscape," and Section 5-1.21E, "Landscape." In the event that there are landscaping obstructions such as ivy, lawn, juniper branches, grass, or other encroaching vegetation, hardscape, gravel, pavers, ornamental garden figurines and/or boulders, you shall trim, prune or relocate such obstruction only to the extent necessary to conduct the installation of improvements in the public right-of-way. The Contractor shall notify the adjacent property owner and the Engineer prior to the removal of any existing improvements.

You shall prune plants under ANSI A 300 part 1, "Pruning," published by the Tree Care Industry Association.

10-1.02E Excavation

Delete Section 10-1.02E, "Excavation," of the *Caltrans Standard Specifications* and replace with the following language:

Refer to Section 100, "Trench Excavation, Bedding and Backfill."

10-1.11 WASTE HAULERS AND RECYCLING OPERATIONS

Contractor shall not impair or impede waste hauler and recycling operations scheduled to be conducted within the project area. It is the Contractor's responsibility to determine which waste hauler and recycling

operator are scheduled to operate within the project area and develop a project schedule that will not impair or impede the waste hauler or recycling operations.

10-1.12 SANITATION

Contractor shall provide sanitary facilities for the use of the workers on the job. The Contractor is required to place and maintain such facilities so as not to be aesthetically displeasing, annoying to the neighbors, offensive to the senses nor the community standards of decency. The Engineer shall be the sole judge of the adequacy of the facility, the placement, and the maintenance thereof. The Contractor is required to make immediate corrections when notified by the Engineer of any deficiencies in any of these areas. Failure to take corrective action within 24 hours of being notified will give the Engineer due cause to stop work on the contract, order the corrective work to be done, and charge all costs of such work against the monies due or to become due to the Contractor.

10-5 DUST CONTROL

Delete Section 10-5, “Dust Control,” of the *Caltrans Standard Specifications* and replace with the following language:

Dust resulting from the Contractor’s performance of the work, either inside or outside the right-of-way, shall be controlled by the Contractor under the provisions of Section 7, “Legal Relations and Responsibility.”

Contractor shall prevent and alleviate dust by:

1. Using non-potable water for dust control.
2. Applying a dust palliative under the provisions of Section 18, “Dust Palliatives.”
3. Managing Material stockpiles under the provisions of Section 13-4.03C(3), “Stockpile Management.”

No separate payment will be made for any work performed or material used to control dust resulting from the Contractor’s performance of the work, either inside or outside the right-of-way. Full compensation for such dust control will be considered as included in the prices paid for the various items of work involved.

Whenever the Contractor is negligent in providing dust control, the Engineer will order the Contractor to provide it. If the Contractor fails to remove the dust nuisance within two (2) hours of being notified by the Engineer, the City may order that such work be done by others. All costs incurred by the City to mitigate the dust nuisance will be deducted from monies owed the Contractor. This does not relieve the Contractor from their responsibilities to perform dust nuisance work.

10-6 WATERING

Delete Section 10-6, “Watering,” of the *Caltrans Standard Specifications* and replace with the following language:

10-6.01 GENERAL

Conform to the Contract Documents and Campbell Municipal Code Chapter 8.34.

10-6.02 DESCRIPTION OF WORK

This Work shall also consist of:

1. Application and payment of fees for drawing water through meters from fire hydrants.
2. Constructing or installing portable tank reservoirs and installing pumping plants and pipeline systems.

The Contractor shall choose any system that will provide adequate water supply for periods of maximum demand for the life of the Project.

Water used for whatever purpose in construction is considered included in the Contract Sum for prices paid for various items of work involved and no additional compensation will be allowed therefor.

10-6.03 APPLICATION

The application of water shall always be under the control of the Engineer. At the Contractor's option, excavation areas and borrow sources may be watered prior to excavating the material.

For compacting embankment material, subbase, base, and surfacing material and for dust control, apply water with equipment that will apply it uniformly.

For compaction, the Contractor may use a chemical additive if authorized.

10-6.04 MATERIALS

Water, wetting agents, and chemical additives shall conform to this section.

10-6.04(A) Water

Water used for whatever purpose in construction shall be free from oils and heavy concentrations of salts, minerals, or other deleterious substances.

Water may be potable or non-potable. Non-potable water must be either recycled water or non-potable water developed from other sources.

Non-potable water must not be conveyed in tanks or drainpipes that will be used to convey potable water. Non-potable water supplies and potable water supplies must not be connected. Non-potable water supply, tanks, pipes, and other conveyances of non-potable water must be labeled Non-potable Water / Do Not Drink.

Each water storage tank and distribution system must be equipped with positive shut-off valves.

Always keep at least 1-mobile unit with a capacity of at least 1,000 gallons at the job site for applying water unless all water is applied through pipes or another authorized method.

10-6.04(A) Wetting Agents and Chemical Additives

Type of material shall be as specified in the Contract Documents. In any case, the chemical additive to be used as a wetting agent shall be capable of readily mixing with water and of distributing moisture evenly in soil, leaving no dry pockets or voids.

The wetting agent shall be a non-ionic, non-organic, non-detergent, non-toxic, non-flammable liquid having a neutral pH which, when applied to soils shall not be harmful to vegetation.

The proportion of wetting agent to water shall be as recommended by the manufacturer, unless otherwise directed by the Engineer.

The manufacturer shall establish the necessary quality control and inspection practice to assure compliance with the Contract Documents. The Contractor shall furnish a certificate of compliance under the provisions of Section 6-1.08, "Certificate of Compliance," that the product furnished complies with the requirements of the Contract Documents.

10-51 MOBILIZATION

10-51.01 GENERAL

Unless otherwise stated in the Contract Documents, mobilization shall conform to Section 9-1.16D(2), “Mobilization for Projects Except for Those Over Water Requiring Marine Access,” of the *Caltrans Standard Specifications*.

Mobilization shall consist of the following:

1. Preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the Project site for the establishment of all offices, buildings, and other facilities necessary for Work on the Project.
2. Application of all necessary permits when required by the Contract Documents.
3. All other work and operations which must be performed prior to beginning work on the various Contract items at the Project site.

10-51.02 PAYMENT

The Contract Sum, including the lump sum price paid for mobilization shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in Mobilization as specified herein.

When the Contract Documents do not include a bid item for mobilization as specified above, full compensation for mobilization shall be considered as included in the prices paid for the various Contract Bid Items of work involved and no additional compensation will be allowed therefor.

END OF SECTION

SECTION 11 WELDING

Welding shall conform to Section 11, “Welding,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

END OF SECTION

SECTION 12 TEMPORARY TRAFFIC CONTROL

Conform to Section 12, “Temporary Traffic Control,” of the C*altrans Standard Specifications* and these *City Standard Specifications*.

12-1 GENERAL

12-1.01 GENERAL

Delete Section 12-1.01, “General,” of the *Caltrans Standard Specifications* and replace with the following language:

Section 12-1, “General,” includes general specifications for providing temporary traffic control.

Work shall conform to Section 7-1.06, “Safety and Health Provisions,” Section 7-1.07, “Public Convenience,” and Section 7-1.08, “Public Safety,” and Part 6, “Temporary Traffic Control,” of the *CA MUTCD*.

12-1.03 CONSTRUCTION

Delete Section 12-1.03, “Construction,” of the *Caltrans Standard Specifications* and replace with the following language:

12-1.03A Traffic Control Plan

The Contractor shall submit a traffic control plan for review and approval by the Engineer as noted in the Contract Documents. The traffic control and pedestrian control plans shall coincide with the project schedule and shall be consistent with the Contract Documents in addressing the work involved.

12-1.03B Detours

The Contractor shall construct and remove detours and detour bridges for the use of public traffic as provided in the Contract Documents, or as directed by the Engineer. Payment for such work will be made at the contract prices for the items of work involved if the work being performed is covered by contract items of work and no other method of payment therefor is provided in the Contract Documents. Otherwise, the work will be Extra Work. When public traffic is routed through the Work, provision for a passageway through construction operations will not be considered as detour construction or detour maintenance and such work shall conform to and be paid for under the provisions of Section 7-1.07, "Public Convenience," unless otherwise specified in the Contract Documents.

Detours used exclusively by the Contractor for hauling materials and equipment shall be constructed and maintained by the Contractor at their sole expense. The failure or refusal of the Contractor to construct and maintain detours at the proper time shall be sufficient cause for the City to shut down the Work until such detours are in satisfactory condition for use by public traffic. The Contractor will not be allowed additional compensation or an extension of time to complete the work due to such suspension of work order.

Where the Contractor's hauling is causing such damage to the detour that its maintenance in a condition satisfactory for public traffic is made difficult and unusually expensive, the Engineer shall have authority to regulate the Contractor's hauling over the detour.

12-1.03C Traffic Control Public Convenience

Compliance with the provisions contained herein shall not relieve the Contractor of his responsibility for public safety.

Construction activities must not inconvenience the public or abutting property owners. The Contractor is to schedule and conduct work to avoid unnecessary inconvenience to the public and abutting property owners. Avoid undue delays in construction activities to reduce the public's exposure to construction.

Where possible, route traffic on new or existing paved surfaces.

Maintain convenient access to driveways, houses, and buildings. When an abutting property owner's access across the right-of-way line is to be eliminated or replaced, the existing access must not be closed until the replacement access facility is usable. Construct temporary approaches to a crossing and an intersecting highway.

Upon completion of rough grading or placing any subsequent layer, bring the surface of the roadbed to a smooth and even condition, free of humps and depressions, and satisfactory for the use of the public.

After subgrade preparation for a specified layer of material has been completed, repair any damage to the roadbed or completed subgrade, including damage caused by public use.

While subgrade and paving activities are underway, allow the public to use the shoulders. If half-width paving methods are used, allow the public to use the side of the roadbed opposite the one under construction. If enough width is available, keep open a passageway wide enough to accommodate at least 2 lanes of traffic at locations where subgrade and paving activities are underway. Shape shoulders or reshape subgrade as necessary to accommodate traffic during subgrade preparation and paving activities.

Apply a dust palliative for the prevention or alleviation of dust nuisance.

If a height differential of more than 0.04 foot is created by construction activities at a joint transverse to the direction of traffic on the traveled way or a shoulder subject to public traffic, construct a temporary taper at the joint with a slope complying with the requirements shown in the following table:

Temporary Tapers

Height differential (foot)	Slope (horizontal:vertical)	
	Taper use of 14 days or less	Taper use of more than 14 days
Greater than 0.08	100:1 or flatter	200:1 or flatter
0.04–0.08	70:1 or flatter	70:1 or flatter

For a taper on existing asphalt concrete or concrete pavement, construct the taper with minor HMA per Section 39-2.07, “Minor Hot Mix Asphalt.”

Grind existing surfaces to accommodate a minimum taper thickness of 0.10 foot under either of the following conditions:

1. HMA material such as rubberized HMA, polymer-modified bonded wearing course, or open-graded friction course is unsuitable for raking to a maximum 0.02-foot thickness at the edge.
2. Taper will be in place for more than 14 days.

For a taper on a bridge deck or approach slab, construct the taper with polyester concrete per Section 60-3.04B, “Polyester Concrete Overlays.”

The completed surface of the taper must be uniform and must not vary more than 0.02 foot from the lower edge of a 12-foot straightedge when placed on its surface parallel and perpendicular to traffic.

If authorized, you may use alternative materials or methods to construct the required taper.

Install signs, lights, flares, Type K temporary railing, barricades, and other facilities to direct traffic. Provide flaggers whenever necessary and as noted in the Contract Documents to direct the movement of the public through or around the work.

After the surface of one- half of the roadbed has been brought to a smooth and even condition for the passage of public traffic as provided herein, traffic shall be diverted, and work commenced on the opposite side of the roadbed.

At locations where traffic is being routed through the Work under one-way controls and when ordered by the Engineer, the movement of the Contractor's equipment from one portion of the work to another shall be governed per such one-way controls.

Whenever a section of surfacing, pavement, or the deck of a structure has been completed, the Contractor shall open it to use by public traffic if the Engineer so orders or may open it to use by public traffic if the Engineer so consents. In either case, the Contractor will not be allowed any compensation due to any delay, hindrance, or inconvenience to his operations caused by such public traffic but will thereupon be relieved of responsibility for damage to the work caused by public traffic, within the limits of such use. The Contractor will not be relieved of any other responsibility under the Contract Documents, nor will he be relieved of cleanup and finishing operations.

Except as otherwise provided in the Contract Documents, full compensation for conforming to the requirements in this section shall be considered as included in the Contract Bid Unit prices paid for the various contract items of work and no additional compensation will be allowed therefor.

Vehicular travel over backfilled but unpaved trenches and other excavation will not be allowed unless a temporary wearing surface of at least 2 inches of plant mix asphalt over 6 inches of aggregate base is provided or traffic plates of sufficient width are set upon the trench and AC cutback shall be placed around the edges of the steel plate. In sidewalk areas, 1-1/8-inch plywood may be substituted.

When pavement is broken prior to trench excavation in a lane to be left open to traffic, the broken pavement fragments must be removed and replaced with a temporary wearing surface.

The Contractor shall leave the project site in a safe, neat, clean, and presentable state at the close of every workday.

No equipment shall be allowed to be parked within any traffic lanes or medians after work hours.

The Contractor shall notify City of Campbell Police Dispatch at (408) 866-2101 twenty-four (24) hours in advance of any detours and street closures. All detours and street closures must be approved in advance by the Engineer.

On streets with one traffic lane in each direction, the Contractor shall maintain one 10-foot traffic lane in each direction unless otherwise approved by the Engineer. All proposed reductions in lane widths and number of lanes must be presented by the Contractor in the traffic control plan for approval by the Engineer prior to work commencing.

The Contractor shall provide electronic arrow board(s) for lane reductions.

All traffic lane diversions and separations shall be delineated with Type I barricades, 28-inch traffic cones, or 37-inch delineators with two white reflective bands spaced 25 feet on center. The tapered transition length shall be 125 feet minimum. Post "KEEP RIGHT" or "KEEP LEFT" signs or Type II barricades at the beginning of each diversion or separation.

The Contractor shall be responsible for informing the public of traffic conditions existing within the construction area at all times by placement of warning and advisory signs.

The Contractor shall not work within two adjacent intersections at the same time.

The Contractor shall not close two adjacent streets at the same time.

12-1.03D No Stopping Signs

It shall be the Contractor's responsibility to post "No Stopping" signs in areas where the Contractor's work will require restricted parking. To be enforceable, the Contractor shall comply with Section 6-1.03A, “No Stopping Signs.”

12-1.03E Traffic Control Public Safety

Comply with Section 7-1.04, “Public Safety.”.

Whenever Work is being performed adjacent to a lane carrying traffic, the edge of lane or pavement shall be delineated by placing temporary portable delineators adjacent thereto under the provisions of Section 12-3.04, "Portable Delineators."

The Contractor is responsible to provide public safety. The Contractor is to move workers, equipment, and materials without endangering traffic. Whenever the Contractor’s activities create a condition hazardous to the public, the Contractor is to furnish, erect and maintain those fences, temporary railing, barricades, lights, signs, and other devices and take any other necessary protective measures to prevent damage or injury to the public.

The Contractor is to provide flagger whenever necessary to ensure that the public is given safe guidance through the work zone.

The Contractor shall not construct a temporary facility that interfere with the safe passage of traffic.

The Contractor shall not block the movement of pedestrian traffic. Where necessary, the Contractor shall provide for movement by phasing its operations, by providing 4-foot-wide temporary bridges across trenches or establishing 4-foot-wide passageways in the parkway or street area as applicable. Each bridge or passageway shall be bordered with safe railings or barricades, which shall be lighted at night, with non-slip walking surface, and which shall remain in place until all Work at the location has been completed and the sidewalk, walkway, or crosswalk has been opened to the safe transit of pedestrian traffic. On barricades which direct pedestrians around the Work site or to crosswalks not closed, the Contractor shall post, where directed by the Engineer, informational signs directing pedestrians. Railings or barricades which border passageways located in roadway areas shall be reflectorized on the side facing oncoming traffic.

Traffic signals shall not be shut down, put into a flashing mode, or new signals activated, unless approved by the Engineer. The Contractor shall request permission from the Engineer for traffic signal shutdowns a minimum of five (5) working days in advance and for signals to be turned on a minimum of ten (10) working days in advance of the proposed turn on.

Any work that is planned to be done within a signalized intersection, including but not limited to traffic signal shutdowns and turn ons, shall require the presence of Campbell police officers, unless otherwise authorized in writing by the Engineer. The cost of providing the required officers shall be borne by the Contractor. The Contractor shall provide a written request for police officer assistance to the Engineer a minimum of five (5) working days in advance of any work within a signalized intersection. If the request is approved, the Engineer shall coordinate with the City of Campbell Police Department for arranging the presence of officers as requested by the Contractor. The Contractor shall then be responsible for all costs associated with providing the officers as requested. A three-hour minimum charge per officer, plus a 15% administrative processing fee shall be charged to the Contractor if the work is postponed or rescheduled, unless a written request for cancellation from the Contractor is received by the Engineer before 3:00 p.m. of the preceding workday.

Unless otherwise approved by the Engineer, flashing arrow boards and advanced warning signs shall be required at the beginning of all lane closures on arterials and collectors.

The traffic cones shall be under the provisions of Section 12-3.02, "Traffic Cones," of the *Caltrans Standard Specifications*.

If the traffic cones or portable delineators are damaged, displaced or are not in an upright position, from any cause, cones or portable delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

Telescoping flag trees shall be of good commercial quality material, suitable for the purpose intended and shall be capable of always maintaining an upright position while in use.

The fluorescent traffic cones or portable delineators shall be placed at intervals as directed by the Engineer, or as shown in the *CA MUTCD*.

Traffic cones or portable delineators, telescoping flag trees with flags, arrow boards and signs shall be placed before beginning work each day and shall be removed from the work site at the end of each working day.

Upon completion of all work requiring lane closure, traffic cones and telescoping flag trees and construction signs shall be removed from the work site.

If material spills onto the roadway, Contractor shall clean the roadway under the provisions of Section 13-4, “Job Site Management,” prior to reopening lane(s).

Control dust resulting from the work, inside and outside the right-of-way.

Full compensation for furnishing, placing, maintaining, and removing the traffic cones and telescoping flag trees with flags required for lane closure, and for moving and placing signs shall be considered as included in the Contract Bid Unit prices paid for the items of work requiring the lane closure and no separate payment will be made therefor.

The provisions for lane closure in this section will in no way relieve the Contractor from his responsibility to provide devices or measures necessary to comply with Section 7- 1.08, ”Public Safety."

On projects such as re-channelization and street widening work where changes in traffic patterns require either relocation, removal or installation of permanent regulatory traffic control and other signs, the Contractor shall relocate, remove, or install signs and standards where and as specifically shown in the Contract Documents, or where directed by the Engineer.

For all existing permanent traffic controls signs which are to be removed and not relocated, the Contractor shall remove the signs, all hardware, and the standards. The Contractor shall deliver the above items to a designated City Corporation Yard. Any signs, standards or hardware damaged by the Contractor through negligence shall be replaced by the Contractor.

The temporary relocation of each "STOP" or other traffic regulatory sign shall be done immediately upon its removal, and to a location as close as possible to the original position of sign or as directed by the Engineer.

Any excavation permitted to be left open shall be barricaded with Type II and Type III barricades with flashers. "OPEN TRENCH" signs shall be posted as directed by the Engineer. Type III barricades shall be available for diverting traffic and barricading trenches. See *Caltrans Standard Details* "Securing Open Trench "A” or "B" for K-railing and Chain Link Fencing."

All open excavated areas shall be in adherence to the *CA MUTCD* or as directed by the Engineer.

12-1.03F Traffic Control Responsibility

The Contractor shall provide and maintain all traffic control and safety items, as required by the Contract Documents, federal and state law, and Caltrans regulations. The Contractor assumes sole and complete responsibility for the Project and Project site conditions, including but not limited to all traffic control measures or lack of appropriate traffic control measures associated with the Work during construction, including safety of all persons and property. This requirement shall apply continuously 24 hours/day and shall not be limited to normal workday hours. This requirement shall apply regardless of the City's approval of the Contractor's traffic control plan.

12-1.03G Responsibility to Other Entities

The Contractor is responsible for any liability imposed by law and for injuries to or death of any person, including workers and the public, or damage to property. Indemnify and save harmless any county, city or district and its officers and employees connected with the work, within the limits of which county, city, or district the work is being performed, all in the same manner and to the same extent specified for the protection of the City.

12-1.03H Construction Flagging

The Contractor shall assign flag personnel:

1. To control traffic.
2. To warn the public of any dangerous conditions resulting from the work activities.
3. To provide for the passage of traffic through the work as specified for the passage of traffic for public convenience and public safety.
4. When ordered by the Engineer.
5. Noted in the Contract Documents.

Qualifications for flaggers shall conform with *CA MUTCD*.

The Contractor is responsible to maintain in good condition flagging apparel, traffic control devices and equipment for used by flaggers.

The cost of furnishing all flaggers, including transporting flaggers to provide for passage of public traffic through the Work under the provisions of Section 7-1.07, "Public Convenience," and Section 7-1.08, "Public Safety," shall be borne solely by the Contractor.

12-1.04 PAYMENT

Delete Section 12-1.04 "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

12-3 TEMPORARY TRAFFIC CONTROL DEVICES

12-3.01 GENERAL

Delete Section 12-3.01, "General," of the *Caltrans Standard Specifications* and replace with the following language:

In addition to the requirements of the *CA MUTCD*, all devices used by the Contractor in the performance of the work shall conform to the requirements in this Section 12-3, "Temporary Traffic Control Devices."

Providing temporary traffic control devices includes installing, placing, maintaining, repairing, replacing, relocating, and removing temporary traffic control devices.

Traffic-handling equipment and devices damaged from any cause during the progress of the work shall be repaired, including painting if necessary, or replaced by the Contractor at his expense.

When traffic control devices furnished by the Contractor are no longer needed for controlling traffic, they shall be removed from the site of the work.

Do not use different types of channelizing devices on the same alignment. The types include plastic drums, portable delineators, channelizers, tubular markers, traffic cones, and Type I and Type II barricades.

Whenever the term "hours of darkness" is used in the specifications it shall be deemed to mean the hours of darkness as defined in Division 1, Section 280, of the California Vehicle Code.

12-3.05 CHANNELIZERS

Conform to Section 12, "Temporary Traffic Control," of the C*altrans Standard Specifications*, the provisions of *Caltrans Standard Plans,* "Delineators, Channelizers and Barricades)," (A73C), and these *City Standard Specifications*.

12-3.10 BARRICADES

Conform to Section 12, "Temporary Traffic Control," of the C*altrans Standard Specifications,* the provisions of *Caltrans Standard Plans,* "Delineators, Channelizers and Barricades)," (A73C), and these *City Standard Specifications*.

12-3.20 TEMPORARY BARRIER SYSTEMS

Add the following language:

Conform to Section 12-3.20, "Temporary Barrier Systems," of the C*altrans Standard Specifications,* any provisions for temporary barrier systems in the *Caltrans Standard Plans,* and these *City Standard Specifications.*

12-3.20D PAYMENT

Delete Section 12-3.20D "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

12-3.21 TEMPORARY TRAFFIC SCREENS

Delete Section 12-21, "Temporary Traffic Screens," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

12-3.22 TEMPORARY CRASH CUSHION MODULES

Add the following language:

Conform to Section 12-3.22, "Temporary Crash Cushion Modules," of the *Caltrans Standard Specifications,* any provisions for temporary crash cushion modules in the *Caltrans Standard Plans,* and these *City Standard Specifications*.

12-4 MAINTAINING TRAFFIC

Delete Section 12-4, "Maintaining Traffic," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

12-6 TEMPORARY PAVEMENT DELINEATION

12-6.01 GENERAL

Delete Section 12-6.01, "GENERAL," of the *Caltrans Standard Specifications* and replace with the following language:

Section 12-6 includes specifications for placing temporary pavement delineation except for delineation on a seal coat project.

Temporary painted traffic stripes and painted pavement markings used for temporary delineation must comply with Section 84-2, "TRAFFIC STRIPES AND PAVEMENT MARKINGS" and CA MUTCD.

Temporary signs for no-passing zones must comply with Section 12-3.11, "Construction Area Signs".

12-6.03A General

Delete Section 12-6.03A, "General," of the *Caltrans Standard Specifications* and replace with the following language:

If work activities obliterate pavement delineation, place temporary or permanent pavement delineation before opening the traveled way to traffic. The temporary pavement delineation must consist of a lane line and centerline pavement delineation for traveled ways open to traffic. On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width, the temporary pavement delineation must also include edge line delineation for traveled ways open to traffic. Temporary pavement delineation of the appropriate color as approved by the Engineer shall be installed and placed on twenty-four (24) foot intervals to delineate all six (6) inch traffic stripes.

All channelization lines (solid eight inch or 12-inch line markings) shall be temporarily restored with traffic striping tape, or a double row of temporary pavement delineation/slurry tabs as approved by the Engineer.

All arrow legends and crosswalks shall be restored with temporary traffic striping tape.

All pavement markers separating multiple turn lanes shall be replaced with slurry tabs on a ten (10) foot spacing.

Establish the alignment for temporary pavement delineation, including the required lines or markers. Surfaces to receive an application of paint or removable traffic tape must be dry and free from dirt and loose material. Do not apply temporary pavement delineation over existing pavement delineation or any other temporary pavement delineation. Maintain temporary pavement delineation until no longer needed or replace it with a new striping detail of temporary or permanent pavement delineation.

When the Engineer determines the temporary pavement delineation is no longer required for the direction of traffic, remove the temporary pavement delineation, including any underlying adhesive for temporary pavement markers, from the final layer of surfacing and from the pavement to remain in place and dispose the material under the provisions of Section 7-1.12, "Disposal of Material Outside of the Project Limits." Remove temporary pavement delineation that conflicts with any subsequent or new traffic pattern for the area.

12-6.03B Temporary Lane Line and Centerline Delineation

Delete Section 12-6.03B, "Temporary Lane Line and Centerline Delineation," of the *Caltrans Standard Specifications* and replace with the following language:

If lane lines or centerlines are obliterated and temporary pavement delineation to replace the lines is not shown, the minimum lane line and centerline delineation must consist of temporary pavement markers placed longitudinally at 24-foot maximum intervals.

For temporary lane line or centerline delineation consisting entirely of temporary pavement markers for short-term day or night use, 14 days or less, do not use the markers for more than 14 days on lanes opened to traffic. Place the permanent pavement delineation before the end of the 14 days. If the permanent pavement delineation is not placed within 14 days, replace the temporary pavement markers with additional temporary pavement delineation equivalent to the pattern described for the permanent pavement delineation for the area.

If no-passing centerline pavement delineation is obliterated, install the following temporary no-passing zone signs before opening lanes to traffic:

1. W20-1 (Road Work Ahead) sign from 1,000 to 2,000 feet in advance of the no-passing zone.
2. R4-1 (Do Not Pass) sign at the beginning of the no-passing zone and at 2,000-foot maximum intervals within the no-passing zone.

The Engineer determines the exact location of temporary no-passing zone signs. Maintain the temporary no-passing zone signs in place until you place the permanent no-passing centerline pavement delineation.

Remove the temporary no-passing zone signs when the Engineer determines they are no longer required for the direction of traffic.

12-6.04 PAYMENT

Delete Section 12-6.04, “Payment,” of the *Caltrans Standard Specifications* and replace with the following language:

Not Used.

12-7.03 CONSTRUCTION

Delete Section 12-7.03, “Construction,” of the *Caltrans Standard Specifications* and replace with the following language:

Before applying binder that will obliterate existing traffic stripes, place temporary raised pavement markers on the existing traffic stripes except for right edge lines at 24-foot maximum intervals. Place 2 markers side by side on double traffic stripes with 1 marker placed on each stripe longitudinally at 24-foot maximum intervals. Place temporary raised pavement markers under the manufacturer's instructions.

Before opening the lanes to uncontrolled traffic, remove the covers from the temporary raised pavement markers.

If you obliterate no-passing centerline pavement delineation, install the following temporary no-passing zone signs before opening lanes to traffic:

1. W20-1 (Road Work Ahead) sign from 1,000 to 2,000 feet in advance of the no-passing zone.
2. R4-1 (Do Not Pass) sign at the beginning of the no-passing zone and at 2,000-foot maximum intervals within the no-passing zone.

The Engineer determines the exact location of the temporary no-passing zone signs. Maintain the temporary no-passing zone signs in place until you place the permanent no-passing centerline pavement delineation. Remove the temporary no-passing zone signs when the Engineer determines they are no longer required for the direction of traffic.

Maintain temporary pavement delineation until you replace it with the permanent pavement delineation. Any damage done to the pavement/seal coat upon removal of the temporary pavement delineation shall be repaired to the satisfaction of the Engineer.

When the Engineer determines the temporary pavement delineation is no longer required for the direction of traffic, remove the temporary pavement delineation, including any underlying adhesive for temporary pavement markers, from the final layer of surfacing and from the pavement to remain in place and dispose the material under the provisions of Section 7-1.12, “Disposal of Material Outside of the Project Limits.” Remove temporary pavement delineation that conflicts with any subsequent or new traffic pattern for the area.

12-11 PAYMENT

Full compensation for furnishing, placing, maintaining (regardless of the number of times it is required), and removing all temporary traffic control devices, delineations, stripes, markings, and markers is as noted herein this Section 12, “Temporary Traffic Control,” and in the Contract Documents.

END OF SECTION

SECTION 13 WATER POLLUTION CONTROL

Conform to these *City Standard Specifications*.

13-1 GENERAL

13-1.01 GENERAL

Contractor shall exercise every reasonable precaution to protect storm drains, inlets, drainage swales, streams, lakes, reservoirs, bays, and coastal waters from pollution with fuels, oils, bitumen's, calcium chloride and other harmful materials and shall conduct and schedule operations so as to avoid or minimize muddying and silting of streams, lakes, reservoirs, bays and coastal waters. Care shall be exercised to preserve roadside vegetation beyond the limits of construction.

In compliance with the State and Federal regulations on construction storm water management and urban runoff pollution control, no pollutants will be allowed to enter the storm drainage system.

Contractor shall comply with the City's general permit issued by the SWRCB for compliance with the NPDES Statewide Storm Water Permit.

13-1.01A Summary

Where Notice of Intent (NOI) is not required, refer to Section 13-2, "Water Pollution Control Program," for preparation of a WPCP.

Where NOI is required, refer to Section 13-3, "Storm Water Pollution Prevention Plan," for preparation of a SWPPP.

The WPCP and SWPPP shall also comply with the following Campbell requirements:

1. City of Campbell Stormwater Pollution Control Requirements – Municipal Code Section 14.02
2. City of Campbell Best Management Practices for the Construction Industry
3. Santa Clara Valley Urban Runoff Pollution Prevention Program

13-1.01B Definitions

Active Area: All areas subject to land surface disturbance activities related to the project including, but not limited to, project staging areas, immediate access areas and storage areas. All previously active areas of construction are considered active areas (unless temporarily defined as inactive areas) until final stabilization is complete. Area where soil-disturbing work activities have occurred at least once within 14 days.

Construction Phase: The construction phase continues from the start of work activities to Contract acceptance and includes the following:

- Demolition and Pre-Development Site Preparation Phase
- Grading and Land Development Phase
- Streets and Utilities Phase
- Vertical Construction Phase
- Final Landscaping and Site Stabilization Phase.

Data Entry Person (DEP): The SWPPP manager or their designated representative(s) will be the designated DEP for all required information to be submitted to the Stormwater Multiple Application and Report Tracking System (SMARTS). The DEP must be a QSP or QSD.

Inactive Area: Area where soil-disturbing work activities have not occurred within 14 days.

Normal Working Hours: Hours you normally work on the project.

Qualifying Precipitation Event: Qualifying precipitation event is any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) and a Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The even begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more if forecast.

Run-On: Water that originates off-site and flows onto the job site.

13-1.02 SUBMITTALS

13-1.02A General

Within 48 hours after (1) the end of a storm event resulting in a discharge, (2) a non-stormwater discharge, or (3) receiving a written notice or an order from the Regional Water Quality Control Board (RWQCB) or another regulatory agency, submit the following information:

1. Date, time, location, and nature of the activity and the cause of the discharge, notice, or order.
2. Type and quantity of the discharge.
3. WPC practices in use before the discharge or before receiving the notice or order.
4. Description of WPC practices and corrective actions taken to manage the discharge or cause of the notice.

Submittals for additional or new WPC practices to manage run-on, run-off, and stormwater conveyance must:

1. Describe the activities, processes, equipment, and materials that will be used to manage the run-on, run-off, and stormwater conveyance through the job site.
2. Show the locations of the management practices.
3. Include a time-scaled logic diagram displaying the sequence and duration of the management practices for each stage of work.
4. Be sealed and signed by an engineer who is registered as a civil engineer in the State.

13-1.03 CONSTRUCTION

13-1.03A General

Retain a printed copy of the authorized WPCP or SWPPP at the job site.

13-1.03B Contractor-Support Facilities

Use WPC practices to protect stormwater systems or receiving waters from the discharge of potential pollutants from any Contractor-support facility.

Contractor-support facilities include:

1. Staging areas
2. Storage yards for equipment and materials

If you obtain or dispose of material at a noncommercially operated borrow or disposal site, prevent water pollution due to erosion at the site during and after completion of your activities. Upon completion of your work, leave the site in a condition such that water will not collect or stand in it.

13-1.03C Inspections

Stormwater site inspections shall be conducted in compliance with the WPCP or SWPPP.

13-1.03D Deficiencies

If the Engineer or you identify a deficiency in the implementation of the authorized WPCP or SWPPP, immediately correct the deficiency unless a later date is authorized, but before precipitation occurs.

The City may correct the deficiency if you fail to correct it immediately, by the agreed date, or before the onset of precipitation. The cost of this work is deducted.

13-1.04 PAYMENT

The City does not pay for the cleanup, repair, removal, disposal, or replacement of WPC practices due to improper installation or Contractor negligence.

The City does not pay for WPC practices at Contractor-support facilities and noncommercially operated borrow or disposal sites.

13-2 WATER POLLUTION CONTROL PROGRAM (WPCP)

13-2.01 GENERAL

If a Notice of Intent (NOI) is required by the State Water Resources Control Board, then Section 13-3, "Stormwater Pollution Prevention Plan," shall govern. Otherwise, WPCP requirements shall comply with this section and Section 7-1.01F, "Water Pollution."

In compliance with the State and Federal regulations on construction stormwater management and urban runoff pollution control, no pollutants will be allowed to enter the storm drainage system.

Contractor shall exercise every reasonable precaution to protect storm drains, inlets, drainage swales, streams, lakes, reservoirs, bays, and coastal waters from pollution with fuels, oils, bitumen's, calcium chloride and other harmful materials and shall conduct and schedule operations so as to avoid or minimize muddying and silting of streams, lakes, reservoirs, bays and coastal waters. Care shall be exercised to preserve roadside vegetation beyond the limits of construction.

The approved WPCP shall be implemented and maintained by the Contractor for the duration of the project.

13-2.02 SUBMITTAL

The Contractor shall prepare and submit three (3) copies of the Water Pollution Control Program (WPCP) to the Engineer within fifteen (15) calendar days after Notice of Award, a program to control water pollution effectively during the construction of the project. The Contractor's program to control water pollution shall conform to the requirements in the *Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual* and its addenda in effect on the day the Notice of Award is dated. The Preparation Manual and other references for performing water pollution control work are available on Caltrans' Storm Water and Water Pollution Control webpage at: https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control

No construction work shall begin on the project until the Contractor receives written notification from the Engineer that the WPCP is acceptable.

Water pollution control work is intended to provide prevention, control and abatement of water pollution to streams, waterways and other bodies of water, and shall consist of constructing those facilities and implementing those Best Management Practices (BMPs) which may be shown in the WPCP, on the plans, specified herein or in the Contract Documents, or directed by the Engineer.

In order to provide effective and continuous control of water pollution it may be necessary for the Contractor to perform the contract work in small or multiple units, on an out of phase schedule, and with modified construction procedures. As described in the WPCP, the Contractor shall implement temporary BMPs as water pollution control measures, including but not limited to sediment and erosion control measures, good housekeeping practices, and applying straw and seed to establish vegetation, which become necessary as a result of the Contractor's operations. The Contractor shall coordinate water pollution control work with all other work done on the contract.

Before starting any work on the project, the Contractor shall submit a plan to effectively control water pollution during construction of the project (i.e., a Water Pollution Control Program or WPCP). The plan shall show the schedule for the erosion control work included in the contract and for all water pollution control measures which the Contractor proposes to take in connection with construction of the project to minimize the effects of the operations upon adjacent streams and other bodies of water. The Contractor shall not perform any clearing and grubbing or earthwork on the project, other than that specifically authorized in writing by the Engineer, until the WPCP has been approved by the City.

If the WPCP measures being taken by the Contractor are inadequate to control water pollution effectively, the Engineer may direct the Contractor to revise the operations and the WPCP. The directions will be in writing and will specify the items of work for which the Contractor's water pollution control measures are inadequate. No further work shall be performed on those items until the water pollution control measures are adequate as may be determined by the Engineer.

The City will not be liable to the Contractor for failure to accept all or any portion of an originally submitted or revised WPCP, nor for any delays to the work due to the Contractor's failure to submit an acceptable WPCP.

The Contractor may request the Engineer to waive the requirement for submission of a written WPCP for control of water pollution when the nature of the Contractor’s operation is such that erosion is not likely to occur. Waiver of this requirement will not relieve the Contractor from responsibility for compliance with the other specifications in the Contract Documents or local, State or Federal laws pertaining to water quality. Waiver of the requirement for a WPCP will not preclude requiring submittal of a written WPCP at a later time if the Engineer deems it necessary because of the effect of the Contractor’s operations. The Contractor shall be responsible for briefing and assuring that all his subcontractors comply with Urban Runoff Pollution Prevention requirements including the installation and implementation of Best Management Practices. The Contractor is advised that stop work notices and other penalties may be issued for noncompliance with storm water pollution discharge control requirements.

13-2.03 CONSTRUCTION

Unless otherwise approved by the Engineer in writing, the Contractor shall not:

1. Disturb a total land area of one acre or more cumulatively for all locations, operations or spread of equipment before either temporary or permanent erosion control measures are accomplished.
2. Any amount or type of land disturbance that exceeds the threshold(s) the City has established for requiring the implementation of construction stormwater management controls.

Projects that will include activities such as soil stockpiling, even when they do not include land disturbance, may be required by the City to implement stormwater control measures.

Where erosion, causing water pollution, is probable due to the nature of the material or the season of the year, the Contractor's operations shall be so scheduled that permanent erosion control features will be installed concurrently with or immediately following grading operations.

Nothing in the terms of the contract nor in the provisions in this section shall relieve the Contractor of the responsibility for compliance with Sections 5650 and 12015 of the Fish and Game Code, and all other applicable statutes relating to prevention or abatement of water pollution.

When borrow material is obtained from other than commercially operated sources, erosion of the borrow site during and after completion of the work shall not result in water pollution. The material source shall be finished, where applicable, so that water will not collect or stand therein.

The requirements of this section shall apply to all work performed under the Contract and to all non-commercially operated borrow or disposal sites used for the project.

The Contractor shall at a minimum implement the following BMP's, as appropriate for site conditions (see City of Campbell BMP's for Construction Industry in the Contract Documents for additional information and guidance):

1. Control and prevent the discharge of all potential pollutants and non-stormwater discharges, including but not limited to, pavement cutting wastes, paints, concrete, petroleum products, chemicals, sediment, wash water, and rinse water from architectural copper to storm drains and watercourses.
2. Store, handle, recycle, and/or dispose of construction materials/wastes properly to prevent contact with stormwater.
3. Do not clean, fuel, or maintain vehicles on-site, except in a designated area where wash water is contained and treated.
4. Protect all storm drain inlets in vicinity of site using controls such as berms, fiber rolls, covers or filters.
5. Limit construction access routes and stabilize designated access points to minimize tracking of sediment offsite.
6. Use temporary erosion controls to stabilize all denuded areas until permanent erosion controls are established.
7. Delineate with field markers clearing limits, easements, setbacks, sensitive or critical areas, buffer zones, trees, and drainage courses.
8. Perform clearing and earth moving activities only during dry weather.
9. Implement filtration or retention/settling to remove sediment when dewatering and obtain all necessary permits for discharge from dewatering operations. All dewatering operations in conformance with the Contract Documents must be reviewed and approved by the Engineer in writing prior to commencement.
10. Trap sediment on-site, using BMP's such as compost socks, fiber rolls, sediment basins or traps earthen dikes or berms, silt fences, check dams, soil blankets or mats, covers for soil stockpiles, etc.
11. Divert on-site run-off around exposed areas; divert off-site runoff around the site (e.g. swales and dikes).
12. Protect adjacent properties and undisturbed areas from construction impacts using vegetative buffer strips, sediment barriers or filters, dikes, mulching, or other measures as appropriate.
13. Sweep paved surfaces and pick up litter regularly.
14. Manage concrete, grout, and mortar under cover and on pallets. Wash out concrete equipment/trucks offsite or into contained washout areas that do not allow discharge of wash-water.
15. Use secondary containment, covers or other protective measures for any equipment, materials, portable toilets or other items on-site that have the potential to pollute stormwater.
16. Train and provide instruction to all employees/subcontractors on construction BMPs.

A copy of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) Construction BMP Plan Sheet or handouts are included in the Contract Documents.

For any work that is adjacent to or within streams or channels or that potentially alters habitat of any aquatic or endangered species, obtain all necessary permits (e.g. from California Department of Fish and Wildlife or the San Francisco Bay Regional Water Quality Control Board) and implement all required actions prior to commencement of work.

Monitor and inspect WPCP practices at the job site. Notify the Engineer within 6 hours whenever Contractor:

1. Identify discharges into receiving waters or drainage systems that are causing or could cause water pollution.
2. Receive a written notice or order for the project from the RWQCB or any other regulatory agency.

Continue WPCP implementation during any suspension of work activities.

When the work and project is complete, the Contractor shall comply with all pertinent stormwater post-construction elements of the City-approved WPCP and stormwater regulations, such as the removal of all temporary best management practices (BMPs) used for the project (e.g., removal of installed inlet protection BMPs in the public right of way and BMPs that are constructed with plastic materials).

Compliance with this section shall in no way relieve you from the responsibility to comply with the Contract Documents, in particular the responsibility for damage and for preservation of property.

13-2.03A Street Sweeping

At the end of each workday or as directed by the Engineer, clean and sweep all roadways, sidewalks, gutters, and paved areas within the project site of all materials deposited by, attributed to, or involved in the work. Water shall not be used to wash down streets in place of sweeping.

13-2.03B Waste Disposal

At the end of each workday, collect and properly dispose of all scrap, debris and waste material. Hazardous material disposal is to be done under the provisions of all local, state, and federal laws.

Hazardous Material Storage:

1. The Contractor shall label and store all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels; and all hazardous wastes, such as waste oil and antifreeze; under the provisions of all applicable State and Federal regulations.
2. The Contractor shall store all hazardous materials and all hazardous wastes under the provisions of secondary containment regulations, and it is recommended that these materials and wastes be covered, as needed, to avoid potential management of collected rainwater as a hazardous waste.
3. The Contractor shall keep an accurate, up-to-date inventory, including Safety Data Sheets (SDSs), of hazardous materials and hazardous wastes stored on-site, to assist emergency response personnel in the event of a hazardous materials incident.

13-2.03C Use of Pesticides

The Contractor shall comply with Section 7-1.01G, “Use of Pesticides.”

The Contractor shall also comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Industrial Relations and all other agencies which govern the use of pesticides required in the performance of work on the contract.

Pesticides shall include but shall not be limited to herbicides, insecticides, fungicides, rodenticides, germicides, nematocides, bactericides, inhibitors, fumigants, defoliants, desiccants, soil sterilants and repellents.

Any substance or mixture of substances intended for preventing, repelling, mitigating, or destroying weeds, insects, diseases, rodents, or nematodes and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant shall be considered a pesticide.

13-2.04 PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for conforming to the requirements of this Section 13-2, "Water Pollution Control Plan," shall be considered as included in the contract prices paid for various items of work and no additional compensation will be allowed therefor.

13-3 STORMWATER POLLUTION PREVENTION PLAN (SWPPP) NOTICE OF INTENT (NOI) REQUIRED

13-3.01 GENERAL

In compliance with the State and Federal regulations on construction stormwater management and urban runoff pollution control, no pollutants will be allowed to enter the storm drainage system.

The Contractor shall develop and submit to the Engineer a site specific State of California Stormwater Pollution Prevention Plan (SWPPP) which shall be filed by the City with the State Water Resources Control Board. The preparation of the SWPPP shall be under the provisions of the following:

1. Current NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order WQ 2022-0057-DWQ, NPDES No. CAS000002), and subsequent revisions or reissuances, referred to herein as "Construction General Permit" or "Permit." Contractor is to refer to: NPDES 2022 Construction Stormwater General Permit | California State Water Resources Control Board.
2. Current California Regional Water Quality Control Board San Francisco Bay Region Municipal Regional Stormwater NPDES Permit Order No. R2-2022-0018, NPDES Permit No. CAS612008, and subsequent revisions or reissuances.
3. City of Campbell Municipal Code, Chapter 14.02 entitled "Stormwater Pollution Control".

13-3.01A Summary

Section 13-3, "Stormwater Pollution Prevention Plan (SWPPP)," includes specifications for preparing a SWPPP for projects that will disturb 1 acre or more of soil.

Where required in the Contract Documents, the Contractor shall comply with all stormwater regulations, including those from the City of Campbell, the San Francisco Bay Regional Water Quality Control Board, and the State Water Resources Control Board.

When required, the Contractor shall develop and submit to the Engineer a site-specific State of California Storm Water Pollution Prevention Plan (SWPPP) which shall be filed by the City with the State Water Resources Control Board. The preparation of the SWPPP shall be under the provisions of the applicable stormwater permits in effect at the time of the project approval (i.e., the City of Campbell's municipal code; the San Francisco Bay Regional Water Quality Control Board Municipal Regional Stormwater Permit; and California State Water Resources Control Board Construction General Permit).

The Contractor is responsible for maintaining all SWPPP measures, adjusting and/or replacing them as necessary as the construction advances, until the project is complete and accepted by the City.

When the work and project is complete, the Contractor shall comply with all pertinent stormwater post-construction elements of the City-approved SWPPP and stormwater regulations, such as the removal of all temporary best management practices (BMPs) used for the project (e.g., removal of installed inlet protection BMPs in the public right of way and BMPs that are constructed with plastic materials).

13-3.02 SUBMITTALS

The Contractor shall submit three (3) copies of the SWPPP to the Engineer within fifteen (15) calendar days after the Notice of Award. The SWPPP shall comply with all the requirements of the permits stated in the section above. No construction work shall begin on the project until the Contractor receives written notification from the Engineer that the SWPPP is acceptable. The City will prepare and file the Notice of Intent and the Notice of Termination.

The Contractor shall provide all applicable Permit Registration Documents as defined in Attachment D.2 of the Construction General Permit (or E.2 for Linear Underground and Overhead Projects) to the City in PDF format in a timely manner for submittal to the SMARTS system. In addition, the Contractor shall provide all documentation required for annual reporting and the Notice of Termination to the City in PDF format in a timely manner for submittal to the SMARTS system.

13-3.03 CONSTRUCTION

The Contractor shall implement, maintain and be responsible for the collection and input of data and for the effectiveness of the SWPPP measures per the Project's assigned Risk Level construction site until the project is accepted by the City.

The Contractor shall provide a Qualified SWPPP Developer (QSD) and Qualified SWPPP Practitioners (QSP) for the project.

The Contractor shall maintain a rain gauge at the site and record daily (Monday thru Friday) rainfall amounts until the project is accepted by the City.

The Contractor shall notify the City if either the QSD or QSP is no longer associated with the work. The City shall be notified within 24 hours and a qualified replacement named within 72 hours. Both the QSD and the QSP must meet the Permit certification requirements.

If there is a Permit violation, the Contractor shall notify the Engineer within 24 hours and corrections shall be made as necessary to comply with the Construction General Permit. Contractor is responsible for any fines, and additional sampling, testing, and monitoring that result from their negligence to comply with the General Construction Permit requirements without any additional compensation by the City. If the Regional Water Quality Board inspects the site, the Contractor shall notify the City Engineer within 24 hours and shall provide a written notice of any deficiencies noted and/or changes requested by the inspector.

Violations of this section shall cause the City to issue a stop-work notice and take necessary actions to require the Contractor to correct and comply with the regulations. All costs related to the stop-work action and corrective work to come into compliance shall be fully borne by the Contractor. The cost of corrective actions required of the Contractor shall be made without any additional compensation by the City.

Post a sign or other notice at a safe, publicly accessible location close to the job site. The notice must include the NPDES tracking number and a contact name and phone number for obtaining additional project information. Locate the sign or notice such that it is visible from the part of the highway nearest the work activities.

Continue SWPPP implementation during any suspension of work activities.

13-3.03A Storm Water Annual Report

Submit the storm water annual report before July 15th for the preceding construction period from July 1st through June 30th or within 15 days after Contract acceptance if construction ends before June 30th. Submit 2 copies of the report. Allow 10 days for the Engineer's review. The Engineer provides comments and specifies the date when the review stopped if revisions are required.

Obtain authorization for the format of the stormwater annual report. The report must include:

1. Project information, such as a description of the project and work locations.
2. Stormwater monitoring information, including:
   2.1. Summary and evaluation of sampling and analysis results and laboratory reports.
   2.2. Analytical methods, reporting units, and detections limits for analytical parameters.
   2.3. Summary of the corrective actions taken.
   2.4. Identification of the corrective actions taken, and compliance activities not implemented.
   2.5. Summary of violations.
   2.6. Names of the individuals performing stormwater inspections and sampling.
   2.7. Logistical information for inspections and sampling, including location, date, time, and precipitation.
   2.8. Visual observations and sample collection records.
3. Documentation of training for individuals responsible for:
   3.1. Permit compliance.
   3.2. BMP installation, inspection, maintenance, and repair.
   3.3. Preparing, revising and amending the SWPPP.

Submit a revised report within 5 business days of receiving the Engineer's comments. The Engineer's review resumes when a complete report has been resubmitted.

When the storm water annual report is authorized, submit 1 electronic copy signed by the WPC manager.

Enter the required information for the storm water annual report into the Stormwater Multiple Application and Report Tracking Systems (SMARTS) by July 15th.

13-3.04 PAYMENT

The contract lump sum price paid for Water Pollution Control Work includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in the preparation of and maintenance of the Storm Water Pollution Prevention Plan (SWPPP) for the site and for implementation of the SWPPP, including collection and input of data required by the SWPPP, complete in place, as specified in the Contract Documents , and no additional compensation will be allowed.

Payment of the lump sum price for Water Pollution Control Work shall be made as follows:

1. A maximum of 10% of the lump sum price for Water Pollution Control Work shall be paid to the Contractor upon City's acceptance of the Storm Water Pollution Prevention Plan (SWPPP).
2. A maximum of 20% of the lump sum price for Water Pollution Control Work shall be paid to the Contractor upon installation of the initial water pollution control measures for the entire project. This amount shall be prorated until all of the water pollution control measures are installed.
3. The remainder of the lump sum price for Water Pollution Control Work shall be paid to the Contractor for maintenance and removal of the water pollution control measures. This payment amount shall be prorated until the Notice of Termination for the project site is submitted by the City.

13-4 JOB SITE MANAGEMENT

13-4.01 GENERAL

13-4.01A Summary

Job site management work includes spill prevention and control, material management, waste management, non-stormwater management, and dewatering activities.

Temporary linear sediment barriers must comply with Section 13-10, "Temporary Linear Sediment Barriers," of the *Caltrans Standard Specifications*.

13-4.01B Definitions

Minor Spill: Spill of oil, gasoline, paint, or other materials in such small quantities that can easily be controlled by a first responder upon discovery of the spill.

Semi-significant Spill: Spill of oil, gasoline, paint, or other materials in quantities that can be controlled by a first responder with help from other personnel.

Significant Or Hazardous Spill: Spill of oil, gasoline, paint, or other materials in quantities that cannot be controlled by job site personnel.

13-4.01C Submittals

At least 15 days before the start of dewatering activities, submit a dewatering and discharge work plan. The dewatering and discharge work plan must include:

1. Title sheet and table of contents
2. Description of dewatering and discharge activities detailing the locations, quantity of water, equipment, and discharge point
3. Estimated schedule for dewatering and the discharge start and end dates of intermittent and continuous activities
4. Discharge alternatives, such as dust control or percolation
5. Visual monitoring procedures with inspection log
6. Copy of the approval to discharge into a sanitary sewer system

For material used or stored within the job site, submit the following documents as informational submittals:

1. SDS at least 5 business days before material is used or stored
2. Monthly inventory records

Submit approval from the local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system.

Submit a discharge notification upon discovery of a spill or discharge of materials into a body of water.

13-4.01D Quality Assurance

Reserved

13-4.02 MATERIALS

Not Used

13-4.03 CONSTRUCTION

13-4.03A General

Implement effective housekeeping practices for handling, storing, using, and disposing of materials to prevent pollution. Limit potential pollutants at their source before they come in contact with stormwater.

13-4.03B Spill Prevention and Control

13-4.03B(1) General

Keep material or waste storage areas clean, well-organized, and equipped with enough cleanup supplies for the material being stored.

Implement spill and leak prevention procedures for chemicals and hazardous substances stored on the job site. If you spill or your equipment or materials leak chemicals or hazardous substances at the job site, you are responsible for all associated cleanup costs and related liability.

Prevent spills from entering stormwater runoff before and during cleanup activities. Do not bury the spill or wash it with water.

Immediately report spills to the WPC manager.

As soon as it is safe, contain and clean up spills of petroleum materials and sanitary and septic waste substances listed in 40 CFR, parts 110, 117, and 302. Comply with Section 14-11, “Hazardous Waste and Contamination,” for a spill or leak that produces hazardous waste.

13-4.03B(2) Minor Spills

Clean up a minor spill as follows:

1. Contain the spread of the spill.
2. Recover the spilled material using absorbents.
3. Clean the contaminated area.
4. Promptly dispose of the contaminated material and absorbents.

13-4.03B(3) Semi-significant Spills

Immediately clean up a semi-significant spill as follows:

1. Contain the spread of the spill.
2. On a paved or other impervious surface, encircle and recover the spilled material with absorbents.
3. On soil, construct an earthen dike and dig up the contaminated soil for disposal.
4. During precipitation, cover the spill with 10-mil plastic sheeting or other material to prevent contamination of the runoff.
5. Promptly dispose of the contaminated material and absorbents.

13-4.03B(4) Significant or Hazardous Spills

Immediately notify the Engineer and qualified personnel of a significant or hazardous spill. Handle the spill as follows:

1. Do not attempt to clean up the spill until qualified personnel have arrived.
2. Obtain the immediate services of a spill contractor or hazardous material team.
3. Notify local emergency response teams by dialing 911 and county officials by using the emergency phone numbers retained at the job site.
4. Notify the California State Warning Center at (800) 852-7550.
5. Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities under 40 CFR 110, 117, and 302.
6. Notify other agencies as appropriate, including:
   - 6.1. Fire department
   - 6.2. Public works department
   - 6.3. US Coast Guard
   - 6.4. California Highway Patrol
   - 6.5. City police or county sheriff's department
   - 6.6. DTSC
   - 6.7. Department of Conservation, Division of Oil, Gas, and Geothermal Resources
   - 6.8. Cal/OSHA
   - 6.9. RWQCB

13-4.03B(5)–13-4.03B(6) Reserved

13-4.03C MATERIAL MANAGEMENT

13-4.03C(1) General

Minimize or eliminate discharge of material into the air, storm drain systems, and receiving waters while taking delivery of, using, or storing the following materials:

1. Hazardous chemicals, including acids, lime, glues, adhesives, paints, solvents, and curing compounds
2. Soil stabilizers and binders
3. Fertilizers
4. Detergents
5. Plaster
6. Petroleum materials, including fuel, oil, and grease
7. Asphalt and concrete components
8. Pesticides and herbicides

Employees trained in emergency spill cleanup procedures must be present during the unloading of hazardous materials or chemicals.

Minimize the use of hazardous materials if practicable.

Perform each of the following activities at least 100 feet from a concentrated flow of stormwater, a drainage course, or an inlet wherever it is performed (1) within the floodplain or (2) at least 50 feet outside the floodplain:

1. Stockpiling materials
2. Storing pile-driving equipment and liquid waste containers
3. Washing vehicles and equipment in outside areas
4. Fueling and maintaining vehicles and equipment

13-4.03C(2) Material Storage

Store materials in their original containers with the original labels maintained in legible condition. Immediately replace damaged or illegible labels.

Comply with Section 14-11.03, “Hazardous Waste Management,” for the storage of liquids, petroleum materials, and substances listed in 40 CFR 110, 117, and 302.

Store bagged or boxed material on pallets. Protect bagged or boxed material from wind and rain during non–working days and whenever precipitation is forecasted.

13-4.03C(3) Stockpile Management

Minimize stockpiling of materials at the job site.

Do not allow soil, sediment, or other debris from stockpiles to enter storm drains, open drainages, or watercourses.

Manage stockpiles by implementing WPC practices on:

1. Active stockpiles before a forecasted storm event
2. Inactive stockpiles according to the WPCP or SWPPP schedule

Cover active and inactive soil stockpiles with soil stabilization material or a temporary cover and surround them with a linear sediment barrier.

Cover stockpiles of concrete and asphalt concrete rubble, HMA, AB, or AS with a temporary cover and surround them with a linear sediment barrier.

Place stockpiles of pressure-treated wood on pallets and cover them with an impermeable material.

Place stockpiles of cold mix asphalt concrete on an impervious surface and cover them with an impermeable material. Protect the stockpile from stormwater run-on and runoff.

Repair or replace linear sediment barriers and covers as needed to keep them functioning properly. If sediment accumulates to 1/3 of the linear sediment barrier's height, remove the accumulated sediment.

13-4.03C(4)–13-4.03C(6) Reserved

13-4.03D WASTE MANAGEMENT

13-4.03D(1) General

Manage solid waste under Section 14-10, “Solid Waste Disposal and Recycling.” Manage hazardous waste under Section 14-11, “Hazardous Waste and Contamination.”

13-4.03D(2) Paint Waste

Clean water-based and oil-based paint from brushes or equipment within a contained area to prevent contamination of soil, receiving waters, or storm drain systems. Handle and dispose of paints, thinners, solvents, residues, and sludges that cannot be recycled or reused as hazardous waste under Section 14-11, “Hazardous Waste and Contamination.” When thoroughly dry, dispose of dry latex paint, paint cans, used brushes, rags, absorbent materials, and drop cloths as solid waste under Section 14-10, “Solid Waste Disposal and Recycling.”

13-4.03D(3) Concrete Waste

Prevent the discharge of concrete and asphalt concrete waste into storm drain systems and receiving waters.

Collect concrete waste simultaneously with the waste-producing activity. Concrete waste includes grout, dust, debris, residue, and slurry from demolition, saw cutting, coring, grooving, or grinding activities.

Dispose of liquid residue from concrete grooving or grinding activities at an appropriately permitted disposal facility.

If authorized, you may transport liquid grooving or grinding residue to a contractor-support facility for drying.

13-4.03D(4) Sanitary and Septic Waste

Do not bury or discharge wastewater from a sanitary or septic system within the highway. A sanitary facility discharging into a sanitary sewer system must be properly connected and free from leaks. Place a portable sanitary facility at least 50 feet away from storm drains, receiving waters, and flow lines.

Comply with local health agency regulations if using an on-site disposal system.

13-4.03D(5) Liquid Waste

Prevent job-site liquid waste from entering storm drain systems and receiving waters. Liquid wastes include:

1. Drilling slurries or fluids
2. Grease- and oil-free wastewater and rinse water
3. Dredgings, including liquid waste from cleaning drainage systems
4. Liquid waste running off a surface, including wash and rinse water

5. Other non-stormwater liquids not covered by separate permits

Store liquid waste in structurally sound, leak-proof containers, such as roll-off bins or portable tanks. Provide enough liquid waste containers with enough volume to prevent overflow, spills, and leaks. Store containers at least 50 feet from moving vehicles and equipment.

Remove and dispose of deposited solids from sediment traps under Section 14-10, “Solid Waste Disposal and Recycling,” unless another method is authorized.

Liquid waste may require testing to determine hazardous material content before disposal. Dispose of drilling fluids and residue.

If an authorized location is available within the job site, fluids and residue exempt under 23 CA Code of Regs § 2511(g) may be dried by evaporation in a leak-proof container. Dispose of the remaining solid waste under Section 14-10, “Solid Waste Disposal and Recycling.”

13-4.03D(6)–13-4.03D(8) Reserved

13-4.03E NON-STORMWATER MANAGEMENT

13-4.03E(1) General

Use water for work activities such that erosion and the discharge of pollutants into storm drain systems and receiving waters are prevented. Obtain authorization before washing anything at the job site with water that could discharge into a storm drain system or receiving waters. Immediately report discharges.

Sweep and vacuum paved areas. Do not wash paved areas with water.

Direct runoff water, including water from the repair of a water line, from the job site to areas where it can infiltrate into the ground. Do not allow spilled water to escape the areas used to fill water trucks. Manage run-on to minimize contact with job site water.

13-4.03E(2) Illicit Connection and Illegal Discharge Detection and Reporting

Before starting work and daily thereafter, inspect the job site and its perimeter for the following evidence of illicit connections, illegal discharges, and dumping:

1. Debris or trash piles
2. Staining or discoloration on pavement or soils
3. Pungent odors coming from drainage systems
4. Discoloration or an oily sheen on water
5. Stains and residue in ditches, channels, or drain boxes
6. Abnormal water flow during dry weather
7. Excessive sediment deposits
8. Nonstandard drainage junction structures
9. Broken concrete or other disturbances at or near junction structures

If evidence of an illegal connection, discharge, or dumping is discovered, immediately notify the Engineer. Do not take further action unless ordered. Assume that unlabeled or unidentifiable material is hazardous.

13-4.03E(3) Vehicle and Equipment Cleaning

Limit vehicle and equipment cleaning or washing at the job site except for the safety and protection of the equipment and as needed to comply with PLACs. Notify the Engineer before cleaning vehicles and equipment at the job site with soap, solvents, or steam. Contain and recycle or dispose of resulting waste under Section 14-11, “Hazardous Waste and Contamination,” or Section 13-4.03D(5), “Liquid Waste,” whichever is applicable. Do not use diesel to clean vehicles or equipment. Minimize the use of solvents.

Clean or wash vehicles and equipment in a structure equipped with disposal facilities. You may wash vehicles in an outside area if the area is:

1. Paved with concrete or asphalt concrete
2. Surrounded by a containment berm
3. Equipped with a sump to collect and dispose of wash water

Use as little water as practicable when washing vehicles and equipment. Hoses must be equipped with a positive shutoff valve.

Discharge the liquid from wash racks to a recycling system or to another authorized system. Remove liquids and sediment as necessary.

13-4.03E(4) Vehicle and Equipment Fueling and Maintenance

If practicable, perform maintenance on vehicles and equipment off-site.

If fueling or maintenance must be performed at the job site, obtain authorization for an assigned area or areas for these activities before using them. Minimize mobile fueling and maintenance activities. Perform fueling and maintenance activities on level ground in areas protected from stormwater run-on and runoff.

Use containment berms or dikes around fueling and maintenance areas. Keep enough absorbents and spill kits in the fueling or maintenance area and on fueling trucks to handle potential spills. Dispose of spill-cleanup material and kits immediately after use. Use drip pans or absorbent pads during fueling or maintenance.

Do not leave fueling or maintenance areas unattended during fueling and maintenance activities. Fueling nozzles must be equipped with (1) an automatic shutoff control and (2) vapor recovery where required by the Air Quality Management District. Secure nozzles in an upright position when not in use. Do not top off fuel tanks.

Recycle or properly dispose of used batteries and tires.

If leaks cannot be repaired immediately, remove the vehicle or equipment from the job site.

13-4.03E(5) Material and Equipment Used Over Water

Place drip pans and absorbent pads under vehicles and equipment used over water. Keep enough spill- cleanup material with the vehicles and equipment to handle potential spills. Place drip pans or plastic sheeting under vehicles and equipment on docks, barges, or other surfaces over water whenever the vehicles or equipment will be idle for more than 1 hour.

Install watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools. Secure any material or debris to prevent spills or discharge into the water due to wind.

Report discharges to receiving waters immediately upon discovery.

13-4.03E(6) Structure Removal Over or Adjacent to Water

Do not allow demolished material to enter storm drain systems and receiving waters. Use authorized covers and platforms to collect debris. Use attachments on equipment to catch debris during small demolition activities. Empty debris-catching devices daily and handle debris under Section 13-4.03D, “Waste Management.”

13-4.03E(7) Paving, Sealing, Saw Cutting, Grooving, and Grinding Activities

Prevent the following materials from entering storm drain systems and receiving waters:

1. Cementitious material
2. Asphaltic material
3. Aggregate or screenings
4. Saw cutting, grooving, and grinding residue
5. Pavement chunks
6. Shoulder backing
7. Methacrylate resin
8. Sandblasting residue

Cover drainage inlets and use linear sediment barriers to protect downhill receiving waters until paving, saw cutting, grooving, and grinding activities are completed and excess material has been removed.

Cover drainage inlets and manholes during the application of seal coat, tack coat, slurry seal, or fog seal.

Whenever precipitation is forecasted, limit paving, saw cutting, and grinding to places where runoff can be captured.

Do not start seal coat, tack coat, slurry seal, or fog seal activities when precipitation is forecasted during the application and curing period.

Do not grind or groove pavement during precipitation.

Use a vacuum to remove slurry immediately after it is produced. Do not allow the slurry to run onto lanes open to traffic or off the pavement.

Collect the residue from grooving and grinding activities with a vacuum attachment on the grinding machine. Do not leave the residue on the pavement or allow it to flow across the pavement.

You may stockpile material removed from existing roadways under Section 13-4.03C(3), “Stockpile Management,” if authorized.

Do not coat asphalt trucks and equipment with substances that contain soap, foaming agents, or toxic chemicals.

When paving equipment is not in use, park the paving equipment over drip pans or plastic sheeting with absorbent material to catch drips.

13-4.03E(8) Thermoplastic Striping and Pavement Markers

Do not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets or receiving waters.

Do not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets or receiving waters.

Collect and dispose of bituminous material from the roadway after removing markers.

13-4.03E(9) Pile Driving

Keep spill kits and cleanup materials at pile driving locations. Park pile driving equipment over drip pans, absorbent pads, or plastic sheeting with absorbent material. Protect pile driving equipment by parking it on plywood and covering it with plastic if precipitation is forecasted.

Store pile driving equipment on level ground and protect it from stormwater run-on when not in use. Use vegetable oil instead of hydraulic fluid if practicable.

13-4.03E(10) Concrete Curing

Do not overspray chemical curing compounds. Minimize the drift by spraying as close to the concrete as practicable. Do not allow runoff of curing compounds. Cover drainage inlets before applying the curing compound.

Minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when concrete is curing.

13-4.03E(11) Concrete Finishing

Collect and dispose of (1) water and solid waste from high-pressure water blasting and (2) sand and solid waste from sandblasting. Before sandblasting, cover drainage inlets within 50 feet of the sandblasting.

Minimize the drift of dust and blast material by keeping the nozzle close to the surface of the concrete. If the character of the blast residue is unknown, test for hazardous materials and dispose of it.

Inspect the containment structures for concrete-finishing waste for damage before each day of use and before forecasted precipitation. Remove the liquid and solid waste from the containment structures after each work shift.

13-4.03E(12)–13-4.03E(15) Reserved

13-4.03F Sweeping

Sweep by hand or mechanical methods, such as vacuuming. Do not use mechanical kick brooms. Sweep paved roads at construction entrance and exit locations and paved areas within the job site:

1. During clearing and grubbing activities
2. During earthwork activities
3. During trenching activities
4. During pavement-structure construction activities
5. When vehicles are entering and leaving the job site
6. After soil-disturbing activities
7. After observing off-site tracking of material

Monitor paved areas and roadways within the project. Sweep within:

1. 1 hour if sediment or debris is observed during activities requiring sweeping
2. 24 hours if sediment or debris is observed during activities not requiring sweeping

Remove collected material, including sediment, from paved shoulders, drain inlets, curbs and dikes, and other drainage areas. You may stockpile collected material at the job site. Dispose of collected material at least once per week if stockpiled.

You may dispose of sediment within the job site collected during sweeping activities. Protect the disposal areas against erosion.

Keep dust to a minimum during street sweeping activities. Use water or a vacuum whenever dust generation is excessive, or sediment pickup is ineffective.

13-4.03G Dewatering

Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities.

Perform dewatering work as specified for the work items involved, such as a temporary ATS or dewatering and discharge.

If dewatering and discharging activities are not specified for a work item and you perform dewatering activities:

1. Conduct dewatering activities under the Department's *Field Guide for Construction Site Dewatering*.
2. Ensure any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
3. Discharge the water within the project limits. Dispose of the water if it cannot be discharged within project limits due to site constraints or contamination.
4. Do not discharge stormwater or non-stormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface. Immediately notify the Engineer upon discovering any such condition.

13-4.03H–13-4.03J Reserved

13-4.04 PAYMENT

Manage solid waste under Section 14-10, “Solid Waste Disposal and Recycling”. Manage hazardous waste under Section 14-11, “Hazardous Waste and Contamination.”

In addition to Water Pollution Control requirements, the Contractor shall comply with Section 14-10.02, “Solid Waste Disposal and Recycled Materials Reporting.”

13-6 TEMPORARY SEDIMENT CONTROL

13-6.01 GENERAL

This section includes specifications for installing temporary sediment control. Temporary linear sediment barriers must comply with Section 13-10, “Temporary Linear Sediment Barriers.”

13-6.02 MATERIALS

13-6.02A General

An erosion control blanket must comply with Section 21-2.02O(4), “Erosion Control Blankets.” Fiber rolls, rope, stakes, gravel-filled bags, and foam barriers must comply with Section 13-10.02, “Materials.”

13-6.02B Rigid Plastic Barriers

A rigid plastic barrier must:

1. Have an integrated filter
2. Have a formed outer jacket of perforated HDPE or polyethylene terephthalate
3. Have a flattened tubular-shaped cross section
4. Be made from virgin or recycled materials
5. Be free of biodegradable filler materials that degrade the physical or chemical characteristics of the completed filter core or outer jacket
6. Have a length of at least 4 feet per unit
7. Have the ability to interlock separate units into a long barrier such that water does not flow between the units
8. Comply with the requirements shown in the following table:

Rigid Plastic Barriers

Quality characteristic	Test method	Requirement
Grab tensile strength of outer jacket material (min, lb/sq in each direction)	ASTM D4632[a]	4,000
Break strength of outer jacket (lb/sq in)	ASTM D4632[a]	1,300
Permittivity of filter core (min, 1/sec)	ASTM D4491	0.38
Flow rate of filter core (gpm per sq ft)	ASTM D4491	100–200
Filter core aperture size (max, microns)	--	425
UV stability of outer jacket and filter core-(min, percent tensile strength after 500 hours, xenon-arc lamp and water spray weathering method)	ASTM D4355	90

[a]You may use other appropriate test methods for the specific polymer.

For an inlet with a curb opening but no grate, the rigid plastic barrier must be sized to fit the opening and have:

1. Horizontal flap of at least 6 inches with an under-seal gasket to prevent underflows
2. High-flow bypass
3. Vertical height of at least 7 inches after installation

For a grated inlet without a curb opening, the rigid plastic barrier must be sized to fit the inlet and:

1. Cover the grate by at least 2 inches on each side and have an under-seal gasket to prevent underflows
2. Have a high-flow bypass
3. Have a vertical height of at least 1.5 inches after installation

For a grated inlet with a curb opening, the rigid plastic barrier must be sized to fit and have:

1. Horizontal flap that covers the grate by at least 2 inches on the 3 sides away from the curb opening and must have an under-seal gasket to prevent underflows
2. High-flow bypass
3. Section that covers at least 5 inches vertically above the flow line of the curb opening after installation

13-6.02C Sediment Filter Bags

Each sediment filter bag must be sized to fit the catch basin or drainage inlet and have a high-flow bypass.

A sediment filter bag may include a metal frame. If the sediment filter bag does not have a metal frame and is deeper than 18 inches, it must include lifting loops, dump straps, and a restraint cord to keep the sides of the bag away from the walls of the catch basin.

13-6.02D–13-6.02F Reserved

13-6.03 CONSTRUCTION

13-6.03A General

Remove sediment deposits if the sediment exceeds 1 inch in depth from the surface of an erosion control blanket.

Remove sediment from a Type 2 sediment trap of a temporary inlet if the volume has been reduced by approximately 1/2.

Remove sediment from a sediment filter bag if it becomes full or if the restraint cords are no longer visible. Empty a sediment filter bag:

1. Without a metal frame by placing no. 8 steel reinforcing bars through the lifting loops and lifting the filled bag from the drainage inlet
2. With a metal frame by lifting the metal frame from the drainage inlet

Rinse the sediment filter bag before replacing it at the drainage inlet. Do not allow the rinse water to enter a drainage inlet or waterway.

If you place the removed sediment within the job site, stabilize the sediment deposits to prevent erosion.

13-6.03B Temporary Check Dams

Before placing a temporary check dam, remove obstructions, including rocks, clods, and debris greater than 1 inch in diameter from the ground.

If a temporary check dam is to be placed in the same area as an erosion control blanket, install the blanket before placing the dam.

Place a temporary check dam approximately perpendicular to the centerline of the ditch or drainage line. Install the dam with enough spillway depth to prevent flanking of a concentrated flow around its ends.

Install a Type 1 or Type 2 dam if the ditch is unlined and a Type 2 dam if the ditch is lined with concrete or asphalt concrete.

For a Type 1 temporary check dam:

1. Secure the fiber rolls with rope and notched wood stakes.
2. Drive the stakes into the soil until the notch is even with the top of the fiber roll.
3. Lace rope between the stakes and over the fiber roll. Knot the rope at each stake.
4. Tighten by driving the stakes further into the soil and forcing the fiber roll against the surface of the ditch or drainage line.

Place a Type 2 temporary check dam as a single layer of gravel-filled bags, placed end-to-end to eliminate gaps. If you need to increase the height of the dam, add more layers of gravel-filled bags. Stack the bags in the upper row to overlap the joints in the lower row. Stabilize the rows by adding more rows of bags in the lower layers.

13-6.03C Temporary Drainage Inlet Protection

Provide temporary drainage inlet protection around drainage inlets as changing conditions require. The drainage inlet protection must be Type 1, Type 2, Type 3A, Type 3B, Type 4A, Type 4B, Type 5, Type 6A, Type 6B, or a combination of these as needed for the surrounding conditions.

For drainage inlet protection in paved or unpaved areas:

1. Prevent runoff ponds from encroaching onto the traveled way or overtopping the curb or dike. Use a linear sediment barrier to redirect runoff and control ponding.
2. Clear the area around each drainage inlet of obstructions, including rocks, clods, and debris greater than 1 inch in diameter, before installing the drainage inlet protection.
3. Install the linear sediment barrier upslope of the existing drainage inlet and parallel with the curb, dike, or flow line to prevent sediment from entering the drainage inlet.

If gravel-filled bags are used for Type 3A and Type 3B temporary drainage inlet protection, place the gravel-filled bags end-to-end to eliminate gaps. Stack the bags such that the upper row overlaps joints in the lower row. Arrange the bags to create a spillway by removing 1 or more gravel-filled bags from the upper layer.

Place fiber rolls over the erosion control blanket for Type 4A temporary drainage inlet protection.

Place the barrier to provide a tight joint with the curb or dike. Cut the cover fabric or jacket to ensure a tight fit.

If a rigid sediment barrier is used for Type 6A or Type 6B temporary drainage inlet protection at a grated inlet without a curb opening, place the barrier using a gasket to prevent runoff from flowing under the barrier. Secure the barrier to the pavement with nails and adhesive, gravel-filled bags, or a combination of both.

Install a sediment filter bag for Type 5 temporary drainage inlet protection as follows:

1. Remove the drainage inlet grate.
2. Place the sediment filter bag in the opening.
3. Replace the grate to secure the sediment filter bag in place.

13-6.03D Reserved

13-6.03E Temporary Fiber Rolls

Install a temporary fiber roll as specified for installing fiber rolls in Section 21-2.03P, “Fiber Rolls.”

13-6.03F Temporary Gravel Bag Berms

Install a temporary gravel bag berm under Section 13-10.03C, “Temporary Gravel Bag Berms.”

13-6.03F Rigid Plastic Barriers

Secure a rigid plastic barrier to:

1. Pavement with 1-inch concrete nails with 1-inch washers and solvent-free adhesive, gravel-filled bags, or a combination of both.
2. Soil with 6-inch nails with 1-inch washers and wood stakes.

13-6.03G–13-6.03J Reserved

13-6.04 PAYMENT

The payment quantity for temporary sediment control bid items paid for by the length is the length measured along the centerline of the installed material.

The payment quantity for temporary fiber roll does not include the additional quantity used for overlaps.

The Department does not pay for the relocation of temporary drainage inlet protection during work progress.

The Department determines the cost for maintaining sediment control measures under Section 9-1.04, “Final Pay Quantities,” and pays you 1/2 of that cost.

13-7 TEMPORARY TRACKING CONTROL

13-7.01 GENERAL

13-7.01A General

This section includes specifications for limiting and removing sediment and debris tracked onto roadway surfacing.

13-7.01B Materials

Not Used

13-7.01C Construction

Do not allow soil, sediment, or other debris that is tracked onto the surfacing to enter storm drains, open drainage facilities, and watercourses. Remove any material tracked onto the surfacing within 6 hours.

13-7.01D Payment

Not Used

13-7.02 STREET SWEEPING

13-7.02A General

13-7.02A(1) Summary

This section includes specifications for sweeping streets.

13-7.02A(2) Definitions

Reserved

13-7.02A(3) Submittals

At least 5 business days before starting clearing and grubbing, earthwork, or any other activity with the potential for tracking sediment or debris, submit the number and type of street sweepers that will be used on the project for each activity.

Keep and submit records of street sweeping activities, including sweeping times, sweeping locations, and the quantity of collected material.

13-7.02A(4) Quality Assurance

Reserved

13-7.02B Materials

Not Used

13-7.02C Construction

Use one of the following types of street sweepers:

1. Mechanical sweeper followed by a vacuum-assisted sweeper
2. Vacuum-assisted, dry, waterless, sweeper
3. Regenerative-air sweeper

Street sweeping does not void the requirements for residue collection included in other work activities, such as grooving, grinding, or asphalt concrete planing.

Sweep streets as specified for sweeping in Section 13-4.03F, “Sweeping,” except use a street sweeper.

At least 1 street sweeper must be at the job site at all times when street sweeping work is required. The street sweeper must be in good working order.

13-7.02D Payment

Not Used

13-7.03 TEMPORARY CONSTRUCTION ROADWAYS AND ENTRANCES

13-7.03A General

13-7.03A(1) Summary

This section includes specifications for constructing temporary construction roadways and entrances.

13-7.03A(2) Definitions

Reserved

13-7.03A(3) Submittals

For a construction entrance, submit details for alternatives at least 5 business days before installation. You may propose alternatives for the sump and corrugated steel panels or eliminate the sump if authorized.

13-7.03A(4) Quality Assurance

Reserved

13-7.03B Materials

13-7.03B(1) General

Fabric for a temporary construction entrance must be Class 8 RSP fabric. Fabric for temporary construction roadway must be Class 10 RSP fabric.

13-7.03B(2) Rock

Use Type A rock for a Type 1 temporary construction entrance. Type A rock must comply with:

1. Quality characteristics for rock material in Section 72-2.02, “Materials.”
2. Sizes shown in the following table:

Type A Rock Size

Square screen size (inches)	Percentage passing	Percentage retained
6	100	0
3	0	100

Use Type B rock for a Type 2 temporary construction entrance.

Type B rock must be no. 25 railway ballast complying with the AREMA Manual for Railway Engineering. Do not use blast furnace slag.

Use Type A or Type B rock for a temporary construction roadway.

13-7.03B(3) Corrugated Steel Panels

Each corrugated steel panel must:

1. Be pressed or shop welded
2. Have a slot or hook for connecting the panels together

13-7.03C Construction

Prepare the location for a temporary construction entrance or roadway as follows:

1. Remove vegetation to the ground level and clear away debris.
2. Grade the ground to a uniform plane.
3. Grade the ground surface to drain.
4. Remove sharp objects that could damage the fabric.
5. Compact the top 1.5 feet of the soil to at least a 90 percent relative compaction.

Construct a temporary construction entrance or roadway as follows:

1. Position the fabric along the length of the entrance or roadway.
2. Overlap the sides and ends of the fabric by at least 12 inches.
3. Spread rock over the fabric in the direction of traffic.
4. Cover the fabric with rock within 24 hours.
5. Keep a 6-inch layer of rock over the fabric to prevent damage from the spreading equipment.

Do not drive on the fabric until the rock is spread.

Repair fabric damaged during rock spreading by placing new fabric over the damaged area. The new fabric must be large enough to cover the damaged area and provide at least an 18-inch overlap on all edges.

Maintain a temporary construction entrance or roadway to minimize the generation of dust and tracking of soil and sediment onto public roads. Place additional rock if dust or sediment tracking increases.

Repair a temporary construction entrance or roadway if:

1. Fabric is exposed
2. Depressions develop in the surface
3. Rock is displaced

For a Type 2 temporary construction entrance, place rock under the corrugated steel panels. Use at least 6 corrugated steel panels for each entrance. Couple the panels together to prevent movement.

If using a sump, install the sump within 20 feet of each temporary construction entrance.

13-7.03D Payment

The Department determines the cost for maintaining a temporary construction entrance or roadway under Section 9-1.04, " Final Pay Quantities," and pays you 1/2 of that cost.

The Department does not pay for the relocation of temporary construction entrances or roadways during work progress.

13-8 RESERVED

13-9 TEMPORARY CONCRETE WASHOUTS

13-9.01 GENERAL

13-9.01A Summary

This section includes specifications for installing temporary concrete washouts. You may use any of the following systems for a temporary concrete washout:

1. Temporary concrete washout facility
2. Portable temporary concrete washout
3. Temporary concrete washout bin

13-9.01B Definitions

Reserved

13-9.01C Submittals

At least 5 business days before starting concrete activities, submit an informational submittal that includes:

1. Location of each concrete washout
2. Name and location of the off-site disposal site to receive the concrete waste
3. Copy of the permit issued by the RWQCB for the off-site commercial disposal site
4. Copy of the permit issued by the state or local agency with jurisdiction over a disposal site located outside of the State

Retain and submit tracking records for the disposal of concrete waste as an informational submittal. Submit a certificate of compliance for (1) the fabric bag for gravel-filled bags and (2) the plastic liner.

13-9.01D Quality Assurance

Reserved

13-9.02 MATERIALS

13-9.02A General

The sign for a concrete washout must comply with Section 12-3.11B(3), “Portable Signs,” except the sign panel may be plywood. The sign panel must be at least 4 by 2 feet. The sign legend must read Concrete Washout in at least 6-inch-high black letters on a white background.

13-9.02B Temporary Concrete Washout Facilities

Stakes for a temporary concrete washout facility must comply with Section 13-10.02C, “Posts.” Straw bales for a temporary concrete washout facility must comply with Section 13-10.02H, “Straw Bales.”

Gravel-filled bags for a temporary concrete washout facility must comply with the following:

1. Be a geosynthetic bag
2. Have inside dimensions from 24 to 32 inches long and from 16 to 2 inches wide
3. Have a bound opening sewn with yarn, bound with wire, or secured with a closure device
4. Weigh from 30 to 50 pounds when filled with gravel

Gravel for a gravel-filled back must be from 3/8 to ¾ inch in diameter and must be clean and free of clay balls, organic matter, and other deleterious materials.

The plastic liner for a temporary concrete washout facility must be:

1. New single-ply polyethylene sheeting without seams or overlapping joints
2. At least 10 mils thick
3. Free of holes, punctures, tears, or other defects

13-9.02C Portable Temporary Concrete Washouts

A portable temporary concrete washout must be a commercially available, watertight container with enough capacity to contain all liquid and concrete waste generated by washout activities without seepage or spills and be:

1. At least 55 gallons in capacity.
2. Labeled for exclusive use as a concrete waste and washout facility. *Concrete Washout* must be stenciled in 3-inch-high black letters on a white background with the top of the letters placed 12 inches from the top of the container.

13-9.02D Temporary Concrete Washout Bins

A temporary concrete washout bin must be a commercially available, watertight container with enough capacity to contain all liquid and concrete waste generated by washout activities without seepage or spills and be:

1. At least 5 cubic yards in capacity
2. Roll-off type with or without folding steel ramps
3. Labeled for exclusive use as a concrete waste and washout facility

13-9.02E–13-9.02G Reserved

13-9.03 CONSTRUCTION

Place a concrete washout at the job site:

1. Before starting concrete placement activities
2. In the immediate area of concrete work where authorized
3. No closer than 50 feet from any storm drain inlet, open drainage facility, ESA, or watercourse
4. Away from traffic or public access areas

Install a concrete washout sign adjacent to each concrete washout location. Use a concrete washout to collect:

1. Washout from concrete delivery trucks
2. Slurries containing concrete or asphalt from saw cutting, coring, grinding, grooving, and hydrodemolition
3. Concrete waste from mortar mixing stations

Do not fill a concrete washout higher than 6 inches below the upper rim.

Dispose of concrete waste within 2 business days after a concrete washout becomes full. Dispose of concrete waste from a concrete washout at a plant licensed to receive solid concrete waste, liquid concrete waste, or both.

Relocate a portable temporary concrete washout or bin as needed for concrete work. The Department does not pay for relocating a portable temporary concrete washout or bin.

Secure a portable temporary concrete washout or bin to prevent spilling concrete waste when relocating or transporting it within the job site. If you spill concrete waste, clean up the spilled material and place it back into the concrete washout unit.

13-9.04 PAYMENT

Not Used

13-10 TEMPORARY LINEAR SEDIMENT BARRIERS

13-10.01 GENERAL

13-10.01A Summary

This section includes specifications for installing temporary linear sediment barriers.

13-10.01B Definitions

Reserved

13-10.01C Submittals

Submit a certificate of compliance for:

1. Fiber rolls
2. Silt fence fabrics
3. Sediment filter bags
4. Foam barriers
5. Fabric for gravel-filled bags

If you substitute steel wire staples with an alternative attachment device, submit a sample of the device at least 5 business days before its installation.

13-10.01D Quality Assurance

Reserved

13-10.02 MATERIALS

13-10.02A General

Stakes, ropes, and staples must comply with Section 21-2.02R, “Fasteners.”

13-10.02B Fiber Rolls

A fiber roll must comply with Section 21-2.02P, “Fiber Rolls,” except a fiber roll for a large sediment barrier must:

1. Have a diameter from 18 to 22 inches
2. Be at least 8 feet long
3. Weigh at least 6.5 lb/ft

13-10.02C Posts

Each post must comply with the specifications for a post for a temporary high-visibility fence except:

1. Post length must be at least 4 feet except for a temporary reinforced silt fence that must have a post length of at least:
   1.1. 6 feet for a Type 1 installation
   1.2. 5 feet for a Type 2 installation

Steel is not allowed for a post for a temporary large sediment barrier

13-10.02D High-Visibility Fabric

The high-visibility fabric must comply with the specifications for fabric for a temporary high-visibility fence.

13-10.02E Wire Mesh

Wire mesh for a temporary reinforced silt fence must:

1. Comply with Section 80-2.02E, “Wire Mesh.”
2. Be fabricated from at least 14-gauge horizontal and vertical wires welded at each intersection
3. Have a maximum opening of 2 inches wide by 4 inches high
4. Be supplied in 50-foot rolls

13-10.02F Wire

Wire for guy wires and tie wires for a temporary reinforced silt fence must be 16-gauge iron or steel.

13-10.02G Anchors

Anchors for a temporary reinforced silt fence must be fabricated from no. 4 steel reinforcing bar.

13-10.02H Straw Bales

Straw for a straw bale must comply with Section 21-2.02H, “Straw.” A straw bale must be:

1. At least 14 inches wide, 18 inches high, 36 inches long, and weigh at least 50 lb.
2. Composed entirely of vegetative matter except for the binding material.
3. Bound by wire, nylon, or polypropylene string. Do not use jute or cotton binding. Baling wire must be at least 16 gauge. Nylon or polypropylene string must be approximately 0.08 inch in diameter with 80 lb of breaking strength.

13-10.02I Foam Barriers

A foam barrier must have:

1. Urethane foam-filled core
2. Geosynthetic fabric cover and flap
3. Triangular, circular, or square cross section
4. Vertical height of at least 5 inches after installation
5. Horizontal flap at least 8 inches in width
6. Length of at least 4 feet per unit
7. Ability to interlock separate units into a long barrier such that water will not flow between units

The geosynthetic fabric cover and flap for a foam barrier must comply with the requirements shown in the following table:

Geosynthetic Fabric Cover And Flap

Quality characteristic	Test method	Requirement
Grab breaking load in each direction, 1-inch grip (min, lb)	ASTM D4632	200
Apparent elongation in each direction (min, %)	ASTM D4632	15
Water flow rate (average roll value, gpm/sq ft)	ASTM D4491	100–150
Permittivity (min, 1/sec)	ASTM D4491	0.05
Apparent opening size (max average roll value, US standard sieve size)	ASTM D4751	40
UV resistance (min, percent retained grab breaking load at 500 hours)	ASTM D4355	70

13-10.02J Gravel-filled Bags

Gravel-filled bags for a temporary gravel bag berm must comply with the following:

1. Be a geosynthetic bag
2. Have inside dimensions from 24 to 32 inches long and from 16 to 20 inches wide
3. Have a bound opening sewn with yarn, bound with wire, or secured with a closure device
4. Weigh from 30 to 50 pounds when filled with gravel

Gravel for a gravel-filled bag must be from 3/8 to ¾ inch in diameter and must be clean and free of clay balls, organic matter, and other deleterious materials.

13-10.02K–13-10.02M Reserved

13-10.03 CONSTRUCTION

13-10.03A General

Before installing a temporary linear sediment barrier, remove obstructions, including rocks, clods, and debris greater than 1 inch in diameter, from the ground.

Maintain a temporary linear sediment barrier to provide sediment-holding capacity and to reduce concentrated flow velocities.

Repair or adjust the barrier if rills or other evidence of concentrated runoff occur beneath the barrier.

Repair or replace split, torn, or unraveled material. Add or replace posts, stakes, or fasteners as needed to prevent sagging or slumping.

Reattach any barrier that becomes detached or dislodged from the pavement.

Repair a split or torn rigid plastic barrier with 16-gauge galvanized steel wire or UV-stabilized cable ties from 5 to 7 inches in length.

Remove sediment deposits, trash, and other debris as needed or ordered.

Remove sediment deposits if the sediment exceeds 1/3 of the height above the ground behind a barrier.

If you place the removed sediment deposits within the job site, stabilize the sediment deposits to prevent erosion.

Place gravel-filled bags behind Type K temporary railing if used within a shoulder area.

13-10.03B Temporary Fiber Rolls

Install temporary fiber rolls as specified for installing fiber rolls in Section 21-2.03P, “Fiber Rolls.”

13-10.03C Temporary Gravel Bag Berms

Place gravel-filled bags end-to-end to eliminate gaps in a temporary gravel bag berm. Place the bags approximately parallel with the slope contour. Angle the last 6 feet upslope at the downhill end of the run. Stack the bags such that the upper row overlaps the joints in the lower row.

Add layers of gravel-filled bags to increase the height of a temporary gravel bag berm if needed. Stack the bags in the upper row to overlap the joints in the lower row. Stabilize the rows by adding rows of bags in the lower layers.

13-10.03D Temporary Large Sediment Barriers

Install a temporary large sediment barrier as follows:

1. Place a single row of fiber rolls end-to-end, approximately parallel with the slope contour. For any 20-foot section of fiber roll, do not allow the fiber roll to vary by more than 5 percent from level.
2. Place the fiber rolls in a furrow that is from 6 to 8 inches deep.
3. Secure the fiber rolls with wood stakes 4 feet apart.
4. Place a stake 18 inches from each end of each fiber roll.
5. Drive the stakes into the soil such that the top of the stakes are less than 2 inches above the top of the fiber rolls.
6. Angle the last 6 feet upslope at the downhill end of the run.

13-10.03E Temporary Reinforced Silt Fences

Place a temporary reinforced silt fence parallel with the slope contour. For any 50-foot section of reinforced silt fence, do not allow the elevation at the base of the fence to vary by more than 1/3 of the fence height.

Install a temporary reinforced silt fence as follows:

1. Dig a 6-inch-deep trench.
2. Place the wire mesh and the bottom of the silt fence fabric in the trench.
3. Place posts on the downhill side of the fabric and wire mesh.
4. Attach the silt fence fabric to the wire mesh with tie wires or locking plastic fasteners along the length of the fence at not more than 3-foot horizontal spacing and from top to bottom at not more than 8-inch vertical spacing.
5. Backfill the trench with soil by hand or mechanical tamping to secure the silt fence fabric and the wire mesh in the trench.
6. Attach guy wires and anchors at each post. Install at least 2 anchors and guy wires at angle points and end posts.

Connect sections of temporary reinforced silt fence as follows:

1. Join separate sections to form reaches not more than 500 feet without openings.
2. Secure the end posts of each section by wrapping the tops of the posts with at least 2 wraps of 16-gauge tie wire.

If temporary reinforced silt fence Type 1 is shown, attach high-visibility fabric to the steel posts with tie wires or locking plastic fasteners.

13-10.03F Temporary Silt Fences

Construct a temporary silt fence with silt fence fabric, posts, and fasteners assembled at the job site or with prefabricated silt fence.

If prefabricated silt fence is used, attach the fabric to the posts by inserting the posts into the sewn pockets. If the fence is assembled at the job site:

1. Fasten the fabric to the posts with staples or nails if wood posts are used
2. Fasten the fabric to the posts with tie wires or locking plastic fasteners if steel posts are used
3. Space the fasteners no more than 8 inches apart

Place a temporary silt fence parallel with the slope contour. For any 50-foot section of temporary silt fence, do not allow the base elevation of the fence to vary by more than 1/3 of the height of the fence above the ground.

Install a temporary silt fence as follows:

1. Place the bottom of the fabric in a 6-inch-deep trench.
2. Secure it with the posts placed on the downhill side of the fabric.
3. Backfill the trench with soil and compact by hand or mechanical methods to secure the fabric in the trench.

Connect sections of a temporary silt fence as follows:

1. Join separate sections to form reaches not more than 500 feet without openings.
2. Secure the end posts of each section by wrapping the tops of the posts with at least 2 wraps of 16-gauge tie wire.

You may install the silt fence by mechanically pushing the silt fence fabric vertically into the soil. Mechanically installed fabric must not slip out of the soil or allow sediment to pass under it.

13-10.03G Temporary Straw Bale Barriers

Install a temporary straw bale barrier as follows:

1. Place a single row of straw bales end-to-end and parallel with the slope contour. For any 20-foot section of straw bale barrier, do not allow it to vary by more than 5 percent from level.
2. Place straw bales in a trench or key them into the slope. Place the bales such that the binding wire or string does not come in contact with the soil. Use wood or metal posts as stakes.
3. Secure each straw bale with 2 stakes. The 1st stake in each bale must be driven toward the previously laid bale to force the bales together.
4. Drive the stakes into the soil such that the top of the stake is less than 2 inches above the top of the straw bale.
5. Angle the last 6 feet upslope at the downhill end of the run.

13-10.03H Temporary Foam Barriers

Secure a foam barrier to:

1. Pavement with:
   1.1. 1-inch concrete nails, 1-inch washers, and solvent-free adhesive
   1.2. Gravel-filled bags
   1.3. Combination of both
2. Soil with 6-inch nails and 1-inch washers

Secure the barrier with 2 nails at the connection points where barriers overlap. Do not pierce the barrier's core with nails.

13-10.03I Temporary Earthen Berms

Construct a temporary earthen berm with native soil or selected material at least 8 inches high by 36 inches wide. Compact it by hand or mechanical methods.

13-10.03J–13-10.03L Reserved

13-10.04 PAYMENT

Not Used

END OF SECTION

SECTION 14 ENVIRONMENTAL STEWARDSHIP

Conform to Section 14, "Environmental Stewardship," of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

14-8.02 NOISE CONTROL

Delete Section 14-8.02, "Noise Control," of the *Caltrans Standard Specifications* and replace with the following language:

Control and monitor noise resulting from work activities.

Refer to Campbell Municipal Code Section 21.16.070, "Noise," and to Section 7-1.01H, "Sound Control Requirements," of the *City Standard Specifications* for additional information.

All work outside of the City of Campbell Municipal Code Section 18.04.052, "Hours of Construction – Time and Noise Limitations," shall require prior written approval of the Engineer unless otherwise specified in the Contract Documents.

14-10.02 SOLID WASTE DISPOSAL AND RECYCLING REPORT

Delete Section 14-10.02, "Solid Waste Disposal and Recycling Report," of the *Caltrans Standard Specifications* and replace with the following:

14-10.02 SOLID WASTE DISPOSAL AND RECYCLED MATERIALS REPORTING

The Contractor shall register with Green Halo Systems to prepare a Waste Management Plan (WMP) per the California Green Building Standards Code (CALGreen) to meet the 65% requirement of all non-hazardous construction and demotion waste be diverted from landfills through reuse (salvage) and/or recycling. Contractor shall review the City's Green Halo Waste Management Plan Handout. This requirement applies to all non-residential projects as well as residential projects that include additions, alterations, or demolitions.

14-10.03 RECYCLED MATERIALS REPORTING

Delete Section 14-10.03, "Recycled Materials Reporting," of the *Caltrans Standard Specifications* and replace with the following:

Not used.

14-11.04 DUST CONTROL

Add the following language:

Provide temporary erosion, dust, and drainage control measures during construction. Conform to Chapter 14.02, "Stormwater Pollution Control," of the Campbell Municipal Code and Best Management Practices (BMP) for the Construction Industry and the Santa Clara County Non-Point Source Pollution Control Board for preventing contamination of the City's storm drain system.

Refer to Section 10-5, "Dust Control," of the *City Standard Specifications* for additional information.

14-11.05A General

Delete Section 14-11.05A, "General," of the *Caltrans Standard Specifications* and replace with the following language:

The Contractor shall maintain a neat appearance at the worksite. Debris developed during construction is to be disposed of concurrently with its generation. Stockpiling of debris/construction materials or staging

equipment/construction materials is not allowed on public property or in the public right-of-way unless otherwise approved by the Engineer in writing.

The Contractor shall not stockpile material containing hazardous waste or contamination unless authorized in your excavation and transportation plan. Stockpiles containing hazardous waste or contamination must not be placed where affected by surface run-on or run-off. The Contractor shall cover stockpiles with a minimum 12-mils-thick plastic sheeting. Do not place stockpiles in ESAs. Stockpiled material must not enter storm drains, inlets, or waters of the State.

END OF SECTION

SECTION 15 EXISTING FACILITIES

Conform to Section 15, “Existing Facilities,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

15-1.01 GENERAL

Delete Section 15-1.01, “GENERAL,” of the *Caltrans Standard Specifications* and replace with the following language:

This section includes general specifications for performing work on existing facilities, facilities which interfere with planned construction, and as identified in the Contract Documents. The removal of existing utilities required to permit orderly progress of Work shall be accomplished by the utility company concerned, unless otherwise shown in the Contract Documents.

Performing work on existing facilities includes abandoning, adjusting, modifying, obliterating, reconstructing, relaying, relocating, remodeling, removing, repairing, resetting, or salvaging a facility.

Do not perform work on an existing facility until the facility is no longer needed.

Reconstructed facilities must comply with the design of and be equal to the best parts of the existing facilities.

Reconstruction work must comply with the specifications for new work of similar character.

15-1.01A Obliterating Roads and Detours

Traffic control devices, such as, but not restricted to, guidance, regulatory, and warning signs and barricades used for the purpose of detouring traffic, shall be removed as directed by the Contract Documents.

15-1.01B Traffic Stripes and Pavement Markings

Painting out traffic lines and markings with black traffic line paint will only be allowed, in rare instances, where the existing pavement will be resurfaced and with permission from the Engineer.

Temporary detour traffic stripes and pavement markings installed on permanent pavement surfaces outside the limits of the Work site shall be removed by sandblasting as directed by the Engineer.

15-1.01C Drainage and Storm/Sewer Facilities

Existing manholes, catch basins, and other sewerage or drainage structures shown in the Contract Documents to be removed shall be removed completely, including foundation, and associated base material.

Existing sanitary or storm sewers, manholes, catch basins, and other sewerage or drainage structures which have been or are to be abandoned, and which lie within a trench or other structure excavation, shall be removed from within the limits of required excavation necessary for the Work.

Sanitary sewers, storm sewers, sewer laterals, and other culverts to be abandoned, but not required to be removed, shall be thoroughly sealed at all open ends, and at the structures in which they terminate as applicable. The open ends shall be sealed with brick or concrete rubble, that is approved by the Engineer, and mortar.

In addition to sealing open ends as specified above, and when specifically required, all sewer mains, upon abandonment, shall be filled with a slurry sand/cement grout or blown sand. Facilities to be filled shall be sealed at the downstream end, filled with the approved mixture, and sealed at the upstream end.

The bottom of abandoned structures shall be perforated or broken to prevent the entrapment of water.

15-1.01D Fences and Gates

All fence material and gates to be salvaged or relocated shall be removed with care to prevent any damage to the material. All adhering concrete footings shall be removed from fence posts and braces which are to be salvaged or relocated.

15-1.01E Concrete Pavement

Asphalt or Portland cement concrete pavements shall be removed to clean straight lines by sawcutting. All saw cuts on concrete shall be made at the nearest joint. Where concrete pavement adjoins a trench, the edges adjacent to the trench shall be trimmed to neat straight lines before resurfacing of the trench.

15-1.01F Frames, Covers, Grates, and Manholes

Frames, covers, or grates of existing manholes, inlets, or other facilities shall be adjusted to grade with new materials similar in character to those in the original structure under the provisions of Section 15, “Existing Facilities,” and the Contract Documents.

After the existing cover or grade frame has been removed, the top of the structure to be raised shall be trimmed to provide a suitable foundation for the new material.

When reconstruction or adjustment of a concrete drainage facility requires partial removal of concrete, sufficient concrete shall be removed to permit new reinforcing steel to be spliced to existing reinforcing steel as Specified in Section 52-6, “Splicing,” of these Standard Specifications. Existing reinforcement that is to be incorporated in new work shall be protected from damage and shall be thoroughly cleaned of all adhering material before being embedded in new concrete.

Concrete removal shall be performed without damage to any portion that is to remain in place. All damage to the existing concrete, which is to remain in place, shall be repaired to a condition equal to that existing prior to the beginning of the removal operations. The cost of repairing existing concrete damaged by the Contractor’s operation shall be at his expense.

Throat grade rings may be used to raise manhole frame castings to a maximum of 18 inches from top of cone to bottom of castings. If height is greater than 18 inches, for raising castings, then the cone shall be removed, and manhole rebuilt accordingly.

When frames, covers, grates of existing manholes, inlets or other facilities are removed, a traffic rated plate shall be placed over the opening. The traffic plate shall be of a design that the possibility of dislodgement is non-existent (recessed). The required use of a traffic plate will be waived if the work of raising frames, covers or grates is accomplished the same day.

The Contractor shall exercise care in removing manhole covers and frames and install protective measures for the manhole to prevent the possibility of any rubble or debris from entering the storm/sewer pipe. Should any rubble or debris fall into the manhole, the manhole shall be immediately cleaned of all rubble and debris. At the discretion of the Engineer, the storm/sewer shall be flushed and cleaned downstream from the point of entry of any rubble and debris, in accordance with Section 106, “Cleaning Storm Infrastructure,” and applicable California law. The cost of flushing and cleaning of storm/sewer mains because of rubble and debris entering the mains shall be the sole responsibility of the Contractor and no additional compensation will be provided. Should the Contractor fail to flush and clean the storm/sewer main, the Engineer shall order the work done by others and deduct the cost from any monies due to the Contractor.

If the manhole cover is unstable under traffic, the manhole ring and cover shall be removed and replaced with a stable ring and cover.

A structure located in the pavement area shall not be constructed to final grade until the adjacent pavement or surfacing has been completed.

Existing manholes shall be remodeled as shown on the plans and noted in the Contract Documents.

All manholes that are to be lowered shall be removed as directed by the Engineer, to an approximate depth of 3.5 feet below finished grade and shall then be reconstructed with the proper taper to finished grade.

When existing manholes or inlets are to be abandoned, all pipes entering the manhole or inlet shall be securely closed by a tight-fitting plug or wall of minor concrete not less than 0.5-foot thick, or by a tight brick wall not less than 0.67-foot thick with cement mortar joints. Such minor concrete shall conform to Section 90-2, "Minor Concrete." The bases of manholes or inlets shall be broken in a manner to prevent entrapment of water. The manhole or inlet shall be demolished to an elevation 3 feet below finished grade and backfilled under the provisions of Section 19-3, "Structure Excavation and Backfill."

15-1.01G Miscellaneous Facilities

All valve boxes, handholes, inlets, and other miscellaneous facilities as shown on the Contract Documents to remain shall be adjusted to grade in a manner as approved by the Engineer.

15-1.01H Sanitary Sewer Laterals

Sanitary sewer laterals encountered in the Work that obstruct or otherwise interfere with other planned improvements shall be adjusted or relocated in accordance with the requirements of the West Valley Sanitation District.

15-1.03 CONSTRUCTION

15-1.03B Removing Concrete

Delete Section 15-1.03B, "Removing Concrete" of the *Caltrans Standard Specifications* and replace with the following language:

Concrete facilities shall be removed to neatly sawed edges with saw cuts made to a minimum depth of 1-1/2 inches.

Concrete sidewalk or driveway aprons to be removed shall be neatly sawed in straight lines either parallel to the curb or at right angles to the alignment of the sidewalk as required. No section of sidewalk or driveway apron to be replaced shall be smaller than score line to score line in either length or width or, as directed by the Engineer.

Curb and gutter shall be sawed to a minimum depth of 1-1/2 inches on a neat line at right angles to the curb face. No section of curb and gutter to be replaced shall be smaller than five (5) feet in length. If the saw cut in curb and gutter falls within five (5) feet of a construction joint or expansion joint, the concrete shall be removed to that joint.

Isolated concrete, where designated, shall be interpreted to mean concrete facilities to be removed in areas outside the area that would normally be designated to be cleared, or such miscellaneous concrete facilities whose removal is required for those projects where cleaning, grubbing, and removal of obstructions are included in other items of Work.

Where concrete is to be removed for the purpose of public improvements, remove concrete to a minimum depth of 12 inches below subgrade of new improvements.

Concrete removal includes removal of any steel embedded in the concrete.

Before removing a portion of a monolithic concrete element, make a 1-inch-deep saw cut to a true line along the limits of removal on faces of the element that will be visible in the completed work.

Protect existing reinforcement to be incorporated into the new work from damage.

Where new concrete is to join existing concrete, remove enough concrete to allow splicing of new reinforcement.

Thoroughly remove all material adhering to the existing reinforcement before embedding it in new concrete.

15-1.03C Salvaging Facilities

Delete Section 15-1.03C, “Salvaging Facilities,” of the *Caltrans Standard Specifications* and replace with the following language:

Tag the bundles, packages, and individually salvaged material. Show the following information on the tags:

1. Name or description of the material
2. Type or model number
3. Dimensions
4. Quantity if more than 1

Haul salvaged material directly to the location specified in the Contract Documents and stockpile it as directed by the Engineer. If authorized, you may temporarily stockpile salvaged material at the job site. Replace any salvaged material that is lost before it is stockpiled at the location specified in the Contract Documents.

15-1.03L Subterranean Facilities

Add the following language:

This work shall consist of removing and/or sealing and abandonment of existing subterranean facilities, including basements, septic tanks, cesspools, and wells. The type and general dimensions of such facilities to be removed, sealed, and/or abandoned will be as shown on the Contract Documents, and will be in accordance with all applicable standards adopted by the West Valley Sanitation District and Santa Clara Valley Water District, and such provisions will be specified in the Contract Documents. If not shown in the Contract Documents and encountered in the Work, immediately notify the Engineer.

15-1.03M Removal of Basements, Septic Tanks, and Cesspools

Add the following language:

While clearing, grubbing, and removing of obstructions to the work, or, if designated on the plans or specified in the Contract Documents, basements, septic tanks or cesspools of any type, size, or depth, are shown or encountered, they shall be removed in their entirety. with the following exception: cesspools 8 feet or greater in depth may be backfilled with approved materials and thoroughly jetted with water containing an approved wetting agent. The top of the cesspool shall be removed 2 feet below the grading plane or 3 feet below existing finished grade.

Floors of basements of any description shall be removed entirely to native soil. All rubble from basement removal shall be disposed of off the project.

All abandoned sewer laterals encountered shall be removed as described below:

1. Sewer laterals 2 feet or more below grading plane shall be sealed under the provisions of Section 15-1.01C, "Drainage and Storm/Sewer Facilities."
2. Sewer laterals in or above the grading plane shall be removed completely to a point where lateral is a minimum of 2 feet below grading plane and the ends of the lateral to remain shall be sealed as described above.

All area depressions resulting from removal of basements, septic tanks and cesspools shall be backfilled with approved native material and compacted to a relative density of not less than 90 percent.

Payment for basement, septic tank, or cesspool removal and/or backfill shall be included in the price paid for clearing and grubbing, if such basement, septic tank, or cesspool are shown on the plans or specified in the Contract Documents. If not shown on the plans or specified in the Contract Documents and encountered in the work, payment for basement, septic tank, or cesspool removal and/or backfill will be paid for as extra work under the provisions of Section 4-1.03G, “Extra Work.”

15-1.03N Sealing and Abandonment of Wells

Add the following language:

The work of sealing and abandoning wells shall be in accordance with Valley Water Ordinance 90-1, “Payment,” for sealing and abandoning of wells will be made per each well so sealed and abandoned as shown on the plans or specified in the Contract Documents. If not shown on the plans or specified in the Contract Documents and encountered in the work, payment for sealing and abandoning wells will be paid for as extra work under the provisions of Section 4-1.03G, "Extra Work.”

15-1.04 PAYMENT

Delete Section 15-1.04, “PAYMENT,” of the *Caltrans Standard Specifications* and replace with the following language:

Unless otherwise noted above or in the Contract Documents, the removal of subterranean facilities will be paid for at a lump sum price. The pay item will include removal of all such facilities encountered within the Project boundaries, except where otherwise specified. Where the Engineer's Estimate designates that payment will be made for the removal or abandonment of specific items on a unit basis, measurement will be made by the unit so designated.

Sealing and abandonment of wells will be paid for at the contract unit price per each.

The above prices paid shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved for the item or items as shown on the Contract Documents, and as directed by the Engineer, including the disposal of all resulting material removed or encountered.

When the Contract does not include a separate pay item for removal of subterranean facilities as specified above, and unless otherwise provided for in the Contract Documents, full compensation for any necessary removal of such facilities required to perform the construction operations specified shall be considered as included in the Contract Sum and no additional compensation will be allowed therefor.

END OF SECTION

SECTION 16 TEMPORARY FACILITIES

Conform to Section 16, “Temporary Facilities” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

END OF SECTION

SECTION 17 GENERAL (EARTHWORK AND LANDSCAPE)

Conform to Section 17, "General," of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

17-2 CLEARING AND GRUBBING

17-2.01 GENERAL

Delete Section 17-2.01, "General," of the *Caltrans Standard Specifications* and replace with the following language:

Areas subject to this section shall include any portions of the Project site identified in the Contract Documents to be cleared and grubbed. This work shall include, but not be restricted to, removal of structures, trees, stumps, logs, brush, other vegetation, debris, and rubbish of any nature. This work shall also include the removal and/or relocation of mailboxes, signs, lights, planters, fences, concrete block walls, or any other miscellaneous items shown on the plans, specified in the Special Provisions, unless covered by a separate pay item in the specifications. All items to be relocated/replaced shall be replaced in equal or better condition than currently exists. Any side property line fences to be cut back shall have new end posts set at the front property line and shall be properly finished. All trees and landscaping not indicated for removal shall be protected from damage by the Contractor, and the Contractor shall be liable for replacement in-kind of any such damaged trees or landscaping.

17-2.03 CONSTRUCTION

17-2.03A General

Delete Section 17-2.03A, "General," of the *Caltrans Standard Specifications* and replace with the following language.

Complete the work specified in Section 20-10.02C(2) before clearing and grubbing.

Clear and grub before performing earthwork in an area.

Do not injure standing trees, plants, and improvements shown to be protected.

17-2.03B Clearing

Delete Section 17-2.03B, "Clearing," of the *Caltrans Standard Specifications* and replace with the following language:

Within the limits of clearing, clear construction areas of 1) all vegetation such as trees, logs, upturned stumps, roots of downed trees, brush, grass, and weeds, and 2) other objectionable material including concrete rubble, masonry, and debris. The removal shall be to 3 feet below the existing ground surface, or 6 feet below finished grade, whichever is deeper.

Cut tree branches that extend over the roadway and hang within 15 feet of finished grade. Cut other branches to give each tree a balanced appearance. Cut off branches close to the trunk under the provisions of ANSI A 300 part 1, "Pruning" published by the Tree Care Industry Association. Do not use tree seal compounds to cover pruning cuts.

17-2.03D Disposal of Materials

Delete Section 17-2.03D, "Disposal of Materials," of the *Caltrans Standard Specifications* and replace with the following language:

17-2.03D Removal and Disposal of Materials

All materials removed shall be disposed of at locations outside the Project site, unless otherwise shown in the Contract Documents.

Combustible material, including chips, shall be disposed of as directed by the Engineer.

17-2.04 PAYMENT

Delete Section 17-2.04, "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Full compensation for furnishing all labor, materials, tools, equipment, and incidentals required for clearing and grubbing, including material disposal and the maintenance and protection of existing trees as specified in this section shall be paid for under the lump sum price for "Clearing and Grubbing" in the Contract Documents. No additional payment will be made therefor.

END OF SECTION

SECTION 18 DUST PALLIATIVES

Conform to Section 18, “Dust Palliatives,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 19 EARTHWORK

Conform to Section 19, “Earthwork,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

19-1.01 GENERAL

19-1.01A Summary

Add the following language to Section 19-1.1A, “Summary,” of the *Caltrans Standard Specifications*:

Earthwork for trench excavation, bedding, and backfill is specified in Section 100, “Trench Excavation Bedding and Backfill,” of these *City Standard Specifications*. Subgrade preparation shall conform to Section 21, “Erosion Control,” of these *City Standard Specifications*.

Earthwork shall include all excavation, compaction, and other earthwork performed on the Project site, as indicated in the Contract Documents. In general, references to the "roadway prism" or "roadway facilities" or "roadway" or "highway" shall be construed as references to the Project or Project site, as applicable and except as otherwise indicated in the Contract Documents.

19-2 ROADWAY EXCAVATION

19-2.03 CONSTRUCTION

19-2.03A General

Add the following language to Section 19-2.03A, “General,” of the *Caltrans Standard Specifications*:

Excavation shall be performed as indicated in the Contract Documents to the lines, grades, and elevations shown. All deleterious materials encountered within the limits indicated shall be removed and disposed of.

The rough excavation shall be carried out to a depth necessary to allow for compacting the basement material to the requirements as specified and to the planned cross-section of the grading plane.

The Contractor may use any type of earth-moving equipment or any type of compaction equipment, provided the equipment is in satisfactory condition and can perform the Work within the Contract Time.

During the process of excavation, the grade shall be maintained so that all facilities will be well drained at all times. When so directed, the Contractor shall install temporary drains and drainage ditches to intercept or divert surface water which may affect the work.

19-2.03D(1) General

Add the following language to Section 19-2.03D(1), “General,” of the *Caltrans Standard Specifications*:

Topsoil excavated within the limits of the Project shall be stockpiled for use in areas to be planted or landscaped and shall not be used for any other purpose until no further topsoil is required for landscape purposes. Any remaining topsoil may then be used as specified for selected material.

Selected material designated for use as backfill for areas to be landscaped shall conform to Section 20-2 "Soil," except the soil need not be surface soil.

19-2.03G Slopes

Add the following language to Section 19-2.03G, “Slopes,” of the *Caltrans Standard Specifications*:

When completed, slopes and shoulders shall present a neat and uniform appearance.

19-3 STRUCTURE EXCAVATION AND BACKFILL

19-3.01 GENERAL

19-3.01A Summary

Add the following language to Section 19-3.01A, "Summary," of the *Caltrans Standard Specifications*:

Trenches or foundation pits for structures or structure footings shall be excavated to the lines and grades or elevations shown in the Contract Documents or as staked by the Engineer. Trenches or pits shall be of sufficient size to permit the placing of structures or structure footing of the width and length shown in the Contract Documents. Any elevation, as shown in the Contract Documents, of the bottoms of footings shall be considered as approximate only and the Engineer may order in writing such changes in dimensions or elevations of footings as may be necessary to secure a satisfactory foundation.

19-3.02 MATERIALS

19-3.02C Structure Backfill

Add the following language to Section 19-3.02C, "Structure Backfill," of the *Caltrans Standard Specifications*:

Material for structure backfill shall be soil selected from structural excavation insofar as such material is readily compactible and conforms to the requirements of this section.

Structure backfill shall be free from stones and lumps exceeding 3 inches in greatest dimension, vegetable matter, or other unsatisfactory material. If satisfactory material for use as structure backfill cannot be obtained from excavation, suitable imported material, approved by the Engineer, shall be furnished by the Contractor, at its sole expense.

Material from excavation that is determined by the Engineer to be unsuitable for use as backfill shall be disposed of at the Contractor's expense.

19-3.02D Pervious Backfill Material

Add the following language to Section 19-3.02D, "Pervious Backfill Material," of the *Caltrans Standard Specifications*:

Sieve analysis of mineral aggregate to be used as pervious backfill will be tested in accordance with California Test 202.

That portion of pervious backfill material passing the No. 4 sieve shall have a sand equivalent of not less than 60, as determined in accordance with California Test 217.

Filter material for wall drain outlets shall consist of burlap sacks, each containing approximately one cubic foot of specified material. One sack shall be placed behind each wall drain outlet, along with the pervious material backfill.

19-3.02K Permeable Backfill Material.

Where shown in the Contract Documents, areas to receive permeable material blankets shall be graded to the lines and grades as shown in the Contract Documents.

The minimum durability index shall be forty (40), when tested in accordance with California Test No. 229. Minimum Sand Equivalent of permeable materials shall be 75 when tested in accordance with California Test 217. Original has no test value.

19-3.03B(4) Cofferdams

Add the following language to Section 19-3.03B(4), “Cofferdams,” of the *Caltrans Standard Specifications*:

Cofferdams shall be used whenever water-bearing strata are encountered above the elevation of the bottom of the excavation.

Cross struts or bracing used in cofferdam construction which extend through foundation concrete both above and below low water shall be removed upon completion of footing pouring or when cofferdam is no longer necessary, and the resulting space filled with concrete of the same mix as that specified for the surrounding concrete.

19-3.03B(5) Water Control and Foundation Treatment

Add the following language to Section 19-3.03B(5), “Water Control and Foundation Treatment,” of the *Caltrans Standard Specifications*:

All loose and displaced material resulting from the driving of piles shall be removed.

19-5 COMPACTION

19-5.01 GENERAL

Add the following language to Section 19-5.01, “General,” of the *Caltrans Standard Specifications*:

For areas greater than 100 square feet on fill, Section 19-6, "Embankment Construction,” shall apply. In addition to the density required, the subgrade shall be stable and unyielding.

Any portion of the Project area which is not accessible to standard compacting equipment shall be compacted to the required density by an approved mechanical tamper.

All irregularities or depressions that develop under compacting or rolling equipment shall be corrected by adding, removing, or replacing material until the surface is smooth, uniform, and unyielding.

All soft and yielding material and material which will not compact readily when rolled or tamped shall be removed as directed by the Engineer and replaced with suitable material.

19-5.03B Relative Compaction (95 Percent)

Add the following language to Section 19-5.03B, “Relative Compaction (95 Percent),” of the *Caltrans Standard Specifications*:

On areas to be paved, the finished subgrade (basement grade) shall be compacted to a density of not less than 95 percent for a depth of 0.5 foot in accordance with Caltrans and/or ASTM test methods as indicated in the Contract Documents.

The required relative compaction for paved areas of 95 percent to a minimum depth of 2.5 feet below finished grade applies to embankment fills in excess of 3 feet from the original ground surface. For embankment fills less than 3 feet in height, the relative compaction of not less than 95 percent shall be obtained for the complete depth of the embankment, including 0.5 foot below the original ground surface.

All embankment lifts not otherwise specified in this section and composed of non-cohesive (granular) soils shall have a relative compaction of not less than 95 percent.

19-5.03C Relative Compaction (90 Percent)

Add the following language to Section 19-5.03C, “Relative Compaction (90 Percent),” of the *Caltrans Standard Specifications*:

If a portion of an area to be paved is on a local filled area, the material shall be compacted to a density of 90 percent to within 0.5 foot of the subgrade and 95 percent thereafter to finished subgrade.

19-5.03D Foundation Preparation

Add the following language to Section 19-5.03D, "Foundation Preparation," of the *Caltrans Standard Specifications*:

No payment will be made for suitable materials removed, manipulated, and replaced to obtain density. Any removal, manipulation, aeration. replacement, or recompaction of suitable materials necessary to obtain the required density shall be considered as incidental to the excavation. The Contractor is responsible for preparing the foundation to receive the material.

19-6 EMBANKMENT CONSTRUCTION

19-6.03 CONSTRUCTION

19-6.03C Placing and Compacting

Add the following language to Section 19-6.03C, "Placing and Compacting," of the *Caltrans Standard Specifications*:

Before placing fill material upon any area, clearing and grubbing shall have been accomplished under the provisions of Section 17, "Clearing and Grubbing." All depressions or holes below the ground surface, whether caused by grubbing or otherwise, shall be backfilled with suitable material and compacted prior to the construction of embankments. Objectionable material shall not be allowed in or under the embankment.

The entire area upon which the embankment is to be placed shall be scarified, plowed, or broken up in such a manner that the fill material will blend with the existing surface. Any objectionable material that would cause interference with the compaction of the fill shall be removed and disposed of.

When embankments are to be constructed upon an existing paved surface, the pavement shall be scarified to its full depth and broken up so that no piece larger than one foot in greatest dimension shall remain. The broken pieces shall be thoroughly mixed with fill material so that no pockets of broken pavement exist.

The loose thickness of each layer of embankment fill material shall not exceed 0.67 foot for the full width of cross-section.

Clods or hard lumps of earth over 0.5 foot in greatest dimension shall be broken up before compacting the embankment material, except as otherwise provided in the *Caltrans Standard Specifications*.

When embankment construction requires cutting a minimum 6-foot horizontal bench into existing slopes, a new bench shall be started where the vertical cut for the next lower bench intersects the existing ground.

19-6.03D Settlement Period and Surcharges

Delete the first paragraph of Section 19-6.03D, "Settlement Period and Surcharges," of the *Caltrans Standard Specifications* and replace with the following language:

If an embankment settlement period is specified, construct the embankment to at least the grading plane and to the limits described for:

1. Distance of at least 150 feet measured parallel to the centerline of the roadway from each bridge abutment.
2. Entire length of a retaining wall and a width of at least 30 feet from the face of the wall.

Where an embankment settlement period is specified, the embankment fill shall be constructed to the lines, grades, and to the limits shown or specified in the Contract Documents.

Any embankment for which a settlement period is provided in the Contract Documents shall remain in place for the required settlement period before excavating for any designated improvements.

Settlement platforms and instruments connected therewith shall be protected by the Contractor for the length of the settlement period.

END OF SECTION

SECTION 20 LANDSCAPE

Conform to these *City Standard Specifications*.

20-1 GENERAL

20-1.01A General

Landscape work shall consist of performing roadway clearing and planting, park and grounds landscaping, and all other work necessary for improving the appearance of the roadside and park facilities at the Project site in conformance with the Contract Documents.

Perform roadside clearing:

1. As required to prepare the job site for construction work.
2. Until the start of the plant establishment work or Contract acceptance, whichever comes first.

Check for plant deficiencies under the provisions of Section 20-6.01A(4), "Quality Assurance," of these *City Standard Specifications* before installing any irrigation system in an existing planting area to be maintained.

Unless a supply line is shown through plant holes, relocate any plant hole to clear a supply line.

Do not install supply lines, control and neutral conductors, and electrical conduits in common trenches above each other. Non-irrigation electrical conduits and water supply lines shall not be in the same trench.

20-1.01B Definitions

Cultivating To turn the soil into a fine tilth to provide the ideal environment for seeds to germinate and plants or shrubs to grow.

20-1.01C Submittals

At least 15 days before applying any pesticide, submit a copy of the pest control adviser's recommendation.

At the end of each week, submit a Report of Chemical Spray Operations form as an informational submittal documenting the application of all pesticides.

Before mixing a pesticide, submit a copy of the registered label for the pesticide as an informational submittal. If you are unable to copy the label, allow the Engineer to read the label on the container.

20-1.01D Quality Assurance

20-1.01D(1) General

Obtain a recommendation for the use of all pesticides under the provisions of the Food & Agri Code from a pest control adviser who is licensed as an agricultural pest control adviser in the State. The recommendation must include the pesticides to be used, rates of application, methods of application, and application areas.

The pesticide applicator must have an active and valid qualified applicator license or certificate from the Department of Pesticide Regulation.

20-1.01D(2) Progress Inspections

The Engineer performs progress inspections:

1. After marking plant locations.
2. Before cultivating work starts.
3. Before pressure testing of irrigation pipe on the supply side of control valves.
4. Before testing of low voltage control and neutral conductors.

1. During irrigation system functional tests.
2. Before planting the plants.
3. Before completion of planting work.
4. Before the start of plant establishment work.
5. Once a month during the plant establishment period.

Notify the Engineer at least 4 business days before each inspection is required. Allow at least 3 business days for the Engineer's inspection.

Do not proceed with the next construction activity until the inspection has been completed and any required corrective work has been performed and authorized.

20-1.02 MATERIALS

20-1.02A General

Reserved.

20-1.02B Water

Unless there is a bid item for irrigation water service charges, the Department furnishes water if it is available from an existing Department-owned facility within the project limits or an irrigation system to be installed under the provisions of the Contract.

If water is not available from one of these sources, make arrangements for supplying water as defined in the Contract Documents. Water must be of a quality that promotes plant growth.

20-1.02C Pesticides

Pesticides must comply with the regulations of the California Department of Pesticide Regulation (DPR). Any Contractor or business applying any pesticides must be licensed with California DPR and registered with the Santa Clara Department of Agriculture. They are responsible for adhering to all California agriculture laws and regulations as well as pesticide label requirements. Applicators must hold a California Qualified Applicator’s Certification (QAC).

For weed control, use a pesticide with a photosensitive dye that produces a contrasting color when sprayed on the ground. The color must disappear within 2 to 3 days after being applied. The dye must not stain surfaces or injure plants or wildlife when applied at the manufacturer's recommended application rate.

20-1.02D – 20-1.02H Reserved

20-1.03 CONSTRUCTION

20-1.03A General

Take precautions to prevent irrigation water from:

1. Wetting vehicles, pedestrians, and pavement.
2. Eroding soil.
3. Causing excess runoff.
4. If water use calculations are provided as supplemental project information, water plants under the provisions of the Model Water Efficient Landscape Ordinance, 23 CA Code of Regs § 490 et seq., and local water agency provisions.
5. Water plants at night unless otherwise authorized.

Dispose of removed, pruned, and damaged vegetative material.

20-1.03B Pesticides

Notify the Engineer of pesticide application times at least 2 weeks before each application. All requirements of the Pest Control Advisors recommendation must be followed, including 72 hours advance Public Noticing.

Mix and apply pesticides under the provisions of the regulations of the Department of Pesticide Regulation and the instructions on the pesticide product label.

Do not apply pesticides:

1. On Saturdays and holidays unless authorized.
2. Whenever weather and wind conditions are unsuitable for application.
3. Within the plant basin.
4. Control pesticide drift to preserve desirable plants
5. Whenever people are nearby

20-1.03C Roadside Clearing

20-1.03C(1) General

Roadside clearing includes:

1. Removing existing plants described to be removed
2. Controlling rodents, insects, and weeds
3. Control rodents by using rodenticides or traps.

20-1.03C(2) Remove Existing Plants

Removal of existing plants includes removing their stumps and roots 2 inches or larger in diameter to a minimum depth of 12 inches below finished grade. Backfill holes resulting from stump removal to the finished grade with material obtained from adjacent areas.

If a plant is to be planted within an existing groundcover area, remove the existing groundcover from within an area 6 feet in diameter centered at each plant location.

20-1.03C(3) Weed Control

Control weeds by the use of pesticides, hand-pulling, or mowing.

If pesticides are used to control weeds, apply pesticides before the weeds reach the seed stage of growth or exceed 4 inches in length, whichever occurs first. Do not use pesticides at cutting plant locations.

If weeds are to be controlled by hand-pulling, hand-pull weeds before they reach the seed stage of growth or exceed 4 inches in length, whichever occurs first.

Where liner, plug, or seedling plants are to be planted 10 feet or more apart, control weeds by the use of pesticides or hand-pulling within an area 2 feet in diameter centered at each plant location. Where liner, plug, or seedling plants are to be planted less than 10 feet apart, control weeds by the use of pesticides within the entire area.

Control weeds by mowing outside of mulched areas, plant basins, groundcover areas, and within areas to be seeded. Mowing must extend to the edges of pavement, dikes, curbs, sidewalks, walls, and fences.

If mowing is to be performed within areas to be seeded, perform mowing as needed until the start of the seeding activity.

Perform mowing before the weeds reach the seed stage of growth or exceed 6 inches in length, whichever occurs first. Mow weeds to a height of 3 inches.

20-1.03C(4) Disposal of Removed Groundcover, Weeds, and Mowed Material

Dispose of hand-pulled weeds the same day they are pulled. Dispose of removed groundcover within 3 days.

Dispose of mowed material from the initial mowing. Disposal of material from subsequent mowing is not required.

20-1.03D Cultivation

Cultivation must be by mechanical methods and performed until the soil is in a loose condition to a minimum depth of 6 inches. Soil clods must not be larger than 2 inches in maximum dimension after cultivation.

The areas to be cultivated must extend 12 inches beyond the outer limit of each planting area requiring cultivation.

After initial cultivation, place soil amendment and fertilizer at specified rates. Recultivate to thoroughly mix native soil and amendments.

Do not drive on cultivated areas after cultivation.

Planting areas that have been cultivated and become compacted must be recultivated.

Rocks and debris encountered during soil preparation in planting areas must be brought to the ground surface.

Remove rocks and debris as ordered. This work is Extra Work.

20-1.03E Weed Germination

Reserved

20-1.03F–20-1.03K Reserved

20-1.04 PAYMENT

Not used.

20-2 SOIL

20-2.01 DESCRIPTION

Topsoil shall be Sandy loam of an even texture and shall pass through a 1/2-inch screen.

The topsoil shall be free from insects, animal life, or any toxic substances that may be detrimental to the growth of vegetation.

Soil sterilizers or weed killers, if required, shall be of a type which will permit growth of nursery stock planted 3 weeks after application. Compounds containing cyanide or arsenic will not be accepted.

Topsoil shall have a neutral soil reaction and shall have a PH of not less than 6.6 nor greater than 8.0. The topsoil shall have a low saline alkali content saturation extract and shall have a conductivity of not more than 4 million per centimeter at 25 degrees centigrade and an exchangeable sodium or sodium cation content of not more than 10 percent of the total metallic cation content.

After notification of source of supply by the Contractor, the Engineer shall inspect the topsoil site and have the Contractor test the soil for compliance with these *City Standard Specifications*.

Contractor shall attach provide soil and plant Lab Report for the Engineer's approval.

20-2.02 SOIL AMENDMENT

Organic soil amendment shall be specified by Engineer based on soil and plant laboratory test results. Soil amendment shall be free of weed seed, dust, and all other objectionable materials.

In addition to selected organic soil amendment, where specified, commercial grade agricultural gypsum shall be used as soil amendment.

The materials shall be uniformly spread and incorporated with a rotary cultivator to obtain a homogeneously blended soil 6 inches in depth, unless stated otherwise in the Contract Documents.

20-2.03 MULCH

Mulch shall be ground, screened fir bark. Mulch size shall be 3/8-inch to l/2-inch. Mulch shall be top dressed, where specified, to a minimum depth of 3 inches over soil level. With the Engineer's approval, clean tree chips (free of leaf debris) may be used.

20-2.04 PLANTING MIX

Planting mix for backfilling planting holes shall consist of 2 parts of soil excavated from the planting holes (free of rocks over 1/2- inch in diameter) and one part soil amendment. The materials shall be thoroughly mixed until they lose their individual identities.

20-2.05 CERTIFICATE OF COMPLIANCE

The Contractor shall be responsible for the establishment of the necessary quality control and inspection practice as necessary to assure compliance with the Contract Documents. The Contractor shall furnish Certificates of Compliance for materials so designated under the provisions of Section 6-1.08, "Certificate of Compliance," certifying that all of the required tests have been made and the results comply with the requirements of the Contract Documents.

20-2.06 TOPSOIL PLACEMENT AND TREATMENT

Topsoil shall be delivered reasonably dry and in a workable condition. It shall be placed and spread to the line and grade as shown on the Contract Documents or as directed by the Engineer. Topsoil shall be compacted to approximately 80 percent relative compaction. Topsoil in tree or shrub pits shall be lightly tamped by hand so as to form a firm setting for the plant, but not hinder growth. Mechanical tamping will not be allowed.

After spreading of the topsoil, any extraneous or unacceptable material not previously removed shall be raked off and removed from the topsoil area. Spreading and compacting shall be completed in such a manner that seeding, sodding, or planting, if and as specified on the Contract Documents, can proceed after completion of this work without additional grading.

When specified in the Contract Documents, the placed topsoil shall be sterilized or treated with an approved weed killer and left 3 or 4 weeks prior to planting.

Immediately before planting, the topsoil shall be cultivated, rolled with a 200-pound roller, and raked to provide a uniformly smooth, firm, friable, fine textured finished surface. No grading equipment will be allowed on the topsoil after the area has been treated and prepared for planting.

20-3 FERTILIZING

20-3.01 FERTILIZER

Fertilizer for tree, turf, and shrub plantings shall be in granular or pelleted form, shall conform to the standards of the Association of Official Agricultural Chemists, and shall provide the minimum percentage of

available nutrients as specified in the Contract Documents. Liquid fertilizer may be used if and when specified in the Contract Documents.

20-4 SEEDS

20-4.01 SEED

Seed shall be furnished separately or in mixtures in standard sealed containers labeled with the seed name, lot number, net weight, percentage of purity, germination and hard seed, and percentage of maximum wildflower/grass seed content.

The Contractor shall furnish the Engineer duplicate signed copies of a Certificate of Compliance by the vendor certifying that each lot of seed has been tested by a recognized laboratory for seed testing within 6 months of date of delivery. The testing shall be in conformance with the test procedure standards of the Association of Official Seed Analysts and the Agricultural Code of the State of California. The Certificate of Compliance shall include name and address of laboratory, date of test, lot number for each kind of seed, and results of tests as to name, percentages of purity and of germination, and percentage of wildflower/grass content for each kind of seed furnished and, in case of a mixture, the proportions of each kind of seed.

20-4.02 HYDROSEEDING

Seeds used for hydroseeding shall conform to the following language:

Mulch shall be virgin wood cellulose fiber and shall be of such character that it will disperse uniformly into a slurry when mixed with water. The slurry, when hydraulically applied to the ground, shall form an absorptive mat of mulch uniformly impregnated with seed and other ingredients. No materials which inhibit growth or germination shall be present in the mixture.

Fertilizer shall have a guaranteed analysis of 6 percent nitrogen, 20 percent phosphoric acid, and 20 percent soluble potash and shall be in a form which readily disperse into the slurry.

Seed shall be labeled under the provisions of the California Department of Agriculture, State Seed Law requirements effective on the date of invitation for bids. Seeds that become wet, moldy, or otherwise damaged in transit or in storage will be subject to retest at the discretion of the Landscape Architect. The seed shall be supplied in unopened containers from a commercial seed dealer and may be either mixed or in separate container for each lot. Tags shall be given to inspector or site superintendent. The Work will not be considered complete unless all tags are produced and verified.

20-4.02A Wildflower Seed

Wildflower seed type to be used for hydroseeding shall be as indicated in the Contract Documents.

Seed shall be labeled under the provisions of the California Department of Agriculture, State Seed Law requirements, effective on the date of invitation for bids. Seeds that become wet, moldy, or otherwise damaged in transit or in storage will be subject to retest at the discretion of the Landscape Architect or Engineer. The seed shall be supplied in unopened containers from a commercial seed dealer and may either be mixed or in separate containers for each lot. Tags shall be given to the inspector or Superintendent. The Work will not be considered complete unless all tags are produced and verified.

20-4.03 TURF SEED

Turf seed or mixtures of seed are classified by type according to species or variety of grass. Types of seed or seed mixtures shall be as shown on the Contract Documents.

Lawn seed shall be true to species or variety for the type as specified and shall conform to the Agricultural Code of the State of California and the standards of the Association of Official Seed Analysts.

20-5 PLANTS AND PLANTING PREPARATION

20-5.01 PREPARING SOIL FOR PLANTING AREAS

In areas to be planted, all rocks and other debris greater than one inch in diameter shall be removed and disposed of.

In areas to be planted, the grade shall be 1 to 2 inches below the planned finish grade prior to conditioning the soil. In all other areas, the grades shall be as indicated at the grading plane for the type of facility to be constructed thereon.

The formation and compaction of embankments shall conform to Section 19, "Earthwork," and as modified herein. In areas to be planted, compaction of the fill shall be not more than 85 percent for the upper one foot of such fill.

Cultivation shall be performed with as many passes with the cultivator as necessary, as determined by the Engineer, to produce a friable, uniformly mixed soil, free of pockets of unmixed soil, amendments, or fertilizers if such are specified.

Areas adjacent to walks, structures, or other such facilities that are inaccessible or difficult to reach by mechanical rotary cultivators shall be cultivated by hand.

All rocks or other debris greater than one inch in diameter brought to the surface during cultivation shall be removed and disposed of.

After cultivation, the surface shall be raked, rolled, or otherwise smoothed to remove ridges and fill depressions. The finished surface shall be uniform, evenly graded, and reasonably firm. The grades of the finished surface shall be approximately 2 inches below the top of adjacent curbs or pavement unless otherwise indicated in the Contract Documents and except for those areas designated to receive topsoil, where the grade shall be 6 inches below planned finish grade.

Grading of plants shall conform to the "American Standard for Nursery Stock," ANSI Standard Z60.1, and as may be specified in the *City Standard Specifications*.

20-5.02 PLANTS

Plants shall be vigorous, first-class representations of the species and cultivars specified, shall conform to all State and local laws governing the sale and transportation of plant materials. Only plants of the size and type indicated, and only plants with normal plant and root structures, will be acceptable. All plants shall be nursery grown in containers, unless otherwise indicated in the Contract Documents, shall have been grown in the specified containers for not less than 6 months, and shall be accompanied by certification of same. They shall have straight, single trunks, unless otherwise specified in the Contract Documents. No pruning shall be undertaken before planting. Plants specified to be multi-trunk shall have at least 3 main leaders from the base. Any and all plants that have any encircling roots (not rootbound) shall have root balls lightly slashed on a minimum of 3 sides to stop encircling root growth. All plants shall be free from disfiguring knots, and sunscald injuries abrasions, or other objectionable disfigurements. Tree trunks shall be sturdy and well "hardened off."

Any plants delivered to the Project site which are found to be not true to name or unsuitable in growth or conditions shall be removed from the site and replaced with acceptable plants. All plants shall be of the species, variety, size, age, and condition as specified herein or as shown on the Contract Documents. Under no condition will there be any substitution of plants or sizes for those listed on the accompanying plans, except with the written consent of the Engineer.

Plants shall be tagged with the name and size of the plant, under the provisions of the standards of practice recommended by the American Association of Nurserymen. Plants shall be classified by type as to species,

variety, and genus and will be specified by scientific name conforming to the publication *Standardized Plant Names* as adopted by the American Joint Committee on Horticultural Nomenclature. The plant materials to be planted will be shown on the Contract Documents.

All plant materials shall meet the specifications of Federal, State, and County laws requiring inspection for plant diseases and insect infestations. Inspection certifications required by law shall accompany each shipment, invoice, or order for stock, and when such plants arrive at the site of the Work, all certificates of inspection shall be filed with the Engineer.

Inspection of all plant material for acceptance shall be made at the project site at time of delivery. All plant material shall be approved by the Engineer prior to installation. The Engineer shall have sole authority to reject any and all nonconforming plants. Contractor shall replace any such nonconforming plants at its sole expense. Any and all rejected plant material shall be marked as such and removed from the project site immediately.

The Contractor shall notify the Engineer at least 2 days prior to the delivery of each shipment of plant materials. Plant materials shall be protected and maintained in good condition. Bare root and balled materials shall be watered regularly and placed in a cool area protected from sun and wind.

20-5.03 TURF

Grass sod shall be well established turf and shall be free of weeds and any other harmful or deleterious matter.

At least 80 percent of the grass plants in the cut sod shall be composed of the species or varieties specified in the Contract Documents.

Grass sod shall be grown, inspected, and under the provisions of the Agricultural Code of the State of California.

Sod shall be machine stripped or cut of a uniform soil thickness of one inch plus or minus 1/4 inch. The measurement for thickness shall exclude top growth and thatch and shall be determined at the time of cutting in the field.

Sod shall be rolled or folded prior to lifting. Handling of sod shall be done in a manner that will prevent tearing, breaking, drying, or any other damage. Sod shall be transplanted within 24 hours from the time it is stripped unless circumstances beyond the Contractor's control make storing necessary. In such case, sod shall be stacked, kept moist, and protected from exposure to the air and sun. The stored sod shall be installed in place not more than 48 hours after cutting.

20-5.04 TREES

Trees are classified by type as to genus, species, and variety as well as common name. The tree varieties to be planted shall be as indicated in the Contract Documents.

Tree species for planting in the City of Campbell are identified by container size and specified in the Contract Documents.

Trees to be planted as street trees shall be free of branches for approximately the lower half of their height. Trees shall have reasonably straight stems and shall be well branched and symmetrical in accordance with their natural habits of growth. The branch system shall be free from dead or dry wood or broken terminal growth.

Container grown trees shall be capable of standing upright without staking and shall have been grown in the container sufficiently long for the fibrous roots to have developed so that the root mass will retain its shape and hold together when removed from the container. Trees not meeting this requirement will be rejected and replaced by the Contractor at their sole expense.

The container shall be sufficiently rigid to protect the root mass during shipping.

Each tree of each species or variety delivered to the Project site shall be identified by scientific name and size on a legible waterproof label securely attached to the tree.

All trees shall be subject to inspection by the Engineer at any time during the duration of the project, at the place of growth, upon delivery, or during planting operations; however, such inspection shall not be construed as final acceptance or even conditional acceptance of such trees until completion of the Project.

The Contractor shall establish the necessary quality control and inspection practice to assure compliance with the Contract Documents. The Contractor shall furnish a California Nursery Stock Certificate for each shipment of trees.

20-5.04A Stakes and Ties

Contractor shall refer to the Contract Documents for the type and size of tree. The Contractor shall install trees pursuant to City Standard Details L-1 “Street Tree Planting & Staking Detail” and L-2 “Tree Staking Table and Notes”.

20-5.05 PLANTING

Each tree and shrub location shall be indicated in the Contract Documents and shall not be in conflict with any existing utilities, utility boxes, etc. Any and all plants improperly located shall be replanted in their proper location at no additional cost to the City.

After all planting operations have been completed, the Contractor shall remove all trash, empty plant containers, tools, and equipment used in this Work, or any other marks in the area caused by this Work shall be repaired at the Contractor's expense, and the ground left in a neat and orderly condition throughout the Work site.

Planting shall be performed under the provisions of the Contract Documents. Each plant shall be placed in the planting excavation in an upright position in the center of the hole, and the space around it backfilled with native or amended planting mix, at the Engineer’s discretion, so that amended soil of a thickness equal to at least half the diameter of the root ball is around the sides of the root ball. Do not place organic matter beneath the plant's root ball. The plant shall be set so that the root crown is higher than average surrounding grade as shown in the Contract Documents. Dispose of balance of borings around plant in a manner that water is shed away from the crown or trunk of plant.

20-5.06 PREPARATION FOR GROUND COVERS

All areas to be planted with ground cover shall receive fertilizers and soil amendment, uniformly distributed at the following rate per 1.000 square feet and thoroughly rototilled into the top 6 inches of soil. The rate of application for fertilizer and soil amendment shall be as determined by the Engineer.

The Contractor shall fine grade so that proper drainage of the entire ground cover is assured. The Contractor shall avoid any compaction of the soil after treatment and shall not permit vehicular or equipment traffic over such areas. In the event of such compaction, the Contractor shall be required to recultivate any areas thus compacted, at his own expense.

All areas shall receive a pre-emergent weed control treatment prior to planting.

Ground covers shall be planted in the prepared soil, which shall be moist and friable, never dry, or wet and soggy. The moist condition shall extend to the full depth of cultivation.

The spacing of all ground cover plants shall be as indicated in the Contract Documents and in the plant list. Plants shall be planted in evenly spaced rows with staggered triangular spacing, around shrubs to within one foot, and around trees to within 18 inches.

20-5.07 PREPARATION FOR TREES AND SHRUBS

Excavate holes by auger unless otherwise specified for particular situations. Before an augured hole is made, the top 6 inches of amended soil shall be removed and stockpiled at one side of hole.

When the backfill around the plant is approximately 2/3 completed, the plant shall be thoroughly watered, after which the backfill shall be completed to the grade of the surrounding area.

Install fertilizer according to the manufacturer's label directions.

No boxed, balled, or canned trees shall be planted if the ball is broken or cracked, either before or during the process of planting.

Except in turf areas, each plant shall have a soil berm constructed around it to retain water. The soil berm shall be at least 4 inches high and shall have a minimum diameter of 2 feet for shrubs and 3 feet for trees.

Each tree in a turf area shall have the turf removed in a ring around the tree base. For 5-gallon trees, the ring shall be 24 inches in diameter; for 15-gallon and larger trees, the ring shall be 30 inches in diameter.

Pruning shall be limited to a minimum necessary for removal of injured twigs and branches.

20-5.08 PREPARATION FOR TURF

All areas to be turfed shall receive fertilizers and soil amendment, uniformly distributed at the following rates per 1,000 square feet and thoroughly rototilled into the top 6 inches of soil unless otherwise stated in the Contract Documents:

1. 160 lbs. agricultural gypsum.
2. 18 lbs. fertilizer.
3. 5 cubic yards soil amendment.

After application of fertilizer and preparation of soil has been completed as specified, the areas to be seeded in lawn shall be brought to a smooth, uncompacted grade.

The Contractor shall fine grade so that proper drainage of the entire Project area is assured. All rocks, soil lumps, and other deleterious materials larger than one inch shall be removed and the area raked smoothly.

The Contractor shall avoid any compaction of the soil after treatment and shall not permit vehicular or equipment traffic over such areas. In the event of such compaction, the Contractor shall be required to recultivate any areas thus compacted, at his own expense.

All soil preparation and planting operations shall be conducted under favorable weather conditions only. Soil shall not be worked when excessively dry or wet and the Engineer reserves the right to stop any work taking place during a period when conditions are considered detrimental to soil structure or plant growth.

The soil on which the turf sod is to be placed shall be moist at the time of planting. The Contractor shall install the turf sod in conformance with all manufacturer's recommendations.

The sod shall be installed to the smooth finish grade with tight edges and no gaps. Sod pieces shall be placed with ends staggered. There shall be no stretching.

After the sod has been placed, it shall be rolled with a roller to ensure no air pockets are between the roots and the soil. Sod shall be watered immediately after installation.

Turf to be seeded shall be sown in prepared soil at the rate of 10 pounds per 1,000 square feet, raked in lightly, and rolled.

20-6 EXISTING IRRIGATION FACILITIES

20-6.01A GENERAL

20-6.01A(1) Summary

Section 20-6, “Existing Irrigation Facilities,” includes specifications for performing work on existing irrigation facilities. Work performed on existing irrigation facilities must comply with Section 15, “Existing Facilities.”

20-6.01A(2) Definitions

Reserved

20-6.01A(3) Submittals

Submit a list of irrigation system deficiencies within 7 days of checking the existing facilities.

20-6.01A(4) Quality Assurance

After irrigation facilities have been relocated, demonstrate in the presence of the Engineer that the relocated facilities function properly.

Certify each existing backflow preventer under the provisions of Section 20-8.05, “Reduce Pressure Backflow Preventers (RPP).”

20-6.02B Materials

Valve box covers must be the same size as the covers they replace.

Control and neutral conductors must be the same size and color as the control and neutral conductors they replace.

20-6.03C CONSTRUCTION

20-6.03C(1) General

Notify the Engineer at least 4 business days before shutting off the water supply to any portion of the existing irrigation system and immediately after restoring the water supply to any portion of the existing irrigation system.

If an irrigation facility to be relocated is determined unsuitable, replace the irrigation facility under the provisions of Section 20-8, “Irrigation Materials” and Section 20-9, “Irrigation Construction.” The replacement of the unsuitable facility is Extra Work.

20-6.03C(2) Check and Test Existing Irrigation Facilities

Before performing irrigation system work, check existing irrigation facilities to remain in place or to be relocated. The Engineer determines the test watering cycle lengths. Check for deficiencies including missing parts, damaged components, and improper operation. Correct deficiencies as ordered. The correction of deficiencies is Extra Work.

20-6.03C(3) Operate Existing Irrigation Facilities

If the Contract includes a bid item for operate existing irrigation facilities, after performing work under the provisions of Section 20-6.03C(2), “Check and Test Existing Irrigation Facilities,” operate existing irrigation facilities through Contract acceptance.

Operate existing irrigation facilities except for water meters, underground supply lines, control and neutral conductors, and electrical conduits.

Check for proper operation at least once every 30 days. Adjust, repair, or replace existing irrigation facilities within 7 days of finding any deficiency.

Operate irrigation systems using the automatic irrigation controller until Contract acceptance. You may operate irrigation controllers manually during plant replacement, fertilization, weed germination, and repair work.

Program the irrigation controllers for seasonal requirements.

20-6.03C(4) Remove Irrigation Facilities

Irrigation facilities to be removed that are more than 6 inches below the finished grade may be abandoned in place unless salvaging is specified or shown.

Immediately after disconnecting an existing irrigation facility to be removed or abandoned from an existing facility to remain, the remaining facility must be capped, plugged, or connected to a new or existing irrigation facility.

20-6.03C(5) Replace Valve Box Covers

Existing valve box covers shown to be replaced must remain in place until the new covers are ready to be installed.

20-6.03C(6) Relocate Backflow Preventer Assemblies

Install backflow preventer assemblies pursuant to City Standard Detail L-3, “Backflow Preventer,” and these *City Standard Specifications*.

20-6.03C(7) Relocate Water Meters

Relocate water meters.

20-6.03C(8) Relocate Irrigation Controllers

Install irrigation controllers under the provisions of Section 20-8.09, “Irrigation Controllers.”

20-6.03C(9) Salvage Irrigation Facilities

Salvage irrigation facilities under the provisions of Section 15-1.03C, “Salvaging Facilities.”

20-6.04D PAYMENT

Not Used

20-7 EXISTING PLANTING

20-7.01 GENERAL

20-7.01A(1) Summary

Section 20-7, “Existing Planting,” includes specifications for performing work on existing planted area.

20-7.01A(2) Definitions

Reserved

20-7.01A(3) Submittals

Submit a work plan for:

1. Transplanting trees. The work plan must include methods for lifting, transporting, storing, planting, guying, and maintaining each tree to be transplanted. Include the root ball size, method of root ball containment, and a maintenance program for each tree.
2. Maintaining existing planted areas. The work plan must include controlling the weeds, fertilizing, mowing, and trimming of turf areas, watering, and controlling rodents and pests..
3. Protecting trees. The work plan must include protection for the tree trunk, the area under the dripline, and roots exposed during excavation.

Submit a copy of the manufacturer's product sheet for root stimulant including application instructions.

20-7.01A(4) Quality Assurance

Inspect for deficiencies of existing planted areas in the presence of the Engineer. Complete the inspection within 15 days of the start of job site activities.

Deficiencies requiring corrective action include:

1. Weeds.
2. Dead, diseased, or unhealthy plants.
3. Plant stakes and tree ties that are missing.
4. Inadequate plant basins and basin mulch.
5. Other deficiencies needing corrective action to promote healthy plant life.
6. Rodents and pests.

20-7.01B Materials

Not Used

20-7.01C CONSTRUCTION

20-7.01C(1) General

Correct deficiencies of the existing planted areas if ordered within 15 days of the order. Correction of deficiencies is Extra Work.

20-7.01C(2) Prune Existing Plants

Prune existing plants under the provisions of ANSI A 300 part 1, *Pruning,* published by the Tree Care Industry Association if ordered. Do not use tree seal compounds to cover pruning cuts.

Pruning existing plants if ordered by the Engineer is Extra Work.

20-7.01C(3) Transplant Trees

Prune, under the provisions of ANSI A 300 part 1, *Pruning* published by the Tree Care Industry Association, each tree to be transplanted immediately before lifting.

Transplant palm trees between March 15 and October 15.

Prune a palm tree by removing dead fronds and frond stubs from the trunk. Remove green fronds up to 2 rows of fronds away from the center of growth. Tie the remaining 2 rows of fronds in an upright position with light hemp or manila rope. Remove fronds and frond stubs at the trunk in a way that will not injure the trunk. Remove fronds and frond stubs for *Phoenix dactylifera* approximately 4 inches from the trunk.

Prepare each hole in the new location before lifting the tree to be transplanted. Lift each tree to be transplanted as described in the work plan.

Handle and plant each tree to be transplanted under the provisions of Section 20-3.02C(3), "Planting Plants," of the *Caltrans Standard Specifications*.

Until a tree is replanted, cover exposed root ball with wet burlap or canvas and cover the crown with 90 percent shade cloth.

Replant each tree on the same day it is lifted if possible. If the transplant location is not ready to receive the tree, store and maintain the tree to be transplanted until the transplant location is authorized. Store the tree in an upright position.

Replace each damaged transplanted tree under the provisions of Section 20-3.01C(4), "Replacement Plants," of the *Caltrans Standard Specifications.*

Plant replacement trees under the provisions of Section 20-3.02C, "Construction," of the *Caltrans Standard Specifications*.

20-7.01C(4) Maintain Existing Planted Areas

Section 20-7.01C(4), "Maintain Existing Planted Areas," applies if a bid item for maintain existing planted areas is shown on the Bid Item List.

After deficiencies are corrected, perform work to maintain existing planted areas in a neat and presentable condition and to promote healthy plant growth through Contract acceptance.

Existing plant basins must be kept well-formed and free of sediment. If the existing plant basins need repairs and the basins contain mulch, replace the mulch after the repairs are done.

Control weeds within the existing planted area and:

1. From the existing planted area limit to the adjacent edges of paving and fences if less than or equal to 12 feet.
2. From the existing planted area limit to 6 feet beyond the outer limit of the existing planted area if the adjacent edge of paving or fence is more than 12 feet away.
3. Within a 3-foot radius from each existing tree and shrub.

Maintain existing planted areas as directed by the Engineer. Maintain existing planted areas if ordered by the Engineer is Extra Work.

20-7.01D PAYMENT

Not Used

20-8 IRRIGATION MATERIALS

20-8.00 GENERAL

All valves and fittings shall be designed for and shall meet the requirements for service at an operating pressure of 150 pounds per square inch, unless otherwise specified in the Contract Documents.

All valves and fittings shall have connections compatible with the type of pipe joint shown on the Contract Documents. If mechanical joints or slip-type joints are used, the Contractor shall furnish and install necessary Portland cement concrete thrust blocks as specified by the Engineer.

Concrete for replacing concrete facilities shall be minor concrete.

HMA for replacing asphalt concrete surfacing and facilities shall comply with Section 39, "Asphalt Concrete," except the Contractor may use minor HMA if authorized by the Engineer.

20-8.01 PIPE

Water transmission pipe and fittings for service mains, branch mains, and laterals shall be as indicated on the Contract Documents.

20-8.01A Plastic Pipe Supply Line

All plastic pipe shall be continuously and permanently marked with the following information: Manufacturer's name, kind of pipe, material, size, NSF approved, and schedule or type.

The manufacturer shall also mark the date of extrusion on pipe. This dating shall be done in conjunction with records to be held by the manufacturer for 2 years, covering quality control tests, raw material batch numbers, and any other information deemed necessary by the manufacturer. Pipe material shall not be older than two years or show signs of being stored out of cover. Guarantee shall cover workmanship of materials from the plastic pipe manufacturer for all plastic pipe and fittings.

PVC Class 200 Pipe shall be made from an NSF approved Type 1, Grade 1 PVC under the provisions of ASTM D1784.

PVC Schedule 40 pipe shall be manufactured in strict compliance with ASTM D1785.

Use rubber-gasketed pipe equipped with factory installed reinforced gaskets for mainline pipe with a nominal diameter greater than or equal to 4-inches. Gasketed pipe joints must conform to the “Laboratory Qualifying Tests” section of ASTM D3139. Gasket material must conform to ASTM F477. Use rubber gasketed deep bell ductile iron fittings conforming to ASTM A-536 and ASTM F-477. Use lubricant approved by the pipe manufacturer.

Use solvent weld pipe for mainline pipe with a nominal diameter 3-inches or less where a pipe connection occurs in a sleeve. Use schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D 1784 at changes in direction or branch mains. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564.

20-8.01B Pipe Fittings

Pipe fittings shall be of the same material as pipe where applicable and recommended by the pipe manufacturer for the particular type of pipe to which they are to be connected and shall conform to the following specifications.

Standard galvanized pipe fittings shall conform to the requirements of the AWWA Committee 8620D report, "Collected Standards for Service Line Materials." Galvanized pipe shall be joined by means of couplings. Couplings, elbow, tees, and other fittings shall be galvanized conforming to the above requirements.

Galvanized steel pipe supply line and couplings must be standard weight complying with ASTM A53, except that the zinc coating must not be less than 90 percent of the specified quantity. Except for couplings, the fittings must be galvanized malleable iron, banded and threaded, and comply with ANSI B16.3, Class 150.

Pipe joint compound must be nonhardening and noncorrosive. Do not use pipe thread sealant tape.

All slip-joint PVC fittings shall be Schedule 40.

20-8.02 QUICK COUPLING VALVES

Contractor shall refer to City Standard Detail L-10 “Quick Coupling Valve and Box.”

20-8.03 RECYCLED WATER IDENTIFICATION

Irrigation components used for recycled water must be manufactured or painted purple. Recycled water irrigation pipe and tubing must have a permanent label with working *CAUTION: RECYCLED WATER* every

24 inches in 2 rows spaced approximately 180 degrees apart in the longitudinal direction of the pipe or tubing.

The recycled water warning sign must be a decal, or a decal attached to a 1/16-inch-thick aluminum plate or tag.

Each warning sign decal must:

1. Show the phrase Recycled Water, Do Not Drink and the drinking-glass graphic symbol.
2. Be UV fade and weather resistant and manufactured from flexible vinyl with or without mylar.
3. Have a purple background, black text, and self-adhesive backing.

Each warning tag must:

1. Show the phrase *RECYCLED WATER* and the drinking-glass graphic symbol.
2. Be UV fade and weather resistant.
3. Be purple, double-sided, and manufactured from polyurethane.
4. Have an integral neck attachment and attachment hole capable of withstanding 178 lb. of pull-out resistance.
5. Have hot-stamped black lettering.

Posts and hardware for the warning signs must comply with Section 82-3, “Roadside Signs.”

Concrete sprinkler protectors used with recycled water must be painted purple.

20-8.04 VALVE BOXES

Valve boxes and covers shall be a “Carson 1419” or as indicated on the Contract Documents.

Valve box covers must be labeled. Labels must:

1. Have mechanically engraved inscriptions on the box cover at least 1 inch high.
2. Covers for valve boxes that contain remote control valves must be labeled with the Controller station.
3. Covers for valve boxes that contain irrigation equipment must be labeled with the standard abbreviation for that equipment.

Wires inside the valve boxes must be labeled with predrilled plastic tags consisting of 2 layers of contrasting color and be at least 1/8 inch thick.

20-8.05 REDUCED PRESSURE BACKFLOW PREVENTERS (RPP)

A backflow prevention assembly shall be as indicated on the Contract Documents.

Each backflow preventer assembly must be certified by a backflow preventer tester. The tester must have an active and valid certification from the water purveyor having jurisdiction.

If the local water purveyor does not have a certification program, the tester must be certified by AWWA or a nearby county with a certification program.

Notify the Engineer at least 5 business days before certifying the backflow preventer assembly. Certify each backflow preventer assembly annually and within 10 days of Contract acceptance.

20-8.06 GATE VALVES

All valves and sizes shall be as indicated on the plans Contract Documents. For gate valves 3 inches and small shall be brass. Gate valves 4 inches and larger shall be ductile iron with flanged connection.

20-8.07 WYE STRAINERS

Strainers shall be self-cleaning, of the size of service main, with a split wedge gate valve on the strainer end. The gate valve shall be compatible with the size of the assembly. The strainer assembly body shall be black iron.

20-8.08 PULL BOXES

Pull boxes must comply with Section 86, “Electrical Work, General,” and be No. 5 or larger. Pull boxes for low voltage conductors must not have side openings.

Pull box covers used solely for irrigation control wiring must be marked *CAMPBELL IRRIGATION* except mark electrical service pull box covers *CAMPBELL SERVICE*.

20-8.09 IRRIGATION CONTROLLERS

Irrigation controllers shall be a certified CalSense system or as indicated on the Contract Documents.

Finish the exposed top surface of concrete pad with a medium broom finish applied parallel to the long dimension.

Install electrical components for automatic irrigation systems under the provisions of Section 87, “Electrical Systems.” Install irrigation controller under the provisions of the manufacturer's instructions.

If 2 or more irrigation controllers operate the same remote master control valve, install an isolation relay under the provisions of the controller manufacturer’s instructions.

Where direct burial conductors are to be connected to the terminal strip, connect the conductors with the open-end-crimp-on wire terminals. Exposed wire must not extend beyond the crimp of the terminal and the wires must be parallel on the terminal strip.

Install rain sensor units for irrigation controllers on the irrigation controller enclosure cabinets. Provide protection against lightning damage.

Contractor shall provide training by a qualified person on the use and adjustment of the installed irrigation controllers at least 30-days before Contract acceptance.

Modifications to electrical components must be done by the manufacturer before shipment to the job site.

The contact information (i.e. name, phone number and email) for the manufacturer and the installation date and expiration date of the manufacturer’s guarantee for the controllers must be permanently marked on a plaque on the inside face of the controller.

20-8.10 CONDUCTORS

The wire conductors for automatic control devices shall be of the size and color as shown on the plans and shall be UL rated for direct burial. Conductors shall be able to withstand a crush test of 5000 psi. Common or neutral conductors shall be white. The control wires to the automatic control valves shall be red. The spare wires used, when necessary, shall be black.

Perform conductors test. The test must comply with the specifications in Section 87, “Electrical Systems,” of these *City Standard Specifications*.

Where the conductors are installed by trenching and backfilling, perform the test after a minimum of 6 inches of backfill material has been placed and compacted over the conductors.

20-8.11 WIRE CONNECTORS

Wire connectors shall consist of the following:

1. A direct burial splice kit with 18 10-guage wire capacity, high quality wire nut, sealant tube with waterproof grease, and snap shut seal on the sealant tube.

Wire connectors shall be suitable for underground wire connections.

20-9 IRRIGATION CONSTRUCTION

20-9.01 CONDUCTORS, ELECTRICAL CONDUIT AND PULL BOXES

Irrigation Conductors may be installed in the same trench as the water pipe. All clearances between conductors, pipes, and trench walls shall be as specified herein and in the standard details or as indicated in the Contract Documents.

Sharp bends or kinks in the conductor shall not be permitted. Conductors shall be unreeled in place alongside or in the trench and shall be carefully placed along the bottom of the trench. Under no condition shall the cable be unreeled and pulled into the trench from one end.

No less than 18-inches of cable slack shall be left on each side of all splices at all points where cable is connected to field equipment. The slack cable shall be placed in the trench in a series of S curves.

20-9.02 INSTALLATION

Before proceeding with any Work, the Contractor shall carefully check and verify all dimensions and shall report any variations to the Engineer.

The Contractor shall immediately shut off water to broken pressurized irrigation components and shall repair the irrigation system within 24-hours after a malfunction or damage occurs.

Connect underground metallic pipes, valves, or fittings made of dissimilar metals through a dielectric coupling or bushing.

20-9.02A Irrigation System Functional Tests

The functional tests for each irrigation controller or group of controllers and associated irrigation system served by a single electric service point must consist of at least 1 complete cycle of operation. The Engineer determines the length of the cycle.

Perform a functional test for each irrigation system:

1. Before planting the plants.
2. After planting the plants.
3. Before the start of the plant establishment work.

Perform the final check of the existing and new irrigation system 20 to 30 days before Contract acceptance. The Engineer determines the length of the cycle.

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

The system shall efficiently and evenly irrigate all areas and shall be complete in every respect and shall be left ready for operation to the satisfaction of the Engineer.

The Contractor shall install the specified pipe, valves, fittings, wiring, switches, controls, and appurtenances at the approximate locations indicated in the Contract Documents. The Engineer shall indicate specific locations.

The Contractor shall provide all temporary storerooms and shops that he may require at the Project site for the safe and proper storage of his materials, tools, etc. These rooms shall be constructed only in locations

approved by the Engineer as designated on the Project map, and must in no way interfere with the Work, including the work of any other contractor. At such times as these structures interfere with the proper installation and completion of the Work, they shall be removed by this Contractor, at its sole expense, within 3 days after having been notified by the Engineer that such removal is necessary.

20-9.02B Trenching and Backfilling

Trenches for pipe and electrical conductors may be excavated manually or with mechanical trenching equipment. Mechanical trench diggers used on the Project site shall be essentially vertical so that a minimum of surface is disturbed. Road patrols or graders shall not be used to excavate the trench with their blades. Trenches for pipe shall be excavated to the depths shown on the Contract Documents.

The procedure for backfilling shall be the same for all trenches. All lumber, Rubbish, and large rocks shall be removed from the trenches. Pipe shall have a firm, uniform bearing for the entire length of each pipeline. Wedging or blocking of pipe will not be permitted. Trenches shall not be excessively wet and shall not contain pools of water during backfilling operations.

Trenches shall be backfilled with sand to a level not less than 8 inches below the finish grade for main-line only. Sand shall be jetted lightly. The remainder of the backfill shall be topsoil not less than 8 inches deep.

Extreme care shall be exercised by the Contractor while backfilling. Any materials or equipment damaged during backfilling shall be repaired or replaced by the Contractor as directed by the Engineer, at no cost to the City.

20-9.02C Pipe

Contractor shall use only the solvent supplied and recommended by the manufacturer to make plastic pipe joints. The pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before applying solvent.

The Contractor shall make solvent weld joints with non-synthetic bristle brush in the following sequence:

1. Apply a liberal, even coat of purple PVC primer to the pipe and fitting immediately before applying the solvent.
2. Apply a liberal even coat of solvent to the inside of the fitting and then to the outside of the pipe, making sure that the coated area is equal to the depth of the fitting socket.
3. Insert the pipe quickly into the fitting and turn the pipe approximately 1/4 turn to distribute the solvent and remove air bubbles. Hold the joint for approximately 15 seconds so the fitting does not push off the pipe.
4. Use a clean rag and wipe off all excess solvent.
5. Be sure in going to the next joint that the pipe is not twisted, disturbing the last completed joint.

Allow at least 15 minutes setup time for each welded joint before moving.

On plastic to steel connections, the Contractor shall work the steel connections first. For all PVC threaded connections use thread sealing paste with virgin Teflon. In no event shall an oil base joint compound be used on a PVC joint.

The Contractor shall exercise care in handling, loading, unloading, and storing plastic pipe and fittings. All plastic pipe and fittings shall be stored under cover before using and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lie flat so as not to be subject to undue bending or concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded until said section of pipe is cut out and rejoined with a coupling.

The Contractor shall provide the necessary mason's lines and supports to insure installation of the pipe to line and grade, as staked by the Engineer. The Contractor's facilities for lowering the pipe into the trench shall be such that neither the pipe nor the trench will be damaged nor disturbed.

All pipes shall be assembled free from dirt, pipe scale, and burrs. The main line supply shall be flushed out and tested for leaks before backfilling and with control valves in place and before lateral pipes are connected to valves. Each section of lateral pipes shall be flushed out before sprinkler heads are attached.

Plastic pipe shall not be laid when there is water in the trench.

The Engineer shall inspect all pipe before they are laid and reject any section that is damaged by handling or is found to be defective to a degree which will materially affect function and service of pipe.

Piping shall be installed a minimum of 24 inches below the top of paved surfaces or as indicated in the Contract Documents. Where irrigation mains or laterals are to be installed under paving, a Schedule 40 PVC sleeve shall be installed. The inside diameter of the sleeve shall be a minimum of 2 inches larger that the outside diameter of the pipe.

A separate sleeve shall be installed for irrigation control wires. The minimum diameter shall be 2 inches or as shown on the Contract Documents.

20-9.02D Valves and Valve Boxes

The Contractor shall provide and install all valves as indicated in the drawings and as required for the proper control of the piping systems in which they are incorporated. All main shut-off valves shall be gate valves unless shown otherwise in the Contract Documents.

Where a remote-control valve is shown at the edge of turf and shrub areas, it shall be placed in the shrub area. In walkways and paved areas, install the top of the valve box flush with the surrounding finished grade.

Valves shall be placed in groupings for ease of maintenance.

20-9.02E Pull Boxes

Install pull boxes under the provisions of Section 87, “Electrical Systems,” at the following locations:

1. At all conductor splices except splices made in valve boxes.
2. Within 5 feet of irrigation controllers.
3. At ends of electrical conduits.
4. At other locations shown in the Contract Documents.

20-9.02F Pressure Testing

Before testing all air shall be expelled from the pipe.

All tests on pressure lines shall be completed prior to backfilling. Fittings and couplings must be open to visual inspection for the full period of the test. However, sufficient sand may be placed in trenches between fittings to ensure the stability of the line under pressure.

No testing shall be done until the last solvent welded joint has had 24 hours to cure.

Where any section of the pipe system is provided with concrete thrust block, the test shall not be made until at least 5 days have passed after the concrete thrust block was installed. If higher early-strength cement is used in the concrete thrust block, the test shall not be made until at least 2 days have elapsed.

Perform pressure testing for leakage on irrigation supply lines:

1. In the Engineer's presence.
2. On business days from 8 a.m. to 5 p.m. unless authorized.
3. Before backfilling supply line trenches.
4. With irrigation system gate valves open.

5. With open ends of the supply line and fittings plugged or capped.

Notify the Engineer at least 48 hours before performing a pressure test.

Perform pressure testing using Method A or B to test supply lines installed by trenching and backfilling and supply lines that are completely visible after installation.

Perform pressure testing using Method A to test all other supply lines, including those installed in the ground by methods other than trenching and backfilling.

Test irrigation supply line in conduit by Method A with the testing period modified to 0.5 hour and no allowable pressure drop.

20-9.02F(1) Pressure Testing Method A

For Method A pressure testing for leakage:

1. Calibrate the pressure gauge from 0 to 200 psi in 5 psi increments. Pressure gauge must be accurate to within a tolerance of 2 psi.
2. Fill the supply line with water and connect the line to a pressure gauge. Place the pipeline under a pressure of 125 psi. Remove the source of pressure and leave the line under the required pressure.
3. Test the supply line under the required pressure for a period of 1 hour. The pressure gauge must remain in place until each test period is complete.
4. Leaks that develop in the tested portion of the system must be located and repair after each test period if a drop of more than 5 psi is indicated by the pressure gauge. After the leaks have been repaired, repeat the 1-hour pressure test until the drop in pressure is 5 psi or less.

For a system consisting of a new supply line connected to an existing line, the new supply line must be isolated from the existing line and tested.

20-9.02F(2) Pressure Testing Method B

For Method B pressure testing for leakage:

1. Turn on the water and maintain at full pressure from the water source for a period not less than 8 consecutive hours after all the air has been expelled from the line for the portion of the supply line on the upstream side of the control valve to be backfilled. Perform the same test for a period not less than 1 hour for the portion of the supply on the downstream side of the control valve to be backfilled.
2. Repair leaks that develop in the tested portion of the system. After the leaks have been repaired, repeat the pressure test until no leaks occur.

20-9.02G Sprinkler Heads

Turf sprinkler heads shall be set flush with finished grade.

After installation of the sprinklers, check and adjust the entire sprinkler system for proper orientation and uniform coverage.

20-9.02H Disinfection

Contractor shall disinfect potable water lines according to AWWA standards.

20-9.02I Recycled Water Warning Signs.

Install recycled water warning signs on irrigation facilities that use recycled water.

Install sign decals directly to clean, smooth surfaces. Clean the surface with alcohol or an equivalent cleaner before applying the decal.

Install a 4-by-4-inch warning sign decal to each:

1. Backflow preventer assembly.
2. Irrigation controller enclosure cabinet door.

Install a 2-by-2-inch warning tag to each remote-control valve and valve box cover.

Install a 2-1/2-by-3-inch sign decal to each sprinkler riser.

Under the provisions of local regulations, install a 12-by-12-inch warning sign decal on an aluminum plate and attach to gates, fences, and walls located in the vicinity of a recycled water irrigation system. On gates and fences, install signs with S hooks and C clips or 14-gauge galvanized steel wire. On concrete walls or other rough surfaces, install signs with a silicon-based adhesive. In open areas, install signs on metal posts under the provisions of Section 82-3, “Roadside Signs.”

20-9.02I Records

The Contractor shall maintain reasonably clear and detailed records of all underground installations. These records shall be available to the Engineer at all times for verification while the Work is in progress. These records shall be delivered to the Engineer in good and acceptable condition prior to final acceptance of the Work.

The Contractor shall provide a chart for each controller, which shall be placed on the inside of the controller enclosure door. Record drawings from which the charts are to be made shall be approved by Engineer prior to preparing the chart.

Each chart shall show the area controlled by the automatic controller and shall be of the maximum size which the controller door will allow. The controller chart shall include:

1. Connection to existing water lines.
2. Routing of pressure lines.
3. Routing of control valves.
4. Locations of remote-control valves, gate valves, and quick valves.
5. Each Irrigation zone shall be represented by a different color.
6. Plant material shall be identified in print.
7. Other items as directed by the Engineer.

The chart shall be a reduced drawing of the actual as-built system. All symbols shall be readable at the final reduced size.

The chart shall be a black line or blue line print and shall be colored or otherwise coded to indicate the area of coverage for each station.

When completed and approved, the chart shall be on 11” x 17” paper, laminated. The Contractor shall provide 3-laminated copies per controller.

Each chart shall be completed and approved prior to final inspection of the irrigation system.

20-9.02J Training

After the system has been completed, the Contractor shall provide training by a qualified person on the operation and maintenance of the system and shall furnish a complete set of operating instructions prior to final acceptance.

20-10 MAINTENANCE

20-10.01 Plant Establishment Work

Contractor shall be responsible for the following plant establishment work. Work shall include, but is not limited to, all watering, weeding, fertilizing, cultivation, spraying, cutting, and pruning necessary to keep the plant material in a healthy, growing condition, and to keep the planted areas neat and attractive in appearance throughout the plant establishment period. This work shall also include any additional watering by hand which may be necessary. All plants shall be watered not less than twice a week and, in any event, shall be such as to provide optimum growth conditions. The Contractor shall provide equipment and means for the proper applications of water to planted areas not provided with an irrigation system under the provisions of the Contract Documents.

Trees and shrubs shall be watered, cultivated, and sprayed as required to assure a vigorous, thriving condition from day of planting to end of plant establishment period. Weeds shall be removed during this period. During the plant establishment period, the Contractor shall not water between the hours of 10:00 a.m. and 4:00 p.m.

Should the Contractor fail, be neglectful, or negligent in this work, the City may choose to perform said work. The City shall then charge the Contractor the cost for performing the required work by deducting this cost from the partial payments due to the Contractor as these costs are incurred by the City.

Turf shall be watered, reseeded, edged, and mowed as required to assure a neat appearance and a healthy and vigorous growth from day of seeding to end of plant establishment period. The first mowing shall not be done until the grass is generally at least 2 inches, but less than 3 inches, high. For the first mowing and all subsequent mowings, the mower shall be set to cut at a height of 1-1/2 inches. Subsequent mowings, as required, shall be done before the grass is 3 inches high. Grass clippings for all mowings shall not be allowed to lie after mowing. A catcher shall be used on the mower, and grass clippings shall be removed and discarded off site. Immediately following the first mowing of the turf, turf areas shall be fertilized at the rate of 8 lbs. per 1,000 square feet or as specified in the Contract Documents. Reapplication of fertilizer shall take place as directed by the Engineer during the plant establishment period.

Just prior to the end of plant establishment period, Contractor shall cut all grass, weed all beds, apply pre-emergent, and generally put the whole work in first-class condition.

Prior to and during the plant establishment period, should the appearance of any plant material indicate weakness and probability of dying, in the Engineer's opinion, that plant shall be replaced immediately by the Contractor, at his own expense. Replacements shall be made in the same manner as specified for the original planting. At the end of the plant establishment period, all plant material shall be in a healthy growing condition. Any plant material replaced within the last 30 days of the plant establishment period must be maintained by the Contractor for 30 days from the date of replacement.

The Contractor shall guarantee a weed free, even stand of the lawn grass, with 95 percent coverage, of the varieties specified. If such stand does not develop as a result of the first seeding, the Contractor shall reseed and care for thin spots until an even stand with 95 percent coverage is produced, at Contractor’s sole expense.

A pre-emergent herbicide, in addition to herbicide, which is specifically required elsewhere, shall be applied to all turf areas, and planted areas unless otherwise directed by the Engineer. The type of pre-emergent herbicide and herbicide to be used and method of application shall be approved by the Engineer.

Following the plant establishment period, the Contractor shall provide a warranty which guarantees all trees for one year from date of final acceptance of the Work. The Contractor shall replace any tree which has died, and the tree replacement shall be the same size container as originally designated in the Contract Documents.

20-10.02 INSPECTION FOR START OF PLANT ESTABLISHMENT PERIOD

Upon completion of the turf and planting work and when a stand of turf between 2 and 3 inches has been established and has undergone the first cutting, the Contractor shall notify the Inspector that the Project is ready for maintenance. The Inspector shall then schedule a pre-maintenance walk-through inspection for the Project and shall notify the Contractor and the Engineer as to the time and date. Upon inspection, if the Inspector and the Engineer find the irrigation, turf, and planting work complete and in compliance with the Contract Documents, the City shall authorize the start of the plant establishment period. Written notice shall be given to the Contractor as to the starting date of the maintenance period. Maintenance period shall be a minimum of one-hundred and twenty (120) calendar days and may extend beyond project acceptance and under no exception shall end prior to project acceptance.

20-10.03 QUALITY ASSURANCE

Provide training by a qualified person on the use and adjustment of the installed irrigation controllers no more than 30 days before completion of the plant establishment period.

Perform a final inspection of the plant establishment work in the presence of the Engineer 20 to 30 days before Contract acceptance.

20-11 PAYMENT

Measurement and payment shall be as specified in the Contract Documents.

END OF SECTION

SECTION 21 EROSION CONTROL

Conform to Section 21, “Erosion Control,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

21-1 GENERAL

21-1.02 MATERIALS

Delete “Not Used” in Section 21-1.02, “Materials,” of the *Caltrans Standard Specifications* and replace with the following language:

Liquid green dye used in erosion control work shall be 48-hour colorfast, applied at the rate of 2 quarts per acre.

21-2 EROSION CONTROL WORK

21-2.01 GENERAL

21-2.01A Summary

Add the following language to Section 21-2.01A, “Summary,” of the *Caltrans Standard Specifications*:

This work shall include all erosion control and planting work performed on any portion of the Project site (not limited to highways), as indicated in the Contract Documents. Similarly, all references to "roadway" or "highway" or "right-of-way" shall be construed as references to the Project site.

21-2.02D Fiber

Add the following language to Section 21-2.02D, “Fiber,” of the *Caltrans Standard Specifications*:

Fiber used for erosion control hydroseeding shall be virgin wood cellulose fiber of such character that it will disperse uniformly into a slurry when mixed with water. The slurry, when hydraulicly applied to the ground, shall form an absorptive mat of mulch uniformly impregnated with seed and other ingredients. No materials which inhibit growth or germination shall be present in the mixture.

END OF SECTION

SECTION 22 FINISHING ROADWAY

Conform to Section 22, “Finishing Roadway,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

22-1.03 CONSTRUCTION

Add the following language to Section 22-1.03, “Construction,” of the *Caltrans Standard Specifications*:

This Work shall also include removal and disposal of all weeds and other objectionable growths from areas which were previously cleared and grubbed by the Contractor.

Contractor shall remove and dispose of all storage facilities, sheds, yards, equipment, tools, and devices used as temporary installations during construction (e.g., fences, barricades, signs, guard rails, and AC berms) from the Project area.

Contractor shall form all earth conforms for back of sidewalks to produce a smooth and uniform slope.

Disposal of materials shall be under the provisions of Section 7-1.12, “Disposal of Material Outside the Project Limits”, except when permitted by the Engineer.

END OF SECTION

SECTION 23 SUBBASES AND BASES

Conform to Section 23, “Subbases and Bases,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

23-1 GENERAL

23-1.01 GENERAL

23-1.01D(2)(c) Qualifications

Delete Section 23-1.01D(2)(c), “Qualifications,” of the *Caltrans Standard Specifications* and replace with the following language:

Testing laboratories and testing equipment must comply with the Department’s Independent assurance Program and must submit proof of compliance, if requested by the City.

Personnel performing sampling and testing must be qualified under the Department’s Independent Assurance Program for the sampling and testing performed and must submit proof of compliance, if requested by the City.

END OF SECTION

SECTION 24 STABILIZED SOILS

Conform to Section 24, “Stabilized Soils,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

END OF SECTION

SECTION 25 AGGREGATE SUBBASES

Conform to Section 25, “Aggregate Subbases,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

25-1 GENERAL

25-1.02 MATERIALS

25-1.02A General

Add the following language to Section 25-1.02A, “General,” of the *Caltrans Standard Specifications*:

The use of recycled Portland cement concrete or asphalt concrete materials will be permitted, provided that the Contractor submits to the Engineer laboratory test data that the proposed materials meet all the quality requirements of this section, and the Engineer approves its use in writing. Data shall be submitted at least 30 days prior to expected use of the proposed materials in the Work. The Contractor shall submit samples of proposed materials if requested by the Engineer.

25-1.02B Class 1, Class 2, and Class 3 Aggregate Subbases

Add the following language to Section 25-1.02B, “Class 1, Class 2, and Class 3 Aggregate Subbases,” of the *Caltrans Standard Specifications*:

If no class is specified in the Contract Documents, Class 1 shall be used.

25-1.03 CONSTRUCTION

25-1.03B Subgrade

Add the following language to Section 25-1.03B, “Subgrade,” of the *Caltrans Standard Specifications*:

Subgrade preparation shall be under the provisions of Section 101, “Subgrade Preparation.”

25-1.03E Compacting

Delete Section 25-1.03E, “Compacting,” of the *Caltrans Standard Specifications* and replace with the following language:

Compact each AS layer to at least 95 percent relative compaction.

Where biaxial geogrid is shown, compact AS with either (1) a smooth-wheeled roller or (2) a rubber-tired roller. Do not use vibratory devices during compaction.

The surface of the finished subbase shall not vary more than 0.08-foot above or below the planned grade at any point and the thickness shall not vary more than 0.08 foot from the thickness shown in the Contract Documents at any point. Surfaces will be tested by a 16-foot straight edge applied parallel with and at right angles to the roadway centerline. The Contractor shall furnish the straight edge for the Engineer's use, and it shall be of a type and in a condition approved by the Engineer.

The finished surface of AS covered by material paid for by volume must not project above the grade established by the Engineer at any point.

Correct areas of AS that do not comply with the thickness shown if an equivalent thickness of overlying base will not compensate or request a payment deduction. If your request is authorized, the Engineer calculates the deduction by multiplying:

1. Deficient thickness less allowable tolerance

2. Planned width
3. Longitudinal distance of the deficient thickness
4. $11.00/cu yd

25-1.04 PAYMENT

Delete Section 25-1.04, "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Quantities of aggregate subbase will be paid for at the Contract price per appropriate unit of measurement, whichever unit is designated in the Contract Bid Item, for the Class or Classes involved, and is included in the Contract Sum.

Quantities of aggregate subbase to be paid for by the square yard will be calculated on the basis of the dimensions shown in the Contact Documents. No allowance will be made for aggregate subbase placed outside such dimensions unless ordered by the Engineer as Extra Work.

The payment quantity does not include the volume of aggregate subbase used to fill low areas of the subgrade.

END OF SECTION

SECTION 26 AGGREGATE BASES

Conform to Section 26, “Aggregate Bases,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

26-1.01D(3) Department Acceptance

Delete Section 26-1.01D(3), “Department Acceptance,” of the *Caltrans Standard Specifications* and replace with the following language:

Aggregate base (AB) is acceptable based on the City’s latest Quality Assurance Program (QAP).

26-1.04 PAYMENT

Delete Section 26-1.04, “PAYMENT,” of the *Caltrans Standard Specifications* and replace with the following language:

Measurement and payment for aggregate base shall be as noted in the Contract Documents.

END OF SECTION

SECTION 27 CEMENT TREATED BASES

Conform to Section 27, “Cement Treated Bases,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 28 CONCRETE BASES

Conform to Section 28, “Concrete Bases,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 29 TREATED PERMEABLE BASES

Conform to Section 29, “Treated Permeable Bases,” of the *Caltrans Standard Specifications* and these *City Standard Specifi*cations.

END OF SECTION

SECTION 30 RECLAIMED PAVEMENT

Conform to Section 30, “Reclaimed Pavement,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTIONS 31-35 RESERVED

SECTION 36 SURFACINGS AND PAVEMENT

Conform to Section 36, “Surfacings and Pavement,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

36-1 GENERAL

36-1.01 GENERAL

36-1.01D(2) Preconstruction Meetings

Delete Section 36-1.01D(2), “Preconstruction Meetings,” of the *Caltrans Standard Specifications* and replace with the following language:

Prior to constructing surfacings and pavements, the Contractor shall refer to the Asphalt Concrete Overlay Section of the Contract Documents for pre-surfacing conference submittal requirements.

36-3.01C(7) Inertial Profiler Verification Test

Delete Section 36-3.01C(7), ”Inertial Profiler Verification Test,” of the *Caltrans Standard Specifications* and replace with the following language:

Within 2 business days after the annual cross-correlation testing, submit a ProVAL profiler certification analysis report for the test results to the Engineer.

36-3.01D(2) Certifications

Delete Section 36-3.01D(2), ”Certifications,” of the *Caltrans Standard Specifications* and replace with the following language:

The inertial profiler must display a current certification decal showing the expiration date.

The operator must be certified for each model of inertial profiler operated.

The certifications issued by Caltrans for the inertial profiler and operator must be current.

END OF SECTION

SECTION 37 SEAL COATS

Conform to Section 37, "Seal Coats," of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

37-1 GENERAL

37-1.01 GENERAL

37-1.01A Summary

Delete Section 37-1.01A, "Summary," of the *Caltrans Standard Specifications* and replace with the following language:

Section 37-1, "General," includes general specifications for applying surface seals and seal coats.

37-1.01C Submittals

Delete Section 37-1.01C, "Submittals," of the *Caltrans Standard Specifications* and replace with the following language:

For each delivery of asphalt binder or asphaltic emulsion to the job site, submit a certificate of compliance and a copy of the specified test results.

37-1.01D(1) General

Delete the first paragraph in Section 37-1.01D(1), "General," of the *Caltrans Standard Specifications* and replace with the following language:

For aggregate testing, quality control laboratories must be in compliance with Caltrans' Independent Assurance Program to be an authorized laboratory. Quality control personnel must be qualified under Caltrans' Independent Assurance Program.

37-1.03 CONSTRUCTION

37-1.03A General

Delete Section 37-1.03A, "General," of the *Caltrans Standard Specifications* and replace with the following language:

If street sealing activities on a street affect access to public parking, residential property, or commercial property, the Contractor shall post the street for no parking under the provisions of Section 6-1.03A, "No Stopping Signs," and shall notify the adjacent property/business owner 72-hours prior to starting street sealing activities. The notice, at a minimum, shall include the following information:

1. Describe the work to be performed and why it is necessary.
2. Detail the location (i.e. streets and limits of activities).
3. Indicate dates and working hours.
4. Indicate what is to be expected.
5. Be authorized/approved by the Engineer prior to its distribution.

Asphaltic emulsion or asphalt binder for seal coats may be reheated if necessary. After loading the asphaltic emulsion or asphalt binder into a truck for transport to the job site, do not heat asphaltic emulsion above 160 degrees F and asphalt binder above 425 degrees F. During reheating, circulate or agitate the asphaltic emulsion or asphalt binder to prevent localized overheating.

Except for fog seals, apply quick setting Grade 1 asphaltic emulsions at a temperature from 75 to 130 degrees F and apply quick setting Grade 2 asphaltic emulsions at a temperature from 110 to 185 degrees F.

Unless otherwise noted in the Contract Documents, the Contractor shall comply with the application rates for the asphaltic emulsion, the asphalt binder, and the aggregate spread rates as noted in these *City Standard Specifications* or as directed by the Engineer.

37-1.03A(1) Typical Surface Preparation

1. Striping Removal: Prior to placing the seals, all existing thermoplastic striping and markings, painted striping and markings, pavement markers and temporary pavement delineation shall be removed under the provisions of Section 15, “Existing Facilities.”
2. Removal shall be performed by grinding. Removal by sand-blasting will not be allowed.
3. Weed Abatement:
   - 3.1. A minimum of one-week prior to the sealing operations, an approved herbicide shall be sprayed on all cracks on the street.
   - 3.2. In addition to spraying the cracks within the roadway surface, the Contractor shall also spray the line between the lip of gutter and the pavement edge for the entire length of the street segment on both sides of the street.
   - 3.3. Application of the herbicide shall be under the provisions of applicable State laws and the City’s Policy on the Use of Pesticides on City Property.
   - 3.4. The application of the herbicide shall be applied by a person who holds a Qualified Applicator Certificate (QAC) or who has been trained and/or works under the direction of the QAC holder.
   - 3.5. The Contractor shall provide the Engineer with a copy of their QAC prior to the application of the herbicide.
   - 3.6. A green or yellow colored dye shall be added to the herbicide mixture to indicate the locations where cracks have been treated.
   - 3.7. The Contractor shall remove all existing weeds and plant materials from all cracks in the street. This includes vegetation removal from cracks along the edge of pavement/lip of gutter.
4. Cracks greater than ¼” in width shall be sealed under the provisions of Section 37-6, “Crack Treatment,” of these Standard Specifications.
5. Utility Protection:
   - 5.1. Before applying the seal, cover manholes, valves, monument covers, grates, and other exposed facilities located within the area of application using plastic or oil resistant construction paper secured by tape or adhesive to the facility being covered.
   - 5.2. Reference the covered facilities with enough control points to locate the facilities after application of the seal.
   - 5.3. Remove and dispose of protective cover under the provisions of Section 7-1.12, “Disposal of Material Outside the Project Limits,” upon completion of the seal.
6. Street Cleaning:
   - 6.1. All oil and grease stains shall be removed by use of an approved cleaning solution, or any other procedure approved by the Engineer.
   - 6.2. The Contractor shall remove oil and grease stains a minimum of 72-hours prior to the sealing operations.
7. Street Sweeping:
   - 7.1. Streets shall be swept from face of curb to face of curb with a self-propelled power broom street sweeper.
   - 7.2. The Contractor at a minimum shall do 3 passes with a power broom street sweeper.
   - 7.3. The surface of the street shall be adequately cleaned by sweeping to remove all loose particles of paving, dirt, vegetation, and all other extraneous material affecting adhesion of the seals with the existing surface.

37-2 CHIP SEALS

37-2.01 GENERAL

37-2.01B(3)(b) Precoated Aggregate

Delete Section 37-2.01B(3)(b), "Precoated Aggregate," of the *Caltrans Standard Specifications* and replace with the following language:

Precoating of aggregate must be performed at a central mixing plant. The plant must be authorized under the provisions of Caltrans' Material Plant Quality Program (MPQP).

When precoating aggregate, do not recombine fine materials collected in dust control systems.

Precoated aggregate must be preheated from 260 to 325 degrees F. Coat with any of the asphalts specified in the table titled "Performance Graded Asphalt Binder" in Section 92, "Asphalt Binders." The asphalt must be from 0.5 to 1.0 percent by weight of dry aggregate. You determine the exact asphalt rate for precoating of aggregate.

Do not stockpile precoated aggregate.

37-2.01C(1) General

Delete Section 37-2.01C(1), "General," of the *Caltrans Standard Specifications* and replace the following language:

For chip seals on 2-lane, 2-way roadways, place a W8-7 (LOOSE GRAVEL) sign and a W13-1 (35) plaque at 2,000-foot maximum intervals along each side of the traveled way where aggregate is spread on a traffic lane and at public roads or streets entering the chip seal area. Place the 1st W8-7 sign in each direction where traffic first encounters the loose aggregate, regardless of which lane the aggregate is spread on. A W13-1 (35) plaque is not required where the posted speed limit is less than 40 mph.

For chip seals on freeways, expressways, and multilane conventional highways, place a W8-7, (LOOSE GRAVEL) sign and a W13-1 (35) plaque at 2,000-foot maximum intervals along the outside edge of the traveled way nearest to the lane worked on, at on ramps, and at public roads or streets entering the chip seal area. Place the 1st W8-7 sign where the aggregate starts with respect to the direction of travel on that lane. A W13-1 (35) plaque is not required where the posted speed limit is less than 40 mph.

Maintain signs in place at each location until the final sweeping of the chip seal surface for that location is complete. Signs may be set on temporary portable supports with the W13-1 sign below the W8-7 sign or on barricades with the W13-1 sign alternating with the W8-7 sign.

Schedule chip seal activities so that the chip seals are placed on both lanes of the traveled way each work shift.

Asphaltic emulsion shall be applied to only one designated traffic lane at a time and the entire width of the lane shall be covered in one operation.

Under no circumstances shall the length of spread of asphaltic emulsion be greater than can be immediately covered by the screenings, nor shall the operations proceed in such a manner that the binder material will be allowed to chill, set-up, dry, or otherwise impair retention of the screenings.

Wherever maintenance sweeping of the chip seal surface is completed, the Contractor shall place permanent stripes and pavement markings as noted in the Contract Documents.

37-2.01C(4)(b) Applying Asphaltic Emulsions or Asphalt Binders

Delete Section 37-2.01C(4)(b), "Applying Asphaltic Emulsions or Asphalt Binders," of the *Caltrans Standard Specifications* and replace with the following language:

Prevent spraying on existing pavement not intended for chip seals or on previously applied chip seals using a material such as building paper. Remove the material after use.

Align longitudinal joints between chip seal applications with designated traffic lanes.

For asphaltic emulsion or asphalt binder, overlap longitudinal joints by not more than 4 inches.

For areas not accessible to a truck distributor bar apply:

1. Asphaltic emulsions by hand spraying.
2. Asphalt binders with a squeegee or other authorized means.

You may overlap the asphaltic emulsion or asphalt binder applications before the application of aggregate at longitudinal joints.

Do not apply the asphaltic emulsion or asphalt binder unless there is sufficient aggregate at the job site to cover the asphaltic emulsion or asphalt binder.

Discontinue application of asphaltic emulsion or asphalt binder early enough to comply with lane closure requirements. Apply to 1 lane at a time and cover the lane width entirely in 1 operation.

37-2.01C(4)(c)(i) General

Delete Section 37-2.01C(4)(c)(i), "General," of the *Caltrans Standard Specifications* and replace with the following language:

Do not allow vehicles to drive on asphaltic emulsion or asphalt binder before spreading aggregate.

Spread aggregate at a uniform rate over the full lane width in 1 application. Apply to 1 lane at a time.

Sweep excess aggregate at joints before spreading adjacent aggregate.

Operate the spreader at speeds slow enough to prevent aggregate from rolling over after dropping.

If the spreader is not moving, aggregate must not drop. If you stop spreading and aggregate drops, remove the excess aggregate before resuming activities.

37-2.01C(4)(c)(ii) Precoated Aggregate Application

Delete Section 37-2.01C(4)(c)(ii), "Precoated Aggregate Application," of the *Caltrans Standard Specifications* and replace with the following language:

During transit, cover precoated aggregate with tarpaulins if the ambient air temperature is below 65 degrees F or the haul time exceeds 30 minutes.

When applied, precoated aggregate must be from 260 to 325 degrees F.

37-2.01C(4)(d)(ii) Traffic Control with Pilot Car

Delete Section 37-2.01C(4)(d)(ii), "Traffic Control with Pilot Car," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

37-2.01C(4)(d)(iii) Sweeping

Delete Section 37-2.01C(4)(d)(iii), "Sweeping," of the *Caltrans Standard Specifications* and replace with the following language:

Sweeping must be performed after the chip seal has set and there is no damage or dislodging of aggregate from the chip seal surface. At a minimum, sweeping is required at the following times:

1. 2 to 4 hours after completion of the rolling operation or as directed by the Engineer.

37-2.01D Payment

Delete Section 37-2.01D, "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

37-2.02 CATIONIC ASPHALTIC EMULSION CHIP SEALS

37-2.02C(3) Spreading Aggregates

Delete the last sentence of Section 37-2.02C(3), "Spreading Aggregate," of the *Caltrans Standard Specifications* and replace with the following language:

Do not spread aggregate more than one block ahead of the completed initial rolling or as directed by the Engineer.

37-2.03 CATIONIC POLYMER MODIFIED ASPHALTIC EMULSION CHIP SEALS

37-2.03C Construction

Delete the last sentence of Section 37-2.03C, "Construction," of the *Caltrans Standard Specifications* and replace with the following language:

Do not spread aggregate more than one block ahead of the completed initial rolling or as directed by the Engineer.

37-2.04 ASPHALT RUBBER BINDER CHIP SEALS

37-2.04A(4)(c)(iii) Crumb Rubber Modifiers

Delete Section 37-2.04A(4)(c)(iii), "Crumb Rubber Modifiers," of the *Caltrans Standard Specifications* and replace with the following language:

Scrap tire CRM and high natural CR are sampled and tested separately.

The Department accepts scrap tire CRM and high natural CRM based on compliance with the requirements shown in the following table:

Crumb Rubber Modifier for Asphalt Rubber Binder

Quality characteristic	Test method	Requirement
Wire in CRM (max, %)	California Test 385	0.01
Fabric in CRM (max, %)	California Test 385	0.05
CRM particle length (max, in)	--	3/16
CRM specific gravity	California Test 208	1.1–1.2
Natural rubber content in high natural CRM (%)	ASTM D297	40.0–48.0

The Department accepts CRM gradation based on the requirements shown in the following table:

Crumb Rubber Modifier Gradation Requirements

Quality characteristic	Test method	Requirement			
Gradation (% passing by weight) Sieve size:	California Test 385	Scrap tire crumb rubber		High natural scrap tire crumb rubber	
		Operating range	Contract compliance	Operating range	Contract compliance
No. 8		100	100	--	--
No. 10		95–100	90–100	100	100
No. 16		35–85	32–88	92–100	85–100
No. 30		2–25	1–30	25–95	20–98
No. 50		0–10	0–15	6–35	2–40
No. 100		0–5	0–10	0–7	0–10
No. 200		0–2	0–5	0–3	0–5

The Contractor shall submit Certificates of Compliance under the provisions of Section 6-1.08, "Certificates of Compliance," of the *City Standard Specifications* and Section 6-2.03C, "Certificates of Compliance," of the *Caltrans Standard Specifications*, certifying that all materials in the crumb rubber modifier for the asphalt rubber binder meet *Caltrans Standard Specifications*.

37-2.04B(4) Crumb Rubber Modifiers

Delete the first sentence in Section 37-2.04B(4), "Crumb Rubber Modifiers," of the *Caltrans Standard Specifications* and add the following language:

Crumb rubber modifier (CRM) shall consist of a combination of scrap tire CRM and high natural CRM. The scrap tire CRM shall consist of grand or granulated rubber derived from any combination of automobile tires, truck tires or tire bufferings. The high nature CRM shall consist of ground or granulated rubber derived from materials that utilize high natural rubber sources.

Cryogenically produced CRM particles that pass through the grinder or granulator without being ground or granulated, respectively, shall not be used.

A certificate of compliance for each quality characteristic shall be submitted certifying that the supplier of the CRM for the asphalt rubber binder has met the requirements of these Standard Specifications. Scrap tire CRM and high natural CRM shall be delivered to the production site in separate bags and shall be sampled and tested separately.

37-2.04C(3) Asphalt Rubber Binder Application

Delete Section 37-2.04C(3), "Asphalt Rubber Binder Application," of the *Caltrans Standard Specifications* and replace with the following language:

Apply the asphalt rubber binder when the ambient temperature is from 60 to 105 degrees F and the pavement surface temperature is at least 60 degrees F.

Do not apply the asphalt rubber binder unless enough aggregate is available at the job site to cover the asphalt rubber binder within 2 minutes. Intersections, turn lanes, gore points, and irregular areas must be covered within 15 minutes.

Do not apply asphalt rubber binder when pavement is damp or during high wind conditions. If authorized, you may adjust the distributor bar height and distribution speed and use shielding equipment during high wind conditions.

When applied, the temperature of the asphalt rubber binder must be from 385 to 415 degrees F.

Apply the asphalt rubber binder at a rate from 0.55 to 0.65 gal/sq yd. You may reduce the application rate by 0.050 gal/sq yd in the wheel paths.

37-2.04C(4) Precoated Aggregate Spreading

Delete Section 37-2.04C(4), "Precoated Aggregate Spreading," of the *Caltrans Standard Specifications* and replace with the following language:

Spread aggregate at a rate from min. 28 to max. 40 lb./sq yd. The exact rate is to be approved by the Engineer in the field. Do not spread aggregate more than 200 feet ahead of the completed initial rolling.

The completed surface shall be free of gaps, ridges, depressions, or other irregularities caused by the application of the asphalt rubber seal coat.

37-2.04C(5) Rolling and Sweeping

Delete Section 37-2.04C(5), "Rolling and Sweeping," of the *Caltrans Standard Specifications* and replace with the following language:

Initial rolling of the asphalt rubber seal coat shall consist of a minimum of one complete coverage with one or more pneumatic-tired rollers and shall begin within 90 seconds following the placement of the screenings. Chip spreading will not be allowed with less than two (2) operating rollers on the job.

A minimum of 3 complete coverages with pneumatic-tired rollers, after the initial coverage, shall be made on the asphalt rubber seal coat. When permitted by the Engineer, the final roller coverage may be made with one steel wheel roller weighing 8 to 10 tons in static mode only.

The Contractor shall immediately remove any excess emulsion from the gutters. The Contractor shall not continue to the next street until all excess emulsion is removed to the satisfaction of the Engineer. No extension of time will be granted due to a delay caused by non-compliance with this section.

Sweeping shall be a multi-step operation following final rolling of the screenings. Loose screenings shall be removed from the roadway surface and all abutting/adjacent areas. Loose screenings shall be disposed of at least 150 feet from the nearest waterway.

Initial sweeping shall be completed before controlled traffic is permitted on the asphalt rubber seal coat. Removal of excess screenings shall be completed before uncontrolled traffic is permitted on the completed asphalt rubber seal coat.

Three (3) additional sweepings shall be performed one day, two days, and on either the fourth or fifth day after the placement of the chip seal to remove all loose screenings. Final sweeping shall be done, and loose screenings shall be removed without dislodging the screenings set in the asphalt rubber binder prior to acceptance.

Sidewinder sweepers or brooms that wind row material shall not be used. A minimum of three (3) sweepers shall be used at all times. Two sweepers shall be used to remove excess screenings from the road surface, and one sweeper shall follow the chip seal operations and be used to clean the surrounding streets and

road surfaces outside the project area to avoid tracking loose material. All areas shall be swept a second time or more, if necessary, in the same manner as the first sweeping or as directed by the Engineer. Completion of sweeping shall be evidenced by the absence of loose chips in gutters or driveways. Special attention may be required in sweeping driveways to clear loose chips.

The Contractor shall also be responsible for the removal of all chips from the sidewalks and other affected areas.

The Contractor shall patch the rubber chip seal where any voids exist prior to the application of the fog, slurry or Microsurface seal at their own expense.

37-2.04D Payment.

Delete Section 37-2.04D, "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

37-2.05 STRESS ABSORBING MEMBRANE INTERLAYERS

37-2.05C Construction

Delete Section 37-2.05C, "Construction," of the *Caltrans Standard Specifications* and replace with the following language:

If a Stress Absorbing Membrane interlayers (SAMI) is overlaid in the same work shift, Section 37-2.01C(4)(e), "Chip Seal Maintenance," does not apply.

Final sweeping is not required for a SAMI if overlay is done within the same work shift.

37-3 SLURRY SEALS AND MICRO-SURFACINGS

37-3.01 GENERAL

37-3.01A(4)(c) Department Acceptance

Delete the last paragraph of Section 37-3.01A(4)(c), "Department Acceptance," of the *Caltrans Standard Specifications* and replace with the following language:

If test results for aggregate gradation do not comply with the specifications, the slurry seal or micro-surfacing represented by the test results shall be replaced with compliant material or as directed by the Engineer.

37-3.01C(3)(e) Shoulder Equipment

Delete Section 37-3.01C(3)(e), "Shoulder Equipment," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

37-3.01C(5)(a) General

Delete Section 37-3.01C(5)(a), "General," of the *Caltrans Standard Specifications* and replace with the following language:

If truck-mounted mixer-spreaders are used, keep at least 2 operational spreaders at the job site during placement.

Spread slurry seals and micro-surfacings uniformly and do not spot, rehandle, or shift the mixture. However in areas inaccessible to spreading equipment, spread the slurry seal or micro-surfacing mixtures with hand tools or other authorized methods. If placing with hand tools, lightly dampen the area first.

You may fog the roadway surface with water ahead of the spreader box. The fog spray must be adjusted for pavement:

1. Temperature.
2. Surface texture.
3. Dryness.

The Contract Documents dictate the application rate for the slurry seal or micro-surfacing seal. Otherwise, the Contractor determines the application rates as dictated by surface conditions in the field and as authorized by the Engineer. The completed spread rate shall be within 10 percent of the designated rate.

The mixtures must be uniform and homogeneous after spreading, and there must not be separation of the emulsion and aggregate after setting.

37-3.01C(5)(e) Maintenance Sweeping

Delete Section 37-3.01C(5)(e), "Maintenance Sweeping," of the *Caltrans Standard Specifications* and replace with the following language:

The Contractor shall provide all necessary equipment, skill, and manpower to sweep all completed slurry sealed or micro-surfaced streets to the satisfaction of the Engineer. Sweeping shall not begin until a sufficient bond has developed between the emulsion and the aggregate. Sweeping shall not dislodge aggregate.

The Contractor shall use a commercial sweeper to sweep each street. During the sweeping, the sweeper shall use only the rear broom. The front brooms shall not be used during this sweeping operation. Brooms shall be vertically adjustable so as to avoid excess pressure during sweeping.

The Contractor shall sweep slurry seal or micro-surfaced streets 24-hours after placement and without damage to the seals. For 4-days after the initial sweeping, the Contractor shall sweep the slurry seal or micro-surfaced streets daily unless otherwise determined by the Engineer or as noted in these Standard Specifications.

Sidewalks and driveways adjacent to slurry sealed and micro-surfaced streets shall also be swept and kept clean of aggregates or other materials resulting from the application operation.

37-3.02 SLURRY SEALS

37-3.02A(4)(c) Department Acceptance

Delete the last paragraph of Section 37-3.02A(4)(c), "Department Acceptance," of the *Caltrans Standard Specifications* and replace with the following language:

If test results for sand equivalent do not comply with the specifications, remove the slurry seal represented by the test results and replace with compliant material or as directed by the Engineer.

In the event that the slurry seal surface violate the Contract Documents or has the following conditions: tire or wheel tracks, longitudinal or transverse ridges, surface blemishes, wash boarding, footprints, excessively rough sand blotter locations, lack of uniformity in color, or other undesired markings; the Contractor shall, at the direction of the Engineer and at no additional cost to the City, repair and reseal those locations where those conditions exists. The method of treatment shall be approved by the Engineer.

37-3.02C(1) General

Delete Section 37-3.02C(1), "General," of the *Caltrans Standard Specifications* and replace with the following language:

If required by the Engineer, the slurry machine shall be inspected and calibrated on a 300-foot test section. The calibration shall establish the settings required to obtain the application rate for the slurry and correct proportions of ingredients under the provisions of these specifications.

The spreader box shall move forward at a rate not greater than 3 miles per hour (270 feet per minute) such that the fluid slurry mixture will penetrate and substantially fill all available voids. All surfaces to slurry sealed shall be lightly dampened with fog spray of water. The slurry box squeegees, rubber belting or similar material, shall be flexible enough to wipe the slurry uniformly over the surface of the roadway without gouging, scouring, or abrading the existing surface or chips.

Areas which cannot be reached with the slurry seal machine shall be surfaced using hand squeegees to provide complete and uniform coverage. Care shall be taken to leave no unsightly appearance from the handwork. All handwork shall achieve the same type of finish as applied by the spreader box. All incidental handwork such as surfacing of driveway aprons and returns shall be done concurrently with the surfacing of the street proper.

The joint between the edge of pavement and the concrete gutter shall be sealed/filled with slurry seal and not overlap into the gutter pan more than one to two inches. Any application spillage beyond this joint shall be removed or cleaned up by the Contractor to the satisfaction of the Engineer. Gutter spills and any tracking of slurry seal onto concrete improvements shall be cleaned immediately. The edges of the limits of the slurry seal application of both sides of the street shall be maintained in a neat and uniform line.

All line of termination for the slurry seal shall be neat and straight. The Contractor shall use building paper or an approved equal header material at all limits of work. Longitudinal joints shall be at the crown of the street or at the edge of the traveled lane. No excessive buildup or unsightly appearance shall be permitted on longitudinal and transverse joints.

Care shall be taken to avoid leaving ridges at the lap joints between adjoining passes. Joints shall coincide with lane lines or in the center of the lane. Ridges are not allowed in the normal wheel track of vehicles.

Weight tags shall be furnished to the Engineer for all materials delivered to the site including aggregates, emulsified asphalt for slurry and retardant.

37-3.02C(1)(a) Rolling

All slurry sealed streets that contain either a cul-de-sac/dead end or a midblock "knuckle'/"dog-leg" bulb shall be rolled by a self- propelled 10-ton pneumatic roller. The roller shall have a tire pressure of 50 PSI and shall be equipped with a water spray system. All tires shall be smooth surfaced and inflated to the same pressure. The cul-de-sac/dead end and/or midblock "knuckle"/"dog-leg" shall be subjected to at least three full coverage passes such that the material is compacted to a uniform texture.

Rolling shall occur the same day as the slurry is placed, however it shall not commence until the slurry seal has cured enough so that the slurry will not pick up on the tires of the roller.

37-3.02C(1)(b) Maintenance Sweeping following Slurry Seal

The Contractor shall conduct additional sweeping on the seventh (7) calendar day and again on the fourteenth (14) calendar day after the slurry seal has been applied. A final sweeping shall be performed no sooner than twenty-eight (28) days and no later than forty-two (42) days following the slurry seal application. The Contractor shall submit a schedule of dates for sweeping. The sweeping schedule shall be approved by the Engineer.

37-3.02C(4) Placement

Delete Section 37-37-3.02C(4), "Placement," of the *Caltrans Standard Specifications* and replace with the following language:

The slurry seal spread rates must be within the ranges shown in the following table:

Slurry Seal Spread Rates

Slurry seal type	Application range (lb of dry aggregate/sq yd)
Type I	8 – 12
Type II	13 – 15
Type III	20 – 25

Protect slurry seals from damage until it has set and will not adhere or be picked up by vehicle tires as determined by the Engineer. Slurry seals must not exhibit distress from traffic such as bleeding, raveling, separation or other distresses.

37-3.02D Payment

Delete Section 37-3.02D, "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

37-3.03 MICRO-SURFACINGS

37-3.03A(1) Summary

Add the following language to Section 37-3.03A(1), "Summary," of the *Caltrans Standard Specifications* and replace with the following language:

Micro-surfacing shall not be placed until at least 72-hours after the crack sealing operation has been completed. Refer to Section 37-6, "Crack Treatments," of these Standard Specifications.

Any utilities designated to be raised shall be raised to grade prior to the micro-surfacing work.

37-3.03A(4)(c) Department Acceptance

Delete the last paragraph of Section 37-3.03A(4)(c), "Department Acceptance," of the *Caltrans Standard Specifications* and replace with the following language:

If the test results for aggregate sand equivalent do not comply with the specifications, remove the micro-surfacing represented by the test results and replace with compliant material or as directed by the Engineer.

In the event that the applied micro-surfaced surface violates the Contract Documents or has the following conditions: tire or wheel tracks, longitudinal or transverse ridges, surface blemishes, wash boarding, footprints, excessively rough sand blotter locations, lack of uniformity in color, or other undesired markings, the Contractor shall, at the direction of the Engineer and at no additional cost to the City, repair and reseal those locations where the conditions exists. The method of treatment shall be approved by the Engineer.

37-3.03B(1) General

Delete Section 37-3.03B(1), "General," of the *Caltrans Standard Specifications* and replace with the following language:

Aggregate gradation shall be Type II and consist of Table Mountain or other black rock similar in color and nature, except that the aggregate or combination of aggregates shall be produced by crushing rock. The use of crushed granite or other light, gray-colored aggregate will not be allowed. The Contractor shall submit aggregate samples for approval at least 10-days prior to staring the micro-surfacing operation.

Mineral filler, consisting of Type I or Type II Portland Cement shall be used in quantities approved in the mix design, sufficient for the micro-surfacing emulsion to break and be ready for traffic within one-hour of placement. The mineral filler shall be considered part of the aggregate in calculations regarding micro-surfacing asphalt content.

37-3.03C(3)(a) General

Delete Section 37-3.03C(3)(a), "General," of the *Caltrans Standard Specifications* and replace with the following language:

Truck mounted mixer spreaders shall be allowed.

37-3.03C(5)(a) General

Delete Section 37-3.03C(5)(a), "General," of the *Caltrans Standard Specifications* and replace with the following language:

Microsurfacing Type and spread rate shall be as designated in these Standard Specifications.

Existing pavement surfaces shall be clean and dry prior to application of the micro-surface material. The mixture shall fill all minor cracks, depressions or low areas and leave a uniform surface free from ruts, humps, depressions, or irregularities. Any ridges, indentations, or other objectionable marks left on the surface shall be eliminated by rolling or other means.

The spreader box shall move forward at a rate not greater than 3 miles per hour (270 feet per minute) such that the mixture will be of the desired consistency upon leaving the mixer. A sufficient amount of mixture shall be carried in all parts of the spreader at all times so that complete coverage is obtained. No lumping, balling, or unmixed aggregate shall be permitted. No streaks such as caused by oversized aggregate shall be left in the finished pavement.

Construction joints shall be neat in appearance and shall be tapered or feathered to conform to the existing surfacing. Longitudinal joins shall be along the centerline crown of the roadway or lane line. Joints between adjacent runs shall not overlap no more than three (3) inches and shall not be located within the wheel path of traffic. All excess materials shall be removed from surfaces upon completion of each run.

Squeegees shall be used to spread the mixture in areas not accessible to the mixer/spreader. Care shall be taken to ensure the proper thickness and to leave no unsightly appearance from handwork.

At limits of work, start or finish, a straight-line cut-off shall be obtained by laying down a strip of building paper or other approved material. Such paper and any excess mixture shall be removed and disposed of by the Contractor after application of the micro-surfacing.

Edge limits of the work on both sides of the street shall be maintained in a neat, straight, and uniform line. Micro-surfacing shall extend to the lip of gutter. In the event that the work extends onto the gutter pan more than one to two inches or is not in a neat, straight, uniform line, it will be the Contractor's responsibility to remove all excess mixture from the gutter pan using an appropriate and approved method. Any runs or drips that spill onto any concrete surface shall be removed the same day that the spill occurs. All work associated with the removal of mixture from the concrete surfaces shall be conducted at the Contractor's expense.

Following application of the micro-surfacing, the Contractor shall protect the work from any traffic that may cause damage to the finished surface or result in tracking of the material until such time as the material has sufficiently cured.

Once the micro-surfacing has cured and is open to traffic, any excessive raveling of the aggregate from the mixture shall be swept u by the Contractor and the surface maintained until such time as the raveling ceases. This requirement for sweeping shall apply to both roadway surfaces and adjacent sidewalks/pedestrian facilities and driveways.

A sand blotter may be spread at selected driveways and intersections when approved by the Engineer to accommodate pedestrian or vehicular traffic until the work cures. The sand used shall be Lone Star Lupis Luster dried sand grades, #213, 2-16, 16, 120 or an approved equal. Substitutions must be submitted for approval prior to use. Sand blotters shall be swept within fourteen (14) hours of placement or sooner if directed by the Engineer.

37-3.03C(5)(a)(i) Rolling

Streets shall be rolled by a self-propelled, 10-ton pneumatic roller. Roller shall have a tire pressure of 50 PSI and be equipped with a water spray system. All tires shall be smooth surfaced and inflated to the same pressure. The micro-surfaced area to be rolled shall be subjected to at least two (2 full coverage passes such that the material is compacted to a uniform surface texture.

37-3.03C(5)(a)(ii) Maintenance Sweeping following Micro-Surfacing

Sweep the micro-surfacing 24-hours after placement without damaging the micro-surfacing. For 5-days afterwards, sweep the micro-surfacing daily. The final sweeping is to be performed no sooner than 28-days and no later than 42-days following the micro-surfacing application.

37-3.03C(5)(c) Micro-surfacing Pavement Surfaces

Delete Section 37-3.03C(5)(c), “Micro-surfacing Pavement Surfaces,” of the *Caltrans Standard Specifications* and replace with the following:

The micro-surfacing spread rates much be within the ranges shown in the following table:

Micro-Surfacing Spread Rates

Micro-surfacing type	Application range (lb of dry aggregate/sq yd)
Type II	18-20
Type III[a]	20–32
Type III[b]	30–32

[a]Over asphalt concrete pavement.

[b]Over concrete pavement and concrete bridge decks.

Protect the micro-surfacings from damage until it has set and will not adhere or be picked up by vehicle tires as determined by the Engineer. Micro-surfacings must not exhibit distress from traffic such as bleeding, raveling, separation or other distresses.

37-3.03D Payment

Delete Section 37-3.03D, “Payment,” of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

37-4 FOG SEALS AND FLUSH COATS

37-4.02 FOG SEALS

37-4.02A(4)(b)(i) General

Delete Section 37-4.02A(4)(b)(i), "General," of the *Caltrans Standard Specifications* and replace with the following language:

Contractor shall submit a certificate of compliance under the provisions of Section 6-1.08, "Certificates of Compliance," for fog sealant used for minor seal work (i.e. when fog seals are specified for digout locations only).

37-4.02D Payment

Delete Section 37-4.02D, "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

37-4.03 FLUSH COATS

37-4.03D Payment

Delete Section 37-4.03D, "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

37-5 PARKING AREA SEALS

Delete Section 37-5, "Parking Area Seals," and replace with the following:

Not Used.

37-6 CRACK TREATMENTS

37-6.01 GENERAL

37-6.01C Submittals

Add the following language to Section 37-6.01C, "Submittals," of the *Caltrans Standard Specifications:*

The Contractor shall submit Certificate of Compliance conforming to Section 6-1.08, "Certificate of Compliance," stating that the mastic material complies with the requirements of this section. The submittal must include the same type of product information as required for crack sealant material stated above.

37-6.02 MATERIALS

37-6.02B Crack Treatment Material

Add the following language to Section 37-6.02B, "Crack Treatment Material," of the *Caltrans Standard Specifications:*

37-6.02B(1) Crack Treatment Material for Wide Cracks

The mastic products for cracks greater than 1 inch shall conform to the same requirements as noted in Section 37-6.02B “Crack Treatment Material,” with the following exceptions:

Mastic Product Exceptions for Wide Cracks

Quality Characteristics [a]	ASTM Test Method [b]	Specification
Softening point (min)	D 36	88 °C
Cone penetration at 77 °F (max)	D 5329	100
Specific gravity (max)	D 70	1.25-2.0

Notes “a” and “b” are found in Section 37-6.02B, “Crack Seal Treatment.”

37-6.03 CONSTRUCTION

Delete Section 37-6.03, “Construction,” of the *Caltrans Standard Specifications* and replace with the following language:

37-6.03A Weed Removal for Crack Treatments

A minimum of one week prior to crack sealing operations, an approved herbicide shall be sprayed on all cracks on the street. In addition to spraying the cracks within the roadway, the Contractor shall spray the line between the lip of gutter and the pavement edge for the entire length of the street segment on both sides of the street. Application of the herbicide shall be under the provisions of applicable State laws and the City’s policy on the use of pesticides on City property. The application of the herbicide shall be applied by a person who holds a Qualified Applicator Certificate (QAC) or who has been trained and/or works under the direction of the QAC holder. The Contractor shall provide the Engineer with a copy of their QAC prior to the application of the herbicide on City Property. The herbicide shall be dyed green or yellow in color for ease of identification in the field if it has been treated.

The Contractor shall remove all existing weeds and plant materials from the cracks that will receive crack sealing treatment. This includes vegetation removal from cracks along the edge of pavement or concrete gutter lip. The Contractor shall use self-propelled power brooms and other methods such as flushing to clean the existing pavement.

37-6.03B Prep-work for Typical Cracks (Wider than ¼-inch to ½-inch)

Cracks wider than one-quarter inch (1/4”) shall be blown clean of loose materials with a high-pressure air nozzle, (90 psi or greater) to the satisfaction of the Engineer. Loose materials include vegetation, dust, dirt, moisture, old sealant, and foreign material. All material cleaned from cracks shall be swept from the roadway surface and disposed of under the provisions of Section 7-1.12, “Disposal of Material Outside the Project Limits.”

Crack sealing shall not proceed until all other preparation work is completed and approval to proceed is granted by the Engineer.

All cracks must be free of moisture prior to sealing. No moisture shall be visible on the street at the time of sealant placement.

Routing of cracks is not required.

37-6.03C Prep-work for Medium Cracks (Wider than ½-inch, less than 1-inch)

After cleaning, cracks wider than one-half inch (½”) and deeper than one inch (1”) shall be filled with clean fine sand so that the surface of the sand is within three-quarter inch (3/4”) of the pavement surface.

37-6.03D Wide Cracks (1-inch or greater)

Mastic products under the provisions of Section 37-6.02B(1), “Crack Treatment Material for Wide Cracks,” may be used for wide cracks 1” or greater in width as directed by the Engineer.

37-6.03E Crack Sealing

Equipment used by the contractor shall be specifically built for this purpose and shall be of current manufacture (Crafco Model BC-220 or an approved equal).

Street surface shall be properly cleaned (with a self-loading vacuum type motor sweeper) of all dust and debris prior to crack sealing.

If treating cracks on a traffic lane adjacent to a shoulder, treat the cracks on the shoulder.

Cracks must be clean and dry before treatment. Before treating, blast cracks with oil-free compressed air at a pressure of at least 90 psi.

If the pavement temperature is below 40 degrees F or if there is evidence of moisture in the crack, use a hot air lance immediately before applying crack treatment. The hot air lance must not apply flame directly on the pavement.

Heat and apply hot-applied crack treatment material under the provisions of the manufacturer's instructions.

Apply cold-applied crack treatment material with a distributor kettle, a piston, or a diaphragm barrel pump that can deliver from 50 to 75 psi. The application line must have a pressure gauge and a filter. The pressure in the application line must not exceed 20 psi. The pressure gauge must have a regulator. Use a high-pressure hose with a 1/2-inch NPT swivel connection and a dispensing wand.

Apply crack treatment with a nozzle inserted into the crack. Fill the crack flush. If after 2 days the crack treatment is more than 1/4 inch below the specified level, the sealant fails, or the crack re-opens, re-treat the crack.

If surplus sealant material rises above the pavement surface, the over banding must be squeegeed flat and flush with the surrounding surface. Over banding that has not been squeegeed and produces a bump or fat spot in the roadway shall be removed and replaced at the Contractor’s expense.

Immediately remove crack treatment material that is spilled or deposited on the pavement surface.

Before opening to traffic, apply sand or the manufacturer's recommended detackifying agent to tacky crack treatment material on the traveled way.

Sweep up excess sand before opening to traffic.

37-6.04 PAYMENT

Delete Section 37-6.04, “Payment,” of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

END OF SECTION

SECTION 38 RESERVED

SECTION 39 SUPERPAVE ASPHALT CONCRETE

Conform to these *City Standard Specifications*.

39-1 GENERAL

39-1.01 GENERAL

This includes specifications for performing asphalt concrete work.

39-2 HOT MIX ASPHALT

39-2.01 GENERAL

39-2.01A General

39-2.01A(1) Summary

This section includes general specifications for producing and placing hot mix asphalt. HMA includes one or more of the following Types:

1. HMA Type F (for digouts and arterials).
2. HMA Type H (for collectors and local/residential).
3. RHMA-G.
4. Minor HMA

If liquid antistrip (LAS) is required for HMA, WMA additive technology may be used as substitution for LAS at the discretion of the Engineer. WMA additive technologies must be on the Caltrans Authorized Material List for WMA authorized technologies.

Wherever reference is made to the following test methods, the latest year of publication for these test methods shall be used as shown in the following table:

Hot Mix Asphalt Test Methods

Test Method	Description
AASHTO M 17	Standard Specification for Mineral Filler for Bituminous Paving Mixtures
AASHTO M 323	Standard Specification for Superpave Volumetric Mix Design
AASHTO R 30	Standard Practice for Mixture Conditioning of HMA
AASHTO R 59	Recovery of Asphalt from Solution by Abson Method
AASHTO T 11	Standard Method of Test for Materials Finer than No. 200 Sieve in Mineral Aggregates by Washing
AASHTO T 27	Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
AASHTO T 30	Standard Method of Test for Mechanical Analysis of Extracted Aggregate
AASHTO T 49	Standard Method of Test for Penetration of Bituminous Materials
AASHTO T 59	Standard Method of Test for Emulsified Asphalts
AASHTO T 96	Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
AASHTO T 164	Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt (HMA)
AASHTO T 176	Standard Method of Test for Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test
AASHTO T 209	Standard Method of Test for Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
AASHTO T 269	Standard Method of Test for Percent Air Voids in Compacted Dense and Open Asphalt Mixtures
AASHTO T 275	Standard Method of Test for Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Paraffin-Coated Specimens
AASHTO T 283	Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage
AASHTO T 304	Standard Method of Test for Uncompacted Void Content of Fine Aggregate
AASHTO T 308	Standard Method of Test for Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
AASHTO T 312	Standard Method of Test for Preparing and Determining the Density of Asphalt Mixture Specimens by Means of the Superpave Gyratory Compactor
AASHTO T 313	Standard Method of Test for Determining the Flexural Creep Stiffness of Asphalt Binder Using the Bending Beam Rheometer (BBR)
AASHTO T 315	Standard Method of Test for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer (DSR)
AASHTO T 329	Standard Method of Test for Moisture Content of Asphalt Mixtures by Oven Method
AASHTO T 335	Standard Method of Test for Determining the Percentage of Fracture in Coarse Aggregate
ASTM D36/D36M	Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
ASTM D92	Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
ASTM D217	Standard Test Method for Cone Penetration of Lubricating Grease
ASTM D297	Standard Test Methods for Rubber Products – Chemical Analysis
ASTM D445	Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids
ASTM D1856	Standard Test Method for Recovery of Asphalt from Solution by Abson Method

Hot Mix Asphalt Test Methods (continued)

Test Method	Description
ASTM D2007	Standard Test Method for Characteristic Groups in Rubber Extender and Processing Oils and Other Petroleum-Derived Oils by the Clay-Gel Absorption Chromatographic Method
ASTM D2074	Standard Test Methods for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
ASTM D2995	Standard Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors
ASTM D4791	Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5329	Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements
ASTM D7741/D7741M	Standard Test Method for Measurement of Apparent Viscosity of Asphalt-Rubber or Other Asphalt Binders by Using a Rotational Handheld Viscometer
CT 125	Method of Test for Sampling Highway Materials and Products Used in the Roadway Pavement Structure Sections
CT 306	Method of Test for Reducing Samples of Asphalt Mixtures to Testing Size
CT 389	Method of Test for Hamburg Wheel-Track Testing of Compacted Hot Mix Asphalt
Asphalt Institute MS-2	Asphalt Mix Design Methods

39-2.01A(2) Definitions

Binder Replacement. Binder from RAP expressed as a percent of the total binder in the mix.

Coarse Aggregate. Aggregate retained on a no. 4 sieve.

Department. City of Campbell.

Fine Aggregate. Aggregate passing a no. 4 sieve.

Leveling Course. Thin layer of HMA used to correct minor variations in the longitudinal and transverse profile of the pavement before placement of other pavement layers.

Miscellaneous Areas. Areas outside the traveled way and shoulders such as:

- Median areas not including inside shoulders.
- Island areas.
- Sidewalks.
- Gutters.
- Ditches.
- Overside drains.
- Aprons at ends of drainage structures.

Reclaimed Asphalt Pavement (RAP). Removed and/or reprocessed pavement materials containing asphalt and aggregates.

Warm Mix Asphalt (WMA). HMA produced using a warm mix asphalt technology produced at a temperature from 240 to 325 degrees F.

Processed RAP. RAP that has been fractionated.

Supplemental Fine Aggregate. Mineral filler consisting of rock dust, slag dust, hydrated lime, hydraulic cement, or any combination of these and complying with AASHTO M 17.

39-2.01A(3) Submittals

39-2.01A(3)(a) General

Submit a paving plan at least 20 working days prior to scheduling paving operation and other associated activities. The plan shall describe each operation, duration, and proposed schedule and shall include the following at the minimum and as applicable:

1. Quality Control Testing.
2. Acceptance Testing.
3. Crack sealing and preparation.
4. Digouts.
5. Cold planning/milling.
6. Installation of pavement interlayers.
7. Asphalt concrete installation.
8. Pavement striping and markings.

39-2.01A(3)(b) Job Mix Formula

39-2.01A(3)(b)(i) General

Except for the HMA to be used in miscellaneous areas and dikes, submit your proposed Job Mix Formula (JMF) for each type of HMA to be used. The JMF must be submitted on the Caltrans Contractor Job Mix Formula Proposal form (CEM 3511) along with:

1. Mix design documentation on Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512) dated within 24 months of submittal.
2. An approved JMF verification on Caltrans Hot Mix Asphalt Verification form (CEM 3513) or a City of San José Hot Mix Asphalt Verification Form dated within 24 months of submittal.
3. The most recent viscosity vs. temperature curve along with mixing and compaction temperature ranges for the asphalt binder used in the JMF.
4. SDS for:
    - 4.1. Asphalt binder.
    - 4.2. Supplemental fine aggregate except fines from dust collectors.
    - 4.3. Antistrip additives.

Caltrans forms can be found here:

https://dot.ca.gov/programs/construction/forms

The Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512) must identify the AASHTO resource accredited lab responsible for the mix design and show documentation on aggregate quality.

Submit a new JMF if you change any of the following:

1. Target asphalt binder percentage greater than ±0.2 percent.

2. Asphalt binder supplier.
3. Combined aggregate gradation.
4. Aggregate sources.
5. Liquid antistrip producer or dosage.
6. WMA additive producer or dosage.
7. Any material in the JMF except lime supplier and source.
8. Average binder content in a new processed RAP stockpile by more than ±2.00 percent from the average RAP binder content reported on the Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512).
9. Average maximum specific gravity in a new processed RAP stockpile by more than ±0.060 from the average maximum specific gravity value reported on your Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512).

Allow the Engineer 10 business days from a complete JMF submittal for document review of the aggregate qualities, mix design, and JMF. The Engineer notifies you if the proposed JMF submittal is accepted.

If your JMF fails verification testing, submit an adjusted JMF based on your testing. The adjusted JMF must include a new Caltrans Contractor Job Mix Formula Proposal form (CEM 3511), Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512), and the results of the failed verification testing.

You may submit an adjusted aggregate gradation TV on a Caltrans Contractor Job Mix Formula Proposal form (CEM 3511) before production start-up testing. Aggregate gradation TV must be within the TV limits specified.

39-2.01A(3)(b)(ii) Job Mix Formula Renewal

You may request a JMF renewal by submitting:

1. Proposed JMF on a Caltrans Contractor Job Mix Formula Proposal form (CEM 3511).
2. Previously verified JMF documented on either a Caltrans Hot Mix Asphalt Verification (CEM 3513) form or a City of San José Hot Mix Asphalt Verification Form dated within 24 months.
3. Mix design documentation on a Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512) used for the previously verified JMF.

39-2.01A(3)(b)(iii) Job Mix Formula Modification

For an authorized JMF, submit a modified JMF if you change any of the following:

1. Asphalt binder supplier.
2. Liquid antistrip producer or dosage.
3. WMA additive producer or dosage.

You may change any of the above items only once during the Contract.

Submit your modified JMF request at least 15 business days before production. Each modified JMF submittal must include:

1. Proposed modified JMF on Caltrans Contractor Job Mix Formula Proposal form (CEM 3511), marked ***MODIFIED.***
2. Mix design records on Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512) for the authorized JMF to be modified.
3. JMF verification on either a Caltrans Hot Mix Asphalt Verification form (CEM 3513) or a City of San José Hot Mix Asphalt Verification Form for the authorized JMF to be modified.
4. Test results for the modified JMF in compliance with the mix design specifications. Perform tests at the mix design OBC as shown on the Contractor Asphalt Mix Design Data form (CEM 3512).

With an accepted modified JMF submittal, the Engineer verifies each modified JMF within 10 days of receiving all verification samples.

39-2.01A(3)(c) Quality Control Plan

This section applies to HMA Type F, H, RHMA-G, and Minor HMA.

At least 10 business days prior to the pre-paving meeting, submit a Quality Control (QC) plan for HMA.

The QC plan must describe the organization and procedures for:

1. Controlling HMA quality characteristics.
2. Taking samples, including sampling locations.
3. Establishing, implementing, and maintaining QC.
4. Determining when corrective actions are needed.
5. Implementing corrective actions.
6. Using methods and materials for backfilling core locations.

The QC plan must address the elements affecting HMA quality, including:

1. Aggregates.
2. Asphalt binder.
3. Additives.
4. Production.
5. Paving.

Allow 10 business days for review of the QC plan.

If you change QC procedures, personnel, or sample testing locations, submit a QC plan supplement before implementing the proposed change. Allow 5 business days for review of the QC plan supplement.

39-2.01A(3)(d) Test Results

If requested by the Engineer, submit all QC test results, except California Test 389, within 3 business days of a request.

If requested by the Engineer, for tests performed under the provisions of California Test 389, submit test data and 1 tested sample set within 5 business days of a request.

39-2.01A(3)(e) Reserved

39-2.01A(3)(f) Liquid Antistrip Treatment

If liquid antistrip treatment is used, submit the following with your proposed JMF submittal:

1. Certificate of compliance for each liquid antistrip shipment. On each certificate of compliance, include:
   1.1. Your signature and printed name.
   1.2. Shipment number.
   1.3. Material type.
   1.4. Material specific gravity.
   1.5. Manufacturer.
   1.6. Consignee.
   1.7. Destination.
   1.8. Quantity.
   1.9. Contact or purchase order number.
   1.10. Shipment date.
2. Proposed proportions for the liquid antistrip.

At the end of each day's production shift, submit production data in electronic and printed media. Present data on electronic media in a tab delimited format. Use line feed carriage return with 1 separate record per line for each production data set. Allow enough fields for the specified data. Include data titles at least once per report. For each HMA mixing plant type, submit the following information in the order specified:

1. For batch plant mixing:
   1.1. Production date.
   1.2. Time of batch completion.
   1.3. Mix size and type.
   1.4. Each ingredient's weight.
   1.5. Asphalt binder content as a percentage of the total weight of mix.
   1.6. Liquid antistrip content as a percentage of the asphalt binder weight.
2. For continuous mixing plant:
   2.1. Production date.
   2.2. Data capture time.
   2.3. Mix size and type.
   2.4. Flow rate of wet aggregate collected directly from the aggregate weigh belt.
   2.5. Aggregate moisture content as a percentage of the dry aggregate weight.
   2.6. Flow rate of asphalt binder collected from the asphalt binder meter.
   2.7. Flow rate of liquid antistrip collected from the liquid antistrip meter.
   2.8. Asphalt binder content as a percentage of the total weight of mix calculated from:
      2.8.1. Aggregate weigh belt output.
      2.8.2. Aggregate moisture input.
      2.8.3. Asphalt binder meter output.
   2.9. Liquid antistrip content as a percentage of the asphalt binder weight calculated from:
      2.9.1. Asphalt binder meter output.
      2.9.2. Liquid antistrip meter output.

39-2.01A(3)(g) Reserved

39-2.01A(3)(h) Warm Mix Asphalt Technology

If a WMA technology is used, submit the following with your proposed JMF submittal:

1. SDS for the WMA technology.
2. For water injection foam technology:
   2.1. Name of technology.
   2.2. Proposed foaming water content.
   2.3. Proposed HMA production temperature range
   2.4. Certification from binder supplier stating no antifoaming agent is used.
3. For additive technology:
   3.1. Name of technology.
   3.2. Percent admixture by weight of binder and percent admixture by total weight of HMA as recommended by the manufacturer.
   3.3. Methodology for inclusion of admixture in laboratory-produced HMA.
   3.4. Proposed HMA production temperature range.

Collect and hold WMA Production data for the duration of the Contract. The snapshot of production data must include the following:

1. Production date.
2. Production location.
3. Time of day the data is captured.
4. HMA mix Type being produced and target binder rate.
5. HMA additive Type, brand, and target rate.

6. Temperature of the binder and HMA mixture.
7. For a continuous mixing plant, the rate of flow of the dry aggregate calculated from the wet aggregate flow rate as determined by the conveyor scale.
8. For a continuous mixing plant, the rate of flow of the asphalt meter.
9. For a continuous mixing plant, the rate of flow of HMA additive meter.
10. For batch plant mixing, actual batch weights of all ingredients.
11. Dry aggregate to binder ratio calculated from metered ingredient output.
12. Dry aggregate to HMA additive ratio calculated from metered output.

At the request of the Engineer, submit electronic and printed media from the HMA plant process controller. Present data on electronic media in comma-separated values or tab-separated values format. The captured data for the ingredients represented by the production snapshot must have allowances for sufficient fields to satisfy the amount of data required by these specifications and include data titles at least once per report.

39-2.01A(3)(i) – 39-2.01A(3)(o) Reserved

39-2.01A(4) Quality Assurance

39-2.01A(4)(a) General

Take samples under the provisions of California Test 125.

Reduce samples of HMA to testing size under the provisions of California Test 306.

The following modifications to California Test 389 apply:

1. The target air void content under the provisions of AASHTO T 269 must equal 7.0 ± 0.5 percent for HMA Type F and HMA Type H specimens (6.5 – 7.5 percent range).
2. Use Table 1 – Type A HMA Testing Temperature in California Test 389 for HMA Type F and HMA Type H specimens.

39-2.01A(4)(b) Job Mix Formula Verification

The Engineer verifies the JMF from samples taken from HMA produced by the plant to be used. The production set point at the plant must be within ±0.2 from the asphalt binder percentage TV shown in your Caltrans (or City of San Jose) Contractor Job Mix Formula Proposal form (CEM 3511). Notify the Engineer at least 2 business days before sampling materials. Samples may be taken from a different project including a non-Campbell project if you make arrangements for the Engineer or the Engineer's authorized representative to be present during sampling.

In the Engineer's or Engineer's authorized representative's presence and from the same production run, you take samples of:

1. Aggregates. Coarse, fine, and supplemental fine aggregates must be taken from the combined cold-feed belt or the hot bins. If lime treatment is required, samples must be taken from individual stockpiles before lime treatment. Samples must be at least 120 lb. for each coarse aggregate,80 lb. for each fine aggregate, and 10 lb. for each Type of supplemental fine aggregate. For hot-bin samples, the City combines these aggregate samples to verify the TV submitted on a Caltrans Contractor Job Mix Formula Proposal form (CEM 3511).
2. Asphalt binder. Take at least two 1qt samples. If the asphalt binder is modified or rubberized, the asphalt binder must be sampled with the components blended in the proportions to be used.
3. RAP. Samples must be at least 50 lb. from each fractionated stockpile used or 100 lb. from the belt.
4. Plant-produced HMA. The HMA samples must be at least 250 lb.

For aggregate, RAP, and HMA, split the samples into at least 4 parts and label their containers. Submit 3 parts to the Engineer and keep 1 part. The Engineer retains 1 part of the samples to be used in the event of dispute resolution.

After acceptance of the JMF submittal, the Engineer verifies each proposed JMF within 20 days of receiving all verification samples.

For JMF verification, the Engineer tests the following for compliance with the specifications:

1. Aggregate quality.
2. Aggregate gradation.
3. HMA quality characteristics for Department acceptance.

To verify the HMA for air voids, voids in mineral aggregate (VMA), and dust proportion, the Engineer uses an average of 3 briquettes. The Engineer tests plant-produced material.

If the Engineer verifies the JMF, the Engineer furnishes you a City of Campbell Hot Mix Asphalt Verification Form.

If the Engineer's test results on plant-produced samples do not show compliance with the specifications, the Engineer notifies you. Adjust your JMF based on your testing unless the Engineer authorizes reverification without adjustments. Engineer authorized reverification without adjustments in not JMF adjusted after verification failure. JMF adjustments may include a change in:

1. Asphalt binder content TV up to ±0.20 percent from the OBC value submitted on the Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512).
2. Aggregate gradation TV within the TV limits specified in the aggregate gradation table.

You may adjust the JMF only once due to a failed verification test.

For each HMA type and aggregate size specified, the Engineer verifies up to two proposed JMF submittals including a JMF adjusted after verification failure. Do not resubmit any of the 2 proposed submittals including a JMF adjusted after verification failure that failed verification on any other City projects. If you submit more than two JMF’s for each type of HMA and aggregate size, the Engineer deducts $5,700 from payments for each verification exceeding this limit. This deduction does not apply to verifications initiated by the Engineer or if a JMF expires while HMA production is stopped longer than 30 days.

A verified JMF is valid for 24 months.

39-2.01A(4)(c) Job Mix Formula Authorization

You may start HMA production if:

1. Engineer's review of the JMF shows compliance with the specifications.
2. The Contractor provides a verified JMF.
3. The Contractor QC plan has been reviewed and approved, if applicable (HMA Type F, H and RHMA-G mixes).
4. The Engineer authorizes the verified JMF.

39-2.01A(4)(d) Job Mix Formula Renewal

For a JMF renewal and upon request, in the Engineer’s or Engineer’s authorized representative’s presence and from the same production run, you take samples of:

1. Aggregates. Coarse, fine, and supplemental fine aggregates must be taken from the combined cold-feed belt or the hot bins. If lime treatment is required, samples must be taken from individual stockpiles before lime treatment. Samples must be at least 120 lb. for each coarse aggregate, 80 lb. for each fine aggregate, and 10 lb. for each type of supplemental fines. For hot-bin samples,

the Department combines these aggregate samples to verify the TV submitted on a Caltrans Contractor Job Mix Formula Proposal form (CEM 3511).
2. Asphalt binder. Take at least two 1 qt samples. Each sample must be in a cylindrical-shaped can with an open top and friction lid. If the asphalt binder is modified or rubberized, the asphalt binder must be sampled with the components blended in the proportions to be used.
3. RAP. RAP samples must be at least 50 lb. from each fractionated stockpile.
4. Plant-produced HMA. The HMA samples must be at least 250 lb.

Notify the Engineer at least 2 business days before sampling materials. For aggregate, RAP, and HMA, split samples into at least 4 parts. Submit 3 parts to the Engineer and use 1 part for your testing. The Engineer retains 1 part of the sample to be used in the event of dispute resolution.

Allow the Engineer 5 business days from a complete JMF renewal submittal for document review of the aggregate qualities, mix design, and JMF.

The Engineer verifies the JMF for renewal under the provisions of Section 39-2.01A(4)(b), "Job Mix Formula Verification," except:

1. Engineer keeps the samples until you provide test results for your part on a Contractor Job Mix Formula Renewal form (CEM 3514).
2. Engineer may use the most recent aggregate quality test results within the past one year, or the Engineer may perform aggregate quality tests.
3. Engineer may use RAP and binder test results from the project where the renewal samples are taken, or the Engineer may perform RAP and binder tests.
4. Department tests samples of materials obtained from the HMA production unit **after** you submit test results that comply with the mix design specifications.
5. After completion of the JMF verification renewal document review, the Engineer verifies each proposed JMF within 20 days of receiving the verification renewal samples and the complete Contractor Job Mix Formula Renewal form (CEM 3514).
6. You **may not adjust** the JMF due to a failed verification.
7. For each HMA type and aggregate gradation specified, the Engineer verifies at no cost to you 1 proposed JMF renewal within a 24-month period.

If the Engineer verifies the JMF renewal, the Engineer furnishes the Contractor a Hot Mix Asphalt Verification form (CEM 3511). The Hot Mix Asphalt Verification form is valid for 24 months.

39-2.01A(4)(e) Job Mix Formula Modification

The Engineer verifies the modified JMF after the modified JMF HMA is placed and verification samples are taken within the firs 750 tons. The Engineer tests verification samples for compliance with:

1. Hamburg wheel track mix design specifications
2. Air void content
3. Voids in mineral aggregate on plant-produced HMA mix design specifications
4. Dust proportion mix design specifications.

If the modified JMF is verified, the Engineer revises your Caltrans Hot Mix Asphalt Verification form (CEM 3513) or a City of San Jose Hot Mix Verification Form to include the new asphalt binder source, or new additive (liquid antistrip and/or WMA) producer or dosage. Your revised form will have the same expiration date as the original form

If a modified JMF is not verified, stop production and any HMA placed using the modified JMF is rejected.

The Engineer deducts $3,500 from payments for each JMF modification.

39-2.01A(4)(f) Certifications

39-2.01A(4)(f)(i) General

Laboratories testing aggregate and HMA qualities used to prepare the mix design and JMF must be accredited through the AASHTO resource program, and/or Caltrans' Independent Assurance Program, or be approved by the Engineer.

Additionally, personnel performing aggregate and HMA quality tests used to prepare the mix design shall be competent and possess the necessary certifications.

39-2.01A(4)(f)(ii) Hot Mix Asphalt Plants

Before production, the HMA plant must have a current certification under the provisions of Caltrans' Material Plant Quality Program or be approved by the Engineer.

39-2.01A(4)(f)(iii)–39-2.01A(4)(f)(v) Reserved

39-2.01A(4)(g) Reserved

39-2.01A(4)(h) Quality Control

39-2.01A(4)(h)(i) General

QC test results must comply with these specifications for City acceptance.

Prepare 3 briquettes for air void content and voids in mineral aggregate determination. Report the average of 3 tests for air void content and voids in mineral aggregate.

Except for smoothness, if 2 consecutive QC test results or any 3 QC test results for 1 day's production do not comply with the materials specifications:

1. Stop HMA production.
2. Notify the Engineer.
3. Take corrective action.
4. Demonstrate compliance with the specifications before resuming production and placement.

For QC tests performed under the provisions of AASHTO T 11 / T 27, results are considered 1 QC test regardless of number of sieves out of compliance.

Do not resume production and placement until the Engineer authorizes your corrective action proposal.

39-2.01A(4)(h)(ii) Reserved

39-2.01A(4)(h)(iii) Aggregates

39-2.01A(4)(h)(iii)(A) General

Reserved

39-2.01A(4)(h)(iii)(B) Reserved

39-2.01A(4)(h)(iv) Liquid Antistrip Treatment

For continuous mixing or batch-plant mixing, sample asphalt binder before adding liquid antistrip. For continuous mixing, sample the combined asphalt binder and liquid antistrip after the static mixer.

39-2.01A(4)(h)(v) Production Start-up Evaluation

For projects **greater than or equal to 2,000 tons**, you and the Engineer evaluate HMA production and placement at production start-up.

Within the first 750 tons produced on the 1st day of HMA production, in the Engineer's or Engineer's authorized representative's presence, and from the same production run, you take samples of:

1. Aggregates.
2. Asphalt binder.
3. RAP.
4. HMA.
5. Additives.

Personnel involved in sampling must be certified in California Test 125.

Sample aggregates from the combined cold-feed belt or hot bin. Take RAP samples from the RAP system.

For aggregates, RAP, and HMA, split the samples into at least 4 parts and label their containers. Submit 3 parts to the Engineer and keep 1 part. The Engineer retains 1 part of the samples to be used in the event of dispute resolution.

You and the Engineer must test the samples and report test results, except for California Test 389, if required, within 5 business days of sampling. For California Test 389, report test results within 15 days of sampling.

California Test 389 is not required if production start-up evaluation is within 45 days of the date the Hot Mix Asphalt Verification form is signed.

If production stops for more than 60 days, perform a production start-up evaluation. If production stops for more than 30 days but less than 60 days, perform a reduced production start-up evaluation. Reduced production start-up evaluation is production start-up evaluation without California Test 389.

If you proceed before receipt of the test results, the Engineer may consider the HMA placed to be represented by these test results. If production start-up evaluation fails, do not begin production.

39-2.01A(4)(h)(vi) Hot Mix Asphalt Density

During HMA placement, determine HMA density using a density gauge. A non-nuclear gauge may be used under the provisions of ASTM D7113.

For projects greater than 1,500 tons of HMA, on the 1st day of production, develop a correlation factor between cores and density gauges under the provisions of California Test 375.

Replace California Test 375 Part 2B Paragraph 2 with "Follow the procedure described in Part 3 of this test method to establish a minimum of five random test site locations on the test strip".

Cores may be 4-inch or 6-inch diameter and, if requested, must be taken in the presence of the Engineer or Engineer's authorized representative. Test cores under the provisions of AASHTO T 275, Method A. In-place core density shall represent final result.

Test for in-place density using a density gauge, which has been correlated as noted in the preceding paragraph. Test at random locations you select and include the test results in your QC production test reports. Lots for density testing must not exceed 250 tons with a minimum of 3 locations per lot.

At the request of the Engineer, provide your QC production test reports for in-place density using a density gauge within 24 hours of a request.

39-2.01A(4)(h)(vii) - 39-2.01A(4)(h)(viii) Reserved

39-2.01A(4)(h)(ix) Pavement Smoothness

For HMA pavement within 3 feet from and parallel to the construction joint formed between curbs, gutters, or existing pavement, test pavement smoothness using a 12-foot straightedge.

39-2.01A(4)(h)(x) Reserved

39-2.01A(4)(i) Engineer Acceptance

39-2.01A(4)(i)(i) General

The Engineer takes HMA samples for California Test 389 from any of the following locations:

1. Plant.
2. Truck.
3. Windrow (plant or jobsite).

The Engineer takes HMA samples for all other tests from any of the following locations:

1. Plant.
2. Truck.
3. Windrow (plant or jobsite).
4. Mat behind the paver.

You must assist in collecting Engineer acceptance samples. Personnel involved in sampling must be certified in Caltrans Test 125. Sample shall be taken in the presence of the Engineer or Engineer's authorized representative. Split the Engineer acceptance samples into at least 4 equal parts. Engineer retains 3 parts and you keep 1 part. The Engineer retains 1 part of the samples to be used in the event of dispute resolution.

To obtain workability of the HMA sample for splitting, the Engineer reheats each sample of HMA mixture not more than 2 cycles. Each reheat cycle is performed by placing the loose mixture in a mechanical forced-draft oven for 2 hours or less after the sample reaches 230 degrees F.

The Engineer conditions each at-the-plant sample of HMA mixture when composite aggregate absorption factor is greater than 2.0 percent as indicated by the JMF in compliance with sections 7.1.1, 7.1.2, 7.1.3, and 7.1.4 of AASHTO R 30.

No single test result may represent more than 750 tons or one day's production, whichever is less, except California Test 389.

Except for smoothness, if 2 consecutive City acceptance test results or any 3 City acceptance test results for 1 day's production do not comply with the specifications:

1. Stop HMA production.
2. Take corrective action.
3. Demonstrate compliance with the specifications before resuming production and placement.

For City acceptance tests performed under the provisions of AASHTO T 11 / 27, results are considered 1 City acceptance test regardless of the number of sieves out of compliance.

The Engineer accepts HMA based on:

1. JMF compliance, applicable material tolerances.
2. In-Place Core Density or density established by nuclear gauge test (if required).
3. Pavement smoothness.

4. Visual inspection.

39-2.01A(4)(i)(ii) In-Place Density

Except for HMA pavement placed using method compaction, the Engineer tests the density core you take from each 250 tons of HMA for projects greater than or equal to 600 tons. For project with less than 600 tons, each density core shall represent 150 tons of HMA. At the discretion of the Engineer, the core sample shall be taken in the presence of the Engineer o Engineer's authorized representative. The Engineer tests the density core you take from each 150 tons of HMA.

If acceptance by cores, you must take the cores in accordance with California Test 375, Part 3B and/or approved by the Engineer. The Engineer tests the cores you take in accordance with AASHTO T 275, Method A, and then determines the corresponding core density.

You must provide accurate documentation of the location of each core taken. The document shall be clear to allow the Engineer to easily locate the sample location in the field.

Cores taken for gauge calibration may be used as acceptance cores for density at the discretion of the Engineer.

If a density core is damaged, replace it with a density core taken within 1 foot longitudinally from the original density core. Relocate any density core located within 1 foot of a rumble strip to 1 foot transversely away from the rumble strip.

The Engineer determines the percent of theoretical maximum density for each density result by taking the density result and dividing by the theoretical maximum density. Test results shall not be rounded to the nearest 1.0%; instead, test results shall be reported to the nearest 0.1%. The theoretical maximum density shall be under the provisions of AASHTO T 209 and shall be representative of the sublot in which the cores are taken.

Each lift of HMA is tested independently.

Final compaction of the paving shall be tested by nuclear gauge using California Test 375 or by coring and testing cores under the provisions of AASHTO T 275 to establish compliance with these *City Standard Specifications* as directed by the Engineer. The in-place density shall be between 92.0 percent and 97.0 percent of theoretical maximum specific gravity (AASHTO T 209).

In the event the nuclear gauge readings do not meet the minimum or exceed the maximum percent of compaction, the contractor may request the failed area(s) to be verified by coring and testing cores under the provisions of AASHTO T 275 Method A to establish compliance with these *City Standard Specifications*. A core shall represent no more than 250 tons. The test results from coring shall take precedence when determining if the paved areas meet the required relative compaction. The contractor shall be responsible for all cost associated with coring and testing of the cores if the test results confirm non-compliance.

If the percent of theoretical maximum density does not comply with the specifications, the Engineer may accept the HMA and take a payment deduction or remove and replace as shown in Table 1 Reduced Payment Factors for HMA Type F & HMA Type H mixtures, and Table 2 Reduced Payment Factors for RHMA-G mixtures:

Table 1 - Reduced Payment Factors for HMA Type F & HMA Type H

HMA Percent of Theoretical Maximum Density	HMA Type F & HMA Type H Reduced Payment Factor	HMA Percent of Theoretical Maximum Density	HMA Type F & HMA Type H Reduced Payment Factor
92.0	0.0000	97.0	0.0000
91.9	0.0125	97.1	0.0125
91.8	0.0250	97.2	0.0250
91.7	0.0375	97.3	0.0375
91.6	0.0500	97.4	0.0500
91.5	0.0625	97.5	0.0625
91.4	0.0750	97.6	0.0750
91.3	0.0875	97.7	0.0875
91.2	0.1000	97.8	0.1000
91.1	0.1125	97.9	0.1125
91.0	0.1250	98.0	0.1250
90.9	0.1375	98.1	0.1375
90.8	0.1500	98.2	0.1500
90.7	0.1625	98.3	0.1625
90.6	0.1750	98.4	0.1750
90.5	0.1875	98.5	0.1875
90.4	0.2000	98.6	0.2000
90.3	0.2125	98.7	0.2125
90.2	0.2250	98.8	0.2250
90.1	0.2375	98.9	0.2375
90.0	0.2500	99.0	0.2500
<90.0	Remove & replace	>99.0	Remove & replace

Table 2 - Reduced Payment Factors for RHMA-G

RHMA Percent of Theoretical Maximum Density	RHMA-G Reduced Payment Factor	RHMA Percent of Theoretical Maximum Density	RHMA-G Reduced Payment Factor
91.0	0.0000	97.0	0.0000
90.9	0.0125	97.1	0.0125
90.8	0.0250	97.2	0.0250
90.7	0.0375	97.3	0.0375
90.6	0.0500	97.4	0.0500
90.5	0.0625	97.5	0.0625
90.4	0.0750	97.6	0.0750
90.3	0.0875	97.7	0.0875
90.2	0.1000	97.8	0.1000
90.1	0.1125	97.9	0.1125
90.0	0.1250	98.0	0.1250
89.9	0.1375	98.1	0.1375
89.8	0.1500	98.2	0.1500
89.7	0.1625	98.3	0.1625
89.6	0.1750	98.4	0.1750
89.5	0.1875	98.5	0.1875
89.4	0.2000	98.6	0.2000
89.3	0.2125	98.7	0.2125
89.2	0.2250	98.8	0.2250
89.1	0.2375	98.9	0.2375
89.0	0.2500	99.0	0.2500
<89.0	Remove & replace	>99.0	Remove & replace

39-2.01A(4)(i)(iii) Pavement Smoothness

39-2.01A(4)(i)(iii)(A) General

39-2.01A(4)(i)(iii)(B) Straightedge

The HMA pavement top layer must not vary from the lower edge of a 12-foot-long straightedge:

1. More than 0.01 foot when the straight edge is laid parallel with the centerline.
2. More than 0.02 foot when the straightedge is laid perpendicular to the centerline and extends from edge to edge of a traffic lane.
3. More than 0.02 foot when the straightedge is laid within 24 feet of a pavement conform.

39-2.01A(4)(i)(iii)(C) – 39-2.01A(4)(i)(iii)(D) Reserved

39-2.01A(4)(i)(iv) Dispute Resolution

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. You and the Engineer may only dispute each other's test results if one party's test results pass, and the other party's test results fail.

You must notify the Engineer if you plan to dispute test results. If you choose to dispute, submit a formal letter along with your complete test results within 3 business days of receiving the Engineer's test results. Your submitted test results should also include copies of paperwork including worksheets used to determine the disputed test results.

You and the Engineer shall mutually agree on an Independent Third Party (ITP) to perform referee testing. Before the ITP participates in a dispute resolution, it must be qualified under the provisions of the AASHTO resource program and the Caltrans Independent Assurance Program. The ITP personnel performing the tests shall be competent and possess the necessary certifications to provide referee testing. The ITP must have no prior direct involvement with the Work.

If the Engineer's portion of the split acceptance samples is not available, the ITP uses any available material agreed by you and the Engineer as representing the disputed test results for evaluation.

For a dispute involving JMF verification, the ITP performs referee testing as specified in the 5th paragraph of Section 39-2.01A(4)(b), "Job Mix Formula Verification." The Engineer's test results for a JMF Verification can only be disputed at the discretion of the Engineer.

For a dispute involving core density, the ITP performs referee testing based on cores.

For a dispute involving Hamburg Wheel-Track testing, it is permissible to select an ITP that is accredited through the AASHTO Accreditation Program or the Caltrans Independent Assurance Program to perform AASHTO T324 instead of California Test 389. Dispute resolution testing still must be performed in accordance with California Test 389 along with modifications to the test specified in Section 39-2.01A(4)(a), "General."

The entire dispute resolution process **shall not exceed 20 business days** from the day you submit a formal letter notifying the Engineer of your plan to dispute the test results (including proposed ITPs for referee testing.) Reduced payment or remove and replace will be enforced at the discretion of the Engineer for dispute resolutions exceeding 20 business days.

If the ITP determines the Engineer's test results are valid, the Engineer deducts ITP's testing costs from payments. If the ITP determines your test results are valid, the Engineer pays the ITP's testing costs.

The outcome of the ITP's test result determination shall be final, and the disputed test results shall be considered resolved. No further tests or investigations will be permitted by the Engineer.

39-2.01B Materials

39-2.01B(1) General

Reserved

39-2.01B(2) Mix Design

39-2.01B(2)(a) General

The HMA mix design must comply with the Superpave HMA mix design method as described in MS-2 *Asphalt Mix Design Methods* by the Asphalt Institute.

The Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512) must show documentation on aggregate quality.

39-2.01B(2)(b) Hot Mix Asphalt Treatments

If the proposed JMF indicates that the HMA is being treated with liquid antistrip, then testing the untreated HMA under the provisions of California Test 389 is not required.

39-2.01B(2)(c) Warm Mix Asphalt Technology

For HMA with WMA additive technology, produce HMA mix samples for your mix design using your methodology for inclusion of WMA admixture in laboratory-produced HMA. Cure the samples in a forced- air draft oven at 275 degrees F for 4 hours ± 10 minutes.

For WMA water injection foam technology, the use of foamed asphalt for mix design is not required.

39-2.01B(3) Asphalt Binder

Asphalt binder must comply with Section 92, “Asphalt Binders.”

39-2.01B(4) Aggregates

39-2.01B(4)(a) General

Aggregates must be clean and free from deleterious substances.

The aggregates for a leveling course must comply with the gradation specifications for HMA in Section 39-2.02B, “Materials.”

39-2.01B(4)(b) Aggregate Gradations

Aggregate gradation must be determined before the addition of asphalt binder and must include supplemental fine aggregates. Test for aggregate gradation under the provisions of AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate under the provisions of AASHTO T11. Use a mechanical sieve shaker. Aggregate shaking time must not exceed 10 minutes for each coarse and fine aggregate portion.

Choose a TV within the TV limits shown in the tables titled "Aggregate Gradations."

Gradations are based on nominal maximum aggregate size.

39-2.01B(4)(c) Reserved

39-2.01B(5) Liquid Antistrip Treatment

Do not use liquid antistrip as a substitute for asphalt binder.

Total amine value for amine-based liquid antistrip must be a minimum of 325 when tested under the provisions of ASTM D2074. Dosage from amine-based liquid antistrip must be from 0.25 to 1.00 percent by weight of asphalt binder. Only amine-based liquid antistrip shall be used at this time.

Use only 1 liquid antistrip type or brand at a time. Do not mix liquid antistrip types or brands.

Store and mix liquid antistrip under the provisions of the manufacturer’s instructions.

Warm mix technology may be used as substitute for liquid antistrip treatment at the approval of the Engineer. Foam injection technology is not an acceptable substitute for liquid antistrip treatment.

39-2.01B(6)–39-2.01B(7) Reserved

39-2.01B(8) Hot Mix Asphalt Production

39-2.01B(8)(a) General

Do not start HMA production before verification and authorization of JMF.

The HMA plant must have a current qualification under the provisions of the Caltrans Material Plant Quality Program or be approved by the Engineer.

Proportion aggregate by hot or cold-feed control.

Aggregate temperature must not be more than 375 degrees F when mixed with the asphalt binder.

Asphalt binder temperature must be from 275 to 375 degrees F when mixed with aggregate.

Mix HMA ingredients into a homogeneous mixture of coated aggregates.

HMA must be produced at the temperatures shown in the following table:

HMA Production Temperatures

HMA compaction	Temperature (°F)
HMA	
Density based	≤ 325
Method	305–325
HMA with WMA Technology	
Density based	240–325
Method	260–325

If you stop production for more than 30 days but less than 60 days, a production start-up evaluation, without California Test 389, is required.

If you stop production for 60 days or more, a production start-up evaluation is required. The Engineer may require California Test 389.

39-2.01B(8)(b) Liquid Antistrip

If 3 consecutive sets of recorded production data show that the actual delivered liquid antistrip weight is more than ±1 percent of the authorized mix design liquid antistrip weight, stop production and take corrective action.

If a set of recorded production data shows that the actual delivered liquid antistrip weight is more than ±2 percent of the authorized mix design liquid antistrip weight, stop production. If the liquid antistrip weight exceeds 1.2 percent of the asphalt binder weight, do not use the HMA represented by that data.

The continuous mixing plant controller proportioning the HMA must produce a production data log. The log must consist of a series of data sets captured at 10-minute intervals throughout daily production. The data must be a production activity register and not a summation. The material represented by the data is the quantity produced 5 minutes before and 5 minutes after the capture time. For the duration of the Contract, the collected data must be stored by the plant controller or a computer memory at the plant.

The Engineer orders proportioning activities stopped for any of the following reasons:

1. You fail to submit data.
2. You submit incomplete, untimely, or incorrectly formatted data.
3. You fail to take corrective actions.
4. You take late or unsuccessful corrective actions.

5. You fail to stop production when proportioning tolerances are exceeded.
6. You use malfunctioning or failed proportioning devices.

If you stop production, notify the Engineer of any corrective actions taken before resuming.

39-2.01B(8)(c) Warm Mix Asphalt Technology

Proportion all ingredients by weight. The HMA plant process controller must be the sole source of ingredient proportioning control and be fully interfaced with all scales and meters used in the production process. The addition of the HMA additive must be controlled by the plant process controller.

Liquid ingredient additive, including a normally dry ingredient made liquid, must be proportioned with a mass flow meter at continuous mixing plants. Use a mass flow meter or a container scale to proportion liquid additives at batch mixing plants.

Continuous mixing plants using HMA additives must comply with the following:

1. Dry ingredient additives for continuous production must be proportioned with a conveyor scale or a loss-in-weight meter.
2. HMA plant process controller and ingredient measuring systems must be capable of varying all ingredient-feed rates proportionate with the dry aggregate delivery at all production rates and rate changes.
3. Liquid HMA additive must enter the production stream with the binder. Dry HMA additive must enter the production stream at or before the mixing area.
4. If dry HMA additives are used at continuous mixing HMA plants, bag-house dust systems must return all captured material to the mix. This requirement is waived for lime-treated aggregates.
5. HMA additive must be proportioned to within ±0.3 percent of the target additive rate.

Batch mixing plants using HMA additives must comply with the following:

1. Metered HMA additive must be placed in an intermediate holding vessel before being added to the stream of asphalt binder as it enters the pugmill.
2. If a container scale is used, weigh additive before combining with asphalt binder. Keep the container scale separate from other ingredient proportioning. The container scale capacity must be no more than twice the volume of the maximum additive batch size. The container scale's graduations must be smaller than the proportioning tolerance or 0.001 times the container scale capacity.
3. Dry HMA additive proportioning devices must be separate from metering devices for the aggregates and asphalt binder. Proportion dry HMA additive directly into the pugmill, or place in an intermediate holding vessel to be added to the pugmill at the appropriate time in the batch cycle. Dry ingredients for batch production must be proportioned with a hopper scale.
4. Zero tolerance for the HMA additive batch scale is ±0.5 percent of the target additive weight. The indicated HMA additive batch scale weight may vary from the preselected weight setting by up to ±1.0 percent of the target additive weight.

39-2.01B(9) Geosynthetic Pavement Interlayer

Geosynthetic pavement interlayer must comply with Section 96-1.02, “Materials,” for pavement fabric, paving mat, paving grid, paving geocomposite grid, or geocomposite strip membrane as shown.

The asphalt binder for geosynthetic pavement interlayer must be PG 64-10, PG 64-16, or PG 70-10.

39-2.01B(10) Tack Coat

Tack coat must comply with the specifications for asphaltic emulsion or asphalt binder. Choose the Type and grade of emulsion or binder.

39-2.01B(11) Miscellaneous Areas and Dikes

For miscellaneous areas and dikes:

1. Choose the aggregate gradation from:
   1.1. 3/8-inch HMA aggregate gradation.
   1.2. 1/2-inch HMA aggregate gradation.
   1.3. Dike mix aggregate gradation.
2. Choose asphalt binder Grade PG 64-10, PG 64-16, or PG 70-10.
3. Minimum asphalt binder content must be:
   3.1. 6.40 percent for 3/8-inch HMA aggregate gradation.
   3.2. 5.70 percent for 1/2-inch HMA aggregate gradation.
   3.3. 6.00 percent for dike mix aggregate gradation.

If you request and the Engineer authorizes, you may reduce the minimum asphalt binder content.

Aggregate gradation for dike mix must be within the TV limits for the specified sieve size shown in the following table:

Dike Mix Aggregate Gradation (Percentage Passing)

Sieve size	Target value limit	Allowable tolerance
1/2"	100	--
3/8"	---	95 - 100
No. 4	73–77	TV ± 10
No. 8	58–63	TV ± 10
No. 30	29–34	TV ± 10
No. 200	--	0 - 14

For HMA used in miscellaneous areas and dikes, the following sections do not apply:

1. Section 39-2.01A(3), “Submittals.”
2. Section 39-2.01A(4), “Quality Assurance.”
3. Section 39-2.01B(2), “Mix Design.”
4. Section 39- 2.01B(4)(c), “Reserved.”
5. Section 39-2.01B(5), “Liquid Antistrip Treatment.”
6. Section 39-2.01B(6) & (7), “Reserved.”
7. Section 39-2.01B(8), “Hot Mix Asphalt Production.”
8. Section 39-2.01B(9), “Geosynthetic Pavement Interlayer.”
9. Section 39-2.01B(10) “Tack Coat.”

39-2.01C Construction

39-2.01C(1) General

Do not place HMA on wet pavement or frozen surface.

Spread and compact HMA at an ambient air temperature of at least 50 degrees F and a surface temperature of at least 55 degrees F.

If the ambient air temperature is below 65 degrees F, cover loads in trucks with tarps. The tarps must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement surface.

No windrow allowed.

You may place HMA in 1 or more layers on areas less than 5 feet wide and outside the traveled way, including shoulders. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture.

HMA handled or spread must not stain the finished surface of any improvement, including pavement.

Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, shovels, rakes, or compactors.

HMA must be free of:

1. Segregation.
2. Coarse or fine aggregate pockets.
3. Hardened lumps.
4. Marks.
5. Tearing.
6. Irregular texture.

Complete finish rolling activities before the pavement surface temperature is:

1. Below 150 degrees F for HMA with unmodified binder.
2. Below 140 degrees F for HMA with modified binder.

39-2.01C(2) Spreading and Compacting Equipment

39-2.01C(2)(a) General

Paving equipment for spreading must be:

1. Self-propelled.
2. Mechanical.
3. Equipped with a screed or strike-off assembly that can distribute HMA the full width of a traffic lane.
4. Equipped with a full-width compacting device.
5. Equipped with automatic screed controls and sensing devices that control the thickness, longitudinal grade, and transverse screed slope.

The screed must be heated and produce a uniform HMA surface texture without tearing, shoving, or gouging.

The paver must not leave marks such as ridges and indentations unless you can eliminate them by rolling.

Rollers must be equipped with a system that prevents HMA from sticking to the wheels. You may use a parting agent that does not damage the HMA or impede the bonding of layers.

In areas inaccessible to spreading and compacting equipment:

1. Spread the HMA by any means to obtain the specified lines, grades, and cross-sections.
2. Use a pneumatic tamper, plate compactor, or equivalent to achieve thorough compaction.

39-2.01C(2)(b) Material Transfer Vehicle

If a material transfer vehicle is specified, the material transfer vehicle must have sufficient capacity to prevent stopping the paver and must be capable of:

1. Either receiving HMA directly from trucks or using a windrow pickup head to load it from a windrow deposited on the roadway surface.

2. Remixing the HMA with augers before transferring into the paver's receiving hopper or feed system.
3. Transferring HMA directly into the paver's receiving hopper or feed system.

39-2.01C(2)(c) Method Compaction Equipment

For method compaction, each paver spreading HMA must be followed by at least one of each of the following 3 Types of rollers:

1. Breakdown roller must be a vibratory roller specifically designed to compact HMA. The roller must be capable of at least 2,500 vibrations per minute and must be equipped with amplitude and frequency controls. The roller's gross static weight must be at least 7.5 tons.
2. Intermediate roller must be an oscillating-Type pneumatic-tired roller at least 4 feet wide. Pneumatic tires must be of equal size, diameter, Type, and ply. The tires must be inflated to 60 psi minimum and maintained so that the air pressure does not vary more than 5 psi.
3. Finishing roller must be a steel-tired, 2-axle tandem roller. The roller's gross static weight must be at least 7.5 tons.

Each roller must have a separate operator. Rollers must be self-propelled and reversible. Any deviation from the above requirements must be approved in writing by the Engineer.

Method compaction procedures are described in detail in Section 39-2.01C(15)(b), “Method Compaction.”

39-2.01C(2)(d)–39-2.01C(2)(f) Reserved

39-2.01C(3) Surface Preparation

39-2.01C(3)(a) General

Before placing HMA, remove loose paving particles, dirt, and other extraneous material by any means including flushing and sweeping.

39-2.01C(3)(b) Subgrade

Prepare subgrade to receive HMA under the provisions of the sections for the material involved. Subgrade must be free of loose and extraneous material.

39-2.01C(3)(c) - 39-2.01C(3)(e) Reserved

39-2.01C(3)(f) Tack Coat

Apply a tack coat:

1. To existing pavement including planed surfaces.
2. Between HMA layers.
3. To vertical surfaces of:
   3.1. Curbs.
   3.2. Gutters.
   3.3. Construction joints.

Equipment for the application of tack coat must comply with Section 37-1.03B, “Equipment,” of these Standard Specifications.

Before placing HMA, apply a tack coat in 1 application at the minimum residual rate shown in the following table for the condition of the underlying surface:

Tack Coat Application Rates for HMA

HMA over:	Minimum residual rates (gal/sq yd)		
	CSS1/CSS1h, SS1/SS1h and QS1h/CQS1h asphaltic emulsion	CRS1/CRS2, RS1/RS2 and QS1/CQS1 asphaltic emulsion	Asphalt binder and PMCRS-2 / PMCRS-2h asphaltic emulsion
New HMA (between layers)	0.02	0.03	0.02
Concrete pavement and existing asphalt concrete surfacing	0.03	0.04	0.03
Planed pavement	0.05	0.06	0.04

If a stress absorbing membrane interlayer as specified in Section 37-2.05, “Stress Absorbing Membrane Interlayers,” of these Standard Specifications is applied, the tack coat application rates for new HMA apply.

Notify the Engineer if you dilute asphaltic emulsion with water. The weight ratio of added water to asphaltic emulsion must not exceed 1 to 1.

Measure added water either by weight or volume under the provisions of Section 9-1, “Measurement,” or use water meters from water districts, cities, or counties. If you measure water by volume, apply a conversion factor to determine the correct weight.

With each dilution, submit:

1. Weight ratio of water to bituminous material in the original asphaltic emulsion.
2. Weight of asphaltic emulsion before diluting.
3. Weight of added water.
4. Final dilution weight ratio of water to asphaltic emulsion.

Apply a tack coat to vertical surfaces with a residual rate that will thoroughly coat the vertical face without running off.

If authorized, you may change the tack coat application rates.

Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.

Close areas receiving tack coat to traffic. Do not allow the tracking of tack coat onto pavement surfaces beyond the job site.

If you use an asphalt binder for tack coat, the asphalt binder temperature must be from 285 to 350 degrees F when applied.

39-2.01C(3)(g) Geosynthetic Pavement Interlayer

Where shown, place geosynthetic pavement interlayer over a coat of asphalt binder and in compliance with the manufacturer's instructions. Do not place the interlayer on a wet or frozen surface. If the interlayer, in compliance with the manufacturer’s instructions, does not require asphalt binder, do not apply asphalt binder before placing the interlayer.

Before placing the interlayer or asphalt binder:

1. Repair cracks 1/4 inch and wider, spalls, and holes in the pavement.
2. Clean the pavement of loose and extraneous material.

If the interlayer requires asphalt binder, immediately before placing the interlayer, apply asphalt binder at a rate specified by the interlayer manufacturer; at 0.25±0.03 gal per square yard of interlayer; or at a rate that just saturates the interlayer; whichever is greater. Apply asphalt binder the width of the interlayer plus 3 inches on each side. At an interlayer overlap, apply asphalt binder on the lower interlayer the same overlap distance as the upper interlayer.

If asphalt binder tracked onto the interlayer or brought to the surface by construction equipment causes interlayer displacement, cover it with a small quantity of HMA.

If the interlayer placement does not require asphalt binder, apply tack coat prior to placing HMA at the application rates specified under the provisions of Section 39-2.01C(3)(f), “Tack Coat,” based on the condition of the underlying surface on which the interlayer was placed.

Align and place the interlayer with no overlapping wrinkles. Cut the wrinkle out and overlap the interlayer no more than 2 inches.

Overlap the interlayer borders between 2 to 4 inches. In the direction of paving, overlap the following roll with the preceding roll at any break.

You may use rolling equipment to correct distortions or wrinkles in the interlayer.

Before placing HMA on the interlayer, do not expose the interlayer to:

1. Traffic, except for crossings under traffic control and only after you place a small HMA quantity.
2. Sharp turns from construction equipment.
3. Damaging elements.

Pave HMA on the interlayer during the same work shift. The minimum HMA thickness over the interlayer must be 0.12 foot including at conform tapers.

39-2.01C(4) Longitudinal Joints

39-2.01C(4)(a) General

Longitudinal joints in the top layer must match lane lines. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the lane line. Other longitudinal joint placement patterns are allowed if authorized.

A vertical longitudinal joint of more than 0.15 foot is not allowed at any time between adjacent lanes open to traffic.

For an HMA thickness of 0.15 foot or less, the distance between the ends of the adjacent surfaced lanes at the end of each day's work must not be greater than can be completed in the following day of normal paving.

For an HMA thickness greater than 0.15 foot, you must place HMA on adjacent traveled way lanes or shoulder such that at the end of each work shift the distance between the ends of HMA layers on adjacent lanes is from 5 to 10 feet. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. You may place kraft paper or other authorized release agent under the conform tapers to facilitate the taper removal when paving activities resume.

If placing HMA against the edge of existing pavement, saw cut or grind the pavement straight and vertical along the joint and remove extraneous material.

39-2.01C(4)(b) Tapered Notched Wedge

For divided highways with an HMA lift thickness greater than 0.15 foot, you may construct a 1-foot-wide tapered notched wedge joint as a longitudinal joint between adjacent lanes open to traffic. A vertical notch of 0.75 inch maximum must be placed at the top and bottom of the tapered wedge.

The tapered notched wedge must keep its shape while exposed to traffic. Pave the adjacent lane within 1 day.

Construct the tapered portion of the tapered notched wedge with an authorized strike-off device. The strike-off device must provide a uniform slope and must not restrict the main screed of the paver.

You may use a device attached to the screed to construct longitudinal joints that will form a tapered notched wedge in a single pass. The tapered notched wedge must be compacted to a minimum of 91 percent compaction.

39-2.01C(5) Pavement Edge Treatments

Construct edge treatment on the HMA pavement as shown by the Contract Documents.

Where a tapered edge is required, use the same Type of HMA used for the adjacent lane or shoulder.

The edge of roadway where the tapered edge is to be placed must have a solid base, free of debris such as loose material, grass, weeds, or mud. Grade the areas to receive the tapered edge as required.

The tapered edge must be placed monolithic with the adjacent lane or shoulder and must be shaped and compacted with a device attached to the paver.

The device must be capable of shaping and compacting HMA to the required cross section as shown by the Contract Documents. Compaction must be accomplished by constraining the HMA to reduce the cross-sectional area by 10 to 15 percent. The device must produce a uniform surface texture without tearing, shoving, or gouging and must not leave marks such as ridges and indentations. The device must be capable of transitioning to crossroads, driveways, and obstructions.

For the tapered edge, the angle of the slope must not deviate by more than ±5 degrees from the angle shown. Measure the angle from the plane of the adjacent finished pavement surface.

If paving is done in multiple lifts, the tapered edge must be placed with each lift.

Short sections of hand work are allowed to construct tapered edge transitions.

39-2.01C(6) Widening Existing Pavement

If widening existing pavement, construct new pavement structure to match the elevation of the existing pavement's edge before placing HMA over the existing pavement.

39-2.01C(7) Shoulders, Medians, and Other Road Connections

Until the adjoining through lane's top layer has been paved, do not pave the top layer of:

1. Shoulders.
2. Tapers.
3. Transitions.
4. Road connections.
5. Driveways.
6. Curve widenings.
7. Chain control lanes.
8. Turnouts.
9. Turn pockets.

If the number of lanes changes, pave each through lane's top layer before paving a tapering lane's top layer. Simultaneous to paving a through lane's top layer, you may pave an adjoining area's top layer, including shoulders. Do not operate spreading equipment on any area's top layer until completing final compaction.

If shoulders or median borders are shown, pave shoulders and median borders adjacent to the lane before opening a lane to traffic.

If shoulder with conform tapers are shown, place conform tapers concurrently with the adjacent lane's paving.

If a driveway or a road connection is shown, place additional HMA along the pavement's edge to conform to road connections and driveways. Hand rake, if necessary, and compact the additional HMA to form a smooth conform taper.

39-2.01C(8) Leveling

This section applies if a bid item for hot mix asphalt (leveling) is shown on the Bid Item List.

Fill and level irregularities and ruts with HMA before spreading HMA over the base, existing surfaces, or bridge decks. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture. HMA used to change an existing surface's cross slope or profile is not paid for as hot mix asphalt (leveling). Compact using the method process unless otherwise specified in the Contract Documents.

39-2.01C(9) Miscellaneous Areas and Dikes

Prepare the area to receive HMA for miscellaneous areas and dikes, including excavation and backfill as needed.

Spread the HMA in miscellaneous areas in 1 layer and compact to the specified lines and grades.

In median areas adjacent to slotted median drains, each layer of HMA must not exceed 0.20 foot (2.4 inch) maximum compacted thickness.

The finished surface must be:

1. Textured uniformly.
2. Compacted firmly.
3. Without depressions, humps, and irregularities.

39-2.01C(10)–39-2.01C(14) Reserved

39-2.01C(15) Compaction

39-2.01C(15)(a) General

Rolling must leave the completed surface compacted and smooth without tearing, checking, cracking, or shoving.

If a vibratory roller is used as a finish roller, turn the vibrator off.

Do not open new HMA pavement to traffic until its mid depth temperature is below 160 degrees F.

If the surface to be paved is both in sunlight and shade, pavement surface temperatures are taken in the shade.

39-2.01C(15)(b) Method Compaction

Use method compaction for any of the following conditions:

1. HMA pavement thickness shown is less than **0.15 foot (1.8 inches).**
2. Replace asphalt concrete surfacing (**digouts**).
3. Leveling courses.
4. Areas the Engineer determines conventional compaction and compaction measurement methods are impeded.

HMA compaction coverage is the number of passes needed to cover the paving width. A pass is 1 roller's movement parallel to the paving in either direction. Overlapping passes are part of the coverage being made and are not a subsequent coverage. Do not start a coverage until completing the prior coverage.

Method compaction must consist of performing:

1. Breakdown compaction of each layer with 3 coverages using a vibratory roller. The speed of the vibratory roller in miles per hour must not exceed the vibrations per minute divided by 1,000. If the HMA layer thickness is less than 0.08 foot, turn the vibrator off.
2. Intermediate compaction of each layer of HMA with 3 coverages using a pneumatic-tired roller at a speed not to exceed 5 mph.
3. Finish compaction of HMA with 1 coverage using a steel-tired roller.

Start rolling at the lower edge and progress toward the highest part.

The Engineer may order fewer coverages if the layer thickness of HMA is less than 0.15 foot (1.8 inches).

The compacted lift thickness must not exceed 0.25 foot (3 inches).

Any deviation from the above requirements must be approved in writing by the Engineer.

39-2.01C(15)(c)–39-2.01C(15)(e) Reserved

39-2.01C(16) Smoothness Corrections

If the pavement surface does not comply with Section 39-2.01A(4)(i)(iii), “Pavement Smoothness,” grind the pavement to within specified tolerances, remove and replace the pavement, or place an overlay of HMA. Do not start corrective work until your method is authorized.

Do not use equipment with carbide cutting teeth to grind the pavement unless authorized. Smoothness corrections must leave at least 75 percent of the specified HMA thickness. If ordered, core the pavement at the locations selected by the Engineer. Remove and replace deficient pavement areas where the overlay thickness is less than 75 percent of the thickness specified.

Corrected HMA pavement areas must be uniform rectangles, half the lane width, with edges:

1. Parallel to and along the nearest HMA pavement edge or lane line.
2. Perpendicular to the pavement centerline.

Measure the corrected HMA pavement surface as specified in 39-2.01A(4)(i)(iii), “Pavement Smoothness,” and correct the pavement to within specified tolerances.

If a must-grind area or straight edged pavement cannot be corrected to within specified tolerances, remove and replace the pavement. Retest the corrected area with the straightedge.

On ground areas not to be overlaid with OGFC, apply a fog seal under the provisions of Section 37-4.02, “Fog Seal.”

39-2.01C(17) Reserved

39-2.01D Payment

The payment quantity for geosynthetic pavement interlayer is the area measured from the actual pavement covered.

The payment for tack coat is included in the payment for hot mix asphalt concrete. The City does not adjust the unit price for an increase or decrease in the tack coat quantity.

The payment quantity for HMA of the Type shown on the Bid Item List is measured based on the combined mixture weight. If recorded batch weights are printed automatically, the bid item for HMA is measured by using the printed batch weights, provided:

1. Total aggregate and supplemental fine aggregate weight per batch is printed. If supplemental fine aggregate is weighed cumulatively with the aggregate, the total aggregate batch weight must include the supplemental fine aggregate weight.
2. Total virgin asphalt binder weight per batch is printed.
3. Each truckload's zero tolerance weight is printed before weighing the first batch and after weighing the last batch.
4. Time, date, mix number, load number and truck identification is correlated with a load slip.
5. Copy of the recorded batch weights is certified by a licensed weigh master and submitted.

The payment quantity for place hot mix asphalt dike of the Type shown on the Bid Item List is the length measured from end to end. Payment for the HMA used to construct the dike is not included in the payment for place hot mix asphalt dike.

The payment quantity for place hot mix asphalt (miscellaneous areas) is the area measured for the in- place compacted area. Payment for the HMA used for miscellaneous areas is not included in the payment for place hot mix asphalt (miscellaneous areas).

The Engineer does not adjust the unit price for an increase or decrease in the pre-paving grinding day quantity.

39-2.02 HOT MIX ASPHALT TYPE F & TYPE H

39-2.02A General

39-2.02A(1) Summary

This section includes specifications for producing and placing HMA Type F & Type H.

If authorized by the Engineer, you may produce HMA Type F & Type H using authorized Caltrans approved WMA technology.

If liquid antistrip (LAS) is specified for HMA Type F or Type H, WMA additive technology may be used as substitution for LAS treatment at the discretion of the Engineer. Foam injection technology is not an acceptable substitute for LAS treatment.

39-2.02A(2) Definitions

Reserved

39-2.02A(3) Submittals

39-2.02A(3)(a) General

Reserved

39-2.02A(3)(b) Job Mix Formula

The JMF must be based on the Superpave HMA mix design method as described in MS-2 *Asphalt Mix Design Methods* by the Asphalt Institute as modified herein.

39-2.02A(3)(c) Reclaimed Asphalt Pavement

Submit QC test results for RAP gradation with the combined aggregate gradation within 2 business days of taking RAP samples during HMA production.

39-2.02A(3)(d)–39-2.02A(3)(f) Reserved

39-2.02A(4) Quality Assurance

39-2.02A(4)(a) General

Reserved

39-2.02A(4)(b) Quality Control

39-2.02A(4)(b)(i) General

Reserved

39-2.02A(4)(b)(ii) Aggregates

Test the quality characteristics of aggregates under the provisions of the test methods and frequencies shown in the following table:

Minimum Contractor Quality Control Aggregate Testing

Quality characteristic	Test method	Minimum testing frequency
Gradation[a]	AASHTO T 11 / T 27	1 per 750 tons and any remaining part
Sand equivalent[b, c]	AASHTO T 176	
Moisture content[d]	AASHTO T 255	
Crushed particles	AASHTO T 335	1 per 10,000 tons or 2 per project whichever is greater
Los Angeles Rattler	AASHTO T 96	
Flat and elongated particles	ASTM D4791	

[a] Test for aggregate gradation under the provisions of AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate under the provisions of AASHTO T11. If RAP is used, test the combined aggregate gradation under the provisions of California Test 384.

[b] Reported value must be the average of 3 tests from a single sample.

[c] Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Section 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in Section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

[d] Test at continuous mixing plants only. If RAP is used, test the RAP moisture content at continuous mixing plant and batch mixing plant.

39-2.02A(4)(b)(iii) Reclaimed Asphalt Pavement

Sample and test mix design RAP stockpile under the provisions of California Test 384.

Report the average AASHTO T 308 uncorrected binder content on page 4 of your Contractor Hot Mix Asphalt Design Data form.

When the mix design RAP stockpile is augmented, sample RAP used to augment the stockpile at a minimum frequency of 1 sample per 1,000 tons under the provisions of California Test 384 before augmenting the stockpile. Test each sample to determine the uncorrected binder content under the provisions of AASHTO T 308. Average the results of the 3 tests.

When tested under the provisions of AASHTO T308, the uncorrected binder content of each augmented RAP sample must be within ±2.00 percent of the average uncorrected asphalt binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form (CEM 3512).

The augmented RAP sample when tested under the provisions of AASHTO T209 must be within ±0.06 of the average maximum specific gravity reported on page 4 of your Contractor Hot Mix Asphalt Design Data form (CEM 3512).

During HMA Type F and Type H production, sample RAP twice daily and perform QC testing for:

1. Aggregate gradation at least once a day under the provisions of California Test 384.
2. Moisture content at least once a day.

39-2.02A(4)(b)(iv)–39-2.02A(4)(b)(viii) Reserved

39-2.02A(4)(b)(ix) Hot Mix Asphalt Production

Test the quality characteristics of HMA under the provisions of the test methods and frequencies shown in the following table:

Minimum Contractor Quality Control HMA Testing

Quality characteristic	Test method	Minimum testing frequency (HMA Type F & Type H)
Asphalt binder content	AASHTO T 308 Method A	1 per 750 tons and any remaining part
HMA moisture content	AASHTO T 329	1 per 2,500 tons but not less than 1 per paving day
Air void content	AASHTO T 269	1 per 4,000 tons or 2 every 5 paving days, whichever is greater
Voids in mineral aggregate	MS-2 Asphalt Mixture Volumetrics	1 per 10,000 tons or 2 per project whichever is greater
Dust proportion	MS-2 Asphalt Mixture Volumetrics	
Density of core	California Test 375	2 per paving day
Nuclear gauge density	California Test 375	3 per 250 tons or 3 per paving day, whichever is greater
Hamburg Wheel Track	California Test 389	1 per 10,000 tons or 1 per project, whichever is greater

39-2.02A(4)(c)–39-2.02A(4)(d) Reserved

39-2.02A(4)(e) Engineer Acceptance

The Engineer accepts HMA based on compliance with:

1. Aggregate quality requirements shown in the following table:

Aggregate Quality Requirements

Quality characteristic	Test method	Requirement	
		Type F[a]	Type H
Aggregate gradation[b]	AASHTO T 11 / 27	JMF TV ± Tolerance	
Percent of crushed particles			
Coarse aggregate (min, %)			
One-fractured face	AASHTO T 335	95	50
Two-fractured faces		90	50
Fine aggregate (min, %)			
(Passing No. 4 sieve and retained on No. 8 sieve.)			
One fractured face		70	70
Los Angeles Rattler (max, %)	AASHTO T 96		
Loss at 100 Rev.		12	12
Loss at 500 Rev.		40	45
Sand equivalent (min.)[c, d]	AASHTO T 176	47	47
Flat and elongated particles (max, % by weight at 5:1)	ASTM D4791	10	10
Non-manufactured sand, (max, %)[e]	-	10	10

[a] When HMA Type F is used as a substitute for HMA Type H, the Engineer accepts HMA based on Type H requirements.

[b] Test for aggregate gradation under the provisions of AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate under the provisions of AASHTO T11. The Engineer determines combined aggregate gradations containing RAP under the provisions of California Test 384. The Engineer uses the correlation factor from the Contractor Hot Mix Asphalt Design Data form (CEM 3512) and mathematically combines the virgin and corrected RAP aggregate gradations at the correct proportions to obtain the combined gradation.

[c] Reported value must be the average of 3 tests from a single sample.

[d] Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in Section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

[e] Manufactured sand is fine aggregate produced by crushing rock or gravel.

2. If RAP is used, RAP quality requirements shown in the following table:

Reclaimed Asphalt Pavement Quality

Quality characteristic	Test method	Requirement
Uncorrected binder content (% within the average value reported[a])	AASHTO T 308	±2.00
Specific gravity (within the average value reported[b])	AASHTO T 209	±0.06

[a]Average uncorrected binder content of three ignition oven tests performed at JMF verification. Engineer must use the same ignition oven used to determine the average uncorrected binder content at JMF verification.

[b]Average maximum specific gravity reported on page 4 of Contractor Hot Mix Asphalt Design form (CEM 3512).

3. In-place HMA quality requirements shown in the following table:

HMA Acceptance In-Place

Quality characteristic	Test method	Type F[a]	Type H
Asphalt binder content (%)	AASHTO T 308 Method A	JMF ± 0.50	JMF ± 0.50
HMA moisture content (max, %)	AASHTO T 329	1.0	1.0
Air voids content at N_{design} (%)[b,c]	AASHTO T 269	4.0 ± 1.5	4.0 ± 1.5
Voids in mineral aggregate on plant-produced HMA (min, %)[b]			
Gradation:	MS-2 Asphalt Mixture Volumetrics[d]		
No. 4		15.5–18.5	15.0–18.0
1/2-inch		14.5–17.5	14.0–17.0
3/8-inch		13.5–16.5	13.0–16.0
3/4-inch		12.5–15.5	12.0–15.0
Dust proportion	MS-2 Asphalt Mixture Volumetrics	0.6-1.3	0.5-1.4
Density of core (% of max theoretical density)[e,f]	California Test 375	92.0–97.0	92.0-97.0
Hamburg wheel track[g] (min number of passes at 0.5-inch rut depth)			
Binder grade:	California Test 389		
PG 58		10,000	7,500
PG 64		15,000	12,500
PG 70		20,000	17,500
PG 76 or higher		25,000	20,000

[a]When HMA Type F is used as a substitute for HMA Type H, the Engineer accepts HMA based on Type H requirements.

[b]Prepare 3 briquettes. Report the average of 3 tests

[c]The Engineer determines the bulk specific gravity of each lab-compacted briquette under the provisions of AASHTO T 275, Method A, and theoretical maximum specific gravity under the provisions of AASHTO T 209, Method A.

[d]Determine bulk specific gravity under the provisions of AASHTO T 275, Method A.

[e]The Engineer determines percent of theoretical maximum density under the provisions of California Test 375 except the Engineer uses:

1. AASHTO T 275, Method A, to determine in-place density of each density core instead of using the nuclear gauge.
2. AASHTO T 209, Method A to determine theoretical maximum density instead of calculating test maximum density.

[f]The Engineer determines theoretical maximum density under the provisions of AASHTO T 209, Method A.

[g]The Hamburg wheel track requirement for HMA Type H may be waived at the discretion of the Engineer.

39-2.02B Materials

39-2.02B(1) General

Reserved

39-2.02B(2) Hot Mix Asphalt Mix Design

The mix design for HMA must comply with the requirements shown in the following table:

HMA Mix Design Requirements

Quality characteristic	Test method	Type F	Type H
Air voids content (%)	AASHTO T 269[a,b]	Ninitial > 8.0 Ndesign = 4.0 Nmax > 2.0	Ninitial > 8.0 Ndesign = 4.0 Nmax > 2.0
Gyration compaction (no. of gyrations)	AASHTO T 312	Ninitial = 8 Ndesign = 85.0 Nmax = 130	Ninitial = 7 Ndesign = 65.0 Nmax = 115
Voids in mineral aggregate (min, %)[b]			
Gradation:			
No. 4	MS-2 Asphalt Mixture Volumetrics	16.5–19.5	16.0–19.0
3/8-inch		15.5–18.5	15.0–18.0
1/2-inch		14.5–17.5	14.0–17.0
3/4-inch		13.5–16.5	13.0–16.0
Dust proportion	MS-2 Asphalt Mixture Volumetrics	0.6–1.3	0.5–1.4
Hamburg wheel track (min number of passes at 0.5-inch rut depth)			
Binder grade:			
PG 64	California Test 389[c]	10,000	7,500
PG 58		15,000	12,500
PG 70		20,000	17,500
PG 76 or higher		25,000	20,000

[a]Calculate the air voids content of each specimen using AASHTO T 275, Method A, to determine bulk specific gravity. Use AASHTO T 209, Method A to determine theoretical maximum specific gravity. Use a pycnometer and digital manometer when performing AASHTO T 209.

[b]Measure bulk specific gravity using AASHTO T 275, Method A.

[c] Test plant-produced HMA sample.

For HMA mixtures using RAP, the maximum allowed binder replacement is 15.0 percent in the upper 0.2 foot (2.4 inches) exclusive of OGFC and 25.0 percent below. The binder replacement is calculated as a percentage of the approved JMF target asphalt binder content.

For HMA with a binder replacement greater than 15.0 percent of your specified OBC and less than or equal to 25.0 percent of OBC, you must use a performance graded asphalt binder grade with upper and lower temperature classifications reduced by 6 degrees C from the specified PG binder grade. Hamburg wheel track requirements are based on the grade of the asphalt binder specified for Type F and Type H HMA.

39-2.02B(3) Asphalt Binder

39-2.02B(3)(a) General

The grade of asphalt binder for HMA must be PG 64-10 or PG 64-16.

39-2.02B(4) Aggregates

39-2.02B(4)(a) General

Before the addition of asphalt binder and lime treatment, the aggregates must comply with the requirements shown in the following table:

Aggregate Quality Requirements

Quality characteristic	Test method	Requirement	
		Type F	Type H
Aggregate gradation[a]	AASHTO T 11 / 27	JMF TV ± Tolerance	
Percent of crushed particles	AASHTO T 335		
Coarse aggregate (min, %)			
One-fractured face		95	50
Two-fractured faces		90	50
Fine aggregate (min, %)			
(Passing No. 4 sieve and retained on No. 8 sieve.)			
One fractured face		70	20
Los Angeles Rattler (max, %)	AASHTO T 96		
Loss at 100 Rev.		12	12
Loss at 500 Rev.		40	45
Sand equivalent (min.)[b, c]	AASHTO T 176	47	47
Flat and elongated particles (max, % by weight at 5:1)	ASTM D4791	10	10
Nonmanufactured sand, (max, %)[d]	-	10	10

[a] Test for aggregate gradation under the provisions of AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate under the provisions of AASHTO T 11. The Engineer determines combined aggregate gradations containing RAP under the provisions of California Test 384.

[b] Reported value must be the average of 3 tests from a single sample.

[c] Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in Section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

[d] Manufactured sand is fine aggregate produced by crushing rock or gravel.

39-2.02B(4)(b) Aggregate Size and Gradations

Unless otherwise indicated in contract documents the ratio of HMA lift thickness to nominal maximum aggregate size must be a minimum of 3:1. If the aggregate gradations for HMA is not specified, aggregate gradations must comply with the requirements shown in the following table:

Aggregate Gradation Requirements

HMA pavement thickness shown	Gradation
0.10 foot	3/8 inch
Greater than 0.10 to less than 0.25 foot	1/2 inch or 3/4 inch
0.25 foot or greater	3/4 inch

Aggregate gradation must be within the TV limits for the specified sieve size shown in the following tables:

Aggregate Gradations for HMA (Percentage Passing)

3/4 inch

Sieve size	Target value limit	Allowable tolerance
1"	100	--
3/4"	90-100	TV±5
1/2"	<90	TV±6
No.8	23-49	TV±5
No.200	2.0-8.0	TV±2.0

1/2 inch

Sieve size	Target value limit	Allowable tolerance
3/4"	100	--
1/2"	90-100	TV±5
3/8"	<90	TV±5
No.8	28-58	TV±5
No.200	2.0–10.0	TV±2.0

3/8 inch

Sieve size	Target value limit	Allowable tolerance
1/2"	100	--
3/8"	90-100	TV±5
No.4	<90	TV±5
No.8	32-67	TV±5
No.200	2.0–10.0	TV±2.0

No. 4

Sieve size	Target value limit	Allowable tolerance
3/8"	100	--
No. 4	95-98	TV±5
No.8	<90	TV±5
No.30	34-45	TV±5
No.200	2.0–12.0	TV±4.0

39-2.02B(5) Reclaimed Asphalt Pavement

Provide enough space at your plant for complying with all RAP handling requirements. Provide a clean, graded base, well drained area for stockpiles.

If RAP is from multiple sources, blend the RAP thoroughly and completely before fractionating.

For RAP substitution greater than 15 percent of the aggregate blend, fractionate RAP stockpiles into 2 sizes, a coarse fraction RAP retained on 3/8-inch sieve and a fine fraction RAP passing 3/8-inch sieve. For RAP substitution of 15 percent of the aggregate blend or less, fractionation is not required.

The RAP fractionation must comply with the requirements shown in the following table:

RAP Stockpile Fractionation Gradation Requirements

Size	Test method	Requirement
Coarse (% passing the 1-inch sieve)	California Test 202[a]	100
Fine (% passing the 3/8-inch sieve)	California Test 202[a]	98–100

[a] Maximum mechanical shaking time is 10 minutes.

You may use the coarse fractionated stockpile, the fine fractionated stockpile, or a combination of the coarse and fine fractionated stockpiles.

Isolate the processed RAP stockpiles from other materials. Store processed RAP in conical or longitudinal stockpiles. Processed RAP must not be agglomerated or be allowed to congeal in large stockpiles.

39-2.02B(6)–39-2.02B(10) Reserved

39-2.02B(11) Hot Mix Asphalt Production

If RAP is used, the asphalt plant must automatically adjust the virgin asphalt binder to account for RAP percentage and RAP binder.

During production, you may adjust hot-or cold-feed proportion controls for virgin aggregate and RAP. RAP must be within ±3 of RAP percentage described in your Caltrans Contractor Job Mix Formula Proposal form (CEM 3511) without exceeding 25 percent.

39-2.02C Construction

Where the pavement thickness shown is equal to or greater than 0.30 foot, you may place HMA in multiple lifts not less than 0.15 foot each. If placing HMA in multiple lifts:

1. Aggregate gradation must comply with the requirements shown in the following table:

Aggregate Gradation Requirements

HMA lift thickness	Gradation
0.15 to less than 0.25 foot	1/2 or 3/4 inch
0.25 foot or greater	3/4 inch

2. Apply a tack coat before placing a subsequent lift.
3. The Engineer evaluates each HMA lift individually for compliance.

If the ambient air temperature is below 60 degrees F, cover the loads in trucks with tarpaulins. If the time for HMA discharge to truck at the HMA plant until transfer to paver's hopper is 90 minutes or greater and if the ambient air temperature is below 70 degrees F, cover the loads in trucks with tarpaulins, unless the time from discharging to the truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or the pavement surface.

Spread HMA at the ambient air and surface temperatures shown in the following table:

Minimum Ambient Air and Surface Temperatures

Lift thickness (feet)	Ambient air (°F)		Surface (°F)	
	Unmodified asphalt binder	Modified asphalt binder	Unmodified asphalt binder	Modified asphalt binder
HMA and HMA produced with WMA water injection technology				
<0.15	55	50	60	55
≥0.15	45	45	50	50
HMA produced with WMA additive technology				
<0.15	45	45	50	45
≥0.15	40	40	40	40

For method compaction, the maximum lift thickness must be 0.25 foot.

For HMA and HMA produced with water-injection technology placed under method compaction, if the asphalt binder is:

1. Unmodified, complete:
   1.1. 1st coverage of breakdown compaction before the surface temperature drops below 250 degrees F.
   1.2. Breakdown and intermediate compaction before the surface temperature drops below 190 degrees F.
   1.3. Finish compaction before the surface temperature drops below 150 degrees F
2. Modified, complete:
   2.1. 1st coverage of breakdown compaction before the surface temperature drops below 240 degrees F.
   2.2. Breakdown and intermediate compaction before the surface temperature drops below 180 degrees F.
   2.3. Finish compaction before the surface temperature drops below 140 degrees F

For HMA produced with WMA additive technology placed under method compaction, if the asphalt binder is:

1. Unmodified, complete:
   1.1. 1st coverage of breakdown compaction before the surface temperature drops below 240 degrees F.
   1.2. Breakdown and intermediate compaction before the surface temperature drops below 190 degrees F.
   1.3. Finish compaction before the surface temperature drops below 140 degrees F.
   1.4. You may continue static rolling below 140 degrees F to remove roller marks.
2. Modified, complete:
   2.1. 1st coverage of breakdown compaction before the surface temperature drops below 230 degrees F.
   2.2. Breakdown and intermediate compaction before the surface temperature drops below 170 degrees F.
   2.3. Finish compaction before the surface temperature drops below 130 degrees F.
   2.4. You may continue static rolling below 130 degrees F to remove roller marks.

You may cool HMA with water when rolling activities are complete if authorized.

39-2.02D Payment

Not used.

39-2.03 RUBBERIZED HOT MIX ASPHALT–GAP GRADED

39-2.03A General

39-2.03A(1) Summary

This section includes specifications for producing and placing rubberized hot mix asphalt–gap graded (RHMA-G).

If authorized by the Engineer, you may produce RHMA-G using a Caltrans approved WMA technology.

If liquid antistrip (LAS) is required for RHMA-G, WMA technology may be used as substitution for LAS treatment at the discretion of the Engineer. Foam injection technology is not an acceptable substitute for LAS treatment.

39-2.03A(2) Definitions

Reserved.

39-2.03A(3) Submittals

39-2.03A(3)(a) General

At least 5 business days before use, submit the permit issued by the local air district for asphalt rubber binder blending equipment. If an air quality permit is not required by the local air district for producing asphalt rubber binder, submit verification from the local air district that an air quality permit is not required.

At least 10 days before RHMA-G production, submit the name of an authorized laboratory to perform QC testing for asphalt rubber binder. The authorized laboratory must comply with the Caltrans Independent Assurance Program.

39-2.03A(3)(b) Job Mix Formula

With your proposed JMF, include the SDS for:

1. Base asphalt binder.
2. CRM and asphalt modifier.
3. Blended asphalt rubber binder components.

The JMF must be based on the Superpave HMA mix design method as described in the most current edition of MS-2 *Asphalt Mix Design Methods* by the Asphalt Institute.

39-2.03A(3)(c) Asphalt Rubber Binder

Submit a proposal for asphalt rubber binder design and profile. In the design, include the asphalt binder, asphalt modifier, and CRM and their proportions.

If you change asphalt rubber binder supplier or any component material used in asphalt rubber binder or its percentage, submit a new JMF.

For the asphalt rubber binder used, submit:

1. Log of production daily.
2. Certificate of compliance with test results for CRM and asphalt modifier with each truckload delivered to the HMA plant. The certificate of compliance for asphalt modifier must represent no more than 5,000 lb.
3. Certified weight slips for the CRM and asphalt modifier furnished.
4. QC test results on viscosity within 2 business days after sampling.
5. QC test results on cone penetration, resilience, and softening point within 3 business days after sampling.

Submit a certificate of compliance for the CRM and asphalt modifier. With the certificate of compliance, submit test results for CRM and asphalt modifier with each truckload delivered to the HMA plant.

39-2.03A(4) Quality Assurance

39-2.03A(4)(a) General

Reserved

39-2.03A(4)(b) Job Mix Formula Verification

If you request, the Engineer verifies RHMA-G quality requirements within 20 days of receiving all verification samples and after the JMF document submittal has been accepted.

39-2.03A(4)(c) Quality Control

39-2.03A(4)(c)(i) General

Reserved

39-2.03A(4)(c)(ii) Asphalt Rubber Binder

39-2.03A(4)(c)(ii)(A) General

The asphalt rubber binder blending plant must be authorized under the provisions of the Caltrans' Material Plant Quality Program.

Take asphalt rubber binder samples from the feed line connecting the asphalt rubber binder tank to the HMA plant.

39-2.03A(4)(c)(ii)(B) Asphalt Modifier

Test asphalt modifier under the provisions of the test methods and frequencies shown in the following table:

Asphalt Modifier for Asphalt Rubber Binder

Quality characteristic	Test method	Frequency
Viscosity	ASTM D445	1 per shipment
Flash point	ASTM D92	
Molecular analysis: Asphaltenes Aromatics	ASTM D2007	1 per shipment

39-2.03A(4)(c)(ii)(C) Crumb Rubber Modifier

Sample and test scrap tire crumb rubber and high natural crumb rubber separately. Test CRM under the provisions of the test methods and frequencies shown in the following table:

Crumb Rubber Modifier for Asphalt Rubber Binder

Quality characteristic	Test method	Frequency
Scrap tire crumb rubber gradation	California Test 385	1 per 10,000 lb.
High natural crumb rubber gradation	California Test 385	1 per 3,400 lb.
Wire in CRM	California Test 385	1 per 10,000 lb.
Fabric in CRM	California Test 385	
CRM particle length	--	
CRM specific gravity	California Test 208	
Natural rubber content in high natural crumb rubber	ASTM D297	1 per 3,400 lb.

39-2.03A(4)(c)(ii)(D) Asphalt Rubber Binder

Test asphalt rubber binder under the provisions of the test methods and frequencies shown in the following table:

Asphalt Rubber Binder Testing

Quality characteristic	Test method	Frequency
Cone penetration	ASTM D217	1 per lot[a]
Resilience	ASTM D5329	
Softening point	ASTM D36/D36M	
Viscosity	ASTM D7741/D7741M	15 minutes before use per lot[a]

[a]The lot is defined in the Caltrans' *MPQP*.

Retain the sample from each lot. Test for cone penetration, resilience, and softening point for the first 3 lots and, if all 3 lots pass, the testing frequency may be reduced to once for every 3 lots.

If QC test results indicate that the asphalt rubber binder does not comply with the specifications, take corrective action, and notify the Engineer.

39-2.03A(4)(c)(iii) Aggregates

Test the quality characteristics of aggregates under the provisions of the test methods and frequencies shown in the following table:

Minimum Contractor Quality Control Aggregate Testing

Quality characteristic	Test method	Minimum testing frequency
Gradation[a]	AASHTO T 11 / T 27	1 per 750 tons and any remaining part
Sand equivalent[b, c]	AASHTO T 176	
Moisture content[d]	AASHTO T 255	
Crushed particles	AASHTO T 335	1 per 10,000 tons or 2 per project, whichever is greater
Los Angeles Rattler	AASHTO T 96	
Flat and elongated particles	ASTM D4791	

[a] Test for aggregate gradation under the provisions of AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate under the provisions of AASHTO T 11.

[b] Reported value must be the average of 3 tests from a single sample.

[c] Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in Section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

[d] Test at continuous mixing plants only.

For lime treated aggregate, test aggregate before treatment and test for gradation and moisture content during RHMA-G production.

39-2.03A(4)(c)(iv)–39-2.03A(4)(c)(viii) Reserved

39-2.03A(4)(c)(ix) Rubberized Hot Mix Asphalt–Gap Graded Production

Test the quality characteristics of RHMA-G under the provisions of the test methods and frequencies shown in the following table:

Minimum Contractor Quality Control RHMA-G Production Testing

Quality characteristic	Test method	Minimum testing frequency RHMA-G
Asphalt binder content	AASHTO T 308 Method A	1 per 750 tons and any remaining part
HMA moisture content	AASHTO T 329	1 per 2,500 tons but not less than 1 per paving day
Air void content	AASHTO T 269	1 per 4,000 tons or 2 every 5 paving days, whichever is greater
Voids in mineral aggregate	MS-2 Asphalt Mixture Volumetrics	1 per 10,000 tons or 2 per project whichever is greater
Dust proportion	MS-2 Asphalt Mixture Volumetrics	
Density of core	California Test 375	2 per paving day
Nuclear gauge density	California Test 375	3 per 250 tons or 3 per paving day, whichever is greater
Hamburg Wheel Track	California Test 389	1 per 10,000 tons or 1 per project, whichever is greater

39-2.03A(4)(d) Reserved

39-2.03A(4)(e) Department Acceptance

39-2.03A(4)(e)(i) General

The City accepts RHMA-G based on compliance with:

1. Aggregate quality requirements shown in the following table:

RHMA-G Aggregate Quality Requirements

Quality characteristic	Test method	Requirement
Aggregate gradation[a]	AASHTO T 11 / T 27	JMF TV ±Tolerance
Percent of crushed particles	AASHTO T 335	
Coarse aggregate (min, %)		
One-fractured face		--
Two-fractured faces		90
Fine aggregate (min, %)		
(Passing No. 4 sieve and retained on No. 8 sieve.)		
One fractured face		70
Los Angeles Rattler (max, %)	AASHTO T 96	
Loss at 100 Rev.		12
Loss at 500 Rev.		40
Sand equivalent (min.)[b, c]	AASHTO T 176	47
Flat and elongated particles (max, % by weight at 5:1)	ASTM D4791	Report only
Nonmanufactured sand, (max, %)[d]	-	10

[a] Test for aggregate gradation under the provisions of AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate under the provisions of AASHTO T11.

[b] Reported value must be the average of 3 tests from a single sample.

[c] Use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in Section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

[d] Manufactured sand is fine aggregate produced by crushing rock or gravel.

2. In-place RHMA-G quality requirements shown in the following table:

RHMA-G Acceptance In Place

Quality characteristic	Test method	Requirement
Asphalt binder content (%)	AASHTO T 308 Method A	JMF -0.50, +0.50
HMA moisture content (max, %)	AASHTO T 329	1.00
Air voids content @ Ndesign (%)[a, b]	AASHTO T 269	4.0 ± 1.5
Voids in mineral aggregate on laboratory-produced HMA[d] (min, %) Gradation: 1/2-inch and 3/4-inch	MS-2 Asphalt Mixture Volumetrics[c]	 18.0–23.0
Voids in mineral aggregate on plant-produced HMA (min, %)[a] Gradation: 1/2-inch and 3/4-inch	MS-2 Asphalt Mixture Volumetrics[c]	 18.0–23.0
Dust proportion[a]	MS-2 Asphalt Mixture Volumetrics	Report only
Density of core (% of max theoretical density)[e, f]	California Test 375	91.0–97.0
Hamburg wheel track (min number of passes at 0.5-inch rut depth) Base binder grade: PG 64 or lower PG 70	California Test 389	 15,000 20,000
Hamburg wheel track (min number of passes at inflection point)	California Test 389	Report Only

[a] Prepare 3 briquettes. Report the average of 3 tests.

[b] The Engineer determines the bulk specific gravity of each lab-compacted briquette under the provisions of AASHTO T 275, Method A, and theoretical maximum specific gravity under the provisions of AASHTO T 209, Method A.

[c] Determine bulk specific gravity under the provisions of AASHTO T 275, Method A.

[d] The Engineer determines the laboratory-prepared RHMA-G value for only mix design verification.

[e] The Engineer determines percent of theoretical maximum density under the provisions of California Test 375 except the Engineer uses:

1. AASHTO T 275, Method A, to determine in-place density of each density core instead of using the nuclear gauge.
2. AASHTO T 209, Method A to determine theoretical maximum density instead of calculating test maximum density.

[f] The Engineer determines theoretical maximum density under the provisions of AASHTO T 209, Method A

39-2.03A(4)(e)(ii) Asphalt Rubber Binder

39-2.03A(4)(e)(ii)(A) General

The City does not use asphalt rubber binder design profile for production acceptance.

39-2.03A(4)(e)(ii)(B) Asphalt Modifier

The City accepts asphalt modifier based on compliance with the requirements shown in the following table:

Asphalt Modifier for Asphalt Rubber Binder

Quality characteristic	Test method	Requirement
Viscosity at 100 °C ($m^2/s \times 10^{-6}$)	ASTM D445	X ± 3[a]
Flash point (min, °C)	ASTM D92	207
Molecular analysis:	ASTM D2007	
Asphaltenes (max, % by mass)		0.1
Aromatics (min, % by mass)		55

[a]The symbol *X* is the asphalt modifier viscosity.

39-2.03A(4)(e)(ii)(C) Crumb Rubber Modifier

CRM used must be on the Caltrans Authorized Materials List for Crumb Rubber Modifier.

CRM must be a ground or granulated combination of scrap tire crumb rubber and high natural scrap tire crumb rubber; CRM must be 75.0 ± 2.0 percent scrap tire crumb rubber and 25.0 ± 2.0 percent high natural scrap tire crumb rubber by total weight of CRM. Scrap tire crumb rubber and high natural scrap tire crumb rubber must be derived from waste tires described in Pub Res Code § 42703.

The City accepts CRM, scrap tire crumb rubber, and high natural crumb rubber based on compliance with the requirements shown in the following table:

Crumb Rubber Modifier for Asphalt Rubber Binder

Quality characteristic	Test method	Requirement
Scrap tire crumb rubber gradation (% passing No. 8 sieve)	California Test 385	100
High natural crumb rubber gradation (% passing No. 10 sieve)	California Test 385	100
Wire in CRM (max, %)	California Test 385	0.01
Fabric in CRM (max, %)	California Test 385	0.05
CRM particle length (max, in)	--	3/16
CRM specific gravity	California Test 208	1.1–1.2
Natural rubber content in high natural crumb rubber (%)	ASTM D297	40.0–48.0

Scrap tire crumb rubber and high natural crumb rubber are sampled and tested separately.

39-2.03A(4)(e)(ii)(D) Asphalt Rubber Binder

For City acceptance testing, take samples of asphalt rubber binder in the Engineer's or Engineer's authorized representative's presence every 5 lots or once a day, whichever is greater. Each sample must be placed into 6 1-qt cans with open tops and friction lids.

The City accepts asphalt rubber binder based on compliance with the requirements shown in the following table:

Asphalt Rubber Binder

Quality characteristic	Test method	Requirement
Cone penetration at 25 °C (0.10 mm)	ASTM D217	25–70
Resilience at 25 °C (min, % rebound)	ASTM D5329	18
Softening point (°C)	ASTM D36/D36M	52–74
Viscosity at 190 °C (centipoises)[a]	ASTM D7741/D7741M	1,500–4,000

[a] Prepare sample for viscosity test under the provisions of California Test 388.

39-2.03A(4)(e)(iii)–39-2.03A(4)(e)(v) Reserved

39-2.03B Materials

39-2.03B(1) General

Reserved

39-2.03B(2) Rubberized Hot Mix Asphalt–Gap Graded Mix Design

For RHMA-G, the mix design must comply with the requirements shown in the following table:

RHMA-G Mix Design Requirements

Quality characteristic	Test method	Requirement
Air voids content (%)	AASHTO T 269[a]	Ndesign = 4.0
Gyration compaction (no. of gyrations)	AASHTO T 312	Ndesign = 50–150[b]
Voids in mineral aggregate (min, %)	MS-2 Asphalt Mixture Volumetrics[c]	18.0–23.0
Dust proportion	MS-2 Asphalt Mixture Volumetrics	Report only
Hamburg wheel track (min, number of passes at 0.5-inch rut depth) Base binder grade: PG 64 or lower PG 70	California Test 389[d]	 15,000 20,000
Hamburg wheel track (min, number of passes at the inflection point)	California Test 389[d]	Report Only

[a] Calculate the air voids content of each specimen using AASHTO T 275, Method A, to determine bulk specific gravity and AASHTO T 209, Method A, to determine theoretical maximum specific gravity. Under the provisions of AASHTO T 209, use a digital manometer and pycnometer when performing AASHTO T 209.

[b] Superpave gyratory compactor ram pressure may be increased to a maximum of 825 kPa, and specimens may be held at a constant height for a minimum of 30 minutes and maximum of 90 minutes.

[c] Measure bulk specific gravity using AASHTO T 275, Method A.

[d] Test plant produced RHMA.

Determine the quantity of asphalt rubber binder to be mixed with the aggregate for RHMA-G as follows:

1. Base the calculations on the average of 3 briquettes produced at each asphalt rubber binder content.
2. Plot asphalt rubber binder content versus average air voids content for each set of 3 specimens and connect adjacent points with a best-fit curve.
3. Calculate voids in mineral aggregate for each specimen, average each set, and plot the average versus asphalt rubber binder content.
4. Calculate the dust proportion and plot versus asphalt rubber binder content.
5. From the curve plotted, select the theoretical asphalt rubber binder content at 4 percent air voids.
6. At the selected asphalt rubber binder content, calculate dust proportion.
7. Record the asphalt rubber binder content in the Caltrans Contractor Hot Mix Asphalt Design Data form (CEM 3512) as the OBC.

The OBC must not fall below 7.5 percent by total weight of the mix.

Laboratory mixing and compaction must comply with Superpave HMA mix design method as described in MS-2 *Asphalt Mix Design Methods* by the Asphalt Institute, except the mixing temperature of the aggregate must be from 300 to 325 degrees F. The mixing temperature of the asphalt rubber binder must be from 375 to 425 degrees F. The compaction temperature of the combined mixture must be from 290 to 320 degrees F.

39-2.03B(3) Asphalt Rubber Binder

39-2.03B(3)(a) General

Asphalt rubber binder must be a combination of:

1. Asphalt binder.
2. Asphalt modifier.
3. CRM.

The grade of the asphalt binder for RHMA-G must be PG 64-16.

The combined asphalt binder and asphalt modifier must be 80.0 ± 2.0 percent by weight of the asphalt rubber binder.

39-2.03B(3)(b) Asphalt Modifier

Asphalt modifier must be a resinous, high-flash-point, aromatic hydrocarbon and must comply with the requirements shown in the following table:

Asphalt Modifier for Asphalt Rubber Binder

Quality characteristic	Test method	Requirement
Viscosity at 100 °C ($m^2/s \times 10^{-6}$)	ASTM D445	X ± 3[a]
Flash point (min, °C)	ASTM D92	207
Molecular analysis:		
Asphaltenes (max, % by mass)	ASTM D2007	0.1
Aromatics (min, % by mass)		55

[a] The symbol *X* is the proposed asphalt modifier viscosity. *X* must be between 19 and 36. A change in *X* requires a new asphalt rubber binder design.

Asphalt modifier must be from 2.0 to 6.0 percent by weight of the asphalt binder in the asphalt rubber binder.

39-2.03B(3)(c) Crumb Rubber Modifier

CRM must be a ground or granulated combination of scrap tire crumb rubber and high natural scrap tire crumb rubber. CRM must be 75.0 ± 2.0 percent scrap tire crumb rubber and 25.0 ± 2.0 percent high natural scrap tire crumb rubber by total weight of CRM. Scrap tire crumb rubber and high natural scrap tire crumb rubber must be derived from waste tires described in Pub Res Code § 42703.

The CRM must comply with the requirements shown in the following table:

Crumb Rubber Modifier for Asphalt Rubber Binder

Quality characteristic	Test method	Requirement
Scrap tire crumb rubber gradation (% passing No. 8 sieve)	California Test 385	100
High natural crumb rubber gradation (% passing No. 10 sieve)	California Test 385	100
Wire in CRM (max, %)	California Test 385	0.01
Fabric in CRM (max, %)	California Test 385	0.05
CRM particle length (max, in)[a]	--	3/16
CRM specific gravity	California Test 208	1.1–1.2
Natural rubber content in high natural crumb rubber (%)	ASTM D297	40.0–48.0

[a] Test at mix design and for certificate of compliance.

CRM must be ground or granulated at ambient temperature. If steel and fiber are cryogenically separated, separation must occur before grinding or granulating. Cryogenically produced CRM particles must be ground or granulated and not pass through the grinder or granulator.

CRM must be dry, free-flowing particles that do not stick together. CRM must not cause foaming when combined with the asphalt binder and asphalt modifier. You may add calcium carbonate or talc up to 3 percent by weight of CRM.

39-2.03B(3)(d) Design and Profile

Design the asphalt rubber binder from testing you perform for each quality characteristic and for the reaction temperatures expected during production. The profile must include the same component sources for the asphalt rubber binder used. The 24-hour (1,440-minute) interaction period determines the design profile. At a minimum, mix asphalt rubber binder components, take samples, and perform and record the tests shown in the following table:

Asphalt Rubber Binder Reaction Design Profile

Quality characteristic	Test method	Minutes of reaction [a]							Limit
		45	60	90	120	240	360	1440	
Cone penetration at 25°C (0.10 mm)	ASTM D217	X [b]	--	--	--	X	--	X	25–70
Resilience at 25 °C (min, % rebound)	ASTM D5329	X	--	--	--	X	--	X	18
Field softening point (°C)	ASTM D36/D36M	X	--	--	--	X	--	X	52–74
Viscosity (centipoises)	ASTM D7741/D7741M	X	X	X	X	X	X	X	1,500--4,000

[a] Six hours (360 minutes) after CRM addition, reduce the oven temperature to 275 °F for 16 hours. After the 16-hour (960 minutes) cool down after CRM addition, reheat the binder to the reaction temperature expected during production for sampling and testing at 24 hours (1,440 minutes).

[b] *X* denotes required testing.

39-2.03B(3)(e) Asphalt Rubber Binder Production

39-2.03B(3)(e)(i) General

Deliver scrap tire crumb rubber and high natural crumb rubber in separate bags.

39-2.03B(3)(e)(ii) Mixing

Proportion and mix asphalt binder, asphalt modifier, and CRM simultaneously or premix the asphalt binder and asphalt modifier before adding CRM. If you premix asphalt binder and asphalt modifier, mix them for at least 20 minutes. When you add CRM, the temperature of the asphalt binder and asphalt modifier must be from 375 to 440 degrees F.

After interacting for at least 45 minutes, the asphalt rubber binder must comply with the requirements shown in the following table:

Asphalt Rubber Binder After Interacting

Quality characteristic	Test method	Requirement
Cone penetration at 25 °C (0.10 mm)	ASTM D217	25–70
Resilience at 25 °C (min, % rebound)	ASTM D5329	18
Softening point (°C)	ASTM D36/36M	52–74
Viscosity at 190 °C (centipoises)[a]	ASTM D7741/D7741M	1,500–4,000

[a] Prepare sample for viscosity test under the provisions of California Test 388.

Do not use the asphalt rubber binder during the first 45 minutes of the reaction period. During this period, the asphalt rubber binder mixture must be between 375 degrees F and the lower of 425 or 25 degrees F below the asphalt binder's flash point shown in the SDS.

If any asphalt rubber binder is not used within 4 hours after the reaction period, discontinue heating. If the asphalt rubber binder drops below 375 degrees F, reheat before use. If you add more scrap tire crumb rubber to the reheated asphalt rubber binder, the binder must undergo a 45-minute reaction period. The added scrap tire crumb rubber must not exceed 10 percent of the total asphalt rubber binder weight.

Reheated and reacted asphalt rubber binder must comply with the viscosity specifications. Do not reheat asphalt rubber binder more than twice.

39-2.03B(4) Aggregates

39-2.03B(4)(a) General

For RHMA-G, before the addition of asphalt binder and lime treatment, the aggregates must comply with the requirements shown in the following table:

Aggregate Quality

Quality characteristic	Test method	Requirement
Percent of crushed particles Coarse aggregate (min, %) One-fractured face Two-fractured faces Fine aggregate (min, %) Passing No. 4 sieve and retained on No. 8 sieve.) One-fractured face	AASHTO T 335	 -- 90 70
Los Angeles Rattler (max, %) Loss at 100 Rev. Loss at 500 Rev.	AASHTO T 96	 12 40
Sand equivalent (min)[a]	AASHTO T 176	47
Flat and elongated particles (max, % by weight at 5:1)	ASTM D4791	Report only
Nonmanufactured sand,(max, %)	--	10

[a] Reported value must be the average of 3 tests from a single sample. The use of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in Section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

39-2.03B(4)(b) Aggregate Gradations

The aggregate gradations for RHMA-G must comply with the requirements shown in the following table:

Aggregate Gradation Requirements

RHMA-G pavement thickness shown	Gradation
0.10 foot to less than 0.20 foot	1/2 inch
0.20 foot or greater	3/4 inch

For RHMA-G, the aggregate gradations must be within the TV limits for the specified sieve size shown in the following tables:

Aggregate Gradations for RHMA-G (Percentage Passing)

3/4 inch

Sieve size	Target value limit	Allowable tolerance
1"	100	--
3/4"	95–98	TV ± 5
1/2"	83–87	TV ± 6
3/8"	65–70	TV ± 5
No. 4	28–42	TV ± 6
No. 8	14–22	TV ± 5
No. 200	0.0–6.0	TV ± 2.0

1/2 inch

Sieve size	Target value limit	Allowable tolerance
3/4"	100	--
1/2"	90–98	TV ± 6
3/8"	81–89	TV ± 5
No. 4	24–42	TV ± 6
No. 8	12–22	TV ± 5
No. 200	0.0–6.0	TV ± 2.0

39-2.03B(5) Rubberized Hot Mix Asphalt–Gap Graded Production

Asphalt rubber binder must be from 375 to 425 degrees F when mixed with aggregate.

39-2.03C Construction

Use a material transfer vehicle when placing RHMA-G.

Do not use a pneumatic tired roller to compact RHMA-G.

Spread and compact RHMA-G and RHMA-G produced with WMA water injection technology at an ambient air temperature of at least 55 degrees F and a surface temperature of at least 60 degrees F.

Spread and compact RHMA-G produced with WMA additive technology at an ambient air temperature of at least 50 degrees F and a surface temperature of at least 50 degrees F.

If the ambient air temperature is below 70 degrees F, cover loads in trucks with tarps. The tarps must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement surface. Tarps are not required if the time from discharge to truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes.

For RHMA-G and RHMA-G produced with WMA water injection technology placed under method compaction:

1. Complete the 1st coverage of breakdown compaction before the surface temperature drops below 285 degrees F.
2. Complete breakdown and intermediate compaction before the surface temperature drops below 250 degrees F. Use a static steel-tired roller instead of the pneumatic-tired roller for intermediate compaction.
3. Complete finish compaction before the surface temperature drops below 200 degrees F.

For RHMA-G produced with WMA additive technology placed under method compaction:

1. Complete the 1st coverage of breakdown compaction before the surface temperature drops below 260 degrees F
2. Complete breakdown and intermediate compaction before the surface temperature drops below 230 degrees F
3. Complete finish compaction before the surface temperature drops below 180 degrees F
4. You may continue static rolling below 140 degrees F to remove roller marks

Spread sand at a rate between 1 and 2 lb./sq yd on new RHMA-G pavement when finish rolling is complete. Sand must be free of clay or organic matter. Sand must comply with Section 90-1.02C(3), “Fine Aggregate.”

Keep traffic off the pavement until spreading of the sand is complete.

39-2.03D Payment

Not used.

39-2.04 RESERVED

39-2.05 RESERVED

39-2.06 HOT MIX ASPHALT ON BRIDGE DECKS

39-2.06A General

This section includes specifications for producing and placing hot mix asphalt on bridge decks.

HMA used for bridge decks must comply with the specifications for HMA Type F in Section 39-2.02, “Hot Mix Asphalt Type F and Type H.”

39-2.06B Materials

Do not use the 1-inch or 3/4-inch aggregate gradation for HMA on bridge decks.

The grade of asphalt binder for HMA must be PG 64-10 or PG 64-16.

39-2.06C Construction

Spread and compact HMA on bridge decks using method compaction.

If a concrete expansion dam is to be placed at a bridge deck expansion joint, tape oil-resistant construction paper to the deck over the area to be covered by the dam before placing the tack coat and HMA across the joint.

Apply a tack coat at the minimum residual rate specified in Section 39-2.01C(3)(f), "Tack Coat." For HMA placed on a deck seal, use the minimum residual rate specified for concrete pavement.

For HMA placed on a deck seal:

1. Place the HMA within 7 days after installing the deck seal.
2. If a paper mask is placed on the deck under the provisions of Section 54-5.03, "Construction," place the HMA continuously across the paper mask.
3. Place HMA in at least 2 approximately equal layers.
4. For placement of the 1st HMA layer:
   4.1. Comply with the HMA application temperature recommended by the deck seal manufacturer.
   4.2. Deliver and place HMA using equipment with pneumatic tires or rubber-faced wheels. Do not operate other vehicles or equipment on the bare deck seal.
   4.3. Deposit HMA on the deck seal in such a way that the deck seal is not damaged. Do not use a windrow.
   4.4. Place HMA in a downhill direction on bridge decks with grades over 2 percent.
   4.5. Self-propelled spreading equipment is not required.

39-2.06D Payment

Not used.

39-2.07 MINOR HOT MIX ASPHALT

39-2.07A General

39-2.07A(1) Summary

This section includes specifications for producing and placing minor hot mix asphalt.

Minor HMA must comply with the specifications for HMA Type F in 39-2.02, "Hot Mix Asphalt Type F and Type H," except as specified in this section.

39-2.07A(2) Definitions

Reserved

39-2.07A(3) Submittals

The QC plan and test results in Sections 39-2.01A(3)(c), "Quality Control Plan," and 39-2.01A(3)(d) "Test Results," do not apply.

39-2.07A(4) Quality Assurance

39-2.07A(4)(a) General

The JMF renewal requirements in Section 39-2.01A(4)(d), "Job Mix Formula Renewal," do not apply.

Test pavement smoothness with a 12-foot straightedge.

39-2.07A(4)(b) Quality Control

Testing for compliance with the following quality characteristics is not required:

1. Flat and elongated particles.

2. Hamburg wheel track.

39-2.07A(4)(c) City Acceptance

The City accepts minor HMA under the provisions of Section 39-2.02A(4)(e), “Engineer Acceptance,” except for compliance with requirements for the following quality characteristics:

1. Flat and elongated particles.
2. Hamburg wheel track.

39-2.07B Materials

39-2.07B(1) General

Reserved

39-2.07B(2) Minor Hot Mix Asphalt Mix Design

The Hamburg wheel track requirements do not apply to the mix design for minor HMA.

39-2.07B(3) Asphalt Binder

The grade of asphalt binder for minor HMA must be PG-64-10 or PG-64-16.

39-2.07B(4) Liquid Antistrip Treatment

Treat minor HMA with liquid antistrip unless you submit California Test 389 test results showing compliance with Section 39-2.02B, “Materials,” and dated within 24 months of the submittal.

39-2.07C Construction

Not used.

39-2.07D Payment

Not used.

39-2.08 RESERVED

39-2.09 RESERVED

39-3 EXISTING ASPHALT CONCRETE

39-3.01 GENERAL

39-3.01A General

This section includes general specifications for performing work on existing asphalt concrete facilities.

Work performed on existing asphalt concrete facilities must comply with Section 15, “Existing Facilities.”

39-3.01B Materials

Not used.

39-3.01C Construction

Before removing a portion of an asphalt concrete facility, make a 2-inch deep saw cut to a true line along the limits of the removal area.

39-3.01D Payment

Not used.

39-3.02 REPLACE ASPHALT CONCRETE SURFACING (DIGOUTS)

39-3.02A General

This section includes specifications for replacing asphalt concrete surfacing.

39-3.02B Materials

HMA to be used for replacing asphalt concrete surfacing must comply with HMA Type F as specified in Section 39-2.02, “Hot Mix Asphalt Concrete Type F and Type H,” unless otherwise specified by the Engineer.

The grade of asphalt binder must be PG 64-10 or PG 64-16.

Tack coat must comply with Section 39-2.01B(10), “Tack Coat.”

39-3.02C Construction

Where replace asphalt concrete surfacing is shown, remove the existing asphalt concrete surfacing as specified in the contract and replace with HMA. The Engineer determines the exact limits of asphalt concrete surfacing to be replaced.

Replace asphalt concrete in a lane before the lane is specified to be opened to traffic.

Before removing asphalt concrete, outline the replacement area and cut neat lines with a saw or grind to full depth of the existing asphalt concrete. Do not damage asphalt concrete and base remaining in place.

If you excavate the base beyond the specified plane, replace it with HMA.

HMA shall be placed under atmospheric and surface conditions in conformance with Section 39-2, “Hot Mix Asphalt,” and these Standard Specifications. It shall not be placed when the weather is foggy or rainy, unless otherwise allowed in advance by the Engineer in writing. Asphalt shall be placed only when the surface is dry and in satisfactory condition. In case of sudden rain, the Engineer may permit the placement of base then in transit from the plant, provided that the subgrade is free from pools of water, and the mixture is laid and compacted at the proper temperature.

Do not use a material transfer vehicle for replacing asphalt concrete surfacing.

Before placing HMA, apply a tack coat as specified in Section 39-2.01C(3)(f), “Tack Coat.” Immediately prior to application of tack coat, the subgrade of the area to receive HMA shall conform to the compaction requirements and grade tolerance of Section 101, "Subgrade Preparation," of these Standard Specifications unless otherwise permitted in advance by the Engineer in writing or as noted in the Contract Documents.

HMA mixtures shall be spread and struck off with approved spreading and placement equipment under the provisions of Section 39-2.01C(2), "Spreading and Compacting Equipment."

In unconfined areas, HMA shall be 0.25 foot minimum and 0.42 foot maximum in compacted thickness. In confined, narrow areas, the thickness may be increased to 0.75 foot, provided the density and surface tolerance of the base is obtained.

Place HMA using method compaction as specified in Sections 39-2.01C(2)(c), “Method Compaction Equipment.” and 39-2.01C(15)(b) “Method Compaction.”

Final compaction of the paving may be tested by nuclear density gauges California Test 375 or by coring and testing cores under the provisions of California Test 308, to establish compliance with these Standard Specifications.

The laboratory specimens will be composed of the same materials, in like proportions, as the job mix formula.

39-3.02C(1) Surface Tolerance

The surface of the completed deep lift asphalt base shall be true to line, grade, and cross section and shall be free of ridges, ruts, or depressions. The finished surface shall not deviate at any point more than 0.03-foot from the bottom of a 12-foot straightedge applied parallel with, or at right angles to the centerline or base line. Each lift, except base surface lift, placed by a motor grader shall be true to cross-section for that lift with a tolerance of not more than 0.05-foot when tested with a 12-foot straightedge in any direction.

39-3.02D Payment

The payment quantity for replace asphalt concrete surfacing is the area determined from the dimensions shown.

39-3.03 RESERVED

39-3.04 COLD PLANING ASPHALT CONCRETE PAVEMENT

39-3.04A General

This section includes specifications for cold planning asphalt concrete pavement.

Cold planning asphalt concrete pavement includes the removal of pavement markers, traffic stripes, and pavement markings within the area of cold planning.

Schedule cold planing activities such that the pavement is cold planed, the HMA is placed, and the area is opened to traffic during the same work shift.

39-3.04B Materials

HMA for temporary tapers must be of the same quality that is used for the HMA overlay or comply with the specifications for minor HMA in Section 39-2.07, “Minor Hot Mix Asphalt.”

39-3.04C Construction

39-3.04C(1) General

Do not use a heating device to soften the pavement.

The cold planing machine must be:

1. Equipped with a cutter head width that matches the planing width unless a wider cutter head is authorized.
2. Equipped with automatic controls for the longitudinal grade and transverse slope of the cutter head and:
   2.1. If a ski device is used, it must be at least 30 feet long, rigid, and a 1-piece unit. The entire length must be used in activating the sensor.
   2.2. If referencing from existing pavement, the cold planing machine must be controlled by a self-contained grade reference system. The system must be used at or near the centerline of the roadway. On the adjacent pass with the cold planing machine, a joint-matching shoe may be used.
3. Equipped to effectively control dust generated by the planing operation.

4. Operated such that no fumes or smoke is produced.

Replace broken, missing, or worn machine teeth.

If you do not complete placing the HMA surfacing before opening the area to traffic, you must:

1. Construct a temporary HMA taper to the level of the existing pavement. Taper shall have a minimum run of 3 foot for every 0.15 foot of vertical rise.
2. Place HMA during the next work shift.
3. Submit a corrective action plan that shows you will complete cold planing and placement of HMA in the same work shift. Do not restart cold planing activities until the corrective action plan is authorized.

39-3.04C(2) Grade Control and Surface Smoothness

Install and maintain grade and transverse slope references. You may adjust the planed depth up to ± 0.03 foot from the depth shown to achieve uniform pavement profile, cross slope, and surface smoothness.

The average cold planed depth must be equal to or greater than the depth shown.

The final cut must result in a neat and uniform surface.

The completed surface of the planed pavement must not vary more than 0.02 foot when measured with a 12-foot straightedge parallel with the centerline. With the straightedge at right angles to the centerline, the transverse slope of the planed surface must not vary more than 0.03 foot.

If you encounter delaminations during planing operations notify the Engineer immediately. If authorized, adjust the planed depth up to ± 0.05 foot to eliminate delaminations. Authorized work beyond the ± 0.05-foot range or other authorized mitigation work is Extra Work.

Where lanes are open to traffic, the drop-off of between adjacent lanes must not be more than 0.15 foot.

39-3.04C(3) Planed Material

Remove cold planed material concurrently with planing activities such that the removal does not lag more than 50 feet behind the planer.

39-3.04C(4) Temporary HMA Tapers

If a drop-off between the existing pavement and the planed area at transverse joints cannot be avoided before opening to traffic, construct a temporary HMA taper.

Completely remove temporary tapers before placing permanent surfacing.

39-3.04D Payment

Not used.

39-3.05 – 39-3.10 RESERVED

END OF SECTION

SECTION 40 CONCRETE PAVEMENT

Conform to Section 40, “Concrete Pavement,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

40-1 GENERAL

40-1.01A Summary

Add the following language to Section 40-1.01A, “Summary,” of the *Caltrans Standard Specifications*:

Subgrade preparation shall conform to Section 101, “Subgrade Preparation,” of these *City Standard Specifications.*

END OF SECTION

SECTION 41 EXISTING CONCRETE PAVEMENT

Conform to Section 41, "*Existing Concrete Pavement,*" of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

END OF SECTION

SECTION 42 GROOVE AND GRIND CONCRETE

Conform to Section 42, “Groove and Grind Concrete,” of the *Caltrans Standard Specifications* and *these City Standard Specifications*.

END OF SECTION

SECTIONS 43-44 RESERVED

SECTION 45 STRUCTURES (GENERAL)

Conform to Section 45, “Structures (General),” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 46 GROUND ANCHORS AND SOIL NAILS

Conform to Section 46, “Ground Anchors and Soil Nails,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 47 EARTH RETAINING SYSTEMS

Conform to Section 47, “Earth Retaining Systems,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 48 TEMPORARY STRUCTURES

Conform to Section 48, “Temporary Structures,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 49 PILING

Conform to Section 49, “Piling,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

END OF SECTION

SECTION 50 PRESTRESSING CONCRETE

Conform to Section 50, “Prestressing Concrete,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 51 CONCRETE STRUCTURES

Conform to Section 51, “Concrete Structures,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 52 REINFORCEMENT

Conform to Section 52, “Reinforcement,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 53 SHOTCRETE

Conform to Section 53, “Shotcrete,” of the Caltrans Standard Specifications and these City Standard Specifications.

END OF SECTION

SECTION 54 WATERPROOFING

Conform to Section 54, “Waterproofing,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 55 STEEL STRUCTURES

Conform to Section 55, “Steel Structures,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

END OF SECTION

SECTION 56 OVERHEAD SIGN STRUCTURES, STANDARDS & POLES

Conform to Section 56, "Overhead Sign Structures, Standards and Poles," of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

56-1 GENERAL

56-1.01 GENERAL

56-1.01C Submittals

Delete Section 56-1.01C, "Submittals," of the *Caltrans Standard Specifications* and replace with the following language:

Submit welder certifications for welders working on overhead sign structures, standards, and poles to the Engineer.

56-3 STANDARDS, POLES, PEDESTALS, AND POSTS

56-3.01 GENERAL

56-3.01C(2)(a) General

Delete Section 56-3.01C(2)(a), "General," of the *Caltrans Standard Specifications* and replace with the following language:

Except for concrete for CIDH concrete pile foundations, concrete must comply with the specifications for minor concrete.

Construct concrete foundations on firm ground.

After each standard, pole, pedestal, and post is properly positioned, place mortar under the base plate. Finish the exposed portion to present a neat appearance. Mortar must comply with the specifications for mortar in Section 51-1, "Concrete Structures," except mortar must have:

1. 1 part by volume of cement.
2. 3 parts by volume of clean sand.

Form exposed portions of the foundation to present a neat appearance and true to line and grade. The top of the foundation at curbs or sidewalks must be finished to curb or sidewalk grade. Forms must be rigid and braced securely in place. Conduit ends and anchor bolts must be placed at the proper height and position. Anchor bolts must be installed a maximum of 1:40 from vertical and held in place by rigid top and bottom templates. Use a steel bottom template at least 1/2 inch thick that provides proper spacing and alignment of anchor bolts near the embedded bottom end. Install the bottom template before placing footing concrete.

For relocated standards, construct new foundations and furnish anchor bolts of the proper type and size. Galvanize steel parts under the provisions of Section 75-1.02B, "Galvanizing."

Provide 2 nuts and washers for the upper threaded part of each anchor bolt. Provide 3 nuts and washers for each anchor bar or stud.

Do not weld HS steel used for anchor bolts, anchor bars, or studs.

Before placing concrete, moisten the forms and ground. Keep the forms in place until the concrete sets for at least 24 hours and is strong enough to prevent damage to the surface.

Except when located on a structure, construct foundations monolithically. Apply ordinary surface finish

under the provisions of Section 51-1.03F(2), “Ordinary Surface Finish.”

If a foundation must be extended for additional depth, the extension work is extra work.

Do not erect standards, poles, pedestals, or posts until the concrete foundation has cured for at least 7 days.

The Engineer selects either the plumbing or raking technique for standards, poles, pedestals, and posts. Plumb or rake by adjusting the leveling nuts before tightening nuts. Do not use shims or similar devices. After final adjustments of both top nuts and leveling nuts on anchorage assemblies have been made and each standard, pole, pedestal, and post on the structure is properly positioned, tighten nuts as follows:

1. Tighten leveling nuts and top nuts, following a crisscross pattern, until bearing surfaces of all nuts, washers, and base plates are in firm contact.
2. Use an indelible marker to mark the top nuts and base plate with lines showing relative alignment of the nut to the base plate.
3. Tighten top nuts following a crisscross pattern:
   3.1. Additional 1/6 turn for anchor bolts greater than 1-1/2 inches in diameter.
   3.2. Additional 1/3 turn for other anchor bolts.
   3.3. Tightening tolerance for all top nuts is ± 1/8 turn.

In unpaved areas, construct a raised concrete pad in front of each controller cabinet pedestal.

If a foundation is shown to be abandoned, remove the top of the foundation, anchor bolts, and conduits to a depth of:

1. Two feet below the surface of the finished grade.
2. One foot below the aggregate base in the roadway.

Backfill the resulting hole with material equivalent to the surrounding material and restore all surfaces in kind.

A foundation must be completely removed if not shown to be reused or abandoned.

Dispose of foundations that are removed.

56-3.01C(2)(b) Cast-In-Drilled-Hole Concrete Pile Foundations

Delete Section 56-3.01C(2)(b), “Cast-In-Drilled-Hole Concrete Pile Foundations,” of the *Caltrans Standard Specifications* and replace with the following language:

Reinforced CIDH concrete pile foundation must comply with Section 49-3, “Cast-In-Place Concrete Piling,” except:

1. Dispose of material resulting from drilling holes.
2. Concrete for CIDH concrete piles will not be considered as designated by compressive strength.

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

If shown, use sleeve nuts on Type 1 standards. The bottom of the base plate must be flush with the finished grade.

Spiral reinforcement must be continuous above the bottom of the anchor bolts. The top termination must be either:

1. 1'-6" lap beyond the end of pitch with a 90-degree hook extending to the opposite side of the cage, or
2. 1'-6" lap beyond the end of pitch with 2 evenly spaced authorized mechanical couplers.

56-3.02 STEEL STANDARDS, POLES, PEDESTALS, AND POSTS

56-3.02A(3)(a) General

Delete Section 56-3.02A(3)(a), "General," of the *Caltrans Standard Specifications* and replace with the following language:

Provide Certificate of Compliance and Buy America certifications. Additionally, the Engineer may select random samples of fastener components from each production lot. The Engineer determines sample sizes for each fastener component. Submit selected sample fasteners to the Engineer for QA testing. Include test reports specified in ASTM with the test sample submittal.

56-3.02B(1) General

Add the following language:

Rolled threads are not permitted on anchor bolts 5/8-inch through 1-1/4 inch.

END OF SECTION

SECTION 57 WOOD AND PLASTIC LUMBER STRUCTURES

Conform to Section 57, “Wood and Plastic Lumber Structures,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 58 SOUND WALLS

Conform to Section 58, “Sound Walls,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 59 STRUCTURAL STEEL COATINGS

Conform to Section 59, “Structural Steel Coatings,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 60 EXISTING STRUCTURES

Conform to Section 60, “Existing Structures,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 61 DRAINAGE FACILITIES (GENERAL)

Conform to Section 61, “Drainage Facilities (General),” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 62-63 RESERVED

SECTION 64 PLASTIC PIPE

Conform to Section 64, “Plastic Pipe,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 65 CONCRETE PIPE

Conform to Section 65, “Concrete Pipe,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 66 CORRUGATED METAL PIPE

Conform to Section 66, “Corrugated Metal Pipe,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 67 STRUCTURAL PLATE CULVERTS

Conform to Section 67, “Structural Plate Culverts,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 68 SUBSURFACE DRAINS

Conform to Section 68, “Subsurface Drains,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 69 OVERSIDE DRAINS

Conform to Section 69, “Overside Drains,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 70 MISCELLANEOUS DRAINAGE FACILITIES

Conform to Section 70, “Miscellaneous Drainage Facilities,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 71 EXISTING DRAINAGE FACILITIES

Conform to Section 71, “Existing Drainage Facilities,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

71-5 ADJUST DRAINAGE STRUCTURES

71-5.03B Frames, Covers and Grates

Delete Section 71-5.03B, “Frames, Covers and Grates,” of the *Caltrans Standard Specifications* and replace with the following language:

Adjust frames, covers and grates must comply with Section 15, “Existing Facilities.”

END OF SECTION

SECTION 72 SLOPE PROTECTION

Conform to Section 72, “Slope Protection,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 73 CONCRETE CURBS AND SIDEWALKS

Conform to Section 73, "Concrete Curbs and Sidewalks," of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

73-1 GENERAL

73-1.01A Definitions

Contraction Joint: A score mark of 1/8-inch wide and ¼-inch deep, or weakened plane joint pursuant to the *Campbell Standard Details.*

Construction Joint: Location where PCC is poured next to hardened PCC pursuant to the *Campbell Standard Details.*

73-1.02 MATERIALS

73-1.02A General

Delete the first paragraph of Section 73-1.02A, "General," of the *Caltrans Standard Specifications* and replace with the following language:

Concrete for curbs, sidewalks and their appurtenances must be minor concrete containing at least 564 pounds of Portland Cement per cubic yard and have a 28-day compressive strength of not less than 3000 psi.

73-1.02B Detectable Warning Surface

Delete Section 73-1.02B, "Detectable Warning Surface," of the *Caltrans Standard Specifications* and replace with the following language:

The detectable warning surface shall be Wausau Tile, Architectural Pavers – Truncated Dome ADA Paver, 12" x 12" x 2" (size of tile), A-60 (color). Truncated domes shall be installed under the provisions of manufacturer's instructions or as directed by the Engineer.

73-1.03 CONSTRUCTION

73-1.03A General

Delete Section 73-1.03A, "General," of the *Caltrans Standard Specifications*: and replace with the following language:

Construct contraction joints by one of the following:

1. Scoring concrete with a grooving tool and rounding corners with an edger tool.
2. Saw cutting hardened concrete to a depth of at least 1 inch. Immediately apply curing compound to the exposed surfaces of saw cut joints.

Construct expansion joints at each side of structures. Fill expansion joints with 1/4-inch-thick preformed joint filler. Finish the concrete adjacent to expansion joints with an edger tool. Do not construct expansion joints within 20 feet of an island nose. Shape the preformed joint filler to match the surface contour of the concrete.

Construct dowels in construction joints under the provisions of Section 51-1.03E, "Drill and Bond Dowels (Chemical Adhesive)," the *Campbell Standard Details,* and as follows:

1. Space dowels 12-inch on center along the joint and 3 to 8 inches from the edge.
2. Drill 11/16-inch diameter (maximum) holes for the dowels.

3. Firmly epoxy dowels with 6-inch embedment into existing PCC improvements.
4. Cut dowels to a length of 12 inches from #4 rebar, grade 60 steel.

Dowels or epoxy may be omitted in construction joints where approved by the Engineer and the following conditions are met:

1. All construction joint PCC (both sides of the joint) is placed within one week.
1. All construction joint PCC (both sides of the joint) is part of the work.

Weakened plane joints shall be constructed at intervals of 10 feet or as shown in the Contract Documents.

The weakened plane joint shall be constructed by scoring the partially set concrete to a minimum depth of 2 inches by 1/4-inch with a tool that will leave the comers rounded

73-1.03A(1) Protecting Concrete

The Contractor shall protect newly completed concrete work from damage, including damage by vandalism. No construction equipment will be allowed adjacent to the concrete curb and/or gutter until the fourth day following placement of the concrete. No paving operation will be permitted adjacent to concrete curb or gutter until the seventh day following the placement of the concrete. No equipment will be allowed on or to travel over newly placed concrete until the seventh day following placement of concrete unless adequate provisions are made to transfer the loads off the concrete.

73-1.03A(2) Damaged or Defective Work

Damaged or defective concrete work shall be removed and replaced at the Contractor's sole expense. Damaged or unacceptable concrete shall be sawcut and removed between joints or score marks.

73-1.03B Subgrade Preparation

Delete Section 73-1.03B, "Subgrade Preparation," of the *Caltrans Standard Specifications* and replace with the following language:

Refer to Section 101, "Subgrade Preparation," of these *City Standard Specifications*.

73-2 CURBS

73-2.01 GENERAL

Add the following language to Section 73-2.01, "General," of the *Caltrans Standard Specifications*:

Concrete curb types are as shown in the following table:

TYPES OF CONCRETE CURBS

Type	Description
A1	Standard curb with 6-inch curb face, 3/4-inch batter, overall depth of 14-inches, no gutter section.
A1-6	Island curb with 6-inch curb face, 3/4-inch batter, overall depth of 6-inches, superimposed on existing pavement.
A2	Standard curb and gutter with 6-inch curb face, 3/4-inch batter, and 24-inch gutter section.
A3	Rolled curb and gutter with 3-inch curb height over 8-inch run and gutter section with 1-inch lip over 10-inch width.
B1	Island barrier curb 24-inches overall in height, 8-inch curb face, 3 1/2-inch batter; with steel reinforcement; used for landscaped islands.
B3-6	Island curb 6-inches in height with 3 1/2-inch batter; superimposed on existing pavement.
B3-8	Island curb 8-inches in height with 3 1/2-inch batter; superimposed on existing pavement.

73-2.03 CONSTRUCTION

73-2.03A General

Delete Section 73-2.03A, "General," of the *Caltrans Standard Specifications* and replace with the following language:

Construction shall be under the provisions of the City Standard Details or as specified in the Contract Documents.

When a Portland cement concrete sidewalk or pavement is adjacent thereto or to be constructed adjacent thereto, weakened plane joints shall coincide with contraction joints in the sidewalk or pavement.

The weakened plane joint shall be constructed at right angles to the line of the curb.

Expansion joints shall be installed only where specifically called for in the Contract Documents or as directed by the Engineer.

The use of an existing asphalt pavement edge as the lip of a gutter form will be allowed only if the edge is true and straight, free from chips, humps, sags, or other irregularities, and upon express approval by the Engineer. The use of the excavated embankment for back-forms will not be allowed.

The top and face of the finished curb must be true and straight. The top surface of the curb must be uniform in width and free from humps, sags, or other irregularities. Clean any discolored concrete by abrasive blast cleaning or other authorized method.

Check the flatness of the top and face of the curb and the surface of the gutter with a 10-foot straightedge. The surfaces must be flat to within 0.01 foot except at grade changes or curves.

If curbs are constructed over existing pavement, use steel dowels and reinforcing steel or adhesive to anchor the curb to the existing pavement.

Anchor steel dowels in drilled holes with mortar made from equal parts by volume of Portland cement, sand, and water. You may use anchor bolts instead of anchored steel dowels if authorized by the Engineer.

If adhesive is used, remove all dust, loose material, or oil from the surface of the existing pavement by either wire brushing or blast cleaning.

Except for curbs on structures, you may place curbs with an extrusion machine or a slip form paver if:

1. Finished curb is true to line and grade
2. Concrete contains the maximum quantity of water that maintains the curb's shape without support
3. Required surface texture is attained
4. Approved by the Engineer

Defective curbs shall be removed and replaced in length not less than 5 feet, and leaving not less than 5 feet from a joint.

73-2.03A(1) Drain Opening

Where required, drainage openings or outlets shall be constructed through curbs as specified in the Contract Documents. The opening may consist of curb opening castings, in configuration of the curb, or may be hand formed using a suitable mold the size of the drain. Care shall be exercised in placing concrete around hand formed openings to prevent cracking of the curb after the concrete has cured.

73-2.03A(2) Flowline Test

Before approval or acceptance of curb and gutter, a flow line test shall be conducted to the satisfaction of the Engineer. Water, in a quantity determined by the Engineer, shall be released at the high point in the gutter and allowed to flow naturally. Any obstructions to the water flow shall be documented and submitted to the Engineer immediately. The noted obstructions shall be corrected by removing and reconstructing the affected portions of curb and gutter as directed by the Engineer.

73-2.03A(3) Backfilling

After the concrete has set sufficiently (minimum of 7-days), the spaces in the back of and in the front of curbs shall be backfilled to the required elevations with suitable material as specified in the Contract Documents or as approved by the Engineer.

73-3 SIDEWALKS, GUTTER DEPRESSIONS, ISLAND PAVING, CURB RAMPS, AND DRIVEWAYS

73-3.01 GENERAL

73-3.01C Submittals

Delete Section 73-3.01C, "Submittals," of the *Caltrans Standard Specifications* and replace with the following language:

Submit prefabricated detectable warning surface cut sheet and manufacturer installation instructions.

73-3.01D(2) Warranties

Delete Section 73-3.01D(2), "Warranties," of the *Caltrans Standard Specifications* and replace with the following language:

The warranty for a prefabricated detectable warning surface must cover defects in dome shape, color fastness, sound-on-cane acoustic quality, resilience, and attachment.

73-3.03 CONSTRUCTION

Delete Section 73-3.03, “Construction,” of the *Caltrans Standard Specifications* and replace with the following language:

The construction of sidewalks, gutter depressions, island paving, curb ramps and/or driveways shall be under the provisions of the City Standard Details or as specified in the Contract Documents.

Sidewalks shall be either separated (i.e. detached from the curb with a landscape strip in between) or attached (i.e. located at the back of / adjacent to the curb) as shown in the City Standard Details or as specified in the Contract Documents.

The thickness of the sidewalk, driveways and curb ramps shall be as shown in the City Standard Details or as specified in the Contract Documents.

Weakened plane joints in sidewalks, driveway aprons, and curb ramps shall be constructed in the concrete slab at all returns and at intervals of 10 feet or as specified in the City Standard Details. Weakened plane joints shall coincide with any existing joints on adjacent curbs or other adjacent facilities. After preliminary troweling, the concrete shall be parted with an approved metal straight edge at the designated locations.

The sidewalk slab shall be divided into sections, between weakened plane joints, at 5-foot intervals, or at intervals specified in the City Standard Details, by score marks. The score marks shall be formed by a jointing or grooving tool. The score mark shall extend into the concrete at least 1/4-inch and shall be approximately 1/8-inch wide. Score marks shall be perpendicular to the line of work except at curves, where the score marks shall be radial to the curve. When longitudinal marks are required, they shall be parallel to or concentric with the line of work.

The surface finish for sidewalks, driveways, and curb ramps shall be troweled, light broom finish unless otherwise specified in the Contract Documents. After the concrete has set sufficiently, the surface to receive the troweled, light broom finish shall be given a final troweling, and all joints, score marks, and edges shall be reopened or refinished. Broom finish shall be perpendicular to the path of travel on surfaces used by pedestrians. Broom finish on wings for curb ramps shall be parallel to the curb.

The finished surface must not vary more than 0.02 foot from a 10-foot straightedge except at grade changes.

If placing pavement around or adjacent to manholes, pipe inlets or other miscellaneous structures in sidewalk, gutter depression, island paving, curb ramps, or driveway areas, do not finish the miscellaneous structures to final grade until the pavement is finished beyond the miscellaneous structure.

The top of driveway or curb ramps shall be true and straight and free from humps, sags, or other irregularities. The face rise of the driveway at flow line of gutter shall be formed with a driveway finishing tool as approved by the Engineer.

Forms for island pavement shall consist of previously constructed or existing type B-3 curbs. Screed forms shall be used where crowns are required in the island pavement.

All other forms shall be under the provisions of Section 73-1.0C, "Fixed Forms," of the *Caltrans Standard Specifications*.

Leave forms in place for sidewalks, gutter depressions, island paving, curb ramps, and driveways for at least 12-hours after surface finishing.

Clean any discolored concrete by abrasive blast cleaning or other authorized method.

Expansion joint filler, ¼-inch thick, shall be installed between concrete sidewalks and any fixed structure such as a building or bridge. The expansion joint filler material shall extend for the full depth of the walk.

73-3.04 PAYMENT

Delete Section 73-3.04, “Payment,” of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

END OF SECTION

SECTION 74 PUMPING EQUIPMENT AND CONTROLS

Conform to Section 74, “Pumping Equipment and Controls,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 75 MISCELLANEOUS METAL

Conform to Section 75, “Miscellaneous Metal,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 76 WELLS

Conform to Section 76, “Wells,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 77 RESERVED

SECTION 78 INCIDENTAL CONSTRUCTION

Conform to Section 78, “Incidental Construction,” of the *Caltrans Standard Specifications* and these *City Standard Specifications*.

78-2 SURVEY MONUMENTS

78-2.01 GENERAL

Delete Section 78-2.01, “General,” of the *Caltrans Standard Specifications* and replace with the following language:

Section 78-2, “Survey Monuments,” includes specifications for constructing survey monuments.

Notify the Engineer at least 7 days before you construct a survey monument or adjust a monument cover to grade. Whenever monuments, property corners, or other survey points are so located that they may be damaged or destroyed by the proposed excavation, the Contractor shall notify the Engineer 48 hours prior to the start of construction so that such monuments, property corners or survey points may be tied out.

Tying out of monuments, property corners or survey points, and resetting shall be the Contractor’s sole responsibility and shall be done by an individual licensed to perform such work. All Costs associated with tying out such monuments, property corners, or survey points and resetting such facilities shall be borne by the Contractor.

Do not disturb monuments without authorization.

Work performed on existing monuments must comply with Section 15, “Existing Conditions,” of these *City Standard Specifications*.

78-2.02 MATERIALS

Delete Section 78-2.02, “Materials,” of the *Caltrans Standard Specifications* and replace with the following language:

Survey monuments shall be Portland Cement Concrete structures with brass discs. The concrete shall contain approximately 470 pounds of Portland cement per cubic yard and have a 28-day compressive strength of not less than 2500 psi. The maximum aggregate size used shall be ¾-inch.

Unless otherwise specified in the Contract Documents, survey marker discs shall be supplied by the Contractor and shall be ”C” style (US Army Corps of Engineers Type 1 Disc) with the classic 3” (76mm) long split-style tapered stem. Marker shall be orbital formed from solid unleaded silicon bronze bar. The disc shall be 3-1/2 inches in diameter and not less than 3 inches in length.

Mortar shall comply with Section 51-1.02F, “Mortar,” of these *City Standard Specifications*.

The materials used in the construction of survey monuments shall conform to, and be tested for, the physical and composition requirements under the provisions of the referenced ASTM Designation.

The frames, covers and hardware must comply with Section 55, “Steel Structures,” of these *City Standard Specifications*.

The covers must fit into the frames without rocking.

78-2.03 CONSTRUCTION

Delete Section 78-2.03, “Construction,” of the *Caltrans Standard Specifications* and replace with the following language:

Construction of monuments shall be under the provisions of the *City Standard Details* or as specified in the Contract Documents.

The brass disc shall be imbedded in the fresh concrete and centered within the cross ties of the survey point. The finished survey monument shall be cured and protected for such time as directed by the Engineer.

Where called for in the Contract Documents, monument cases shall be installed over new or existing monuments under the provisions of the City's Standard Details or as specified in the Contract Documents. The finished monument case shall be flush with the surrounding area and shall be secured by a concrete or mortar collar.

78-2.04 PAYMENT

Delete Section 78-2.04, "Payment," of the *Caltrans Standard Specifications* and replace with the following language:

The Contract unit prices paid for survey monuments shall include the brass disc unless otherwise specified in the Contract Documents.

The Contract unit price paid for each monument box shall include furnishing and the placement of the sleeve and monument box complete in place. The method of payment for monument cases is the same as that provided for survey monuments.

78-4 MISCELLANEOUS COATINGS

78-4.08 PAINTING ELECTRICAL MATERIAL

78-4.08C(1) General

Delete Section 78-4.08C(1), "General," of the *Caltrans Standard Specifications* and replace with the following language:

Clean and paint electrical material.

The coating must be free from flow lines, streaks, blisters, and other defects that would impair serviceability or detract from the general appearance.

Prepare and finish conduit and conduit fittings above ground as specified for the adjacent standard or post. Finish conduit, conduit fittings, and mounting hardware on structures to match the color of the structure.

78-4.08C(2) Traffic Signal Faces and Fittings

Delete Section 78-4.08C(2), "Traffic Signal Faces and Fittings," of the *Caltrans Standard Specifications* and replace with the following language:

Finish the interiors of the metal signal visor, louver, and the front face of backplates with 2 applications of lusterless black, exterior-grade, latex paint formulated for application to properly prepared metal surfaces. Painting is not required if the equipment has a good factory finish.

Apply 2 coats of lusterless dark olive green, exterior-grade, latex paint formulated for application to properly prepared metal surfaces to the following electrical equipment:

1. Signal section.
2. Signal head mounting, brackets and fittings.
3. Outside of visor.
4. Pedestrian push button housing.
5. Pedestrian signal section and visor.

6. Back face of back plate.

The color must match color chip No. 68 under the provisions of *Caltrans Standard Specifications*.

78-5 PARKING BUMPERS

78-5.02 MATERIALS

Delete Section 78-5.02, "Materials," of the *Caltrans Standard Specifications* and replace with the following language:

Parking bumpers must be steel-reinforced PCC units. The concrete must be air entrained and have a minimum compressive strength of 4,000 psi.

Each unit must be from 4 to 6 inches high, from 6 to 9 inches wide, and from 3 to 4 feet long. All units for a project must be the same size.

Each unit must have chamfered corners, transverse drainage slots on the underside, and at least 2 factory-formed or drilled vertical holes through the parking bumper for anchoring it to the substrate.

The units must be free of pockets, sand streaks, honeycombs, and other obvious defects. Corners must be uniform, straight, and sharp.

The mounting hardware must be galvanized steel.

78-21 RESETTING AND RELOCATING MAILBOXES

78-21.03 CONSTRUCTION

Delete Section 78-21.03, "Construction," of the *Caltrans Standard Specifications* and replace with the following language:

78-21.03A Mailboxes During Construction

Existing mailboxes may be temporarily relocated to clear the way for the Contractor's operations. Mailboxes shall be accessible for delivery at all times. Mailboxes shall either be installed on posts set in the ground or they may be installed on temporary supports approved by the Engineer. Portable supports for the mailboxes consisting of posts set in concrete in 5-gallon buckets shall not be used.

78-21.03B Final Mailbox Construction

When construction is complete, mailboxes shall be installed in their final position on new 4x4 inch rough sawn redwood posts at a height of 46 inch above finish grade. Foundations for the mailbox posts shall be replaced in kind.

Groups of mailboxes on a single-post or multi-post support shall be provided with redwood planks as a supporting cross member between posts. Redwood shall conform to the requirements for sign-posts in Section 82-3.02C, "Wood Posts," of the *City Standard Specifications*. The space around the posts shall be backfilled with native soil or aggregate base. The backfill material shall be placed in layers approximately 4 inch thick and each layer shall be moistened and thoroughly compacted.

Existing posts and mounts shall become the property of the Contractor and disposed of outside the right-of-way.

Newspaper boxes attached to existing mailbox posts shall be removed and fastened to the new mailbox posts. Final locations of mailboxes shall be as shown on the Contract Documents or as designated in the field by the Engineer.

78-21.04 PAYMENT

Delete Section 78-21.04, “Payment,” of the *Caltrans Standard Specifications* and replace with the following language:

Not used.

78-23 ADJUST UTILITY FRAMES, COVERS, AND MANHOLES

Delete Section 78-23, “Adjust Utility Frames, Covers, and Manholes,” of the *Caltrans Standard Specifications* and replace with the following language:

Section 15, “Existing Facilities,” specifies work to adjust utility frames, covers, grates, and manholes.

END OF SECTION

SECTION 79 RESERVED

SECTION 80 FENCES

Conform to Section 80, “Fences,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 81 MISCELLANEOUS TRAFFIC CONTROL DEVICES

Conform to Section 81, “Miscellaneous Traffic Control Devices,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

81-2 DELINEATORS

81-2.02 MATERIALS

81-2.02E Target Plates

Delete the fifth paragraph in Section 81-2.02E, “Target Plates” of the *Caltrans Standard Specifications* and replace with the following language:

The nominal thickness of an aluminum sheet must be at least 0.080-inch.

81-3 PAVEMENT MARKERS

81-3.03 CONSTRUCTION

81-3.03A Summary

Add the following language to Section 81-3.03A, “Construction” of the *Caltrans Standard Specifications*:

Construct lane line type traffic lines markers under the provisions of *Caltrans Standard Plan*s A20A, “Pavement Markers and Traffic Lines Typical Details,” Detail 9, “Lane lines (Multilane Highways),” except reflective pavement markers must be Type C (red/clear).

Construct channelizing line type traffic lines under the provisions of *Caltrans Standard Plan*s A20D, “Pavement Markers and Traffic Lines Typical Details,” Detail 38, “Channelizing Line,” except reflective pavement markers must be Type C (red/clear).

END OF SECTION

SECTION 82 SIGNS AND MARKERS

Conform to these *City Standard Specifications*.

82-1 GENERAL

82-1.01 GENERAL

82-1.01A Summary

This section includes general specifications for fabricating and installing sign panels and markers and constructing roadside signs.

Signs and markers must comply with the *CA MUTCD*, *California Sign Specifications*.

Unless otherwise shown or specified in the Contract Documents, all sign panels, fastening hardware, and poles shall be furnished and installed by the Contractor. All sign poles shall be 2” x 2” Unistrut Telespar perforated galvanized steel pole, or 2” inside diameter galvanized unpainted or powder-coated pole as specified in the Contract Documents.

82-2 SIGN PANELS

82-2.01 GENERAL

82-2.01A Summary

This section includes specifications for furnishing sign panels. Furnishing sign panels includes fabricating and installing sign panels.

82-2.01B Definitions

Background: Dominant sign color.

Legend: Letters, numerals, tildes, bars, arrows, route shields, symbols, logos, borders, artwork, and miscellaneous characters that are intended to convey specific meanings on traffic signs.

82-2.01C Submittals

Submit a certificate of compliance for:

1. Aluminum sheeting
2. Retroreflective sheeting
3. Color imaging methods and film
4. Protective-overlay film

Upon request, submit test samples of sign panels and materials at various stages of production. The samples must be at least 12 by 12 inches and include the background material and legend.

At least 15 days before starting sign fabrication, submit at least 3 copies of your QC plan for sign panels. The QC plan must include:

1. Contact information for the person responsible for sign QC.
2. Acceptance criteria for incoming raw materials at the fabrication plant.
3. Type, method, and frequency of QC testing at the fabrication plant.
4. Types and brand names of retroreflective sheeting.
5. List of the retroreflective sheeting manufacturer's approved process colors, protective overlay film, and black nonreflective film, including the manufacturer's name and product name for each item.

6. Manufacturer's installation and splicing instructions for the retroreflective sheeting.
7. Manufacturer's instructions for cleaning each product.
8. Method of packaging, transporting, and storing signs.

82-2.01D Quality Assurance

The City may inspect signs at the fabrication plant or the job site. The City rejects formed panel signs with holes that are slanted or incorrectly spaced. The Engineer will reject damaged signs, defective signs, and signs with spelling errors before or after installation.

The City rejects a laminated panel if a 0.010-inch-thick by 1/2-inch-wide feeler gauge can be inserted to a depth of more than 1/2 inch between the extruded aluminum frame and the aluminum sheeting.

If instrumental testing under the provisions of ASTM D4956 is disputed, the Engineer's visual inspection will determine the color of the retroreflective sheeting, screened process colors, and film.

82-2.02 MATERIALS

82-2.02A General

A sign panel must be produced at a fabrication plant.

For a sign composed of multiple panels, the legend must be placed across joints such that it does not affect the size, shape, spacing, and appearance of the legend on the assembled sign.

For a formed panel sign, the retroreflective sheeting for the background and legend must be wrapped around the interior vertical edges of each panel.

The exposed portion of the mounting hardware on the sign face, including rivets used to attach sheeting to framing members, must have a factory- or field-applied finish that closely matches the color of the background and legend of the sign face.

The face of a fabricated sign must be uniform, flat, smooth, and free from defects, scratches, chips, wrinkles, gel, hard spots, streaks, extrusion marks, and air bubbles. The front, back, and edges of sign panels must not have bends, router chatter marks, burns, sharp edges, loose rivets, delaminated skins, excessive adhesive over-spray, or aluminum marks.

Protect, transport, and store sign panels fabricated with screened-process colors under the provisions of the retroreflective sheeting manufacturer's instructions.

Transport sign panels such that the faces of the panels are protected from damage and weather. Ship panels on pallets, in crates, or in tier racks. Ship panels vertically on edge, not stacked horizontally. Place padding and protective materials between the panels as necessary. Keep panels dry during transit.

Do not store sign panels directly on the ground. Keep sign panels dry at all times and store the panels:

1. In a dry environment.
2. On edge vertically whether indoors or outdoors.
3. In enclosed, climate-controlled trailers or containers in areas of high heat and humidity.
4. Indoors whenever the panels will be stored more than 30 days.

82-2.02B Aluminum Sheeting

A sign panel must be fabricated from aluminum sheeting of an alloy and temper complying with ASTM B209.

The aluminum sheeting must be pretreated for corrosion resistance as specified in ASTM B449. The surface of the sheeting must be cleaned, deoxidized, and coated with a light, tightly-adherent chromate conversion coating free from powdery residue. The conversion coating must be Class 2 with a weight from 10 to 35

mg/sq ft and an average weight of 25 mg/sq ft. After the cleaning and coating process, the aluminum sheeting must be protected from exposure to grease, oils, dust, and contaminants.

The aluminum sheeting must be free from buckles, warps, dents, cockles, burrs, and other defects resulting from fabrication.

The base plate for standard route markers must be die cut.

82-2.02C Retroreflective Sheeting

Retroreflective sheeting used for the background and legend must comply with the latest California Manual on Uniform Traffic Control Devices for Prismatic Sheeting, Type IV or higher.

82-2.02D Single-Sheet Aluminum Panels

The aluminum sheeting for framed and unframed panels must be aluminum alloy 6061-T6 or 5052-H38.

A single-sheet aluminum panel must not have a vertical splice in the aluminum sheeting. A panel with a depth greater than 48 inches may have 1 horizontal splice in the sheeting.

For a framed panel, the framing members must be aluminum channel or rectangular aluminum tubing. The lengths of the framing members must be within +/- 1/8 inch of the lengths shown.

Aluminum channels or rectangular aluminum tubing must be welded together using the inert gas-shielded arc welding process and E4043 aluminum-electrode filler wires. The filler diameter must be equal to the wall thickness of the smallest welded channel or tubing.

The aluminum sheeting must be attached to the frame with 3/16-inch-diameter rivets. The rivets must be placed at least 1/2 inch from the web channel edges. The rivets must be made of aluminum alloy 5052 and be anodized or treated with a conversion coating to prevent corrosion.

A fabricated single-sheet, aluminum panel must be within +/- 1/8 inch of the dimensions shown. The panel must be flat to within +/- 1/32 in/ft of the panel dimensions as measured by a straightedge placed in any direction across the plane of the panel.

82-2.03 CONSTRUCTION

82-2.03A General

Deliver sign panels to the job site with the background and legend permanently affixed to the panels. Do not chip or bend sign panels.

Use the following hardware to mount the type of sign panel shown:

1. Lag screws, nuts, bolts, and washers for roadside signs.
2. Braces and wood block spacers for roadside signs.
3. Type A-1 and Type A-2 mounting hardware for overhead laminated-panel signs.
4. Type A-3 mounting hardware for overhead formed-panel signs.

82-3 ROADSIDE SIGNS

82-3.01 GENERAL

82-3.01A Summary

This section includes specifications for constructing roadside signs.

Roadside signs include ground-mounted signs and Type N(CA), Type P(CA), and Type R(CA) markers panels.

82-3.01B Definitions

Roadside signs: Traffic sign with 1 or more sign panels attached to a supporting structure consisting of 1 or 2 posts, a signal standard, or a lighting standard.

Ground-mounted sign: Roadside sign or signs with a wide-flange metal post.

82-3.02 MATERIALS

82-3.02A General

A roadside sign includes sign panels, fastening hardware, back braces, straps and saddle brackets, and frame assemblies for multiple sign panels.

82-3.02B Wood Posts

A wood post must be the allowable grade and species for the sizes shown in the following table:

Wood Post Grade and Specie

Nominal post size[a]	Allowable grades and species
4 by 4 inches	Select heart redwood
	No. 1 heart structural redwood, 1050f
	No. 2 heart structural redwood, 900f
	No. 1 structural light framing Douglas Fir, free of heart center
	No. 1 structural light framing Hem-Fir, free of heart center
	No. 1 structural light framing Southern yellow pine, free of heart center
4 by 6 inches	Select heart grade redwood
	Select heart structural grade redwood, 1100f
	No. 1 heart structural redwood, 950f
	No. 2 structural joists and planks, Douglas fir, free of heart center
	No. 1 structural joists and planks Hem-Fir, free of heart center
	No. 2 structural joists and planks Southern yellow pine
Greater than 4 by 6 inches	Select heart redwood
	No. 1 heart structural redwood, 950f
	No. 1 posts and timbers, also known as no. 1 structural, Douglas fir, free of heart center
	Select structural posts and timbers Hem-Fir, free of heart center; and no. 1 timbers Southern yellow pine, free of heart center

[a] Sizes shown are minimum dressed dry sizes.

The posts must be graded under the provisions of Section 57-2.01B(2), “Structural Timber and Lumber.” The sweep must not exceed 0.08 foot in 10 feet.

Posts must be treated under the provisions of Section 57-2.01B(3), “Preservative Treatment,” and under the provisions of AWPA U1, Use Category UC4A, Commodity Specification A. Posts must be incised, and the minimum retention of preservative must comply with AWPA requirements.

82-3.02C Streetlight Poles and Traffic Signal Standards

Signs to be installed on streetlight poles shall be installed with 0.5 inch stainless steel straps with worm-gear clamp.

82-4 MARKERS

82-4.01 GENERAL

82-4.01A Summary

This section includes specifications for fabricating and installing markers.

Provide object markers under the provisions of *Caltrans Standard Plans,* “Object Markers,” (A73A), and “Markers,” (A73B), and these City Standard Specifications wherever object markers are specified.

82-4.01B Submittals

Submit a certificate of compliance for:

1. Metal target plates
2. Enamel coating
3. Retroreflective sheeting

82-4.01C Quality Assurance

When tested under the provisions of California Test 671, the enamel coating on metal target plates must have satisfactory resistance to weathering, humidity, salt spray, and chemicals. The enamel coating must have:

1. Satisfactory adherence and impact resistance.
2. Pencil lead hardness of HB minimum.
3. 60-degree specular gloss of 80 percent minimum.
4. Excitation purity of 3 percent maximum:
   4.1. As received.
   4.2. After 1,000 hours in an artificial weathering device as specified in ASTM G155, Table X3.1, Cycle 1.
5. Daylight luminous directional reflectance, Y value, of 70 minimum.

The City may sample metal target plates for testing at the production stages for the lot and sample sizes shown in the following table:

Metal Target Plate Sampling

Production stage	Lot size	Sample size
Finished target plates	Less than 5,000	5 target plates
	5,000–10,000	10 target plates
Flat sheet stock	10,000 sq ft or less[a]	Five 12-by-24-inch specimens
Coil stock	5,000 lb or less	Two 12-by-12-inch specimens or one 12-by-24-inch specimen

[a] Flat sheet stock must be identifiable with parent coil stock.

The City rejects the entire lot if either of the following occurs:

1. Any sample does not comply with Section 82, “Signs and Markers.”
2. Zinc-coated steel sheets show any evidence of damage to or removal of the zinc coating.

If the City chooses to resample, the sample size may be twice the number shown in the table titled "Metal Target Plate Sampling."

82-4.02 MATERIALS

82-4.02A General

A marker must be on Caltrans’ Authorized Material List for signing and delineation materials.

82-4.02B Metal Posts

Steel for a metal post must comply with ASTM A36/A36M. A metal post must be galvanized under the provisions of Section 75-1.02B, “Galvanizing.”

82-4.02C Wood Posts

A wood post must comply with Section 82-3.01, “Wood Posts.”

82-4.02D Flexible Posts

A flexible post must be white except where shown as yellow.

The flexible post must be free from burns, discoloration, contamination, and other objectionable marks or defects that affect appearance or serviceability.

82-4.02E Target Plates

A target plate for a Type K-1 (CA) or a Type K-2 (CA) object marker must be the same color and material as the flexible post.

A target plate for Type L-1 (CA) or Type L-2 (CA) object marker installed on a metal post must be manufactured from an aluminum sheet or zinc-coated steel sheet.

Galvanize steel sheets under the provisions of Section 75-1.02B, “Galvanizing.” Zinc-coated steel sheets must comply with ASTM A653/A653M, Commercial Steel, Types A, B, and C.

The nominal thickness of a zinc-coated steel sheet must be at least 0.038 inch.

Prepare zinc-coated surfaces to produce optimum adherence of the enamel coating without damaging or removing the zinc coating.

An aluminum target plate must be aluminum alloy 3003-H14. You may use other alloys having equivalent properties if authorized.

The nominal thickness of an aluminum sheet must be at least 0.080 inch.

Prepare the aluminum sheets for the enamel coating by a suitable cleaning method to remove contaminants and by uniformly applying an acid-chromate-fluoride, acid-chromate-fluoride phosphate, or equivalent chemical anticorrosion conversion coating.

Cut the target plate to size and shape and punch the mounting bolt holes. The surfaces and edges of the plate must be free from fabrication defects.

Coat the pretreated metal target plate with an opaque white coating on both sides using a 1-coat or 2- coat system. When tested under the provisions of California Test 671, the dry film for the:

1. 1-coat system must be uniform and have an average thickness of at least 0.75 mil with no individual measurement less than 0.65 mil.
2. 2-coat system must consist of 0.10- to 0.20-mil-thick primer and have an average thickness of at least 0.75 mil, including primer and top coat, with no individual measurement less than 0.65 mil.

If using a 1-coat painting system, fabricate a zinc-coated steel target plate, including shearing, cutting, and punching, before starting the enameling process.

The enamel coating on a metal target plate must be the product of a commercial manufacturer. Apply the enamel coating by spray, dip, roller, or continuous roller coating. You may use other methods if authorized.

The coating must be smooth and substantially free from flow lines, paint washout, streaks, blisters, and other defects that might impair serviceability or detract from the general appearance.

A finished metal target plate must not have dents or defects. The maximum edge-to-edge surface deviation from a horizontal plane must not exceed 1/8 inch.

82-4.02E Reflectors

A reflector for a marker must be made of a Type III or higher grade retroreflective sign sheeting shown on the Authorized Material List for signing and delineation materials.

82-4.02F Hardware

Use (1) 1/4-inch galvanized steel or aluminum nuts and bolts or (2) 3/16-inch blind aluminum rivets and washers to attach a target plate to a post.

Use 5/16-inch galvanized steel bolts, nuts, and washers to attach a marker panel to a post.

82-4.03 CONSTRUCTION

Drive posts in place where soil conditions allow the driving without damage to the posts. Drill pilot holes if the ground conditions are such that the posts cannot be driven without being damaged.

Install target plates and marker panels after the posts are set in place.

After setting the posts, fill the space around them with rock-free earth. During placement, thoroughly tamp and water the fill material such that the post is held securely in position.

Unless surplus excavated material is hazardous, uniformly spread it along the adjacent roadway where designated by the Engineer.

Before Contract acceptance, spot paint all exposed areas where the paint is damaged and clean all exposed areas that are soiled.

82-5 EXISTING ROADSIDE SIGNS AND MARKERS

82-5.01 GENERAL

This Section includes specifications for performing work on existing roadside signs and markers. Work performed on existing roadside signs and markers must comply with Section 15, “Existing Facilities.”

82-5.02 CONSTRUCTION

82-5.02A General

Remove roadside signs only when replacement signs are installed or when the existing signs are no longer required for traffic. Reset or relocate each roadside sign the same day it is removed.

Single sheet aluminum signs to be salvaged must be banded on a pallet with a total weight of not more than 500 lb/pallet.

Reset or relocate roadside signs using existing posts.

If an existing post is deteriorated or broken, notify the Engineer. If ordered, use a new post.

Any new post and its installation, ordered for reasons other than damage you cause is extra work.

82-5.02B Installation of Sign Panels on Existing Frames

Install sign panels on existing frames with fastening hardware under the provisions of Section 82-2.03A, “Construction.”

82-5.02C Installation of Sign Panels on Existing Posts

Install roadside sign panels on existing posts with fastening hardware under the provisions of Section 82-2.03A, “Construction.”

END OF SECTION

SECTION 83 RAILINGS AND BARRIERS

Conform to Section 83, “Railings and barriers,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 84 TRAFFIC STRIPES AND PAVEMENT MARKINGS

Conform to these *City Standard Specifications*.

84-1 GENERAL

84-1.01 GENERAL

This section includes general specifications for applying and constructing markings.

Traffic striping and pavement markings shall conform to the standards, dimensions, and details as specified in the *California Manual on Uniform Traffic Control Devices (MUTCD)* or as otherwise stated in the *City Standard Details* or Contract Documents.

84-2 TRAFFIC STRIPES AND PAVEMENT MARKINGS

84-2.01 GENERAL

84-2.01A Summary

This section includes specifications for applying traffic stripes and pavement markings.

Traffic stripes and pavement markings must comply with ASTM D6628 for daytime and nighttime color.

Retroreflectivity must be measured under ASTM E1710, and the sampling protocol specified in ASTM D7585.

Unless otherwise specified in the Contract Documents, traffic lane stripes 8 inches (8”) or wider, crosswalks, and all pavement legends, markings, and arrows shall be thermoplastic. All other traffic stripes and pavement markings shall be in paint.

84-2.01A(1) Control of Alignment and Layout

Locations of new traffic striping and pavement markings shall be reviewed in the field and approved by the Engineer prior to its installation.

84-2.01B Definitions

Pavement marking. Transverse marking which includes shoulder or gore marking, traffic island marking, word or numeral or symbol marking, arrow, limit line, stop line, yield line, crosswalk marking, speed measurement marking, speed reduction marking, speed hump marking, parking space marking, and route shield marking.

Traffic stripe. Longitudinal centerline or lane line used for separating traffic lanes in the same direction of travel or in the opposing direction of travel or a longitudinal edge line marking the edge of the traveled way or the edge of a lane at a gore area separating traffic at an exit or entrance ramp. A traffic stripe is shown as a traffic line.

84-2.01C Submittals

For each lot or batch of traffic stripe material, primer, and glass beads, submit:

1. Certificate of compliance, including the material name, lot or batch number, and manufacture date
2. A copy of Caltrans’ Department of Materials Engineering and Testing Services (METS) notification letter stating that the material is authorized for use, except for thermoplastic and primer.
3. Safety Data Sheets (SDS).
4. Manufacturer's Instructions.

For each lot or batch of thermoplastic, submit a manufacturer's certificate of compliance and the following test results from the California Test 423:

1. Brookfield Thermosel viscosity.
2. Hardness.
3. Yellowness index, white only.
4. Daytime luminance factor.
5. Yellow color, yellow only.
6. Glass bead content.
7. Binder content.

The date of the test must be within 1 year of use.

Upon request by the Engineer submit the following:

1. Submit test results for each lot of beads specifying the EPA test methods used and tracing the lot to the specific test sample. The testing for lead and arsenic content must be performed by an independent testing laboratory.
2. Submit the thermoplastic test stripe to the Engineer.
3. Submit the retroreflectivity test result within 5 days of testing the traffic stripes and pavement markings. The data must include the retroreflectivity, time, date, and GPS coordinates for each measurement.

84-2.02 MATERIALS

84-2.02A Thermoplastic

Thermoplastic traffic stripe material is classified by color only as either white or traffic yellow.

Thermoplastic must comply with State Specification PTH-02ALKYD.

Each lot or batch of thermoplastic must be tested under California Test 423.

84-2.02B Traffic Striping and Pavement Marking Tape

Traffic striping and pavement marking tape must be on the Caltrans Authorized Material List for signing and delineation materials.

White tape must have an initial retroreflectivity of a minimum 700 mcd/m^2.

Yellow tape must have an initial retroreflectivity of a minimum 500 mcd/m^2.

84-2.02C Paint

Paint must comply with the requirements shown in following table:

Paint Specifications

Paint type	Color	Specification
Waterborne traffic line	White, yellow, and black	State Specification PTWB-01R2
Waterborne traffic line for the international symbol of accessibility and other curb markings	Blue, red, and green	Federal Specification TT-P-1952F

84-2.02D Glass Beads

Each lot of glass beads must comply with EPA Test Method 3052 and 6010B or 6010C. Glass beads must contain less than 200 ppm each of arsenic and lead.

Type 1 glass beads must comply with AASHTO M 247.

Type 2 glass beads must comply with AASHTO M 247. At least 75 percent of the beads by count must be true spheres that are colorless and do not exhibit dark spots, air inclusions, or surface scratches when viewed under 20X magnification.

High-performance glass beads must be on the Authorized Material List for high-performance glass beads.

Large-gradation glass beads must be on the Authorized Material List for two component traffic paint.

Glass beads for paint must comply with State Specification 8010-004.

Glass beads must be surface treated, according to the bead and the material manufacturer's instructions, to promote adhesion with the specified material.

84-2.03 CONSTRUCTION

84-2.03A General

Establish the alignment for traffic stripes and the layouts for pavement markings with a device or method that will not conflict with other traffic control devices.

Protect existing retroreflective pavement markers during work activities.

Remove existing pavement markers that are coated or damaged by work activities and replace with an equivalent marker on the Caltrans Authorized Material List for signing and delineation materials.

A completed traffic stripe or pavement marking must:

1. Have well defined edges.
2. Be uniform.
3. Be free from runs, bubbles, craters, drag marks, stretch marks, and debris.

A completed traffic stripe must:

1. Be straight on a tangent alignment.
2. Be a true arc on a curved alignment.
3. Not deviate from the width shown by more than:
   3.1. 1/4 inch on a tangent alignment.
   3.2. 1/2 inch on a curved alignment.

The length of the gaps and individual stripes that form a broken traffic stripe must not deviate by more than 2 inches from the lengths shown. The gaps and stripes must be uniform throughout the entire length of the traffic stripe.

Protect newly placed traffic stripes and pavement markings from traffic and work activities until the traffic stripes and pavement markings are dry or hard enough to bear traffic.

Use mechanical methods to remove dirt, contaminants, and loose material from the pavement surface before applying the traffic stripe or pavement marking.

Use abrasive blast cleaning to remove laitance and curing compound from the surface of new concrete pavement before applying the traffic stripe or pavement marking.

84-2.03B Application of Traffic Stripes and Pavement Markings

84-2.03B(1) General

Apply material for a pavement marking with a stencil or a preformed marking.

Immediately remove drips, overspray, improper markings, or material tracked by traffic, using an authorized method.

Apply a traffic stripe or a pavement marking only to a clean, dry surface during a period when the pavement surface temperature is above 50 °F.

Apply traffic stripe or pavement marking and glass beads in a single pass. You may apply the glass beads by hand on pavement markings.

Embed glass beads to a depth of 1/2 their diameters.

Distribute glass beads uniformly on traffic stripe and pavement markings.

Glass beads with integral color must match the color of the stripe or pavement marking. Apply glass beads with two separate applicator guns when two gradations are specified.

Allow enough overlap distance between new and existing striping patterns to ensure continuity at the start and end of the transition.

The retroreflectivity of applied traffic stripes and pavement markings must comply with the requirements shown in the following table:

Retroreflectivity Requirements

Traffic stripe material	White (min, $mcd \cdot m^{-2} \cdot lx^{-1}$)	Yellow (min, $mcd \cdot m^{-2} \cdot lx^{-1}$)
Paint	250	125
Thermoplastic	250	125
Tape	700	500

84-2.03B(2) Thermoplastic

84-2.03B(2)(a) General

Apply primer or surface preparation adhesive under the manufacturer's instructions and:

1. To all roadway surfaces except for asphaltic surfaces less than 6 months old.

2. At a minimum rate of 1 gallon per 300 square feet.
3. To allow time for the thermoplastic primer to dry and become tacky before application of the thermoplastic.

Do not thin the primer.

Preheat thermoplastic using preheaters with mixers having a 360-degree rotation. Apply thermoplastic in a single uniform layer by extrusion methods.

Completely coat and fill voids in the pavement surface with the thermoplastic.

84-2.03B(2)(b) Extruded Thermoplastic

Apply extruded thermoplastic at a temperature of 400 to 425 degrees F or as recommended by the manufacturer.

Apply extruded thermoplastic for a traffic stripe at a rate of at least 0.36 lb of thermoplastic per foot of 6- inch-wide solid stripe. The applied traffic stripe must be at least 0.060 inch thick.

Apply extruded thermoplastic pavement markings at a thickness from 0.100 to 0.150 inch.

Apply Type 2 glass beads to the surface of the molten thermoplastic at a rate of at least 8 lb of beads per 100 sq ft.

84-2.03B(3) Traffic Striping and Pavement Marking Tape

Do not use traffic stripe and pavement marking tape on existing open graded friction course or chip seal.

Prepare pavement surface and use primer under the traffic tape manufacturer's written instructions. Apply tape to clean and dry pavement surface. Roll or tamp the traffic tape in place.

84-2.03B(4) Paint

Do not apply paint if:

1. Fresh paint could become damaged by rain, fog, or condensation.
2. Atmospheric temperature could drop below 50 degrees F during the drying period.

Do not thin paint.

Use mechanical means to paint traffic stripes and pavement markings and to apply glass beads for traffic stripes.

The striping machine must be capable of superimposing successive coats of paint on the 1st coat and on existing stripes at a minimum speed of 5 mph.

Where the configuration or location of a traffic stripe is such that the use of a striping machine is not practicable, you may apply the traffic paint and glass beads by other methods and equipment if authorized.

Apply traffic stripes and pavement markings in 1 coat on existing pavement surfaces, at an approximate rate of 107 sq ft/gal.

The Contractor shall install the first coat of paint within 7 calendar days of the final resurfacing. After 14 calendar days after the final resurfacing, the second coat of paint shall be applied.

Apply 2-coat paint at the approximate rate of 215 sq ft/gal for each coat.

Paint a 1-coat, 3-inch-wide black stripe between the two 6-inch-wide yellow stripes of a double traffic stripe. If the two 6-inch-wide yellow stripes are applied in 2 coats, apply the black stripe concurrently with the 2nd coat of the yellow stripes.

Apply glass beads at an approximate rate of 5 lb of beads per gallon of paint.

Verify the application rate of paint by stabbing the paint tank with a calibrated rod. If the striping machine has paint gauges, the Engineer may measure the volume of paint using the gauges instead of stabbing the paint tank with a calibrated rod.

84-3 TEMPORARY STRIPING

84-3.01 GENERAL

Unless shown otherwise in the Contract Documents, whenever existing traffic striping or markings have been removed, paved over, or otherwise obliterated, temporary striping or markings shall be provided as follows:

1. Slurry tabs of the appropriate color as approved by the Engineer shall be installed and placed on twenty-four (24) foot intervals to delineate all six (6) inch traffic stripes.
2. All channelization lines shall be temporarily restored with traffic striping tape, or a double row of slurry tabs as approved by the Engineer.
3. All arrow legends and crosswalks shall be restored with temporary traffic striping tape.
4. All pavement markers separating multiple turning lanes shall be replaced with slurry tabs on a ten (10) foot spacing.

Temporary traffic striping and markings shall be removed and replaced with permanent striping and markings as soon as the final pavement surfacing has cured sufficiently to receive the permanent traffic paint or thermoplastic.

Permanent pavement markers shall be installed on the same day that the permanent traffic striping and markings are installed, however, the installation of pavement markers shall be done only after all traffic striping and markings are installed.

The Contractor shall maintain the temporary striping until the permanent traffic striping and markings are placed and approved by the Engineer.

84-4 EXISTING MARKINGS

84-4.01 GENERAL

84-4.01A Summary

This section includes specifications for removing existing markings.

Work performed on existing markings must comply with Section 15, “Existing Facilities.”

84-4.02 CONSTRUCTION

84-4.02A General

Existing striping and pavement markings shall be removed as designated in the Contract Documents or as directed by the Engineer.

The removal of existing traffic stripes shall be done before making any changes to the traffic pattern.

Remove existing traffic stripes and pavement markings before applying traffic stripe and pavement marking tape.

Remove pavement markings such that the old message cannot be identified. Make any area removed by grinding rectangular. Water must not puddle in the ground areas. All striping and pavement marking removal areas shall be sealed in accordance with the Contract Documents to the limits specified below:

1. Lane lines – two-foot (2') on either side of the lane line.
2. Pavement markings - two-foot (2') beyond the top, bottom and sides of the marking.

All holes/divots left from marker removals shall be filled by the Contractor.

Sweep up or vacuum any residue before it can:

1. Be blown by traffic or wind.
2. Migrate across lanes or shoulders.
3. Enter a drainage facility.

END OF SECTION

SECTION 85 RESERVED

SECTION 86 ELECTRICAL WORK GENERAL

86-1 GENERAL

86-1.01 GENERAL

Conform to these *City Standard Specifications* and the CEC as amended by the City of Campbell Municipal Code.

86-1.01A Summary

This section includes general specifications for furnishing electrical equipment and materials.

Electrical equipment and materials must comply with CEC as amended by the Campbell Municipal Code, part 4 of the *California MUTCD,* and Title 8 California Code of Regulations, chapter 4, subchapter 5, "Electrical Safety Orders."

Galvanized equipment and materials must comply with Section 75-1.02B,"Galvanizing."

Decorative poles, foundations and appurtenances must comply with the specifications for streetlights.

86-1.01B Definitions

Accessible pedestrian signal: Accessible pedestrian signal as defined in the *California MUTCD*.

Accessible walk indication: Activated audible and vibrotactile action during the walk interval.

Actuation: Actuation as defined in the *California MUTCD*.

Ambient sound level: Background sound level in dB at a given location.

Ambient sound sensing microphone: Microphone that measures the ambient sound level in dB and automatically adjusts the accessible pedestrian signal speaker's volume.

Audible speech walk message: Audible prerecorded message that communicates to pedestrians which street has the walk interval.

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

Controller assembly: Assembly for controlling a system's operations, consisting of a controller unit and auxiliary equipment housed in a waterproof cabinet.

Controller unit: Part of the controller assembly performing the basic timing and logic functions.

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

Detector: Detector as defined in the *California MUTCD*.

Electrolier: Assembly of a lighting standard and luminaire.

Flasher: Device for opening and closing signal circuits at a repetitive rate.

Illuminance gradient: Ratio of the minimum illuminance on a 1-foot square of sign panel to that on an adjacent 1-foot square of sign panel.

Inductive loop detector: Detector capable of being actuated by an inductance change caused by a vehicle passing or standing over the loop. An inductive loop detector includes a loop or group of loops installed in the roadway and a lead-in cable installed and connected inside a controller cabinet.

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

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

Lighting standard: Pole and mast arm supporting the luminaire.

Link: Part of a system which provides a data connection between a transmitter and receiver.

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

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

Luminaire: Assembly that houses the light source and controls the light emitted from the light source.

Mid-span access method: Procedure in which fibers from a single buffer tube are accessed and spliced to a multi buffer tube cable without cutting the unused fibers in the buffer tube, or disturbing the remaining buffer tubes in the cable.

National Voluntary Laboratory Accreditation Program (NVLAP): U.S. Department of Energy program that accredits independent testing laboratories.

Optical time domain reflectometer: Fiber optic test equipment that is used to measure the total amount of power loss between two points and over the corresponding distance. It provides a visual and printed display of the relative location of system components such as fiber sections, splices and connectors as well as the losses that are attributed to each component and or defects in the fiber.

Pedestrian change interval: Pedestrian change interval as defined in the *California MUTCD*.

Powder coating: Coating applied electrostatically using exterior-grade, UV-stable, polymer powder.

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

Power meter: Portable fiber optic test equipment that, when coupled with a light source, is used to perform end-to-end attenuation testing. Its display indicates the amount of power injected by the light source at the designed wavelength of the system under testing that arrives at the receiving end of the link.

Pretimed controller assembly: Assembly operating traffic signals under a predetermined cycle length.

Programmed visibility signal head: A type of signal head which can be optically programmed to restrict visibility of indication(s) to only those areas or lanes designated.

Programming mechanism: Device to program the accessible pedestrian signal operation.

Pull box: Box with a cover that is installed in an accessible place in a conduit run to facilitate the pulling in of wires or cables.

Push button information message: Push button information message as defined in the *California MUTCD.*

Push button locator tone: Push button locator tone as defined in the *California MUTCD*.

Segment: Continuous cable terminated by 2 splices, 2 connectors or 1 splice and 1 connector.

Signal cycle: A complete sequence of signal indications.

Signal face: Signal face as defined in the *California MUTCD*.

Signal head: Signal head as defined in the *California MUTCD*.

Signal indication: Signal indication as defined in the *California MUTCD*.

Signal section: Signal section as defined in the *California MUTCD*.

Signal standard: Pole with or without mast arms carrying 1 or more signal faces.

Street side lumens: Lumens from a luminaire directed to light up areas between the fixture and the roadway, such as traveled ways and freeway lanes.

Surge protection device: Subsystem or component that protects equipment against short-duration voltage transients in power line.

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

Traffic-actuated controller assembly: Assembly for operating traffic signals under the varying demands of traffic as registered by detector actuation.

Traffic phase: Traffic phase as defined in the *California MUTCD*.

Traffic signal communications: A method by which traffic signals are connected electrically through a multi-point analog communications system for central control, monitoring and data collection at individual intersections.

TEES: The most recent version of the *Transportation Electrical Equipment Specifications* published by Caltrans.

Vehicle: Vehicle as defined in the California Vehicle Code.

Vibrotactile pedestrian device: Vibrotactile pedestrian device as defined in the *California MUTCD*.

86-1.01C Submittals

86-1.01C(1) General

In addition to the information in Section 5-1.20, “Submittals,” the list must include:

1. Manufacturer's name.
2. Make and model number.
3. Month and year of manufacture.
4. Lot and serial numbers.
5. Contract number.
6. Your contact information.

Submit confirmation of the vendor's acceptance of the order for the electrical equipment and materials as an informational submittal.

Submit 3 sets of computer-generated, schematic wiring diagrams for each cabinet.

Diagrams, plans, and drawings must be prepared using graphic symbols in the Contract Documents and IEEE 315, "Graphic Symbols for Electrical and Electronic Diagrams."

Submit a manufacturer's maintenance manual or combined maintenance and operation manual as an informational submittal. The manual must have a master item index that includes:

1. Specifications.
2. Design characteristics.
3. General operation theory.
4. Function of all controls.
5. Troubleshooting procedure.
6. Parts list, descriptions, stock numbers, and settings.
7. Block circuit diagram.
8. Layout of components.
9. Schematic diagrams.

86-1.01C(2) Pull Boxes

Submit the manufacturer's installation instructions for pull boxes, including:

1. Quantity and size of entries that can be made without degrading the strength of the pull box below the load rating.
2. Locations where side entries can be made.
3. Acceptable method for creating the entry.

Submit the label inscribed on the lid.

Submit load-rating test reports for pull boxes from a laboratory that is accredited to International Standards Organization/International Electrotechnical Commission 17025 by the American Association for Laboratory Accreditation (A2LA) or the ANSI-ASQ National Accreditation Board (ANAB).

86-1.01C(3) Luminaires

Submit for a luminaire:

1. Maximum power in watts.

2. L70 in hours when extrapolated for the average nighttime operating temperature
3. Life expectancy based on the junction temperature.
4. Manufacturer's data sheet for the power supply, including the rated life.
5. Product warranty.
6. Manufacturer’s specifications and data sheets.
7. Luminaire test data including efficacy, correlated color temperature, LCS results (backlight, uplight and glare as defined by ANSI/IES TM-15-20 Luminaire Classification System for Outdoor Luminaires), correlated color temperature, color rendering index.
8. Qualified years of experience (LED luminaire manufacturer and/or LED luminaire distributor).
9. Manufacturer’s QC test data for LED luminaires as an informational submittal.

86-1.01C(4) Reserved

86-1.01C(5) Service Equipment Enclosures

Submit shop drawings for a service equipment enclosure.

86-1.01C(6) Signal Heads

Submit a certificate of compliance and the manufacturer's QC test data for signal heads as an informational submittal.

86-1.01C(7) LED Signal Modules

Submit the manufacturer's QC test data for LED signal modules as an informational submittal.

86-1.01C(8) Visors

Submit a certificate of compliance and the manufacturer's QC test data for visors as an informational submittal.

86-1.01C(9) LED Countdown Pedestrian Signal Face Modules

Submit the manufacturer's QC test data for LED countdown pedestrian signal face modules as an informational submittal.

86-1.01C(10) Accessible Pedestrian Signals

Submit the manufacturer's QC test data for accessible pedestrian signals as an informational submittal.

86-1.01C(11) Traffic Signal communications Cable

Submit the cable manufacturer's recommended and maximum pulling tensions for each cable size and type. These pulling tensions must be specified for pulling from the cable's outer jacket. Submit the cable manufacturer's approved pulling lubricants and application guidelines.

86-1.01D Quality Assurance

86-1.01D(1) General

Electrical equipment must comply with one or more of the following standards:

1. ANSI.
2. ASTM.
3. EIA or ECIA.
4. NEMA.
5. NETA.
6. UL.
7. NRTL.

8. TIA.
9. IMSA.
10. ICEA.
11. EUSERC.

Materials must comply with:

1. FCC rules.
2. ITE standards.
3. CEC as amended by the City of Campbell Municipal Code.

86-1.01D(2) Reserved

86-1.01D(3) Department Acceptance

Deliver controller cabinets and appurtenances to the City for testing.

Allow 30 days for testing. Deliver equipment to the City for testing at the location designated by the Engineer. The City notifies you when testing is complete.

If the City accepts the material or equipment, you must pick it up from the test site and deliver it to the job site.

If the City rejects material or equipment, remove it within 5 business days after you are notified it is rejected. If it is not removed within that period, the City may remove it and ship it to you and deduct the costs of labor, material and shipping from any moneys due or to become due the Contractor.

Resubmit a new sample and allow 30 days for retesting. The retesting period starts when the replacement material or equipment is delivered to the City.

86-1.02 MATERIALS

86-1.02A General

Anchor bolts, anchor bars or studs, and nuts and washers must be hot dipped galvanized and comply with Section 75-1.02, “Materials.”

Bolt threads must accept galvanized standard nuts without requiring tools or causing removal of protective coatings.

86-1.02B Conduit and Accessories

86-1.02B(1) General

Conduit and fittings must comply with the requirements shown in the following table:

Conduit and Fitting Requirements

Type	Requirement
1	Must be hot-dip galvanized rigid steel complying with UL 6 and ANSI C80.1. The zinc coating must comply with copper sulfate test requirements in UL 6. Fittings must be electrogalvanized and certified under the provisions of UL 514B.
2	Must comply with requirements for Type 1 conduit and be coated with PVC or polyethylene. The exterior thermoplastic coating must have a minimum thickness of 35 mils. The internal coating must have a minimum thickness of 2 mils. Coated conduit must comply with NEMA RN 1, or NRTL PVC-001.
3	Must be Type A, extruded, rigid PVC conduit complying with UL 651 .
4	Must have an inner, flexible metal core covered by a waterproof, nonmetallic, sunlight-resistant jacket, and must be NRTL certified for use as a grounding conductor. Fittings must be certified under the provisions of UL 514B.
5	Must be intermediate steel complying with UL 1242 and ANSI C80.6. The zinc coating must comply with copper sulfate test requirements specified in UL 1242. Fittings must be electrogalvanized and certified under the provisions of UL 514B.

Solvent weld cement under the provisions of ASTM D2564.

PVC conduit elbows must be factory manufactured.

Bonding bushings installed on metal conduit must be insulated and hot-dipped galvanized type.

Conduit used for horizontal directional drilling must be HDPE Type IPS, SDR 9 and comply with ASTM F2160 and D3350.

Adhesive for bell ends on HDPE conduit must be a high strength polyethylene type with lap shear strength of 175 lbs/in^2 within 24 hours at 75 degrees Fahrenheit for PVC to HDPE when tested under the provisions of ASTM D1002 (consider the samples to be metal).

Sealing plug must:

1. Be reusable.
2. Withstand a pressure of 5 psi.
3. Provide an airtight seal.

Sealing plug for empty conduit must have a rope tie.

Innerduct must be:

1. Pre lubricated fabric mesh with 3 pouches, MaxCell or approved equal. Innerduct for fiberoptic cable installed in empty conduit without other conductors must have a 18AWG minimum (12AWG maximum) trace wire.
2. Continuous without splices or joints.
3. Capable of accepting installation of cable up to 0.55 inch diameter in each cell.
4. Pull tape rated 1250 lbs with a unique color in each cell.

Shipped and stored on a reel, covered to protect from UV deterioration. The reel must be marked with:

1. Manufacturer's name.
2. Size and length of the innerduct.

86-1.02B(2) Structures Accessories

Steel hangers, steel brackets, and other fittings used to support conduit in or on a wall or bridge superstructure must comply with Section 75-3, “Miscellaneous Bridge Metal.”

Precast concrete cradles for conduit must be made of minor concrete and commercial-quality welded wire fabric. The minor concrete must contain a minimum of 590 lbs of cementitious material per cubic yard. The cradles must be moist cured for a minimum of 3 days.

86-1.02C Pull Boxes

86-1.02C(1) General

A pull box cover must have a marking on the top that is:

1. Clearly defined.
2. Uniform in depth.
3. Parallel to the longer side.
4. From 1 to 3 inches in height.

The cover marking must include one of the following:

CAMPBELL TRAFFIC SIGNAL:	for traffic signal systems with or without streetlighting systems.
CAMPBELL LIGHTING:	for lighting systems only.
CAMPBELL COMMUNICATIONS:	for traffic signal interconnect and fiber optics only.
CAMPBELL IRRIGATION :	for irrigation feeder or control systems only.
CAMPBELL SERVICE:	for service laterals to utility facilities termination point only.
CAMPBELL ELECTRICAL:	for combined electrical systems or miscellaneous systems not mentioned above.
CAMPBELL LIGHTING-CELL:	for wireless cell facilities co-located with lighting.

A metal pull box cover must include a fitting for a bonding conductor.

Fasten the pull box cover with stainless steel alloy 304 hardware.

If a transformer or other device must be placed in the pull box, include recesses for a hanger

86-1.02C(2) Roadway Pull Boxes

1.02C(2)(a) General

A pull box cover must have a nonskid surface.

The pull boxes and covers must not have exposed fibers or reinforcement on the finish surfaces that are exposed.

The load rating must be:

1. Stenciled or stamped on the inside and outside of the pull box.
2. Stamped on the outside of the cover.

If a transformer or other device is to be placed in the pull box, include recesses for a hanger, and install hanger and fasteners that are stainless steel alloy 304.

Hold-down bolts must:

1. Be a 3/8-16 UNC.

2. Have a thread lock material with a medium strength that allows removal with hand tools.
3. Withstand a torque from minimum 20 ft-lb.
4. Withstand a minimum pull-out strength of 750 lb.

The opening in which the cover sets must have length and width dimensions 1/8 inch greater than the cover.

86-1.02C(2)(b) Nontraffic Pull Boxes

A nontraffic pull box and cover must comply with ANSI/SCTE 77, "Specification for Underground Enclosure Integrity," for Tier 22 load rating and must be gray.

An extended pull box must be a minimum 22 inches deep and may be a single box or a box with an extension made of the same material as the pull box. The extension may be another pull box if the bottom edge of the pull box fits into the opening for the cover.

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

The pull box must have a 3/8-16 coarse-thread insert with drainage hole, to secure the hold down bolts.

The cover must have a 1/2 inches by 4 inches pull slot with a 3/16-inch center pin.

The cover markings must be cast in the mold of the cover.

Pull boxes must have gray ultraviolet resistant polypropylene face of the lid and rim of the box that do not crack when tested under the provisions of ASTM D1693.

86-1.02C(2)(c) Traffic Pull Boxes

A traffic pull box and cover must comply with AASHTO HS20-44 and load tested under the provisions of AASHTO M 306.

A traffic pull box must be reinforced with a galvanized steel Z bar welded frame. The frame must be anchored to the box with 2-1/4-inch-long concrete anchors with a 1/4-inch diameter. The pull box must have 4 concrete anchors, one in each corner, and two near the middle on each of the longer sides.

The frame must have nuts fabricated with the frame or spot welded to the underside of the frame, to secure the hold down bolts.

The nuts must be~~,~~ zinc-plated carbon steel, vibration-resistant, and have a wedge ramp at the root of the thread.

The cover must:

1. Be steel, reinforced and galvanized post fabrication.
2. Be countersunk approximately 1/4 inch to accommodate the bolt head and washer. When tightened, the hold down bolt head must be no more than 1/8 inch above the top of the cover.
3. Have a 1/2-inch by 2-inch pull slot with a guard under the cover to prevent entry of more than 3 inches below the bottom surface of the cover without deflection.

Before galvanizing a steel cover, the manufacturer must apply the cover marking by one of the following methods:

1. Use a cast iron strip at least 1/4-inch thick with letters raised a minimum of 1/16 inch. Fasten the strip to the cover with 1/4-inch, flathead, stainless steel machine bolts and nuts. Peen the bolts after tightening.

2. Use a sheet steel strip at least 0.027-inch thick with letters raised a minimum of 1/16 inch. Fasten the strip to the cover by spot welding, tack welding, or brazing with 1/4-inch stainless steel rivets or 1/4-inch, roundhead, stainless steel machine bolts and nuts. Peen the bolts after tightening.
3. Bead weld the letters on the cover such that the letters are raised a minimum of 3/32 inch.

86-1.02C(2)(d) Reserved

86-1.02C(3) Structure Pull Boxes

Pull box corner joints must be lapped and spot welded or riveted.

Concentric and eccentric multiple size knockouts are not allowed.

Structure pull boxes must be under the provisions of the most current *Caltrans Standard Plans*.

A number 7 pull box must:

1. Be 12 by 12 by 12 inches.
2. Be manufactured with 0.075-inch sheet steel.
3. Have 3/4-inch flanges on the top and bottom.
4. Have one 1-inch and one 1-1/2-inch knockouts on each side, except for the covers
5. Have drilled and tapped holes on the top and the bottom flanges for the cover screws. The hole pattern and spacing must be the same at the top and bottom.
6. Have covers that secure to the box with eight 1/4-inch diameter, 20NC (American National Coarse) brass machine screws.

A number 8 pull box must:

1. Be 12 by 12 by 12 inches.
2. Be manufactured with 0.135-inch sheet steel.
3. Mount to the structure with three 3/8-inch diameter machine screws per side.
4. Have 1-1/2-inch knockouts on each side, except the cover.
5. Have drilled and tapped holes on the sides and the bottom for the cover screws. The holes must be reinforced with a 1-by-1-by-0.135-inch bar inside the box.
6. Have a cover with 3/4-inch flanges on the sides and bottom with the corners welded at the bottom. The cover must secure to the box with, three 1/4-inch diameter by 1/2-inch long cadmium plated brass or stainless steel, machine screws.

A number 9 pull box must:

1. Be 24 by 9-1/2 by 6-1/4 inches.
2. Be manufactured with 0.075-inch sheet steel.
3. Have a rain tight hood.
4. Have a 1-1/2-by-4-1/2-by-0.135-inch strap welded to the back of the box at each corner, parallel to the long side. The strap must have a 1/4-inch hole on the exposed end.
5. Have a 1-inch lip around the opening.
6. Have drilled and tapped holes with a minimum 1/4-inch thread length, at the ends of the bottom lip for the cover screws.
7. Have a 3-inch knockout on each side at the bottom and at the center of the bottom.
8. Have a 2-inch knockout on each side at the top and at both ends of the bottom.
9. Have an L 5/8-by-7/8-by-0.075-inch formed angle spot welded to the inside of the top on both sides and on the bottom.
10. Have a cover manufactured with 0.125-inch steel, that secures to the box with two 3/8-inch diameter by 3/4-inch long stainless-steel flathead screws with 11/16-inch diameter countersink holes. The cover must include a 1/16-inch neoprene gasket.

A number 9A pull box must:

1. Be 20 by 8 by 8-1/2 inches.
2. Be manufactured with 0.075-inch sheet steel.
3. Have 3/4-inch flanges on the top.
4. Have drilled holes on the short sides for the cover screws. The holes must have a stainless-steel hex nut or a 1/4-by-5/8-by-8-inch bar spot welded to the bottom of the flange.
5. Have a 3-inch knockout on each side at the top and at the center of the bottom.
6. Have a 2-inch knockout on each side at the bottom and at both ends of the bottom.
7. Have a cover manufactured with 0.105-inch steel, that secures to the box with four 3/8-inch diameter stainless steel hex head cap screws, two on each short side. The cover must have a rain tight hood and include a 1/16-inch neoprene gasket.

86-1.02D Tapes

86-1.02D(1) General

Reserved

86-1.02D(2) Pull Tape

Pull tape must be a flat, woven, lubricated, soft-fiber, polyester tape with a minimum tensile strength of 1,800 lb. The tape must have sequential measurement markings every 3 feet with a tolerance of ±0.5 inch.

86-1.02F Conductors and Cables

86-1.02F(1) General

Conductors and cables must be clearly and permanently marked the entire length of their outer surface with:

1. Manufacturer's name or trademark.
2. Insulation-type letter designation.
3. Conductor size.
4. Voltage rating.
5. Number of conductors for a cable.

86-1.02F(2) Conductors

86-1.02F(2)(a) General

A conductor must be NRTL certified and rated for 600 V(ac).

Conductors must be copper.

The insulation color must be homogeneous throughout the full depth of the insulation. The identification stripe must be continuous throughout the length of the conductor.

Conductors must be identified as shown in the following table:

CONDUCTOR IDENTIFICATION TABLE

	Signal Phase or Function	Insulation Color	Insulation Base Stripe	Label Designation	Conductor Size
Vehicle Signals	2,6	Re, Ye, Brn	Black	2,6	14
	4,8	"	Orange	4,7	14
	1,5	"	None	1,5	14
	3,7	"	Purple	3,7	14
	Overlaps ….	"	Note 1	OL#	14
Pedestrian Signals	2p, 6p	Red, Brown	Black	2p, 6p	14
	4p, 8p		Orange	4p, 8p	14
	1p, 5p		None	1p, 5p	14
	3p, 7p		Purple	3p, 7p	14
Pedestrian Push Buttons	2p, 6p	Blue	Black	pb2, pb6	14
	4p, 8p		Orange	pb4, pb8	14
	1p, 5p		None	pb1, pb5	14
	3p, 7p		Purple	pb3, pb7	14
Traffic Signal Controller Cabinet	Ungrounded-Line 1	Black	None	CN1	As Required
	Grounded-Neutral	White	None	CNN	
Streetlighting	Ungrounded-Line 1	Black	None	SL1	As Required
	Ungrounded-Line 2	Red	None	SL2	
	Grounded-Neutral	White	None	SLN	
Lighting Control	Ungrounded to electric unit (PEU)	Black	None	C1	14
	Switched leg from PEU unit	Red	None	C2	14
	Grounded-Neutral	White	None	C3	14

	Signal Phase or Function	Insulation Color	Insulation Base Stripe	Label Designation	Conductor Size
Irrigation Control	Ungrounded-Line 1	Black	None	IR1	As Required
	Grounded-Neutral	White	None	IRN	
Service	Ungrounded-Line 1	Black	None	SR1	As Required
	Ungrounded-Line 2	Red	None	SR2	
	Grounded-Neutral	White	None	SRN	
Sign Lighting	Ungrounded-Line 1	Black	None	SN1	12
	Grounded-Neutral	White	None	SN2	12
Flashing Beacons	Undergrounded between flasher & beacons	Red or Yellow	None	Flasher-location	14
	Grounded-Neutral	White	None	FLN	14
Logic Common	Pedestrian Push Buttons	White	Black	None	14
Grounded Neutral	Traffic Signals	White	None	TSN	As Required
Railroad Pre-emption	As Required	Black	None	RR	14
Emergency Vehicle Pre-emption	As Required	As Required	None	EV#1,2,3 As Required	14 or As Required
Spares	Traffic Signal Spares	Black	None	None	14
Inductive Loop Detector Circuits	Vehicle Detection	As Required	None	DLC & Phase	As Required

Notes:

1. On overlaps, the insulation is striped for the 1st phase in the designation, e.g., phase (2+3) conductor is striped as for phase 2.

2. Band for overlap and special phases as required.

3. Label conductors in each pull box and at termination points. Label ungrounded traffic signal conductors by banding groups of conductors comprising a signal phase or function.

4. Labeling may be omitted where the wiring and cabling is only a single streetlight circuit.

86-1.02F(2)(b) Aluminum Conductors

Aluminum conductors must not be used.

86-1.02F(2)(c) Copper Conductors

86-1.02F(2)(c)(i) General

Copper wire must comply with ASTM B3, B8, with:

1. Stranded for number 8 AWG and larger.
2. Solid for number 10 AWG wire connected to pole mounted luminaires.
3. Stranded for number 12 AWG.
4. Solid for number 14 AWG.
5. Stranded for wire completely inside cabinets.

Insulation for number 14 to number 4 AWG conductors must be one of the following:

1. Type THW PVC under the provisions of ASTM 2220.
2. Type USE, RHH, or RHW cross-linked polyethylene.

The insulation for number 2 AWG and larger conductors must be one of the above or THWN.

The minimum wire gages for streetlighting systems must be one of the following:

1. Number 8 AWG for service and feeder conductors from the service point to the main disconnect and branch circuits, except service conductors to service pedestals.
2. Number 10 AWG for branch circuits from fused splice connector to luminaire terminal block.
3. Number 14 AWG for control circuits from photoelectric-unit (PEU) to contactor.

86-1.02F(2)(c)(ii) Bonding Jumpers, Equipment Grounding Conductors, and Ground Clamps

A bonding jumper must be copper wire or copper braid of the same cross-sectional area as a number 8 AWG conductor or larger, except where:

1. Bonding and grounding wire is provided as an integral part of manufacturer's splice kit and is in conformance with all applicable statutes and regulation.
2. The jumper is entirely installed inside standards and cabinets.

An equipment grounding conductor must be bare, except the equipment grounding conductor must be insulated where entirely installed inside standards and cabinets.

Ground clamps must be rated for direct burial.

Ground clamps connecting ground rods must be high strength.

Hardware for ground clamps must be silicon bronze.

86-1.02F(2)(c)(iii) Inductive Loop Conductors

An inductive loop conductor must comply with the requirements shown in the following table:

Conductor Requirements for Inductive Loop Detectors

Loop wire	Requirement
Type 1	Type RHW-USE neoprene-jacketed or Type USE cross-linked polyethylene, insulated, number 12 AWG, stranded copper wire with a minimum 40-mils insulation thickness at any point.

86-1.02F(2)(d) Reserved

86-1.02F(3) Cables

86-1.02F(3)(a) General

Not Used.

86-1.02F(3)(b) Aluminum Cables

86-1.02F(3)(b)(i) General

Not Used.

86-1.02F(3)(b)(ii) Direct Burial Cables

Not used.

86-1.02F(3)(c) Reserved

86-1.02F(3)(d) Copper Cables

86-1.02F(3)(d)(i) General

Not Used.

86-1.02F(3)(d)(ii) Conductor Signal Cables

Not used

86-1.02F(3)(d)(iii) Detector Lead-in Cables

Conductors for a loop detector lead-in cable must be two number 16 AWG, 19-by-29, stranded, tinned copper wires with calculated cross-sectional areas complying with ASTM B286, Table 1 and the requirements shown in the following table:

Conductor Requirements for Loop Detector Lead-In Cables

Lead-in cable	Requirement
Type B	Insulated with 20 mils of high-density polyethylene. Conductors must be twisted together with at least 2 turns per foot, and the twisted pair must be protected with a copper or aluminum polyester shield. A minimum number 20 AWG copper drain wire must be connected to the equipment ground within the cabinet. Cable must have a high-density polyethylene or high-density polypropylene outer jacket with a nominal thickness of 32 mils. Include an amorphous, interior, moisture penetration barrier of nonhydroscopic polyethylene or polypropylene fillers.

86-1.02F(3)(d)(iv) Reserved

86-1.02F(3)(d)(v) Signal Interconnect Cables

A signal interconnect cable must be a 6-pair type with stranded, tinned, copper number 20 AWG conductors. The insulation for each conductor must be color-coded polypropylene with a minimum 13-mils nominal thickness. The conductors must be in color-coded, twisted pairs. Each pair must be wrapped with an aluminum polyester shield and have a number 22 AWG or larger, stranded, tinned, copper drain wire inside the shielded pair.

The cable jacket must be black HDPE rated for a minimum of 300 V(ac) and 60 degrees C. The jacket must have a minimum nominal wall thickness of 40 mils. The cable jacket or the moisture-resistant tape directly under the outer jacket shall be marked with the manufacturer's name, insulation type designation, number of conductors and conductor size, and voltage and temperature ratings.

The signal interconnect cable (SIC) shall consist of six (6) twisted pairs. Unless otherwise indicated on the plans, in the special provisions, or as directed by the Engineer, splicing of the signal interconnect cable is not allowed.

Seal cable ends with a cable end cap factory installed, Heavy-Wall Shrink-kon type manufactured by ABB Installation Products (previously Thomas & Betts) or approved equal.

86-1.02F(3)(d)(vi) Communication Cables

86-1.02F(3)(d)(vi)(a) Reserved

86-1.02F(3)(d)(vi)(b) Reserved

86-1.02F(3)(d)(vi)(c) Reserved

86-1.02F(3)(d)(vi)(d) Reserved

86-1.02G Reserved

86-1.02H Splicing Materials

Splicing materials include:

1. Connectors.
2. Heat shrink tubing.

Heat-shrink tubing must be made of irradiated polyolefin tubing with a minimum wall thickness of 40 mils before contraction and an adhesive mastic inner wall. When heated, the inner wall must melt and fill the crevices and interstices of the covered splice area and the outer wall must shrink to form a waterproof insulation.

Heat-shrink tubing must comply with the requirements for extruded, insulating tubing at 600 V(ac) specified in UL Standard 468D and ANSI C119.1 and the requirements shown in the following table:

Heat-Shrink Tubing Requirements

Quality characteristic	Requirement
Shrinkage ratio of supplied diameter[a] (max, %)	33
Dielectric strength (min, kV/in)	350
Resistivity (min, Ω/in)	25×10^{13}
Tensile strength (min, psi)	2,000
Operating temperature (°C)	-40–90 (135 °C in emergency)
Water absorption (max, %)	0.5

[a] When heated to 125 °C and allowed to cool to 25 °C.

86-1.02I Connectors and Terminals

Copper connectors must comply with UL-486A. Aluminum connector must comply with UL-486 B.

Connectors and terminals must be rated for the conductors' size and material type. Connectors and terminals for aluminum conductors must and be prefilled with oxide-inhibiting compound.

Connectors must be a compression type and:

1. Color Keyed H-Tap type manufactured by ABB Installation Products (previously Thomas&Betts) for #14 and #12 AWG except for connecting detector loop and lead-in cable.
2. Color Keyed C-Tap type manufactured by ABB Installation Products (previously Thomas&Betts) for #10 AWG and larger.
3. Butt type for connecting detector loop and lead-in cable

Terminals must be a crimp type spring spade connector as follows:

1. Model #SS20891B or SS20830B manufactured by Hollingsworth or approved equal for #16 and #14 AWG.

86-1.02J Standards, Poles, Pedestals, and Posts

Standards for signals, lighting, and flashing beacons, poles for closed circuit television, pedestals for cabinets, posts for extinguishable message sign and posts for pedestrian push button assemblies must comply with Section 56-3, "Standards, Poles, Pedestals, and Posts." Attach bonding inside the pole except for Type 1B poles.

Use signal mast arms with signal head mounting under the provisions of Pipe Tenons Detail S.

Do not use Tip Tenon Detail TL or Detail TS.

Galvanize all signal and lighting standards.

Lighting standards must be Caltrans Type 15 with luminaire arm length of 8 feet for 2 lane roads and 12 feet for roads 4 lanes or more.

Mast arms for wood lighting standards must be under the provisions of mast arms for steel poles except that the arm and steel fitting welded to the end of the mast arm must be specifically designed for wood pole mounting. Use 6 feet long mast arms for wood lighting standards.

86-1.02J(1) Pole Plugs

Pole plugs must have a front and #10-24 by 0.55 inch threaded stud manufactured from 304 stainless steel with a oil resistant gasket and secured inside the pole with a zinc plated washer and wingnut, or 16 gage zinc plated back plate with treaded hole and thread locking system for the stud.

86-1.02K Luminaires

86-1.02K(1) General

Luminaires must comply with the Contract Documents.

86-1.02L Reserved

86-1.02M Photoelectric Controls

Photoelectric control types are as shown in the following table:

Photoelectric Control Types

Control type	Description
II	Pole-mounted photoelectric unit. Contactor, a 15-A circuit breaker per ungrounded conductor, and test switch located in a service equipment enclosure.
IV	A photoelectric unit that plugs into a NEMA twist-lock receptacle, integral with the luminaire.

The pole-mounted adaptor for Type II photoelectric controls must include a terminal block and cable supports or clamps to support the wires.

The photoelectric unit (PEU) must be an Acuity Dark to Light #DLL127F-1.5 or approved equal (Fail Off; 120-277V(ac)).

Type II photoelectric controls must have a test switch to allow manual operation of the lighting circuit. Switch must be:

1. Single-hole mounting, toggle type.
2. 15 A, Single pole and single throw.
3. Labeled *Auto-Test* on a nameplate.

Photoelectric control's contactor must be:

1. Normally open.
2. Mechanical-armature type with contacts of fine silver, silver alloy, or equal or better material.
3. Installed to provide a minimum space of 2-1/2 inches between the contactor terminals and the enclosure's sides.

The terminal blocks must be rated at 25 A, 600 V(ac), molded from phenolic or nylon material, and be the barrier type with plated-brass screw terminals and integral marking strips.

86-1.02N Fused Splice Connectors

The fused splice connector for 240 and 480 V(ac) circuits must simultaneously disconnect both ungrounded conductors. The connector must not have exposed metal parts except on the connector for 240 and 480 V(ac) circuits the head of the stainless steel assembly screw. The head of the assembly screw must be recessed a minimum of 1/32 inch below the top of the plastic boss that surrounds the head.

The connector must protect the fuse from water or weather damage. Contact between the fuse and fuse holder must be spring loaded. When the connector is disassembled, the fuse must remain in the load end of the fuse holder. . Springs must not carry current. The terminals of the connector must be rigidly crimped, onto the conductors using a tool of the type recommended by the manufacturer of the connector, and must be insulated and made waterproof under the provisions of Section 86-1.02H, “Splicing Materials.”

Connectors must be rated 30A, 250V(ac) minimum and must accept 13/32" X 1-1/2" standard midget ferrule type fuses of the ampacity and types specified. Connectors must be Bussman TRON type "HEX" for 240V(ac) or "HEB" for 120V(ac) applications, as manufactured by Eaton, Littelfuse, or approved equal.

Fuses must:

1. Be midget type with nickel plated brass ferrules.
2. Be 13/32 by 1-1/2 inches.

Fuse ratings, category, and manufacturer for luminaires are shown in the following table:

Fuse Requirements

Load Description	Individual luminaires		Services feeding more than one streetlight	Irrigation Controllers
Circuit voltage	120/240	480	120/240	120/240
Fuse voltage rating	250 V(ac)	500-600 V(ac)	500-600 V(ac)	500-600 V(ac)
Response Time Category	Fast acting/No time-delay	Fast acting/No time-delay	Time-delay	Time-delay
Ampere Rating	6	10	30	15
Bussmann type or approved equal	BAF	BAF	FNQ	FNQ

86-1.02O Grounding Electrodes

Grounding electrode must be:

1. 1 piece.
2. Minimum 10-foot length of one of the following:
   2.1. Galvanized steel rod or pipe not less than 3/4 inch in diameter.
   2.2. Copper clad steel rod not less than 5/8 inch in diameter.

86-1.02P Enclosures

86-1.02P(1) General

The enclosures must be rated NEMA 3R and include a dead front panel and a hasp with a 7/16-inch-diameter hole for a padlock.

Except for a service equipment enclosure, an enclosure must:

1. Be manufactured from steel and either galvanized, cadmium plated, or powder coated.
2. Mount to a standard, pole, post, or sign structural frame.
3. Provide a minimum space of 2-1/2 inches between the internal components and the enclosure's sides.

The enclosure's machine screws and bolts must not protrude outside the cabinet wall.

The fasteners on the exterior of an enclosure must be vandal resistant and not be removable. The exterior screws, nuts, bolts, and washers must be stainless steel.

Sealing compound for enclosures must be under the provisions of 86-1.02Q, “Cabinets.”

86-1.02P(2) Service Equipment Enclosures

Service equipment enclosure must:

1. Comply with the Electric Utility Service Equipment Requirements Committee.
2. Meet the requirements of the service utility.
3. Be watertight.
4. Be marked as specified in NEC to warn of potential electric-arc flash hazards.

Service equipment enclosures must be type IIIAF under the provisions of *CalTrans Standard Plan*s ES-2D:

1. Be stainless steel.
2. Bond anchor bolts.
3. Be manufactured using welding procedures, welders, and welding operators that comply with the requirements for welding procedures, welders, and welding operators in in AWS B2.1, "Specification for Welding Procedure and Performance Qualification."
4. Have full-seal weld exterior seams.
5. Exterior welds must be ground smooth and edges filed to a radius of at least 0.03 inch.
6. Be manufactured without PEU window.

If an enclosure houses a transformer of more than 1 kVA, the enclosure must have effective screened ventilation louvers of no less than 50 sq. in for each louver. The framed screen must be stainless number 304 with a number 10 size mesh and secured with at least 4 bolts.

The dead front panel on a service equipment enclosure must have a continuous stainless steel piano hinge. The panel must be secured with a latch or captive screws. No live part must be mounted on the panel except the test switch.

Internal conductors for the photoelectric control unit must be 600 V(ac), number 14 AWG (THHN) stranded machine tool wire. Where subject to flexing, 19 stranded wire must be used.

Service equipment enclosure must have the meter view windows located on the front side of the enclosure.

The meter area must have a sealable, lockable, weather-tight cover that can be removed without the use of tools.

The meter socket must be a 5-clip type, and the landing lug must be suitable for multiple conductors.

Landing lugs must be (1) sized for the incoming service utility conductors, (2) compatible with either copper or aluminum conductors, and (3) made of copper or tin-plated aluminum. Live parts of the electrical equipment must be guarded against accidental contact.

The main and neutral busses of the enclosure must be made of tin-plated copper, be rated for 125 A, and be suitable for copper or aluminum conductors.

Circuit breaker for a service equipment enclosure must:

1. Be quick-break on either automatic or manual operation.
2. Be trip indicating.
3. Be internal-trip type.
4. Be NRTL certified to comply with UL 489 or equal.
5. Be clearly marked with the frame size.
6. Have an operating mechanism that is enclosed and trip-free from the operating handle on overload.
7. Have the trip rating clearly marked on the operating handle.
8. Have an interior made of copper.
9. Be cable-in/cable-out type.
10. Be rated for an ambient temperature range from minus 18 to plus 50°C.

Circuit breakers used as disconnects must have a minimum interrupting capacity of 10,000 A, rms. Service cabinets must have interruption capacity equal to or greater than the available short circuit fault current.

The interior of the enclosure must have circuit breaker mounting plate by the same manufacturer as the circuit breakers. Single-pole circuit breakers, 3/4" nominal, must be provided for branch circuits.

The pedestal must be for 120/240 volt, 3 wire, single phase, metered and unmetered (split bus) service and the following circuit breakers and items must be provided in the service pedestal:

1. MAIN breaker: 1 each 100 amp, 3 pole, 120/240 volt, split bus.
2. SIGNAL breaker: 1 each 60 amp, 1 pole, 120 volt, metered.
3. LIGHTING breaker: 1 each 40 amp, 2 pole, 240 volt, unmetered.
4. LTG. CONTROL breaker: 1 each 15 amp, 1 pole, 120 volt, unmetered.
5. AUX. breaker: 1 each 15 amp, 1 pole, 120 volt, metered.
6. AUTO/TEST lighting test switch.
7. LIGHTING CONTACTOR: 1 each, 2 pole, 240V(ac), 120V(ac) coil, 60 amp rating per pole.
8. PEC (photo electric control) field wire connection terminal block.
9. SURGE PROTECTION DEVICES: 2 each, (metered and unmetered load) 50kA surge rating, NRTL certified to comply with UL1449.
10. SURGE PROTECTION BREAKERS: 3 each, 20 amp, 1 pole, NRTL certified to comply with UL 489.

Identify each circuit breaker and component by description using an engraved phenolic nameplate attached with stainless steel rivets or screws.

Nameplate must be installed as follows:

1. Adjacent to the breaker on the dead front panel. The characters must be a minimum of 1/8 inch high.
2. Adjacent to the component on the back panel. The characters must be a minimum of 1/8 inch high.
3. At the top exterior of the door panel. The nameplate must include the system number, voltage, and number of phases engraved in minimum 3/16-inch-high characters.

A plastic-laminated wiring diagram must be affixed on the inside of the enclosure door.

Each service equipment enclosure must be factory pre-wired and delivered to the Project site ready to bolt to the foundation and connect to service and load wires. Furnish 2 sets of wiring diagrams showing location and describing components and wiring connections.

Wiring must be arranged so that any piece of apparatus may be removed without disconnecting any wiring except the leads to that piece of apparatus. All wiring must be marked with permanent clip sleeve wire markers. Felt, pencil, or stick back markers will not be acceptable.

86-1.02Q Cabinets

86-1.02Q(1) General

Cabinets must be factory wired except for battery backup system cabinets.

The fasteners on the exterior of a cabinet, except for battery backup system cabinets, must be removable and vandal resistant. The exterior screws, nuts, bolts, and washers must be stainless steel.

Terminal blocks, circuit breakers, and a power supply must be NRTL certified.

Sealing compound for caulking and adhesive sealing must be polysulfide or polyurethane complying with ASTM C920, Type S, Grade NS, Class 25, Use O.

86-1.02Q(2) Reserved

86-1.02Q(3) Controller Cabinets

The controller cabinet must be a Type P or as specified by the Contract Documents.

86-1.02Q(5) Battery Backup Systems

Battery backup system must be Tesco model 22 BBS or approved equal with optional external on-battery light and internal light.

A battery backup system includes the enclosure, batteries, and electronics assembly.

The electronics assembly includes the inverter/charger unit, manual bypass, and the battery harness. Connect batteries using a battery harness with keyed quick connectors with silver that protect hot terminals from accidental contact. During power outage, batteries must be replaceable without traffic signal shutdown.

86-1.02R Signal Heads

86-1.02R(1) General

A signal head consists of a signal mounting assembly, backplate, and signal face, the LED module, the assembly housing, and other appurtenant devices.

The head must have a terminal block attached to the back of one housing. The terminal block must have enough positions to accommodate all indications. Each position must be permanently labeled for the indications used.

The signal heads must be metal and not fracture or deflect more than half the lens diameter when tested under the provisions of the most recent version of Caltrans California Test 666.

The deflection must not be more than 10 degrees in either the vertical or horizontal plane after the wind load has been removed from the front of the signal face or more than 6 degrees in either the vertical or horizontal plane after the wind load has been removed from the back of the signal face.

Install signal modules in the signal housing and connect conductors from the signal module to the signal housing terminal block before delivery of signal equipment to the project site.

86-1.02R(2) Signal Mounting Assemblies

Signal mounting assembly must include:

1. 1-1/2-inch-diameter galvanized steel pipe or galvanized conduit.
2. Pipe fitting made of bronze.
3. Mast arm and post-top slip fitters and terminal compartments made of cast bronze or hot-dip galvanized ductile iron.

The horizontal distance between the vertical centerlines of the terminal compartment or slip fitter and of each signal face must not exceed 11 inches except where required for proper signal face alignment or to allow programming of programmed visibility signal sections.

Bracket arms must be long enough to allow proper alignment of signals and backplate installation.

The mounting assembly must be watertight and free of sharp edges or protrusions that might damage conductor insulation. The assembly must have positive-locking serrated fittings that prevent signal faces from rotating when the fittings are mated with similar fittings on the faces.

Each terminal compartment must be fitted with a terminal block having a minimum of 12 positions, each with 2 screw-type terminals. Each terminal must accommodate at least five number 14 AWG conductors. The terminal compartment must have a cover for easy access to the terminal block.

Painting of all signal heads and signal mounting assemblies must be done with a powder coating process and must be dark olive green. In order to prevent damage to the powder coating, the Contractor must use a woven fabric strap wrench to assemble, modify or tighten signal mounting assemblies.

86-1.02R(3) Backplates

The backplate material must be a homogeneous black color with a lusterless finish. Backplate must be made of a minimum 1/16-inch-thick 3001-14 aluminum.

86-1.02R(4) Signal Faces

Signal face consists of signal sections with signal housings, LED modules, and visors. Signal face must:

1. Be adjustable and allow for 360-degree rotation about the vertical axis.
2. Comply with ITE publications ST-052-E, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement and ST-054, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement.
3. Be sealed with a neoprene gasket at the top opening.

Signal face must have a metal backplate and visor. Signal face is supported by a Type MAS slip fitter. Spacers are required between the 2 sections. The spacers must be made of the same material as the housing. The vertical dimension of the spacers must allow proper seating of the serrations between the slip fitter and the 2 sections. The 2 sections must be joined with at least two number 10 minimum machine screws through holes near the front of the housing and the spacers and matching holes in a reinforcing plate installed in the housing.

86-1.02R(4)(a) Signal Sections

86-1.02R(4)(a)(i) General

Signal sections must be metal and have:

1. Opening at the top and bottom for a 1-1/2-inch pipe.
2. Maximum height of 14-3/4 inches for a 12-inch section.
3. Hinge pins, door-latching devices, and other exposed hardware manufactured of Type 304/304L or 305 stainless steel.
4. Interior screws and fittings manufactured of stainless steel or steel with a corrosion-resistant plating or coating.
5. Gaskets made of a material that does not degrade.

Sections must be capable of being joined together to form a signal face in any combination. Each section must be joined to an adjacent section by one of the following:

1. Install a minimum of 3 machine screws for 8-inch sections and 4 machine screws for 12-inch sections through holes near the front and back of the housing. Each screw must be a number 10 and have a nut, flat washer, and lock washer.
2. Install 2 machine screws, each with a nut, flat washer, and lock washer through holes near the front of the housing and a fastener through the 1-1/2-inch pipe opening. The fastener must have 2 large, flat washers to distribute the load around the pipe's opening and 3 carriage bolts, each with

a nut and lock washer. The minimum screw size must be number 10, and the carriage bolt size must be 1/4 inch.

The holes for the machine screws must be either cast or drilled during signal section fabrication. Each hole must be surrounded by a minimum 1/8-inch-wide boss to allow contact between signal sections about the axis of the hole.

86-1.02R(4)(a)(ii) Programmed Visibility Signal Sections

Programmed visibility signal section must have:

1. Nominal 12-inch-diameter circular or arrow indication.
2. Cap visor.
3. Adjustable connection that:
   3.1. Provides incremental tilting from 0 to 10 degrees above or below the horizontal.
   3.2. Maintains a common vertical axis through couplers and mountings.

The terminal connection must allow external adjustment about the mounting axis in 5-degree increments. The visibility of each signal section must be capable of adjustment or programming within the section.

The adjustment for the section must be preset at 4 degrees below the horizontal.

86-1.02R(4)(a)(iii) Signal Housings

The signal housing must:

1. Be die-cast aluminum or permanent mold-cast aluminum.
2. Be blackpowder coat finish throughout, including the door, and match color number 17038, 27038, or 37038 of AMS-STD-595.
3. Have a 1-piece, hinged, square-shaped door that is:
   3.1. Designed to allow access for replacement of modules without the use of tools.
   3.2. Secured such that it remains closed during loading tests.
4. Have a watertight module or lens mounted in the door.
5. Have a terminal block attached to the back, with the terminals permanently labeled for conductors to facilitate field wiring.

Each housing must have reinforcement plates. Reinforcement plates must be either sheet aluminum or cast aluminum. Each plate must have a minimum thickness of 0.11 inch and a hole concentric with a 1-1/2-inch pipe-mounting hole in the housing. Reinforcement plates must be placed as specified in the following table:

Reinforcement Plate Placement

Material	Placement
Sheet aluminum	Inside and outside of housing
Cast aluminum	Outside of housing

Reinforcement plates placed outside of the housing must be finished to match the signal housing color and be designed to allow a proper serrated coupling between the signal face and the mounting hardware. A minimum of three number 10 machine screws must be installed through holes in each plate and matching holes in the housing. Each screw must have a round or binder head, a nut, and a lock washer.

A metal housing must have a metal visor. The exterior of the housing must be painted as specified in Section 78-4.08, “Painting Electrical Material,” and Section 59, “Structural Steel Coatings.”

86-1.02R(4)(b) LED Signal Modules

An LED signal module must be on the Caltrans Authorized Material List for LED Traffic Signal Modules, and comply with:

1. ITE publication *ST-052-E, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement*.
2. ITE publication *ST-054, Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Supplement*.
3. Except module must have:
   - 3.1. Maximum weight of 4 lb.
   - 3.2. A sealed unit.
   - 3.3. 2 color-coded conductors for the power connection except lane control modules must use 3 color-coded conductors.
   - 3.4. A printed circuit board that complies with *TEES*, chapter 1, Section 6, “Printed Circuit Boards.”
   - 3.5. A lens that is:
     - 3.5.1. Convex or flat with a smooth outer surface.
     - 3.5.2. Made of UV-stabilized plastic or glass.
   - 3.6. 1-piece ethylene propylene diene monomer (EPDM) gasket.
   - 3.7. 3-foot-long conductors with attached quick-disconnect terminals.
   - 3.8. Integral power supply.
   - 3.9. Identification including:
     - 3.9.1. Month and year of manufacture.
     - 3.9.2. 1-inch-diameter symbol of the module type with the module color written adjacent to the symbol in 0.50-inch-high letters.
   - 3.10. Ultra-bright type LED rated for 100,000 hours of continuous operation.
   - 3.11. Individual LEDs wired such that a loss or failure of 1 LED will not result in a loss of more than 5 percent of the module's light output. Failure of an individual LED in a string must not result in a loss of an entire string or other indication.

The symbol for a 12-inch U-turn section must be a 15/16-inch-wide inverted *U* with an arrow on the left end.

A lane control section must be a combination module with a red *X* and green arrow. The conductor function and color code must be as shown in the following table:

Conductor Function and Color Code

Function	Color
Neutral	White
Red *X*	Red
Green arrow	Brown

The minimum power consumption for an LED signal module must be 5 W.

The maximum power consumption for an LED signal module must be as shown in the following table:

Maximum Power Consumption

LED signal module type	Power consumption (W)					
	Red		Yellow		Green	
	25 °C	74 °C	25 °C	74 °C	25 °C	74 °C
8-inch circular	8	13	13	16	12	12
12-inch circular	11	17	22	25	15	15
12-inch arrow	9	12	10	12	11	11
12-inch U-turn	9	12	10	12	11	11
Bicycle	11	17	22	25	15	15
Programmed visibility	11	17	22	25	15	15
Lane control (*X*)	9	12	--	--	--	--
Lane control (*Arrow*)	--	--	--	--	11	11

Red and green LED signal modules operating over a temperature range from -40 to 74°C and yellow LED signal modules operating at 25°C must maintain the minimum illumination values for 48 months as shown in the following tables:

Minimum Maintained Intensities for Circular Indications

Angle (v,h)	Intensities (cd)					
	8-inch			12-inch		
	Red	Yellow	Green	Red	Yellow	Green
2.5, ±2.5	133	267	267	339	678	678
2.5, ±7.5	97	194	194	251	501	501
2.5, ±12.5	57	113	113	141	283	283
2.5, ±17.5	25	48	48	77	154	154
7.5, ±2.5	101	202	202	226	452	452
7.5, ±7.5	89	178	178	202	404	404
7.5, ±12.5	65	129	129	145	291	291
7.5, ±17.5	41	81	81	89	178	178
7.5, ±22.5	18	37	37	38	77	77
7.5, ±27.5	10	20	20	16	32	32
12.5, ±2.5	37	73	73	50	101	101
12.5±7.5	32	65	65	48	97	97
12.5±12.5	28	57	57	44	89	89
12.5±17.5	20	41	41	34	69	69
12.5±22.5	12	25	25	22	44	44
12.5±27.5	9	16	16	16	32	32
17.5±2.5	16	32	32	22	44	44
17.5±7.5	14	28	28	22	44	44
17.5±12.5	10	20	20	22	44	44
17.5±17.5	9	16	16	22	44	44

17.5±22.5	6	12	12	20	41	41
17.5±27.5	4	9	9	16	32	32

Minimum Maintained Luminance for Indications

Indication type	Luminance (fL)		
	Red	Yellow	Green
Arrow	1,610	3,210	3,210
U-turn	1,610	3,210	3,210
Bicycle	1,610	1,610	1,610
Lane control (*X*)	1,610	--	--
Lane control (*Arrow*)	--	--	1,610

Minimum Maintained Luminance for Programmed Visibility Indications

Indication type	Luminance (cd)		
	Red	Yellow	Green
PV at angle v=2.5, h=±2.5	314	314	314

86-1.02R(4)(c) Visors and Directional Louvers

The visor must be a tunnel type.

The visor must have a downward tilt from 3 to 7 degrees with a minimum length of 9-1/2 inches for nominal 12-inch round lenses.

Visor must be formed from a minimum of 0.050-inch-thick aluminum alloy sheet.

A visor must withstand a wind load applied to its side for 24 hours without permanent deformation or removal from its door when tested under the provisions of Caltrans California Test 666 for metal visors.

Visors and directional louvers must have a black powder coat finish throughout, and match color number 17038, 27038, or 37038 of AMS-STD-595

If directional louvers are used, the louvers must fit into full-circular signal visors. Louvers must consist of one of the following:

1. Outside cylinder constructed of sheet steel with a minimum nominal thickness of 0.030 inch and vanes constructed of sheet steel with a minimum nominal thickness of 0.016 inch.
2. Outside cylinder and vanes constructed of 5052-H32 aluminum alloy of equal thickness.

86-1.02S Pedestrian Signal Heads

86-1.02S(1) General

A pedestrian signal head consists of a pedestrian signal mounting assembly and a pedestrian signal face comprising of a pedestrian signal housing, an LED countdown pedestrian signal face module, and a front screen.

The pedestrian signal door must not be plastic.

86-1.02S(2) Pedestrian Signal Mounting Assemblies

A pedestrian signal mounting assembly must be under the provisions of Section 86-1.02R, “Signal Heads,” except mast arm slip fitters are not required.

86-1.02S(3) Pedestrian Signal Faces

86-1.02S(3)(a) General

Each pedestrian signal face must include a light-duty terminal block rated at 5 A and have 12 positions with number 6-by-1/8-inch binder head screws. Each position must have 1 screw-type terminal.

The wiring and terminal block must comply with ITE publication ST-055-E, *Pedestrian Traffic Control Signal Indicators: Light Emitting Diode (LED) Signal Modules*.

86-1.02S(3)(b) Pedestrian Signal Housings

Pedestrian signal housing must be under the provisions of Section 86-1.02R(4)(a)(iii), “Signal Housings,” except the maximum overall dimensions must be 18-1/2 inches wide, 19 inches high, and 11-1/2 inches deep and without:

1. Visor.
2. Watertight module or lens mounted in the door.
3. Reinforcement plates.

The housing must have a terminal block attached to the back. The terminal block must have enough positions to accommodate all indications. Each position must be permanently labeled for the indications used.

86-1.02S(3)(c) LED Countdown Pedestrian Signal Face Modules

An LED countdown Pedestrian Signal Face (PSF) module must:

1. Comply with ITE publication ST-055-E, Pedestrian Traffic Control Signal Indicators: Light Emitting Diode (LED) Signal Modules.
2. The material must comply with ASTM D3935.
3. Have circuit boards that comply with TEES, chapter 1, Section 6, “Printed Circuit Boards.”
4. Have symbols that are at least 9 inches high and 5-1/4 inches wide each. The 2-digit countdown display, Upraised Hand, and Walking Person indications must be electronically isolated from each other. The 3 indications must not share a power supply or interconnect circuitry.
5. Ultra-bright-type LED rated for 60,000 hours of continuous operation. Individual LEDs must be wired such that a loss or failure of 1 LED will not result in a loss of more than 5 percent of the module's light output. Failure of an individual LED in a string must not result in a loss of an entire string or other indication.
6. Have a manual control to turn on and off the 2-digit countdown display.
7. Lot number and month and year of manufacture permanently marked on the back.
8. Prominent and permanent vertical markings for accurate indexing and orientation within the pedestrian signal housing. Markings must be a minimum of 1 inch in height and include an up arrow and the word up or top.

Upon initial testing at 25 degrees C, the module must have at least the luminance values shown in the following table:

Luminance Values

PSF module symbol	Luminance(fL)
Upraised hand and 2-digit countdown timer	1,094
Walking person	1,547

The module must not exceed the power consumption requirements shown in the following table:

Maximum Power Consumption Requirements

PSF module display	At 24 ºC	At 74 ºC
Upraised Hand	10.0 W	12.0 W
Walking Person	9.0 W	12.0 W
2-digit countdown timer	6.0 W	8.0 W

If the pedestrian change interval is interrupted, then the 2-digit countdown timer and display must reset to the full pedestrian change interval before being initiated the next time. The 2-digit countdown display on the PSF module must go dark within a second after displaying "0".

86-1.02S(3)(d) Front Screen

The frame of a pedestrian signal face must be made of plastic that is a flat black color.

Pedestrian signal face must have a flat black front screen that is one of the following types:

1. 1/2-inch-thick plastic screen with 3/8-inch-wide squares with 1/16-inch wall thickness that:
   1.1. Is installed so it tilts downward at an angle of 15 ± 2 degrees from the top and completely covers the message plate.
   1.2. Includes a clear front cover made of either a minimum 1/8-inch-thick acrylic plastic sheet or a minimum 1/16-inch-thick polycarbonate plastic.
   1.3. Is held firmly in place, including the cover, with stainless steel or aluminum clips or stainless steel metal screws.
2. Polycarbonate screen that:
   2.1. Has a nominal thickness of 1/32 inch.
   2.2. Is a 1-1/2-inch-deep eggcrate or Z-crate type.
   2.3. Is mounted in a frame constructed of aluminum alloy or polycarbonate with a minimum thickness of 0.040 inch.
   2.4. Is held in place with stainless steel screws.

86-1.02T Accessible Pedestrian Signals

Accessible pedestrian signal must be on the Caltrans Authorized Material List for Accessible Pedestrian Signals.

Accessible pedestrian signal must comply with the *California MUTCD*, chapter 4E, and have:

1. Audible speech message that plays when the push button is actuated. The accessible pedestrian signal must have at least 5 audible message options.
2. Push button locator tone that clicks or beeps.
3. Feature that activates the pedestrian phase during any failure without causing the pedestrian phase to be on RECALL.

No part of the accessible pedestrian signal must be installed inside the controller cabinet.

Power for the accessible pedestrian signal must be from the pedestrian signal housing terminal block.

The housing for the signal assembly must be made of corrosion-resistant material. Theft-proof bolts used for mounting the housing to the standard must be stainless steel with a content of 17 percent chromium and 8 percent nickel. The housing must be shaped to fit the pole's curvature.

The color of a metallic housing must match color number 33538 of AMS-STD-595.

The color of a plastic housing must match color number 17038, 27038, or 37038 of AMS-STD-595. Accessible pedestrian signal must:

1. Have controllable and programmable volume level and messaging.
2. Be weatherproof and shockproof.

Enclosure for the accessible pedestrian signal must:

1. Weigh less than 7 lb.
2. Measure less than 16 by 6 by 5 inches.
3. Have a wiring hole with a diameter not exceeding 1-1/8 inches.
4. Have a switch for a push button.
5. Have a vibrotactile device on the push button or on the arrow.
6. Have an internal weatherproof speaker and microphone that senses the ambient sound level.

The separation between adjacent holes used for conductors and mounting must be at least twice the diameter of the larger hole.

The speaker grills must be located on the surface of the enclosure. The speakers must not interfere with the housing or its mounting hardware.

The cable between the accessible pedestrian signal assembly and the pedestrian signal head must be rated for outdoor use and have a:

1. Minimum four number 18 stranded or larger tinned copper conductors with a minimum insulation thickness of 15 mils.
2. Cable jacket with a minimum thickness of 20 mils and rated for a minimum:
   2.1. 300 V(ac).
   2.2. 80 degrees C.
3. Nominal outside diameter less than 350 mils.
4. Conductor color code of black, white, red and green.

86-1.02U Push Button Assemblies

The housing for a push button assembly must be made of die-cast aluminum, permanent mold-cast aluminum, or UV-stabilized self-extinguishing structural plastic.

The housing must have powder coat finish throughout with a uniform color that matches color number 17038, 27038, or 37038 of AMS-STD-595.

If the push button is to be attached to a pole, the housing must be shaped to fit the pole's curvature. The assembly must be waterproof and shockproof.

The push button's switch must be a single-pole, double-throw switching unit with screw-type terminals rated 15 A at 125 V(ac).

Switch for the push button must have:

1. Plunger actuator and a U frame to allow recessed mounting in the push button housing.
2. Operating force of 3.5 lb.
3. Maximum pretravel of 5/64 inch.
4. Minimum overtravel of 1/32 inch.
5. Differential travel from 0.002 to 0.04 inch.
6. Minimum 2-inch diameter actuator.

Pedestrian push buttons signs must be porcelain enameled metal.

86-1.02V Reserved

86-1.02W Loop Detector Sealants

86-1.02W(1) General

Sealant for filling loop detector slots must be one of the following:

1. Asphaltic emulsion.
2. Elastomeric sealant.
3. Epoxy sealant for inductive loops.
4. Hot-melt rubberized asphalt.

86-1.02W(2) Asphaltic Emulsion Sealant

Asphaltic emulsion sealant must comply with the State Specification 8040-41A-15.

86-1.02W(3) Elastomeric Sealant

Elastomeric sealant must be a polyurethane material that cures only in the presence of moisture if used within the stated shelf life. The sealant must be suitable for use in both asphalt concrete and concrete pavement.

The cured elastomeric sealant must comply with the requirements shown in the following table:

Cured Elastomeric Sealant Requirements

Quality characteristic	Test method	Requirement
Hardness	ASTM D2240[a]	65–85
Tensile strength (min, MPa)	ASTM D412[b]	3.45
Elongation (min, %)		400
Flex at -40 °C[c]	--	No cracks
Weathering resistance	ASTM D822[d]	Slight chalking
Salt spray resistance:	ASTM B117[e]	
Tensile strength (min, MPa)		3.45
Elongation (min, %)		400
Dielectric constant (%)	ASTM D150[f]	<25

[a] Indentation at 25°C and 50% relative humidity (Rex. Type A, Model 1700 only).

[b] Die C pulled at 508 mm/minute.

[c] 0.6-mm free film bend (180°) over 13-mm mandrel.

[d] Weatherometer 350 h, cured 7 days at 25°C and 50% relative humidity.

[e] 28 days at 38°C with 5% NaCl, Die C, and pulled at 508 mm/minute.

[f] Change over a temperature range from -30 to 50°C.

86-1.02W(4) Hot-Melt Rubberized Asphalt Sealant

Hot-melt rubberized asphalt sealant must:

1. Be in solid form at room temperature and fluid at an application temperature range from 190 to 205 °C.
2. Not produce toxic fumes.
3. Be suitable for use in both asphalt concrete and concrete pavement.
4. Be packaged in containers clearly marked *Detector Loop Sealant* with the manufacturer's batch and lot number.

The cured hot-melt rubberized asphalt sealant must comply with the requirements shown in the following table:

Cured Hot-Melt Rubberized Asphalt Sealant Requirements

Quality characteristic	Test method	Requirement
Cone penetration, 25°C, 150 g, 5 s (max, 1/10 mm)	ASTM D5329	35
Flow, 60°C, 5 hr (max, mm)		5
Resilience 25°C (min, %)		25
Softening point (min, °C)	ASTM D36	82
Ductility, 25°C, 5 cm/min (min, cm)	ASTM D113	30
Flash point, Cleveland Open Cup (min, °C)	ASTM D92	288
Viscosity, number 27 spindle, 20 rpm, 190°C (Pa·s)	ASTM D4402	2.5–3.5

86-1.02X Reserved

86-1.02Y Reserved

86-1.02Z Batteries

Batteries for the battery backup system must be under the provisions of 22-000 Battery Backup System manufactured by Tesco Controls or approved equal.

86-1.03 CONSTRUCTION

Not Used.

86-1.04 PAYMENT

Not Used.

END OF SECTION

SECTION 87 ELECTRICAL SYSTEMS

87-1 GENERAL

87-1.01 GENERAL

Conform to these *City Standard Specifications* and the *CEC* as amended by the City of Campbell Municipal Code.

87-1.01A Summary

This section includes general specifications for constructing and installing electrical systems.

The Engineer must establish locations for standards, service cabinets, and controller cabinets using stakes or marks on existing pavements or curbs. Such location stakes or marks must be protected and preserved for however long as is necessary.

Decorative poles, foundations and appurtenances must comply with the specifications for streetlights.

87-1.01B Definitions

Reserved.

87-1.01C Submittals

Reserved.

87-1.01D Quality Assurance

87-1.01D(1) General

87-1.01D(2) Quality Control

87-1.01D(2)(a) General

Any fault in any material or in any part of the installation revealed by these tests must be replaced or repaired by the Contractor at its expense in a manner approved by the Engineer, and the same test must be repeated until no fault appear.

Before starting operation of an electrical system, perform a conductor test in the presence of the Engineer.

Conductor test consists of testing each conductor and the conductors in cables for:

1. Continuity.
2. Grounds.
3. Insulation resistance at 500 V(dc) between the circuit and ground. A minimum insulation resistance of 100 MΩ on circuits must be attained.

Start the operational test of the system on any day except Friday or the day before a holiday. The operational test for signals must start at 9:00 a.m. or as directed by the Engineer. Notify the Engineer 48 hours before starting the test.

An operational test consists of a minimum of 5 business days of continuous, satisfactory operation of the system. If the system fails, correct the problem and retest the system. A shutdown of the system caused by traffic, a power interruption, or unsatisfactory performance of City-furnished materials does not constitute discontinuity of the test.

87-1.01D(2)(b) Reserved

87-1.01D(2)(c) Battery Backup System

Notify the Engineer 48 hours before testing the battery backup system.

Test the battery backup system in the presence of the Engineer by turning off the service power to the electrical system to be powered by the battery backup system. The electrical system must remain in full continuous operation for 30 minutes. If the test fails, correct the problem and retest the system. After successful completion of the test, turn on the service power for the electrical system.

87-1.01D(2)(d) Reserved

87-1.02 MATERIALS

Not Used.

87-1.03 CONSTRUCTION

87-1.03A General

The Engineer determines the final locations of electrical systems.

Verify the locations of electrical systems and the depths of existing detectors, conduits, and pull boxes.

Work performed on an existing system not described is Extra Work.

Do not use electrical power from existing City facilities unless authorized.

Maintain a minimum 48-inch clearance for a pedestrian pathway when placing equipment.

Except for service installation or work on service equipment enclosures, do not work above ground until all materials are on hand to complete the electrical work at each location.

Bond all metal components including metallic cable sheaths and the equipment grounding conductor to form a continuous grounded system.

Orient louvers, visors, and signal faces such that they are clearly visible to approaching traffic from the direction being controlled.

Test loops and the detector lead-in cable circuit for continuity, ground, and insulation resistance at the controller cabinet before connecting detector lead-in cable to the terminal block.

Perform an operational test of the systems.

Before starting the operational test for systems that impact traffic, the system must be ready for operation, and all signs, pavement delineation, and pavement markings must be in place at that location.

Collect the geographic information system mapping data.

Ground metallic equipment mounted less than 8 feet above the ground surface on a wood pole.

Notify the Engineer a minimum of 48 hours before performing work on the existing system including work that may reroute traffic off of existing vehicle detectors or away from pedestrian push-buttons.

Vehicle detectors and pedestrian push-buttons taken out of service shall be repaired or replaced within 24 hours.. Where worksite conditions do not permit the installation of permanent vehicle detectors and pedestrian push-buttons within 24 hours, temporary vehicle detectors and pedestrian push-buttons shall be

installed, at the Contractor's expense, as directed by the Engineer. Permanent vehicle detectors and pedestrian push-buttons shall be installed as soon as worksite conditions permit.

87-1.03A(1) Inspection

Prior to backfilling of conduit trenches or the pouring of concrete foundations, the Contractor must notify the Engineer and request inspection of all conduits and foundation forms.

All conduits, conduit couplings, conduit bends, and ground bushings must be in place and tightened and all anchor rods/bolts and ground rods must be in place in the foundation form prior to the request for inspection. Wire must not be pulled in conduits until inspection, backfilling, and pouring of foundations are completed. Stub ends of all conduits must have approved caps and ground bushings installed prior to backfilling or pouring of foundations.

The Contractor must not backfill, enclose, or otherwise cover up any electrical work prior to inspection and/or testing by the City. Should any of the Work be backfilled, enclosed, or covered up, the Contractor must, at its expense, expose such Work for City inspection and/or testing.

When the Contractor has completed all work as specified in the Plans regarding the street lighting installation and it is the opinion of the Contractor that said installation is in conformance with the applicable Contract Documnets, the City of Campbell's Public Works Inspector must be notified that the street light installation is ready to be inspected.

87-1.03A(2) System Shutdown

You may shut down systems for alteration or removal.

Request in writing approval from the Engineer of the time and date for a shutdown a minimum of ten (10) working days prior to requested date of the shutdown.

Traffic signal shutdowns must be limited to Monday through Thursday excluding holidays, from 9:00 AM to 4:00 PM.

Place temporary W3-1 and R1-1 signs in each direction to direct traffic through the intersection during shutdown of the signal. Place two R1-1 signs for 2-lane approaches. Place R1-1 signs for each lane approaching the intersection. The signs must comply with part 2 of the *California MUTCD*.

Cover signal faces when the traffic signal system is shut down overnight. Cover temporary W3-1 and R1-1 signs when the system is turned on.

If you work on an existing lighting system and the roadway is to remain open to traffic, ensure the system is in operation by nightfall.

Where a facility requires continuous 24 hours per day lighting, the shutdown time shall be limited to one-half hour.

87-1.03A(3) Reserved

87-1.03A(4) Cleaning Existing Conduit

If existing underground conduit is to be incorporated into a new system, clean it with a mandrel or cylindrical wire brush and blow it clean with compressed air.

87-1.03A(5) Damage

Refer to Sections 7-1.10 “Preservation of Property,” 7-1.11, “Responsibility for Damage,” and this section for damage to electrical systems.

Notify the Engineer immediately if an existing facility is damaged by your activities:

1. Damaged traffic signal systems must be repaired or replaced within 24 hours. If the system cannot be repaired or replaced within 24 hours or it is located on a structure, provide a temporary system until the system can be repaired or replaced.
2. Damaged existing lighting systems must be repaired or replaced by nightfall. If the system cannot be repaired by nightfall, provide a temporary system until the system can be repaired.

During the shutdown, the Contractor must pay for all traffic control costs, including control devices and the time of all City staff.

Permanently repair the signal and lighting system under the provisions of these Standard Specifications and to the Engineer' s satisfaction within 24 hours.

If you damage an existing fiber optic cable, install a new cable such that the length of cable between splices (and cable slack) is at least the same as before the damage, measured between original splice points or terminations. All splices must be made using the fusion method. Re-splice fiber at existing splices. Test the repaired fiber and provide testing documentation for review under the provisions of the specifications for new construction.

If you damage an existing signal interconnect cable, install a new cable such that the length of cable between the cabinets where the cable terminates (and cable slack) is at least the same as before the damage. Terminate the cable in the cabinets. Test the cable and provide testing documentation for review under the provisions of the specifications for new construction.

87-1.03B Conduit Installation

87-1.03B(1) General

The installation of conduit includes installing caps, bushings, and pull tape and terminating the conduit in pull boxes, foundations, poles, or a structure.

Notify the Engineer at least 1 week before starting horizontal directional drilling method or jack and drill activities.

Use Type 1 conduit:

1. On all exposed surfaces.
2. In concrete structures.
3. Between a structure and the nearest pull box.

Ream the ends of shop-cut and field-cut conduit to remove burrs and rough edges. Make the cuts square and true. Do not use slip joints and running threads to couple conduit. If a standard coupling cannot be used for metal-type conduit, use a threaded union coupling. Tighten the couplings for metal conduit to maintain a good electrical connection.

Cap the ends of conduit to prevent debris from entering before installing the conductors or cables. Use a plastic cap for Type 1 conduits and a standard pipe cap for all other types of conduit or bell.

For Type 1, 2, 4 and 5 conduits, use threaded insulated grounding bushings and bond them using a jumper, except conduit in steel pull boxes use an insulated bushing inside and a fitting outside of the box.

For Type 3 conduits, use a PVC end bell.

Do not install new conduit through foundations except as shown in the Standard Details.

Cut Type 3 conduit with tools that do not deform the conduit. Use a solvent weld for PVC to PVC connections. Thoroughly coat the mating surfaces of the connection with primer and cement and, after insertion, twist the joint 180 degrees to insure a complete bond. Remove excess solvent from PVC after making the connection.

Protect shop-cut threads from corrosion under the standards shown in the following table:

Shop-Cut Thread Corrosion Protection

Conduit	Standard
Types 1 and 2	ANSI C80.1
Type 5	ANSI C80.6

Apply 2 coats of unthinned, organic zinc-rich primer to metal conduit before painting. Use a primer on the Caltrans Authorized Material List for organic zinc-rich primers. Do not use aerosol cans. Do not remove shop-installed conduit couplings.

For conduits, paint:

1. All exposed threads.
2. Field-cut threads, before installing conduit couplings to metal conduit.
3. Damaged surfaces on metal conduit.

Install ground wire in conduit that will remain empty with at least 2 feet of slack at each end of the conduit.

Install conduit terminating in a standard or pedestal from 2 to 3 inches above the foundation. Slope the conduit toward the handhole opening.

Prove and clean the conduit by pulling a mandrel or wire brush through the conduit prior to the installation of conductors, cables, or innerduct in conduit.

Extend an existing conduit using the same material. Terminate conduits of different materials in a pull box.

Conduit must be free of flattening, kinks, and indentations.

Use conduit to enclose conductors and cables except detector cables or where they are installed overhead or inside standards or posts.

Install innerducts as one continuous unit between vaults. Innerducts may be interrupted inside pull boxes located between vaults and cabinets.

Lubricate innerducts under the provisions of manufacturer's instructions during installation. Install a pull tape in conduits and innerducts to remain empty.

Seal the ends of conduit after conductors, cables or pull tape are installed.

87-1.03B(1)(a) Bends

Conduit must be installed as straight as possible using factory elbow fittings for bends. No single conduit bend or elbow must exceed an angle of 90 degrees.

Limit the number of bends in a conduit run to:

1. 135 degrees of bends in a conduit run from a pull box to a foundation.
2. 90 degrees of bends in a conduit run from a pull box to a pull box where the conduit is installed parallel to and on the sidewalk side of curb.

3. 270 degrees of bends in a conduit run from a pull box to a pull box where the conduit is installed parallel to and on the street side of the curb.
4. 180 degrees of bends in a conduit run from a pull box to a pull box where the conduit is installed perpendicular to the curb.

Conduit 1-1/2 inch and larger and in runs of less than 10 feet must have a bending radius of not less than 18 inches. Conduit 1-1/2 inch and larger and in runs of more than 10 feet must have bending radius of not less than 18 inches or 12 times the inside diameter of the conduit, whichever is greater. Maximum bend rise of elbows into pull boxes must be 45 degrees.

Use a radius for bends and sweeps under the provisions of PG&E requirements between the "CAMPBELL SERVICE" pull box and the PG & E secondary box with a minimum of:

1. 24 inches for a 2 inch vertical bend.
2. 24 inches for a 3 inch vertical 90 degree bend.
3. 36 inches for all other bends.

87-1.03B(1)(b) Conduit Size and Quantity

Install 2 conduits between a controller cabinet and the adjacent pull box.

Install 1 conduits between a controller cabinet and the adjacent pull box.

Use a minimum trade size of conduit of:

1. 2 inches from an electrolier to the adjacent pull box.
2. 1 inch from a pedestrian push button post to the adjacent pull box.
3. 2 inches from a signal standard to the adjacent pull box.
4. 3 inches from a controller cabinet to the adjacent pull box.
5. 2 inches from a service equipment enclosure to the adjacent pull box for feeder wiring.
6. 2 inches for traffic signal controller cabinet feeder.
7. 2 inches for detector lead-in cable runs.
8. One inch between the detector loop termination at the lip-of-gutter and pull box.
9. 3 inches for traffic signal conduits between pull boxes where the conduit crosses a roadway.
10. 2 inches for traffic signal systems.
11. 1-1/2 inches if unspecified.

You may use a larger size conduit than specified for the entire length between termination points. Do not use a reducing coupling.

87-1.03B(2) Conduit Installation for Structures

87-1.03B(2)(a) General

Paint exposed Type 1 conduit the same color as the structure.

Paint in accordance with the requirements for conduit and install galvanized steel hangers, steel brackets, and other fittings to support conduit in or on a wall or bridge.

Install Type 1 conduit in foundations of controller cabinets, lighting standards and signal standards.

Clean the exterior surface of conduit which will be partially or completely imbedded in concrete structures before the concrete is placed.

87-1.03B(2)(c) Existing Structures

Run surface-mounted conduit straight and true, horizontal or vertical on the wall, and parallel to walls on ceilings or similar surfaces. Support the conduit at a maximum of 5-foot intervals where needed to prevent

vibration or deflection. Support the conduit using hot-dipped galvanized, malleable-iron, conduit clamps, and clamp backs secured with expansion anchorage devices. Use the largest diameter of galvanized, threaded studs that will pass through the mounting hole in the conduit clamp.

87-1.03B(3) Conduit Installation Underground

87-1.03B(3)(a) General

Place conduit couplings at a minimum of 6 inches from the face of a foundation.

Conduit that is installed underground must be Type 3, Schedule 40 PVC, except conduit installed by directional boring must be HDPE.

Where an underground obstruction is encountered which prevents the installation of a conduit run as shown on the plans the alignment of the conduit run may be revised and/or additional pull box(es) may be installed as required to avoid the obstruction. Such revisions to the conduit alignment and pull box layout will require the prior written approval of the Engineer.

You must, at the request of the Engineer, open inspection holes as required to determine compliance with the requirements for trench-laid conduit depth and alignment. Inspection holes must not be backfilled until the conduit installation has been approved by the Engineer. Upon completion of inspection, inspection holes must be filled to the satisfaction of the Engineer. The opening and filling of inspection holes must be at your expense.

Conduit runs for streetlighting must be installed either parallel to or perpendicular to the curb, unless otherwise approved by the Engineer prior to placement. Conduit runs parallel to the curb must be located not more than 27 inches nor less than 6 inches behind the face of curb.

Conduit must enter a concrete pull box through the short side and must be so positioned that the prolongation of the conduit would pass through the top opening of the pull box. Conduit must not enter from the bottom or from the long side of a pull box unless otherwise approved by the Engineer. Conduit must enter a pull box in the direction of the conduit run.

Where a new pull box is installed in an existing metallic conduit run, cut, thread, extend and terminate the conduit in the pull box in accordance with the specifications for new conduit.

87-1.03B(3)(b) Conduit Installation under Paved Surfaces

Install conduit under existing pavement by either the horizontal directional drill method or trench-in-pavement method.

87-1.03B(3)(c) High Density Polyethylene Conduit Installation

Demonstrate a minimum of 2 test fusions to the Engineer prior to performing fusion operations on HDPE conduit to be installed.

Join HDPE conduit using the electro fusion method recommended by the conduit manufacturer. Do not expose conduit to direct flame. The electro-fusion must be performed by a person certified by the conduit manufacturer.

Install PVC end bells on HDPE conduit with high strength polyethylene adhesive. Sand bell ends and conduit on mating surfaces with 120 grit sandpaper or emery cloth before applying adhesive. Mix adhesive for bell ends for a uniform color and consistency. Attach bell end within the working time recommended by the manufacturer or 3 minutes whichever is less.

87-1.03B(3)(d) Conduit Installation under Railroad Tracks

Install conduit under rail for light rail and railroad in accordance with the requirements of the encroachment permit issued by the owner of the rail right of way.

87-1.03B(4) Conduit Installation by Horizontal Directional Drilling Method

Install a conduit to a minimum depth of 2.5 feet and maximum depth of 6 feet. If you must install a conduit less than 2.5 feet in depth or greater than 6 feet in depth, the installation must be authorized.

The diameter of the bore hole must be no larger than 1.5 times the outside diameter of the conduit.

Water-based mineral slurry or wetting solution may be used to lubricate the boring tool and stabilize the soil surrounding the boring path.

The horizontal directional drilling equipment must have directional control of the boring tool and have an electronic boring tool location detection system. During operation, the equipment must be able to determine the location of the tool both horizontally and vertically.

Do not use slurry cement backfill.

87-1.03B(6) Conduit Installation by the Trenching-In-Pavement Method

Install conduit by the trenching-in-pavement method under the provisions of the requirements for utility trenches, Section 100, “Trench Excavation, Bedding and Backfill.”

Where additional pavement is to be placed, you must complete the trenching before the final pavement layer is applied.

If the conduit shown is to be installed under the sidewalk, you may install it in the street within 3 feet of and parallel to the face of the curb. Install pull boxes behind the curb.

Dig the trench by hand to the required depth at pull boxes.

Place conduit in the trench.

87-1.03B(7) Utility Conduit

Install molding on a utility pole or conduit into a manhole, vault, and/or pull box of the Pacific Gas and Electric Company, AT&T or other utility agency under the provisions of the requirements of the respective agency. Contact representatives of those organizations for instructions regarding the preferred location of entry and termination method of such molding or conduit.

87-1.03C Installation of Pull Boxes

87-1.03C(1) General

Install pull boxes no more than 200 feet apart.

Place the cover on the box when not working in it.

87-1.03C(2) Roadway Pull Boxes

87-1.03C(2)(a) General

Where a roadway pull box is adjacent to a post or standard, place the pull box within 10 feet from the post or standard on the downstream side of traffic unless otherwise approved by the Engineer.

Bond and ground the metallic conduit before installing conductors and cables in the conduit. Do not install pull boxes in concrete pads, curb ramps, or driveways.

Construct the drain rock sump, tar paper, and grout of a pull box disturbed by your activities.

Install pull boxes clear of driveways and access ramps.

Install drain rock a minimum of 6 inches beyond the inside wall of the box.

87-1.03C(2)(b) Nontraffic Pull Boxes

When a pull box is in a structure, modify the base as required.

Place mortar between a nontraffic pull box and a pull box extension.

Install drain rock a minimum of 6 inches beyond the inside wall of the box.

Where a nontraffic pull box is in the vicinity of curb in an unpaved area, place the box adjacent to the back of the curb if practical.

If you replace the cover on a nontraffic pull box, anchor it to the box.

87-1.03C(2)(c) Traffic Pull Boxes

Place minor concrete around and under a traffic pull box as shown.

Bolt the steel cover to the box when not working in it.

Bond the steel cover, ground rod and metal conduit after installing the conductors and cables.

87-1.03D Battery Backup System

Install the battery backup system cabinet to the right side of the controller cabinet. If installation on the right side is not possible, obtain authorization for installation on the left side.

Construct access opening between controller cabinet and battery backup cabinet using:

1. 2-inch nylon-insulated, steel chase nipple.
2. 2-inch steel sealing locknut.
3. 2-inch nylon-insulated, steel bushing.

Remove the jumper between the terminals labeled *BBS-1* and *UBS-1* and the jumper between the terminals labeled *BBS-2* and *UBS-2* in the 7-position terminal block in the controller cabinet before connecting the electronics assembly.

Install the electronics assembly and batteries in the battery backup system cabinet. Obtain authorization for installation of the electronics assembly in the controller cabinet.

87-1.03E Excavating and Backfilling for Electrical Systems

87-1.03E(1) General

Notify the Engineer at least 72 hours before starting excavation activities.

Dispose of surplus excavated material.

Remove the entire square, section, or slab from score line to score line and reconstruct the concrete as specified in Section 73, "Concrete Curbs and Sidewalks," whenever a part of a square or slab of existing concrete sidewalk, curb, gutter, driveway or driveway approach is broken or damaged.

Cut all areas of Portland cement concrete sidewalks, driveways and driveway approaches, and asphalt and/or concrete pavements to be removed to a minimum depth of 2 inches with an abrasive type saw prior to removal. Make cuts neat and true along score lines.

87-1.03E(2) Trenching

Do not dig a trench until conduits or direct burial cables are to be installed.

After placing the conduit or direct burial cable, backfill the trench.

Backfill the trench to the pavement's surface by the end of each work day.

Excavate trenches straight and true to line and grade, with the bottom smooth and even.

Conduit must not be covered until the installation has been approved by the Engineer.

87-1.03E(3) Concrete Pads, Foundations, and Pedestals

Construct foundations for standards, poles, metal pedestals, and posts under Section 56-3, “Standards, Poles, Pedestals, and Posts.”

Construct concrete pads, foundations, and pedestals for controller cabinets, and service equipment enclosures on firm ground.

Install anchor bolts using a template to provide proper spacing and alignment. Moisten the forms and ground before placing the concrete. Keep the forms in place until the concrete sets for at least 24 hours to prevent damage to the surface.

Bond all anchor bolts using ground clamps and number 8 AWG ground wire

Use minor concrete for pads, foundations, and pedestals except for CIDH concrete pile foundations.

Construct a pad in front of a Type III service equipment enclosure. The pad must be a minimum of 36 in length, 48 inches wide, and 4 inches in thickness.

Construct a pad in front of a battery backup system cabinet. The pad must be a minimum of 36 in length, 48 inches wide, and 4 inches in thickness.

Construct cabinets so that openings are 48 inches clear of the street or as directed by the Engineer. In unpaved areas, place the top of the foundation 2 inches above the grade for Type III service equipment enclosures.

The pad must be 2 inches above the surrounding grade in unpaved areas.

In and adjacent to the sidewalk and other paved areas, place the top of the foundation 4 inches above the surrounding grade, except place the top level with the finished grade for Type III service equipment enclosures.

The pad must be level with the finished grade in paved areas.

Apply an ordinary surface finish under Section 51-1.03F, “Finishing Concrete.”

Allow the foundation to cure for at least 7 days before installing any equipment.

Where obstructions prevent the construction of a planned foundation, you must consult with the Engineer to determine an effective resolution.

Foundations for standards and poles must be placed the same day as they are excavated.

Unless otherwise specified by the Engineer, posts and standards must be erected within 10 calendar days after commencement of excavation of the foundation, but not until the foundation has set at least 7 calendar days. Posts and standards must be plumbed or raked as directed by the Engineer. Plumbing of posts and standards must be accomplished before the foundation is finished to final grade and/or before placing the grout between the base plate and the foundation cap or structure.

The elevation or grade of the foundation cap must conform to existing surrounding grades or as directed by the Engineer.

The top portion of the foundation or cap must not be constructed until after the post, standard, or pedestal is set in proper position, and other improvement constructed, unless otherwise directed.

Grout must be placed between the base plate and foundation cap or structure.

Grout, foundation cap, or pavers must be placed after the post or standard is in proper position.

In unpaved areas, posts and standards without adjacent pull boxes must have a foundation cap formed a minimum of 2.5 feet square. When posts or standards are within 1.5 feet of other finished concrete work, finish foundation cap must extend to existing adjacent surfaces.

87-1.03F Conductors and Cable Installations

87-1.03F(1) General

The installation of conductors and cables includes splicing conductors and attaching the terminals and connectors to the conductors.

Clean the conduit and pull all conductors and cables as a unit.

If new conductors or cables are to be added in an existing conduit:

1. Remove the content
2. Clean the conduit
3. Pull new conductors and cables as a unit using all new conductors and cables unless noted otherwise.

Traffic signal and streetlighting conductors receiving power from different service points must not be installed in the same standard, conduit, pull boxes, or other enclosures.

Install service conductors in conduit dedicated to the service conductors.

Provide conductor and cable slack to comply with the requirements shown in the following table and 87-19:

Conductor and Cable Slack Requirements

Location	Slack (feet)
Signal standard	1
Lighting standard	1
Signal and lighting standard	1
Pull box (except traffic signal interconnect and fiber optic cables)	3
Pull box (traffic signal interconnect)	5
Splice	3
Controller cabinet	6

Slack must be measured by removing the handhole cover on the standard and extending the wire or cable horizontally beyond the handhole opening and measuring the shortest horizontal distance between the handhole and the conductor splice, or between the handhole and the midpoint of un-spliced conductors and cables.

Slack must be measured by removing the pull box lid and extending the wire or cable vertically above the pull box grade and measuring the shortest vertical distance between the rim of the pull box and the conductor splice, or between the rim and the midpoint of un-spliced conductors and cables.

Slack must be measured by opening the traffic signal or termination cabinet and extending the wire or cable straight outward and measuring the shortest horizontal distance between the cabinet opening frame and the midpoint of conductors and cables cabinet.

Slack for fiber optic cable must be determined using the manufacturer's cable markings.

Wrap conductors and secure cables to the end of the conduit in a pull box.

Seal the ends of conduits with a sealing compound after installing conductors or cables.

Neatly arrange conductors and cables inside pull boxes and cabinets. Tie the conductors and cables together with self-clinching nylon cable ties or enclose them in a plastic tubing or raceway.

Identify conductors and cables by labeling, tags, or bands fastened in such a way that they will not move. Use mechanical methods for labeling.

Provide labeling, tags, or band identification on each conductor/cable or each group of conductors comprising a signal phase in each pull box and near the end of terminated conductors.

Tape the ends of unused conductors and cables in pull boxes to form a watertight seal.

Do not connect the push-button or accessible pedestrian signal neutral conductor to the signal neutral conductor.

A number 8 AWG or larger equipment grounding conductor must be provided in all PVC conduits carrying any traffic signal conductor, street lighting conductor, metered signal feeder conductor, metered irrigation feeder conductor, detector lead-in (DLC) cable, or signal communications/signal interconnect (SIC) cable.

A number 8 AWG or larger bare, stranded copper equipment grounding conductor must be provided in any PVC conduit left empty for future use.

Only the conduit between the loop detector hand hole and the pull box where the loop conductors are spliced in the DLC(s) does not require any copper equipment grounding conductor.

87-1.03F(2) Cables

87-1.03F(2)(a) General

Precautions must be taken to ensure that the cable is not damaged during storage or installation. The cable must not be stepped on by workmen nor run over by any vehicle or equipment.

87-1.03F(2)(b) Communication Cables

87-1.03F(2)(b)(i) General

Terminate the ends of the communication cables as shown.

87-1.03F(2)(b)(ii) Category 5E and 6 Cables

Do not splice category 5E and 6 cables.

87-1.03F(2)(b)(iii) Not Used

87-1.03F(2)(c) Copper Cables

87-1.03F(2)(c)(i) General Reserved

87-1.03F(2)(c)(ii) Detector Lead-in Cables

Install Type B detector lead-in cable in conduit.

Seal ends of the lead-in cable before installing it in the conduit to prevent moisture from entering the cable.

Splice loop conductors for each direction of travel for the same phase, terminating in the same pull box, to a separate lead-in cable running from the pull box adjacent to the loop detector to a sensor unit mounted in the controller cabinet. Install the lead-in cable without splices except at the pull box when connecting to loop wire.

Verify in the presence of the Engineer that the loops are operational before making the final splices between loop conductors and the lead-in cable.

Identify the detector designation each lead-in cable using labeling, tags, or bands at the cabinet and pull box adjacent to the loops.

87-1.03F(2)(c)(iii) Reserved

87-1.03F(2)(c)(iv) Signal Interconnect Cable

Do not splice the cable. The SIC shall run continuously and unspliced from one cabinet to the next cabinet.

Cable ends must be kept sealed until termination takes place.

Label traffic signal communication cables "TS-COM" in all pull boxes.

Label traffic signal communication cables in controller cabinets and termination cabinets with location of the other end of the cable.

The allowable pulling tension must be the smaller of the cable manufacturer's recommended pulling tension for that cable for pulling by the outer jacket, or 80 percent of the manufacturer's maximum pulling tension for pulling by the outer jacket. Ensure that the allowable pulling tension is not exceeded at anytime during cable installation by using one of the following methods, as approved by the engineer:

1. Pulling the cable by hand.
2. Using a winch with an adjustable clutch for taking up the pulling line. The clutch must be set such that the clutch slips, and the winch immediately ceases taking up the pulling line, whenever the allowable pulling tension of the cable is exceeded. The proper operation of the winch/clutch assembly must be demonstrated to the City for approval prior to any cable installation, and at any time during cable installation as may be directed by the City.

Cables must be attached to the pulling line with a cable grip designed to provide a firm hold on the exterior covering of the cable, and with heat shrinkable end caps placed on the cable ends.

The pulling eye/cable grip must be attached to the pulling line by means of a "B" swivel of 0.75-inch links minimum.

To prevent damage to the cable, voice communications must be established and maintained between the cable feeding location and the cable pulling equipment location prior to and during all pulling operations. A person with Traffic Signal Technician certification by International Municipal Signal Association must be stationed at the "feed" end at all times during the cable pulling operation. The cable reels must be set up on the same side of the junction box as the conduit section in which the cable is to be placed. The reel axle must be made level and brought into proper alignment with the conduit section such that the cable must pass from the top of the reel in a long smooth bend into the duct without twisting. The cable must not be pulled from the bottom of the reel. The cable must be fed by manually rotating the reel.

The cable must not be pulled through any intermediate junction box, pull box, handhole, or any other opening in the conduit not shown on the plans, unless specifically approved by the Engineer. Once the installation of a necessary length of cable to be pulled from a cabinet to the immediate next downstream cabinet begins, the cable installation must be completed that same work day.

Cable that has to be temporarily stored during the work day must be carefully stored in a manner that is not hazardous to worker, pedestrian, or vehicular traffic, and which ensures that no damage to the cable must occur. When cable is stored temporarily it must be stored in a manner that allows that length of cable to be safely pulled into the next conduit directly from the cable reel or storage rack. Cable must not be stored on the jobsite overnight, unless approved by the Engineer.

You must determine the length of cable necessary to reach from termination point to termination point. Splicing of cable at any location other than controller cabinets and termination cabinets shown on the plans is not permitted. Splicing of cable in conduit, pull boxes, junction boxes, or handholes is not permitted. The cable must not bend at any location to a radius less than 10 times the diameter of the cable's outside dimension, or the manufacturers recommended working radius, whichever is greater. This minimum bending radius of the cable must not be exceeded at any time during cable installation. The cable must not be pulled over edges or corners, over or around obstructions, or through unnecessary curves or bends. Cables must be looped in and out of pull boxes to provide the least amount of stress on conductors.

A lubricant approved for the installation, in the amount recommended by the cable manufacturer, must be used to facilitate pulling the cable. The cable must be lubricated as it is rolled off the cable reel or storage stack into the cable feeder. An approved cable lubricator (funnel) must be placed around the cable just ahead of the cable feeder to facilitate proper lubrication of the cable. After the cable has been installed, the exposed cable in a pull box or cabinet must be wiped clean of cable lubricant with a cloth before leaving the pull box or cabinet.

At the start of the pull, tension must be kept on both the cable reel or storage stack, and the pulling line. As far as possible, the cable must be pulled without stopping until the required amount of cable is at the downstream pull box or cabinet. If for any reason the pulling operation is halted between pull boxes and/or cabinets, the tension must not be released. In restarting the pulling operation, the inertia of the cable must be overcome by gradually increasing the tension, in small steps a few seconds apart, until the cable is once again in motion.

87-1.03F(2)(c)(v) Reserved

87-1.03F(3) Conductors

87-1.03F(3)(a) General

Do not run conductors to a terminal block on a standard unless they are to be connected to a signal head mounted on that standard.

Provide 3 spare conductors in all conduits containing ramp metering and traffic signal conductors.

Install a separate conductor for each terminal of a push button assembly and accessible pedestrian signal.

Do not connect the push-button or accessible pedestrian signal neutral conductor to the any other neutral conductor.

87-1.03F(3)(b) Reserved

87-1.03F(3)(c) Copper Conductors

87-1.03F(3)(c)(i) General

Install a minimum number 8 AWG grounding copper conductor in conduit and connect it to all-metal components.

Conductors must be pulled into conduit by hand; use of winches or other power actuated pulling equipment will not be permitted.

87-1.03F(3)(c)(ii) Inductive Loop Conductors

Install a Type 1 inductive loop conductor. Install the conductor without splices except at the pull box.

87-1.03F(4) Manual Installation Method

Use an inert lubricant for placing conductors and cables in conduit.

Pull the conductors and cables into the conduit by hand using pull tape.

Pull conductors into conduits after pull boxes are set to grade, drain rock sumps installed, conduit grouted in place, bottoms of concrete boxes grouted, and the conduits bonded.

The conduit system must be complete and approved by the Engineer before any conductors are installed in conduits. All conductors must be run in conduit except where conductors are installed inside poles, pull boxes, or cabinets. Conductors must be installed by means which will not in any way damage the conductor or its insulation.

Conductors entering conduits must be carefully fed and "positioned" to avoid "tangles" and "crossovers." All conductors must be installed simultaneously.

Conductors and cables in all pull boxes must be grouped and arranged in a workmanlike manner. Conductors and cables in manholes must be supported by strapping to the side wall.

87-1.03F(5) Reserved

87-1.03G Equipment Identification Characters

Unless otherwise indicated on the Plans or as directed by the Engineer, the City will furnish and apply the appropriate labels to the outside of poles and cabinets.

87-1.03H Conductor and Cables Splices

87-1.03H(1) General

You may splice:

1. Grounded conductors in a pull box.
2. Accessible pedestrian signal and push button conductors in a pull box.
3. Ungrounded signal conductors in a pull box.
4. Ungrounded signal conductors to a terminal compartment or a signal head on a standard with conductors of the same phase in the pull box adjacent to the standard.
5. Ungrounded lighting circuit conductors in a pull box.

Solder all copper conductor splices using the hot iron, pouring, or dipping method. Do not perform open- flame soldering.

87-1.03H(2) Splice Insulation Methods

Insulate splices in a multiconductor cable to form a watertight joint and to prevent moisture absorption by the cable.

Use heat-shrink tubing to insulate a splice under the provisions of *Caltrans Standard Plans*, “Electrical Systems (Splice Insulation Methods Details),” “Typical Splice Insulation Heat-Shrink Tubing” for C-tap type connector (ES-13A). Use heat-shrink tubing as follows:

1. Cover the splice area completely with an electrical insulating coating and allow it to dry.
2. Heat shrinkable insulating tubing must be applied after completion of the splicing procedure. Insulation over the splice connection must consist of a heat shrinkable, mastic lined, heavy wall polyolefin cable sleeve, or cover, to which heat must be applied at a temperature greater than 120 degrees C, with an electric hot air gun until the sleeve or cover shrinks and covers the connector and the mastic material has flowed completely around and between the conductor(s) to form a waterproof insulation. The conductor insulation must not be damaged due to application of the heat shrinkable insulation sleeve.
3. Do not perform open-flame heating. After contraction, each end of the heat-shrink tubing or the open end of the tubing's end cap must overlap the conductor insulation at least 1-1/2 inches.
4. Heat must be applied at a temperature greater than 120 degrees C. with an electric hot air gun until the sleeve or cover shrinks and covers the connector and the mastic material has flowed completely around and between the conductor(s) to form a waterproof insulation.

87-1.03I Connectors and Terminals

Apply connectors and terminals to cables and conductors using a crimping compression tool under the manufacturer's instructions. The tool must prevent opening of the handles until the crimp is completed.

Install crimp-style terminal lugs on stranded conductors smaller than number 14 AWG.

Install crimp-style connectors between conductors.

Solder number 8 AWG and smaller copper conductors to connectors and terminal lugs.

Connect lead-in cable to loop wires with a 3 inch offset between connections. Insulate each connection separately and then insulate as a unit:

1. Both connections.
2. 2 inch overlap of the cable end including the outer jacket, ground and shield.
3. 1 inch overlap of the insulated conductors.

The detector lead-in cable drain wire must be terminated on the detector panel ground bus. Only one drain wire must be connected to each spade lug terminal.

87-1.03J Standards, Poles, Pedestals, and Posts

Install standards, poles, pedestals, and posts under Section 56-3, “Standards, Poles, Pedestals, and Posts.” Poles with slip bases must not be used.

All exposed holes shall be plugged with pole plugs. Apply thread locker on threads. Drill and tap back plates when used in lieu of wingnuts. Tighten wing nuts and back plates. Lightly sand, clean, prime and paint plug for painted poles to match the pole finish.

Ground standards without a handhole by bonding a 8 AWG minimum conductor to all anchor bolts using ground clamps and connecting it to a metal conduit or to the grounding wire in the adjacent pull box. The bonding jumper must be visible after grout has been placed on the foundation. The bonding jumper may extend 1/2 inch maximum from the grout.

The mast arm(s), signal equipment, luminaire, and other devices may be assembled and attached to a standard prior to it being erected and set.

After erection, standards and posts must be plumbed or raked as directed by the Engineer. Plumbing or raking of standards and posts must be accomplished by adjusting the leveling nuts before the foundation cap is placed. The use of shims or other similar devices for plumbing or raking of standards and posts is not acceptable.

Signal equipment must be plumbed and aimed and luminaires must be leveled after the standard has been erected and set.

Drilling, tapping, and machining of signal standards must be performed on the Project site. Holes in standards must be cut using drills or hole saws. The use of a cutting torch for the purpose of producing holes in standards will not be permitted unless authorized by the Engineer prior to performing the Work.

87-1.03K Reserved

87-1.03L Utility Service

87-1.03L(1) General

Install the service equipment early enough to allow the utility to complete its work before completion of the electrical work.

At least 15 days before permanent electrical and telecommunication service is required, request the service connections for permanent installations. The City arranges with the utilities for completion of the connections and pays all costs and fees required by the utilities.

24-hour notice must be given to any utility company before the beginning of any operation involving their facilities or systems.

87-1.03L(2) Electric Service

87-1.03L(2)(a) General

If service equipment is to be installed on a utility-owned pole, furnish and install the conduit, conductors, pull boxes, and other necessary material to complete the service installation. The service utility decides the position of the riser and equipment on the pole.

Service points must be at the locations shown on the plans or as established by the Engineer. Electrical service installations and materials must conform to the requirements of the serving utility company.

Services must be underground to a service cabinet or pull box, or overhead to electroliers or as established by the Engineer. Service equipment must be installed as soon as possible to enable the utility to schedule its work well in advance of the completion of the Project.

The position of the riser must be determined by the utility. Service conduit must conform to the requirements of the serving utility and these specifications and must not be less than 1-1/2 inches in size.

The conductors between the service equipment and the utility company service connection point must be continuous and must not be spliced. When these conductors pass through pull boxes, they must be looped one complete loop in the pull box following the perimeter of the pull box tightly before exiting.

The Contractor must install pull boxes, conduit, and conductors between the utility company service point and the service equipment. Where the service point is a utility-owned pole, the Contractor must install a 2-inch minimum service conduit riser up the pole one foot above grade in the quadrant assigned by the serving utility company and must also install a pull box at the base of the utility pole in accordance with the utility company requirements and Contract Documents.

Unmetered underground services to streetlights must have circuit protection installed in the "service" pull box in accordance with the Standard Plan Details.

Where the service point is indeterminate and is shown on the plans as an "approximate location" or "service point not yet established," the labor and materials required for making the connection between the service point, when established, and the nearest pull box shown on the plans will be paid for as extra work.

The street lighting service conductors must be run in PVC conduit from the "CAMPBELL SERVICE" pull box to the PG& E secondary box and the pigtail from the "LINE" side of the fuse holder must be coiled in the PG&E secondary box left with 3 feet of slack and the loose ends of the conductors must be waterproofed with PVC tape.

Grounding of metal conduit, service equipment and the grounded conductor at service point must be accomplished as required by all applicable statutes, regulation and the serving utility, except that the grounding electrode conductor must be Number 8 AWG minimum.

87-1.03L(2)(b) Reserved

87-1.03L(2)(c) Reserved

87-1.03L(3) Telecommunications Service

Establishing telecommunication service includes installing conduit, conductors, and pull boxes and making connections from the service point to the telephone demarcation cabinet.

87-1.03M Photoelectric Controls

Mount the photoelectric unit on the top of the pole for Type II photoelectric controls. Use mounting brackets where pole-top mounting is not possible. Orient the photoelectric unit to face north.

87-1.03N Fused Splice Connectors

Install a fuse splice connector with a fuse in each ungrounded conductor for luminaires. The connector must be located in the pull box adjacent to the luminaires.

Install a fuse splice connector with a fuse on primary side of transformer.

Crimp the connector terminals onto the ungrounded conductors using a tool under the manufacturer's instructions. Insulate the terminals and make them watertight.

A fused disconnect splice connector must be located in the pull box adjacent to the lighting standard when fed from underground wiring systems. Existing lighting standards which are underground-fed and do not have an adjacent pull box must have the fused disconnect splice connector located in the base of the lighting standard directly behind the hand hole and it must be readily accessible.

87-1.03O Grounding Electrodes

Install a grounding electrode for each cabinet, service equipment enclosure, transformer, multiple service point, and at each standard.

Install the grounding electrode in the pull box where a pull box is located within 10 feet of the standard.

Grounding electrodes in foundations must be set obliquely through the foundation and must extend above the finished foundation sufficiently to attach a ground clamp and bare copper wire ground conductor. Ground rod identifying marks must be visible. Both the bolt and ground rod clamp must be visible from the door or handhole.

Bond grounding electrodes using of high strength ground clamps listed for direct burial.

The grounding electrode's resistance to ground must not exceed 25 ohms.

87-1.03P Service Equipment Enclosures

Installing a service equipment enclosure includes constructing the foundation and pad and installing conduit, adjacent pull boxes, and grounding electrode.

Locate the foundation such that the minimum clearance around the enclosure complies with *CEC*, article 110.26, "Spaces About Electrical Equipment, (600 V, nominal or less)."

Apply sealing compound between the foundation and the enclosure before installing the enclosure.

Remove excess sealing compound.

Bond and ground metal conduit as specified in *CEC* and by the service utility except the grounding electrode conductor must be number 6 AWG or larger.

Bond and ground all anchor bolts with ground clamps and number 8 AWG ground conductor.

If circuit breakers and components do not have a description on engraved phenolic nameplates, install them using stainless steel rivets or screws under Section 86-1.02P(2), "Service Equipment Enclosures."

Place the service equipment wiring diagram and the streetlight circuit diagram on the inside of the enclosure door in a clear plastic water resistant envelope.

87-1.03Q Cabinets

87-1.03Q(1) General

Installing a cabinet includes constructing the foundation and pad and installing conduit, adjacent pull boxes, and grounding electrode.

Apply sealing compound between the foundation and the cabinet before installing the cabinet on the foundation.

Remove excess sealing compound.

Connect the field wiring to the terminal blocks in the cabinet. Neatly arrange and lace or enclose the conductors in plastic tubing or raceway. Terminate the conductors with properly sized captive or spring spade terminals. Apply a crimp-style connector and solder them.

Install and solder a spade-type terminal on number 12 AWG and smaller field conductors and a spade-type or ring-type terminal on conductors larger than number 12 AWG.

Place the sheets with the layout of components and all diagrams inside of the cabinet in a clear plastic water resistant envelope.

Bond and ground all anchor bolts with ground clamps and number 8 AWG ground conductor.

87-1.03Q(2) City-Furnished Controller Cabinets

Arrange for the delivery of City-furnished controller cabinets.

87-1.03Q(3) Reserved

87-1.03Q(4) Reserved

87-1.03R Signal Heads

87-1.03R(1) General

Installing a signal head includes mounting the heads on standards and mast arms, installing backplates and visors, and wiring conductors to the terminal blocks.

Keep the heads covered and direct them away from traffic until the system is ready for operation.

Quadrants for mounting of signal fixtures must be verified with the ~~City~~ Engineer prior to drilling or cutting holes in signal standards.

87-1.03R(2) Signal Faces

Use the same brand and material for the signal faces at each location.

Program the programmable visibility signal faces under the manufacturer's instructions. The indication must be visible only in those areas or lanes to be controlled.

87-1.03R(3) Backplates

Install backplates using at least six 10-24 or 10-32 self-tapping and locking stainless steel machine screws and flat washers.

Each machine screw must have an integral or captive flat washer, a hexagonal head slotted for a standard screwdriver, and either a locking nut with an integral or captive flat washer or a nut, flat washer, and lock washer. Machine screws, nuts, and washers must be stainless steel or steel with a zinc or black oxide finish.

If a metal backplate has 2 or more sections, fasten the sections with rivets or aluminum bolts peened after assembly to avoid loosening.

Install the backplate such that the background light is not visible between the backplate and the signal face or between sections.

87-1.03R(4) Signal Mounting Assemblies

Install a signal mounting assembly such that its members are arranged symmetrically and plumb or level. Orient each mounting assembly to allow maximum horizontal clearance to the adjacent roadway.

For a bracket-mounted assembly, bolt the terminal compartment or pole plate to the pole or standard.

In addition to the terminal compartment mounting, attach the upper pipe fitting of Type SV-1-T with 5 sections or a SV-2-TD to the standard or pole using the mounting detail for signal heads without a terminal compartment.

Use a 4-1/2-inch slip fitter and set screws to mount an assembly on a post top.

After installing the assembly, clean and paint the exposed threads of the galvanized conduit brackets and bracket areas damaged by the wrench or vise jaws. Use a wire brush to clean and apply 2 coats of unthinned, organic zinc-rich primer. Do not use an aerosol can to apply the primer.

Install the conductors in the terminal compartment and secure the cover.

87-1.03S Pedestrian Signal Heads

Installing a pedestrian signal head includes mounting the heads on standards and wiring conductors to the terminal blocks.

Install the pedestrian signal mounting assembly under Section 87-1.03R(4), “Signal Mounting Assemblies.”

Use the same brand and material for the pedestrian signal faces at each location.

Install a pedestrian signal face such that its members are arranged symmetrically and plumb or level.

87-1.03T Accessible Pedestrian Signals

Use the same brand for the accessible pedestrian signals at each location.

Install an accessible pedestrian signal and the R10 series sign on the crosswalk side of the standard. Attach the accessible pedestrian signal to the standard with self-tapping screws.

Mount the sign onto the accessible pedestrian signal using an adapter plate provided by the manufacturer.

Point the arrow on the accessible pedestrian signal in the same direction as the corresponding crosswalk. Furnish the equipment and hardware to set up and calibrate the accessible pedestrian signal.

Arrange to have a manufacturer's representative at the job site to program the accessible pedestrian signal with an audible message or tone.

When replacing an existing accessible pedestrian signal, the housing color must match the color of the existing housing.

87-1.03U Push Button Assemblies

Install the push button assembly and the R10 series sign on the crosswalk side of the standard. Attach the sign to the assembly for Type B assemblies.

Attach the sign to the standard using 2 straps and saddle brackets for Type C assemblies. You may use straps and saddle brackets to secure the push button to the standard.

Use a slip fitter to secure the assembly on top of a 2-1/2-inch-diameter post.

When replacing an existing push button assembly, the housing color must match the color of the existing housing.

Push button signs and push button switch caps must be fastened to the housings with stainless steel, Philips head screws.

87-1.03V Detectors

87-1.03V(1) General

Installing a detector includes installing inductive loop conductors, sealant, conduit, and pull boxes. Center the detectors in the traffic lanes.

Do not splice the detector conductor.

Splices to the lead-in cables must be insulated with heat-shrink tubing..

Detector lead-in cables must be continuous, without splices, from the controller cabinet detector panel terminal block to the loop termination pull box.

Sawcut loops under the provisions of “Electrical Systems (Detectors)” “Type E Loop Detector Configuration.”

All vehicle detector lead in cables must be run to detector handhole placed at the lip of gutter under the provisions of “Electrical Systems (Curb and Shoulder Termination, Trench, and Handhole Details)” “Type A” “Curb Termination Detail.”

87-1.03V(2) Inductive Loop Detectors

Mark the location of the inductive loop detectors such that the distance between the side of the loop and a lead-in saw cut from an adjacent detector is at least 2 feet. The distance between lead-in saw cuts must be at least 6 inches.

Saw cut the slots under Section 13, “Water Pollution Control.” The bottoms of the slots must be smooth with no sharp edges. For Type E detector loops, saw the slots such that the sides are vertical.

Wash the slots clean using water and blow dry them with compressed air to remove all moisture and debris.

Identify the start of the conductor.

Waterproof the ends of a Type 2 loop conductor before installing it in the conduit to prevent moisture from entering the cable.

Install the loop conductor in the slots and lead-in saw cuts using a 3/16- to 1/4-inch-thick wood paddle. Hold the conductors in place at the bottom of the slot with wood paddles during placement of the sealant.

Wind adjacent loops on the same sensor unit channel in opposite directions.

Twist the conductors for each loop into a pair consisting of a minimum of 2 turns per foot before placing them in the lead-in saw cut and the conduit leading to the pull box. Do not install more than 2 twisted pairs of conductors per lead-in saw cut.

Test each loop for continuity, circuit resistance, and insulation resistance before filling the slots with sealant.

Remove excess sealant from the adjacent road surface before it sets. Do not use solvents to remove the excess.

Identify the loop conductor pair in the pull box, marking the start with the letter *S* and the end with the letter *F*. Band conductors in pairs by lane in the pull box adjacent to the loops and in the cabinet. Identify each pair with the detector designation and loop number.

Install the conductors in a compacted layer of HMA immediately below the uppermost layer if more than one layer will be placed. Install the loop conductors before placing the uppermost layer of HMA. Fill the slot with a sealant flush to the surface.

Install the conductors in the existing pavement if one layer of HMA is to be placed. Install the loop conductors before placing the layer of HMA. Fill the slot with a sealant flush to the surface.

Sawcut slots must be at the location laid out by the Engineer. Sawcuts must be overlapped at all corners so that slots are full depth at the corners.

After conductors are installed in the slots cut in the pavement, one inch strips of 3/8-inch diameter foam backer rod must be inserted in the slot over the loop wires, spaced as necessary, but not more than 5 feet apart to prevent the loop wires from rising up in the slot when the slots are being filled with sealant. The

slots must be filled with sealant to within 1/8-inch of the pavement surface. The sealant must be a minimum of 1-1/4-inch thick above the top conductor in the slot. Conductors in asphalt concrete pavement and within 4 feet of the lip of gutter must have a minimum cover of 3 inches. Before setting, surplus sealant must be removed from the adjacent road surfaces without the use of solvents.

Loop conductors must be installed without splices and must terminate in the pull box indicated on the Plans. The loop conductors must be spliced to the lead-in cables in the termination pull box adjacent to the loops. Each loop must be provided with its own detector lead-in cable. Detector lead-in cables must be continuous, without splices between the loop termination pull box and the detector panel terminal block in the controller cabinet. The shield and drain wire of the detector lead-in cable must be grounded in the traffic signal controller cabinet only.

The start (S) and finish (F) conductors of each loop must be permanently labeled with a (S) on the start conductor and a (F) on the finish conductor and then grouped together as a pair. The start (S) loop conductor must be spliced to the black conductor in the lead-in cable and the finish (F) loop conductor to the white conductor in the lead-in cable. Each loop pair and lead-in cable must be identified as to direction, lane, and signal phase in all pull boxes and in controller cabinets. Labeling must be under the provisions of Section 86-1.02F(2)(a), “General.”

The end of the lead-in cable must be taped and waterproofed prior to installing in conduit to prevent moisture from entering the cable. Where loop conductors are not immediately to be spliced to a lead-in cable, the ends of both the loop conductors and lead-in cable must be taped and waterproofed with an electrical insulating coating. If the ends of the loop and lead-in cable are left not taped and waterproofed for more than 24 hours the loop and the lead-in cable must both be replaced at the Contractor’s expense.

All adjacent loops must be wound in the same direction. No more than 4 loop conductors (2 twisted pairs) must be installed in one home-run slot. Loop conductors for more than one signal phase must not be combined in a common home-run slot.

Loops must be set back 2 feet from stop bar and must be centered in lanes except for curb lanes greater than 12 feet where they must be installed 3 feet from the lane line, unless specified otherwise by the Contract Documents or the Engineer. The distance between the side of the loop and the home-run saw cut from the adjacent loops must be 2 feet minimum. The distance between home-run saw cuts must be 6 inches minimum. Loop conductors must be installed a minimum of 3 feet from any metal obstacles in the street such as metal manhole covers unless otherwise approved by the Engineer prior to installation.

If loops are to be installed in asphalt concrete pavement, the loop conductors may, at the Contractor's discretion, be installed either in the finished surface layer of asphalt concrete or in the compacted layer of asphalt concrete immediately below the uppermost layer.

Before installing loop conductors in the sawed slots, the slots must be thoroughly washed with water and then blown out with compressed air and allowed to dry thoroughly.

The loop conductor must be installed into the slot using a 3/16-inch to 1/4-inch thick wood paddle or roller designed and approved for the purpose. The loop conductors must be carefully installed in the sawcut slots to prevent insulation damage. The loop conductors must be loosely installed around the sawcut slot corners to prevent tension from being placed on the conductors at the corners.

Four feet of loop conductor slack for each loop, must be left in the loop termination pull box.

The loop conductor home-run for each loop must have its start (S) and finish (F) conductors twisted together into a pair (at least 3 turns per foot) before being placed in the home-run slot, conduit, and termination pull box.

Each loop must be tested at the termination pull box before the slots are filled with sealant. Each loop must not exceed 0.5 ohms circuit resistance and must not measure less than 200 meg-ohms insulation resistance. As measured with a 500 VDC megger.

In the controller cabinet, the outer jacket of the detector lead-in cable must be removed between the cable termination point on the detector panel to the bottom of the controller cabinet.

Care must be taken not to nick or otherwise damage the detector lead-in cable conductor insulation while removing the outer jacket.

All detector loop circuits must be tested for circuit resistance, insulation resistance, and inductance at the controller cabinet with the drain wires terminated before final termination of the detector lead-in cable to detector panel terminal blocks.

The detector loop circuit resistance must not exceed 0.5 ohms plus 0.35 ohms per 100 feet of lead-in cable. The complete detector loop circuit insulation resistance must not be lower than 100 meg-ohms between any conductor and earth ground.

The detector lead-in cable conductors must be twisted together into a pair (at least 3 turns per foot) before termination on the detector panel terminal blocks.

87-1.03V(3) Reserved

87-1.03W Sealants

87-1.03W(1) General Reserved

87-1.03W(2) Elastomeric Sealant

Apply an elastomeric sealant with a pressure feed applicator.

87-1.03W(3) Asphaltic Emulsion Sealant

Asphaltic emulsion sealant must:

1. Be used for filling slots in asphalt concrete pavement of a maximum width of 5/8 inch.
2. Not be used on concrete pavement or where the slope causes the material to run from the slot.
3. Be thinned under the manufacturer's instructions.
4. Be placed when the air temperature is at least 45°F.

87-1.03W(4) Hot-Melt Rubberized Asphalt Sealant

Melt the sealant in a jacketed, double-boiler-type, melting unit. The temperature of the heat transfer medium must not exceed 475°F.

Apply the sealant with a pressure feed applicator or a pour pot when the surface temperature of the pavement is greater than 40°F.

87-1.03X Reserved

87-1.03Y Transformers

Installing a transformer includes placing the transformer inside a pull box, a cabinet, or an enclosure.

Use a submersible type transformer inside pull boxes.

Wire the transformer for the appropriate voltage.

Ground the secondary circuit of the transformer.

87-1.03Z Reserved

87-1.04 PAYMENT

Not Used.

87-2 LIGHTING SYSTEMS

87-2.01 GENERAL

87-2.01A Summary

This section includes specifications for constructing lighting systems. Lighting system includes:

1. Foundations.
2. Pull boxes.
3. Conduit.
4. Conductors.
5. Standards.
6. Luminaires.
7. Service equipment enclosure.
8. Photoelectric control.
9. Fuse splice connectors.

The components of a lighting system are shown on the project plans.

87-2.01B Definitions

Reserved.

87-2.01C Submittals

Submit a certificate of compliance and test data for the high mast lighting luminaires.

87-2.01D Quality Assurance

Reserved.

87-2.02 MATERIALS

87-2.02A General

Reserved.

87-2.02B Reserved

87-2.02C Soffit and Wall-Mounted Luminaires

87-2.02C(1) General

Soffit and wall-mounted luminaires must be weatherproof and corrosion resistant.

Each luminaire must include a 5,800 lumen LED assembly with a minimum average rated life of 24,000 hours.

Flush-mounted soffit luminaire must have:

1. Metal body with two 1-inch-minimum conduit hubs and a means of anchoring the body into the concrete.
2. Prismatic refractor made of heat-resistant polycarbonate:
   2.1. Mounted in a door frame.
   2.2. With the street side identified.
3. Aluminum reflector with a specular anodized finish.

The door frame assembly must be hinged, gasketed, and secured to the luminaire body with at least 3 machine screws.

A pendant soffit luminaire must be enclosed and gasketed and have an aluminum finish. Luminaire must have:

1. Aluminum reflector with a specular anodized finish.
2. Refractor made of heat-resistant polycarbonate.
3. Optical assembly that is hinged and latched for lamp access and a device to prevent dropping.
4. Ballast designed for operation in a raintight enclosure.
5. Galvanized metal box with a gasketed cover, 2 captive screws, and 2 chains to prevent dropping and for luminaire mounting.

Wall-mounted luminaire must have:

1. Cast metal body.
2. Prismatic refractor:
   2.1. Made of glass.
   2.2. Mounted in a door frame.
3. Aluminum reflector with a specular anodized finish.
4. Integral ballast.
5. Lamp socket.
6. Gasket between the refractor and the body.
7. At least 2 mounting bolts of minimum 5/16-inch diameter.

A luminaire to be cast into or mounted against concrete must have two coats of epoxy mastic coating on all surfaces to be in contact with the concrete. Epoxy mastic coating shall be ROCEpoxy Direct-to-Metal Epoxy Mastic 9100 manufactured by Rust-oleum or approved equal. Coating color to match luminaire. Prepare surface of the luminaire to be coated under the provisions of the manufacturer’s specifications.

87-2.03 CONSTRUCTION

87-2.03A General

Set the foundations for standards such that the mast arm is perpendicular to the centerline of the roadway.

Tighten the cap screws of the luminaire's clamping bracket to 10 ft-lb for roadway luminaires.

Perform the conductor and operational tests for the system.

Lighting standards must have underground 240V wiring.

87-2.03B Reserved

87-2.03C Soffit and Wall-Mounted Luminaires

For a flush-mounted soffit luminaire:

1. Prevent concrete from getting into the housing during pouring of the concrete for the structure.
2. Install the luminaire with the axis vertical and the street side of the refractor oriented as indicated.

3. Locate the luminaire to provide a minimum 2-foot clearance from the inside surface of the girders and 1-foot clearance from the near face of the diaphragm.
4. Install the bridge soffit and ceiling pull box over the same lane.

For a pendant soffit luminaire:

1. Cast in place the inserts for the number 8 AWG pull box during concrete placement for a new structure.
2. Drill holes for expansion anchors to support the number 8 AWG pull box on existing structures.
3. Bond the suspension conduit and luminaire to the pull box.

For a wall-mounted luminaire, provide:

1. Extension junction box or ring on a new structure.
2. 4 external mounting taps on an existing structure.

Place the soffits or wall-mounted luminaires in operation as soon as practicable after the falsework has been removed from the structure.

If the Engineer orders soffit or wall-mounted luminaires to be activated before permanent power service is available, installing and removing the temporary power service is Extra Work.

87-2.04 PAYMENT

Not Used.

87-3 RESERVED

87-4 SIGNAL AND LIGHTING SYSTEMS

87-4.01 GENERAL

87-4.01A Summary

This section includes specifications for constructing signal and lighting systems.

Signal and lighting system includes:

1. Foundations.
2. Pull boxes.
3. Conduit.
4. Conductors and cables.
5. Standards.
6. Signal heads.
7. Service equipment enclosure.
8. City-furnished controller assembly.
9. Detectors.
10. Reserved.
11. Accessible pedestrian signals.
12. Push button assemblies.
13. Pedestrian signal heads.
14. Luminaires.
15. Photoelectric control.
16. Fuse splice connectors.
17. Battery backup system.
18. Reserved.
19. Reserved.

The components of a signal and lighting system are shown on the project plans.

87-4.02 MATERIALS

87-4.02A General

Not used.

87-4.02B Reserved

87-4.03 CONSTRUCTION

87-4.03A General

Set the foundation for a standard such that the mast arm is perpendicular to the centerline of the roadway.

Tighten the cap screws of the roadway luminaire's clamping bracket to 10 ft-lb.

Label the month and year of the installation inside the luminaire housing's door. Perform the conductor and operational tests for the system.

87-4.03B Reserved

87-4.03D Activation of Signal and Lighting Systems

The Contractor must request, in writing, approval from the Engineer of the time and date for traffic signal activations a minimum of ten (10) working days prior to the requested date of activation.

Complete testing of the signal and lighting system 24 hours prior to activation.

Traffic signal activations must follow all signal activation procedures required by the City.

Traffic signal activation must be limited to Monday through Thursday excluding holidays, from 9:00 AM to 4:00 PM.

On the day of the traffic signal system activation, the signal faces must be uncovered and properly oriented to traffic as directed by the Engineer.

87-4.04 PAYMENT

Not Used

87-5 TO 87-7 RESERVED

87-8 PEDESTRIAN HYBRID BEACON SYSTEMS

87-8.01 GENERAL

87-8.01A Summary

This section includes specifications for constructing pedestrian hybrid beacon system.

A pedestrian hybrid beacon system includes:

1. Foundations
2. Pull boxes
3. Conduit
4. Conductors and cables

5. Standards
6. Pedestrian hybrid beacon face
7. Pedestrian signal heads
8. Service equipment enclosure
9. City-furnished controller assembly
10. Accessible pedestrian signals
11. Push button assemblies
12. Luminaires
13. Fuse splice connectors
14. Battery backup system

The components of a pedestrian hybrid beacon system are shown on the project plans.

87-8.01B Definitions

Reserved

87-8.01C Submittals

Reserved

87-8.01D Quality Assurance

87-8.01D(1) General

Reserved

87-8.01D(2) Quality Control

Verify the sequence for the pedestrian hybrid beacon system under the provisions of California *MUTCD*, Chapter 4F, Figure 4F-3 "Sequence for a Pedestrian Hybrid Beacon" during the operational test.

Test the battery backup system.

87-8.02 MATERIALS

87-8.02A General

The pedestrian hybrid beacon system must comply with California *MUTCD*, Chapter 4F.

87-8.02B Pedestrian Hybrid Beacon Face

A pedestrian hybrid beacon face consists of two red indications on the top and one yellow indication on the bottom.

87-8.03 CONSTRUCTION

Install pedestrian hybrid beacon system under Sections 87-4.03A “General.”

Install battery backup system.

87-8.04 PAYMENT

Not Used

87-9—87-13 RESERVED

87-14 RADAR SPEED FEEDBACK SIGN SYSTEMS

87-14.01 GENERAL

87-14.01A Summary

This section includes specifications for installing radar speed feedback sign systems. Radar speed feedback sign system includes the following or as indicated in the contract documents:

1. Foundations.
2. Pull boxes.
3. Conduit.
4. Conductors and cables.
5. Standards or wood posts.
6. Vehicle speed feedback sign.
7. Service equipment enclosure.
8. Signs.

The components of a radar speed feedback sign system are shown on the contract documents.

87-14.01B Definitions

Not Used

87-14.01C Submittals

Submit 2 copies of:

1. Test data report complying with NEMA-TS-2 for the vehicle speed feedback sign.
2. Shop drawings or installation manuals for the sign support, electrical connections, attachments, and mounting configurations.

87-14.01D Quality Assurance

87-14.01D(1) General

Not Used.

87-14.01D(2) Quality Control

Equipment setup must comply with the sign manufacturer's instructions.

Notify the Engineer at least 5 business days before performing the system test. Test the system in the presence of the Engineer.

Radar speed feedback sign system test consists of:

1. Turning on the radar speed feedback sign system.
2. Driving a vehicle and recording the speeds displayed:
   2.1. By the vehicle speedometer.
   2.2. On the vehicle speed feedback sign for the vehicles.
3. Performing the test 5 times per lane detected.
4. Ensuring that the 5 recorded speeds of the vehicle speed feedback sign are within ± 1 mph of the vehicle speeds recorded from the vehicle speedometer.

After successful testing, present the recorded results to the Engineer.

87-14.01D(3) Reserved

87-14.02 MATERIALS

87-14.02A General

Not used.

87-14.02A Vehicle Speed Feedback Signs

Vehicle speed feedback sign consists of a housing, display window, and radar unit.

Sign must:

1. Comply with the *California MUTCD*, Chapter 2B.
2. Have an operating voltage of 120 V(ac) for permanent installations.
3. Have a maximum weight of 45 lb.
4. Have a wind load rating of 90 mph.
5. Have an operating temperature range from -34 to 165°F.
6. Have a retroreflective white sheeting background.

87-14.02B Housings

Housing must:

1. Be weatherproof (NEMA 3R or better) and vandal resistant.
2. Be made of 0.09-inch-gauge welded aluminum with the outer surfaces being UV resistant.
3. Have the manufacturer's name, model number, serial number, date of manufacture, rated voltage and rated current marked inside.
4. Have the internal components easily accessible for field repair without removal of the sign.

87-14.02B(2) Display Windows

Display window consists of a cover, LED character display, and dimming control. Character display and cover must deflect together without damage to the internal electronics and speed detection components.

87-14.02B(2)(a) Covers

Cover must be:

1. Vandal resistant and shock absorbent.
2. Field replaceable with the removal of external stainless-steel, tamper proof fasteners.
3. Cover must be made of a minimum 0.25-inch-thick, shatter-resistant polycarbonate.

87-14.02B(2)(b) LED Character Displays

LED character display must:

1. Consist of two 7-segment. Solid-state, numeric characters.
2. Be capable of displaying the detected vehicle speed within 1 second.
3. Remain blank when no vehicles are detected within the radar detection zone.
4. Have the option to flash the pre-set speed limit when the detected vehicle speed is 5 miles higher than the pre-set speed.
5. Be viewable only by the approaching traffic.

Characters must:

1. Be a minimum of 15 inches in height.
2. Be visible from a minimum distance of 1500 feet and legible from a minimum distance of 750 feet.
3. Consist of a minimum 16 LEDs.

LEDS must:

1. Be amber and have a wavelength from 590 to 600 nm and rated for minimum 60,000 hours.
2. Maintain a minimum 85 percent of the initial light output after 48 months of continuous use over the temperature range.

87-14.02B(2)(c) Dimming Controls

Dimming control must:

1. Automatically adjust the character light intensity to provide optimum character visibility and legibility under all ambient lighting conditions.
2. Have minimum 3 manual dimming modes of different intensities.

87-14.02B(3) Radar Units

Radar unit must:

1. Be able to detect up to 3 lanes of approaching traffic.
2. Operate with an internal, low power, 24.159 GHz (K-band).
3. Be FCC approved Part 15 certified.
4. Have a speed accuracy of ±1 mph.
5. have a maximum 15W power consumption.

87-14.03 CONSTRUCTION

Install the vehicle speed feedback sign under the manufacturer's instructions.

Install R2-1 SPEED LIMIT sign.

Perform the conductor test.

Configure the radar speed feedback sign system to detect only traffic in the approach direction of travel. Perform the radar speed feedback sign system test.

Perform the operational test for the system.

87-14.04 PAYMENT

Not Used.

87-15—87-17 RESERVED

87-18 INTERCONNECTION CONDUIT AND CABLE

87-18.01 GENERAL

This section includes specifications for constructing interconnection conduit and cable. Interconnection conduit and cable includes:

1. Pull boxes.
2. Conduit.
3. Signal interconnect cables.
4. 12 position terminal block.

The components of an interconnection conduit and cable are shown on the project plans.

87-18.02 MATERIALS

Terminal block must comply with *TEES*, Chapter 1, Section 3, “Components.”

Surge Protection must be manufactured by Citel, model DLA2-24D3 or approved equal.

87-18.03 CONSTRUCTION

Test the signal interconnect cable.

Install the terminal block on the input panel in the controller cabinet.

Connect the signal interconnect cable to the terminal block as shown on the following table:

Signal Interconnect Termination

Terminal Block	Color
1	BLUE
2	BLACK
3	RED
4	BLACK
5	BROWN
6	BLACK
7	GREEN
8	BLACK
9	YELLOW
10	BLACK
11	WHITE
12	BLACK

Install surge protection devices in the controller cabinet.

87-18.04 PAYMENT

Not Used.

87-19 FIBER OPTIC CABLE SYSTEMS

87-19.01 GENERAL

87-19.01A Summary

This section includes specifications for constructing fiber optic cable systems. A fiber optic cable system includes:

1. Conduit and accessories.
2. Vaults.
3. Warning tape.
4. Fiber optic cables.
5. Fiber optic splice enclosures.
6. Fiber distribution units.
7. Fiber optic markers.
8. Fiber optic connectors and couplers.

The components of a fiber optic system are shown on the project plans.

87-19.01B Definitions

Reserved.

87-19.01C Submittals

At least 15 days before cable installation, submit:

1. Manufacturer's procedures for pulling fiber optic cable.
2. Test reports from a laboratory accredited to International Standards Organization/International Electrotechnical Commission 17025 by the American Association for Laboratory Accreditation (A2LA) or the ANSI-ASQ National Accreditation Board (ANAB) for:
   2.1. Water penetration.
   2.2. Cable temperature cycling.
   2.3. Cable impact.
   2.4. Cable tensile loading and fiber strain.
   2.5. Cable compressive loading.
   2.6. Compound flow.
   2.7. Cyclic flexing.
3. Proof of calibration for the test equipment including:
   3.1. Name of calibration facility.
   3.2. Date of calibration.
   3.3. Type of equipment, model number and serial number.
   3.4. Calibration result.
4. Cable end caps.

Submit optical time-domain reflectometer data files for each test as raw data and in a Microsoft Excel format.

After performing the optical time-domain reflectometer test and the power meter and light source test, submit within 4 business days:

1. Cable Verification Worksheet.
2. Segment Verification Worksheet.
3. Link Loss Budget Worksheet.

The worksheet forms are available upon request.

87-19.01D Quality Assurance

87-19.01D(1) General

Reserved.

87-19.01D(2) Quality Control

Notify the Engineer 4 business days before performing field tests. Include exact location of the system or components to be tested. Do not proceed with the testing until authorized. Perform each test in the presence of the Engineer.

The optical time-domain reflectometer test consists of:

1. Inspecting the cable segment for physical damage.
2. Measuring the attenuation levels for wavelengths of 1310 and 1550 nm in both directions for each fiber using an optical time-domain reflectometer.
3. Comparing the test results with the data sheet provided with the shipment. If there are attenuation deviations greater than 5 percent, the test will be considered unsatisfactory and the cable segment will be rejected. The failure of any single fiber is a cause for rejection of the entire segment. Replace any rejected cable segments and repeat the test.

The power meter and light source test consists of:

1. Testing each fiber in a link using a light source at one end of the link and a power meter at the other end.
2. Measuring and recording the power loss for wavelengths of 1310 and 1550 nm in both directions.

Index matching gel is not allowed.

Installation and splicing of the fiber optic cable system must be performed by a certified fiber optic installer.

The optical time-domain reflectometer test and the power meter and light source test must be performed by a certified fiber optic technician.

The certification for the fiber optic installer and fiber optic technician must be from an organization recognized by the International Certification Accreditations Council and must be current throughout the duration of the project.

87-19.02 MATERIALS

87-19.02A General

All metal components of the fiber optic cable system must be corrosion resistant. All connectors must be factory-installed and tested.

Patch cords, pigtails and connectors must comply with ANSI/TIA-568. Pigtails must have a minimum 80 N pull out strength.

A splice cassette may be used in place of a pigtail and a splice tray.

Each cable reel must be labeled as specified in ANSI/ICEA S-87-640 including:

1. Contractor's name.
2. Contract number and name.
3. Number of fibers.
4. Cable attenuation loss per fiber at 1310 and 1550 nm.

The labeled or tagged information must also be in a shipping record in a weatherproof envelope. The envelope must be removed only by the Engineer.

87-19.02B Vaults

A vault must:

1. Comply with Section 86-1.02C “Pull Boxes,” and AASHTO HS 20-44, and be load tested under AASHTO M 306.
2. Be a minimum:
   2.1. 4 feet wide by 4 feet high by 4 feet long nominal inside dimensions for box type
   2.2. 4 feet high by 4 feet outside diameter for round type.
3. Have a minimum access of:
   3.1. 30 inches diameter for round type.
   3.2. 3 feet wide by 3 feet long for box type.
4. Be precast either modular or monolithic.
5. Have cable racks installed on the interior sides. A rack must:
   5.1. Be fabricated from ASTM A36 steel plate.
   5.2. Support a minimum of 100 pounds per rack arm.
   5.3. Support a minimum of 4 splice enclosures and a minimum of 4 cables with a minimum slack of 50 feet each.
   5.4. Be hot-dip galvanized after manufacturing.

5.5. Be bonded and grounded.
6. Have a minimum:
   6.1. Two 4-inch diameter knockouts on each side for box type.
   6.2. Two 4-inch diameter knockouts placed every 90 degrees for round type.
7. Have a minimum 2 inch diameter drain hole at the base.

Entry points for knockouts must not cause the cable to exceed its maximum bend radius.

The access cover must:

1. Be in two-piece torsion-assisted sections or a minimum 30-inch-diameter cast iron.
2. Have inset lifting pull slots.
3. Have markings "CAMPBELL" and "FIBER OPTIC".

87-19.02C Fiber Optic Cable

The fiber optic cable must:

1. Comply with 7 CFR 1755.900 1755.901, and 1755.902, and ANSI/ICEA S-87-640.
2. Be a single mode, zero-dispersion, and have non-gel loose type buffer tubes.
3. Have no splices.
4. Have a Type H or Type M outer jacket.

Be shipped on a reel

1. Have 10 feet of length on each end of the cable accessible for testing.
2. Be armored type.
3. Be sealed with cable end caps.

87-19.02D Fiber Optic Splice Enclosures

A fiber optic splice enclosure must:

1. Not exceed 36 inches in length, 8 inches in width, and 8 inches in height.
2. Be made of thermoplastic material, weather proof, chemical and UV resistant, and re-sealable.
3. Accommodate a minimum of 8 internal splice trays.
4. Have 1/4 to 1 inch diameter cable entry ports.
5. Have brackets, clips and cable ties.
6. Have means to anchor the dielectric member of the fiber optic cable.
7. Include grounding hardware.

87-19.02E Fiber Distribution Units

The Fiber Distribution Unit (FDU) consists of a housing, a patch panel, a 12 multicolor pigtail, and a splice tray.

The FDU must be self-contained and pre-assembled. The housing must:

1. Be a 19-inch rack mountable modular metal enclosure.
2. Be a one rack unit.
3. Have cable clamps to secure fiber optic cables to the chassis.
4. Have cable accesses with rubber grommets or similar material to prevent the cable from coming in contact with the bare metal.
5. Be weatherproof.
6. Have a hinged top door with a latch or thumbscrew to hold it in the closed position.

A patch panel must have a minimum of 12 single-fiber type connector sleeves.

A pigtail must:

1. Be a simplex single mode fiber in a 900 µm tight buffer with a 0.12 inch outer diameter PVC jacket.
2. Have a fiber optic connector attached on one end and bare fiber on the other end.
3. Be at least 3 feet in length.
4. Have the manufacturer's part number on the jacket.

Pigtails must be single-fiber or ribbon type.

87-19.02F Patch Cords

Patch cords must:

1. Be a single mode fiber in a 900 µm tight buffer with a 0.12 inch outer diameter PVC jacket.
2. Have fiber optic connectors attached on both ends.
3. Be at least 6 feet in length.
4. Have manufacturer's part number on the jacket.

Duplex patch cords must be of round cable structure, and not have zip-cord structure.

87-19.02G Splice Trays

Splice trays must:

1. Have brackets to spool incoming fibers a minimum of 2 turns.
2. Have means to secure and protect incoming buffer tubes, pigtails, and a minimum of 12 heat shrink fusion splices.
3. Be stackable.
4. Have a snap-on or hinged cover. The cover may be transparent.

87-19.02H Fiber Optic Connectors and Couplers

Connectors must be:

1. FC type with metallic connector body and ceramic ferrules.
2. Capped when not used.

Couplers must be made of the same material as the connector's housing and have ceramic sleeves.

Singlemode fiber optic connectors must have a yellow strain relief boot or a yellow base.

87-19.03 CONSTRUCTION

87-19.03A General

Perform the optical time-domain reflectometer test:

1. On the fiber optic cable upon its arrival to the job site and before its installation. Complete the Cable Verification Worksheet. Do not install the fiber optic cable until the Engineer's written approval is received.
2. After the fiber optic cable segments have been pulled but before breakout and termination. Complete the Segment Verification Worksheet.
3. Once the passive cabling system has been installed and is ready for activation. If the measured individual fusion splice losses exceed -0.30 dB, re-splice and retest. At the conclusion of the optical time-domain reflectometer test, perform the power meter and light source test. If the measured link loss exceeds the calculated link loss, replace the unsatisfactory cable segments or splices and retest. Complete the Link Loss Budget Worksheet.

87-19.03B Vaults Installation

Install a vault behind curb.

Install the top of the vault flush with surrounding grade in paved areas and 2 inches above the surrounding grade in unpaved areas.

Place 6 inches of minor concrete around vaults. In unpaved areas, finish top of concrete at a 2 percent slope away from cover. In paved areas, finish top of concrete to match existing slope.

Bolt the steel cover to the vault when not working in it.

87-19.03C Fiber Optic Cable Installation

Cap cable ends until termination takes place.

The cable must enter controller and termination cabinets, as specified, through existing conduit or through new conduit installed in existing or new foundations.

Approved duct seals must be placed around the communications cable(s) in the end of each conduit or riser assembly entering a controller cabinet or termination cabinet.

Install fiber optic cable by a certified installer or a representative from the fiber optic cable manufacturer during installation.

When using mechanical aids to install fiber optic cable:

1. Maintain a cable bend radius at least twenty times the outside diameter of the cable.
2. Cable grips have a ball bearing swivel.
3. Pulling force on a cable must not exceed 500 pound-foot or manufacturer's recommended pulling tension, whichever is less.

When installing the cable using the air blown method, the cable must withstand a static air pressure of 110 psi.

Lubricate the cable using a lubricant recommended by the cable manufacturer.

Install fiber optic cable without splices except where shown.

Provide a minimum of 100 feet of slack for each fiber optic cable at each vault. Divide the slack equally on each side of the splice enclosure.

Install fiber optic cable in innerduct.

Install tracer wires in the fiber optic conduits and innerducts as shown. Provide a minimum 5 feet of slack tracer wire in each pull box and splice vault from each direction. You may splice tracer wire at intervals of not less than 500 feet and only inside splice vaults or pull boxes.

Pulling a separate fiber optic cable into a spare duct to replace damaged fiber will not be allowed.

Apply a non-hygroscopic filling compound to fiber optic cable openings.

Seal the ends of conduit after cables are installed.

Install strain relief for fiber optic cable entering a fiber optic enclosure.

Identify fibers and cables by direct labeling, metal tags, or bands fastened in such a way that they will not move. Use mechanical methods for labeling.

Provide identification on each fiber optic cable or each group of fiber optic cables in each vault and at the end of terminated fibers. Fiber optic cable must be identified as shown in the following table:

Cable Identification[a]

Sequence order	Description	Code	Numbers of characters
1	Fiber type	S: Singlemode	1
2	Fiber count	###: Example 048	3
3	Begin point	T: TMC H: Hub V: Video Node D: Data Node C: Cable Node TV: Camera CM: CMS E: Traffic Signal SV: Vault SC: Splice Cabinet	1 or 2
4	Begin point county abbreviation	AA or AAA: Examples: Orange (ORA), San Mateo (SM)	2 or 3
5	Begin point Street	AAA: Examples: Bascom	12
6	Begin point Address or Cross Street	###AAA: 2000 or Campbell	12
7	End Point	In the same way as for Begin Point	12
8	End point county abbreviation	In the same way as for Begin Point County Abbreviation	2 or 3
9	End point route number	In the same way as Begin Point Route Number	12
10	End point post mile	In the same way as Begin Point Post Mile	12

[a] Cable identification example: The cable code S 048 SV SCL BASCOM STEVENS CREEK SV SCL BASCOM CAMPBELL describes a singlemode, 48 strand, cable starting at a fiber optic vault in Santa Clara County on BASCOM AVE and STEVENS CREEK BOULEVARD, and ending at another fiber optic vault in Santa Clara County on BASCOM AVE at CAMPBELL AVE.

Place labels on the cables at the following points:

1. Fiber optic vault and pull box entrances and exits.
2. Splice enclosures entrance and exit.
3. Fiber distribution unit entrance.

Lace fiber optic cable inside controller cabinets and secure to the cage.

Support the fiber optic cable within 6 inches from a termination and every 2 feet.

Secure fiber optic cables to the cable racks. Store excess cable in a figure 8 fashion.

87-19.03D Fiber Optic Cable Splices

Use fusion splicing for fiber optic cables.

Splice single-buffer tube cable to multi-buffer tube cable using the mid-span access method under manufacturer's instructions. Any mid-span access splice or Fiber distribution unit termination must involve only those fibers being spliced as shown.

Place fiber splices in the splice enclosures installed in the vaults.

87-19.03E Splice Enclosures Installation

Maintain an equal amount of slack on each side of the splice enclosure.

Secure the fiber optic splices in splice tray.

Secure the splice trays to the inner enclosure.

Label cables and buffer tubes.

Do not seal fiber splice enclosure until authorized and the power meter and light source test is performed. Seal the enclosure under manufacturer's instructions.

Flash test the outer enclosure under manufacturer's instructions in the presence of the Engineer. Visually inspect the enclosure. If bubbles are present, identify the locations where the bubbles are present, take corrective actions and repeat the flash test until no bubbles are present.

Attach the splice enclosure to the side wall of a vault or hub with a minimum 2 feet distance between the ground and the bottom of the enclosure.

Secure fiber optic cables to the chassis using cable clamps for fiber optic units.

Connect a minimum of one bonding conductor to a grounding electrode after mounting the fiber optic enclosure to the wall. If there are multiple bonding conductors, organize the conductors in a neat way.

87-19.03F Fiber Optic Distribution Unit Installation

Spool incoming buffer tubes 2 feet in the splice tray and expose 1 foot of individual fibers. Maintain a minimum 2-inch-bend radius during and after installation in the splice tray.

Splice incoming fibers in the splice tray.

Restrain each fiber in the splice tray. Do not apply stress on the fiber when located in its final position.

Secure buffer tubes near the entrance of the splice tray.

Secure splice trays under manufacturer's instructions.

Label splice tray after splicing is completed.

Install patch cords in Fiber distribution units and patch panels. Permanently label each cord and each connector in the panel with the system as shown.

87-19.04 PAYMENT

Not Used.

87-20 TEMPORARY ELECTRICAL SYSTEMS

87-20.01 GENERAL

This section includes specifications for providing, maintaining, and removing temporary electrical systems.

Temporary systems may be mounted on wood posts or trailers.

Obtain the City's authorization for the type of temporary electrical system and its installation method.

A temporary system must operate on a continuous, 24-hour basis.

A temporary electrical system must have a primary power source and a back-up power source from:

1. Commercial utility company
2. Generator system
3. Photovoltaic system
4. Battery system

Working drawings for temporary electrical systems necessary to complete the work and maintain existing electrical systems and their function must be submitted for review. Working drawings must include description and location of materials used. Materials must include poles, conductors, conduits, pull boxes, luminaires, traffic heads and any other materials needed to build the temporary electrical system. A noise analysis and attenuation plan must be submitted for generator use.

Temporary electrical systems must be built as under the provisions of the Contract Documents.

87-20.02 MATERIALS

87-20.02A General

Temporary wood poles must comply with Section 48-6, “Temporary Wood Poles.”

If you use Type UF-B cable, the minimum conductor size must be number 12 AWG.

A back-up power source must:

1. Have an automatic transfer switch.
2. Start automatically and transfer the system load upon reaching the operating voltage in the event of a power source failure.

Non-metallic pole riser system must be Carlon Heavy-duty PV-Mold or approved equal.

A trailer must be equipped with devices to level and plumb the temporary system.

87-20.02B Generators

A generator must comply with City Municipal Code 18.04.052 and:

1. Be 120 V(ac) or 120/240 V(ac), 60 Hz, 2.5 kW minimum, continuous-duty type.
2. Be powered by a gasoline, LPG, or diesel engine operating at approximately 1,800 rpm with an automatic oil feed.
3. Be equipped to provide automatic start-stop operation with a 12 V starting system.
4. Have generator output circuits that have overcurrent protection with a maximum setting of 15 A.
5. Have a spark arrester complying with Pub Cont Code § 4442.

87-20.02C Automatic Transfer Switches

An automatic transfer switch must provide:

1. Line voltage monitoring in the event of a power outage that signals the back-up power source to start.
2. Start delay, adjustable from 0 to 6 seconds, to prevent starting if the power outage is only momentary and a stop delay, adjustable from 0 to 8 minutes, to allow the back-up power source to unload.
3. Transfer delay from 0 to 120 seconds to allow the back-up power source to stabilize before connecting to the load and retransfer delay from 0 to 32 minutes to allow the line voltage to stabilize.
4. Mechanical interlock to prevent an application of power to the load from both sources and to prevent backfeeding from the back-up power source to the primary power source.

87-20.02D–87-20.02G Reserved

87-20.02H Reserved

87-20.02I Temporary Lighting Systems

A temporary lighting system consists of a lighting system, a power source, and wood poles.

The system must comply with Section 87-2, “Lighting Systems.”

87-20.02J Temporary Signal Systems

A temporary signal system consists of a signal and lighting system, wood poles and posts, and a power source.

The system must comply with the specifications for signal and lighting systems in Section 87-4, “Signal and Lighting Systems,” except signal heads may be mounted on a wood pole, mast arm, tether wire or a trailer.

87-20.02K Temporary Pedestrian Hybrid Beacon Systems

A temporary pedestrian hybrid beacon system consists of a pedestrian hybrid beacon system, wood poles and posts, and a power source.

The system must comply with the specifications for pedestrian hybrid beacon systems in Section 87-8, “Pedestrian Hybrid Beacon Systems,” except:

1. Signal heads may be mounted on a wood pole, mast arm, tether wire or trailer. Luminaires may be mounted on a wood pole and mast arm.

87-20.03 CONSTRUCTION

87-20.03A General

Provide electrical and telecommunication services for temporary systems. Do not use existing services unless authorized.

Provide power for the temporary electrical systems.

Commercial power must be 120 V(ac) or 120/240 V(ac) single phase. Make arrangements with the utility company for providing service. Protect the power source in a locked enclosure. Provide keys to all locks to the Engineer.

Install conductors and cables in a conduit, or suspended from wood poles at least 25 feet above the roadway, or use direct burial conductors and cables.

Place the portions of the conductors installed on the face of wood poles:

1. In either Type 1, 2, 4 conduit or non-metallic pole riser system above 10 feet from grade.
2. In Type 1, 2 or 4 conduit between 10 feet above grade to 18 inches above grade.
3. Type 2 conduit between the point 18 inches above grade to the nearest pull box.

Place conductors across structures in a Type 1 conduit. Attach the conduit to the outside face of the railing using galvanized iron straps and back spacers.

Mount the photoelectric unit at the top of the standard or wood post.

You may abandon in place conductors and cables in sawed slots. Remove conductors and cables in conduit installed below the ground surface.

87-20.03B–87-20.03H Reserved

87-20.03I Temporary Lighting Systems

Protect each luminaire with a fused splice connector on the line side. Wherever conductors are run overhead, install the fused splice connectors in the line side before entering the mast arm.

87-20.03J Temporary Signal Systems

You may splice conductors that run to a terminal compartment or a signal head on a pole to the through conductors of the same phase in a pull box adjacent to the pole. Do not splice conductors or cables except in a pull box or in a NEMA 3R enclosure.

The City provides the timing for the temporary signal.

Maintain the temporary signal except for the City-furnished controller assembly.

87-20.03K Reserved

87-20.04 PAYMENT

Not Used.

87-21 EXISTING ELECTRICAL SYSTEMS

87-21.01 GENERAL

This section includes general specifications for performing work on existing electrical systems.

Disconnect the electrical system before modifying circuits, disconnecting or connecting signal heads, luminaires, push buttons, photocontrols, or electrical devices. No work where an energized bare wire is exposed is allowed.

87-21.02 MATERIALS

Not Used.

87-21.03 CONSTRUCTION

87-21.03A General

Abandon unused underground conduit after pulling out all conductors and removing conduit terminations from the pull boxes.

Remove or abandon foundation under Section 56-3.01C(2)(a), “General.”

If standards are to be salvaged, remove:

1. All components.
2. Mast arms from the standards.
3. Luminaires, signal heads, and signal mounting assemblies from the standards and mast arms.

If the existing material is unsatisfactory for reuse and the Engineer orders you to replace it with new material, replacing the existing material with new material is extra work.

If the removed electrical equipment is to be reinstalled, supply all materials and equipment, including signal mounting assemblies, anchor bolts, nuts, washers, and concrete, needed to complete the new installation.

Remove electrical equipment, designated as a hazardous waste.

87-21.03B Maintaining Existing Electrical Systems

87-21.03B(1) General

Maintain the existing electrical system in working order, or approved temporary replacements thereof, during the progress of the work. Conduct your operations to avoid damage to the elements of the systems.

Replace pull box where PCC is removed from around the pull box.

Where an existing cable is reused, reinstall all existing cable slack.

87-21.03B(2) Reserved

87-21.03C Modifying Existing Electrical Systems

When modifying signal or lighting equipment on existing signal standards, the Contractor must shut down the system, de-energize and remove circuit conductors prior to drilling, cutting, welding, and/or tapping the pole.

Existing standards having a painted finish which are modified, relocated, repaired, or upon which equipment is altered by the Contractor must be repainted.

87-21.03D Removing Existing Electrical Systems

Items scheduled for salvage or items to become the property of the Contractor must not be reused in the Work.

The Contractor must replace any electrical equipment scheduled for salvage that has been lost, damaged or destroyed.

The items to be salvaged must be disassembled, dismantled, or otherwise removed to the extent necessary for transporting to the salvage stockpile. Box luminaire after removal.

The Contractor must transport the salvaged items to the stockpile location and off-load the items as directed. Deliver salvage to City of Campbell maintenance yard at 290 Dillon Avenue, Campbell. Delivery by appointment only between 2pm and 3pm Monday through Thursday. Make an appointment 72 hours in advance. Arrange appointment by calling (408) 866-2744 or emailing streetlights@campbellca.gov.

An itemized receipt, in duplicate, must be prepared by the Contractor prior to delivery of salvaged equipment to the City and must be signed by the City custodian at the stockpile site. Give one copy of the receipt to the City custodian and one copy to the Engineer.

87-21.04 PAYMENT

Not Used.

END OF SECTION

SECTION 88 RESERVED

SECTION 89 AGGREGATE

Conform to Section 89, “Aggregate,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 90 CONCRETE

Conform to Section 90, “Concrete,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

90-1 GENERAL

90-1.01 GENERAL

90-1.01A Summary

Add the following language to Section 90-1.01A, “Summary” of the *Caltrans Standard Specifications*:

Portland cement concrete is designated by class based on 28-day compressive strengths (when tested under the provisions of ASTM C 39) as specified herein:

Cement Content, Strength and Use

Class	Cement Content & Strength	Intended Use
A	Concrete shall contain approximately 564 Pounds of Portland cement per cubic yard and have a 28-day compressive strength of not less than 3000 psi.	General Construction - structures[a], curbs, gutters, sidewalks, cast-in-place pipe, minor structures, thrust and anchor blocks.
B	Concrete shall contain approximately 470 pounds of Portland cement per cubic yard and have a 28-day compressive strength of not less than 2500 psi.	Pavements, pavement base, slope pavement.
C	Concrete shall contain approximately 367 pounds of Portland cement per cubic yard and have a 28-day compressive strength of not less than 2000 psi.	Nonreinforced concrete as gravity walls, backfills, jackets, cradles.
D	Concrete shall contain not less than 658 pounds of Portland cement per cubic yard and have a 28-day compressive strength of not less than 3500 psi.	Emergency pavement, underwater placement, seals.

[a]Except concrete for CIDH foundations must be under the provisions of Section 56, “Overhead Sign Structures, Standards & Poles.”

If the Class of concrete is not specified in the Contract Documents, or otherwise directed by the Engineer, it shall be Class A.

The Contractor shall determine the mix proportions and consistency (slump) and shall furnish concrete which conforms to the strengths designated by class or as shown on the plans or specified in the special provisions. All mix designs shall be submitted for the Engineer's approval.

The Contractor shall be limited to one approved mix for each specific use.

90-1.01D Quality Assurance

Delete Section 90-1.01D(1), “General,” 90-1.01D(2), “Cementitious Material Content,” 90-1.01D(3), “Shrinkage,” 90-1.01D(4), “Concrete Uniformity,” 90-1.01D(5), “Compressive Strength,” 90-1.01D(6), “Curing Compound,” of the *Caltrans Standard Specifications* and replace with the following language:

Unless otherwise specified in the Contract Documents, Quality Assurance shall conform to the City's current Quality Assurance Program (QAP).

90-1.02 MATERIALS

90-1.02G(6) Quantity of Water and Penetration or Slump

Add the following language:

The nominal slump of the mix design shall be stated on all delivery tags. Loads containing concrete that exceeds the maximum slump allowable based on the mix design and ASTM C94 shall be rejected.

90-2 MINOR CONCRETE

90-2.01 GENERAL

90-2.01A Summary

Add the following language:

Minor concrete shall be Class A, 3000 psi concrete and shall contain not less than 564 pounds of cement per cubic yard unless otherwise specified on the plans or in the special provisions. The cement per cubic yard requirement may be waived by the Engineer in writing, provided the mix as designed consistently produces concrete whose compressive strength is in excess of 3000 psi and has a moving average of 3500 psi or more.

The compressive strength of the concrete will be determined under the provisions of Section 90-1.01D(5), "Compressive Strength," of *Caltrans Standard Specifications*, except that sampling and testing will be done under the provisions of ASTM C172 and C39.

Concrete samples for compressive strength requirements as a basis for acceptance of minor concrete will be molded, cured and tested under the provisions of Section 90-1.01D(5), "Compressive Strength," of the *Caltrans Standard Specifications*, except that sampling and testing will be done under the provisions of ASTM C172, ASTM C31, and ASTM C39. The evaluation of compressive strength tests for minor concrete will be under the provisions of Section 90-1.01D(5), "Compressive Strength," of the *Caltrans Standard Specifications*,.

Acceptance of concrete will be based on the individual test and operating range test results representing accepted concrete. In the event of variations from these criteria, enforcement of these specifications shall be according to the nature of variation, as follows:

1. Individual test result above 3000 psi, moving average above 3500 psi: Concrete is acceptable. No effect on mix design. Moving average is continued.
2. Individual test result between 2850 psi and 3000 psi, moving average above 3500 psi: Concrete is deemed acceptable. No effect on mix design. Moving average is continued.
3. Individual test result between 2550 psi and 2850 psi, moving average above 3500 psi: Non-conformance of this concrete may be waived by the Engineer. Mix design may be reviewed for possible changes. Moving average is continued.
4. Individual test below 2550 psi, moving average above 3000 psi and below 3500 psi: Concrete will be deemed not acceptable unless certified to be above 3000 psi at 28 days by an approved private laboratory under the provisions of Section 90-1.01D(5) "Compressive Strength," of the *Caltrans Standard Specifications*." Mix design shall be reviewed for possible changes or improvements. No test results representing this concrete will be used in moving average calculations.

5. Individual test result above 3000 psi moving average below 3000 psi: Concrete is acceptable. Mix design is rejected. A redesigned mix will be required under the provisions of #6 below. Moving average is continued.
6. Individual test result between 2850 and 3000 psi, moving average below 3000 psi: Concrete may be deemed acceptable. Supplier will be notified that moving average is below 3000 psi. Supplier will be required to redesign mix. Moving average will be continued until test results of new redesigned mix are available, at which time a new moving average will be started. The first individual test and from then on the moving average of the new redesigned mix up to 5 tests must be above 3000 psi. If either the first individual test or the moving average up to 5 tests is below 3000 psi, the supplier will not be allowed to supply concrete for the specific use of the mix until it is again redesigned and 28-day specimen shows it is above 3000 psi.
7. Individual test result between 2550 psi and 2850 psi, moving average below 3000 psi: Concrete is deemed not acceptable unless certified to be above 3000 psi at 28 days by an approved private laboratory under the provisions of Section 90-9.01, “General,” of the *Caltrans Standard Specifications.* Supplier will be notified that operating range is below 3000 psi. Supplier will be required to redesign mix. Moving average will be continued until test results of new redesigned mix are available, at which time a new moving average will be started. The first individual test and, from then on, the moving average of this new redesigned mix up to 5 tests must be above 3000 psi. If either the first individual test or the moving average up to 5 tests is below 3000 psi, the supplier will not be allowed to supply concrete for the specific use of the mix until it is again redesigned and 28-day specimens show that it is above 3000 psi.
8. Individual test result below 2550 psi, moving average below 3000 psi: Concrete is not acceptable.

Within 15 calendar days from date of receipt of test results, the Contractor or supplier shall have the option of either removing that portion of concrete represented by the test result below the designed compressive strength or, at their sole expense, have the concrete tested by a certified private testing laboratory who shall attest to the fact that the concrete does in fact conform to the compressive strength requirements of these Specifications.

Each load of ready-mixed concrete shall be accompanied by a ticket, which shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise ordered by the Engineer. The ticket shall be clearly marked by stamping or imprinting 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. The delivery ticket shall also indicate the mix design designation and the nominal slump thereof.

A certificate of compliance under the provisions of Section 6-1.08, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously certified by the City or used on City work, stating that minor concrete to be furnished meets all contract requirements, including minimum cement content specified.

90-2.02 MATERIALS

90-2.02A General

Delete Section 90-2.02A, “General,” of the *Caltrans Standard Specifications* and replace with the following language:

90-2.02A(1) Portland Cement

Unless otherwise specified in the Contract Documents or the *Caltrans Standard Specifications*, cement shall be Type II modified. Portland cement shall be specified, in the Contract Documents by the Type (I, IA, IP (MS) Modified, II, IIA, II Modified, II Prestress, III, IIIA, IV, or V) and shall be under the provisions of ASTM Designation: C595 for type IP and ASTM Designation: C150 for other types.

Type II Prestress is for the same use as Type II Modified and where low contraction in air is required. Portland cement designated Type II Prestress shall conform to the requirements of Type II Modified, except that the mortar, when tested under the provisions of California Test 527, shall not contract in air more than 0.053 percent.

Portland cement used for precast, prestressed concrete pilings and precast, prestressed concrete members shall be Type II Prestress.

Portland cement used for sanitary sewer facilities as specified in these specifications shall be Type V.

Either Type II Prestress or Type II Modified cement may be used in steam-cured concrete products.

END OF SECTION

SECTION 91 PAINT

Conform to Section 91, “Paint,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 92 ASPHALT BINDERS

Conform to Section 92, “Asphalt Binders,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

106-1 GENERAL

92-1.04 PAYMENT

Delete Section 92-1.04, “PAYMENT” of the *Caltrans Standard Specifications* and replace with the following:

Not used.

END OF SECTION

SECTION 93 RESERVED

SECTION 94 ASPHALT EMULSIONS

Conform to Section 94, “Asphalt Emulsions,” of the *Caltrans Standard Specifications and these City Standard Specifications.*

94-1.01 GENERAL

94-1.01D Quality Assurance

Delete Section 94-1.01D, “Quality Assurance” of the Caltrans Standard Specifications and replace with the following:

Take samples of asphaltic emulsions under the provisions of the City’s Quality Assurance Program (QAP).

Store samples in clean and airtight sealed containers. Storage temperature must be at least 40°F until tested.

The Engineer may waive the settlement test if the asphaltic emulsion is used in less than 5 days from the time the sample is taken.

94-1.04 PAYMENT

Delete Section 94-1.04, “PAYMENT” of the Caltrans Standard Specifications and replace with the following:

Not used.

END OF SECTION

SECTION 95 EPOXY

Conform to Section 95, “Epoxy,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 96 GEOSYNTHETICS

Conform to Section 96, “Geosynthetics,” of the *Caltrans Standard Specifications* and these *City Standard Specifications.*

END OF SECTION

SECTION 97-99 RESERVED

SECTION 100 TRENCH EXCAVATION, BEDDING AND BACKFILL

Conform to these *City Standard Specifications.*

100-1 GENERAL

100-1.01 DESCRIPTION

This Work shall consist of the excavating and backfilling of all utility trenches, including the restoration of surfaces as specified in the Contract Documents, and as directed by the Engineer.

100-1.02 PERMIT

Before any excavation within an existing City street is allowed, an Encroachment Permit shall be obtained and a copy of said permit shall be available at the Project site at all times. Signed and executed contracts for public improvements issued by the City shall constitute compliance with this section.

For utility services not owned by the City, approved permit/plans from the utility owner shall be provided to the City prior to issuance of the Encroachment Permit.

100-1.03 TRENCH WORK

Contractor shall refer to Section 7-1.01D, “Trench Safety.”

100-1.04 PROTECTION OF SURVEY MONUMENTS AND POINTS

Contractor shall refer to Section 78-2, “Survey Monuments.”

100-1.05 EXISTING UTILITIES

Under the provisions of with Section 7-1.10, "Preservation of Property," and in Section 8-1.09, "Utilities and Other Facilities," the Contractor shall protect existing facilities from damage. Any damage done to utility facilities shall be immediately reported to the respective utility owner by the Contractor, and any repair work required shall be done by such company's repair crew. Prior to backfilling, all repair work shall be approved by the Engineer.

All utility lines that cross or lie along the trench shall be adequately supported during construction and such supports left in place. Care should be exercised when backfilling around such lines to avoid any damage to them. Contractor shall replace in kind any pipeline or lateral, storm or sanitary, cut or damaged in any way. The damaged pipe shall be replaced between adjacent joints. No patching of damaged pipe will be permitted. When it is impossible to avoid damaging signal facilities installed in the pavement, notify the Engineer. Damage to traffic signal loops, pads, interconnect cables, conduits, or fire alarm conduits shall be repaired or replaced as directed by the Engineer. All traffic markers and markings damaged or destroyed shall be replaced unless otherwise directed by the Engineer.

100-1.06 BACKFILL AND SURFACE RESTORATION METHODS

Backfill and surface restoration shall be pursuant to the *City Standard Details*, unless otherwise specified in the Contract Documents.

100-1.07 DEWATERING

Trenches shall be dewatered as specified on Section 103-3, "Trench Dewatering."

100-2 MATERIALS

100-2.01 BEDDING

Bedding material shall conform to the following criteria:

Bedding Gradation

Sieve Size	Bedding Class (Gradation – Percent Passing)			
	I	II	III	IV
1”	100	100	See Section 19-3.02C, “Structure Backfill.”	100
3/4”	90-100	90-100		90-100
1/2”	---	---		
3/8”	20-55	40-100		
#4	0-10	25-40		
#8	0-5	18-33		
#30		5-15		
#50		0-7		
#200		0-4		

100-2.01A Class I

Class I Bedding shall have a Durability Index (California Test No. 229) of not less than 30. Where percent passing the #1 sieve is equal or greater than 8%, the Sand equivalent (California Test No. 217) shall not be less than 40.

100-2.01B Class II

Class II Bedding shall have a Durability Index (California Test No. 229) of not less than 40 and a Sand Equivalent (California Test No. 217) of not less than 60.

100-2.01C Class III

Class III Bedding shall meet the gradation and Sand Equivalent (California Test No. 217) requirements of Structure Backfill described in Section 19-3, “Structure Excavation and Backfill.”

100-2.01D Class IV

Class IV Bedding shall be native soils and not be bedrock, cobbles, etc.

100-2.01E Class V

Class V Bedding shall be plain or reinforced Class A Portland cement concrete, constructed as specified in the Contract Document and shown on the plans.

100-2.02 BACKFILL

Backfill material shall conform to the following:

100-2.02A Native Material

Native material shall be free of vegetation and debris and shall be free of all rocks larger than 3 inches in maximum dimension.

100-2.02B Structural Backfill

Structural Backfill shall be a mixture of clay, sands, and gravel; shall have a sand equivalent of not less than 20; and shall be under the provisions of the following grading:

Structural Backfill Grading

Sieve Size	Percent Passing
3 Inch	100
No. 4	35-100
No. 30	20-100

100-2.03 CONTROLLED DENSITY FILL

Controlled density fill (CDF) shall consist of a mixture of aggregate, Portland cement, mineral admixtures, water, and at the option of the Engineer, chemical accelerating admixtures.

100-2.03A Portland Cement

Portland cement shall be Type II Modified under the provisions of Section 90-2.02A, "General." Mineral admixtures shall not be substituted for Portland cement.

100-2.03B Water

Water shall conform to Section 90-2.02D, "Water." Chemical admixtures for accelerating shall be Type C or Type E under the provisions of ASTM C494, “Standard Specification for Chemical Admixtures for Concrete.”

100-2.03C Aggregates

Aggregate shall conform to the quality requirements of Section 90-2.02C, "Aggregates." Aggregate shall be well graded from coarse to fine. Aggregate shall have a Sand Equivalent, as tested by California Test 217, “Method of Test for Sand Equivalent,” of not less than 40.

Aggregate shall be of such size and gradation that, when mixed with Type II modified Portland cement and mineral admixtures, and tested under the provisions of ASTM C39, the compressive strength of a sample will not be less than 100 pounds per square inch at 24 hours or greater than 1,000 pounds per square inch at 28 days or as specified by the Contract Documents.

The Contractor shall notify the Engineer, in writing, of the source and grading of the aggregate to be used in the CDF. If material supplier is not approved by the City for CDF, Contractor shall make such material available to the Engineer for sampling and testing at least 45 days prior to scheduled placing of the fill. Should the Contractor change its source of supply, it shall notify the Engineer in writing of the new source and grading and make that material available for sampling and testing at least 45 days prior to intended use.

100-2.03 PROPORTIONING, MIXING, AND TRANSPORTING

The Portland cement content of the controlled density fill (CDF) shall be not less than 47 pounds per cubic yard except that, after testing samples of the Contractor's proposed supply, the Engineer may order an increase in cement content, if necessary to meet the compressive strength requirement specified above.

Proportioning for CDF shall conform to Section 90-1.02F(4), "Proportioning," except that dividing of aggregate into sizes will not be required.

Mixing and transporting CDF shall conform to Section 90-1.02G, "Mixing and Transporting Concrete." CDF shall have a slump, as tested by ASTM C 143 / C 143M-12, of not more than 10 inches.

100-2.04 SURFACE RESTORATION MATERIALS

Surface restoration materials shall conform to the applicable provisions for bases and surfacing specified elsewhere in these *City Standard Specifications*.

100-3 EXCAVATION

100-3.01 GENERAL

When excavation is within existing asphalt concrete or Portland cement concrete pavements, the edges of the trench outline shall be cut, before the trenching operation is begun, to a neat line with a cutting device approved by the Engineer.

The removal of asphalt concrete or Portland cement concrete pavements, curbs, gutters, sidewalks, or driveways shall conform to Section 17, "Clearing and Grubbing."

Excavations shall be performed in such a manner as to avoid any unnecessary damage to streets, sidewalks, landscaping, and other existing improvements or facilities.

All underground facilities, including but not limited to sewer laterals, water services, gas services and underground electrical or communication conduit crossing the trench line shall be located and exposed, if necessary, ahead of any trenching operations. All underground facilities within the limits of the Work shall be protected from damage due to construction-related activities. Excavations in the street shall be performed in such a manner that not more than one traffic lane is restricted in either direction at any time, unless otherwise provided for in the Contract Documents or any associated permits.

Excavation shall not commence until immediately before installation of the underground facilities. The material from the excavation shall be placed in a position that will not cause damage to or cause obstruction to vehicular and pedestrian traffic nor interfere with surface drainage. All existing underground utilities shall be located and identified in accordance with Underground Services Alert (USA).

Rubble/debris from the removal of asphalt or Portland cement concrete pavements, curbs, gutters, sidewalks, or driveway shall be immediately removed from the Work site.

Unless otherwise permitted in writing by the Engineer, all surplus excavated material shall be immediately removed and disposed of outside of the Project limits.

The Contractor shall not sweep construction and other debris into the storm drainage system and shall prevent such materials from entering the storm drains.

The Contractor is advised that disposal of dirt and other debris into the public storm drain system is prohibited under the provisions of the Campbell Municipal Code and other State and Federal regulations. Any fines and penalties levied against the Contractor for violation of the above and related regulations are the sole responsibility of the Contractor.

100-3.02 WIDTH AND DEPTH OF TRENCH

All trenches in existing paved areas shall be excavated vertically and shall be of sufficient width to provide free working space on either side of the applicable installation. Trench width, clear of shoring, shall be installed as specified in the Contract Documents.

100-3.03 BOTTOM OF TRENCH

The bottom of the trench, shall be graded and prepared under the provisions of the Contract Documents. Bedding shall under the provisions of Section 100-4.01, "Bedding."

100-3.04 TRENCH SHEETING, SHORING AND BRACING

Trench bracing requirements shall be as specified in Section 7-1.01D, “Trench Safety.” For Trench Plating Condition and Requirements, refer to Section 100-3.05, “Trench Plating Condition and Requirements.”

Sloping may be used as deemed necessary by the Engineer in place of sheeting, shoring, and bracing.

Additionally, if existing gas, water, telephone, sanitary sewer, storm drain, electricity, or other underground conduit, pipeline, or cable systems and related structures (e.g., manholes, vaults, etc.) or surface improvements such as curb and gutter, trees, sidewalks, foundations, concrete slabs, or pavements are endangered by caving in or sloughing in of the trench side walls, the Contractor shall install shoring, sheeting and/or bracing required to protect said facilities from damage. The Contractor shall provide shoring under the provisions of with OSHA, State Division of Industrial Safety requirements, and Section 7-1.01D, “Trench Safety.”

All excavated asphalt shall be saw-cut unless the asphalt is cold-planed or otherwise specified in the Contract Documents. The Contractor shall furnish and install all sheet piling, shoring, bracing, lagging, or other precautions against caving in or sloughing in of the sides of the trench.

100-3.05 TRENCH PLATING CONDITIONS AND REQUIREMENTS

Wherever traffic is permitted over or adjacent to trenches and other depressions, Contractor shall furnish and maintain steel plating unless other means of protecting the public and the work are accepted by the City. Plates shall be secured against movement including shifting and rocking by use of adjustable cleats, shims and other devices such as anchor and keys. No gaps between plates and other deficiencies hazardous to bicycles shall be allowed; and the existing pavement shall be protected from damage.

Steel plating shall have a non-skid surface.

Steel plates used for bridging shall extend not less than 12 inches beyond the edges of the trench.

Steel plates shall conform to the following minimum thickness:

Steel Plates Minimum Thickness

Trench Width		Minimum Plate Thickness	
12 inches	(300 mm)	.5 inches	(13 mm)
18 inches	(450 mm)	.75 inches	(19 mm)
24 inches	(600 mm)	.87 inches	(22 mm)
36 inches	(900 mm)	.98 inches	(25 mm)
3.9 feet	(1.2 m)	1.5 inches	(38 mm)

Recessed trench plates shall be used at the following locations: all arterial streets, all collector streets, at trench alignments not parallel with or perpendicular to the direction of traffic and locations determined by City Engineer to be necessary.

The Contractor shall prepare for placement of plates over trench by grinding a relief 12 inches wide on each side of the trench by the thickness of the steel plate so that the surface of the steel plate is level with the adjacent pavement surface.

100-4 BEDDING AND BACKFILL

100-4.01 BEDDING

Bedding material of the class and type designated in the Contract Documents shall be placed under and about the pipe to the depths required, except that Type D does not require bedding material.

The material supporting, surrounding, and/or extending to one foot above the top of the pipe shall be considered as bedding.

Where it becomes necessary to remove boulders or other interfering objects at subgrade for bedding, any void below such subgrade shall be filed with the class and type of bedding material designated in the Contract Documents. Where concrete is specified to cover the pipe, the top of the concrete shall be considered as the top of the bedding.

If soft spongy, unstable, or other similar material is encountered upon which the bedding material or pipe is to be placed, this unsuitable material shall be removed to a depth ordered by the Engineer and replaced with bedding material suitably densified. Additional bedding so ordered, over the amount required by the Contract Documents, will be paid for as Extra Work. If the necessity for such additional bedding material has been caused by an act or failure to act on the part of the Contractor, or is required for the control of groundwater, the Contractor shall bear the expense of the additional excavation and bedding.

Bedding material shall first be placed so that the pipe is supported for the full length of the barrel. If the pipe is laid in a rock cut, there shall be at least 4-inches of bedding below the pipe, even if Type D bedding has been indicated in the Contract Documents. Then the remainder of the bedding shall be placed.

100-4.01A Type of Bedding

Pipe shall be embedded entirely, partially, or not at all, under the following provisions:

1. Type A Bedding material shall have a minimum thickness beneath the pipe of 4 inches, or one-eighth of the outside diameter of the pipe, whichever is greater, and shall be placed around the pipe and extend up the sides of the trench to a height of 12 inches above the pipe.
2. Type B Bedding material shall have a minimum thickness beneath the pipe of 4 inches, or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the trench to the spring-line of the pipe (mid or quarter point of pipe).
3. Type C Bedding material shall have a minimum thickness beneath the pipe of 4 inches, or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the trench to the pipe haunch-line (eighth point of pipe).
4. Type D No bedding material required. Pipe shall be laid on trench bottom and backfilled.
5. Use bedding for category of pipe as follows:

Pipe Bedding Type

Category of Pipe	Type of Bedding
ABS Composite Pipe	A
ABS Solid Wall Pipe	A
Ductile Iron Pipe	C
Concrete Pipe Plain and Reinforced 24" Diameter and Less 25" Diameter and Greater	 A A
Corrugated Aluminum Pipe	A
Poly-Vinyl Chloride Pipe	A
Reinforced Plastic Mortar Pipe	A
Vitrified Clay Pipe	A

100-4.01B Placing Bedding or Initial Backfill

According to the Class and Type of bedding, the bedding material may be required to be placed and compacted in more than one lift. Class I material requires no compacting. Class II and III material requires hand or mechanical compaction. If no material is required for bedding the pipe, the initial backfill shall be carefully shaded around the pipe and carefully compacted to the haunch-line of the pipe. Precautions shall be taken to prevent movement of the pipe during placement of bedding or initial backfill.

100-4.02 BACKFILL AND SURFACE RESTORATION

Material from the bedding to the finished or subgrade shall be considered as backfill. Backfill and surface restoration shall be pursuant to the City of Campbell Details, unless otherwise specified in the Contract Documents.

When deemed necessary, the Engineer will make the final determination of backfill and surface restoration methods and materials to be used.

The type of backfill and surface restoration methods shall be as shown on the plans, or as designated on the permit, or special provisions.

No broken pavement, regardless of size, shall be permitted in any backfill. No trench shall be left open at the end of the day, unless otherwise permitted by the Engineer.

100-4.02A Main-Line Backfill and Surface Restoration

Mainline backfill and surface restoration shall be used on all sewer and other utility line trenches which are excavated in the longitudinal direction/parallel to traffic of major city streets.

100-4.02B Lateral Backfill and Surface Restoration

Lateral backfill and surface restoration shall be used on all sewer and utility line trenches which are excavated across/perpendicular to existing streets.

100-4.02C Method C Backfill and Surface Restoration

Not used.

100-4.2.D Temporary Resurfacing

Unless permanent pavement is replaced immediately, a temporary surface consisting of Asphalt Concrete, 3 inches thick, shall be placed and maintained at locations determined by the Engineer, wherever an excavation is made through the pavement. In sidewalk or driveway areas the temporary asphalt concrete surface shall be at least one-inch thick. At major intersections and other critical locations, a greater thickness of Asphalt Concrete may be required. The temporary pavement shall be constructed as soon as conditions permit and shall remain in place and maintained until the permanent restoration of pavement is constructed.

100-4.02E Mechanically Compacted Backfill

Backfill shall be mechanically compacted by means of tamping rollers, sheep's-foot rollers, pneumatic tire roller, vibrating rollers, or other mechanical tampers. All such equipment shall be of a size and type approved by the Engineer. Impact-type pavement breaker (stompers) may be permitted only over reinforced concrete pipe or ductile iron pipe.

Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage. Damage caused by the use of the permitted equipment must be repaired by the Contractor at no cost to the City.

Unless otherwise approved by the Engineer, material for mechanically compacted backfill shall be placed in lifts which, prior to compaction, shall not exceed the thickness specified below for the various types of equipment:

Lift thickness for Mechanically Compacted Backfill

Equipment Type	Maximum Lift Thickness
Vibratory equipment, including vibratory plates, vibratory smooth-wheel rollers, and vibratory pneumatic-tired rollers	One foot
Rolling equipment, including sheepsfoot (except for roadway base), grid, smooth wheel (nonvibratory), pneumatic-tired (nonvibratory), and segmented wheels	One foot
Hand-directed mechanical tampers	One foot

Mechanically compacted backfill shall be placed in horizontal layers of thickness, not exceeding those specified above, compatible to the material being placed and the type of equipment being used. Each layer shall be evenly spread, moistened, or dried, if necessary, and then tamped or rolled until the specified relative compaction has been attained.

100-4.02.F Water Densified Backfill

Not used.

100-4.02.G Controlled Density Fill

Controlled density fill (CDF) shall be placed in a manner as will assure complete filling of the trench without segregation of the fill and without pockets of entrapped air.

100-5 MEASUREMENT AND PAYMENT

The work of this section will not be separately measured for payment. Full compensation for the excavation, bedding, and backfill specified in this section shall be included in the various contract unit prices paid for pipe and structures and no additional compensation will be allowed therefor.

END OF SECTION

SECTION 101 SUBGRADE PREPARATION

Conform to these *City Standard Specifications*.

101-1.01 GENERAL

This work consists of preparing subgrades for the placement of subsequent construction such as pavements, bases, subbases, curbs, gutters, sidewalks, driveways, and other structures, which may not be specifically provided for under the provisions of the other sections of these *City Standard Specifications*.

The preparation of the subgrade may be required at various elevations, depending upon the number of layers of material specified to be placed thereon or type of structure to be constructed and as required in Section 19, "Earthwork."

101-1.02 CLASSES

Subgrade preparation is classified according to the plane or layer of material placed thereon as follows:

1. Class A. Preparation of the native or imported material at the basement grade (grading plane).
2. Class B. Preparation of any layer of new material above the basement grade (grading plane), on which a succeeding layer of material is to be placed.
3. Class C. Rehabilitation of an existing surface upon which a layer of subbase, base. pavement, surfacing, or other specified material is to be placed.

101-1.03 PREPARATION

Material shall not be placed upon the prepared subgrade until it has been inspected and approved by the Engineer.

101-1.03A Class A

The preparation of Class A subgrade shall consist of grading and compacting native or imported soil material at the basement grade. Scarifying and cultivating will be required, prior to grading and compacting for dry soils which are impervious to the penetration of water, or for soils which contain excessive amounts of moisture which may result in unstable foundations, or for soils which are non-uniform in character which may result in non-uniform compaction and subsequent differential settlements of finished surfaces, or when a pavement material is to be placed directly on native soil.

After rough grading has been completed, when scarifying and cultivating is required, the basement material shall be loosened to a depth of at least 0.5 foot. The loosened material shall then be worked to a finely divided condition and all rocks larger than 0.25 foot in dimension shall be removed. The moisture content shall be brought to optimum by the addition of water, or by the addition and blending of dry suitable material or by the drying of existing material. The material shall then be compacted by approved compacting equipment.

Uniform pervious soils, that allow the immediate penetration of water or uniform impervious soils which allow the penetration of water to a depth of at least 0.5 foot, after the addition of an approved wetting agent to the water, will not require scarifying and cultivating unless a condition previously set forth in this section requires such processing. When scarifying and cultivating are not required, the moisture content of the top 0.5 foot of the material shall be brought to optimum by addition of water at the surface, and the material shall be compacted by approved equipment.

101-1.03B Class B

The preparation of Class B subgrade shall consist of finishing the surface of any layer of material above the grading plane under the provisions of the sections for such material, as described below:

Preparation References for Class B Subgrade

Type of Material	Section
Subbases and Bases	23
Stabilized Soils	24
Aggregate Subbase	25
Aggregate Base	26
Cement Treated Base	27
Concrete Base	28
Treated Permeable Base	29
Reclaimed Pavement	30
Asphalt Concrete	39
Concrete Pavement	40
Concrete Curbs and Sidewalks	73

Portions of the subbase, base, or other material which have become damaged or destroyed since completion shall be repaired or reconstructed to the specified tolerance requirements for grade and cross section immediately prior to placing any new material thereon, or immediately prior to the application of a curing seal, prime coat, or tack coat.

101-1.03C Class C

In advance of spreading any new material on an existing surface to be rehabilitated, surface shall be cleaned of all dirt and loose material.

Broken, failed, or otherwise unsatisfactory portions of the existing surface and sections interfering with new construction shall be removed and disposed of. The areas and depths to be removed shall be as shown on the plans and as directed by the Engineer. The basement grade area in the exposed spaces shall be watered and compacted, after which the space shall be filled with subbase, base, or pavement material as shown on the plans or as directed by the Engineer.

Where shown on the plans or specified in the Special Provisions or directed by the Engineer, the existing surface shall be scarified, watered, and rolled in advance of placing any new material thereon.

Where shown in the Contract Documents, a leveling course shall be spread upon the existing surface under the provisions of the specifications for the type of material being placed, and no compensation other than the Contract Sum or prices being paid for the material will be made for such Work, unless otherwise designated.

101-1.04 CONFORM AREAS

Roadway or other areas where "grade only" or "conform" is called for in the Contract Documents, shall be graded to meet the tolerances for a base material grade. The finished surface shall be a straight grade from the finished pavement or curb elevations shown in the Contract Documents to the elevation of the existing ground at the extremities of the area graded.

101-1.05 COMPACTION

The finished subgrade immediately prior to placing subsequent layers of material thereon shall have a relative compaction of not less than 95 percent for a depth of 0.5-foot, or to a depth of 3 ft. below finished grade for engineered fill area. The subgrade for driveways, aprons, curb and gutter, and similar structures

below the aggregate or sand cushion shall be compacted to a relative compaction of 95 percent for a depth of 0.5 foot. The subgrade for sidewalks shall be compacted to a relative compaction of 90% for a depth of 0.5 foot. After compaction and trimming, the subgrade shall be firm, hard, and unyielding.

Relative compaction will be determined under the provisions of Contract Documents.

Compaction testing on City projects shall be arranged for by the City. The Contractor shall notify the Engineer 48 hours in advance of requesting compaction tests. The City will pay for all passing tests. All costs for failing tests or tests that had to be rescheduled because the Contractor was not ready shall be deducted from monies due to the Contractor.

Compaction testing on City issued permit related work shall be arranged for and paid for by the permittee. Passing compaction test results certified by a licensed laboratory will be required for all permit work, unless otherwise approved by the Engineer. Results shall be delivered to the Engineer prior to placement of any subsequent layers.

101-1.06 TOLERANCES

The finished subgrade for pavements, sidewalks, curb and gutters, driveways, aprons, and other roadway structures shall be uniform and shall not vary more that 0.02-foot from the specified grade and cross section. The finished subgrade for subbase or base material shall not vary more than 0.05-foot from the specified grade and cross section, except as otherwise specified in the appropriate sections of these *City Standard Specifications* for the material being placed.

101.107 MEASUREMENT

Where a separate pay item for Class A subgrade is designated in the Engineer's Estimate, the area of subgrade preparation to be paid for as shown on the Contract Documents. No allowance will be made for subgrade preparation outside such dimension unless ordered by the Engineer.

101-1.08 Payment

The area of Class A subgrade will be paid for at the Contract Sum. The price shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work in preparing the subgrade complete, as shown on the Contract Documents, as specified in these *City Standard Specifications* and as directed by the Engineer.

Where a Contract item is not provided for Class A subgrade and for all other subgrade preparation, no separate payment will be made for such work. Full compensation for such subgrade preparation shall be considered as included in the various Contract items of work involved and included in the Contract Sum. No additional payment will be allowed.

END OF SECTION

SECTION 102 PIPE AND STRUCTURES

Conform to Sections 202, “Masonry Materials,” 206, “Miscellaneous Metal Items,” and 207, “Gravity Pipe,” or however currently enumerated, of the most current edition of the *Greenbook: Standard Specifications for Public Works Construction*, and all supplements,(*Greenbook*), and these *City Standard Specifications*.

102-1 REINFORCED CONCRETE PIPE

102-1.01 GENERAL

It shall be the Contractor's responsibility to insure the timely delivery and proper storage of all pipe materials.

All reinforced concrete pipe (RCP) sizes refer to the nominal inside diameter of pipe (including any pipe linings) and no pipe, except where specified herein, shall deviate from the nominal size designated by more than plus or minus one percent. All pipe, pipe joints incorporated into the pipe, and manufactured fittings connecting pipe between structures shall be of one and only one manufacturer's brand and of the same type, quality, class, and size unless otherwise specified or detailed in the Contract Documents. All field cut pipe shall be accomplished by methods and equipment recommended by the pipe manufacturer. No hammer and chisel cuts will be permitted.

The Contractor shall submit at its own expense working drawings and material details of all special pipe for approval before the pipe shall be manufactured or used on the Work. All pipe and fittings delivered to the job site shall be marked by the manufacturer with such inventory and identification as to be properly identified in the field as meeting the requirements for the Work.

102-1.01A Quality Assurance/Control

The pipe manufacturer shall designate one person for Quality Assurance. It shall be that individual's responsibility to assure pipe manufacturing Quality Control. This individual shall be responsible for all pipe testing, keeping quality control records, insuring that quality assurance procedures are followed during the manufacture of the pipe, and inspecting each pipe length before leaving the plant.

Pipe shall be separated in lots of no more than 400 feet in order of manufacture. Each pipe shall be dated according to date of manufacture and numbered sequentially for each date of manufacture, pipe class indicated for each pipe, and D-load.

102-1.01A(1) D-Load Test

All pipe shall be subject to a D-load test at the manufacturer's plant. The Engineer may select at random, and test as specified one length of each class of pipe for the D-load test under the provisions of ASTM C 497. Three-edge bearing test loads shall be applied to produce a 0.01-inch crack except that applied test loading may be terminated without producing a 0.01-inch maximum crack if or when such loading has reached one hundred ten percent (110%) of that required for and relative to the specified D-load for the subject pipe.

The cost of the pipe and the tests shall be borne by the Contractor. Pipe will be acceptable under the provisions of the test requirements specified herein when all the test specimens conform to the test requirements. Should any of the test specimens fail to meet the test requirements, the manufacturer will be allowed to retest 2 additional specimens for each specimen that failed, and the pipe shall be acceptable only when all of the retest specimens meet the strength requirements.

Test results shall be submitted to the City prior to shipment to the project jobsite. Results shall indicate the specified D-load applied.

102-1.01A(2) Reinforcing Steel Placement

The pipe manufacturer shall cut a minimum of four cores, at least 2-1/2-inch diameter, as indicated in the Table of Frequency of Sampling and Testing. Two cores taken near the bell end, 180 degrees apart, and two cores taken near the spigot end, 180 degrees apart, and 90 degrees from the opposite to determine the reinforcing steel location. If the steel is misplaced more than plus or minus 1/2-inch in any one core the manufacturer shall core two other sections of pipe selected by the Engineer from the lot from which the original pipe was selected. If the four cores of each pipe retested indicates the steel is in the proper location, the remainder of the pipe in that period run will be accepted. If the steel is not in the proper place that period's run will not be accepted.

All of these cores shall be checked to determine that the reinforcing steel is completely embedded in concrete and that the concrete adheres to the steel surface. The exposed surfaces of the cores shall be inspected for concrete to reinforcing steel contact. Contact between the circumferential reinforcement and the concrete shall be considered noncontinuous if a void is found in which a 1/16-inch diameter pin can be inserted 1/4-inch deep, without undue force, between the reinforcement and concrete. The lot will be acceptable if the total number of noncontinuous contact surfaces is 10% or less of the total number of steel bars exposed by the cut. If more than 10 percent noncontinuous contact surfaces are found in the first series of cores, the manufacturer may cut an additional series of cores, and if the additional cores bring the total to 10% or less, the lot will be acceptable.

If the steel location meets the specification requirements, the pipe core holes shall be filed with approved Epoxy mortar. If all specifications requirements are met, the pipe will be accepted.

102-1.01A(3) Pipe Joint Shear Test

The shear load for the pipe joint shear test shall be 150 lb./in. of nominal diameter and shall be uniformly applied over an arc of not less than 120 degrees along a longitudinal distance of 12 inches. The assembled pipe shall rest on three supports. A support shall be located at each extreme end of the assembly. The third support shall be placed within 14 inches of the joint for flush bell pipe. The shear load shall be placed on a loading block (cradle) immediately adjacent to the joint. During these tests, the ends of the tested pipe shall be restrained only in the amount necessary to prevent longitudinal movement, and there shall be no joint leakage when tested either with water or air as described under Section 105, "Acceptance Tests for Storm Drainage Infrastructure."

Upon removal of the test load and the disassembly of the joint, neither the bell nor the spigot shall show permanent deformation or damage. If any joint tested should fail, two additional joints shall be tested. Failure of any of the additional joints so tested shall be cause for the rejection of that 400 feet of manufactured pipe.

102-1.01B Contractor Submittals

The Contractor shall submit the following to the Engineer:

1. Test Certificates or Certificate of Compliance guaranteeing that the pipe furnished hereunder is in compliance with the requirements of these *City Standard Specifications*.
2. Detailed fabrication and laying working drawings.
3. Quality Control records of test as specified herein and under the provisions the following table:

TABLE OF FREQUENCY OF SAMPLING AND TESTING

ITEM	TEST	FREQUENCY	REMARKS
Test at Manufacturing Plant:			
1.	RCP Core.	See footnote [a].	Section 102-1.01A(2), "Reinforcing Steel Placement."
2.	PVC lining Pull Test[b]	1 per 50 pipes.	Without regard to type of pipe or lot.
3.	RCP D-Load	See footnote [a]	ASTM C 497.
4.	RCP Hydrotesting, 12 PSI: for 1 hr.	See footnote [a].	ASTM C 361.
5.	Absorption.	1 core from Item #1.	ASTM C 497 Section 7, Method A, Max 7%.
6.	Concrete Strength.	5 cylinders, 6"x 12".	ASTM C 361, Section 10, Daily manufacturing cast/ Independent lab test.
7.	Aggregate.	Weekly.	ASTM C 33 except gradation shall not apply.
8.	Certification of Type II modified cement, mix design, and gasket under the provisions of ASTM C-361 Section 9.1.2.	As required.	
9.	PVC lining spark Flaw Test[b].	Each section of pipe.	15,000 VAC.
10.	PVC lining Chemical Resistance.	Certification by manufacturer permitted.	
11.	Carbonate Equivalence Test.	See footnote [a] .	Section 102-1.03 No. 5, "Carbonate Equivalence Test for Non-PVC-Lined RCP."
12.	Pipe joint shear test.	2 joints on first lot.	
Test in Field:			
13.	Joint Leakage, Air Hydrostatic test.	Each joint and each completed section.	ASTM C 1103.
14.	PVC lining spark Flaw Test[b].	Each section of pipe.	15,000 VAC.

[a] For the purpose of these *City Standard Specifications*, a lot is defined as 400 feet but no more than 50 sections of pipe, or fraction thereof, of one size and class manufactured on consecutive working days. If the 400 feet, but no more than 50 sections, of pipe are not made on consecutive working days, then only those made on consecutive working days shall be considered a lot. If an interruption in the manufacture of a lot occurs, the Engineer may permit the pipe made after the interruption to be included in the lot, provided the interruption does not last more than 7 calendar days. A new lot number will be assigned if any change occurs in the size or spacing of reinforcing steer, in the concrete mix, or in the curing method.

[b] Lined RCP pipe only.

102-1.01.C Quality Control Records

The Contractor shall, prior to pipe delivery, submit to the Engineer with two copy sets of the manufacturer's quality control records for pipe manufactured under the provisions of this section. Records shall indicate thereon:

1. The agency and technician performing the test.
2. Frequency of sampling and testing.
3. The test date.
4. The City's Job Number assigned to the project.
5. The pipe size.
6. Lot number and date manufactured.
7. Required test results and additional information as required herein.

   Each test record sheet shall be endorsed by the manufacturer, (and the agency performing the test if other than the manufacturer), as certifying compliance with this section.

Contractor shall provide video inspection of all newly constructed storm mains prior to project acceptance.

102-1.02 MATERIALS

Materials shall comply with Section 6 of the appropriate ASTM Designation under which the subject pipe is to be manufactured, modified under the provisions of the following:

1. Portland cement used in the manufacture of all pipes shall be Type II under the provisions of ASTM C 150 or Type IP under the provisions of ASTM C 595.
2. No admixtures shall be introduced to concrete mixes without specific approval by the Engineer. Approval for admixture or blend usage for pipe for a specific project shall not be considered a general use approval for subsequent projects unless stated.
3. Rubber for gaskets shall be neoprene and shall comply with the requirements of ASTM C 361.

102-1.03 Pipe Design

Design shall comply with Section 7 of the appropriate ASTM Designation under which the subject pipe is to be manufactured, modified under the provisions of the following:

1. In no case shall pipe be less than that specified under the provisions of ASTM C 76 for Class III RCP, Wall B, unless otherwise specified.
2. Joint assembly design shall be reinforced concrete bell and spigot type incorporating a fully retained, single or double rubber gasket under the provisions of ASTM C 361. Steel joint rings will not be allowed. The joint shall meet the thickness requirements of the United States Bureau of Reclamation (USBR) Type R-4 joint whether flared or flush bell pipe is supplied. Reinforcement steel shall be in each end of the pipe bell and spigot.
3. Manufacturer's design working drawings shall be submitted to the Engineer for approval prior to fabrication. Drawings shall indicate, at relative scale, concrete covers, reinforcement placements and joint assembly design. Submittals shall also include the design pipe size, D-load, Cement type, concrete strength and areas, and types and placements of reinforcement.
4. Pipe minimum and maximum lengths, except where required otherwise, shall be under the provisions of Section 3.1.2 of ASTM C 361.
5. Carbonate Equivalence Test for Non-PVC-Lined RCP: The method and procedure for determining the alkalinity content for the inner wall of RCP shall be as follows:
   5.1. A minimum of two carbonate equivalence tests shall be run on sample pipe manufactured from concrete ingredients batched each week of manufacture for each pipe size manufactured. Additional testing on different pipe sections shall be required if the carbonate equivalence results of individual tests per pipe sample vary more than 10%.
   5.2. Test samples of concrete shall be obtained from randomly selected pipe sections by drilling, using carbide concrete bits as will procure at least 5 grams of material per drilling. Sample

material shall be taken at two locations on the pipe interior at least 12 inches apart longitudinally and to the depth of the steel reinforcements, surface. (For elliptically placed reinforcements, sample material shall be taken at the minor axis as marked on the pipe.)

5.3. All drilled holes shall be repaired with cement and fine aggregate as specified and used in the manufacture of the subject pipe.

5.4. Each material sample shall be tested separately as obtained from the subject pipe. Test material shall be ground or pulverized sample material, oven dried for at least four hours at a temperature of 100 degrees plus 5 degrees Celsius prior to testing.

5.5. Testing shall involve the following equipment and procedures:

5.5.1. Equipment - Sample weighing shall be performed with a precision balance accurate to at least the nearest 10 milligrams. Liquid measures shall be performed with precision burettes accurate to at least 2/10 of a milliliter. Meters for measuring pH shall read to at least the nearest tenth of a unit. Weighing and pH meter equipment shall have been properly calibrated for correctness.

5.5.2. Test procedure - Weigh at least one gram of the test material of each sample into an appropriately sized Erlenmeyer flask and add about 100 ml of distilled water. (Place glass funnel in neck of flask to minimize spray losses). Slowly add 50 ml of Standardized 1-Normal Hydrochloric Acid per gram of test material. When effervescence has subsided, heat to boiling and boil about 1/2 minute period. Cool and add 50-100 ml distilled water. Titrate with standardized, carbonate-free, 1-normal Sodium Hydroxide solution to an end point of pH 6.8 minimum to 7.8 maximum. End point reading must be stabilized for not less than two minutes.

5.6. Calculation of Carbonate Equivalence Calculation shall be based upon the chemical reaction of equivalent weights of Calcium Carbonate, $CaCO_3$, and the liquid measures of specifically standardized acid and base tinting solutions, to the nearest tenth of one gram at the stabilized end point. The equivalence of the tested sample shall be expressed in a percentage as $CaCO_3$ to the nearest tenth of one percent.

5.7. Test results shall be submitted to the City prior to shipment to the project jobsite. Results shall indicate the:

5.7.1. Weight of the test material.

5.7.2. Actual standardized normality of the acid and citrate solutions and the test amounts used.

5.7.3. Individual sample and pipe section average equivalent $CaCO_3$ percentage.

102-1.04 CURING PROCEDURES

Cast and spun pipe shall be cured by steam or water, or a combination of both under the provisions of ASTM C 76 Section 10.2.1, 10.2.2, or 10.2.3.

102-1.05 CAUSES FOR REJECTION

Rejection of pipes shall be under the provisions of Greenbook Section 207-2.8, “Causes for Rejection,” and these *City Standard Specifications*. The quality of materials, the process of manufacture and the finished pipe shall be subject to inspection and approval by the Engineer. Pipe shall be substantially free of fractures and surface roughness. The ends of the pipe shall be normal to the walls and center line of the pipe, within the limits of variation given in Sections 12.3 and 12.4 of ASTM C 76. Pipe shall be subject to rejection as described in Section 15 of ASTM C 76, and in addition to the following:

1. Any shattering or flaking of concrete or other conditions indicating an improper concrete mix or molding.
2. PVC liner with bubbles, T-lock not properly embedded in the concrete or voids behind the PVC liner.
3. Any exposed reinforcing steel.
4. Voids around the reinforcing steel.

The Engineer's decision regarding rejection of the pipe shall be final and the rejected pipe shall be immediately removed from the jobsite at no cost to the City. Rejected pipe shall be clearly and indelibly marked accordingly so as to prevent confusion with pipe delivered under subsequent shipments.

Bell and spigot repairs shall be done with epoxy mortar only and shall be limited to normal pipe dressing operation. Any other repair in this area of the pipe shall require the prior approval of the Engineer before the repair is done. Other repairs outside of the bell and spigot shall be limited to a 12-inch square in any direction at the surface of the pipe and 3/4-inch deep.

Painting with cementitious slurry without the prior approval of the Engineer is strictly prohibited and shall be cause for rejection of the pipe.

The City reserves the right to accept damaged pipe after it has been suitably repaired at no cost to the City. Repair procedures shall be submitted by the Contractor for the Engineer's review and approval prior to performing any repair work. The Engineer's approval of any repaired pipe shall not waive the right to reject repair of any subsequent damaged pipe regardless of whether or not it is similarly damaged.

102-2 DUCTILE IRON PIPE

Ductile Iron Pipe (DIP) shall be Class 150, with compression (TYCON or equal) type joints, unless otherwise specified. DIP shall be wrapped with an 8 mils thick polyethylene under the provisions of *AWWA C105/A21.5-18 Polyethylene Encasement for Ductile-Iron Pipe Systems* for corrosion resistance.

102-3 PIPELINE STRUCTURES

Pipeline structures shall conform to the requirements of these *City Standard Specifications*. All manhole structures shall be watertight. Eccentric manholes will not be allowed unless permitted by the Engineer.

Concrete for drainage structures shall be Class A with Type II cement under the provisions of ASTM C 150 or type IP under the provisions of ASTM C-595.

Manholes shall be provided with covers to prevent the intrusion of debris into the sewer pipe as soon as the manhole is constructed or as directed by the Engineer. This measure does not relieve the Contractor from his duties to alert the public about hazardous conditions as specified in these *City Standard Specifications*.

Manholes shall have non-rocking manhole frame and covers, as shown on Standard Detail C-15, “Manhole Frame and Cover,” unless otherwise noted on the plans.

All manholes shall be provided with concrete collars to hold the frame firmly in place.

Bolt-down manhole covers shall be used when manholes are not located in the roadway.

102-4 MEASUREMENT AND PAYMENT

The work of this section will not be separately measured for payment. Full compensation for the materials specified in this section shall be considered as included in the various Contract unit prices paid for pipe and structures, included in the Contract Sum, and no additional compensation will be allowed therefor.

END OF SECTION

SECTION 103 PIPE INSTALLATION

Conform to these *City Standard Specifications*.

103-1 GENERAL

103-1.01 DESCRIPTION

This work shall consist of laying pipe in trenches or jacking pipe and making joints as required to complete the pipe installation, as specified in the Contract Documents, and as directed by the Engineer.

Trenches shall be excavated, trench bottom prepared, and bedding placed and compacted as specified in Section 100, "Trench Excavation, Bedding, and Backfill."

Bell holes shall be excavated at each joint, if necessary, to provide full length barrel support of the pipe and to prevent point loading at the bells or couplings.

Fill material or trench subgrade beneath the pipe shall be graded and shaped to provide uniform and continuous support beneath the pipe at all points between the bell holes or pipe joints.

Unless otherwise specified or directed by the Engineer, all pipe shall be laid straight between the changes in alignment and at uniform grade between changes in grade. For concrete pipes with elliptical reinforcement, the pipe shall be placed with the minor axis of the reinforcement in a vertical position.

Attention is directed to Section 100-1.05, "Existing Utilities," for requirements relating to protection of existing facilities.

103-2 MATERIALS

Materials shall conform to the requirements of Section 102, "Pipe and Structures," and the requirements of this section.

103-3 TRENCH DEWATERING

At all times, groundwater and surface runoff shall be controlled to maintain the trench in a stable condition during construction.

At the time of laying pipe, the prepared trench shall be in a firm and dry condition. If trench is not in such condition, the Contractor shall furnish and operate such pumps or other devices as may be necessary for removing ground water from trenches during the construction of pipeline system. Additionally, excavation for concrete structures or trenches, which extends down to or below groundwater shall be dewatered by lowering and keeping the groundwater level 12 inches or more below the bottom of the excavation.

If pumping is used to control and remove water, electric power for pumps shall use PG&E temporary drop service points. Using City power supply for dewatering facilities will not be permitted. The Contractor shall be responsible for coordinating drop service points with PG&E and shall pay all costs of the required temporary drop service points. Use of electric generators to operate dewatering pumps will be permitted only between the hours of 8:00 AM and 5:00 PM.

Non-contaminated groundwater shall be discharged to the storm drainage system under the provisions of the Contract Documents and in compliance with other local, State, and Federal requirements. Prior to discharging all necessary permits and regulatory documentations, such as the Notice of Intent from San Francisco Bay Regional Water Quality Control Board must be in place.

Groundwater shall be treated in a sedimentation system providing a minimum of 30 minutes detention time before discharge. Settled solids shall not be discharged. The rate of discharge for groundwater shall be controlled so as not to cause surcharging of the storm drain system or erosion of the downstream streambed.

When shown on the plans, or ordered by the Engineer, a filter blanket of pervious material or permeable material under the provisions of Section 19-3.02D, "Pervious Backfill Material," shall be placed per the dimensions shown on the plans or to a depth ordered by the Engineer. If the filter blanket is ordered by the Engineer, it will be paid for as Extra Work.

103-4 PIPE LAYING

103-4.01 GENERAL

Regardless of the type of pipe shown on the plans or as specified in the special provisions, the standard procedures for pipe laying specified herein shall apply.

Pipe will be inspected in the field before and after laying. If any cause for rejection is discovered in a pipe after it has been laid, it shall be subject to rejection. All corrective work shall be approved by the Engineer and shall be at no cost to the City.

When connections are to be made to any existing pipe, conduit, or other appurtenances, the actual elevation or position of which cannot be determined without excavation, the Contractor shall excavate for, and expose, the existing improvement before laying any pipe or conduit. Contractor shall obtain approval of proposed field connections from the Engineer before cutting into any existing drainage structures. All connections into existing structures shall be watertight.

Any adjustments in line or grade which may be necessary to accomplish the intent of the plans shall be made, and the Contractor will be paid for any additional work resulting from such change in line or grade as Extra Work.

Pipe shall be laid from downstream to upstream.

Corrugated metal pipes shall be laid with external laps of the circumferential seams toward the inlet end. Corrugated pipes shall be shipped and handled in such a manner as to prevent damage to protective coatings.

Pipe shall be laid to plan line and grade, within uniform bearing under the full length of the barrel of the pipe. Suitable excavation shall be made to receive the socket or collar which shall not bear upon the subgrade or bedding. Any pipe which is not in true alignment or shows any undue settlement after laying shall be taken up and re-laid at no cost to the City.

At the close of work each day, or whenever the work ceases for any reason, the end of the pipe shall be securely closed unless otherwise permitted by the Engineer.

The Contractor shall be responsible for performing any work necessary to correct any settlement of a restored excavation that may occur within one year from the date of acceptance of the project. Any such work shall be performed at the Contractor’s sole expense and shall have prior authorization from the Engineer.

103-4.01A Storm Drain Laterals

All laterals shall be laid to a grade of l/4-inch vertical rise to 1 foot run of pipe, (2%) slope, unless otherwise specified by the Engineer.

103-4.02 FIELD JOINING OF PIPE

103-4.02A General

Materials for pipe joints shall conform to the applicable requirements of Section 102, "Pipe and Structures."

Pipe joints shall be handled and assembled under the provisions of the following general requirements:

1. Care shall be taken to avoid dragging the spigot on the ground or allowing it to be damaged by contact with gravel, crushed stone, or other hard objects.
2. Joint mating surfaces shall be cleaned immediately prior to joining.
3. Joining of pipe sections shall be under the provisions of the manufacturer's or industry recommendations for the type of joints used and as specified herein.
4. All joints shall be formed so that when the pipe sections are drawn together the system shall be continuous, uniform, and watertight.

103-4.02B Concrete Pipe Joints

The ends of concrete pipe (reinforced or nonreinforced) sections shall be so formed that when properly laid together they will make a continuous and uniform line of pipe. The joints shall be such design as will permit placement without appreciable irregularities in the flowline and capable of being sealed to prevent leakage or infiltration.

Unless otherwise specified in the Contract Documents, concrete pipe shall be joined with rubber gasketed joints.

1.03-4.02B(1) Rubber Gasketed Joints

Gasket type joints shall be watertight and flexible. Each joint shall contain a solid gasket of neoprene or other material approved by the Engineer, which shall be the sole element responsible for water tightness of the joint. When laying the pipe, the bell end of the pipe shall be laid with the bell upstream. The gasket and bell shall be thoroughly cleaned and then lubricated with a soft vegetable soap compound. The gasket shall be stretched evenly when it is installed on the pipe. The spigot end of the pipe to be laid shall be inserted into the bell end of the previously laid pipe. For pipe in which the inside joints are to be pointed, suitable spacers shall be placed against the inside shoulder of the bell to provide the proper space between the abutting ends of the pipe. After the joint is assembled, a feeler gage shall be inserted between the bell and the spigot, and the position of the gasket checked around the complete circumference of the pipe. If the gasket has been improperly placed the pipe shall be withdrawn and the joint remade. The gasket shall not be reused if damaged.

103-4.02C Cast and Ductile Iron Pipe Joints

The type of joint to be used will be indicated on the plans or in the special provisions in the Contract Documents and shall be installed as specified by the manufacturer.

103-4.02D Corrugated Metal Pipe Joints

Corrugated metal pipe shall be joined with coupling bands. The separate sections of pipe shall be laid in the trench with outside laps of circumferential joints upgrade, with longitudinal laps positioned other than in the invert, and with a maximum spacing between sections of 1-1/2-inches. The sections shall then be joined with coupling bands. Corrugations or projections on the coupler shall properly engage the pipe corrugations of each section before bolts are tightened.

Paved inverts shall be placed and centered on the bottom of the trench. Any damage to the protective lining and coating shall be repaired prior to the backfilling around the pipe.

If waterproof joints are called for in the Contract Documents, the caulking compound or other waterproofing material used shall be subject to the approval of the Engineer.

Where hydraulic structures such as manholes are constructed in conjunction with corrugated metal pipe, the ends of pipes shall penetrate through structure walls and be placed flush or cut off flush with the structure face, unless otherwise directed by the Engineer.

103-4.02E Poly-Vinyl Chloride Pipe Joints

Poly-Vinyl Chloride pipe shall be sealed with rubber sealing ring pre-molded in the bell of the pipe for sewer pipe or with insertable rubber sealing rings for pressure pipe. Lubricant shall be applied to spigot end of pipe. The pipe shall be assembled to coupling by using a bar and wood block or level or friction pullers. The spigot end shall be pushed in until the reference mark on the spigot end is flush with the end of the bell. The pipe lengths in the trench shall be continuously supported between bell holes.

103-4.02F Reinforced Plastic Mortar Pipe Joints

Reinforced Plastic Mortar pipe shall be sealed with a rubber sealing ring installed in a factory-formed groove in the spigot end of the pipe section. The mating areas of the pipe shall be wiped clean, including the groove for the rubber sealing ring. The rubber ring shall be installed in groove. Assemble pipe sections by stabbing, bar and wood block or level or friction pullers making sure spigot end in firmly seated to the shoulder of the bell end of a joining pipe.

103-4.02G Acrylonitrile-Butadiene-Styrene Composite Pipe Joint

Acrylonitrile-Butadiene-Styrene (ABS) composite pipe shall be joined and sealed by solvent cement joint coupling and installed as herein specified. Apply a coat of primer to the inside of the socket and to the outside of the spigot end of pipe. Without delay, apply a coating of cement to the same surfaces in sufficient quantity that when the spigot is fully inserted into the socket, a bead of excess cement will form around the complete circumference of the outside juncture of the spigot and socket. Remove excess cement. The pipe lengths in the trench shall be continuously supported between joints.

103-5 JACKING

103-5.01 GENERAL

Before starting excavation, the Contractor shall submit working drawings of jacking pit bracing, casing, or conduit, and jacking head proposed to be used.

Unless otherwise specified, the methods and equipment used in jacking, casing, or pipe shall be optional with the Contractor, provided that the proposed method is approved by the Engineer. Such approval, however, shall in no way relieve the Contractor of the responsibility for making a satisfactory installation meeting the criteria set forth herein. Only workers experienced in jacking operations shall be used in performing the work.

The leading section of casing or pipe shall be equipped with a jacking head securely anchored thereto to prevent any wobble or variation in alignment during the jacking operation.

The driving ends of the casing or pipe shall be properly protected against spalling and other damage, and intermediate joints shall be similarly protected by the installation of sufficient bearing shims to properly distribute the jacking stresses. Any sections of casing or pipe conduit showing signs of failure shall be removed and replaced with a new precast section or with a cast-in-place section, which is adequate to carry the loads imposed upon it.

Excavation shall not be made in excess of the outer dimensions of the casing or pipe being jacked unless approved by the Engineer. Every effort shall be made to avoid any loss of earth outside of the jacking head. Excavated material shall be removed from the casing or pipe as excavation progresses, and no accumulation of such material within the conduit will be permitted.

Once the jacking operation has commenced, it shall be continued uninterrupted around the clock until the casing or pipe has been jacked between the specified limits. This requirement may be modified if the Contractor submits to the Engineer for prior approval methods and details that shall prevent the "freezing" of the casing or pipe and ensure that the heading is stable at all times.

Upon completion of the jacking operations, all voids around the outside face of the casing or conduit shall be filled by grouting.

Grouting equipment and material shall be on the Project site before jacking operations and drilling of grout holes are completed in order that grouting around the jacked casing or conduit may be started immediately after the jacking operations have finished.

Should appreciable loss of ground occur during the jacking operation, the voids shall be backpacked promptly to the extent practicable with soil cement consisting of a slightly moistened mixture of one-part cement to 5 parts granular material. Where the soil is not suitable for this purpose, the Contractor shall import suitable material at no cost to the City. The soil cement shall be thoroughly mixed and rammed into place as soon as possible after the loss of ground.

103-5.02 TOLERANCES

Pipe and casing shall be jacked true to line and grade. When a pilot tunnel is required to be constructed in connection with jacking reinforced concrete pipe, variations of the pilot tunnel from theoretical alignment and grade shall not exceed 0.25 percent of the distance from the jacking point to terminus of pilot tunnel, unless otherwise shown on the plans or specified in the special provisions or specified in the Contract Documents.

103-6 MEASUREMENT

The Work performed under the provisions of this section will be listed in the contract item by pipe size, type, thickness, or whatever information is necessary for identification.

The length of the various pipes to be paid for will be the horizontal length in linear feet measured from centerline-of structure to centerline of structure or terminus. Laterals to be paid for will be the horizontal length in linear feet from inside face of structure or terminus. Stub outs will be measured per linear foot and paid for by length designated on the plans or the length actually installed if ordered by the Engineer.

Pipe bends, wyes, tees, and other branches will be measured and paid for per each of the actual number installed.

If the Contract item is provided for, jacked casing will be measured per linear foot and paid for by the actual length of casing installed.

103-7 PAYMENT

The length of pipes and casing measured as specified in Section 103-6, "Measurement," will be paid for at the Contract unit price, per linear foot for the various types, sizes, and classes of pipe or casing installed and is included in the Contract Sum.

Except when a Contract item is provided for jacked casing the cost of furnishing and jacking casing in place shall be included in the Contract price per linear foot for that portion of the pipeline to be installed within the casing.

The above prices and payments shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing various sizes and classes of pipe including excavating, furnishing, and placing backfill, jacking pipe or casing, connecting new pipe to existing facilities, restoration of pavement, testing, flushing and cleaning, complete in place as shown and specified in the Contract Documents, and as directed by the Engineer.

Structures installed in connection with the pipe main or where otherwise shown separately on the plans will be measured and paid for under the provisions of Section 104, "Storm Drain Infrastructure."

END OF SECTION

SECTION 104 STORM DRAIN INFRASTRUCTURE

Conform to these *City Standard Specifications*.

104-1 GENERAL

104-1.01 DESCRIPTION

This work shall consist of furnishing all necessary material, equipment, and labor for the construction of manholes, drainage inlets, flushing inlets, and other sewer drainage appurtenances, as shown on the plans, under the provisions of Contract Documents, and as directed by the Engineer. The type of structures will be as designated on the plans.

104-1.02 EXISTING FACILITIES

Existing sewer drainage facilities shall be adjusted to grade, remodeled, or abandoned as shown on the plans and under the provisions of Section 15, "Existing Facilities."

New frames, grates and covers shall be set on new structures.

104-2 MATERIALS

Conform to the requirements of Section 102, "Pipe and Structures."

104-3 INSTALLATION

104-3.01 MANHOLES

Manholes shall consist of cylindrical barrel sections, concentric tapered cones, and grade ring sections. Manholes shall be sound, watertight structures constructed under the provisions of the Contract Documents.

Cones for manholes shall be eccentric and shall have plastic steps when rim to floor height is greater than three (3) feet.

The various shaft sections shall fit together readily, and all jointing and connections shall be cemented with mortar or joined with rubber gaskets or mastic joint fillers. All mortar joints shall be troweled smoothly on the inside face and shall be watertight.

The rubber ring gaskets shall be installed so as to form a flexible watertight seal. The mastic joint filler shall be applied under the provisions of the manufacturer's recommendations so as to form a watertight seal.

The shaft sections and cone shall be combined in such a manner that a maximum height of the throat or neck is no more than 18 inches to finished grade, the measurement shall include the manhole frame casting.

All manholes shall be waterproofed by applying a coat of sodium silicate, or other approved waterproofing agent, to the interior surfaces. The waterproofing agent shall contain a dark green pigment and shall be not soluble in water and shall be easily recognizable.

104-3.01A Foundation

After excavation is completed and approved, a cast-in-place foundation or base block shall be constructed. The excavation for the foundation shall be level and of sufficient width and depth to accommodate the foundation dimensions specified herein.

The foundation specified shall be of such width that the outside edges shall be a minimum of 3 inches beyond the outside wall of the manhole wall at all points and be of such depth that it is a minimum of four inches under the outside bottom of the lowest pipe in the foundation and a minimum of three inches over the outside top of the highest pipe in the foundation.

The concrete for the foundation shall be placed continuous and deposited in such a manner that segregation of material does not occur. Once deposited, the concrete shall be consolidated mechanically so as to secure a dense watertight mass. Before final set of the concrete, a keyway shall be made in the top of the foundation block by use of a metal form ring. The keyway in the foundation block will only be required for precast manholes.

Whenever possible, the foundation shall be formed around the pipe running continuously through the manhole.

When the pipe cannot be run continuously through the manhole base foundation invert channels shall be shaped and troweled smooth, with transitions, of line and grade, from one pipe to another. The channels shall conform to and be of such width equal to the inside diameter of the pipes.

The top of the foundation, from inside face of manhole, shall be shaped to slope toward the channels at the rate of one inch per foot minimum.

104-3.01B Manhole Frame Casting

The manhole frame casting shall be permanently set when so authorized by the Engineer. The frame casting shall be centered on the manhole neck and set on a layer of mortar. The mortar shall be neatly struck. In flexible pavement areas a concrete collar shall be poured around the manhole neck from the top of the casting to the top of the cone section so as to securely anchor the frame to the manhole neck. The collar shall be of uniform width at least 4-inches wider than the flange of the casting.

Contractor shall refer to Section 15-1.01F, “Frames, Covers, Grates, and Manholes,” for protecting existing facilities.

104-3.02 FLUSHING STORMWATER CLEANOUTS

Eight inch diameter flushing cleanouts shall be installed for purpose of flushing underdrains and overflow pipes for stormwater treatment facilities. Riser pipes and fittings shall be of PVC or the same material and joined in the same manner as the main to which it connects.

Cleanout at the terminal end of a main shall be a vertical riser joined by a 90-degree elbow. Such elbow shall be encased in concrete. Cleanouts along the main shall be connected using wye connectors.

Vandal proof caps shall be installed at all open ends of flushing stormwater cleanouts.

104-3.03 DRAINAGE INLETS

Drainage inlets or catch basins shall be of the type specified and constructed or installed at the locations shown on the plans, the standard plan details, and under the provisions of the Contract Documents. All installations shall include a “No Dumping – Flows to Bay” medallion or other types of placards as approved by the Engineer. Reinforcement shall be under the provisions of Section 52, “Reinforcement.”

104-3.03A Cast-In-Place

Cast-in-place drainage inlets shall be constructed on a compacted subgrade with the natural earth bank serving as the outside form. All other forming and placing of concrete shall conform to Section 51, "Concrete Structures." The interior bottom shall be shaped accurately so as to be smooth, uniform, and cause minimum resistance to flowing water. The bottom, from inside walls, shall be sloped toward the outlet.

Hooded curb inlets shall be constructed in two phases. The bottom pour shall be low enough to accommodate installation of the hood without bending the hood legs. Inlets shall have plastic steps when grate to floor height is greater than three (3) feet. Grates shall be bicycle proof. Hooded drainage inlets shall be flush against the edge of pavement with a consistent flowline along the curb, gutter, and inlet. The sides and bottom of the inlet shall be poured monolithically with the height of the sides below the grade of

the bottom of the curb and gutter. The castings shall be set along with the forming of the curb and gutter and poured along with or after installation of the curb and gutter.

Flat grate inlets shall be constructed in a single phase.

104-3.03B Precast

Precast inlet structures shall be set on a previously placed or constructed concrete slab foundation. The foundation shall be 6-inches thick and 3-inches wider than outside dimensions of the precast structure.

Provisions shall be made for connections for pipe laterals to be installed in the structure. All joints between vertical sections and openings around pipes shall be grouted with cement mortar.

The top of the inlet shall be accurately set to line and grade as shown on the plans.

104-3 MEASUREMENT

Quantities of the various type of manholes, flushing inlets and drainage inlets will be determined as units from actual count of the item complete and in place, including castings.

104-4 PAYMENT

Items of work, measured as specified in Section 104-3, "Measurement," will be paid for at the contract unit price each by type for manholes, drop manholes, flushing inlets and drainage inlets and included in the Contract Sum. The above prices and payments shall be full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in constructing the manholes and inlets, complete in place, including connections to pipes and other structures, as shown on the plans, under the provisions of the Contract Documents, and as directed by the Engineer.

END OF SECTION

SECTION 105 ACCEPTANCE TESTS FOR STORM DRAIN INFRASTRUCTURE

Conform to these *City Standard Specifications*.

105-1 GENERAL

105-1.01 DESCRIPTION

This work shall consist of testing storm sewers for leakage and deflection, and the furnishing of all necessary materials and equipment required.

This work shall be accomplished as specified in the Contract Documents and as directed by the Engineer.

Leakage test shall be performed on the entire storm sewer main installed, with the length of each test section limited to the pipe segment between manholes.

105-1.02 PREPARATION OF STORM SEWER SYSTEM

Prior to performing leakage tests for acceptance, the storm sewer system installation shall be completed (laid, backfilled and compacted), and cleaned. Cleaning of the storm sewer system shall be under the provisions of Section 106, "Cleaning Storm Drain Infrastructure."

105-2 TELEVISION INSPECTION

This section shall also apply to the installation of storm sewer within the City.

105-2.01 GENERAL

After all testing specified in this section has been satisfactorily completed, the entire tested storm sewer shall be given a television inspection. The Contractor shall inspect internal storm sewer mains by color television camera and the inspection shall be recorded in digital medium, as specified hereinafter. Cleaning of the existing storm sewer shall be performed prior to the television inspection by a separate operation.

The Contractor shall make a continuous color digital recording or each pipe segment inspected. The Contractor shall store a single video file for each pipeline inspected. Video recordings shall be in ISO/IEC 14496, *Information Technology Coding of Audio-visual Objects* file format (MPEG-4). The recorded files shall have a minimum resolution of 720 x 480 pixels and a frame rate of a minimum of 24 frames per second. The running footage distance shown on the video shall be the distance traveled by the camera in the pipe from manhole wall to manhole wall. Each video shall include the slow panning of upstream and downstream manholes, with focused attention to significant defects or conditions of note. The Contractor shall pause the digital recording at any time there is a delay in the inspection and restart the digital video recording in the same digital file. The pause shall in no way affect, freeze, or interrupt the replay of the video and shall not close the video file during the inspection.

A written log in City of Campbell Standard Television Inspection format (available from the Engineer) shall accompany the recording. Including the following information shall accompany the recording provided to the Engineer:

1. Date
2. Video Number
3. Location
4. Pipe Material and Size
5. Name of Equipment Operator
6. Name of Firm Performing the Inspection
7. All deficiencies in the sewer installation shall be noted and their location referenced to their on-screen footage readout

The recording and accompanying report shall be delivered to the Engineer not later than 24 hours after completion of the inspection. The recording and report shall then become the property of the City. The Engineer will review the recording and will notify the Contractor of the following:

1. The review revealed a satisfactory installation.
2. The review revealed deficiencies.

The Contractor may review the recording by requesting and arranging the review with the Engineer.

All corrective measures proposed by the Contractor shall be approved by the Engineer.

Upon completion of repairs, the sewer main shall again be videoed and the recording provided to and reviewed by the Engineer. This process shall be repeated until the review of the recording reveals a satisfactory installation.

105-3 MEASUREMENT AND PAYMENT

The work specified in this section will not be separately measured for payment. Full compensation for the acceptance tests specified in this section shall be considered as included in the various Contract unit prices paid for storm sewer pipe, is included in the Contract Sum, and no additional compensation will be allowed therefor.

END OF SECTION

SECTION 106 CLEANING STORM DRAIN INFRASTRUCTURE

Conform to these *City Standard Specifications*.

106-1 GENERAL

106-1.01 DESCRIPTION

This work shall consist of flushing and cleaning of installed storm drain infrastructure, and the furnishing of all necessary materials and equipment required, under the provisions of the Contract Documents and as may be directed by the Engineer.

106-2 FLUSHING AND CLEANING

106-2.01 GENERAL

After the storm pipe has been installed and the trench backfill has been completed, the Contractor shall flush and clean all mains, laterals, manholes, and catch basins to be free of all debris. The Contractor shall install screens in a downstream manhole to collect debris. All debris shall be collected in a downstream manhole and shall not be allowed to migrate to other portions of the system or outfall. The Contractor shall remove and dispose of all debris collected.

106-2.02 CLEANING WATER

The Contractor may use fire hydrants with temporary meters obtained from the San Jose Water Company (SJWC) to supply water for this cleaning. The Contractor will be required to contact SJWC to complete a hydrant meter application and obtain a fire hydrant flow meter. The Contractor will be responsible for paying all applicable deposits, meter rental cost, water use fees, etc. for use of the meter and water.

106-3 MEASUREMENT AND PAYMENT

The work specified in this section will not be separately measured for payment. Full compensation for providing all of the items necessary to accomplish the cleaning of storm drain infrastructure under the provisions of these specifications, the Contract Documents, and as directed by the Engineer shall be considered to be included in the various Contract unit prices paid for the storm pipe, included in the Contract Sum, and no additional compensation will be allowed therefor.

END OF SECTION